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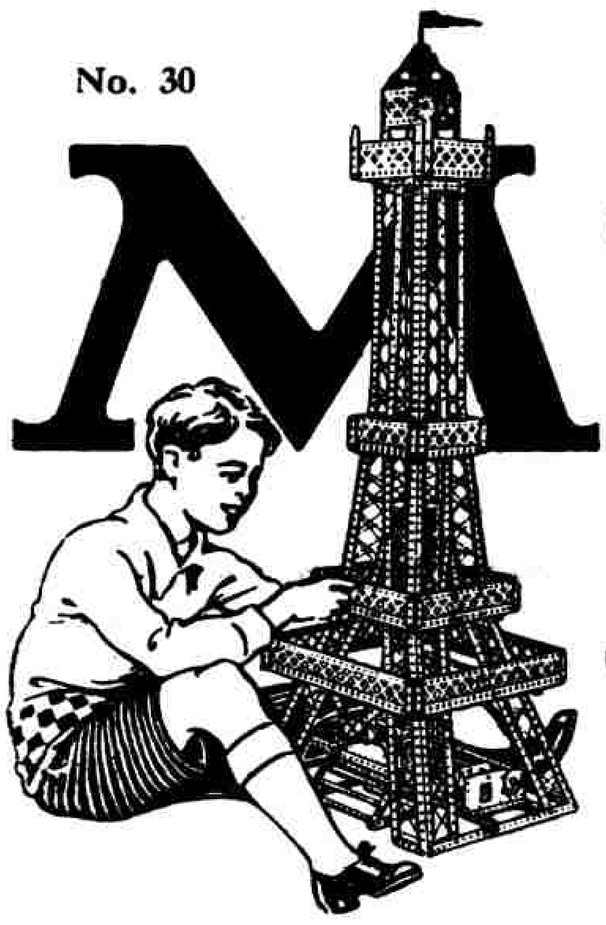


MECCANO MAGAZINE

PRICE 1d

PUBLISHED IN THE INTERESTS OF BOYS

Special Articles in this Issue

Two Famous Locomotives
Meccano Helps to Invent Motor Cycle
The Thermionic Valve
The Armstrong Circuit
Message from Dr. J. R. Fleming, F.R.S.
Radio Installation on Trains

BOYS and men may be broadly divided into two classes. One includes those who are content to go through life in a haphazard way, and who do not accomplish anything in particular. The other includes those who possess the power that enables them to achieve results, often the seemingly impossible. We have only to look through the pages of history to find that none of the men belonging to the former class are mentioned. It is the men who overcome difficulties, the men who are unaffected by disappointments, who make history.

Men who Make History.

What ship's captain would set out, even on the shortest voyage, without a compass? He would say, probably very forcibly, that without a compass it is impossible to navigate his ship. Yet there were expert navigators long before the mariners' compass was invented. Over 2,000 years ago the Phœnicians sailed through the Mediterranean, coming to this country to exchange dyes, ivory and spices, for tin from the Cornish mines. These adventurous sailors had no compass to guide them over the strange seas, and yet they accomplished what a first-class mariner to-day would hesitate to attempt.

Steering without Compass.

Pizarro, faced with starvation, mutiny and death, overcame all difficulties in conquering Peru. Searching for riches and fame, he was stranded on a small island with but thirteen followers and without food. Suffering untold hardships, from which the only hope of relief seemed to be to turn back to Panama, the dauntless Spaniard traced a line in the sand with his sword. "Friends and comrades," he said, "on this side, the south, are toil, hunger, storm, desertion and death. On this side, the north, ease and pleasure. There lies Peru with its riches—Panama with its poverty. Each man must make his choice. For my part I go to the south." Saying which, he stepped across the line in the sand; and every one of his men followed him—to success.

Pizarro of Peru.

Alone on the vast expanse of the Atlantic, and surrounded by a gang of mutineers intent on murdering him, Columbus quelled the discontent of his men. Inspiring new confidence in their hearts, he sailed on and on—to discover a New World.

During the American Civil War, General Grant made desperate but forlorn attempts to capture the fort at Vicksburg. He encountered every conceivable obstacle, and for months on end his efforts were without hope of success. At last, however, the fortress surrendered, and Grant, crowned with glory, lives to-day as one of the greatest men in American history.

A Great General.

History is full of examples of how courageous men, hopelessly handicapped and faced by apparently unsurmountable obstacles, were buoyed up by the courage of their convictions so that they turned failure into success; defeat into victory.

The secret of the success of each great man of history is that he did not wander aimlessly through life. He had a plan and made up his mind to follow it, even although at times unforeseen obstacles arose that tempted him to forsake his plan and take an easier course It is the overcoming of all obstacles that is responsible for the joy of everything worth having in the world. It is determination that enables us to overcome even the greatest obstacles, that makes possible the accomplishment of any achievement, no matter how impossible it may seem.

Work with a Plan.

GREETINGS

Mr. Hornby and the Editor wish to thank the numerous readers of the "*M.M.*" who have sent Christmas and New Year cards from all parts of the world. Owing to the large number of greetings that have been received it is impossible to acknowledge them individually, and it is hoped the senders will accept this announcement as an acknowledgment.

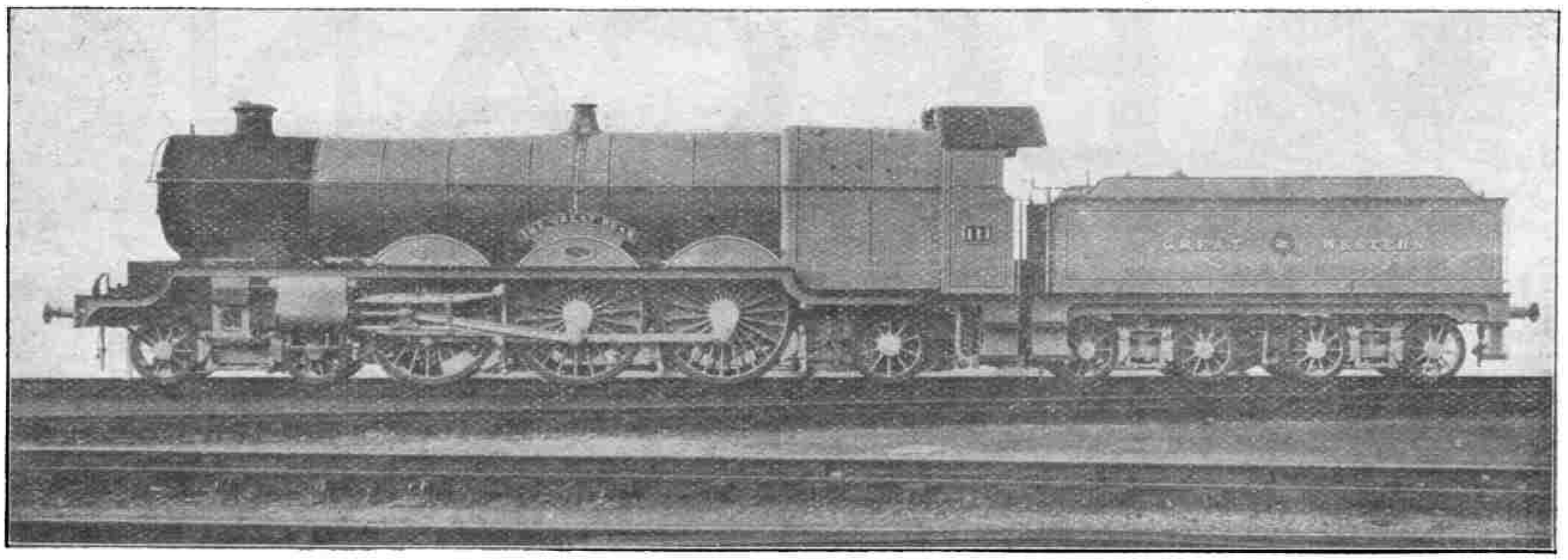
Every good wish for the New Year is sent to all our readers.

Before long you boys will find yourselves in one of these two classes. Which is it to be? Will you be content to stand by, while others achieve the impossible; or will you form your plan in life and make up your mind to follow that plan, so that when you become a man you will belong to that class of men who do great deeds? Weak men dislike anything that savours of opposition and go out of their way to avoid it. Only the determined men find pleasure in overcoming difficulties and take a delight in facing obstacles. Like Pizarro, Columbus, and Grant they achieve the impossible in their business and in their home life, and experience the reward that comes to the victor of a hard fight.

Joys of Conquest.

Super Locomotives and Their History

WHAT THE FUTURE HOLDS FOR US



Photograph by permission of the [*Great Western Railway Co.*

The 'Pacific' Type: *"The Great Bear."*

There is no more interesting subject than the study of the various types of locomotives and of the details of their construction. It makes a train journey a great deal more interesting if we know that our train is being hauled by a locomotive belonging to some famous class. The boy who understands the difference between locos., and the method of their classification, is able to entertain his friends with much information.

AMONG the several famous locomotives in this country there is none more interesting than the "*Great Bear*" and the "*Great Northern*," owned respectively by the Great Western and the Great Northern Railway Companies. Both these locomotives belong to the 'Pacific' type, of which type the "*Great Bear*" was the first example in this country.

In no department of engineering has there been greater advances than in the development of the locomotive. To realise this we have only to compare prints of the famous "*Rocket*" of barely a hundred years ago, with the photographs of locos. of to-day. Locomotive engineers have indeed gone "from strength to strength," and one type leading to another, improvement after improvement has been added. It is sometimes difficult to imagine that locos. of the later types are related to, and have evolved from, some of the earlier types, for the resemblance between the two extremes is often very remote.

In the early days, nearly all express engines were driven by one pair of driving wheels only. Modern locomotives have to pull heavier loads, however, and coupled wheels are generally used to enable the engines to obtain the necessary grip on the rails.

How Locomotives are Classified.

As most readers of the "*M.M.*" know, engines are classified by a numeral system. In this system it is considered that every locomotive has wheels of three kinds:—carrying, driving and trailing wheels. Both the carrying and trailing wheels may consist of either one pair of wheels, or of a four-wheeled bogie. On the other hand, there may be neither the one nor the other. The driving or coupled wheels may be two, four or six in number.

Classification is indicated by numbers, such as 4–6–2. The reference always commences from the front, or chimney end of the engine. The numbers 4–6–2 means that the loco. to which they refer has two pairs of carrying wheels in front (4 wheels) as a leading bogie, three pairs of driving wheels coupled together (6 wheels) and one pair of small trailing wheels under the fire-box (2 wheels)—hence 4–6–2. Engines of the 'Pacific' type belong to this class, four carrying wheels, six coupled driving wheels and two trailing wheels. Engines of the 'Atlantic' type are designated 4–4–2 because they have four carrying wheels, four coupled driving wheels and two trailing wheels.

Should there be no trailing wheels the figure 0 is used and—in the case of the 4–6–2 class—if the trailing wheels were removed the designation would then become 4–6–0. Should the same type of engine have no carrying wheels in front, the designation would be 0–6–2. Engines with three pairs of wheels coupled and no carrying or trailing wheels, such as are used in goods traffic would be designated, 0–6–0.

Continental Classification.

On the Continent a similar classification is used, except that engines are described according to the numbers of their axles, instead of the numbers of their wheels. Thus the numbers are just half those in the British classification, 4–6–2 becoming 2–3–1, and so on.

As we have not sufficient space in this article to describe the many different types of locomotives, we must confine our remarks to two of the more interesting. In the first of these, the 4–4–2, known as the 'Atlantic' type, there is a bogie in front, followed by four wheels coupled and one pair of small trailing wheels below the fire-box. These engines have three cylinders one being inside and two outside the frame.

A Wonderful Invention.

The 'Atlantic' type was first introduced into this country in 1898 in order to obtain a larger boiler. The diameter of boilers had been steadily increasing until in this type it reached the large dimensions of 5ft. 6 ins. In 1908 superheating was introduced and created quite a revolution in boiler capabilities. Superheating is a method by which generated steam is further used as a heating agent, the idea being to use heated steam rather than ordinary steam. Superheating received its greatest testimonial from a test in 1909 when a London, Brighton & South Coast Express Tank loco. ran in competition with the L. & N.W. engine 'Precursor' type "*Titan*" (4–4–0) between Brighton and Rugby. The L.B. & S.C. engine was fitted with Schmidt superheaters. The tank engine (with a water capacity of 2,000 gallons) made the amazing performance of completing the journey of 78 miles without a stop and without taking up water. Not only this but it hauled a train 250 tons at an average speed of 52.6 m.p.h.—an accomplishment unheard of up to that time. The remarkable economy in the consumption of fuel and water in these trials was a deciding factor in favour of superheating.

Adapted by British Railways.

By 1906 most British railways were using 'Atlantics' for the heaviest passenger work, but—with the exception of the North Eastern—most Companies have long since adopted locos. of six wheels coupled designs, while the Great Western have converted all 'Atlantics' to 4–6–0's. For many years 'Atlantics' handled most of the Great Northern Express passenger service. Locos. of this type are used to-day on the North Eastern Railway to work the heavy Scotch trains between York, Newcastle and Edinburgh. The Great Northern Railway also employs 'Atlantics,' but they are of a smaller type than those used by the North Eastern.

The Type of the Future.

The 'Atlantics' have always proved capable of splendid work and have shown themselves to be highly efficient in maintaining running time with heavily laden trains. The noteworthy success of the design is mainly due to the fact that because of the very large boiler-capacity, the engine may be worked very hard with little or no fear of running short of steam.

Two Famous Locomotives (*continued*).

In spite of this useful feature, however, locomotives of this type are not being constructed to any extent to-day, it being eleven years since the last 'Atlantic' was built for the Great Eastern. To a certain extent this is due to the fact that their place is being taken by the 4–6–2 'Pacific' type, on which type it would seem that future designs will be largely based, especially for locomotives of greater power than can be obtained with four wheels coupled.

A Famous Locomotive.

These requirements, together with the proved success of the three-cylinder system, have led to the use of engines of the 'Pacific' type for the Great Northern express service. It is believed that their introduction for hauling trains between London and Edinburgh will not only permit of a considerable increase in loading, but will also obviate the necessity for a second engine on some of the heavier gradients north of Newcastle.

One of the most famous engines of the 'Pacific' type is the "*Great Bear*," belonging to the Great Western Railway. This well-known engine, which has now been in service for ten years, has four cylinders and an immense boiler, and until recently was by far the largest express engine in this country. It generally works trains between London and Bristol, and because of its high power is frequently employed in hauling long and heavy goods trains.

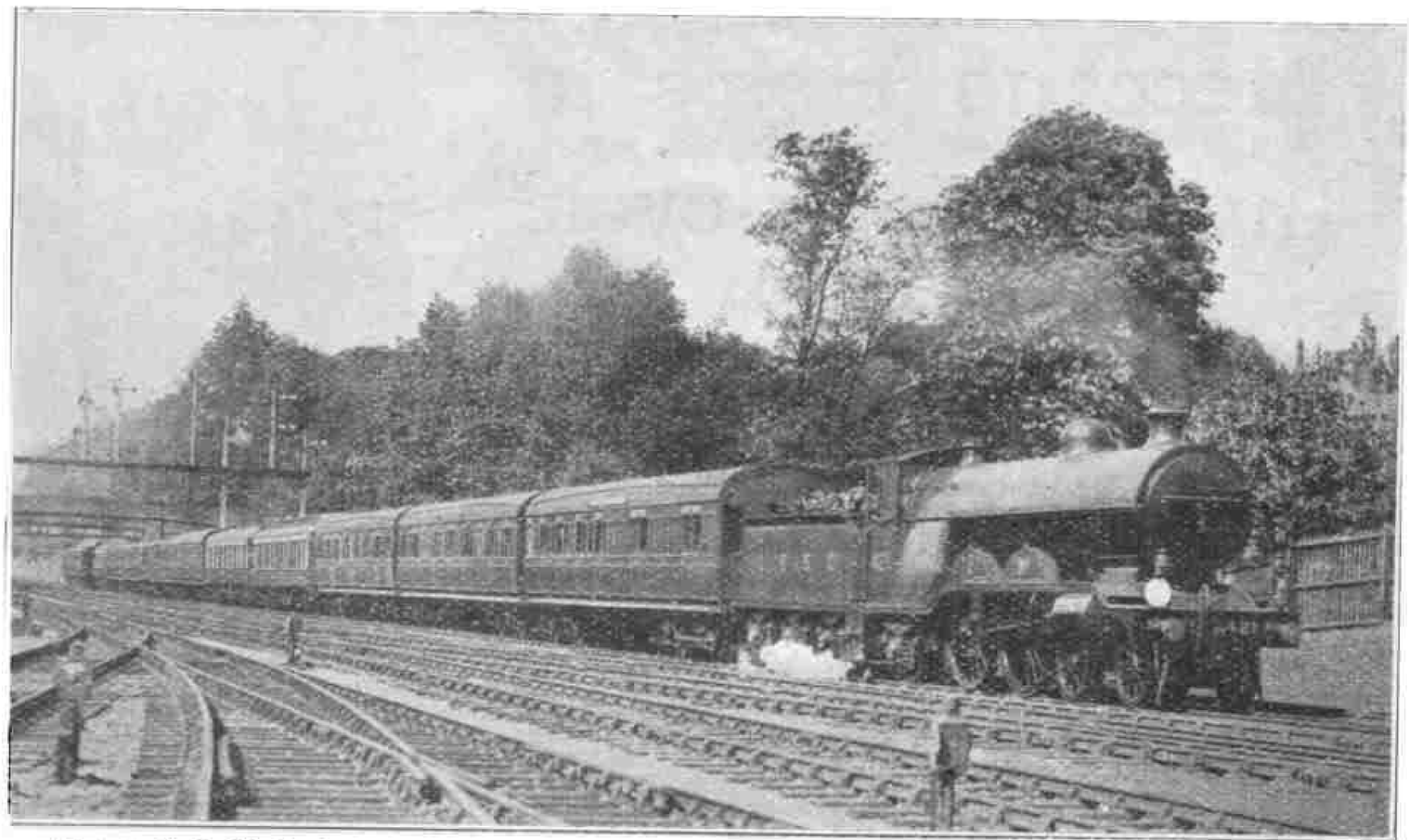


Photo by F. E. Mackay] [*From the "Railway Magazine."*

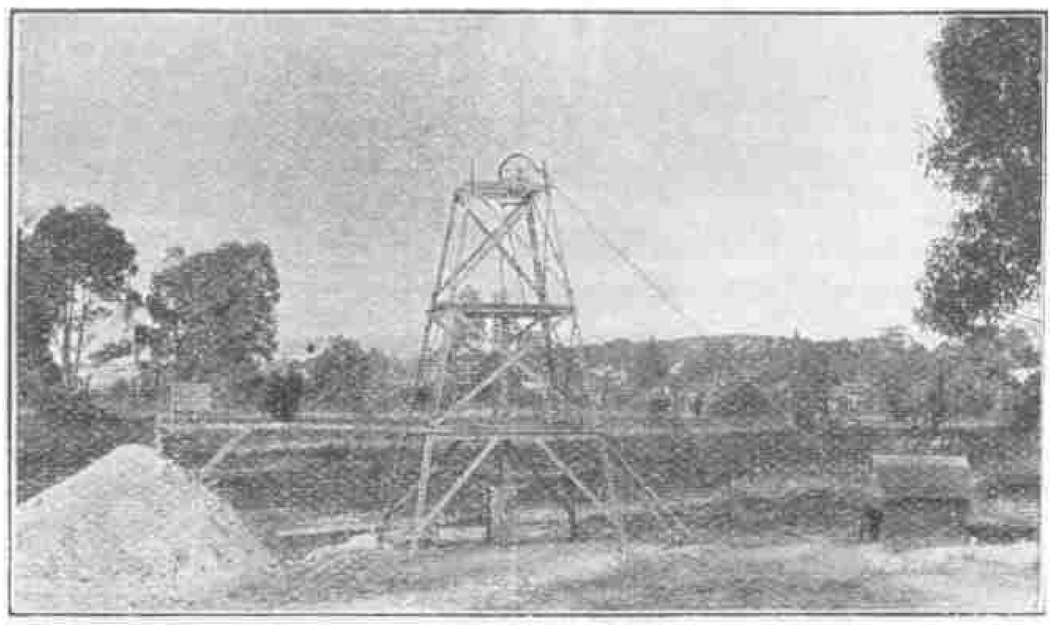
The 'Atlantic' Type.
Locomotive No. 421 (4–4–2).

Our Most Powerful Locomotive.

In point of size and general interest, however, the "*Great Bear*" has recently been eclipsed by the "*Great Northern*," now the largest and most powerful loco. in use in Great Britain for express passenger work. It hauls the "Flying Scotsman" on the long up-hill pull as far as Grantham, leaving King's Cross at 10 a.m. daily.

(*To be concluded.*)

The Mallins Boys of Bendigo.

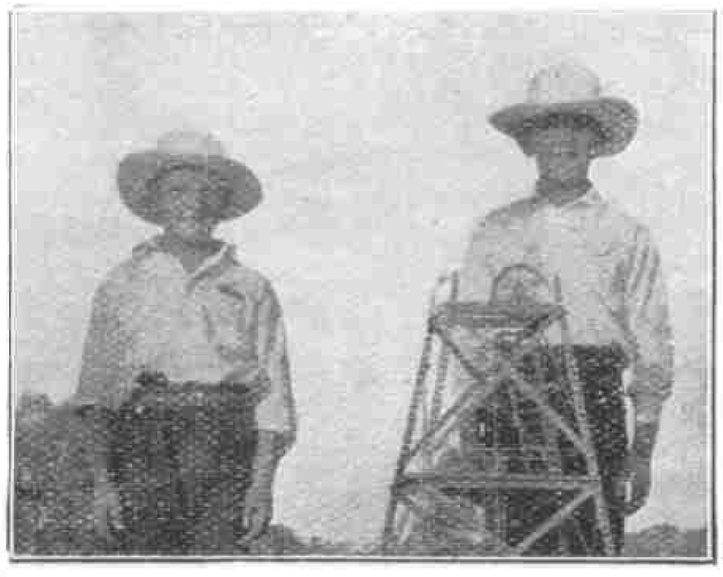


Master Mallins' Model Pithead Gear

We are able to publish a photograph of the two sons of Mr. A. Mallins, Manager of the Bendigo Amalgamated Gold Mines. These two boys are keen Meccano boys and have built many interesting models. Our photograph shows a model of a pit-head gear and we congratulate Masters Mallins on their realistic reproduction of a structure that is of such importance.

It is interesting to note that a Meccano dealer in Bendigo has arranged for the loan of this and other models, and with them is making a very effective display in his window.

We feel sure that our readers will join us in sending our good wishes to these two happy Meccano boys overseas. We shall look for further evidence of their ingenuity in time to come.



The Meccano Smile!

The Meccano Manuals

There are three Manuals, the 0 Manual for simple models built with the 0 Outfit, the 0–3 Manual comprising models built with any of the Outfits from 0–3 and the Complete Manual, which comprises a selection of models that may be built with every Outfit from 0–7. This latter Manual is a very fine publication and should be in the hands of every Meccano boy. It includes instructions for building most of the models shown in the present No. 3 Manual. A limited supply of the No. 3 Manual is still available.

PRICES OF MANUALS:		s.	d.
0 Manual	post free ...	0	6
0–3 ,, ...	,, ...	1	2
Complete Manual ...	,, ...	2	10
No. 3 Manual	,, ...	1	4½

Change of Address.

Subscribers should immediately notify the Editor of any change of address. Send a Postcard *giving the old and new address*, so that records may be kept up to date.

Meccano Helps to Invent Motor-cycle

By Lt.-Col. McKechnie.

In this article Lt.-Col. McKechnie tells how very helpful he found Meccano. The Colonel, who describes himself as being "a Surgeon by profession and a Scientist by inclination," was Commandant of a War Hospital in India at the time he invented his motor-cycle. We feel sure that all readers of the "*M.M.*" will be interested to read of the original Meccano Model of the McKechnie Motor-cycle.

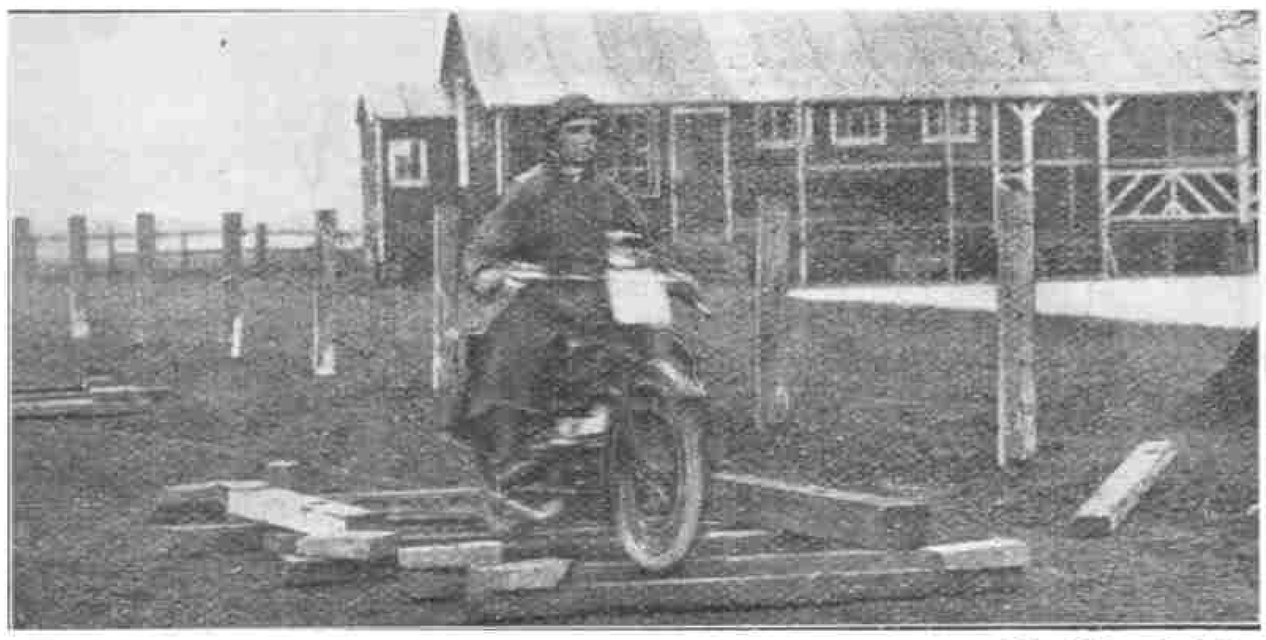


Photo by courtesy of ["*The Motor Cycle.*"

Trial over sleepers to demonstrate the perfect springing of the McKechnie Motor-cycle.

AT the time I invented the motor-cycle that bears my name I was stationed at Karachi, a tropical sea-port town of India. Karachi is surrounded by a

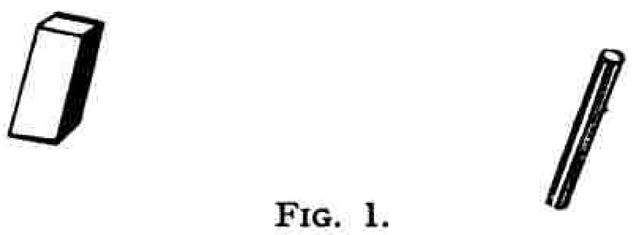


Fig. 1.

desert, across which communication with the interior is effected by a single railway. There is practically no rain-fall and the desert supplies no food for horses, so that although horses are usually used elsewhere in India they are not of much use in Karachi. Here the Europeans nearly all use motor-cars, but there are many who, like myself, cannot afford to do so.

Having neither horse nor car, and finding that a push-bike was an impossible means of locomotion owing to the tropical heat, I purchased a handy little motor-cycle. Although this carried me very well and enabled me to get through my medical work much more quickly, it shook me up a good deal for there is only one good road in Karachi, between Government House and the station. On the other roads the rigid frame and 24" wheels caused a great deal of vibration that jarred me from head to

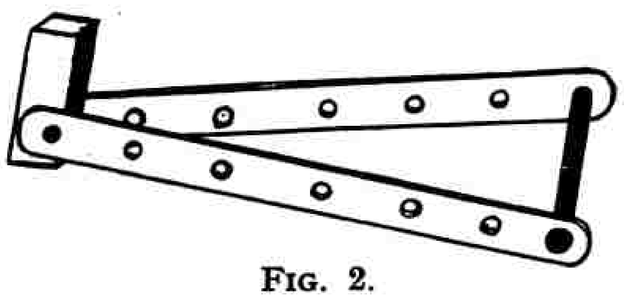


Fig. 2.

foot, for though my machine was fitted with spring saddle and spring forks these were quite inefficient on such rough roads as are encountered in India. This discomfort made me determine to invent a spring-frame motor-cycle.

As most of my readers know, nearly all motor cycles have rigid diamond frames, for they have been evolved from the push bicycle. The first motor cycle was merely a push cycle with a petrol engine clamped to the frame, and from this beginning the present-day motor cycle has been evolved.

Having made a number of sketches and drawings I sought for a means of testing my ideas. Knowing that Indian workmen are unintelligent and moreover are aggravatingly slow, I realised that there was likely to be an interminable delay if I decided to have them make me a model. Suddenly I remembered that the young son of one of my medical officers had a Meccano Outfit, and an interview with his father resulted in my being able to borrow the Outfit. The Outfit was a No. 6 and I found the Meccano parts quite satisfactory for building a model of my suggested motor cycle, except that there were no suitable wheels. I soon supplied this deficiency, however, by using two wooden bungs from large stone jars in which we stored medicine.

It took me about an hour to construct the model, but only thirty seconds were necessary to show that it could not possibly work! Although I had obtained excellent springing, I had failed to anchor the back wheel axle to the steering head. As soon as a weight was placed on the saddle, the wheels flew apart! A few minutes' study of the model showed what was wrong and the difficulty was soon overcome and another model built. To all intents and purposes this model was identical with the McKechnie motor cycle shown for the first time at Olympia in November of last year.

The McKechnie Motor-cycle in its final form fitted with a 5/7 H.P. Coventry-Victor engine.

Briefly the model consisted of a rigid frame formed of two tension members joining the steering head and the back axle (Fig. 1) and giving a triangulated girder (Fig. 2). Two compression members were added to maintain the correct slope of the steering head (Fig. 3) the whole forming a rigid triangulated frame, which carried no weight but served simply to fix the back axle immovably with respect to the steering head.

The weight-carrying frame was next constructed with a Meccano strip (representing a leaf spring) running horizontally from the bottom of the steering head to a bridge-piece, over the back axle (Fig. 4). The engine was supported by a special cradle, the construction of which allowed independent freedom of movement so that both back and front wheels could follow the irregularities of the road. The cradle was supported at the rear by the back axle and suspended at the front from the centre of the leaf spring (Fig. 4). Other important details in regard to rigidity, etc., were subsequently carefully worked out and embodied in the finished model.

With the Meccano model before me, it did not require a great deal of imagination to visualise in my mind's eye what the actual motor cycle would be like. I worked on my Meccano model and experimented with it until I learned exactly how the spring should be placed to give the easiest riding positions; the nature and location of the strains the frame would have to undergo, and whether they were strains of tension, compression or twisting.

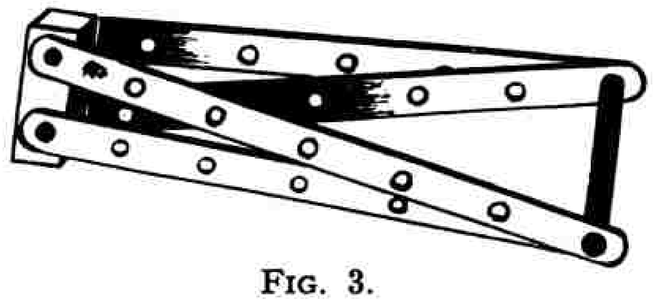


Fig. 3.

Although I had first worked it out in my head and then on paper, it was the Meccano model that filled me with joy and confidence. It seemed so substantial when braced up, so springy and business-like that I could almost imagine it saying:—"Here I am, sprung like a car—even my engine—with a springing that is better than you will find in many cars. There is nothing tinny about me. I have no shackles or tiny joints that

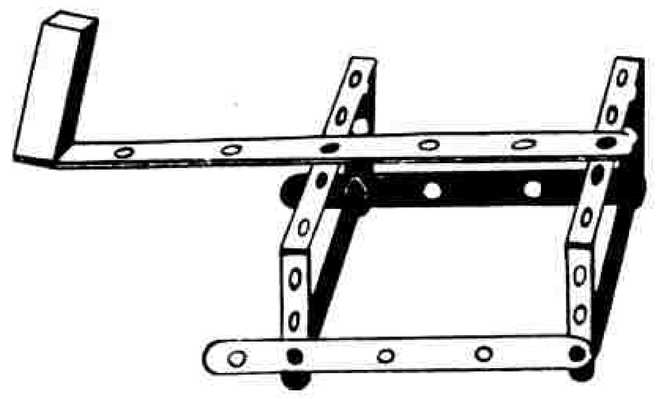


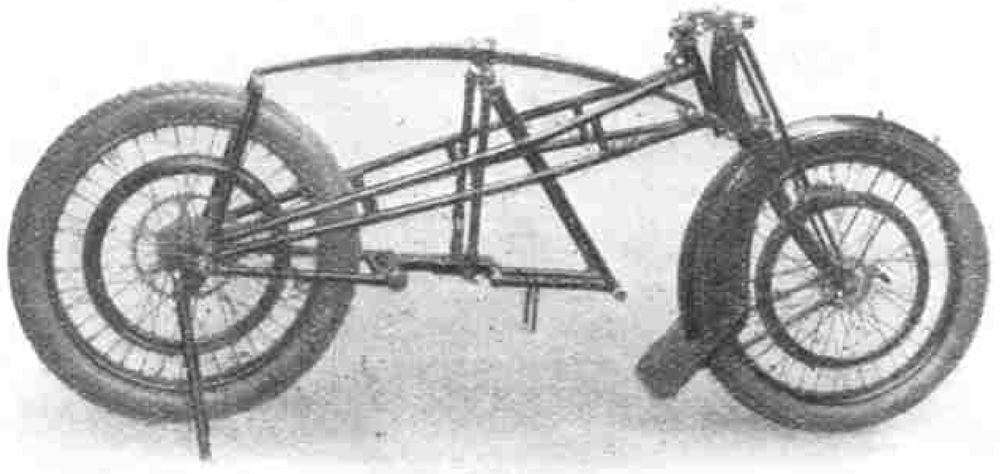
Fig. 4.

will wear themselves to pieces. My frame does not whip and the metal is disposed where it is most wanted. I am truly rigid where I should be rigid, and truly flexible where flexibility is needed."

My Meccano model seemed to say all this, and a good deal more, as I handled it and pressed on its spring or cradle. From it I knew that my idea was sound, and I felt convinced that I could face and overcome the many obstacles that lay between the conversion of the Meccano model into the finished product of the McKechnie Motor Cycle.

The little boy who had lent me his Meccano Outfit became very restive at my prolonged use of it. More than once his father came to me and said he wanted it back, and several times I put him off because I had not finished my experiments. At last, however, the first model of the McKechnie Motor Cycle was resolved into its component parts and the Outfit returned with grateful thanks to its owner.

Now that my vision is realised and the McKechnie Motor Cycle an accomplished fact, I have had the added pleasure of sweeping along the road on it and discovering in it a new vehicle of locomotion that combines the glorious sensations of sitting on an easy-actioned thoroughbred horse and speeding in a fast car.



Details of the spring frame construction of the McKechnie Motor-cycle.

RADIO SECTION

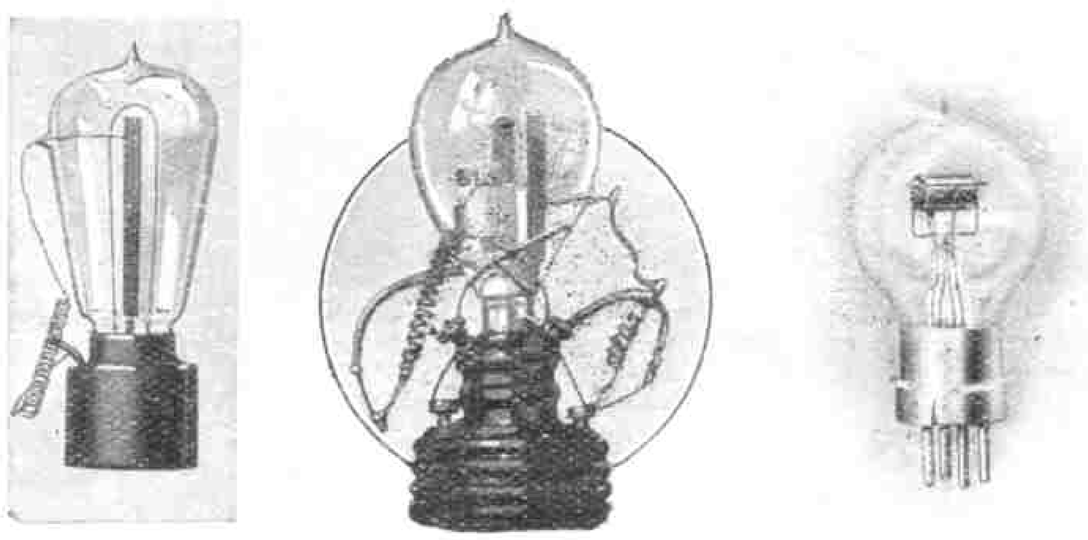
The Thermionic Valve

THE INVENTION THAT MADE WIRELESS TELEPHONY POSSIBLE.

The following is the final instalment of the special article explaining the principle of the Thermionic Valve. In it is described Dr. Lee de Forest's addition to the Fleming Valve.

(*Concluded.*)

The story of the further development of the valve commences in 1907, when Dr. Lee de Forest, an American scientist, conceived the idea of introtroducing into the bulb a third element in the form of a perforated metal plate or "grid." He supported this grid by a separate connecting wire, fused through the glass of the bulb and inserted between the plate and the filament (see Fig. 7). Thus, negative electrons from the filament had first to pass through the meshes of the grid before reaching the plate that attracted them.



Photographs by courtesy of "Popular Science Monthly" and the G.E.C., Ltd.

Three Stages in the Development of the Thermionic Valve.

On the left is illustrated a globe with plate inserted to give the "Edison Effect." In the centre, the valve as used by Professor Fleming in his experiments. On the right, a modern Thermionic Valve as used for Radio reception.

The Function of the Grid.

It is not difficult to understand that if this interposed grid is negatively-charged it will tend to drive back the negative electrons to the filament, in spite of the attraction of the positively-charged plate. On the other hand, if the grid be given a positive charge it will assist matters by attracting the electrons through its meshes to the plate. The stronger the positive current in the grid, the greater will be the number of electrons attracted.

The apparatus may, in fact, be compared with a machine-gun (the filament) which is bombarding a target (the plate) with bullets (the electrons). These bullets must pass through the grid before they reach the target, the oscillations from the aerial causing the grid to act as a spasmodic shield. When the positive half of the aerial current reaches the grid the negative electrons are allowed free access to pass to the target (see Fig. 5 *) When the negative half of the impulse reaches the grid, the effect is as though a screen were lowered between the filament and the plate, thus completely cutting off the stream by negative electrons (Fig. 6 *).

By suitably regulating the relative currents in filament and plate circuits, one-half of the incoming current can be made to influence the plate circuit to a greater extent than the remaining half; indeed, the latter half can be made to have practically no effect at all.

Every time the grid allows the electrons to pass from the filament to the plate an impulse is produced in the plate circuit; this is converted into sound waves by a telephone earpiece, included in the circuit. Thus, because the passage of these impulses has been controlled through the grid by the wireless waves, the sounds in the 'phones are similar to those at the transmitting station.

To this improved form of Valve, Dr. de Forest gave the name Audion. Because it also possesses the property of magnifying the current, it is called the Amplifying Valve. In America it is known as the Vacuum Tube.

There are several types of valves in use to-day. In the type generally employed the plate is made in the form of a metal cylinder, which is fitted around the filament. As we have already seen, this form of plate attracts the greatest possible number of electrons from all sides, and the efficiency of the value is thereby greatly increased. The grid generally takes the form of a spiral of fine wire fitted between, but insulated from, the plate-cylinder and the filament.

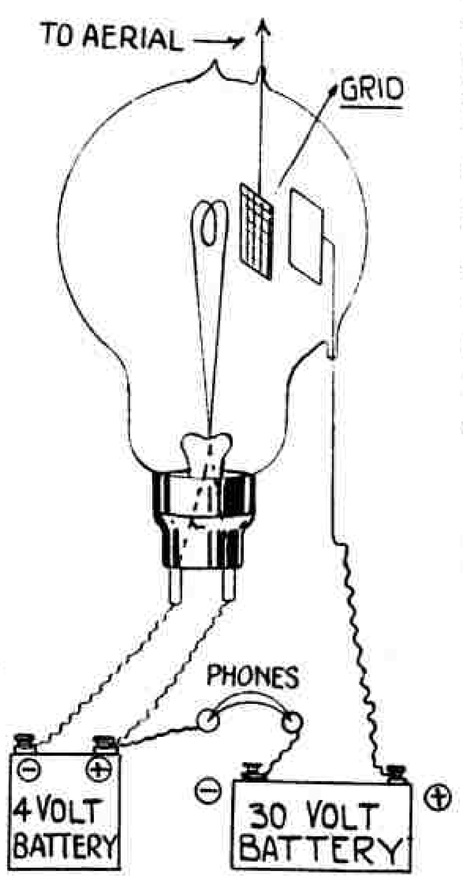


FIG. 7.

The Valve and Radio Receiving.

We must now learn how the valve is used for the reception of wireless messages.

We have seen that if the grid is negatively charged it will repel the filament electrons, and that the degree of its repulsion depends on the strength of the grid's negative charge. It has also been mentioned that the oscillations received by the aerial from the transmitting station are composed of alternating currents—half positive and half negative.

The grid is connected to the aerial, and when the oscillations reach the grid they affect the degree of strength of the negative charge it carries. Thus, when the negative half of the incoming oscillation reaches the grid, it increases the negative charge of the grid and so causes the latter to repel, to a certain extent, the electrons from the filament. When the positive half of the aerial current reaches the grid, the flow of electrons to the plate is assisted. In this way, the incoming oscillations alternately weaken and strengthen the flow of filament electrons to the plate.

Several Valves give Greater Amplification.

A very important feature is the fact that one or more valves may be connected and used together. By doing this, the stream of electrons (or the "current" as it should now be called) received on the plate of the first valve may be conducted to the grid of a second valve, where it is subjected to a further amplifying action and passed on to a third valve. The amplification need not end there and, theoretically, it may be continued almost without limit. With every additional valve a greater magnification of the original current is obtained, and the minute oscillations received by the aerial may in this way be converted into sound waves of such great volume that—if a concert is being received—the music may be made to fill a room, or even a hall for dancing.

The addition of every valve, however, naturally adds to the complication of the apparatus. It also adds considerably to the expense, as batteries are required to supply the valves with two separate currents—a low and a high-tension. The maintenance of these batteries is an expensive item. In practice three or four valves generally give all the results required, but sometimes six or even eight are used.

De Forest's valve fulfils yet another highly-important function, discovered in 1913. If connected to an appliance called a transformer, the valve will generate electric oscillations and continue to do so

* Figs. 5 and 6 will be found in the last issue (December) of the "*MM*."

The Thermionic Valve (*continued*).

as long as the conditions remain the same. By means of an aerial these oscillations may be broadcasted, and the valve thus becomes a powerful transmitting apparatus. The oscillations may be "tuned" to any frequency required—even up to millions per second. The effect thus obtained is due to the reaction of the plate and the grid circuits on each other and is similar to the well-known action of the singing arc.

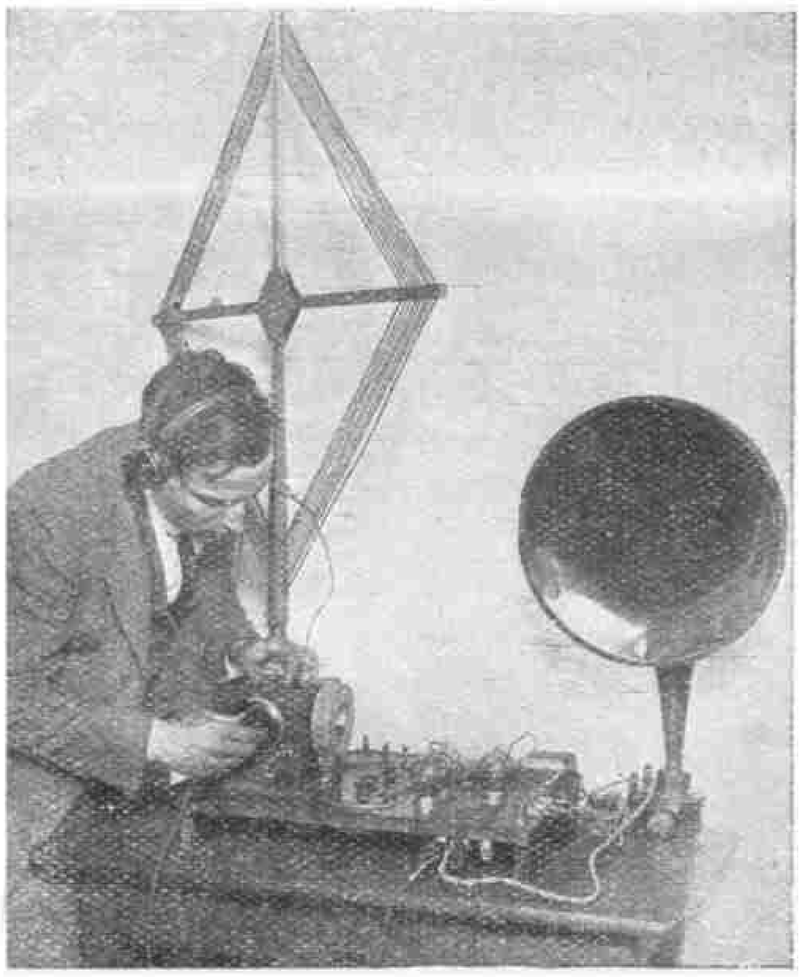
It has been found that under certain conditions a valve used for receiving may generate these oscillations and thus act in every way as a miniature transmitter. If this oscillation occurs it is liable to cause serious interference to other stations listening-in. For this reason the Postmaster-General objects to the installation of valve sets that use reaction. Especially is this the case if the set is being installed by an amateur who has not sufficient scientific knowledge of the subject for him to understand how this interference is caused, and what it means. By using certain connections, however, the reaction principle may be used in such a way that no interference can possibly be caused to other receiving stations. Valve receiving apparatus of this type has recently been approved by the Postmaster-General.

THE END.

The Armstrong Circuit

A Wonderful Invention that gives Great Amplification

No more wonderful discovery has been made in recent years in Radio than the circuit brought out by Major Armstrong, an American scientist. This discovery is called the "the Super-regenerative circuit," and consists of making the connections between batteries and valves in a particularly effective manner, by which the incoming impulses are greatly magnified.



Photograph] ["*Popular Radio.*"

Our illustration shows Major Armstrong adjusting the controls on his super-regenerative receiving set.

The possibilities of the Armstrong circuit are astounding. As an example it may be mentioned that with only three valves the same result is obtained as requires nine valves in apparatus using ordinary connections.

Major Armstrong recently demonstrated his invention before the American Institute of Radio Engineers in New York, when wonderful results were obtained even with a limited aerial. In the course of this demonstration, Major Armstrong filled a large auditorium with music, received by radio, from the broadcasting station WJZ 15 miles away at Newark, New Jersey. On this occasion he used only a small loop-frame aerial as shown in the accompanying illustration.

Needless to say, the connections used by Major Armstrong are suitable only for valve receivers and are very complicated. The amateur who uses this circuit must therefore be fully conversant with the theory and practice of Radio.

The broadcasting station at Newcastle-on-Tyne is now working, and Sir William Noble, the Chairman of the Broadcasting Committee, recently stated that the stations at Cardiff and Glasgow are to commence working at an early date.

* * *

Newcastle broadcasts concert and news items from 6.30 to 8 each evening. The wave length is 400 metres and the power 1,500 watts. The call signal is 5 N O.

* * *

Manchester Broadcasting Station transmits nightly. The wave length is 385 metres and the power approximately 1,500 watts. Call signal, 2 Z Y.

* * *

Broadcast may be heard from Marconi House every evening. The wave length is 369 metres and the call letters 2 L O. The power used is 1,500 watts.

News is broadcasted at 5 p.m., with concerts and late news until 10.30 p.m.

* * *

Birmingham Broadcasting Station at Witton broadcasts every evening with a power of about 1,500 watts and wave length 425 metres. The call signal 2 W P. The programme begins at 6.30 p.m. with children's stories.

Broadcast is sent out from the Eiffel Tower, Paris, from 6.20 to 6.50 p.m., when a concert (in French) is transmitted. The wave length is 2,600 metres, the power 4,000 watts and the call signal F L.

* * *

Writtle, near Chelmsford, transmits from 8 p.m. to 8.30 p.m. on Tuesdays. Wave length 440, power 250 watts. Call, 2 M T.

The Hague broadcasts Sunday concerts from 3 to 5 p.m. on a wave length of 1,085 metres.

* * *

Amateurs in London and district may hear during almost any evening several amateur stations sending out telephony on wave lengths between 200–300 metres.

Slot-Machine for Radio.

CONCERTS "WHILE YOU WAIT."

The wonderful development and popular interest in wireless is further demonstrated by the inventor of a 25c. Radio Slot-Machine. The possibilities for such a machine in this country are, as yet, obscure, but there can be no doubt that the time will come when Radio slot-machines may become available for public use. Railway stations will have rooms set apart for this purpose, and the dull monotony of "waiting for the next train" will no longer exist. This is only one of many useful functions that public Radio sets could easily fulfil, but until wireless broadcasting becomes more general, such inventions cannot be commercially possible.

The new Radio slot machine is an American invention and consists of an automatic apparatus with an exterior not unlike a Post Office stamp slot-machine. In order to hear whatever programme is being broadcasted at the time, a coin is inserted in the slot and the current to the valves being automatically switched on, a large horn at the bottom of the instrument delivers a programme of music or speech, as the case may be.

Terrestrial "Interference."

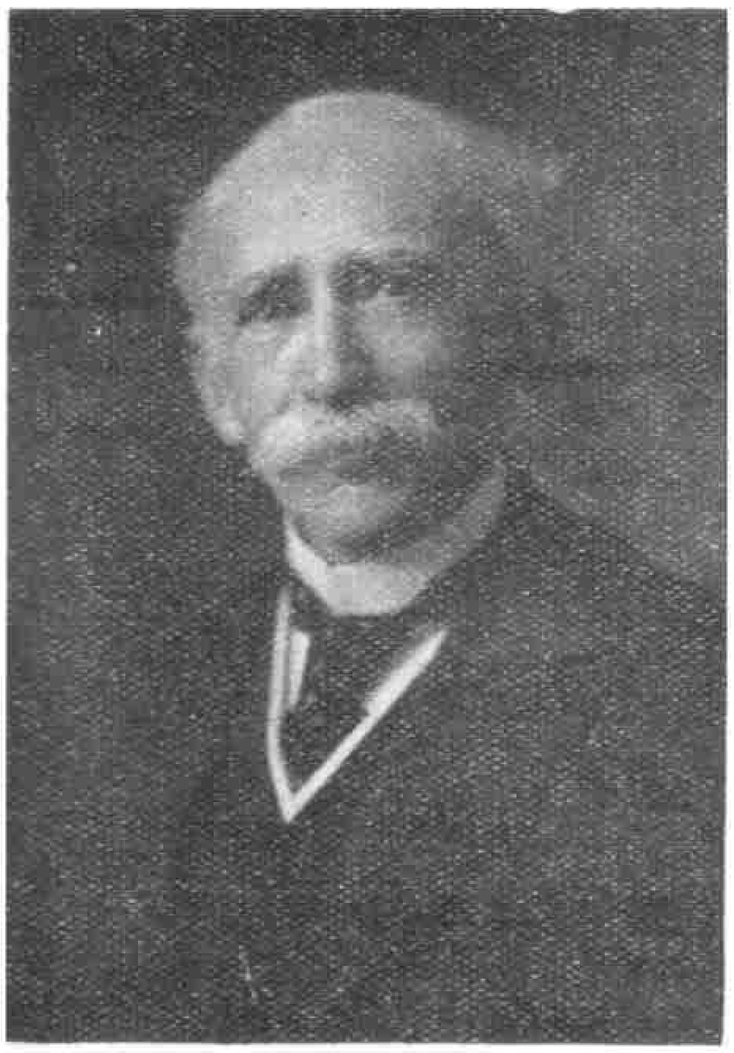
THE RADIO ENTHUSIAST: "I wonder whether that shriek is in my condenser or in my valves!"

(*Peculiar noises are often heard in the telephones of a receiving set. Sometimes these noises have an electrical origin—at other times they have not!*)

A Message to Meccano Boys

FROM

Dr. J. A. Fleming, F.R.S.



DR. JOHN AMBROSE FLEMING, F.R.S.

Professor of Electrical Engineering in the University of London and Inventor of the original Thermionic Valve, which in its subsequent developments is the instrument that has made Wireless Telephony possible on a large scale.

"I am glad to hear that so many Meccano boys are interested in Wireless Telegraphy and Telephony. It is not only a subject of immense scientific interest, but there is an abundant field for new inventions. In this connection it may be mentioned that many of the valuable discoveries in Wireless Telegraphy have come from amateurs. Moreover, a study of this subject necessitates a knowledge of the sciences of Electricity and Magnetism and an intelligent boy can learn more from experiments he carries out himself than from more elaborate performances in the class room or laboratory.

At the lectures I gave last Christmas at the Royal Institution in London I had a very large audience of young people who were greatly attracted by the discourses given on 'Electrons, Electric Waves and Wireless Telephony'."

Yours faithfully

J. A. Fleming

H. A. Longley (Surrey).—I hope to publish shortly a series of articles on the theory of Wireless from the beginning to the more advanced stages, so that my readers may thoroughly understand the principles of Radio.

T. A. Gatley (Peel Green, near Manchester).—You should be able to listen-in with a Crystal Receiving Set as you live within the 25 miles radius of the Manchester Broadcasting Station. Mr. Hornby is not thinking of paying another visit to America and Canada at present. He has received many applications from Meccano boys who would like to accompany him.

J. E. Govan (Melrose).—Batteries and accumulators are not required with the Meccano Crystal Receiving Set. Apart from the aerial, and ground or earth wire, the Set is complete. These latter are sold separately.

A. Ramsay Rae (Chester-le-Street).—The price of an aerial set complete and ready for connecting to receiver is 12/6. Write again if you are in any difficulty, for I shall be glad to help you.

J. Taylor (West Hartlepool).—Your cage-type aerial should answer very well, but you will not be able to obtain the best results unless particular care is paid to the insulation of the antenna or individual wires forming the cage. Try to keep within the limit of 100 feet of wire, including the leading-in wire, when fitting your aerial. I am glad that you have written to me on this matter, as it is one that will prove of considerable interest to the other readers.

W. H. Evans (Nottingham).—It is necessary to have a licence in order to receive Broadcast. The cost is 10/- and full particulars may be obtained from any Post Office.

E. West (Rochester).—It is quite possible to add an amplifying valve to a crystal receiver, but this does not increase the range of reception.

L. Clayton (Northampton).—It is not necessary to use a battery with the Meccano Receiver but it is essential to have an aerial. On page 7 of our Radio Booklet is a good illustration of an aerial. You will be well advised to have your aerial as long and as high as possible.

H. Sims (West Bromwich).—The Meccano Receiver will receive on wave lengths of from zero up to approximately 1,000 metres. It is supplied with a single head-phone.

R. Fallows (Londonderry).—No receiving set can be used without an aerial. In your case it would not be practicable to use the electric light wiring in your house as an aerial; as this method requires a Valve Set.

D. J. S. Moyse (Ipswich).—Wave length could be increased by the addition of extra wire if it was considered necessary but as ships work on a wave length of 300 or 600 metres, and as the Broadcasting wave length is between 300 and 400 metres, it is not considered necessary to increase the wave length beyond the present range.

L. G. Blake (Lewisham, S.E.13).—You would not be able to hear Broadcast in any part of the room, as a Crystal Set does not sufficiently magnify the sound to make this possible. It would be possible for you to employ more than one 'phone and so enable two persons to listen-in.

W. Gorton (Stalybridge).—We are afraid that your proposed loud speaker would not be satisfactory, as there is not a sufficient volume of sound from a Crystal detector to make the signals audible.

W. J. Turner (Burslem).—We would point out that the induction coil shown in the Meccano Electrical Manual is not intended to be used as a sparking coil but is essentially a "shocking" coil. To make an efficient spark coil that would give an ½" spark wind about a soft iron core 3½" long and ¾" in diameter, a primary winding in three layers of No. 20 double cotton covered copper wire. For your secondary winding take a ¼ lb. of No. 38 double silk covered copper wire. It will be necessary for you to use also a condenser, made of 21 pieces of tin foil 2" × 2½", using dialectric of mica,

Singing to Unseen Thousands

Photograph by] [*Western Electric Co.*

Broadcasting is now in full swing in this country. Our illustration shows two vocalists broadcasting a duet at a New York Broadcast Station. The sensitive microphone, which transmits their voices to thousands of listeners-in, is seen on the table near the window. The walls of the Studio are padded with felt and every effort is made to exclude outside noise and inside echoes, for even the minutest sound is picked up by the microphone and sent out broadcast.

Passengers Listen In

Concerts Heard and Criminals Tracked Down, whilst travelling on trains

An American Railway Company recently claimed to be the first railway to instal a wireless apparatus on a train. This is no new invention, however, for over forty years ago scientists were endeavouring to find some means of enabling signalmen to hold direct communication with the guards or drivers of trains.

Before the days of wireless, many suggestions were made for communicating with trains and numerous experiments were carried out on the principle of ordinary telegraphy. An advance upon this method, suggested in 1881 by a Mr. A. C. Brown, was the use of inductance. This scientist proposed to transmit impulses from a wire, laid parallel to the rails, to a coil of wire wound round the engine or guard's van. This latter coil was to be placed in such a position that it should be parallel to, and as near the line wire as possible.

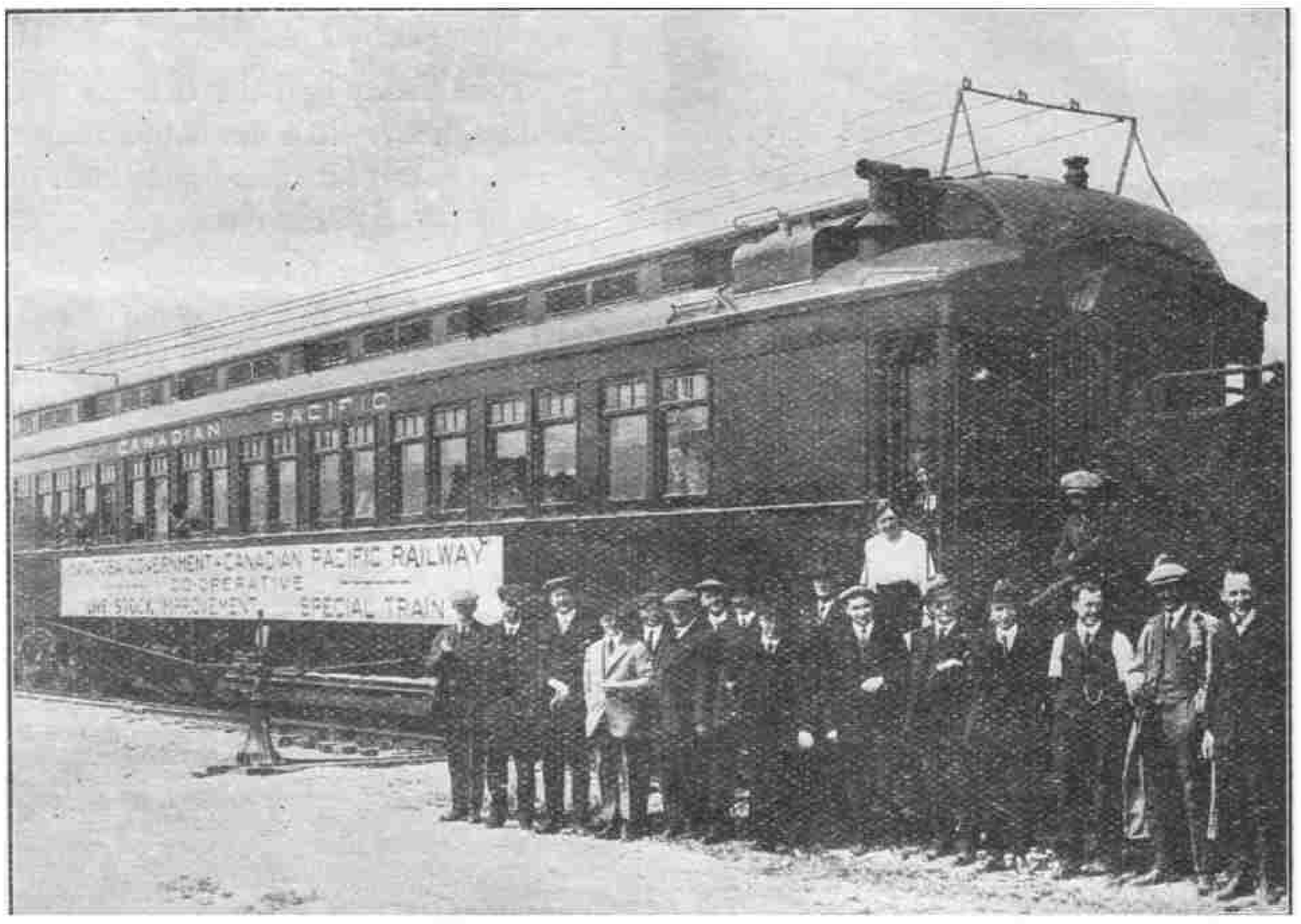
Radio Signals 37 Years Ago.

As long ago as 1885 Edison took out a patent for "an apparatus for telegraphing between moving trains by induction and without the use of connecting wires." In his system Edison used the ordinary telegraph wires running alongside the railway in place of a specially laid wire. He also provided a transmitting apparatus on the train so that passengers could send messages as well as receive them.

Edison's system was used in 1887 on the Lehigh Valley Railroad, and worked perfectly. It had been anticipated that passengers would take advantage of the installation, and keep the telegraph busily employed in flashing messages during their journey. Such was not the case, however, and from a commercial standpoint the scheme was a failure and was subsequently abandoned.

Edison's System of Radio.

A few years later Edison took out a fresh patent for his system, but operating on a larger scale to enable it to be used for communication between vessels at sea, or between ships at sea and stations on land. This was one of the first systems of wireless telegraphy and was a forerunner of Marconi's system, with which such extraordinary good results have been obtained.



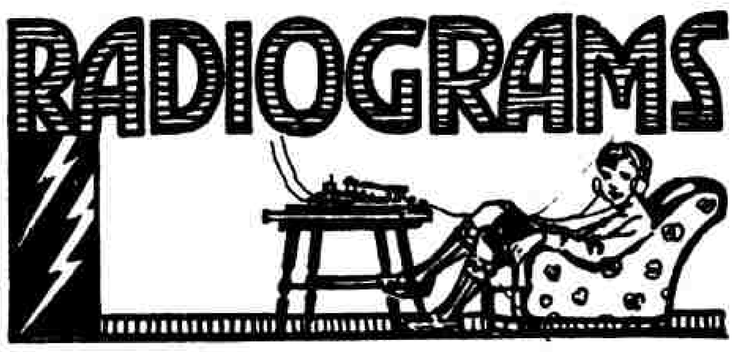
Photograph by] [*C. P. R. Co.*

Radio Fitted to a C. P. R. Train.

Modern Radio and Trains.

With the increased interest in Radio, the subject of communication with trains has again been revived. A Radio apparatus has recently been installed on one of the trains of the Canadian Pacific Railway, enabling concerts to be heard by those on board the train.

Although this particular installation is more or less an experiment, the fact that Radio can be successfully employed in this direction opens out vast possibilities for the future. The imaginations of all Meccano boys will enable them to realise the great possibilities of such installations, when they become fully developed, not only in connection with the arrest of criminals escaping on the train, but in the more commonplace manner of passing the time of a long journey with selections of music, by lectures, speeches and many other forms of entertainment.



It is now possible to make connection between the wireless phone and an exchange on the ordinary land line. Conversation with Amsterdam was recently held from London by means of a land-line to Southwold, wireless over the North Sea, and then by land again to Amsterdam. The conversation was as clearly heard as if an ordinary land telephone line were being used.

* * *

Scientists have for a long time been endeavouring to discover a means of making Radio messages private. In this connection the most effective system yet devised has recently been demonstrated by Marconi, by which the direction of Radio messages can be controlled. By this apparatus direct messages are sent to any desired receiving station and these messages cannot be picked up by stations situated in other directions.

* * *

A world radio combine, with a total capital of thirty-four million sterling, has been formed with New York as a centre. It will include the British Station at Carnarvon, the French Station at Sainte Assise, and the German Station at Nauen.

* * *

As a result of this combine, a working arrangement has been made between the four principal wireless companies, by which foreign telegraphic service to all parts of the world will be conducted from the new Monte Grande Station at Buenos Aires. This new station will be completed within the next few months.

* * *

Another new wireless station is to be erected in Canada at an approximate cost of £250,000. In connection with this scheme Commander C. P. Edwards, the wireless expert to the Canadian Government, is now in this country.

At the new trans-radio central station, Berlin, there is a wonderful "world's time clock." On the face of this clock, which is lit up from inside, there is a map of the world. The hour hands point to various towns situated in different parts of the globe, and it is possible to see at a glance the exact time at any of these towns. A shadow moves over the face of the clock to represent night falling on earth. Although this clock appears to work in a simple manner, it required a very ingenious brain to design and construct it.

* * *

A contract for a new wireless station in Sweden has been placed by the Swedish Government with the Radio Corporation of America. The station will engage in trans-Atlantic service and the entire plant will cost nearly £500,000.

* * *

The new station will be situated near Gothenburg, on the west coast of Sweden, and the equipment will include two 200-kilowatt Alexanderson alternators.

THE MECCANO GUILD

The Secretary's Notes.

I trust that all Guild members will accept my good wishes for 1923, which I hope will bring them happiness and success.

The New Year.

Also, I should like to express my appreciation of the numerous Christmas and New Year greetings received from Guild members at home and abroad.

The First Winter Session has proved eminently successful and arrangements are now being made for the Second Session.

The Second Winter Session.

From letters that I have received I feel quite sure that the success of this Session will be unprecedented. Programmes are being drawn up by Leaders who know just how to cater for the requirements of their members, and it is not surprising to note the increased enthusiasm of the members.

Every day dozens of boys write to me for information, not only about the Guild but about various other subjects. It is

My Mail Bag.

scarcely necessary to mention that I welcome these letters and that it is a pleasure for me to give all the help and encouragement possible. Quite a number of my correspondents apologise for writing on subjects other than Guild matters. I want every member to know that I am here to assist them in any way, and that in any difficulty or doubt, my advice and help are at their disposal.

I expect you have all noticed that in every issue of the "*M.M.*" I publish lists of Clubs recently affiliated with the Guild.

Support New Clubs.

In each case the name and address of the Leader or Secretary is given. I hope that all Meccano boys will make it a point to support any new Club opened in their districts, and to join at the earliest opportunity. They should either write or, preferably, call to see the Leader or Secretary of the new Club, and I am sure they will be made welcome and given all information they desire.

Where a Club is established in connection with a School, it is not always possible to enrol boys who do not attend that particular school. On one or two occasions, however, the Club Leader has been able to arrange matters and if there is any case in point where difficulty arises, I shall be pleased to do what I can to help.

Many boys write to me under the impression that they cannot join the Guild as there are no Meccano Clubs in

Individual Membership.

their district. In such cases, and if they cannot form Clubs themselves, boys should join the Guild as individual members. On filling up the usual form of application they will receive a badge and Certificate, and if on holiday where there is an affiliated Club, they will be able to spend an evening with the Club. The Guild has many thousands of "lone" members in all parts of the world.

It was for the benefit of these "lone" members that the Correspondence Club was originated. If a member has a cheerful correspondent, he is able to

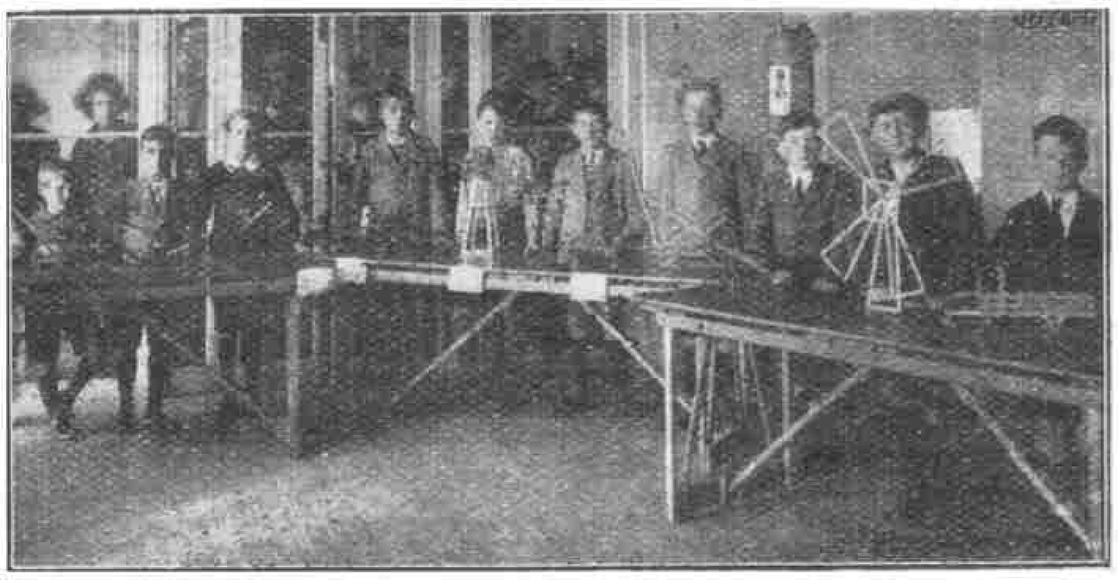
Correspondence Club.

sit down and write to him as though he were chatting to him in the Club-room. I am always pleased to find suitable correspondents and it will help me to do so if, when writing to me on the subject, members will mention their age and whether they wish to correspond with a boy living in England or abroad. If correspondence is desired with a boy living in a country where English is not spoken, it should be stated whether correspondence will be carried out in the language of that particular country.

A Successful Meccano Competition.

A successful Gala was held recently at the Church Army Social Centre, Chipping Norton. The Exhibition was well patronised, and reflected great credit on the organisers.

Interesting Competitions were held, including a Meccano Model Building Section. We have pleasure in publishing a photograph of some of the boys who took part.



The room was decorated with Meccano streamers and posters and rivalry was keen. We hope that each of the boys who entered for this Competition will also send in models for the big £250 Competition, particulars of which are announced elsewhere in this issue.

CLUB NOTES

South Kirby M.C.—Making better progress than ever. "Discussion Nights" and "Table Games Night" (Tennis, Cricket and "Who Knows") prove immensely popular. Programme for next Session includes model building and demonstration on "Soldering" by the Club Leader, speed-building test, social evening and an "At Home." *Secretary:* J. Williamson, School House, South Kirby, near Wakefield.

Parkstone Congregational M.C.—Continues to make good progress. A very successful Exhibition was held on 29th November, resulting in an increase in membership. Members working hard on their model for Inter-Club Model Competition. *Secretary:* F. Brumwell, Fernside Avenue, Parkstone.

Rolleston M.C.—Successful Exhibition and Concert held on 13th December, 1922. *Secretary:* Phin Toon, Sherbourne House, Tutbury Road, Rolleston, Burton-on-Trent.

St. Mary-with-St. Gabriel M.C.—Very creditable display of models was given in connection with the Sale of Work held recently. The Club continues to make good progress. *Secretary:* Mr. C. Curle, 37, Pullens Buildings, Peacock Street, London, S.E.

Liscard High School M.C.—During last Session members of this progressive Club paid a visit to the Meccano Factory. Also, by kind courtesy of Captain W. H. Fry, R.N.R., they visited Engineering Works of Wallasey Ferries. Later, one of the blacksmiths from the latter works gave a Lecture to the Club on "Applied Mensuration." A Cinema Show was given by the the kindness of Scoutmaster T. H. Pickles, depicting "Life on the Ranches of Oxo" in addition to other films of interest. Mr. Shinn, a local Electrical Engineer, gave an interesting lecture on "Electric Wiring." It is hoped that Mr. Kenny Campbell, the International Goalkeeper, will give a Lecture to the Club at an early date. The boys are all Football enthusiasts, and Mr. T. Karras has kindly undertaken to coach the teams. *Secretary:* B. Warburton, 11, Brisbane Avenue, New Brighton.

St. Cedas M.C.—A Social, Dance and Exhibition held during the past Session proved immensely popular and included the exhibition of a large number of models *Secretary:* S. F. Elliott, 142, Beckton Road, Canning Town, London, E.16.

Central Secondary School M.C.—Continues to make good all round progress. The Lecture "The Story of Our Ships" met with an enthusiastic reception. An interesting programme is being drawn up for the Second Winter Session. *Secretary:* A. S. Taylor, Fern Lea Villas, 19, Roach Road, Ecclesall, Sheffield.

Sparkbrook M.C.—The energetic members have organised a Football Club and were all very excited when they received their special jerseys. *Secretary:* Francis Hubball, 71, Turner St., Sparkbrook, Birmingham.

Bromsgrove M.C.—The Secretary won First Prize in Mr. Cooke's Meccano Competition and I congratulate him on his success. *Secretary:* L. Edwards, 148, Worcester Street, Bromsgrove.

Clubs Recently Affiliated.

St. Johns (Northallerton) M.C.—At present only eight members, but all are very enthusiastic. Meetings are held three times a week. *Secretary:* Vivian Todd, The Cottage, Appleton Wiske, Northallerton.

Motherwell M.C.—A Meccano Section was organised in connection with a local Engineering Exhibition. A Model Workshop, loaned, from Headquarters, together with a number of other models built by the boys, were on view. *Secretary:* C. Tait, "Walworth," Catherine Street, Motherwell.

Hanson (Bradford) M.C.—Good progress has already been made and the Club membership now stands at 27. An interesting programme is being drawn up for the coming Session. *Secretary:* J. Wm. Whitworth, 107, Curzon Road, Bradford.

Wisbech M.C.—Been in existence for a few weeks only but promises to develop into a really successful Club. *Leader:* Mr. E. A. Ransome, 61, Rammoth Road, New Walsoken, Wisbech.

Kerry M.C.—Club Leader writes: "The splendid Lecture 'The Story of Our Ships' was much appreciated by all members of the Club. The Club is progressing very well. There are now eleven members and we have held some very successful meetings." *Secretary.* S. Bowen, New Inn Hotel, Kerry, Mont.

Southall M.C.—Established under the direction of Mr. E. C. Carpenter, this Club has every prospect of becoming successful. Any Guild member living in Southall should communicate with the *Secretary:* K. Watson, 29, Regina Road, Southall, Middlesex.

Club Not Yet Affiliated.

East Croydon M.C.—This Club invites new members. Any Meccano boys who live in East Croydon should make it their business to join. *Secretary:* Murry F. Wilson, 46, Cedar Road, Easy Croydon, Surrey.

BRIGHT IDEAS

These columns are reserved for dealing with suggestions sent in by Meccano users for new parts, new models and new ways of making Meccano model-building attractive. We are always pleased to hear from any Meccano boy who has an idea which he considers will be useful in the Meccano system.

G. Everitt (Great Yarmouth).—(1) We are considering the question of curved girders. (2) A triple cranked rod on the lines you suggest has only one application. A new part must possess a much wider scope before we could consider its introduction. (3) Would not our healds serve the purpose of your suggested wire stays? (4) We shall keep in mind your suggestion for a passenger brake van.

M. Collin (Aix Les Bains).—The Meccano clockwork motor provides sufficient power for simple models. A loose spring such as you suggest is always a source of danger through accidental release and consequent sudden expansion.

Henry Storer (Wandsworth Common, S.W.).—We illustrate the method of driving models by Clockwork and Electric Motors in our Manual. This principle applies to any model suitable for driving by mechanical power.

M. Noel A. Chatenois.—We have in mind the piercing of the sector plates with holes along the edges.

M. Davoust (Fouquenies Par Beauvais).—The bearing you suggest is for use where there is heavy friction. The method we adopt in such cases is to re-inforce a strip bearing with two or three additional strips.

J. Aberdun (Colchester).—The single hand-rail support was introduced for use with a model loco and other similar models. Double or treble hand-rail supports for other construction may be made from couplings and rods.

D. Reeves (Byfleet).—(1) We do not think that a $12\frac{1}{2}'' \times \frac{1}{2}''$ double angle strip has any great advantages. (2) The application of the spanner to the nut whilst screwing up the bolt will ensure a firm connection. Extra rigidity may be obtained by using a 1" angle bracket.

A. W. Hammonds (Totterdown, Bristol).—(1) We shall keep in mind your suggestion for miniature barrels. (2) We already list a $5\frac{1}{2}'' \times 3\frac{1}{2}''$ flat plate. Do you consider your suggested $5\frac{1}{2}'' \times 5\frac{1}{2}''$ plate to have any advantages over our present one?

M. C. Guillaume (Nantes).—Up to the present we have not seen a satisfactory working model of a cinematograph. The apparatus would require so many foreign pieces that we have never seriously thought of incorporating it as a working model.

Richard K. Dresden (Streatham, S.W.).—(1) We shall consider the question of larger bevel wheels. (2) We list separate discs for attachment to face plates for making larger flanged wheels.

M. Federspiel (Metz).—We are at the moment considering the question of helical gears. These would be more adaptable than a combination of gear wheel and wide pitch worm wheel, as the drive could be applied to either shaft.

W. E. Maw (Leicester).—Our type of electric movement is too large to be accommodated in the No. 1 Engine. A smaller movement is not possible without sacrificing efficiency.

Jack Day (Heywood, Lancs.).—(1) Toothed wheels of even measurement would not mesh with our present $\frac{1}{2}''$ standard wheels. We have under consideration the introduction of a $3\frac{1}{2}''$ gear wheel. (2) Thanks for the suggested link motion. We shall have to go carefully into its possibilities and application. (3) The "*M.M.*" is being published monthly from September until the end of the year.

S. Sharp (Bowes Park, N.).—(1) No doubt we shall eventually introduce the three track switch, but not just yet. (2) You should send for our rail formations leaflet, for the two point combination is there illustrated, together with many other figures that will be of interest to you. It costs 4d., post free.

M. Lucien D'auzet (Villeneuve).—We think our regular spring connected diagonally to two strips disposed at a right angle would overcome your difficulty.

V. Lintott (Beccles, Suffolk).—We shall see whether your suggested $5\frac{1}{2}''$ face plate has any scope but we are inclined to doubt its possessing any advantages over the present 3" face plate.

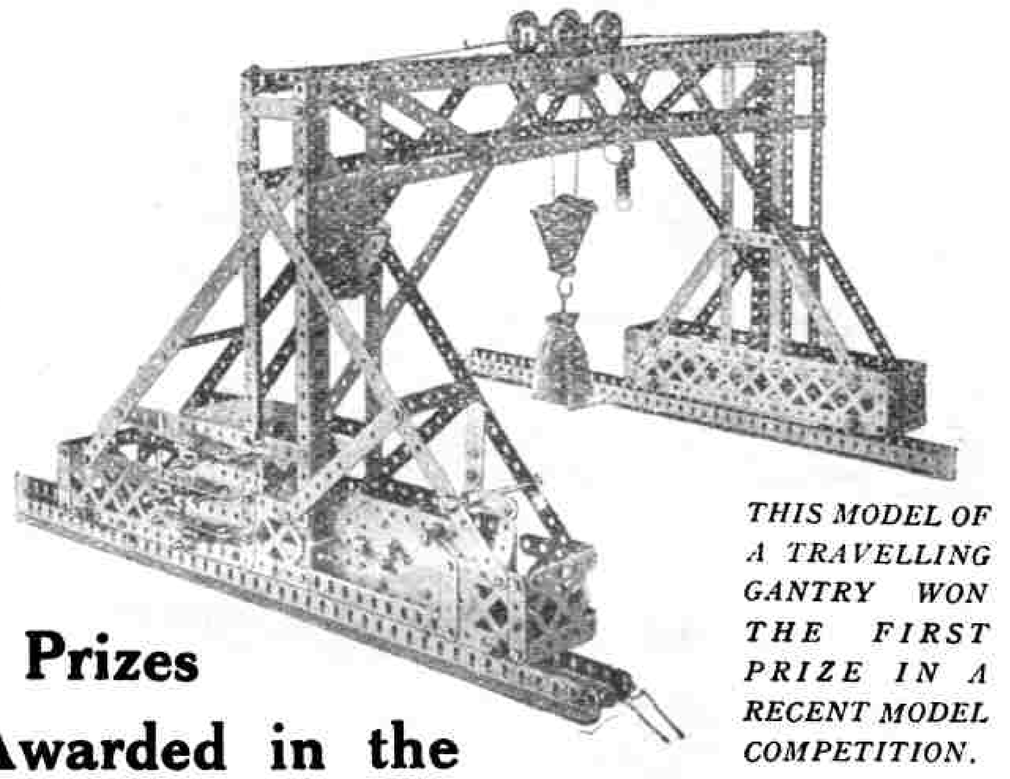
Roy Cureton (Ainsdale).—You cannot be a very enthusiastic Meccano boy, Roy, or you would know that we list such indispensable articles as washers. Apply to your dealer for our latest list, in which you will probably find many other interesting things.

Y. Gaynard (Paris).—We do not quite understand the purpose of your suggestion for an articulated coupling. Perhaps you will send us some further particulars.

Norman Keith (Geelong, Victoria, Australia).—Tie your cord with a figure 8 knot, which makes a much smaller knot than a double half-hitch.

Cyril Jaque (London, E.).—The question of the slide action along the rod at the same time giving a positive drive has already been raised, but it is impracticable on account of the smallness of the diameter of our rods.

Enter this Splendid Competition



THIS MODEL OF A TRAVELLING GANTRY WON THE FIRST PRIZE IN A RECENT MODEL COMPETITION.

£250 in Prizes

Awarded in the

Meccano Model-Building Competition

Cash prizes to the value of £100, Meccano Outfits, Inventors' Accessory Outfits, Hornby Trains and Zulu Trains to the value of £150.

These prizes will be awarded in the next Meccano-building Competition, for which every Meccano boy should enter. As was the case last year, the Competition will be divided into three sections (1) for boys under 10 years of age, (2) for boys between 10 and 14 years of age and (3) for boys over 14 years of age.

There are no restrictions and no entrance fees. Full particulars and entry form will be sent on application. The closing date for the Competition will be 15th April, 1923, for entries from the United Kingdom, and the 30th May, 1923, for entries from Overseas.

Ask your dealer, or send to us, for an Entry Form.

G. Blakely (Ontario, Canada).—We have in mind the question of flat angle and "T" pieces. We must first of all explore their application and determine the best sizes.

S. Irlam (Salford).—(1) The couplings on the Hornby Trains were purposely designed to protrude beyond the buffers, otherwise the buffers would foul each other on the narrow radius rails and so derail the train. (2) We have the question of curved girder sections under consideration.

W. Penfold (Peckham, S.E.).—We should be glad to hear of any uses you have found for the suggested curved rack strip.

Jack Glendinning (Thirsk).—We are engaged on a suitable sliding gear. The trouble with flat rods is the uneven action in the bearings.

John Morton (Belfast).—Any gradient over $1\frac{1}{2}''$ in 12" is scarcely practical with clockwork engines. Their light weight would be insufficient to ensure a grip on the rails. The present straight rails can be adapted to the above mentioned gradient.

E. Holbrook (West Croydon).—We are afraid we do not understand your statement that the flanged disc combined with the face plate does not make an efficient flanged wheel. This combination gives a flange of nearly 3/16" which is more than adequate to keep your engine on its rails.

Gilly Kowitz (Oakey, Cooyer Line, Queensland).—It has already been suggested that we should pierce a hole in the centre latticing of the braced girder. If there are any advantages in it, we shall certainly do it.

H. C. Key (Calcutta, India).—Double angle strips lend themselves admirably to steps.

Robert Poeros a Cournon (Puyde Dome).—We are considering a rack element which may be used for operating a tractor, and this will be announced when ready.

Leslie Jones (Bristol).—Perhaps at some later date we may introduce the crane bucket as an accessory.

Jack Lord (Haslingden).—Thanks for your suggested connection from crank-shaft to slay on model looms. We are afraid that it is rather too elaborate, and in any case the number of parts that are not interchangeable would tend to preclude its introduction from the Meccano System. (2) We shall go carefully into the matter of the ratchet although our present pawl used in conjunction with the pinion wheels makes a good ratchet.

M. Guilmarol (Angers).—Existing parts are adaptable to making the road spring you suggest. See, for instance, the method of front shackle connection on the Meccano Chassis.

Mm. H. and G. Vermeulen (Etterbeek-Bruxelles).—(1) The shank of the threaded pin is the same diameter as the standard rod and should permit of its insertion through the boss of any wheel. (2) We are afraid we do not see any special uses for a threaded boss in two parts and it would be very much more expensive to make than our present type.

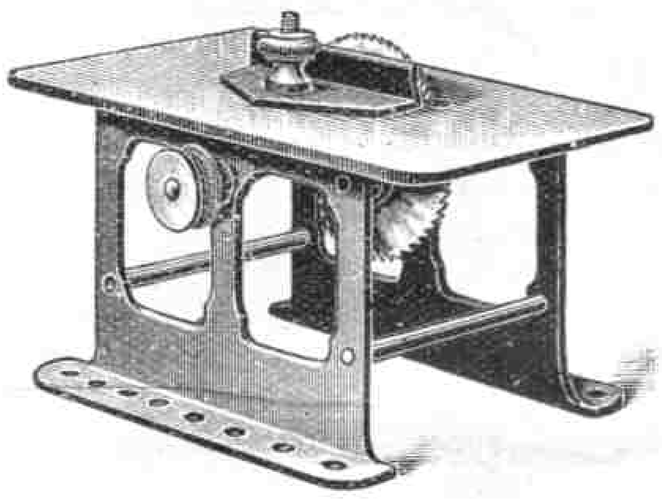
A. F. Butters (Saltburn-by-Sea).—A double throw crank may be made by joining two cranks together by means of a coupling.

Mr. G. A. Liardet (Bradford).—Your suggestion for a grooved rod to prevent wheels from slipping would not be practical with our present rods, on account of the smallness of the diameter.

J. Henniker (Ashford, Kent).—The pipes above the couplings of trains are flexible tube couplings for the vacuum brakes. This item added to Hornby Trains would merely be ornamental and would serve no useful purpose.

Jack Royds (Caversham).—We have the subject of circular plates under consideration, also curved angle girders. The two together would give flanged plates.

Model Saw-benches



We have a number of model saw-benches suitable for use with electric motors or vertical steam-engines. Our stock is limited and readers are advised to take advantage of this offer immediately as the stock will be quickly exhausted.

Model saw benches as illustrated, each 4/- (postage 7d.).

New Meccano Part

34B. Box Spanners ... ... each 3d.

A Useful Tool

Our illustration shows a type of screwdriver useful for reaching bolts in inaccessible places on models. For this reason the blade has been made so that it may be passed through the standard Meccano hole to reach bolts so placed. We are disposing of these screwdrivers whilst our stock lasts, at the special price of 10d. each, post free.

The Meccano Leaflets

Those Meccano boys who have not had copies of the Meccano leaflets should order them immediately. There are now three leaflets published: (1) Chassis Leaflet, giving full instructions for building the Special Meccano model of a motor chassis; (2) Loom Leaflet, giving full particulars of the Meccano Loom for real weaving; (3) Charging Board Leaflet, instructions for making a Charging Board, to enable the Meccano electric motor to be run direct from the electric light main and to charge accumulators from the same source.

These leaflets are sent post free at the following prices:—

Motor Chassis Leaflet	4d.
Loom Leaflet	4d.
Charging Board Leaflet	3d.

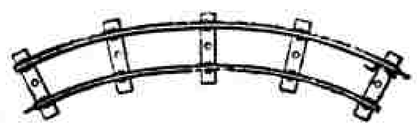
MECCANO RAILS

POINTS AND CROSSINGS.

MECCANO Rails, Points and Crossings are built for hard wear and smooth running. They are made of the finest materials and hold together rigidly and strongly, for real workmanship is put into them. Note the great superiority both in quality and appearance of the Meccano Rails as compared with the usual continental-made Rails. Note also the extra sleepers, giving an added steadiness to the track. Each sleeper is stamped with the name "MECCANO" and you should look for this in order to ensure getting the genuine article.

NOTE.—All Rails, Points and Crossings illustrated below may be obtained with a centre rail for use with Electric Trains. Send for descriptive leaflet.

Rails for Clockwork and Steam Trains, Guage 0, 1⅜-in., Alternate Pegs.



For 1-ft. 6-in. diameter circle.

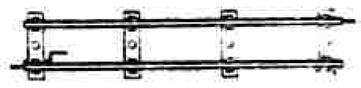
A9.	Curved Rails (9-in. radius) for 1-ft. 6-in. diam. circle ... ... per doz. ...	3/-

For 2-ft. diameter circle.

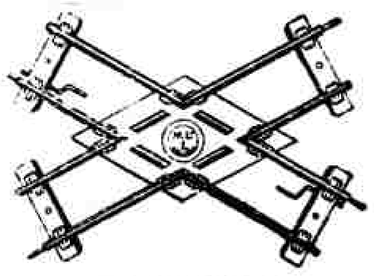
A1.	Curved Rails (1-ft. radius) per doz. ...	4/-
A1½.	Curved Half Rails ... ... ,, ...	3/-
A1¼.	Curved Quarter Rails ... ,, ...	2/6

For 4-ft. diameter circle.

A2.	Curved Rails (2-ft. radius) per doz. ...	5/-
A2½.	Curved Half Rails ... ... ,, ...	3/6
A2¼.	Curved Quarter Rails ... ,, ...	3/-

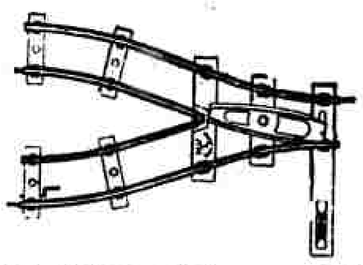


B1.	Straight Rails ... ... per doz. ...	3/-
B½.	Straight Half Rails ... ... ,, ...	2/6
B¼.	Straight Quarter Rails ... ,, ...	2/-

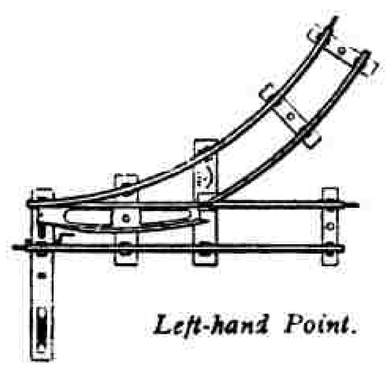


CROSSINGS.

CA.	Acute-angle Crossings ... each ...	1/6
CR.	Right-angle Crossings ... ,, ...	1/6



PPR.	Parallel Points, right ... each ...	3/-
PPL.	Parallel Points, left ... ... ,, ...	3/-



Left-hand Point.

POINTS.

For 1-ft. 6-in. diameter circle.

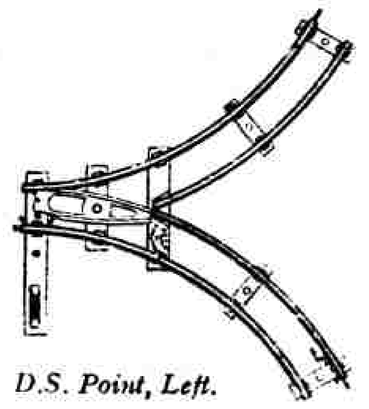
PR9.	Right-hand Point (9-in radius)	each 2/6
PL9.	Left-hand Point (9-in. radius)	,, 2/6

For 2-ft. diameter circle.

PR1.	Right-hand Point (1-ft. radius)	each 2/6
PL1.	Left-hand Point (1-ft. radius)	,, 2/6

For 4-ft. diameter circle.

PR2.	Right-hand Point (2-ft. radius)	each 2/6
PL2.	Left-hand Point (2-ft. radius)	,, 2/6



D.S. Point, Left.

DOUBLE SYMMETRICAL POINTS.

For 2-ft. diameter circle.

DSR1.	Double Symmetrical Points (1-ft. radius), right ... ... each ...	3/-
DSL1.	Double Symmetrical Points (1-ft. radius), left ... ... ,, ...	3/-

For 4-ft. diameter circle.

DSR2.	Double Symmetrical Points (2-ft. radius), right ... ... each ...	3/-
DSL2.	Double Symmetrical Points (2-ft. radius), left ... ... ,, ...	3/-

Which are the Six Best Books for Boys?

Which are the six best books for boys is a difficult question to answer, for everything depends upon the taste of the individual reader.

We are anxious to find out just exactly what type of books readers of the "*M.M.*" prefer—whether they prefer fiction to any other class and if so what type of fiction: school stories, adventure, historical novels, detective tales, etc. For this purpose we announce a Competition in which entrants should send a list of what they consider are the six best books for boys.

The books should be arranged in order of merit and the first prize, a No. 1 Hornby Train Set, will be awarded to the reader who places the six books in the order nearest to that order of merit voted for by all readers participating in the competition.

The voting must be on post cards only and they should reach the Editor of the "*M.M.*" before the 31st January next. Mark your post cards "Best Book Competition."

IMPORTANT NOTICE.

We are constantly asked to supply back numbers of the "*M.M.*" Our readers will please note that we print only sufficient copies to fill the regular orders on our books, and back numbers cannot therefore be supplied. In order to prevent disappointment our readers are advised to place a regular order either with a Meccano dealer or direct with us.

OUR MAIL BAG

In this column the Editor replies to letters from his readers, from whom he is always pleased to hear. He receives hundreds of letters each day, and only those that deal with matters of general interest can be dealt with here.

Correspondents will help the Editor if they will write neatly in ink and on one side of the paper only.

S. Leach (Newtown).—We are pleased to hear you think the "*M.M.*" is "a top-hole paper and that it gets better every issue." Your pleasure at its monthly publication is shared by tens of thousand of other readers. We are sorry that on your recent visit to Liverpool you were not able to get up to see us, and note that the closest touch you were able to have was to see a tramcar making its way to "Old Swan!" We hope you will have better luck next time.

R. C. Clarke (Woking).—The lecture on Liquid Oxygen must indeed have been interesting. To see a kettle boil on a block of ice, rubber balls frozen so that they could be cracked like nuts, and tomatoes and meat frozen until they could not be broken with a hammer, was indeed a unique experience. We feel sure that every reader of the "*M.M.*" wishes he could have been with you.

I. P. Fraser (Elgin).—Thank you for your congratulations on the recent improvements in the "*M.M.*" We heartily reciprocate your wishes, Ian, and wish you a very happy New Year.

James Adams (Motherwell).—You are quite right, James, when you say "there seems to be no limit to the possibilities of the Super-Toy, Meccano." We are pleased to hear that you enjoyed the Meccano lecture and that your Club is making such good progress.

T. F. Tonnessen (Bergen, Norway).—You certainly are an enthusiastic supporter of the "*M.M.*" and we have pleasure in entering your subscription, which will not now expire until you receive a copy of No. 64!

H. C. Key (Calcutta, India).—I regret that at present space does not permit of a jokes and riddles column in the "*M.M.*"

V. C. Davey (Ipswich).—We feel sure that all other readers of the "*M.M.*" share your wish to see a photograph of the inventor of Meccano. We must use our best endeavours to persuade Mr. Hornby to be photographed with this end in view.

H. W. Bird (Ulverston).—Thank you for your Riddle-me-ree, but we are afraid that it would present no difficulty to the bright readers of the "*M.M.*" You must try again and give them something more difficult.

R. A. Baldwin (London, S.E.5).—Your rhyme is very good considering your age, but it is scarcely up to our standard. We are pleased you enjoy reading the "*M.M.*"

G. Cowe (Midlothian).—"Latin is dry, the very name is enough, but Science is the opposite. Of course you know all about it."—We do indeed, George, but Latin will perhaps be of more use to you than you can at present understand, and we advise you to persevere and work hard at it.

L. Baxter (Birmingham).—I was particularly glad to know that Meccano has been the means of finding your best chums. A good hobby has often served as a wonderful bond of friendship and I hope you will continue to derive pleasure and instruction from Meccano for many years to come.

W. E. Pickard (Prestwich).—We do not think a rubber stamp for marking note paper would be quite suitable. We have in mind the issuing of special note paper of nice quality and well printed, for the use of Meccano boys only and before long we may be able to announce shortly that this is available.

A. Burnett (Camden Town, N.W.).—Sorry to disappoint you, but at present space in the "*M.M.*" does not permit of the inclusion of "Jokes" columns.

E. Jackson (Dublin).—Thanks for the photo of the rolling lift-bridge at Dublin. If space permits in the near future I shall publish this as an item of engineering interest.

Y. H. Eckert (London, N.2).—I am pleased to hear that you are so delighted with the enlarged Magazine.

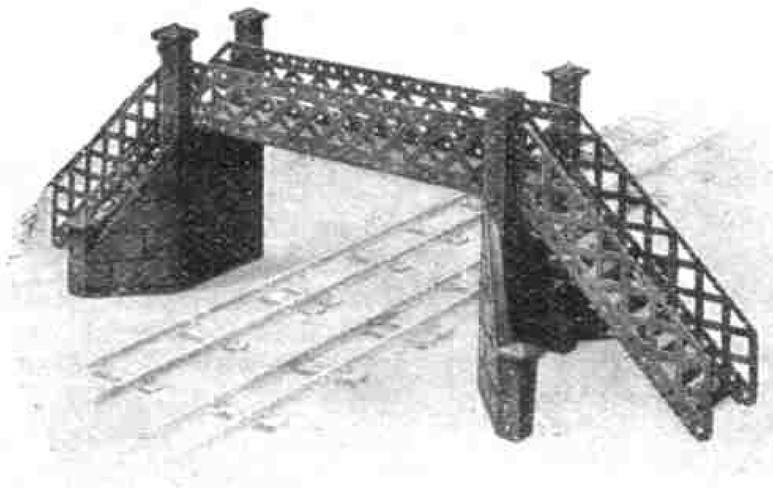
T. A. Gatley (Peel Green).—"I hope you enjoyed your visit to America. I will come with you next time you go, if you have no objection."—Not the slightest objection, T. A., but we fear your parents might object to the cost of the trip. It would be a pleasure to take a boat-load of Meccano boys with us each time.

F. L. James (Cardiff).—We deeply sympathise with you. You must have suffered greatly, but no doubt the amputation of your leg secured you from something more serious. Many thanks for the old "Mechanics Made Easy" adverts, which bring back pleasant memories. We hope you will write to us often.

TRAIN ACCESSORIES

GAUGE O

THE addition of Train Accessories further enhances the fun to be obtained from a Clockwork Train. Every boy possessing a set should provide himself with the complete series of accessories illustrated below. Each unit is strongly built of the finest material and the greatest care is taken in its manufacture, to ensure that the high standard of Meccano Products is maintained.



LATTICE GIRDER BRIDGES

AS will be seen from our illustration these Bridges are of the constructional type, strong and well-proportioned. The design of the well-known Meccano braced girder has been followed in footways and steps, giving realistic and pleasing appearance. The Bridges are beautifully enamelled in colours.

The Meccano system of equi-distant holes has been preserved so that signals made from Meccano strips, etc., may be erected on the Bridges.

Lattice Girder Bridges are supplied disassembled for convenience of packing.

Price ... ... each 10/6

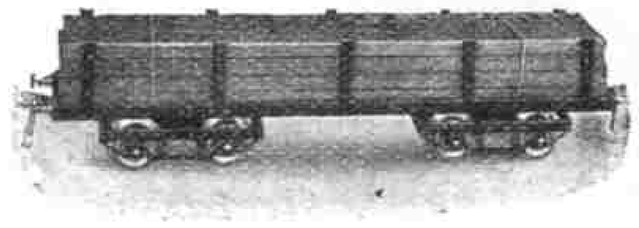
TIMBER WAGONS No. 1

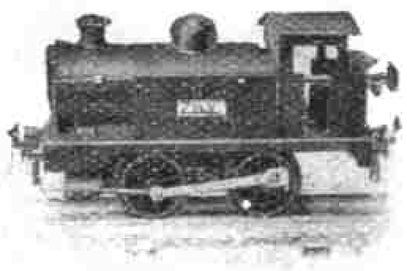
Suitable for all rails. Complete with load of timber ... ... each 2/-

TIMBER WAGONS No. 2

These timber wagons measure 13 inches in length and are beautifully enamelled in colours.

Suitable only for rails of 2-ft. radius (forming circles 4 ft. in diameter). Complete with load of timber ... ... each 5/6

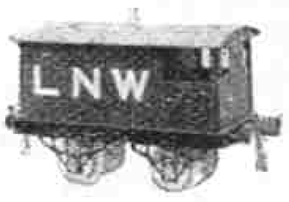




ZULU TANK LOCOS

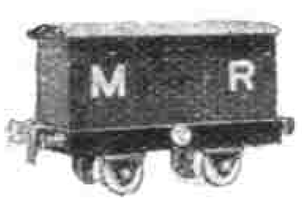
Strong and durable Locos capable of any amount of hard work; richly enamelled and highly finished; fitted with brake, governor, and reversing gear.

In black only ... ... each 12/6



BRAKE VANS

Finished in colour to represent L. & N. W. system each 4/-

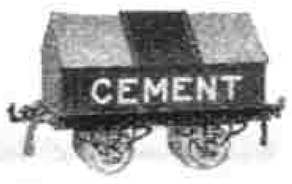


COVERED LUGGAGE VANS

Lettered M. R. ... each 4/6

PETROL TANK WAGONS

Finished in red, lettered gold each 3/6

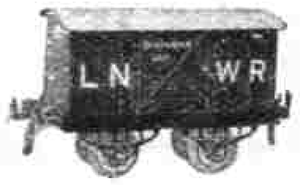


CEMENT WAGONS

Enamelled in colour each 4/6

SPRING BUFFER STOPS

Enamelled in colour each 2/-



GUNPOWDER VANS

Finished red ... each 4/-

C. Cliff (Stone).—We are hoping to start a Stamp Collectors' Column, as well as other new features, in the near future. You are very fortunate in having so many splendid toys and we hope you will derive much pleasure from your Meccano Electric Motor.

V. Atkinson (Liverpool).—Thank you for your rhyme, but although perfectly truthful, it is not up to our usual standard.

J. Mercieca (Malta).—Congratulations, Joseph, on your having won the third prize in the £12 Meccano Competition, held by our Malta Agents. Your entries for the various "*M.M.*" Competitions have been received and will be dealt with in due course. We heartily reciprocate your good wishes for the New Year.

T. Angear (Torpoint, Cornwall).—"My Meccano badge seems to bring me good luck every day.."—We trust your good luck will continue and note you have been requested to give lessons in Meccano at your school. You will find full particulars of models that may be constructed with a No. 5 Outfit in the Meccano Manual.

ADVERTISEMENTS

In response to numerous requests, it has been decided to accept small miscellaneous advertisements in the "*M.M.*," commencing with the March issue. The rates are 1/- per line (average 7 words to the line) or 10/- per inch (average 12 lines to the inch). Further particulars will be sent on request. Address your letter to ADVERTISEMENT MANAGER, *Meccano Magazine*, Binns Road, LIVERPOOL.

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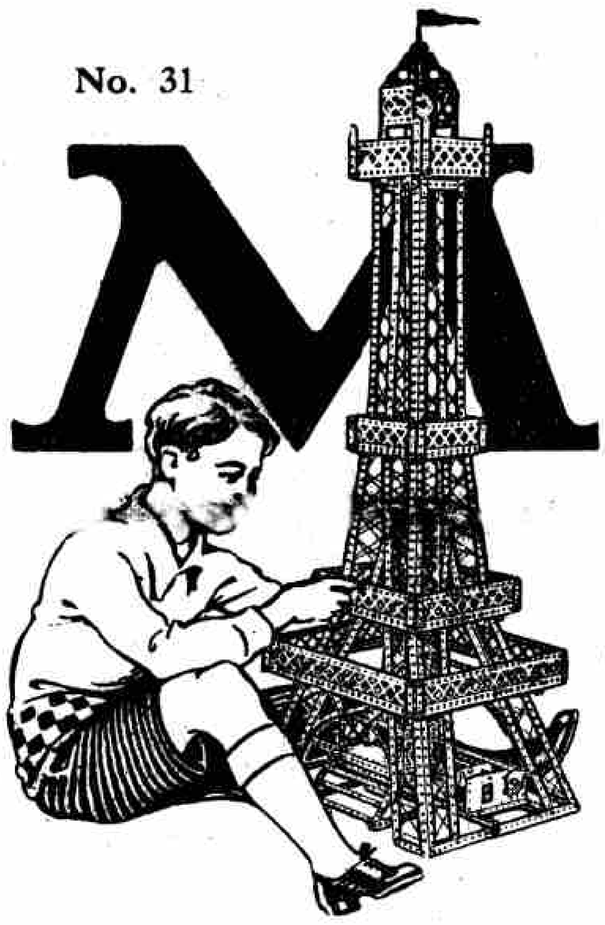
Printed by The P.P. Press, King Edward Street, Liverpool.

THE NEXT NUMBER OF THE "M.M." WILL BE PUBLISHED ON 15th MARCH

No. 31 FEBRUARY 1923



MECCANO MAGAZINE

PRICE 1d

PUBLISHED IN THE INTERESTS OF BOYS

EDITORIAL

OF all the bad habits that human beings acquire, I think the one of indulging in gloomy and depressed thoughts is the worst and the easiest to fall into. We all know those people who habitually look on the black side of everything. To such, a cut finger calls up visions of certain blood poisoning! A bad cold means nothing less than premature death from pneumonia!

A Bad Habit.

The same boys will say harsh ungenerous things of their Headmaster, and will speak with contempt and scorn of the accomplishments and character of their form-masters or teachers. These boys, with habitually pessimistic, grumbling and complaining minds, are to be pitied. Not only does their state of mind give rise to miserable thoughts in others, but they are unhappy themselves, because they have fallen into bad habits of thought, which are souring their lives.

It is just as easy to acquire good, healthy, happy thoughts if you really wish. To "look on the bright side of things" is a phrase that we often hear, but one to which we too seldom pay serious attention. Yet happiness is largely dependent upon our being able to see the silver lining and to ignore the dark clouds.

The Bright Side.

Do you enjoy grapes because of their fine flavour, or do you detest them because they contain so many seeds? Do you think rain is a blessing because it makes things grow and lays the dust, or a nuisance because it makes mud? Is a bee a creature producing gloriously flavoured honey, or is it a horrible buzzing insect with "a sting in its tail"? Everything that happens in life can be looked at from two points of view—the bright and the gloomy. It is up to ourselves to take our choice and to be happy or miserable, as we elect.

Two Points of View.

One of the finest qualities in a boy is the quality of seeing what requires to be done, and doing it without being told. A gardening tool is left out on the lawn, there is a rail off the fence, a lock has come away from the door or a window-frame has "gone" somewhere. The boy who attends to these things, without specific instructions, is the boy who—other things being equal—will be in demand when he gets out into the great world. It is the attention to the little things, and the habit of observing that which needs to be done and then doing it, that enables boys and girls to become exceedingly useful men and women. There is always a position open for such persons and there will always be a call to "come up higher."

The Boy in Demand.

Good Things Coming

There are many interesting articles, with splendid illustrations, in store for future numbers of the "*M.M.*" In an early issue we shall publish an article describing the world's greatest liner, the "Majestic." Articles dealing with giant cranes, turbines, and other remarkable machinery are only waiting an opportunity to be published.

In the Radio Section several articles of great interest to Radio enthusiasts are in hand, including illustrated articles dealing with the world's largest Radio stations.

We have also arranged for a special series of articles—extending over several issues—describing the work of the early pioneers of wireless telegraphy and giving a short account of their inventions. The articles will show how Marconi formed the first practical system of wireless, and the history of the subject will be traced up to the time of the first trans-Atlantic message transmitted from Cornwall to St. John's, Newfoundland, in 1901.

Whoop! Whoop!! Whoop!!! Red Indians!

RED HAWK, THE IROQUOIS INDIAN, IS COMING

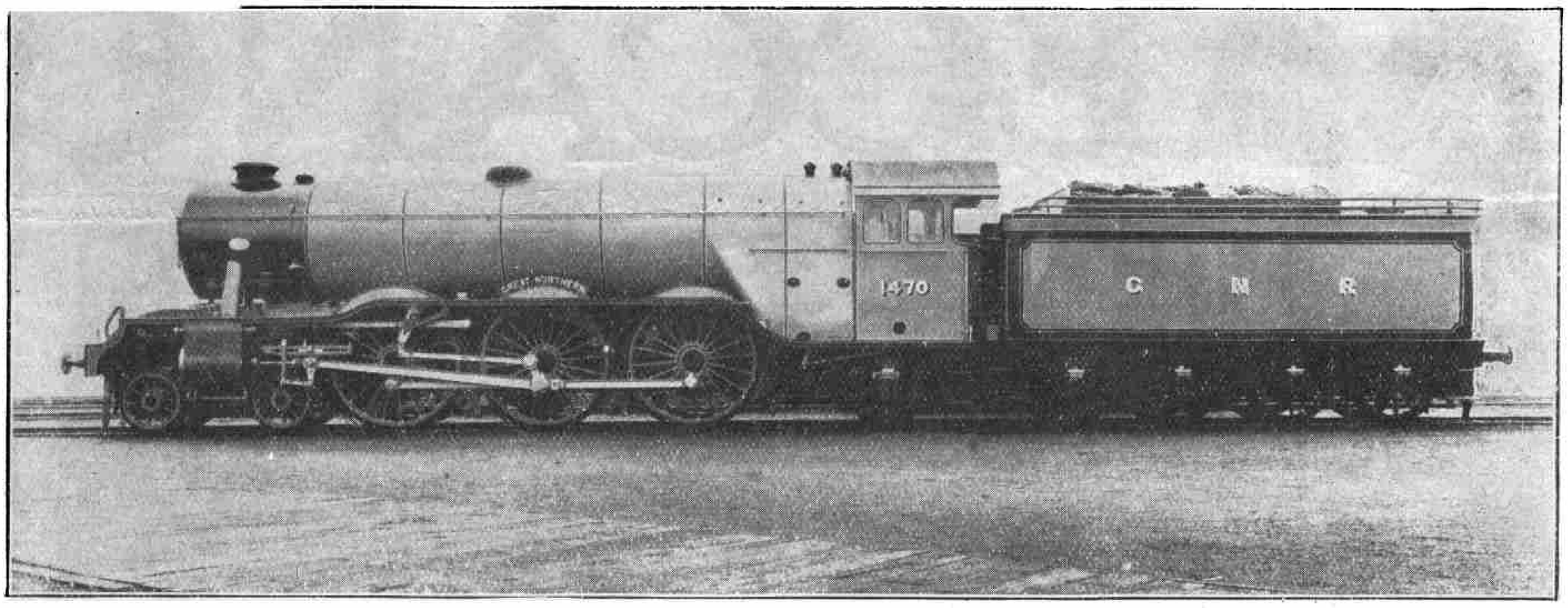
He will arrive on the 15th March in a splendid serial story "*A Night at the Pool.*" This story, which will run over three issues of the "*M.M.*," has been described as being one of the best Red Indian stories ever written.

"*A Night at the Pool,*" the first serial to appear in our pages, is printed in response to hundreds of requests for a serial story. Whether further serials appear in future numbers depends on the views of our readers, and we invite them to express their opnions.

There will be a big demand for the *Meccano Magazine* and you should ensure your copy by placing your order *NOW*, either through your dealer or direct with this office. Sixpence will cover six issues or one shilling twelve issues, sent post free.

Super Locomotives and Their History

WHAT THE FUTURE HOLDS FOR US



Photograph by permission of the [*Great Northern Railway Co.*

The 'Pacific' Type: "*The Great Northern.*"

Details of the "*Great Bear.*"

Cylinders	Four
„ diam.	15 in.
Piston Stroke	26 in.
Working pressure, per sq. in. ...	225 lbs.
Wheels—	
Coupled, diam.	6 ft. 8½ in.
Bogie „	3 ft. 2 in.
Trailing „	3 ft. 8 in.
Heating Surfaces—	
Fire Box	sq. ft. 158
Tubes	„ 2596
Superheater, heating surface ...	„ 505
Total	„ 3259
Grate area	„ 41.79

(*Conclusion.*)

The "*Great Northern*" includes almost every known improvement and its footplate has been stated to be the most comfortable and convenient to be found on any British locomotive. This wonderful locomotive was built at Doncaster to the design of the Great Northern Company's Chief Engineer, Mr. H. N. Gresley, by whose courtesy we are able to reproduce the accompanying photograph.

Prior to the introduction of this new locomotive, there was considerable speculation among the railway engineers as to the form that any new locomotive would take. At one time it was rumoured that an engine of the 2–6–2 type was being built at Doncaster, this wheel arrangement being favoured because of the very high speeds (of 70 miles and over) that have been reached and maintained by engines of this type. The new locomotive proved to be a 'Pacific,' however, and it has naturally been the object of a great deal of interest.

Interesting Details.

Although using shorter tubes, its designer added 5 inches to the diameter of the boiler, and yet retained the same general character of the exceptionally large and long boiler of the "*Great Bear.*" A Robinson superheater is fitted and Wakefield mechanical lubricators are employed for the steam-chests and cylinders.

The tender, which is mounted on eight wheels without bogies, has a water capacity of 5,000 gallons as compared with the 3,500 gallons of the "*Great Bear,*" and is also fitted with a water pick-up apparatus.

The "*Great Northern*" has three cylinders, two of which are outside the frame and placed horizontally above the bogie to drive the middle pair of coupled wheels. The third cylinder is inside the frame, placed at an inclination of 1 in 8 and located over the rear axle of the bogie.

Novel Valve-Gearing.

A difficulty with a three cylinder locomotive, as compared with one of two or four cylinders, is that of arranging for an efficient distribution of steam without the necessity for separate valve gearing for each cylinder. Mr. Gresley had previously devised and patented a form of gearing in which the system of steam distribution for the inside cylinder is on similar lines to that of the outside cylinders, and this form of gearing was adopted in the "*Great Northern.*"

All three cylinders drive on one axle, the three crank pins being set at relative angles of 120 degrees to each other. There is thus always a piston in position ready to take steam. This is a decided advantage, for when an engine comes to a standstill with its pistons on "dead centre," it cannot "get going" again until it has backed a foot or two, to enable the pistons to be moved into position to take steam for forward progression.

THE END.

Details of the "*Great Northern.*"

Cylinders	Three
„ diameter	20 in.
Piston Stroke	26 in.
Working pressure, per sq. in. ...	180 lb.
Wheels—	
Coupled, diameter	... 6 ft. 8 in.
Bogie „	... 3 ft. 2 in.
Trailing „	... 3 ft 8 in.
Heating Surfaces—	
Fire Box	sq. ft. 215
Tubes	„ 2715
Superheater, heating surface	„ 525
Total	„ 3455
Grate area	„ 41.25

Magazine Binder.

In response to numerous requests we have introduced a spring-back binder for *Meccano Magazines*. The binder has a strong stiff back, covered with imitation leather, tastefully tooled. It takes a large number of copies and keeps them neat and clean. In black, lettered gold. Price 3/– each, post free

GIVING AWAY £250

Not so Easy as it Looks

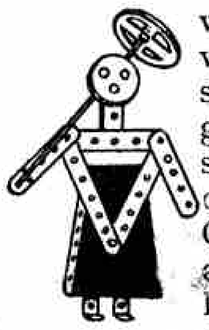
AS readers of the "*M.M.*" know, the closing date for the 1923 Meccano Model-building Competition is now drawing near. We hope that every Meccano boy will enter this Competition, and that he will send in his entry well before the 15th April next. Already entries have been received in large numbers, but the judges will not set to work until after the 15th April.

The task of adjudicating is always difficult. Imagine the thousands upon thousands of entries with their accompanying photographs or drawings, each one of which has to be carefully scrutinised and the model's original points examined. Meccano boys are found in nearly every land, and so entries come from all parts of the world. Those in foreign languages have first to go to our translation department, so that they may be translated into English. French, Dutch, Spanish, Italian, Norwegian and Swedish, are the languages generally used, although occasionally entry forms are received in the weird characters of Chinese, Russian or Bulgarian. Of course by far the greater number of entries are in English, from the United Kingdom, our Colonies and Dominions overseas, as well as from the U.S.A.

I am sure all Meccano boys wish they could be here to help Mr. Hornby and his assistants in their great task of making the awards. Well, although you boys cannot be here, you *can* help the judges a great deal by carefully and correctly filling up your entry forms, and more particularly by writing legibly. If the judges cannot read what you have written there is not such a good chance of their being able to understand the important points of your model. A brief description of your model what it is, what it will do, and what are its original features—helps considerably and claims the attention of the judges. Do not make your description too long. One Meccano boy in a former competition used up twenty sheets of foolscap, and then wrote us that he could not finish all he had to say about his model because he was short of paper! That was in war-time, of course, when paper was controlled, but now that paper is not rationed, I hope neither he, nor any one else, will inflict twenty sheets of descriptive matter upon the overworked judges!

Some boys have the happy knack of attracting the judges' attention. One entry was a model of a hay wagon—just an ordinary little wagon such as hundreds of boys enter in every competition. But before photographing his wagon this boy loaded it with hay, making it look so attractive that its original points were at once apparent.

Send all the particulars about your model at one time. The competitor who



wrote: "If you think I shall win a prize tell me, and I will send another and better photograph of my model" could scarcely expect to have much chance! When you enter the Competition try hard to win a prize on merit. Do not feel like the boy who wrote: "I don't want a prize and I am only sending in my model for the good of the other fellows."

If possible the illustration of your model should be a photograph. If you cannot obtain a photograph, however, a good clear sketch will serve the purpose, with a short description. We receive hundreds of photographs that can only be understood by the boys who have sent them. Some appear to have been taken by the light of a candle. The prints of others are not even "fixed," and they very quickly turn black and the once beautiful model exists no longer!

When describing or photographing a model remember that the judges have never seen your model and know nothing at all about it. You have probably thought about it and worked on it for weeks, or even months, so that every little detail is clearly impressed upon your mind. You should describe or illustrate your model so that these details may be fully understood by the judges. There is no necessity to go to any expense over the illustrations, for it is not the merit of the photograph but of the model depicted, on which a decision is made. Whether photographs or drawings they must be clear so that the judges may at once see the model's best points.

Write on one side of clean paper only. One entry that we received looked like an announcement of a sale. It advertised farming machinery, etc., by auction and a free lunch at noon to those who attended the sale. The judges were just putting on their hats and coats to attend the sale when they accidentally saw from the other side of the announcement that it had a model sketched on it and was an entry for the Competition! You may imagine their disappointment!

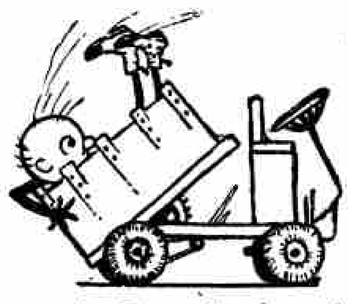
Don't forget to write your address on the entry form. If you win a prize the postman won't be able to deliver it, if he only has your name to go by!

The choice of names for competing models is not always happy. One model was called "My Journey Over the Mountains," but it was not at all clear what connection this title had with the model, which appeared to be a combination of a dentist's chair and an electric tramcar! Then again a title such as "The Old Oaken Bucket" cannot truthfully be applied to a model made of "shining steel and brass." The name given to a model is not everything, however, for the boy who called his model "Hope" did not win a prize, nor did another, who chose for his model the extraordinary name of "Buldozer."

All the models submitted are not attractive—a remark that applies to a model of a new type of gallows: scarcely a suitable subject for inventive Meccano boys! Sometimes the competitors are not lacking in a sense of humour. One competitor pointed out that although it was a condition of the competition that the models should be made of Meccano, he had made his "out of his head!" Another gave a description of the underneath part of a motor-car and entitled it "worm's-eye view"—the opposite, we suppose, to a "bird's-eye view." Some competitors embellish their drawings with humorous touches. A hay-stacker was decorated with comic men and horses, and part of a model "A New Idea in Swings" was shown supporting a sketch of a parrot.

Models that actually work and models that do what they are intended to do, are naturally more appreciated by the judges than those models that fail in both respects. A crane that refuses to hoist, and a Meccano glass-cutter that won't cut glass, are robbed of much of their interest.

In every Competition there are numbers of old friends. By this I do not mean boys who have won in previous years, but models that we have seen many times. Aeroplanes by the hundred, motor-cars and cranes, many of them taken direct from the Manuals. Sometimes an entry form bears the legend "here is a new device I have invented for the Competition." Often it is such an old friend that we recognise it at once, although it may be a new invention to the boy who sent it in.



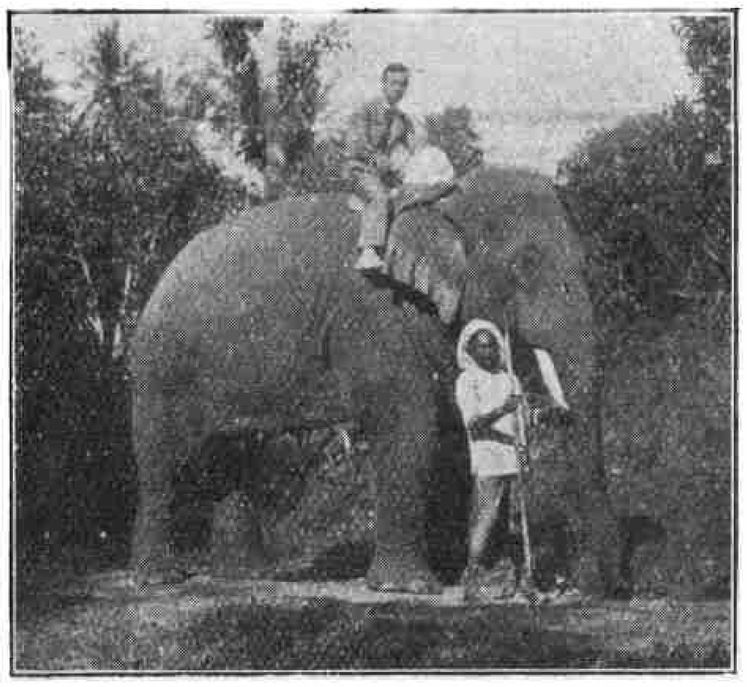
We realise it must often happen that when building, say, a model motor-wagon a boy may think of a new tipping device. Although already known to motor-wagon builders, the fact that the boy thought out the device himself causes him to describe it as being new.

From the letters we receive there is no doubt that Meccano boys obtain a vast amount of pleasure from our annual Model-building Competition, and they do not hesitate to tell us so. The building of the models is itself a pleasure, and the prospect of a prize adds zest to their endeavours. The overcoming of difficulties and the inventing of new movements encourages boys to persevere and to think intelligently. There is pleasure and there is profit in this great Meccano Competition, so send in your entry now. **If your dealer cannot supply you with an entry form, send us a postcard, and we will mail one to you by return. Closing date 15th April next for the United Kingdom, and 30th May for Overseas and foreign countries.**

Photographic and Photo-Essay Competitions.

Results—Overseas Sections.

The overseas section of the Photographic Competition has been a great success, the entries being very numerous and the standard of work high. There is no doubt that Meccano boys overseas are keen competitors with the boys in this country in photography as well as in Meccano model building.



First Prize: by Master Billimoria.

Many excellent photographs were submitted, the subjects generally being of a very interesting nature and including elephants, Zulu warriors, Indian temples, etc. After careful consideration I have pleasure in announcing the result as follows :—

(1) Master B. K. Billimoria, Kandy, Ceylon.
(2) „ E. H. Whitney, East London, S.A.
(3) „ R. Bandiera, Florence, Italy.
(4) „ G. Adamson, Eshowe, Zululand, S.A.

The Prizes have been despatched to the winners, and I congratulate them on their well-earned successes.

PHOTO-ESSAY COMPETITION

I have much pleasure in announcing the winner of the Overseas Photo-Essay Competition

Master J. F. Parker,
Salisbury,
Rhodesia, S. Africa.

I congratulate Master Parker on his well-written and well-illustrated essay, and would say that this competition brought some very interesting essays from overseas. I sincerely hope that I shall see more of the work of the entrants in future Competitions of a similar nature.

Second Prize: by Master Whitney.

In the Canary Islands

BY MASTER M. WHITCOMBE

An apprentice on a tramp steamer, I found myself convalescing last October in the Island of Teneriffe, after being put ashore for an operation. When this was over and I was able to walk about and see the place, I soon made friends with some native boys. These boys frequently used to take me for walks over the island, generally to a very pretty village which is called La Laguna. As the Canary Isles belong to Spain, everybody of course speaks Spanish there, and being a very easy language I soon picked up quite a lot.

One day, they explained to me that a captain of an English steamer had given them a No 4 Meccano Outfit, amongst other things, in recognition of some small service they had done for him. Unfortunately there was no Manual of Instructions with the Outfit, and being unacquainted with nuts and bolts, gear wheels, girder strips and other engineering parts, the native boys were very puzzled as to what use they might be put. This is not as surprising as it may seem, for I may mention that there are no great bridges, cranes or other engineering wonders in the Canaries—except a tram service, which is so ancient that I imagine the rails must have been laid by Noah or his family!

Being an enthusiastic Meccano boy myself, I soon enlightened them as to the uses of Meccano parts. I made them a Telpher Span, and fixing one line on the side of a steep hill, laid the gear box at the bottom; You should have heard the screams of delight when they saw the carrier come whizzing down the line on a 1 in 3 gradient!

Soon, all the children in the district wanted to work the Telpher. Then I made them a Swing Bridge, Girder Crane, and a Roundabout, and you can judge of their delight. Every day afterwards, instead of begging pennies, as they usually do, it was "*Mec-y, Mec-y,*" whenever the native boys saw me.

One day Gregorio, one of my friends, showed me a shop window where some Meccano Outfits were for sale with a Meccano Manual printed in Spanish. So I bought the Manual for him and his friends, and by the time I left for England in one of Elders & Fyffe's boats, they had obtained a good insight into the science of engineering. Such a regretful "*Adios Amica*" ("Good bye, my friend") I never heard before.

Famous Poet's House.

Photo. by] [*Master E. H. Daniels.*

Every visitor to Stratford-on-Avon is familar with Shakespeare's House shewn in the above photograph. The immortal Shakespeare's association with this beautiful town causes it to be the objective of large numbers of visitors, especially from America.

Results of "Best Magazines" Competition

We have pleasure in announcing that the prize has been won by Master Ronald G. Farrant, of Tonbridge, the entrant who out of a very large number, sent a list of Magazines in the correct order as voted for by the whole of the competitors.

The winning list is as follows:

1. "The Boy's Own Paper."
2. "My Magazine."
3. "Chums."
4. "The Captain."

A large number of entries were received for this Competition and many and varied were the reasons given for the popularity of the selected magazines.

The first prize of a Hornby Clockwork Train Set has been awarded to Master Kenneth H. Cripps, Hertford, who chose *My Magazine* as his favourite.

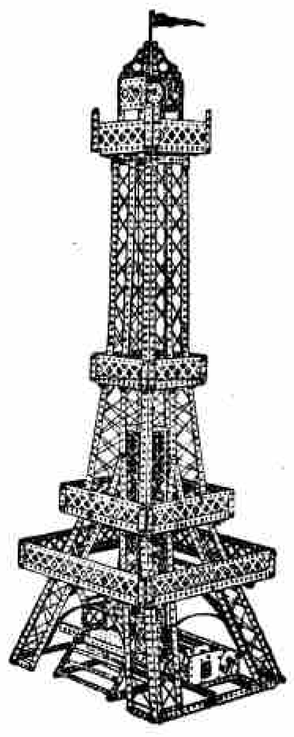
A second prize of a Clockwork Motor has been despatched to Master E. W. Goate, Gt. Yarmouth, whose choice is *The Boy's Own Paper.*

Canadian Boy says his Model Tower is a Pippin.

GREGG, MANITOBA,
CANADA.

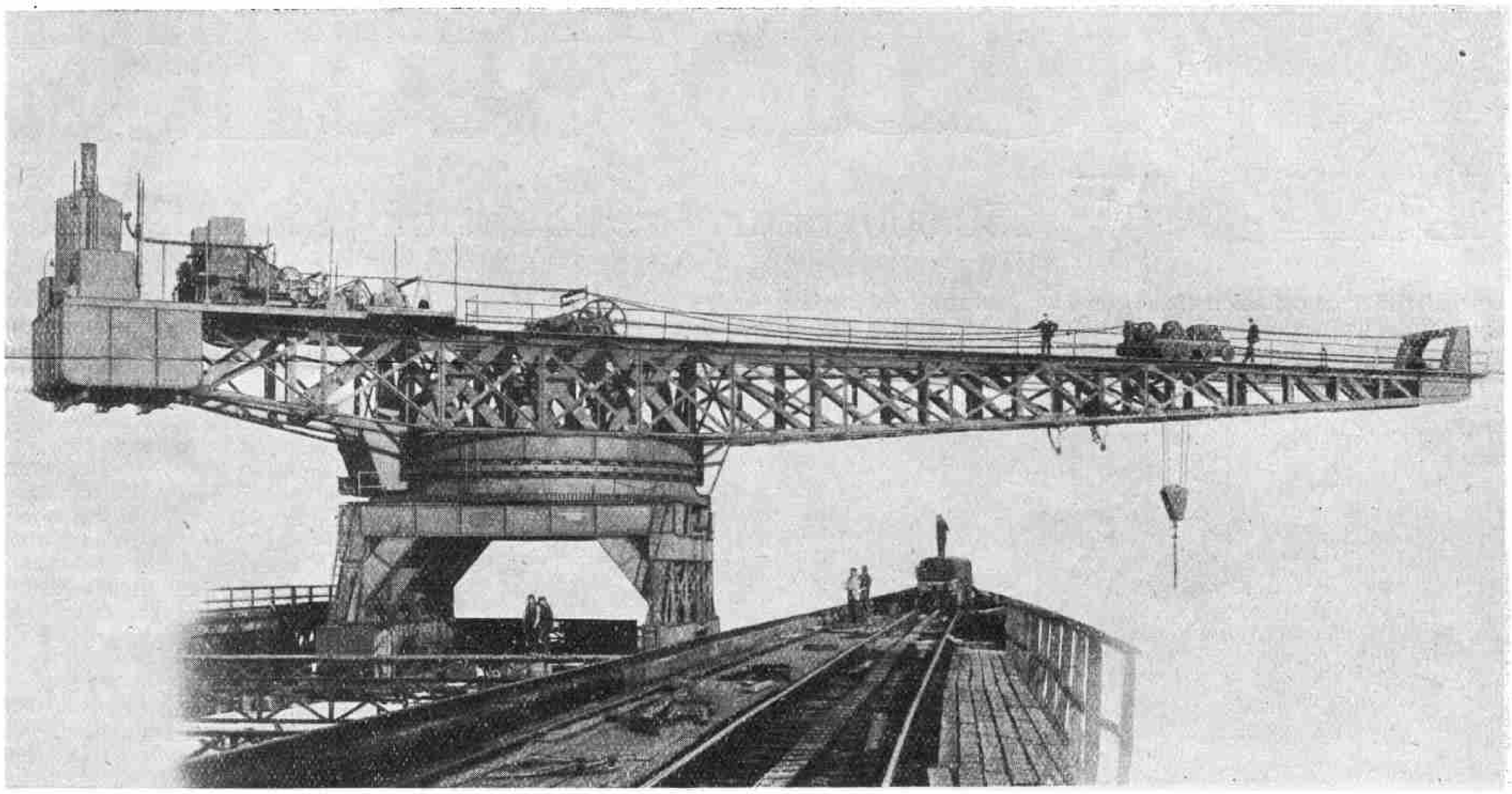
"DEAR MECCANOMAN."

I remember reading somewhere in the Meccano literature of the happiest boy in the world. He had just finished building the Eiffel Tower and I can quite believe that his claim to be the happiest boy in the world was the truth. I have just completed this same model, and for smoothness of operation and beauty of design, I think it just wonderful. Many models have I built with my Outfit during my five Meccano years, but none have made me sit back and get an eye-full like this one. I simply had to take my hat off to it! At present it is standing in the parlour and I am as proud of it as though it was a statue of Napoleon. I'll tell the world she's a pippin!



Yours Meccanoized,

C. W. MERRY."



A Giant Block-Setting Crane

40-TON "TITAN" FOR SOUTH AFRICA.

We have already illustrated in the "*M.M.*" large pontoon cranes and the largest hammer-head crane in the world. We now have pleasure in describing a giant crane of another type. This huge engineering structure was built for use in the construction of Table Bay Harbour, South Africa, by Messrs. Cowans, Sheldon & Co., Ltd., of Carlisle, by whose courtesy we are able to reproduce the accompanying photograph. The particular crane illustrated is one of the largest cranes of this type, and although designed for lifting blocks of up to 40 tons weight, has been tested to 50 tons.

A New Type of Crane.

The Titan type of crane was evolved some years ago when the block system came to be generally used in the construction of harbours and breakwaters. Improvements in the manufacture of cement enabled massive blocks to be cast in special yards on the shore, near the scene of operations. When placed carefully in position and locked together, these blocks present a solid front to the devastating action of the waves.

In the employment of this method it became necessary to introduce a new type of crane, the chief essential of which was that it should be mobile, not only so as to move along the pier as the work progressed but also so that it might be withdrawn to shelter in bad weather. It was also required to be capable of handling heavy blocks of 30 or 40 tons weight over a radius of 100 ft. or more.

These requirements are met by mounting a long cantilever arm on a turntable, which itself rests on a massive metal foundation, mounted on flanged wheels running on a special track. As will be seen, the girders and superstructure are lattice-built, in order to reduce their resistance to the tempestuous winds to which the crane will be exposed.

Revolving on Rollers.

The superstructure revolves on a roller path 32 ft. in diameter, being carried on a series of turned steel rollers. These are kept in position by a suitable frame, revolving on machined pathways formed on the upper and lower circular girders. The revolving structure is centred by means of a large steel centre pivot, securely attached to the Crane carriage. Revolving motion is transmitted from the engine, through a train of spur and bevel gearing, which engages in the segmental spur rack formed round the exterior of the lower roller path. All the gearing of the crane is thoroughly protected from the weather.

The height of the rail on the cantilever is 36 ft., the cantilever itself having a total length of 175 ft., extending for 50 ft. from the centre to the tail and for 125 ft. from the centre to the nose. The counterpoise, or ballast, consists of 120 tons of concrete blocks, stored in a steel plate box beneath the boiler.

The crane weighs 425 tons and can handle a load of 40 tons over an area having a maximum radius of 155 ft. It can lift this load to a height of 21 ft., or lower it to 74 ft. below the level of the rails upon which it runs, giving a total range of lift of 95 ft.

The crane is steam driven, the engines and boiler being mounted on the "tail," or shorter end of the cantilever. The engine is of the ordinary two-cylinder type, provided with link motion, reversing gear and slide valves. The cylinders are 12 ins. in diameter and of 18 in. stroke. The boiler is 12 ft., in height and 6 ft. in diameter.

A Useful "Crab."

The load is lifted by means of a "crab," or monkey, drawn along the cantilever by steel ropes. A lifting rope, 1,341 ft. in length and 4 ins. in circumference, passes over this crab to the hoisting-block. The crab is capable of moving 10 tons at 30 ft. per minute and may be worked from the end of the cantilever, special provision being made for working a grab or dredger.

The hoisting speed upon slow gear, when lifting 40 tons, is 8 ft. per minute. When racking upon slow gear with the same load it is 20 ft. per minute, and 50 ft. per minute upon quick gear. The crane can develop a speed of 50 ft. per minute with a maximum load of 40 tons, and under the same load can slew through a complete revolution in 3 minutes.

The entire crane is mounted on 16 pairs of spring-mounted steel-tyred rail wheels (8 per side) arranged to travel on tracks of 3 ft. 6 in. gauge. Four pairs of rail wheels on each track are driven from the engine through a train of spur and bevel gearing, and finally, by link chains and steel sprocket wheels.

Pierhead Bridge in Mammoth's "Teeth"

The 200-ton floating crane "Mammoth" (which was illustrated in No. 21 of the "*M.M.*") has recently demonstrated its capabilities during a series of lifts in connection with the modernising of the Landing Stage at Liverpool. The giant crane brought in its "teeth" a heavy bridge from Princes Jetty, where it had been built in sections, and placed it in position on the Landing Stage The ease with which the massive structure was handled drew many appreciations from the spectators.

RADIO SECTION

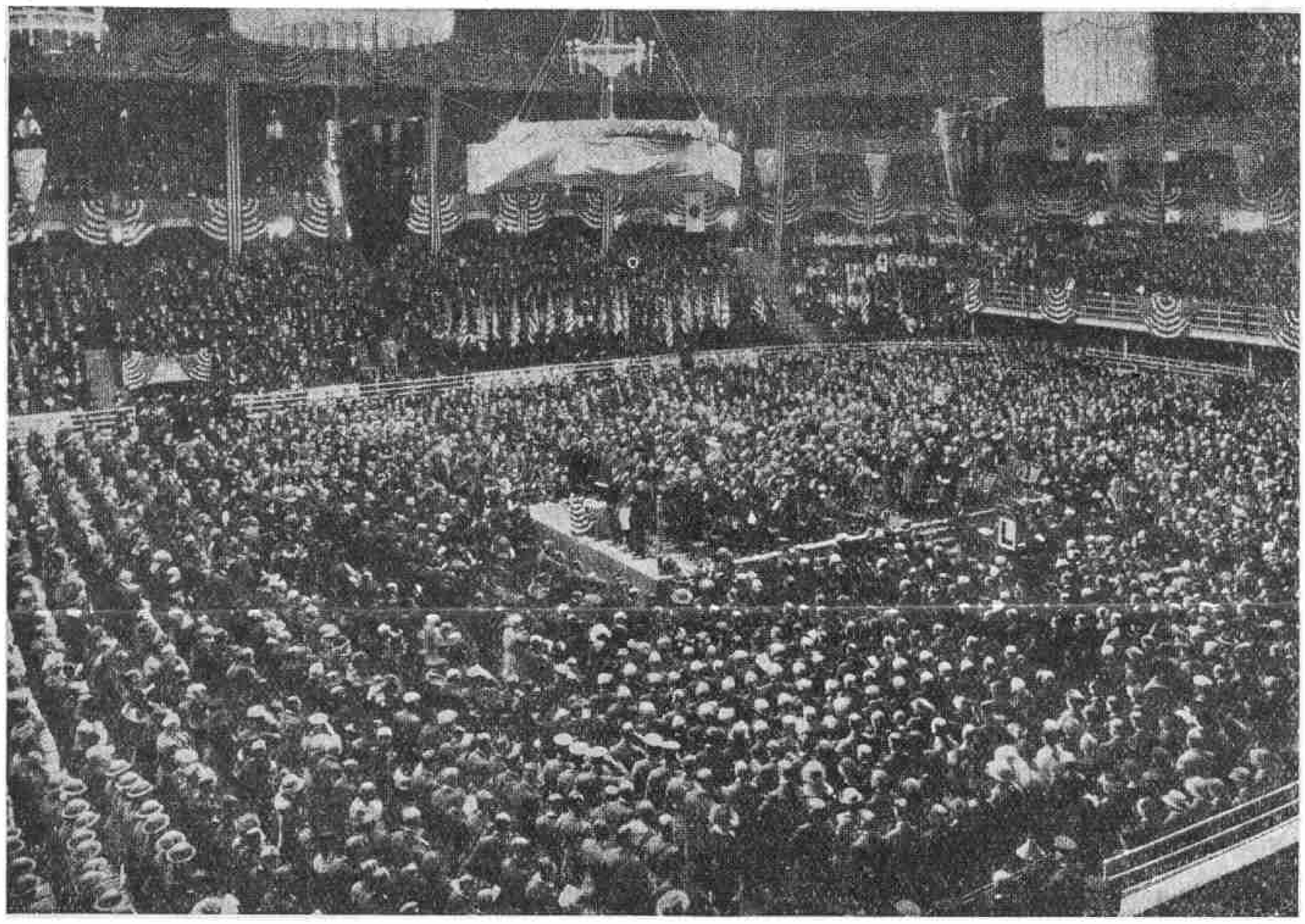
250,000 hear President of U.S.A. talking

A wonderful demonstration of the benefit that Radio may confer upon the human race was given on 11th November last year. On this anniversary of Armistice Day an unknown American soldier was buried at Arlington, Virginia, following the lead given by Britain, when an unknown British soldier was buried at Westminster Abbey.

The President of the United States addressed a vast audience of several thousand people, who were assembled for a special service in the Memorial Theatre. Great crowds surrounded the Theatre and were unable to gain admission, the total number of people present being about 100,000. By special arrangement the President's voice was received by microphones on the platform and transmitted to loud speakers outside the building, so that the whole of the great crowd there assembled was able to hear his address.

In addition to this, it was arranged to broadcast the President's address in some of the chief cities of the U.S.A. His voice was distinctly heard simultaneously by about 30,000 people in New York (250 miles distant), 20,000 people in San Francisco (3,700 miles). At Washington, the crowds overflowed the amphitheatre where the loud speakers were installed, and covered the surrounding hills. Our photograph shows the audience inside Maddison Square Gardens, New York, listening to the President's address broadcast from Arlington. There was not the slightest difficulty in distinctly hearing every word spoken by the President at Arlington.

This great achievement in Radio broadcast was mainly due to the work of the engineers of the Western Electric Company, by whose courtesy we are able to reproduce the accompanying photograph.



The above illustration shows part of the vast audience at Maddison Square Gardens, New York, which, by means of loud speakers (seen hanging in the centre of the photograph) and radio broadcast, heard the address given by the President of the U.S.A. at Arlington, 250 miles distant.

Two Daimler cars fitted with wireless apparatus recently travelled from London to Chelmsford and back. During each journey the passengers of both cars listened to conversation and music transmitted from Marconi House and Writtle.

* * *

A long-distance wireless telephone conversation was recently reported by Captain Voldborg, of the Scandinavian-American line. For more than five hundred miles he was able to maintain conversation with the shore station at Copenhagen. With powerful wireless telegraph apparatus, he was also able to keep in touch with Nauen (Germany) up to a distance of 2,100 miles.

* * *

Electric light wires are being used in the United States as aerials for valve sets. A special adapter is used in place of the ordinary electric lamp. We do not recommend our readers to experiment in this connection, however, unless they are fully conversant with the working of an electric light installation. They may not only fuse the lights but damage their apparatus and injure themselves as well!

* * *

Mr. Marconi states that in the immediate future it will be possible to speed up wireless transmission, so that the sending of messages at the rate of 200 words a minute becomes an accomplished fact. Needless to say, such transmission will be carried out by mechanical means, as would also the reception of the messages.

The Swazis who live in the wilds of Africa refused to believe it possible to speak from one distant place to another. When radio telephony was demonstrated to them, they were dumbfounded, and at once held an "*indaba*" or special mass meeting. Here it was decided that, in the event of war, they wanted to be on the white man's side!

* * *

The high frequency generators, weighing several tons, and only recently installed at the great French Station of Sainte Assise, are stated to be obsolete already. It is declared that they have been superseded by a new invention.

* * *

While sailing for Rio, the Royal Mail steampacket "*Darro*" recently received a wireless call from the Steamer "*Somme,*" some 70 miles away. The message stated that the chief engineer was seriously ill. Arrangements were quickly made by which the steamers met, and the suffering officer was carefully transferred to the "*Darro,*" where an operation was immediately performed by the liner's surgeon.

Dr. de Forest and his Wonderful "Audion"

When Dr. Lee de Forest commenced his scientific experiments, in the summer of 1900, he lived in Chicago. Here he rented a room for which he paid 10/– per week, and it was in this room that he discovered an appliance that has been of remarkable importance in modern Radio work. As was the case when Edison discovered the leaping electrons, Dr. de Forest at first thought that his discovery was only a strange phenomenon, but later he realised its immense importance.

It is interesting to hear how Dr. de Forest made his discovery. One night in 1900 he was experimenting with a new detector. As he could not rely upon receiving signals from an outside source (for in those days Wireless signals were few and far between) he had to use a small transmitting set in order to be sure of receiving signals. He had installed his transmitting apparatus in the room in which he was working, operating it by means of a string, with the sparking coil in a cupboard about 10 feet, away.

Coil Affects Gas Mantle.

Dr. de Forest was surprised to notice that when he closed the circuit and caused the coil to spark, there was a decided change in the light given out by the incandescent mantle that was illuminating the room. While the coil was sparking, the light decreased very materially; as soon as the sparking ceased, the light at once resumed its normal brilliance. Dr de Forest was greatly impressed by this phenomenon, and his interest was so aroused by the peculiar set of facts described, that he commenced a series of experiments with the incandescent burner. As a result he came to the conclusion that "heated gas molecules are sensitive to high frequency electrical oscillations."

Having investigated the matter so far he shelved it for the time being and engaged in other experimental work. Three years later, however, he returned to the subject and commenced a series of extensive experiments, using various types of Bunsen burners.

As a result of these experiments he discovered that a flame of a certain type might be successfully used to detect electric waves.

The Flame Detector.

It is interesting to note that Dr. de Forest's flame detector was subsequently used successfully for receiving wireless signals from ships in New York Harbour. This type of detector required a large supply of gas, however, and as there were many other difficulties in the way of making its use commercially possible, Dr. de Forest became convinced that he was not working on correct lines. He therefore endeavoured to obtain the same results by other means, and to this end introduced an electric arc as a detector. As this method was found to be very noisy and to give irregular signals in the telephone receiver, however, it was abandoned.

The First Valve.

Up to this time the detectors usually employed had all been solid or liquid, but in his next invention Dr. de Forest used heated gas for the first time. He used ~~an incandescent filament in an enclosed~~ glass bulb, and this was the foundation of his vacuum tube. Dr. de Forest took out his first patent in June, 1906, and realised the great importance of his discovery to Radio, expressing the opinion that "the Audion, the most sensitive detector in the world to-day, is, I consider, my greatest achievement."

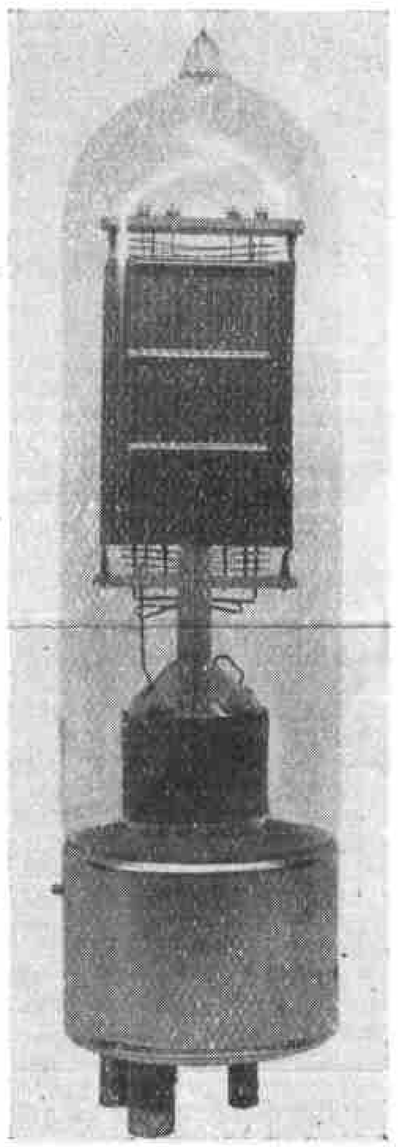


Photo by] [Western Electric Co.

A 250-watt Thermionic Valve, which operates with a current of 1600 volts on the plate.

Dr. de Forest now claims that he was thus independently led to develop the Audion, and that he did not base his discovery on Fleming's Two Element Valve as is generally supposed.

Because of the very many developments of Dr. de Forest's Audion it is believed that we are but on the eve of great possibilities and that its many applications may make possible important discoveries in several branches of science.

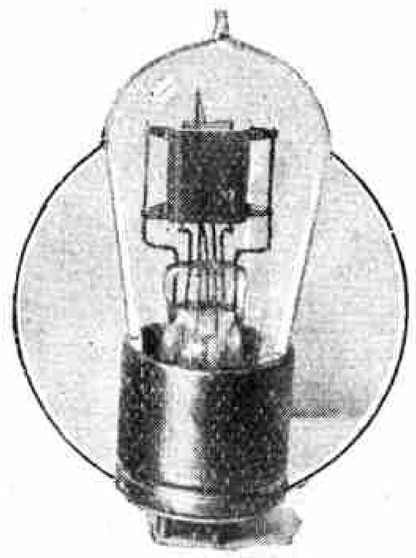
The Many Applications of the Valve.

In the summer of 1912, when at work in his laboratory at Parlo Talto in California, Dr. de Forest discovered that the Audion could be made to oscillate or to generate alternating currents of any frequency. It may thus be used for transmitting purposes and it is this transmitting valve that, in its subsequent highly developed form, has enabled broadcasting to become an accomplished fact.

The Audion may also be used as telephone relay, and in this connection has been extensively employed in America.

One of the most interesting developments of the Audion is the reproduction of synthetic music. In this connection a demonstration of the musical Audion, made before the New York Electrical Society in 1915 proved of very great interest both to musicians and scientists. Further investigations in synthetic music, however, have been delayed by still another discovery in which the Audion is again the most important element. This is the invention of the talking Cinema Film, or as Dr. de Forest ~~himself calls it~~, the "~~Phonofilm~~".

In this apparatus the sound waves of the cinema actor's voice are reproduced in the form of bands of light on the film. The sounds are picked up by a sensitive microphone and transmitted as electrical energy to the valve, which, when submitted to the influence of an electric current, developes a powerful violet light. The strength of this light varies according to the strength of the voice-current from the microphone, and so causes records of varying intensity to be photographed in the margin of the film, alongside the picture. When a "talking film" is being shown, the process is reversed and the light bands in the margin are converted again into sound waves, enabling the original speech to be reproduced.



(Photo by courtesy of "Popular Science Monthly."

A familiar type of Valve.

Used by many thousands of Radio workers in all parts of the world. Although differing in detail, its principle is exactly the same as that of the larger valve illustrated on this page.

The Audion Camera or Projector is yet another application of de Forest's discovery, and one for which the scientist predicts a revolution in the cinema world.

Between 1904 and 1912 there were filed no less than twenty patents in which the Audion played a prominent part. To-day over a hundred patents have been granted in this same connection and the number is rapidly growing. Practically every one of these patents is dependent upon Dr. de Forest's Three-Electrode Valve.

Dr. Lee de Forest's work in connection with the Thermionic Valve is described on this page. Speaking recently at Boston, U.S.A., he said:—

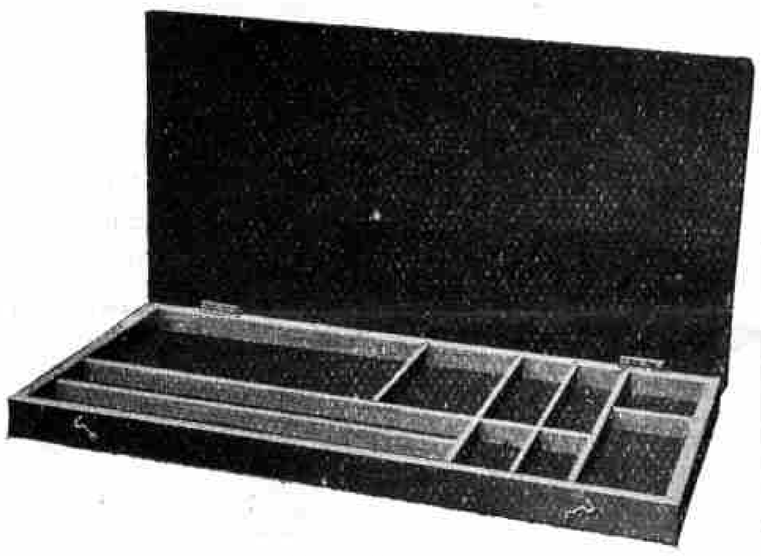
"It is not often the happy lot of a prophet to witness within a few years, or even in his lifetime, a full and sudden fulfilment of his prophecies, made before a world of indifference, a world of sceptics. Yet in the world of Radio, our dreams have come true. Like a tidal wave the attitude of the press and public toward Radio Broadcasting has mounted, within a few months, to a magnitude of interest.

"Radio is beginning to come into its own. I say 'beginning,' because I still feel that we are only at the start of the Wonderful Age of Radio"

Dr. de Forest predicts that within two years there will be five million Radio enthusiasts in the United States alone, and four times as many by 1927.

Storage Boxes.

We have in stock a limited number of boxes, in two sizes, suitable for holding Meccano parts.



Box No. 1.

Box No. 1 is stained and polished imitation Walnut. It is fitted with partitions and lined with green baize. The lid is hinged and fastens by means of two outside hooks.

Box No. 1. 20¼″ × 10½″, depth 1¼″. Price 7/6; postage 1/3.

Box No. 2.

Box No. 2 is polished oak, fitted with partitions and hinged lid. This box fastens with lock and key and is provided with two drawers, also with locks and keys.

Box No. 2. 17″ × 15″, depth 9¼″. Price 70/-; carriage forward.

We illustrate the two types and as our stock is only small we advise those of our readers who are interested to take immediate advantage of this opportunity.

Measuring Ocean Depths by Radio.

WONDERFUL NEW INVENTION.

The Assistant Secretary of the U.S. Navy announces that successful tests have been made with a new wireless sounding device that measures ocean depths. This method was first discovered during the war, when it was found that hydrophones (used to detect submarines) enabled the depth of the water to be judged, by calculating the time that a sound takes to travel from the ship to the bed of the ocean and back.

(*Continued next column.*)

The invention has now been developed to such an extraordinary degree of accuracy that a depth even of only a few feet may be measured. The new instrument has taken the place of the Kelvin apparatus in which the depth of the ocean was judged by air compressed in a glass tube and recorded by a special arrangement.

Clever Young Editor's Success

Our readers will probably remember that in No. 26 of the "*M.M.*" we gave some particulars of Master Hubert H. Lansley's publication the "*Meccano Engineer.*" We now have pleasure in publishing a photograph of Master Lansley at work with his duplicator, by which the "*Meccano Engineer*" is printed. This clever young Editor, who himself writes, prints, and distributes his bright little paper, has lately been photographed and interviewed for the newspapers both of this country and of America. The "*Daily Chronicle*" recently stated that the "*Meccano Engineer*" had "Enterprise stamped on every page," and with this opinion we heartily agree.

Master Hubert Lansley, the enterprising young Editor, at work in his study.

Our young friend, who is 15 years of age, tells us that the most popular items in his paper are the unique free insurance scheme by which damaged Meccano parts are replaced and the serial story "The Pioneer." His paper has now readers in Malta, India, Canada, Germany, Australia, and New Zealand.

At present the "*Meccano Engineer*" is published bi-monthly and Master Lansley will be pleased to send a copy, post free, to any Meccano boy on receipt of 1½d. His address is 26, Thornton Road, Barnet.

A. Pollastrine (London, N.16).—(1) "Mfd," means "Micro-farad." As the farad, the electrical unit of capacity, is too large a unit to use in Radio, the micro-farad (or one millionth of a farad) is generally used to denote the capacity of electrical condensers. (2) With Crystal Receiving Sets a battery is only required with certain crystals such as carborundum. The Meccano Crystal Receiver is fitted with a special crystal for which a battery is not required.

G. Simon (Swindon).—The use of a valve for low frequency amplifying does not make possible reception from greater distances than is obtainable with a crystal detector alone. An amplifying valve intensifies the volume of sound only and a message which, without the aid of an amplifier is faint, becomes more clearly heard when an amplifying valve is used.

R. E. Mate (Liverpool).—You do not give the height of your window, but judging from your diagram, a double aerial will be suitable for your purpose. Though this will be parallel with the tramway wires I do not think they will cause any disturbance. An article on aerials will appear in the "*M.M.*" shortly.

B. N. Satghar (Bombay, India).—There is a station at Bombay that transmits Morse upon a wave length of 2,000 metres, but you would not be able to receive this transmission with a standard Meccano Crystal Receiving Set, which is wound for lower wave lengths.

P. Mostyn (London, W.4).—There is no reason why two Crystal Receiving Sets should not be worked from the same house, provided that the two aerials are kept at least 20 feet apart, to avoid inductance. Two receivers may be used on one aerial but the results will not be satisfactory.

J. C. Wylde (Bromley).—A carborundum crystal requires a special holder, to which provision is made for coupling the battery connections. The use of a low frequency amplifying valve increases the strength of the received signals, but will not increase the range of the receiver. See reply to G. Simon above.

Henry Jackson (Manchester).—Your enquiry apparently refers to the receivers used in the ordinary telephone service. As a rule, such receivers have much too low a resistance to be suitable for use with a Crystal Receiving Set.

Leslie Chapman (London, S.W.17).—With regard to the buzzing noise which makes it impossible for you to receive telephony, I would suggest that you thoroughly overhaul your Receiving Set and make sure there are no loose connections, also that there is no leakage to earth from the secondary circuit. If the trouble still continues, I would suggest that you change the position of the aerial, as it may be affected by the neighbouring telephone wires.

J. R. Smith (South Shields).—The No. 1 Meccano Crystal Receiving Set does not require an Experimenter's licence, for having been approved by the Postmaster General, it may be used with a Broadcasting Licence.

A. R. Cleaver (Lytham).—It is advisable to have your aerial as high as possible, and the total length should not exceed 100 feet including the lead-in wire. The usual method adopted to bring in the lead from the aerial is to bore a small hole, say about ¼″, in the side frame of the window. Your lead-in wire should, of course, be insulated at the point it enters the window.

S. Williams (Salford).—I was very interested to read your description of the valve panel that you have made, and also of the contrivance made of Meccano parts that enabled you to wind your coils. Perhaps when next you write you will let me have some more information.

M. Walker (Limavdy).—In order to receive messages from the British Broadcasting Stations it will be necessary for you to employ a Valve Set. A Meccano Receiver of this type is at present being considered and full details will be announced if it matures.

E. A. Hall (Cape Town).—It is difficult to advise you without some knowledge of local conditions. I think you would obtain better results if instead of a loose coupler you used a simple inductance, with either one or two sliders. This type of coil is better suited to reception upon short wave lengths.

THE MECCANO GUILD

The Secretary's Notes.

I should like to point out that the reports sent to me by Secretaries at the end of each Session should be as short and concise as possible. They should not be embodied in a letter but should be written clearly on a separate sheet of paper and headed "Club Report." The Balance Sheet should be set out separately. Many of the reports I receive are very lengthy and difficult to read, some being sent in without the signature of the Club Leader, which all reports should bear, as well as the signature of the Secretary.

Club Reports.

Quite a number of Clubs now run their own Club Magazine, which they issue at different periods. These magazines are very interesting indeed and I am pleased to note that in the majority of cases each issue is a distinct improvement on the previous one. At first these bright little publications are generally hand-printed by members of the Club, then when funds increase they are produced by different forms of duplicating. For the guidance of boys who are running these magazines I may say that where articles are taken from other magazines it is customary to acknowledge the source from which the information is obtained.

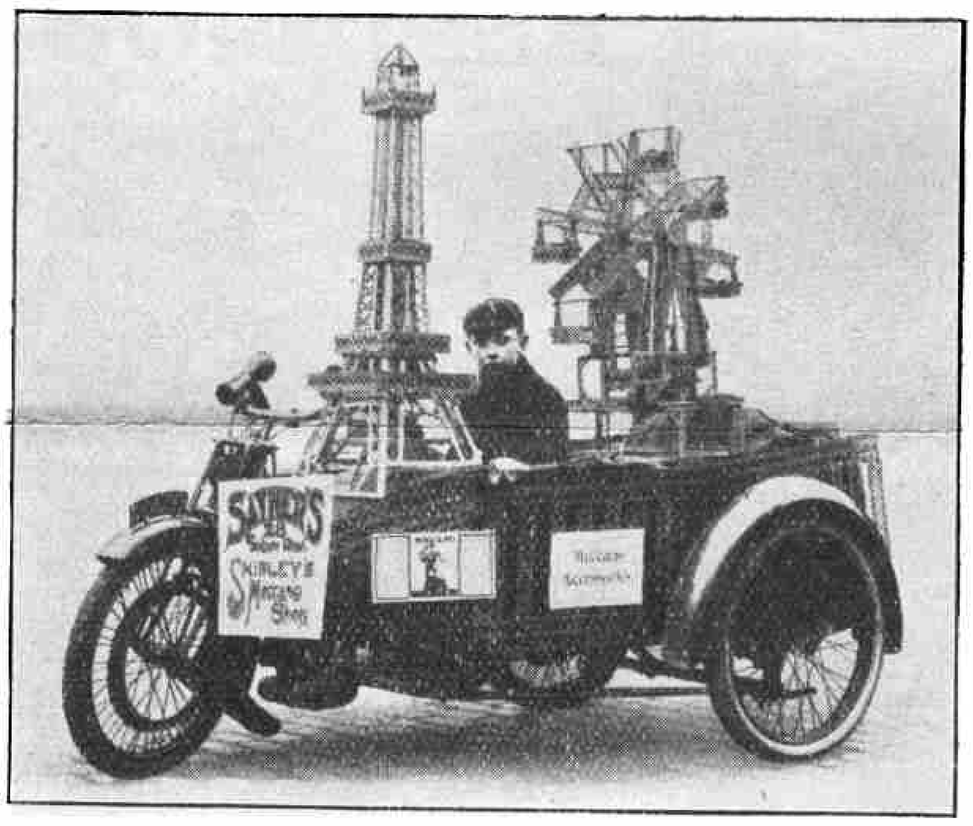
Club Magazines.

In an earlier issue of the "*M.M.*" I announced that two Meccano Lectures—namely, a revised edition of "Lives of Inventors" and an entirely new lecture "The Story of Our Ships"—were available for the use of Meccano Clubs. These lectures have met with a great reception from those Clubs who have already had copies. In this connection the Secretary of the "Oaklands (Motherwell) Meccano Club" writes:—"I return herewith your splendid lecture 'The Story of Our Ships,' and I must say that from every point of view it has proved a complete success. The members of the Club shouted 'encore' and it had to be read all over again! The second reading was followed by an interesting discussion by the boys themselves. One of the members was particularly keen on having a copy of it and he wrote it out at my dictation; now, I learn, that every member has taken a copy from him. Some testimonial!"

Meccano Lectures.

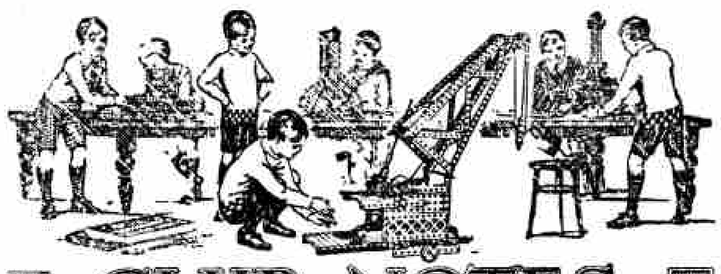
Copies of both lectures are available singly, the only stipulation being that they are returned after the lecture is read, so that they may be passed on to other Clubs.

A Real Joy-Ride.



We have pleasure in publishing a photograph of the Meccano exhibit entered by Mr. H. Sayner in a recent Gala held at Shipley, Yorks. All Meccano boys will be interested in this novel turn-out. The body of the side-car was decorated with Meccano braced girders and showcards, whilst the justly-proud Meccano boy sitting so happily behind the model of the Eiffel Tower, wore the Meccano boy's jersey of red, embroidered with black squares. The revolving Big Wheel at the rear was particularly effective, shining in the sunlight, and driven by a Meccano Electric Motor.

Altogether the effect was very striking and we congratulate Mr. Sayner upon his ingenuity and patience.



CLUB NOTES

Chard M.C. Making very satisfactory progress, with membership of eighteen. Three interesting Lectures have been given, one by Leader, Mr. J. S. Miller, on "Steam Turbines" and two by members, Masters F. Poole and L. Payne on "Gas" and "History of Meccano" respectively. *Secretary:* Frank Macey, 17, Ashfield, Chard, Somerset.

The Oakland M.C.—Recently purchased a charging set for charging accumulators and lighting Club-room. The Club also possesses an Electric Railway. Membership is increasing and good progress is being made in every direction. *Secretary:* Lyle A. Ford, "Oakland," Catherine Street, Motherwell.

1st Ceylon M.C.—Mr. Fernando has undertaken the joint leadership of this Club with Mr. Ekanayake. A number of visits have been paid to local places of interest and it is hoped to give a Variety Entertainment sometime in March. *Secretary:* B. K. Billimoria, Dharmaraja College, Kandy, Ceylon.

Southall M.C.—The members, who are busy preparing for an Exhibition to take place very shortly, are very keen on model-building and many interesting models have been built on the ordinary Club night. These include Field Searchlight (with gas attachment), Motor Cycle and Side Car and new type of Lift with weight movement. *Secretary:* Master K. Watson, 29, Regina Road, Southall.

Motherwell M.C.—A model Exhibition was held recently in connection with the local Y.M.C.A. and a model of the Workshop was loaned from Headquarters. On a special track a Hornby Train ran continuously during the whole week. *Secretary:* Master C. Tait, "Walworth," Catherine Street, Motherwell.

South Kirkby M.C.—A Speed-building Test organised a few weeks ago met with great success, the Club being divided into two sections. The Meccano Lecture, "Lives of Inventors," was greatly enjoyed by the members. *Secretary:* Master J. Williamson, School House, South Kirkby, near Wakefield.

Kilmarnock (Riccarton) M.C.—At the close of the last Session a successful Exhibition was held, at which many prizes were given. These included a gold watch and a fountain pen, presented by Mr. Robertson, of Messrs. Jackson's Ltd., and a pocket book given by Mr. Wallace, the father of one of the members. The fortunate prize-winners were William Durney (Blackpool Tower), John Hamilton (Coal Chute), and David Brown (Transporter Bridge). Consolation prizes were also given. A very interesting forenoon was spent at the engineering works of Messrs. Glenfield and Kennedy, Ltd., by the kindness of Mr. McCutcheon, a local gentleman very interested in the Club. *Secretary:* Master A. Todd, 96, Campbell Street, Riccarton, Kilmarnock.

Holy Trinity (Blackburn) M.C.—Next month the members are having a Lantern Lecture on "Radio," together with a Wireless Concert. It is hoped to produce "Nonsense Nana" together with another play entitled "Billy Bunter's Treasure" at an Exhibition and Concert to be held at the close of the present Session. *Secretary:* Master J. Catlow, 183, Whalley New Road, Blackburn.

Buckfastleigh M.C.—Is making excellent progress with a membership of twenty-four. *Secretary:* Master H. Parsons, Bell Cottage, Buckfastleigh.

Knutsford Lecture Hall M.C.—Last Session closed with a successful Social and Competition, divided into two Sections. In the Section for boys over ten, prizes were awarded to Masters L. Shepherd, J. Carberg, S. Knight. In the Second Division the only prize was won by Master J. Woodcock. *Secretary:* Master L. J. Shepherd, Grove Lodge, Knutsford.

St. Mary with St. Gabriel M.C.—A number of models exhibited by the members at a recent Sale of Work attracted considerable attention. The Club Magazine improves with each issue. An enjoyable programme has been drawn up for the present Session. *Secretary:* Mr. C. Curle, 37, Pullens Buildings, Peacock Street, London, S.E.

Hanson (Bradford) M.C.—Club membership is still increasing. Model-building, Competitions and Table Games such as Ping Pong, Draughts and Dominoes make the programme interesting. The Club also has a splendid Football Team. *Secretary:* Master J. W. Whitworth, 107, Curzon Street, Bradford.

Meads M.C.—A Football Team has been organised and already several matches have been played. Good progress is being made in every direction. *Secretary:* Master F. Moore, Chesterfield Cottage, Chesterfield Road, Meads, Eastbourne.

Small Heath M.C.—The last Session closed with a successful concert, the second Winter Session commencing on 11th January. It is hoped to include lessons on Physical Culture in the programme. *Secretary:* Master W. Edge, 131, Whitehall Road, Small Heath, Birmingham.

Clubs Recently Affiliated.

Model Engineering (Glasgow) M.C.—Under the supervision of Mr. J. R. Parnell, one of the Masters of George Watson's Boys' College, there is no doubt that this Club will have a successful career. The present membership is twenty-five. *Secretary:* Master W. M. Gemmell, "Glenbourne," South Oswald Road, Edinburgh.

Garstang and District M.C.—First meeting held on 15th December, and affiliation to the Guild granted. *Secretary:* Master C. Irvine, Sunny Bank, Garstang.

Victoria (Glasgow) M.C.—Formed by the energetic Secretary and affiliation granted. I feel sure that the Club will make rapid progress. *Secretary:* Master Ian Kerr, 57, Victoria Park Drive, South, Whiteinch, Glasgow, W.

Clubs Not Yet Affiliated.

Cricklewood M.C.—A Club is being started in Cricklewood (London, N.W.2) and any boy living in that district should write for full particulars to the *Secretary:* Master James Fenton, 24, Station Road, Willesden Green, Cricklewood, London, N.W.2.

St. Paul's (Minehead) M.C.—Has already made quite good progress and I hope to affiliate it with the Guild in the near future. *Secretary:* Master G. J. Hancock, "Prince Albert," Maidenhead, Berks.

Adderbury M.C.—A Meccano Club has been successfully formed in Adderbury and meetings are held every Saturday. *Secretary:* Master T. Thacker, Adderbury, Banbury, Oxon.

BRIGHT IDEAS

These columns are reserved for dealing with suggestions sent in by Meccano users for new parts, new models and new ways of making Meccano model-building attractive. We are always pleased to hear from any Meccano boy who has an idea which he considers will be useful in the Meccano system.

M. Verlaine (Schaerbech).—We cannot follow your application of the suggested cone pinion.

Fred Rickitts (Gorton, Manchester).—We already list a single crank shaft (No. 134). Connecting rods may be made from our standard rods with a coupling as connection.

Dott Raffaele Mauro (Francavilla Fontana, Italy).—(1) We already list a fly wheel (No. 132). (2) With the addition of a rubber ring our 3" pulley makes an admirable wheel for vehicles. We note your other suggestions with interest, but would like to know what specific uses you have found for them.

M. Peniend (Cremien, Isere).—Spacing in any particular construction can be effected by the insertion of the requisite number of washers.

John Spooner (Seaford Cottage, Sussex).—(1) We are continually adding to our train accessories. No doubt we shall introduce a breakdown crane in the future. (2) Two 3½" rods joined by means of a coupling will give you the 6½" rod that you are seeking. This method may be adopted in every instance where a rod of an odd size is required.

Gordon Lyon (Skipton).—(1) The function of your suggested bent strip is similar to our cranked bent strip No. 44. (2) We are interested in your double crank piece, but shall be glad to hear of any uses that you have found for it. (3) See our reply below to John Meade.

Richard Ball (Rainford).—We may introduce a cross-over switch from one line to another next season.

John Meade (Queenstown, Co. Cork).—It is difficult to standardise wire stays. No two occasions would require the same length and this inadaptability places them out of court.

F. M. Hargreave (Birkdale).—A 7" rod may be formed by joining a 5" and a 2" rod with a coupling.

Clarence Payne (Port Elizabeth, S.A.)—The difficulty of curved sections, such as you suggest, is in determining the diameters adaptable to general construction.

Alex Dempster (Kidderminster).—See our reply above to F. M. Hargreave, Birkdale.

George Caine (Midlothian).—As we do not contemplate manufacturing steam engines at present, your idea for cylinders, etc., is premature. We shall consider your suggestion for a large flanged wheel.

C. P. Smith (Grange, near West Kirby).—(1) The subject of large wheels is having our attention. (2) We do not stock rubber rings because of their perishable nature.

H. C. Key (Calcutta).—(1) We shall pass your idea for improvement of the electric motor to our electrical department for their consideration. (2) The bearings for high-speed spindles may be reinforced by the addition of two or three strips bolted to the motor side-plates.

Alex Purves (Surrey, B.C., Canada).—(1) An interior toothed wheel would be too expensive to make and its advantages are somewhat doubtful. (2) The drilling of a small hole in the bolt end, for the insertion of a cotter pin to give a swivelling action, only duplicates the function of the lock nuts.

L. Dewing (Crouch End, N.).—We are continually adding to our train accessories and several of the items you mention are already contemplated. Some further additions will be announced in the "*M.M.*" shortly.

Harry Barlow (Kearsley).—We do not know whether your suggested cone box principle of the finished scutcher has any real value in Meccano construction. Perhaps you could give us an instance of its application in a model.

R. A. Maynard (Derby).—Turning wheels from the solid bar is both wasteful and extremely costly. Our present method of manufacture of wheels facilitates quick production and cheapness. The boss is pinched into the wheel and it very occasionally happens that the pinching process is not quite efficiently done, the boss thereby becoming loose when subjected to a little strain. If you will return the wheel to us we will gladly replace it.

P. Short (Derby).—(1) We have in mind the question of circular plates. (2) What are the uses of the two types of rods you suggest? (3) We are modifying the eye-piece in order that it may be used with the 12½" strip.

Leonard Shore (Cambridge).—(1) Your suggested longer rack strips to save nuts and bolts is a question of "six of one and half-a-dozen of the other." The trifling cost of nuts and bolts saved by the extra length of rack strips is balanced by the slight extra cost of the rack strips. However, if we consider it expedient to introduce a longer length we shall certainly do it. (2) We shall give careful consideration to your suggestion for fitting a connecting rod to the wheels of the Hornby and Zulu trains.

Norman Ryan (Wembley).—The difficult matter of standardising curved plates is already exercising our attention.

James Unwin (Chesterfield).—We have never experimented with a water motor coupled to a generator to provide current for the electric motor.

Albert Wilcock (Rochdale).—When a new part is suggested it is helpful to us if an instance of its use is cited at the same time. We do not quite see what possibilities your various double cranks possess.

C. H. Shepherd (London, W.)—You can increase the length of your crank shaft by the addition of rods of the required length, secured by means of couplings.

T. Poole (Chessington).—Two or three turns of your cord around the crank handle and then securing it by two ordinary half hitches will give you a firm grip.

E. Clarke (Leicester).—We cannot quite make out the nature of your suggestion, Edward. Write us again more fully.

A. J. F. Davies (Burwell).—We shall no doubt introduce improved designs of rolling stock in the future and we shall keep in mind your suggestion regarding Pullman cars.

M. G. S. Sewell (Weymouth).—Heavy capacity cranes are fitted with wire ropes, which are more convenient in working than chains. We scarcely see any advantage in introducing a chain for lifting purposes.

E. Brewster (Manchester).—To facilitate the recognition of the various parts we include illustrations in our price lists.

J. W. Phillips (Earlswood).—We have the twisted or transverse strip already under consideration.

A. G. Allan (Aberdeen).—(1) Why not use the 1½" pulley wheel fitted with a rubber ring for your model motor? This wheel is the same diameter as the flanged wheel. (2) A roller may be constructed from two bush wheels connected together by double angle strips.

R. Philbrick (E. Croydon).—Dry batteries when run down must be discarded as they cannot be re-charged. This method of obtaining electrical energy is very expensive in the long run.

B. Emby (South Woodford).—(1) A Rheostat or controller is not practical in a 4-volt circuit. (2) We are considering the question of larger wheels, also circular plates. (3) If circular strips of varying diameters have a general application, we shall certainly introduce them.

F. Hallmns (Shoeburyness).—We fear you are not a very enthusiastic Meccano boy, F. H., or you would know that your suggested trunnion is already listed.

Cyril Manes (Woolwich).—We do not advocate the use of Meccano strips for the purpose of railway track. The curves made by bending the strips are not all that could be desired.

H. Rutledge (Oxford).—Your idea for a hexagonal axle rod and corresponding hexagonal hole in the gear wheel to give a sliding action is sound. This principle would have to be extended throughout the whole series of rods and wheels, however, thereby necessitating duplicated sets.

R. Jardine (London).—We are at present exploring the possibilities of a double crank shaft. We should be interested to see a photograph, if you have one available, of the beam engine you have constructed.

1922-3

BEST MODEL CONTEST

£250 in Prizes

Closing Date 15th April

Cash prizes to the value of £100, Meccano Outfits, Inventors' Accessory Outfits, Hornby Trains and Zulu Trains to the value of £150.

These prizes will be awarded in the Meccano-building Competition, for which every Meccano boy should enter. As was the case last year, the Competition is divided into three sections (1) for boys under 10 years of age, (2) for boys between 10 and 14 years of age and (3) for boys over 14 years of age.

There are no restrictions and no entrance fees. Full particulars and entry forms will be sent on application. The closing date for the Competition will be 15th April for entries from the United Kingdom, and the 30th May for entries from Overseas.

Ask your dealer, or send to us, for an Entry Form.

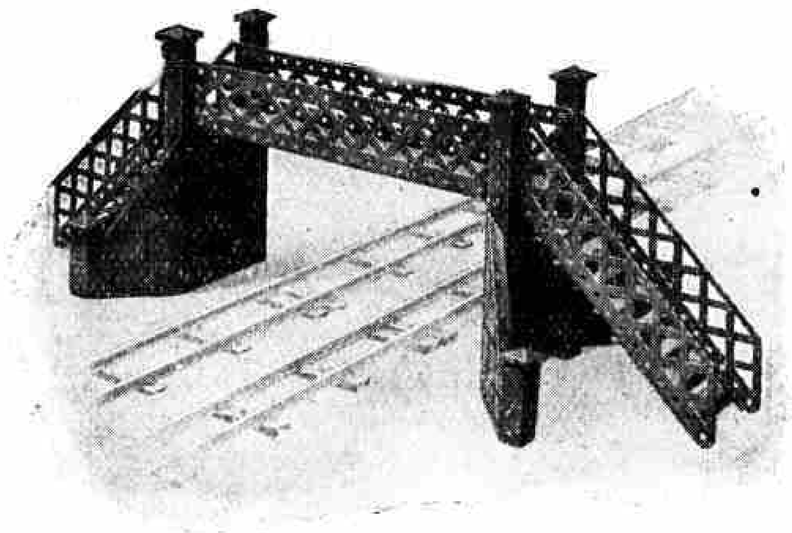
The Passing of Barbara

Barbara, the famous Polar Bear at the London Zoo, died on the 29th of January. For three days and nights she lay with her head on her left paw, her tongue hanging from her mouth—altogether a sorry-looking object. She died from a tumor or quinsey in the throat. Evidently her mate, Sam, thought it might be "catching," for he kept at a safe distance all the time she was ill. Barbara and Sam were both well-known to all boys who visited the Zoo. Some time ago when a boy was leaning over the bars surrounding her den, Barbara caught hold of his arm and severely mauled him.

TRAIN ACCESSORIES

GAUGE O

THE addition of Train Accessories further enhances the fun to be obtained from a Clockwork Train. Every boy possessing a set should provide himself with the complete series of accessories illustrated below. Each unit is strongly built of the finest material and the greatest care is taken in its manufacture, to ensure that the high standard of Meccano Products is maintained.



LATTICE GIRDER BRIDGES

AS will be seen from our illustration these Bridges are of the constructional type, strong and well-proportioned. The design of the well-known Meccano braced girder has been followed in footways and steps, giving realistic and pleasing appearance. The Bridges are beautifully enamelled in colours.

The Meccano system of equi-distant holes has been preserved so that signals made from Meccano strips, etc., may be erected on the Bridges.

Lattice Girder Bridges are supplied disassembled for convenience of packing.

Price ... ... each 10/6

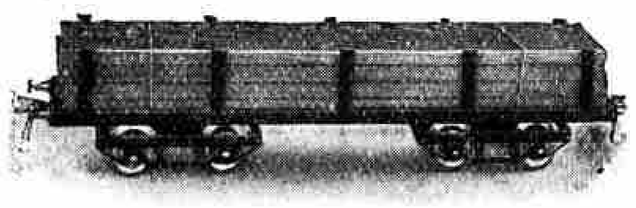
TIMBER WAGONS No. 1

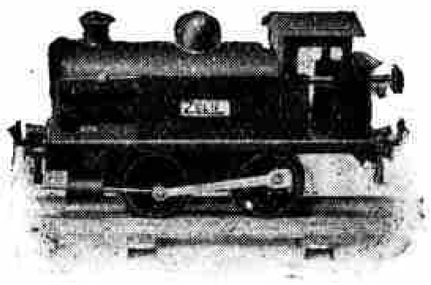
Suitable for all rails. Complete with load of timber ... ... each 2/–

TIMBER WAGONS No. 2

These timber wagons measure 13 inches in length and are beautifully enamelled in colours.

Suitable only for rails of 2-ft. radius (forming circles 4 ft. in diameter). Complete with load of timber ... ... each 5/6

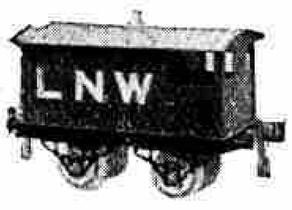




ZULU TANK LOCOS

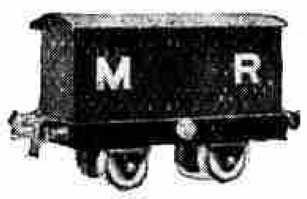
Strong and durable Locos capable of any amount of hard work; richly enamelled and highly finished; fitted with brake, governor, and reversing gear.

In black only ... ... each 12/6



BRAKE VANS

Finished in colour to represent L. & N. W. system each 4/–

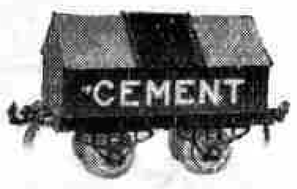


COVERED LUGGAGE VANS

Lettered M. R. ... each 4/6

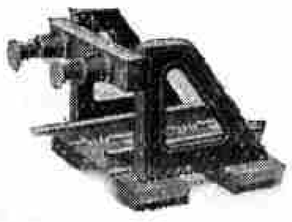
PETROL TANK WAGONS

Finished in red, lettered gold each 3/6



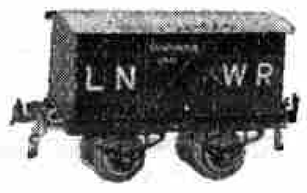
CEMENT WAGONS

Enamelled in colour each 4/6



SPRING BUFFER STOPS

Enamelled in colour each 2/–



GUNPOWDER VANS

Finished red ... each 4/–

Tommy (*excitedly*): "Dad! Dad! Baby's swallowed a penny!"

Father (*absently*): "Well, give him another!"

A Useful Tool

Our illustration shows a type of screwdriver useful for reaching bolts in inaccessible places on models. For this reason the

blade has been made so that it may be passed through the standard Meccano hole to reach bolts so placed. We are disposing of these screwdrivers whilst our stock lasts, at the special price of 10d. each, post free.

An Island with only One White Boy.

I have pleasure in printing an interesting letter from Master Oscar Newman, who lives in the New Hebrides, on one of the many thousands of isolated islands in the Pacific Ocean. I feel sure that readers of the "*M.M.*" will be pleased to read this bright and cheery letter from a Meccano boy in that far-off island, especially as Oscar is a member of the Meccano Guild.

Tongoa Plantations,
NEW HEBRIDES.

DEAR MR. EDITOR,

I have never been to school, but mother has taught me to read and write. I am 12 years of age and am the only white boy on this Island, so I would like some boy correspondents.

Some time ago I hurt my foot, and a missionary who was visiting here took me down in his launch to the hospital, over 60 miles away.

On our way we called at an Island called Tongriki to land a native teacher. At Tongriki you cannot run a launch or a boat ashore, as you can at our place. Instead, if one wants to land, natives come out in a canoe and two or three get into your boat. Then they paddle towards the shore and wait till a big wave comes and throws the canoe up on the bank. A lot of natives will then rush and hold the canoe while you jump out as quickly as you can before another wave comes. You should hear the rattle of the cobble stones as the water rushes back! The first time, everybody is frightened, but after that it is great fun.

We broke our table gong and I made one out of my Meccano Set. Mother says it is just a beauty because the girls cannot say they don't hear it! If you happen to break anything just after the steamer leaves, it is a long wait before you can replace the article as the ship only calls every 8 or 10 weeks, it was a lucky thing I had a Meccano, wasn't it?

If any Meccano boys would like to hear about the Islands I will write and tell them. My sister has translated some Island stories.

Yours sincerely,

OSCAR.

Change of Address.

Subscribers should immediately notify the Editor of any change of address. Send a Postcard *giving the old and new address*, so that records may be kept up to date.

The Royal Road to Engineering.

We recently received an interesting letter from Mr. C. L. Henry of Nottingham, and as we think that our readers will be pleased to read this letter, we have obtained Mr. Henry's consent to our publishing it for their perusal. Mr. Henry, who holds an important position in the assembling department of a factory specialising in the manufacture of electrical instruments, writes as follows:—

"In my business of supervising and training boys in mechanics, I have found that those boys who own Meccano Outfits are far more advanced than other boys. Their perspective in drawing, as well as their knowledge of the parts needed to make up an instrument, machine or tool, places them well ahead of other boys. Thanks to Meccano the hard work of continually instructing them in the correct way of handling their work and tools is considerably reduced.

"Meccano is to my mind the best medium for initiating students into the engineering profession. The complex problems of figuring, speeds, feeds, ratios, proportions, etc., are quickly and easily grasped by the student when demonstrated by Meccano gear and pulley wheels and other standard parts. In my opinion every college, evening class, or classes in any engineering works, elementary or advanced, should be equipped with a complete set of Meccano, for by its use the student obtains both practical and theoretical knowledge.

"The community at large will never know the debt it owes to the inventor of Meccano, but we in the engineering world do, and I'm sure we say 'Thanks, Mr. Hornby,' for it is a boon to us and the rest of humanity. So Long Live Meccano."

OUR MAIL BAG

In this column the Editor replies to letters from his readers, from whom he is always pleased to hear. He receives hundreds of letters each day, and only those that deal with matters of general interest can be dealt with here.

Correspondents will help the Editor if they will write neatly in ink and on one side of the paper only.

E. Way (Brixham).—It was nice, as you say, to take a trip to America, but we were certainly not glad to get away from our boy correspondents as you suggest. That is the part of our work that makes life really worth living.

E. S. Borthwick (Christchurch, N.Z.).—Thanks for your interesting description of the tramway system in your town. We shall be glad to receive the promised photos. We were interested to see the photo of yourself in fancy costume, and we congratulate you on winning a prize.

H. Peters (Barwood).—Many thanks for your suggestion and for your kind wishes. Your verse is very good but a little too long for us to print.

A. E. Macer (Attleboro').—We wish you success in your business career and are glad your young brother at home is taking so keenly to model building. The "bright one," as you call the "*M.M.*," will be sent to you regularly.

D. Craft (Hornsea).—We are pleased to know that you consider that the "*M.M.*" is successfully practising the Coué teaching. You have our best wishes for your success in the Recruiting Campaign.

C. H. Sundy (Dublin).—Of course Meccano boys are very lucky, and we know from the thousands of letters we receive from them that they are happy. Entry forms are being sent to you by post. Mr. Hornby appreciates your good wishes.

G. Burnham (Sydney, N.S.W.)—We were very interested to hear of your Meccano afternoons at school. Your teacher appears to be an ideal Club Leader, Let us know how you progress.

E. Jackson (Dublin).—It is unfortunate that at present no one is allowed to use a wireless set in Ireland. We earnestly hope that soon all differences may be adjusted in Ireland and that shortly you will be able to taste the joys of Radio.

E. Borthwick (Christchurch, N.Z.).—Your desire to see what our winters are like would amuse British Meccano boys. We wish we could send over to you for half an hour the leaden sky overhead, and the icy sleet that is beating against our office windows as we write. We feel sure your interest in the subject would quickly wane! Your chatty letters always give us pleasure.

Mr. W. Yates (Leeds).—"I wish to congratulate you on the invention of what I think is the finest toy for boys, and to tender my thanks for a peace and quietness which I never knew before. I say many a time to my wife when our boy is building models 'God bless Meccano!'"—We much appreciate your tribute to Meccano, and the many kind expressions in your letter.

L. R. Stockdale (Thirsk).—

"Dear Editor, a question has struck me quite a bit.
By day and night to get it right I tried, but now I quit.
Here is what I ask you, please don't pass it by—
'Can a man with whiskers tell a barefaced lie?'"

Being an Editor is an awful business L. R.—Another enquiring youth asks us to observe that the day breaks but it doesn't fall, and that the night falls, but it doesn't break. That if you have an apple its just an apple, and that if you have two, its a pear—and he wants to know why. We will handsomely reward any reader who can help us to reply to these posers.

G. Orton (Litherland).—Your deciphering of the code message by Master Stanbury was correct. Your own message "Llyrremal masamtsirhcio lootio oormoi kiybnrohoo" does not seem very difficult, and we wonder how many readers will be able to decode it. We hope to publish a short article on codes and cyphers shortly.

G. Hare (Leamington).—If it takes two hours to be blacked and forty minutes to wash it off again, we do not wonder that you have difficulty in inducing your Minstrel Troupe to have a photograph taken. We wonder if they are like the conscientious actor, who, in order to thoroughly "feel" the part of Othello, blacked himself all over! We should certainly like to publish a photograph of the Minstrels in the "*M.M.*' Would not a flashlight photograph taken before a performance be possible?

Fred Wingfield (Sheffield).—We are very sorry to hear that you are so frequently ill, and it is good to know that Meccano and our letters cheer you up so much. We are always glad to hear from you.

A. R. A. Milton (Willesden).—"I have noticed in my dealings with you, your readiness to help whenever you can. No! this is not eye-wash but an undisputable fact. Don't blush!"—We very nearly did, Alexander.

Jack Muff (Southend).—We remember you well, although it is a long time since you wrote us. We are very glad to know that your affection for Meccano and ourselves has not waned.

D. Carter (Old Colwyn).—Stamp collecting is a very good hobby and we are interested in hearing of your splendid collection. We contemplate starting a stamp collectors' column in the "*M.M.*" and should be glad to hear from any readers who are interested.

G. Winward (Burnley).—Your letter pleased us very much, George. We hope you will win a prize in the Model Competition. You have our best wishes for your complete recovery.

C. A. Miller (Frizington).—Your letters are always welcome Charles. You appear to be a studious, thrifty, and level-headed boy, and there is no limit to your progress if you will work hard and aim high. You have had an unusual bringing up for a boy, and we should like you to send us an account of your early experiences.

B. Bayliss (Port St. Mary).—It is hard luck to have had to lie in bed for six years, but we are glad you can get about a little now, and we hope that this means that you are well on the way to a complete and permanent recovery. It is fine to see that in spite of your sufferings you are able to enjoy so many things in your life.

A. H. Rable (Perth, Ont., Canada).—We congratulate you on your ingenuity in making so serviceable a lathe from Meccano parts. You must be one of our oldest Canadian boys. Send us a line occasionally.

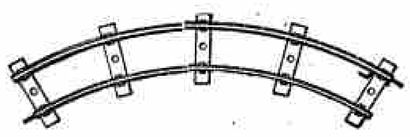
MECCANO RAILS

POINTS AND CROSSINGS.

MECCANO Rails, Points and Crossings are built for hard wear and smooth running. They are made of the finest materials and hold together rigidly and strongly, for real workmanship is put into them. Note the great superiority both in quality and appearance of the Meccano Rails as compared with the usual continental-made Rails. Note also the extra sleepers, giving an added steadiness to the track. Each sleeper is stamped with the name "MECCANO" and you should look for this in order to ensure getting the genuine article.

NOTE.—All Rails, Points and Crossings illustrated below may be obtained with a centre rail for use with Electric Trains. Send for descriptive leaflet

Rails for Clockwork and Steam Trains, Guage 0, 1g-in., Alternate Pegs.



For 1-ft. 6-in. diameter circle.

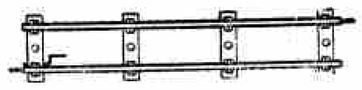
A9. Curved Rails (9-in. radius) for 1-ft. 6-in. diam. circle ... ... per doz. ... 3/-

For 2-ft. diameter circle.

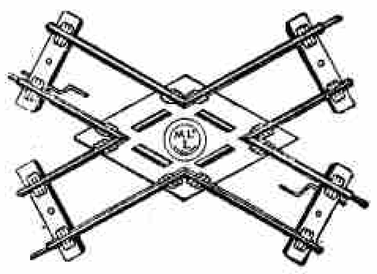
A1. Curved Rails (1-ft. radius) per doz. ... 4/-
A1½. Curved Half Rails ... ... „ ... 3/-
A1¼. Curved Quarter Rails ... „ ... 2/6

For 4-ft. diameter circle.

A2. Curved Rails (2-ft. radius) per doz. ... 5/-
A2½. Curved Half Rails ... ... „ ... 3/6
A2¼. Curved Quarter Rails ... „ ... 3/-

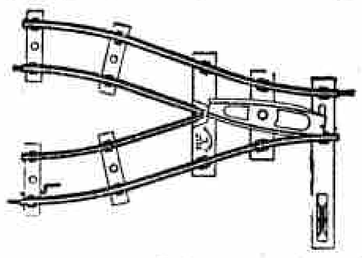


B1. Straight Rails ... ... per doz. ... 3/-
B½. Straight Half Rails ... ... „ ... 2/6
B¼. Straight Quarter Rails ... „ ... 2/-

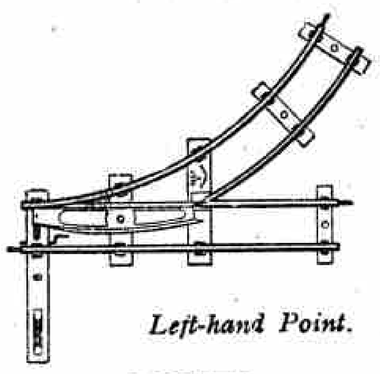


CROSSINGS.

CA. Acute-angle Crossings ... each ... 1/6
CR. Right-angle Crossings ... „ ... 1/6



PPR. Parallel Points, right ... each ... 3/-
PPL. Parallel Points, left ... ... „ ... 3/-



Left-hand Point.

POINTS.

For 1-ft. 6-in. diameter circle.

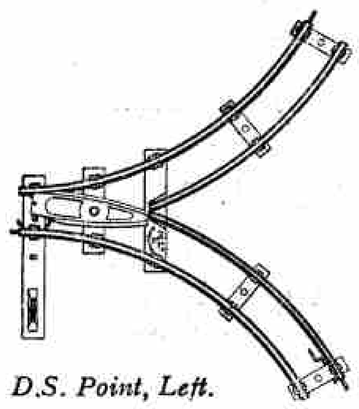
PR9. Right-hand Point (9-in radius) each 2/6
PL9. Left-hand Point (9-in. radius) „ 2/6

For 2-ft. diameter circle.

PR1. Right-hand Point (1-ft. radius) each 2/6
PL1. Left-hand Point (1-ft. radius) „ 2/6

For 4-ft. diameter circle.

PR2. Right-hand Point (2-ft. radius) each 2/6
PL2. Left-hand Point (2-ft. radius) „ 2/6



D.S. Point, Left.

DOUBLE SYMMETRICAL POINTS.

For 2-ft. diameter circle.

DSR1. Double Symmetrical Points (1-ft. radius), right ... ... each ... 3/-
DSL1. Double Symmetrical Points (1-ft. radius), left ... ... „ ... 3/-

For 4-ft. diameter circle.

DSR2. Double Symmetrical Points (2-ft. radius), right ... ... each ... 3/-
DSL2. Double Symmetrical Points (2-ft. radius), left ... ... „ ... 3/-

ADVERTISEMENTS

In response to numerous requests, it has been decided to accept small miscellaneous advertisements in the "*M.M.*," commencing with the March issue. The rates are 1/- per line (average 7 words to the line) or 10/- per inch (average 12 lines to the inch). Further particulars will be sent on request. Address your letter to ADVERTISEMENT MANAGER, *Meccano Magazine*, Binns Road, LIVERPOOL.

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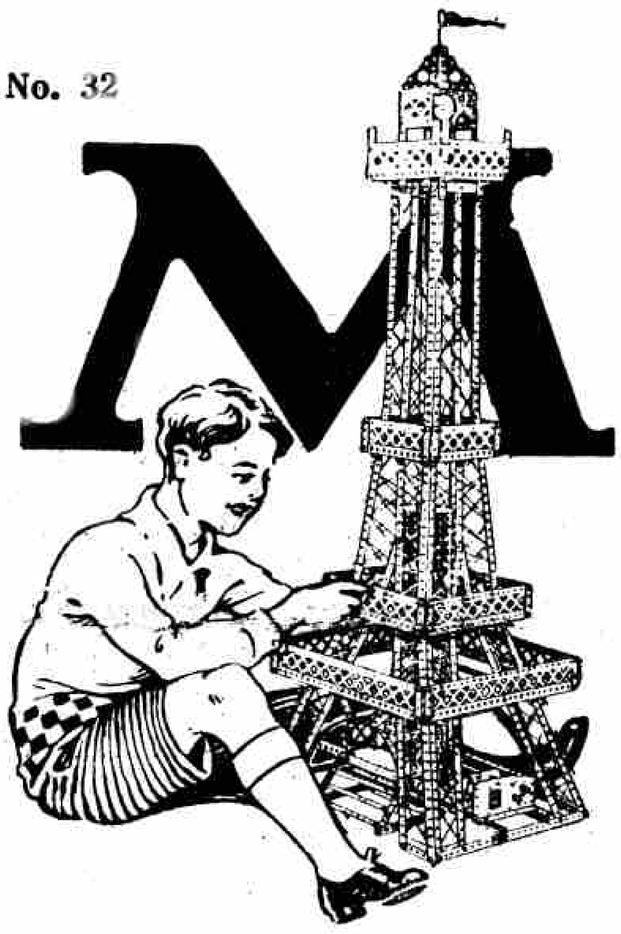
No. 32

MARCH 1923



MECCANO MAGAZINE

PRICE 1d

PUBLISHED IN THE INTERESTS OF BOYS

EDITORIAL

NO doubt many boys wish they could ~~be detectives and that they could~~ imitate the exploits of the great Sherlock Holmes. Now, the greatest asset of a detective is his power of observation. A detective is, after all, a human being. He does not derive his power to track down criminals from any supernatural gift. He owes his prowess to his capacity for observing those little details that often escape the notice of the ordinary person. A finger print on the window through which a burglar has entered; the remainder of a cigarette that he had smoked; a button from his waistcoat which, unknown to him, fell upon the floor. All these are trivial objects that might escape the notice of any but a detective, trained in observation.

Importance of Details.

Some months ago at Grimsby some goods were bought and paid for with a Bank of England note for £50. The buyer was under the impression that the note tendered was a £5 note, and the shop-keeper took his word for it. The £50 note subsequently passed through the hands of four people who never troubled to inspect it, each thinking it was a note for £5 only. The fifth person to receive it was a cashier in a draper's shop. Although he had keener powers of observation than the others, his cleverness eventually secured him two months' imprisonment for dishonesty. On discovering the error that had previously been made, he decided to take advantage of it and quietly pocketed the balance of £45!

Adventures of a Banknote.

When the customer who first launched the note on its travels ultimately discovered his mistake, the note was traced to the dishonest cashier and all the facts revealed. The cashier was sentenced to two months' imprisonment, in which to ponder over the fact that it is better to be honest than clever.

Keep your Eyes Open.

With this part of the story we are not concerned, but I want to point out the extraordinary fact that four intelligent individuals handled this £50 note in such a careless manner that they were ~~under the impression~~ its value was only £5. The opportunity of examining £50 notes is probably not given frequently to many readers of the "*M.M.*", but it is surprising to find how many boys miss noticing other important facts in their everyday life.

Special Articles in this Issue:

A Town that Travels

New Serial Story: "A Night at the Pool"

Competitions

"Hearing" a Base-ball Match

The Men Who Gave Us Radio

Guild Notes and News

Playing Detectives.

It is a good game to imagine that you are a detective, and to observe every detail of each person that you meet. You should endeavour to observe them so closely that, even some days later, you could give a sufficiently minute description of the person to enable him to be arrested, even though he might be in a different part of the country. You will be surprised to find how, by training your mind, important details will be quickly brought to notice and how you are able to remember them.

It is from their power of observation that many men have made great discoveries. During a service in the cathedral at Pisa, Galileo noticed the gentle swinging of a lamp, hanging from the roof. This led him to the discovery of the pendulum and many of its applications. Sir William Herschel, the illustrious astronomer, noticed that one of the stars in his telescope appeared slightly different from the others. Following up this discovery he found that this star was not a star at all, but was in fact a new planet. Some years later, keen observers noticed that this new planet Uranus was not just where it should be in the heavens. The discrepancies between its actual position and the calculated position, although extremely minute, were sufficient to enable mathematicians to say that they were caused by the effect of the attraction of another hitherto unknown body upon Herschel's planet. Astronomers set to work to find this unknown body, and subsequently discovered still another planet, which was named Neptune.

Observation Leads to Discovery.

These are three of many illustrations furnished by Astronomy that show what wonderful discoveries observation may lead to. Similar instances are found in every science, and many books would be required to enumerate the discoveries that have been made, due solely to the power of keen observation.

It is surprising how little-developed is this power of observation in our everyday life, and it is good and profitable that we should cultivate it wherever possible.

£250 Given Away

Are you entering the Great Meccano Model-building Competition?

£250 in Prizes.

Closing Date: 15th April.

For full particulars see page 5

A Town that Travels 6,000 Miles each Month

A TRIUMPH OF MODERN SHIP-BUILDING

IN that famous book "*Gulliver's Travels*" we are told of a wonderful floating island, and of the adventures of its inhabitants. The celebrated author, Dean Swift, could scarcely have imagined that his fantastical story could ever come true, yet the super-liner "*Majestic*," the latest achievement in modern ship-building, exceeds in wonder even the dream of Dean Swift. This amazing ship may correctly be described as a floating town, for it has its 5,000 inhabitants, its palatial restaurants, lounges, gymnasiums, swimming and medicinal baths. Its theatre, hospital, bakeries and fire-station, electric lifts, telephone exchange and wireless stations. Indeed, almost every detail of a town's organisation is to be found on board.

Feeding a Town

To provide for the feeding of the population of this floating town for five or six days, the foodstuffs carried on one voyage must include among other items such huge quantities as 200,000 lbs. of fresh meat, 50,000 eggs, 26,000 lbs. of vegetables, 500 gallons of milk and 3 tons of tea, not to mention hundreds of chickens, ducks, geese, and game. As a complete description of the wonders of the "*Majestic*" would fill a very large volume, we are only able to mention the more interesting features in the space at our disposal.

Under the command of Sir Bertram Hayes, the first merchant captain to be knighted, the "*Majestic*" sailed on her maiden voyage across the Atlantic on the 10 May last year, having been placed on the mail and passenger service between Southampton, Cherbourg and New York. She sailed from Southampton, the same port from which, some three hundred years ago, the "*Mayflower*," a sailing vessel of 180 tons, set out with the Pilgrim Fathers and their families. They, too, were undertaking a voyage across the Atlantic, but under conditions that were totally different, both as regards comfort and accommodation, from those that are experienced to-day by passengers in the "*Majestic*."

300 Years' Progress

Since the time of the little "*Mayflower*," ship-building has continued to make remarkable progress, especially in the case of trans-Atlantic liners. It would almost seem as though each of the "*Mayflower's*" successors had nibbled at one side of Alice-in-Wonderland's cake, for ships have continued to grow until to-day they have reached gigantic proportions.

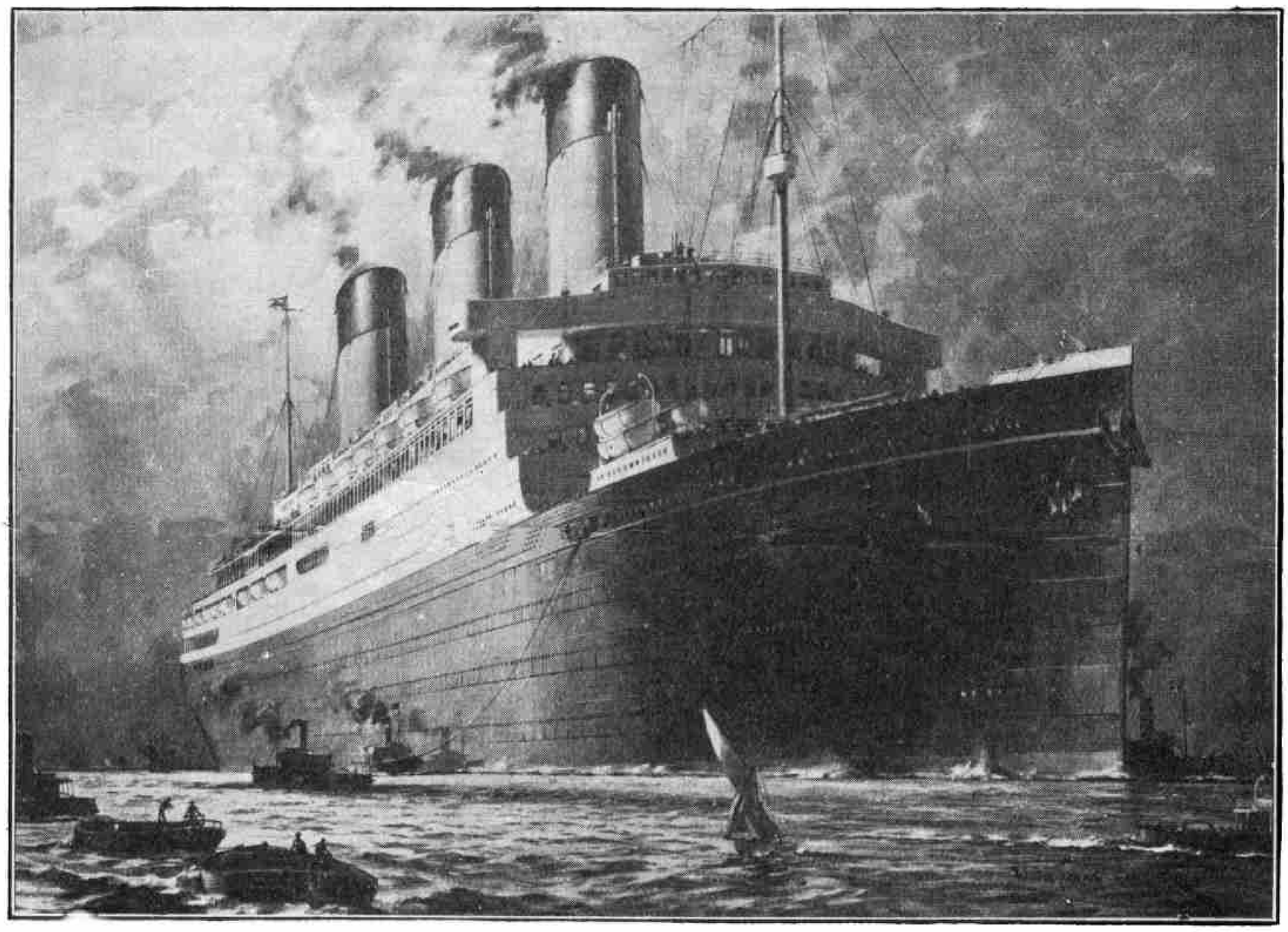
A unique sight was seen recently at Southampton docks, when three of these modern leviathans—"*Berengaria*" and "*Mauretania*" of the Cunard Line and "*Majestic*" of the White Star Line—berthed together. The "*Mauretania*," once the largest ship in the world, seemed to "have her nose put out of joint" as the saying is, by her two giant sisters. Even her passengers looked up with respectful admiration at the upper deck of the "*Majestic*" as she passed by, outward bound for New York.

The "*Majestic*" is well-named, for she represents the last word in luxury, as well as in size. This wonderful ship accommodates 4,100 passengers, and carries a crew of nearly 1,000. The little "*Mayflower*" was only of 180 tons burthen, but the "*Majestic*" is of 56,000 tons, or about the same weight as the whole of the 135 vessels that formed the Spanish Armada. When fully laden she displaces about 64,000 tons of water.

Funnels like Tunnels

The "*Majestic*" is 956 ft. (or nearly one-fifth of a mile) in length. If laid alongside, Big Ben—the famous clock-tower overlooking Westminster Bridge—would indeed appear dwarfed in comparison. The "*Majestic*" is, in fact, almost twice as long as the Blackpool Tower is high. She measures 100 ft. in breadth and 186 ft. from keel to smoke-stacks, thus rising to about the height of a twelve-storey building.

She has nine decks, seven of which are for the use of passengers. Above the top deck rise the three funnels, each 30 ft. in diameter. If either of these was placed horizontally, two trains could pass each other in it with ease! Her massive rudder-posts and plates weigh 140 tons, and the stern-posts, with their brackets for the four propeller shafts, weigh over 300 tons. She has five anchors, the largest weighing 15 tons, the total weight of the anchors and their cables being over 230 tons.



The World's Largest Liner: The "*Majestic*"

Guarding against Fire

In building so large a vessel, every care had to be taken to provide the very best means of protection in case of accident. This was the first consideration when the watertight bulkheads were designed. In order to aim at still greater safety, however, the ship was also provided with a double "skin" for part of her length.

To guard against fire the steel bulkheads are coated with fire-proof material, and provided with special fire-proof doors that will resist a temperature of 2,900 degrees Fahrenheit. The main staircases can be isolated, thus ensuring a means of escape to the upper decks. The 450 fire alarms, placed at different points throughout the vessel, work automatically. From them, the officer on watch can tell the exact part of the ship in which fire has broken out.

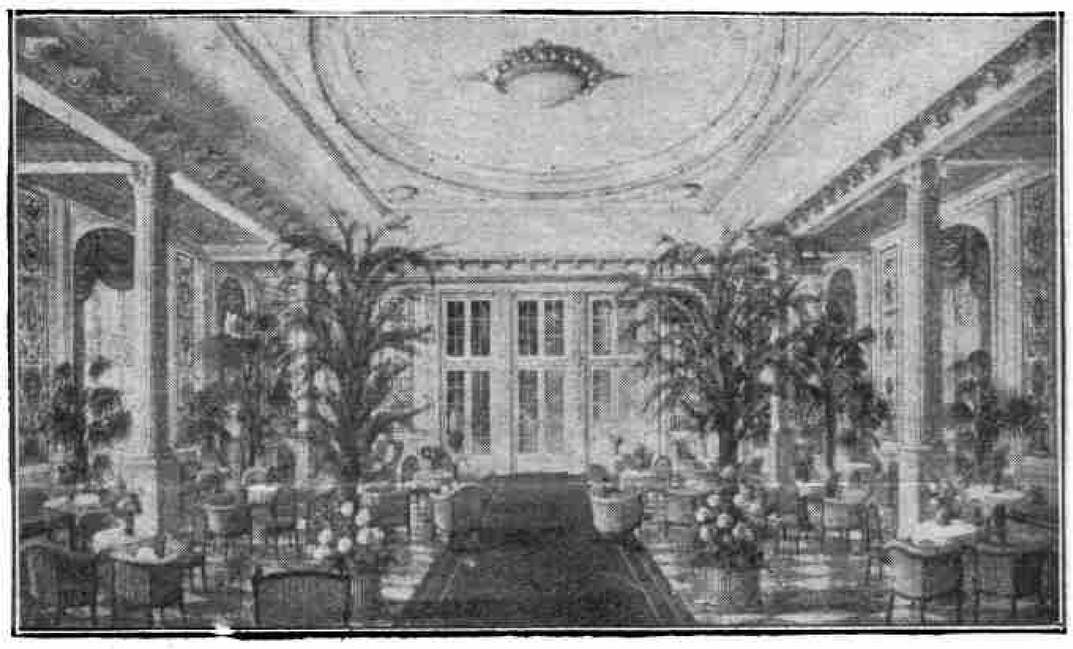
Comfort and Luxury

The huge vessel is designed almost exclusively for passenger traffic, and no provision is made for cargo. In addition

A Town that Travels

to the accommodation of passengers and crew, a considerable amount of space is used for the storage of fuel, fresh water, provisions, baggage and mail.

Space, ventilation, and decorations have been given the most careful thought, and no expense has been spared to make the vessel as luxurious as possible. We can imagine that were the Pilgrim Fathers able to inspect the "*Majestic*" they would shake their heads and hold up their hands in marked disapproval at the astonishing luxuries provided!



The Palm Lounge

The Wonderful Palm Court

The public rooms include the restaurant, which is the loftiest ever built on board ship, covering an area of over 11,000 sq. ft. It is capable of seating 700 persons, and is furnished with 170 small tables for parties of from two to twelve in number.

This restaurant opens on to a beautiful Palm Court, with palm trees and flower boxes to delight the lover of Nature. Beyond is a vestibule and a luxurious lounge, with a wonderful glass dome, the area of which is nearly 4,000 sq. ft. The wine-coloured carpet may be rolled aside disclosing an inlaid floor, ready polished for dancing. A stage at one end enables the lounge to be used as a theatre or for concerts.

The large smoke-room adjoining is beautifully panelled in unpolished oak, carved with oak leaves and adorned with the crests of the colleges of the English Universities. Near-by are the card-room, and the library containing 4,000 volumes. Here also is the beautiful swimming bath, with a depth of 8 ft. at the deep end, and tiled in green with marble steps. The bath can be filled with warmed sea water in about 25 minutes. There are thirty dressing rooms for bathers, and surrounding the swimming pool is a gallery for spectators. Shower, Medicinal, Electric, and Turkish baths are also available, as well as a gymnasium.

(*To be concluded*).

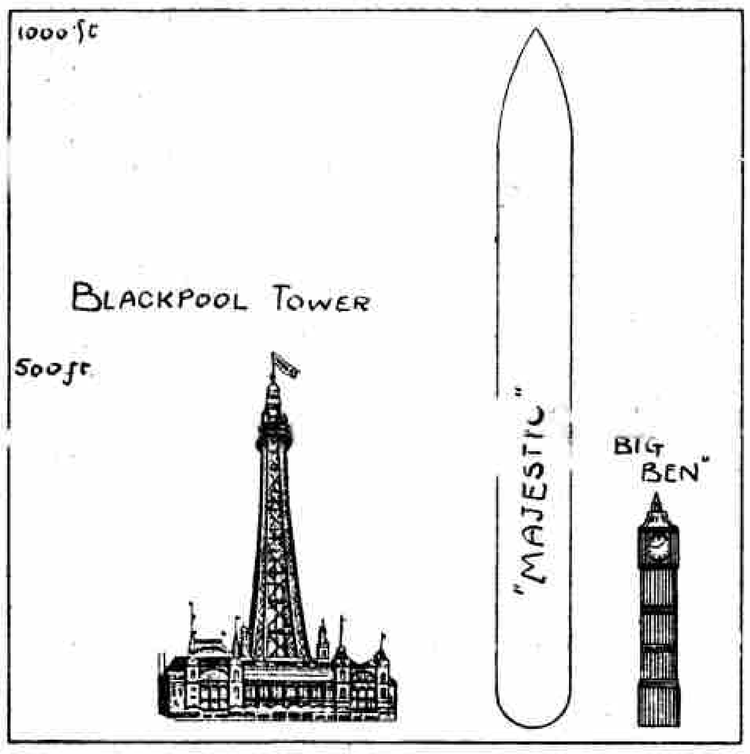


Diagram showing comparative sizes of the "*Majestic*," the Blackpool Tower and Big Ben

Master Jim Timms

Jim's Poultry Win Prizes

I have pleasure in publishing a photograph of Master Jim Timms, of Brackley, Northants. Jim is one of my regular correspondents, and is very keen on poultry-keeping, which—next to Meccano—is his favourite hobby. As a true Meccano boy Jim puts his whole heart and soul into his hobbies, and his enthusiasm is being well rewarded. Already he has had considerable success with his exhibits, his latest triumph being at the Syresham Show, where he won a prize for eggs laid by his pullets.

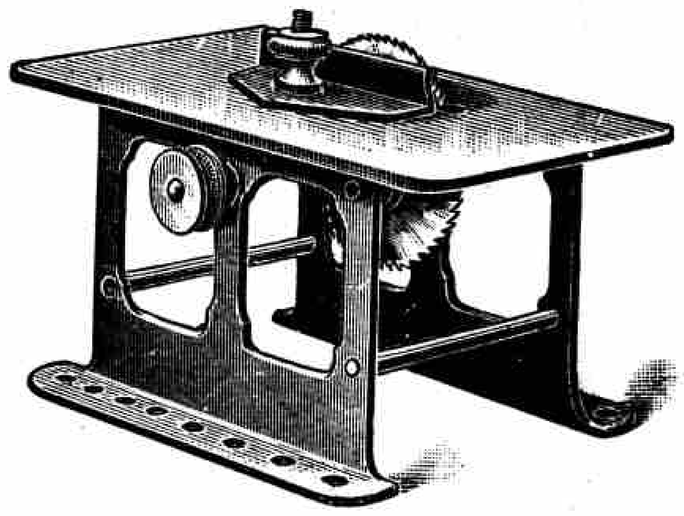
In addition to poultry-keeping, Jim also finds time to take a keen interest in gardening, in which he is equally successful. With these three hobbies it is no wonder that he always finds himself so fully occupied that he has no time to be downhearted or lazy!

My young friend tells me that he is soon going to a boarding school, and I am sure

(*Cont. foot of next col.*)

all readers of the "*M.M.*" will join in wishing him a very happy and successful career there. We hope to hear of him winning further prizes, but in this instance for tasks of a different nature!

Model Saw-benches



We have a number of model saw-benches suitable for use with electric motors or vertical steam-engines. Our stock is limited and readers are advised to take advantage of this offer immediately, as the stock will be quickly exhausted.

Model saw benches as illustrated, each 4/– (postage 7d).

A Useful Tool

Our illustration shows a type of screwdriver useful for reaching bolts in inaccessible places on models. For this reason the

blade has been made so that it may be passed through the standard Meccano hole to reach bolts so placed. We are disposing of these screwdrivers whilst our stock lasts, at the special price of 10d. each, post free.

Interesting Paragraphs

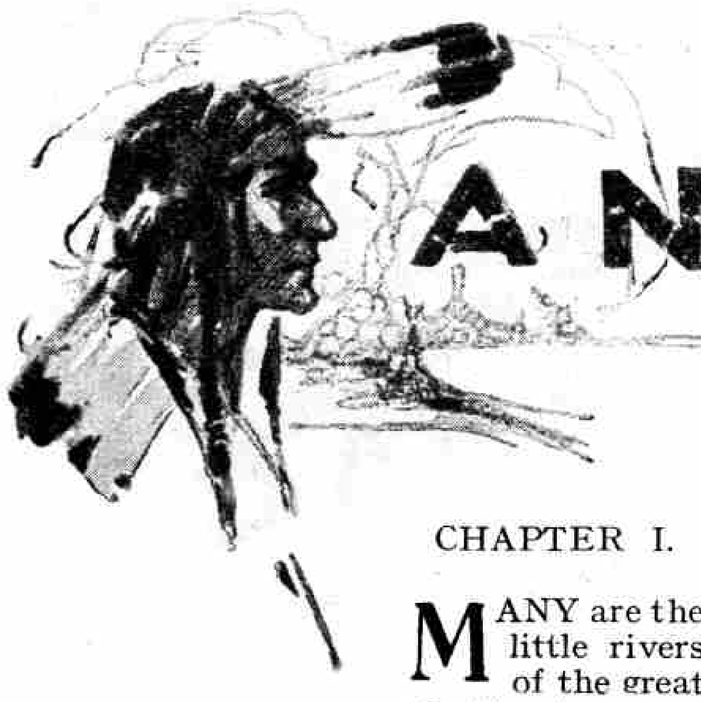
A fourth pipe-line from Thirlmere, in the Lake District, is to be laid to Manchester. The cost of the work, which is to be undertaken by the Manchester Corporation, will be over £1,000,000.

* * * *

The work consists of the laying and joining of a line of 54 in. welded steel pipes. The line passes through Kendal, Kirkby Lonsdale, Lancaster and Horwich. Work will be provided for a large number of men for many months, and the most modern types of excavating plant and equipment will be employed.

* * * *

A new ray which, it is claimed, will pierce the thickest fog, is to be tested at the London Docks. The new ray is one of reflection, not of projection, is incandescent, and is given off by a half-inch flame. It is reddish-blue in colour, and in shape the flame resembles the sharpened end of a pencil. The inventor suggests that by this new ray vessels will be able to enter dock during fog.



OUR NEW SERIAL

A NIGHT AT THE POOL

BY

Bernard Sexton

CHAPTER I.

MANY are the little rivers of the great North American Continent, but there is none more beautiful than the Housatonic. It flows across the State of Connecticut from north to south. At no place is it more than three hundred feet wide, and through most of its course it is too shallow to float a rowboat for more than a few miles. Yet what it lacks in size it more than makes up in beauty and variety. There was a time, long ago, when it was a favourite resort for the red men, because of the abundance of fish and eels, and the tribes whose territory touched its shining waters counted themselves fortunate as the inheritors of a beautiful and sacred stream.

A few miles to the east of the Housatonic, and within the limits of the present township of Kent, there is a curiously-shaped round hill. Even to-day this gives the traveller the impression of being "an Indian Mound." It is so perfectly circular, so symmetrical in its roundness that it is difficult to imagine the blind forces of Nature as instrumental in its formation. Strange to say, this tradition of an artificial origin is one that has persisted through the centuries. Each generation has attributed the formation of the hill to mysterious and powerful craftsmen of some vanished civilization. Even among the Indians it was held semi-sacred. The bravest of them could hardly be induced to pass a night near it, and only the boldest and most powerful, that is the medicine men, had succeeded in gathering sufficient courage to actually stand upon it.

At the time when this story opens, nearly three hundred years ago, two Indian youths were sitting crouched near a little fire at the very base of this sacred hill. Their tribal markings proclaimed them to be members of the great Iroquois confederation. In fact, they were Mohawks scouting far into hostile territory, bent upon one of those daring enterprises dear to the heart of the Five Nations. The young men were lithe, powerful, intelligent-looking. Evidently they were among the very best of their kind. The fact that they had so far survived was alone sufficient proof of their daring and skill.

* * * *

It was dusk. They sat crouched over a small and smokeless fire. Dense woods were all about, and a little brook, winding through the forest, circled the mysterious hill at whose base they were encamped for the night. The two young warriors had adopted every precaution that savage woodcraft could devise to keep themselves hid from the eyes of their kind. The fire was their only recklessness, and in that they indulged themselves because they felt assured that there was small chance of anyone following them into the vicinity of the sacred mound, the existence of which coloured all the superstition of the neighbourhood.

One of the young men fished noiselessly with his hands. The little brook at this point was rounded into a deep, golden-hued pool, overhung with rocks. Upon one of these the fisherman lay motionless. With eyes alert he searched the deeps of the pool. When he saw one of the great lazy trout the young Mohawk would sink his hands below it with infinite care and, gently tickling its underpart, would mesmerise it. A quick snap of the fingers and the fish was caught, and flung to land. The only sounds were an occasional splash as he threw ashore his catch, and the slight crackling noises made by the burning of light sticks. At last it grew too dark to see, and the fisherman stood up, stole in and sat by the fire.

"The trout in this pool swim into my hands," he said after a pause.

"They would not swim into anyone else's hands," answered the other, his face lighting as he flashed a glance of admiration at his comrade.

Red Hawk, the fisherman, stood up.

"They swim into the hands of Red Hawk because he is wise and cunning."

Across the face of him addressed as Red Hawk there passed a shadow of a smile at this praise from one whose praise to him meant more than life itself.

Red Hawk, though only eighteen summers old, was the leader in this hazardous expedition. He was tall and slender and had that thoughtful face characteristic of the best blood of the proud Mohawks. Pride showed in every line of his body—pride of race and pride of person—but it was not the blind tribal pride of the average Indian. Red Hawk was a thinker, the child of the race that formed the great confederacy of the Five Nations, that association of Nations which foreshadowed in its structure the principles of the United States. He was a little above the medium height, about five feet ten.

Wolverene, his comrade, who sat across the fire roasting fish, was a little shorter and one year older. He had been the chosen comrade of Red Hawk as far back as both could remember. As little boys they had been inseparable. They possessed for each other the affection that made either almost ill with apprehension if the other were absent or in danger. Thus they grew up, sharing that glorious life of the wilderness, which in spite of its occasional perils was almost entirely a happy adventure for the youth of the Great Confederacy. Their people had nothing to fear from armed invasion. For hundreds of years now their crops, their villages, and their women, had been secure against attack. Indeed the Mohawks could rove the wilderness for hundreds of miles and not meet any men save such as those that bowed the knee in subjection to their power.

A few months before, however, a rumour had drifted through the wilderness that set the Sachems and Sagamores thinking. It was to the effect that a settlement of white men had been started in the territory of the Massachusetts Indians. It was only a rumour, and at last these two, Red Hawk and Wolverene, each with a great name yet to make in the Tribe, offered to penetrate the hundreds of miles of perilous wilderness and find out the facts. They had done so. They had tracked their way across what are now the states of Connecticut, Massachusetts and Rhode Island. They had looked at last upon the Great Waters—and they had seen, curling up over timbered roofs, the smoke from the fires of the Pilgrims at Plymouth.

Their task accomplished they had returned swiftly. Passing through the territory of hundreds of tribes and clans they had avoided intercourse with all, for such were their orders. Their mission was to be secret—and they had succeeded in coming as far as the Housatonic without detection. Nevertheless they knew they were now in peculiar danger.

(*Continued at foot of next column*)

Improving the "*M.M.*"

A TALK BY THE EDITOR

It is a terrible job being an Editor! Every week I receive large numbers of letters from my readers criticising the contents of the "*M.M.*" If I were to carry out a quarter of the suggestions contained in these letters, I should have to enlarge the "*M.M.*" to several hundred pages. "Then why don't you do it?" I imagine some readers saying! Well, there are many good reasons why it cannot be done and the chief reason is that printing a large magazine is an expensive business! As we cannot at present increase the number of pages of the "*M.M.*" we must necessarily make the best of things as they are.

It is an Editor's ambition to try to please as many of his readers as possible, by giving them articles on subjects that he thinks will interest them. This is where the terrors of the Editorial chair manifest themselves, for with the tens of thousands of readers of the *Meccano Magazine* the problem of satisfying everybody becomes very difficult. What would you do if you were to receive letters from some readers who say we do not give sufficient space to Radio, while the very next post brings letters from others who think that "four pages is too much valuable space to devote to Radio matters!" Others suggest that at least two pages each should be devoted to Railway subjects, Stamp Collector's Column, Nature Study, Photography, Conjuring Tricks, Puzzles, or to the hundred-and-one other subjects in which they are particularly interested. While all these subjects are certainly interesting to Meccano boys, they cannot be dealt with in the "*M.M.*" simply because of lack of space.

Now boys, I want you to help me to obtain information as to just what subjects appeal to you most. *I want every reader of the "M.M."* to send me a post-card answering the questions printed below. For the most original reply to question No. 10 I shall award a Hornby Clockwork Train as a prize, and a Zulu Tank Loco as a second prize. There is no necessity for you to write out these questions—simply place the number of the question before your answer. By answering these questions intelligently and thoughtfully you will be helping me to a large extent in my monthly task of trying to please you. Not only this, but a "brain wave" will stand a chance of winning one of the prizes! Just stretch out your arm for the pen and ink and set to work right away, because the answers must be received before 30th April.

Questions.

1. Should we print short stories (similar to "How Jimmy Thornton Made Good" in the December issue) written by Meccano boys?
2. (*a*) Should we include instead serial stories?
   (*b*) If so, should they be stories of adventure or of school life?
3. (*a*) Do you like the "Mail Bag" Column?
   (*b*) Should we give it more space?
4. Do you like the new Editorials, or do you prefer the old style of Editorial paragraphs?
5. Do you consider four pages too much to devote to Radio?
6. Do you like reading about Meccano boys and what they are doing?
7. Do you prefer the inclusion of illustrations of new Meccano models such as were published on the front page of the "*M.M.*" last year?
8. Should we publish more articles of a general scientific nature, or should we have fewer of these articles and use the space for articles relating to Meccano?
9. Which kind of Competitions interest you most?
10. *Can you suggest a novel feature for improving the "M.M."*

A Night at the Pool (*cont.*)

In the previous year the tribe, through whose territory they were now passing, had suffered an affront from some of the emissaries of the Five Nations. Although they did not dare to resent it in open warfare, it was well understood that the life of any Mohawk found in their territory would be forfeited.

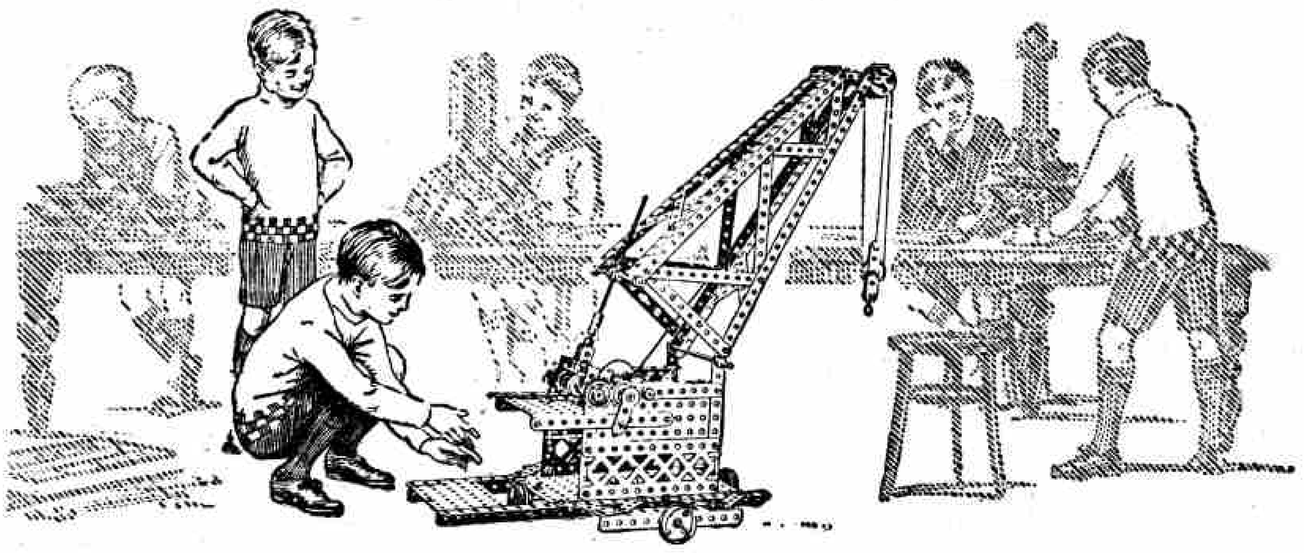
Red Hawk and Wolverene knew this, and also did they know that during the past two days they had been persistently tracked. Doubling on their tracks, employing all the stratagems of Mohawk cunning, they had not been able to throw their pursuers off the scent. Red Hawk had made a careful examination of the back trail to discover the number of the party following them.

(*To be continued*).

£250 in Prizes

BEST MODEL CONTEST

Closing Date: 15th April, 1923



Cash Prizes to the value of £100, Meccano Outfits, Inventors' Accessory Outfits, Hornby Trains and Zulu Trains to the value of £150.

These prizes will be awarded in the big Meccano Competition, which every Meccano boy should enter. As was the case last year, the Competition is divided into three sections (1) for boys under 10 years of age, (2) for boys between 10 and 14 years of age and (3) for boys over 14 years of age.

There are no restrictions and no entrance fees. Full particulars and entry forms will be sent on application. The closing date for the Competition will be 15th April for entries from the United Kingdom, and the 30th May for entries from Overseas.

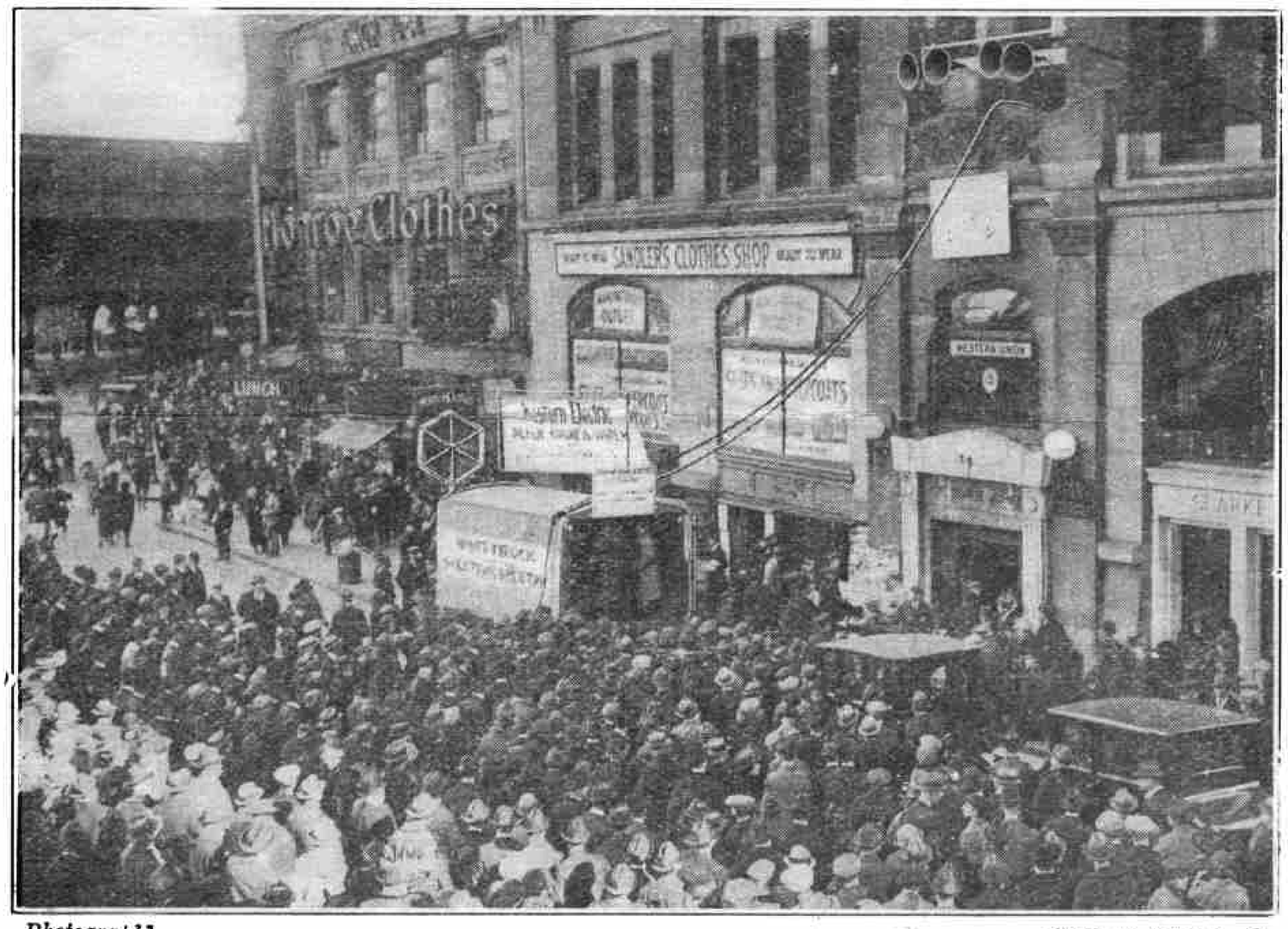
Ask your dealer, or send to us, for an Entry Form.

RADIO SECTION

"Hearing" a Base-ball Match 1,000 Miles Away

SCIENTISTS are already familiar with "sounds" that cannot be heard and "colours" that cannot be seen. Now Radio makes it possible to "hear" a cricket or a football match! An experiment, recently carried out in America, in connection with a base-ball match, consisted of broadcasting a verbal account of the match as witnessed by an observer. He spoke into a microphone connected to the apparatus at the transmitting station.

In the particular case referred to, the microphone was installed in a sound-proof compartment on top of the grand-stand on the base-ball ground at Chicago.



Photograph] [*Western Electric Co.*

Our illustration shows the crowd at New York "listening" to a base-ball match that was being played at the Stadium, Chicago. In the centre is seen the motor-car with frame aerial connected to the loud speakers at the top of the picture.

This was the starting point of a circuit, which by wire and radio, carried the observer's story of the Chicago *v.* Princeton match into thousands of homes. A well-known sporting writer described every incident of the game, and when the door of the sound-proof compartment was opened the listeners-in were able to hear the shouts and cheers of the spectators. Even the shrill blast of the referee's whistle was audible.

Outside the compartment, valve amplifiers sent the story on its way over the telephone lines to New York. Here it was broadcast by Radio from WEAF, the station of the American Telephone and Telegraph Co.

In one of the main streets of New York was a motor truck, equipped with a frame aerial. This intercepted the radio waves and directed them to a receiving set, connected in turn to five loud-speaking projectors. These were mounted in a window of the New York "*Tribune*" and made the story of the match clearly audible, above the noise of the street traffic, to a throng of several thousand people in City Hall Park. Over in Newark a similar outfit broadcast the story to another great crowd.

This was the first time that a long-distance telephone circuit was used for the preliminary transmission of broadcast. Every word was clearly heard by thousands of listeners-in as well as by the two big audiences in the open-air. So successful was the performance that it has been decided to broadcast the most important match every Saturday afternoon during the season.

Cardiff Broadcasts

New Station Opened

THE new Broadcasting Station at Cardiff was officially opened on 13th February, and is now in nightly operation. The first words sent out were spoken by the General Manager of the British Broadcasting Company, Mr. J. C. W. Reith, calling "Hello! 5 W A Cardiff Station calling." After a short greeting Lord Gainford delivered to his unseen audience, a message from Mr. Lloyd George expressing his pleasure at the opening of the first Radio Station in Wales. Lord Gainford informed listeners-in that Cardiff was the fifth station to be erected by the Broadcasting Company, and he congratulated the people of Wales upon their good fortune in having a station from which so much pleasure and information might be derived, for the Company would do all in their power to give listeners-in programmes of the highest standard. It had been hoped to transmit the King's Speech from the Throne in the House of Lords, but unfortunately the Government's permission was withheld.

Sir William Noble, late Chief Engineer to the G.P.O., then spoke, saying that he looked forward to the day when the great Welsh musical festivals would be broadcast and the wonderful voices of the Welsh singers heard by thousands who would otherwise be denied the pleasure. He was followed by the Lord Mayor of Cardiff, who sent his hearty greetings to each and every listener-in, and mentioned how Radio brings the greatest artists of the world into the home of the humblest cottager. How the music of such great masters as Paderewski, and the art of such singers as Melba and Tetrazinni, will be within the reach of all, and how all will be able to share the highest artistic and intellectual pleasures with the wealthiest people in the land.

A musical programme then followed, and included classical and popular music, followed by a news bulletin and a weather report. The evening's entertainment was concluded by humorous items.

Cardiff Broadcasting Station operates each evening from 6.30 to 10.0, the call letters being 5 W A and the wave length 395 metres. From 9.0 to 9.30 each evening the station will close down to enable the possessors of valve sets to get in touch with the London Station. Broadcasting will then be resumed from 9.30 until 10.0.

The Men Who Gave Us Radio:

I. GILBERT, GALVANI, VOLTA AND AMPÈRE

THE story of the invention and development of a practical system of communication without wires is one of the most remarkable in the annals of Science. In it we read how the Radio of to-day was only made possible by persistent and thoughtful study. We learn of the conquering of difficulties and the overcoming of obstacles that, when first encountered, were regarded as being insurmountable, and we find that success has been gained only by close attention to detail, perseverance, and sound judgment.

No chance discovery has been made that has enabled scientists to arrive, by a short cut, at such brilliant achievements as radio-telephony or super-regeneration. It has been exactly the same in Radio as in the case of the invention of the steam engine. Here Watt's idea of the separate condenser was not obtained by accident, but was the outcome of close and continuous study. It was the final step in a long journey—a step that could never have been taken had not the road that led to it been carefully and thoughtfully traversed.

The Radio of to-day is not the work of any one man, but is the outcome of the labour of many scientists. These men devoted their lives in endeavouring to develop a practical system of communication without wires, and their researches go back at least one hundred years.

* * * *

Radio is made possible by Magnetism and Electricity, of which fascinating sciences most boys possess some knowledge. Let us first deal with magnetism and magnets. There are two kinds of magnets, (1) the permanent and (2) the electro-magnet. A specimen of the former may be bought at any toy-shop, while the latter has a wide application, being used for many commercial purposes, that range from the ringing of a house-bell to providing great motive power by means of large electric motors.

Dr. Gilbert of Colchester

The permanent magnet was known in olden days, and was regarded as an object of curiosity by the people of many nations. An iron ore, possessing the peculiar property of attracting iron and called the "lodestone," is mentioned in Ancient Chinese records, and is referred to by ancient Greek and Roman writers. In Queen Elizabeth's reign the celebrated Dr. Gilbert of Colchester studied the curious properties of the magnet, and discovered that when freely suspended, a magnet always points north and south, and this principle forms the basis of our magnetic compass.

For some three hundred years no further progress was made in the study of magnetism, but some advances were made in electricity. Up to the latter part of the 18th century only one kind of electricity was known. This was called "static" electricity, as distinct from "current" electricity. Static electricity is produced by rubbing together two substances such as a glass rod and a piece of flannel. The glass becomes charged and will attract feathers and other light objects.

It is often thought that the invention of wireless telegraphy was due solely to Marconi. Many people are surprised when they find that Radio is the result of researches extending back considerably over 100 years.

In this science, as in history itself, progress may be traced by studying the lives of the men who devoted themselves to the subject. These men overcame difficulties, were unaffected by disappointments, and made possible the achievements of their successors.

In this series of articles we propose to outline the development of the science and to briefly describe the researches of those scientists who, before Marconi's time, laid the foundation of Radio. We hope, by these means, to enable our readers to more fully realise the great physical laws and the vast amount of labour and research, that lie behind even the faintest "click" of the Morse dot or dash heard in the receiver.

Static electricity cannot be used to ring electric bells or to do other similar work, and it is of little or no interest, except for experimental purposes.

Galvani and Volta

The second type of electricity was discovered in 1780 by Luigi Galvani, an Italian. In 1799 another Italian, Alessandro Volta, showed that this new form of electricity could be produced by a column of copper and zinc discs. Placing these discs alternately, and separating them with moist flannel, he found that they produced feeble charges of positive and negative electricity. The electricity thus produced was totally different from static electricity, for the supply was available

André Ampère was one of the many scientific men who have distinguished themselves by applying the highest branches of mathematical analysis to the investigation of the problems of Electricity and Magnetism. Ampère was born at Lyons in 1775 and died at Paris in 1836.

in a continuous current, being renewed as fast as it flowed away. This type of electricity therefore became known as "current electricity."

Volta's discovery was followed by a long and heated controversy as to the origin of the electricity thus produced. It was finally decided that it was produced by chemical action. The "Voltaic pile," as Volta's column of metal discs is called, was later replaced by a vessel containing dilute acid, in which two kinds of metal—generally copper and zinc—were placed. From these two metals positive and negative currents were obtained. These together compose an electrical circuit.

Subsequently there were introduced several types of "wet cells," such as the "Daniel" cell and the "Leclanché" cell, the latter being largely in use to-day for electric bells and telephones.

Cells of this type contain liquid, and for that reason they cannot be conveniently handled. To supply the requirement for a portable and unspillable cell, dry batteries were introduced. They function in a similar manner to the wet cells, but their acids are inserted in a paste, contained in a casing of zinc. The positive current is generally provided by a carbon rod in the centre of the zinc container, and packed around by the acid-charged paste. The whole is sealed with a covering of pitch, or some similar waterproof and insulating medium. (The small batteries used for flash-lamps belong to this type and their construction may be seen in detail if one is pulled into pieces. An old exhausted cell should be chosen for preference, as the cells cannot be re-assembled satisfactorily).

André Ampère

About the time that Volta was experimenting, André Ampère, a French scientist, was also studying electricity. His father had been put to death by the guillotine in 1793, and the tragedy made a deep and melancholy impression on young Ampére. He sought solace in a study of nature and antiquity. He was a distinguished mathematician, and in 1805 went to Paris, where he became an able teacher. In 1824 he was appointed Professor of Physics in the College of France.

We have not space to describe Ampére's work in detail, but must content ourselves by stating that it had a marked effect on scientific progress, especially in electricity and magnetism. What is of even greater importance is the fact that Ampère's researches prepared the way for Faraday's experiments, which we shall consider later.

(To be continued).

NEXT MONTH.

OERSTED, HENRY and FARADAY

F. R. Marchant (Southampton).—There is no Broadcasting Station in Liverpool at present, although many people would welcome one.

A. V. Hughes (Whitehaven).—Very little is known at present about ether except that it is everywhere, and that if there was no ether there would be no Radio. It has been said that "Ether is the stuff that vacuum is made of."

G. Nelson (Milford Haven).—There is no risk whatever in using a Crystal Receiver, as neither acids nor batteries are used.

T. Morrisey (Tynemouth).—The higher the aerial is placed, the better will be the result. You can fasten one end of the antenna to a pole attached to the chimney, and the other to another chimney about 80 feet distant or to a clothes-post in the garden.

L. Radley (Exeter).—Instructions for the construction of an Electric Buzzer are given on page 9 of the Meccano Electrical Manual (1/8, post free).

H. Atkins (Leatherhead).—I do not think your suggested aerial, composed of metal discs spaced on a piece of wire by washers, would be satisfactory. Although it is true they would present a greater surface, on the other hand their resistance would be very considerably increased. A single wire is the best form of aerial that can be used for reception with a Crystal Set.

B. Mercer (Reading).—We do not recommend you to use a frame aerial with a Crystal Set, as we do not think that you would obtain very good results.

L. Dewhurst (Grimsby).—Telephony may be received from distances up to 50 miles with one valve as a detector. This distance may sometimes be increased, but all depends upon the local conditions.

P. Maitland (Birmingham).—The transmission of Radio-telephony depends upon the variations in the carrier wave.

T. Brinsley (London, S.E.1).—The "dead-end" effect in inductance is caused by the idle portion of any variable inductance coil. The effect on reception is to give rise to loss of energy by discharging into the air.

G. Rendall (Sheffield).—We do not recommend the use of a "ticker" in the manner you suggest for the reception of continuous wave signals.

K. Lunt (Morecambe).—The Meccano No. 2 Receiver, being of the constructional type, may only be used with an Experimental Licence, and is not available for use with the Broadcast Licence. Full instructions for building same will be ready shortly. The Meccano Valve Receiving Set is not yet ready for sale.

H. Greenfield (Tredegar).—There are several very instructive books on the subject of Radio. You might also read the various Radio periodicals that are published weekly.

B. Stokes (Liverpool).—It is not permissable for us to have a transmitting station in London, much as we should like to broadcast to Meccano boys. Certainly you may write as often as you wish and we shall be glad to help you.

N. Corfield (Bristol).—The combined height and length of your aerial must not exceed 100ft. The antennae may consist of any number of wires.

W. Knowles (Newcastle).—A tree situated near your aerial would not make any great difference to the reception of broadcasting. I am very gratified to note your high opinion of the "*M.M.*"

L. Berry (Oxford).—The actual distance from which telephony can be received on a Crystal Set depends largely upon the type and situation of the aerial, and upon the power used at the transmitting station. Broadcast from Manchester has been received perfectly in Cheshire with a Meccano No. 1 Crystal Receiver at distances up to 33 miles from Manchester, using a standard aerial.

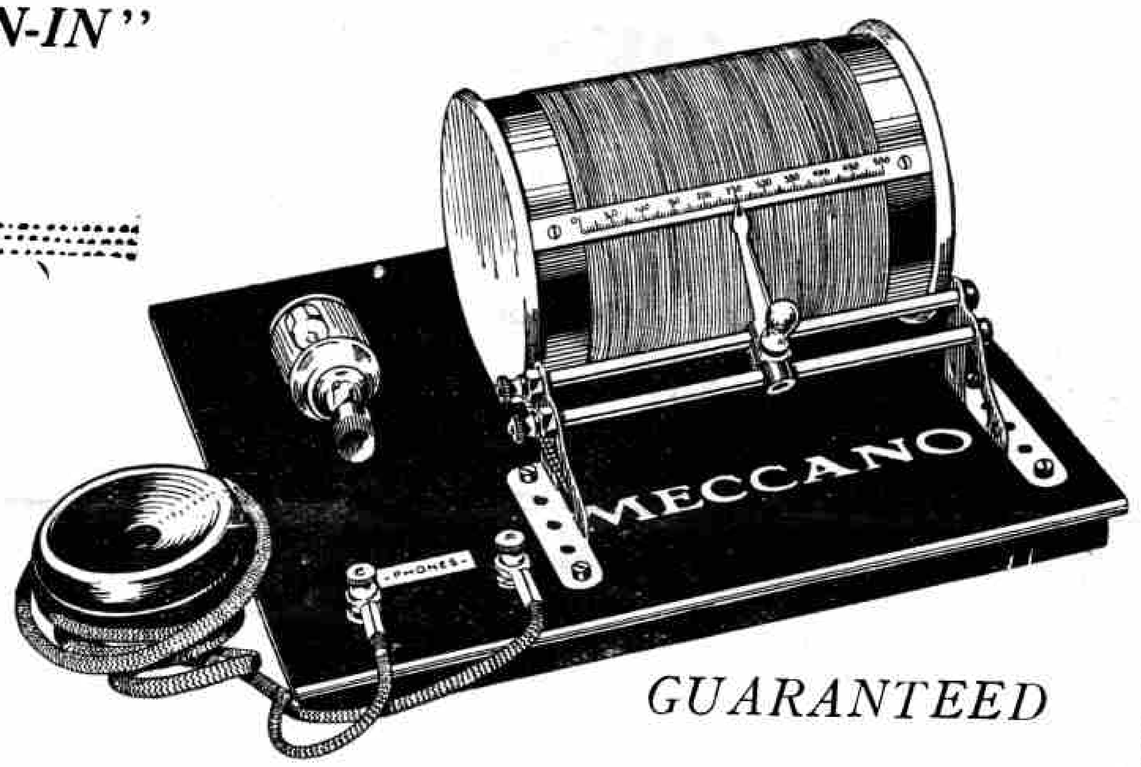
G. Montgomery (Blackburn).—Morse signals may be received up to distances of 100 miles or over on a Crystal Receiving Set.

P. Russet (Yarmouth).—An article giving directions for the erection of various types of aerials will shortly appear in the "*M.M.*" In the meantime I advise you to give up attempting to climb on the roof!

B. Shaw (Musselburgh).—A frame aerial would probably enable you to receive messages from Glasgow on a two Valve Set. Regarding the number of valves necessary for you to receive messages from Manchester or Birmingham, probably three would suffice, but a great deal depends upon the aerial, the skill of the operator, and local conditions.

H. Wilson (Scarborough).—Although the London broadcast has been received at Bridlington on a Crystal Set, this must be regarded as "freak reception." The reception of broadcast on a Crystal Set at Scarborough is not generally possible. As telegraphy may be received at distances up to 100 miles or even over, you could receive code messages from ships at sea.

"LISTEN-IN"



GUARANTEED

THE

MECCANO

RADIO RECEIVER No 1

For Broadcast and Morse Reception

The Meccano Crystal Receiving Set is a piece of scientific apparatus with which anyone may spend hours of delight and enjoyment "listening in" to broadcasting stations and other telephony transmissions.

It has been thoroughly tested and has received with great clearness music and speech in London, Birmingham, Manchester, and elsewhere, up to distances of 33 miles from the broadcasting station.

Low in cost and complete in itself, ready to be connected to any aerial, the Meccano Radio Receiving Set will provide hours of fun and entertainment.

PRICES:

MECCANO No. 1 CRYSTAL RECEIVING SET, complete **55/-**

MECCANO AERIAL SET (including antenna, lead-in and aerial wires and insulators) **12/6**

A splendid booklet, "The Meccano Crystal Receiving Set," explaining how easy it is to receive broadcasting, will be mailed free on application.

Address: Department R1, MECCANO LTD., BINNS RD., LIVERPOOL.

L. O. Thompson (Portsmouth).—As explained in our Radio booklet, the Radio waves are intercepted by an insulated length of copper wire, known as the "aerial."

V. T. Meadows (Wigan).—When listening-in to broadcast you hear full concert programmes, including songs, recitations, violin and 'cello solos and selections of grand opera. Also special late news items, weather and market reports, bed-time stories and interesting lectures.

H. Fleming (Brighton).—It is necessary to obtain a licence before installing a Receiving Set. If you wish to install the Meccano No. 2 Receiver (Constructional type) you will require an Experimental Licence. The No. 1 Meccano Receiver may be used with a Broadcast Licence. Either of these Licences costs 10/-.

W. B. V. Hanson (St. Helens).—A knowledge of Morse is necessary if you wish to receive telegraphy, but this is not difficult to acquire. If you wish to join the Meccano Guild, write to the Guild Secretary for an application form.

H. Clements (Glasgow). If you intend attaching an aerial to your house, it will first be necessary to obtain the consent of your landlord.

L. Brown (Watford).—You should be able to receive broadcast from Marconi House satisfactorily at Watford with a Meccano Crystal Set.

H. Forshaw (Birmingham).—Only one person can "listen-in" with a Crystal Set, unless more than one 'phone is used. I hope that you will be able to pay a visit to the Meccano factory while in Liverpool.

G. M. Goodwin (Ripley).—I am afraid that you are too far away from Birmingham to receive broadcast with a Crystal Set, to receive which a valve set would be necessary.

D. Inglis (Oldham).—There is no charge made for broadcast concerts other than the contribution you pay when buying your receiver.

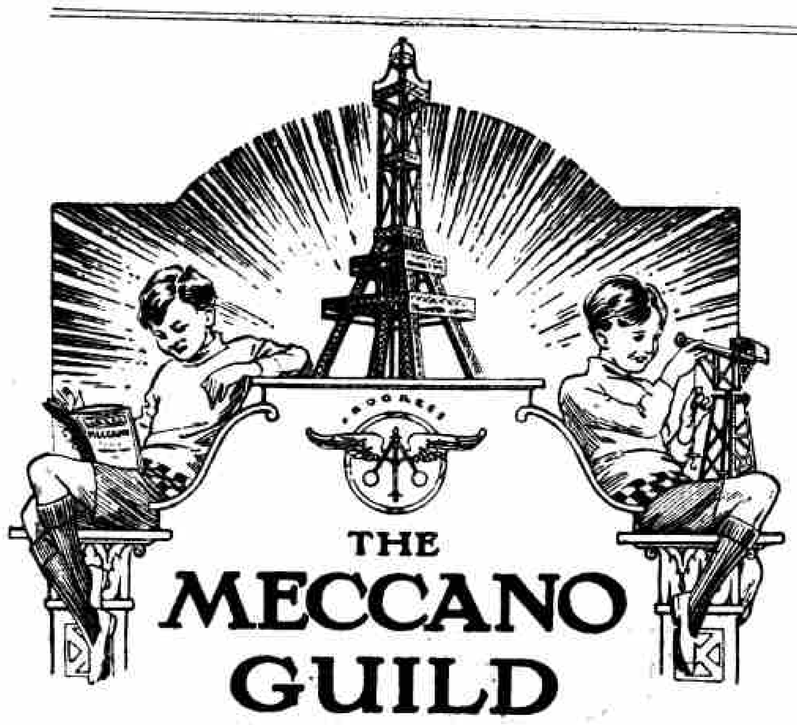
M. Burton (Newbury).—I am very pleased to learn that you are studying Radio. The science is as yet only in its early stages, and, as Professor Fleming recently pointed out in our columns, many of the valuable discoveries in Wireless Telegraphy have come from amateurs.

T. F. Sinclair (Ulverston).—A short paragraph on the new American invention, a Radio Slot-machine, appeared in the January issue of the "*M.M.*"

L. F. Conway (Newcastle).—We shall continue to deal with Radio in the "*M.M.*" so your wish will be granted.

C. Edwin (Ashton).—A good illustration of an aerial is given on page 7 of the Meccano Radio Booklet.

N. J. Leonard (Leeds).—A world radio combine with a capital of £34,000,000 has been formed. It will include British, French and German Stations.



THE MECCANO GUILD

The Secretary's Notes

Every day the scope of the Guild increases and new members are enrolled from all parts of the world. The small enamelled badge of membership is becoming universally known, and Guild members everywhere are pleased to recognise other Guild members by this token, and to accept them as friends. I often hear of members in strange towns meeting and claiming fellowship with other members whom they see in the streets, recognising them by the triangular Guild badge.

Guild Activity

The handsome membership certificate, which shows that a boy has been enrolled as a member of the Guild, is one that draws many tributes from new members. Many thousands of members' bedrooms contain this certificate, framed and hanging at the head of the bed, reminding its owner of the objects of the Guild. For the benefit of boys who are not members, it may be mentioned that the three objects of Meccano Guild Fellowship are :—

1. To make every boy's life brighter and happier.
2. To foster clean-mindedness, truthfulness, ambition and initiative in boys.
3. To encourage boys in the pursuit of their studies and hobbies, and especially in the development of their knowledge of mechanical and engineering principles.

Every boy who possesses a Meccano Outfit should join the Guild without delay. The Meccano Guild stands for Happiness, Instruction and Progress. It helps a boy to live straight by bringing out all that is best in his nature. A member of the Guild is associated with tens of thousands of other members, who also are interested in the most instructive toy in the world. To join the Guild it is necessary for a boy to fill up the official form of application and to post it to me, together with 7d. in stamps. The Guild badge and certificate of membership are then forwarded, and the boy enrolled as a member of the Guild. If you are not already a member, send a postcard to-day for an application form.

Join the Guild

Having joined the Guild the member should attach himself to an existing Meccano Club. If he is not already acquainted with a Club he should write to me for particulars of the nearest Club to him, or a list of the Clubs, if there are more than one. On this list are given the names and addresses of the Club Leader and Secretary, either of whom will be pleased to give details as to the place and time of meetings.

Support Meccano Clubs

If there is no Club near enough for him to join, the new member should endeavour to form a Club in his district. A useful booklet "*Suggestions for Club Secretaries*" tells him how to do this, and will be sent (post free) to applicants. If there is no existing Club and one cannot be formed, the boy becomes a "lone member" of the Guild. If he desires it he may be placed in touch with other lone members in almost any part of the world, through the Guild Correspondence Section.

Club Football Teams

The activity of the second Winter Session of Meccano Clubs all over the world is now in full swing. From all quarters I hear how enjoyable and successful the Session is proving. Many Clubs have recently introduced gymnastics and indoor games into their programmes, but up to the present Football seems to have been the most popular development of physical exercise. I should like to extend my congratulations to Clubs on their initiative in establishing Football Teams, and to express my pleasure at the number of matches that have been won by Meccano Clubs. It is quite evident that the majority of Guild members are keen sportsmen, and that they are as much at home on a football field as in the Club-room.

CLUB NOTES

West View (Nottingham) M.C.—Second Winter Session proved even more enjoyable than those held hitherto. A very successful exhibition was held last month. *Leader :* Mr. H. W. R. Cousens, 494, Mansfield Road, Sherwood, Nottingham.

Leamington M.C.—This enthusiastic Club recently organised an entertainment in the Urquhart Hall. The Meccano Minstrels, under the direction of Mr. Frank Reade, were the principal attractions. The audience of about 500 included the Mayor of Leamington (Councillor G. W. Hawkins), and the Club President, Lieut.-General Sir John L. Keir, K.C.B. The items were splendidly rendered, and included the well-known song entitled "The Roast Beef of Old England," and a trio "The Pom and the Pug and the Pekingese" given with great effect. A musical tragedy entitled "The Body in the Bag," and a burlesque on the new medical theories, under the heading of "I'm getting better every day," provoked much laughter. During the interval the Mayor presented two Special Merit Medallions to Master J. L. Hills and F. C. Miles, and read a letter of congratulation to these boys from Mr. Hornby, President of the Guild. Mr. F. W. Bull, the Club Leader, then gave a brief outline of the general Club routine and said that he would be pleased to welcome new members, and the proceedings terminated. After all expenses were paid there was £5 profit, which was added to the Club funds. The Leamington Meccano Club have good cause to be proud of their troupe of Meccano Minstrels. *Secretary :* Mr. G. Hare, 36, Willes Road, Leamington.

Malvern (South Africa) M.C.—An excellent Session has resulted in the members being keener than ever, and the attendance has been very good. Before the close of the First Winter Session an enjoyable picnic was arranged to the Zoo Lake. Sports are held every Saturday afternoon, and a very successful sale of work was organised during last month. *Leader :* Mr. E. Sykes, c/o T. Henderson, P.O., Cleveland, Transvaal, S. Africa.

1st Belfast M.C.—The Club continues to make good progress and the members turn up in full force for each meeting. Local gentlemen are evincing great interest in the Club, and one gentleman kindly gave a Lecture on "Radio," and allowed the boys to listen-in. It is hoped in the near future to instal a Radio Set for the use of the members. *Secretary :* Master J. Sinclair, 39, Oakland Avenue, Bloomfield, Belfast.

Butt Lane Council School (Talke) M.C.—Continues to make progress. A very successful Competition, held recently, proved a welcome addition to the programme. *Secretary :* Master Percy A. Ray, 147, Congleton Road, Talke, Staffs.

St. Luke's M.C. (London, W.10).—This is a new Club, and at present the members are all Boy Scouts. The programme includes a number of table games in addition to the usual model building, and the Club is rapidly increasing the scope of its usefulness. *Leader :* Mr. P. J. Betts, 178, Wornington Road, North Kensington, London, W.10.

Airdrie M.C.—An Exhibition which was held recently lasted for almost three weeks, and was an unqualified success. There was a fine show of models, including Cranes, Bridges, Ships, and an Electric Railway and Electric Tramway with overhead wire. The Wireless Section of the Club were busy also, and concerts were heard from Manchester, Birmingham and London, almost every evening. *Secretary :* Master W. B. Gardner Henderson, "Rosehall," Airdrie.

Luton M.C.—The members are very keen on model building, and the programme for the last Session proved very enjoyable. Master W. Humby was awarded a Special Merit Medallion. *Secretary :* Master W. Humby, 34, Adelaide Street, Luton.

Victoria (Glasgow) M.C.—The Club membership now stands at over 40, and the Club-room is always well filled. A Model Building Competition was held recently, which proved very popular indeed. *Secretary :* Master Ian Kerr, 57, Victoria Park Drive South, Whiteinch, Glasgow, W.

Bromsgrove M.C.—The Club Leader informs me that the Club is at present more successful than it has ever been, and that owing to the increase in membership further accommodation has become necessary. The Meccano Lecture entitled "The Story of our Ships" has been given and met with a good reception. Master Dennis Tilt has been awarded a Special Merit Medallion. *Secretary :* Master L. Edwards, 148, Worcester Street, Bromsgrove.

St. Cedds (London, E.16) M.C.—Just before the close of the First Winter Session a very successful Dance, Social and Exhibition was held. The Club in general continues to make good progress. *Secretary :* Master S. Elliott, 142, Beckton Road, Canning Town, London, E.16.

Holy Trinity (London) M.C.—The Fourth Annual Exhibition of this Club was held in conjunction with the "St. Mary with St. Gabriel M.C." towards the close of last Winter Session. The Exhibition was the most successful yet held and representatives were present from several London Clubs. In addition to a display of Meccano models, a Radio Demonstration was included in the programme. This was conducted by G. F. Auckland, Esq., and telephony was received every hour from his firm. It is hoped that another Exhibition will be held this year on an even larger scale, and that more of the London Clubs will co-operate. The Club continues to make excellent progress. *Leader :* Mr. S. H. Wilson, 29, Thornhill Road, Barnsbury, London, N.1.

Woodville (Thornton Heath) M.C.—During the last Session two interesting Lectures were given : "Japan" by the Secretary, and "Temperance" by the Leader, Mr. J. F. Preskett. Further progress has been made during the present Session and the Club is steadily advancing. *Secretary :* Master B. Morley, 12, Liverpool Road, Thornton Heath, Surrey.

South Kirkby M.C.—The Meccano Lecture "The Story of our Ships" was read to the members recently and was greatly enjoyed. The boys are hoping to produce the Meccano play "Nonsense Nana" at an early date. A novel Competition consisted of each member studying a certain model from the Manual of Instructions for a few minutes. The books were then put away and the model had to be constructed from memory in a given time. Mr. Hawkesworth has kindly undertaken the Leadership of the Club. *Secretary :* Master J. Williamson, School House, South Kirkby, nr. Wakefield.

Clubs Recently Affiliated.

Adderbury M.C.—This Club, which was referred to in the last issue of the "*M.M.*" has now become affiliated with the Guild and shows every sign of becoming a keen and energetic branch of the Guild. *Secretary :* Master T. Thacker, The Green, Adderbury, Banbury.

Den Haag (Holland) M.C.—This Club is the first Club in Holland to become affiliated with the Guild, it having been established mainly through the energetic Secretary. Mr. van der Sluis was formerly the Secretary of the "Weltevreden Meccano Club" in the Dutch East Indies, and is one of the most enthusiastic of our Guild members. *Secretary :* Mr. H. G. van der Sluis, 54, Ant. Duijck Straat, Den Haag, Holland.

Change of Address

Subscribers should immediately notify the Editor of any change of address. Send a Postcard *giving the old and new address*, so that records may be kept up-to-date.

BRIGHT IDEAS

These columns are reserved for dealing with suggestions sent in by Meccano users for new parts, new models and new ways of making Meccano model-building attractive. We are always pleased to hear from any Meccano boy who has an idea which he considers will be useful in the Meccano system.

Louis Bodinsio (Arras).—Although we quite see the value of your suggested short crank handle, the coupling makes a more ready and cheaper connection than the screw method you mention.

C. A. Mason (Northampton).—We shall go carefully into your suggestion for a square shoulder on the threaded pins.

J. Semple (Falmouth).—Your idea for a front axle necessitates the introduction of complicated and costly parts. It would be detracting from the adaptability of Meccano if special parts were introduced to serve the same purpose of existing parts.

Victor Isard (Brighton).—We are introducing a 3½" gear wheel this year. We shall explore the possibilities of the 2½" gear wheel you suggest.

J. M. Myers (Nairobi).—Although we have utilised a contact block on our display models, for the transmission of electric current to the moving part, we do not consider the demand would justify our introducing it as an accessory part.

Cedric Pearson (Eastbourne).—It is not possible to make electric motors and accumulators of the vest pocket size. There is a minimum bulk which precludes their incorporation in small size locos.

A. W. Hammods (Bristol).—It is possible that we may shortly introduce miniature barrels as an accessory to Hornby Trains.

R. C. Terry (Ealing).—(1) Our present coupling is adaptable to a corner connection. (2) The face plate (No. 109) is 2½" diameter, and is quite suitable for boiler ends.

W. G. Chowles (Winstow).—The disadvantage to the fly-wheel type of motor is the lack of reserve power. The slightest load quickly brings it to a standstill.

Master MacFarlane (Plymouth).—Such a part as you suggest has only an ornamental use. Unless a new part has a general use we cannot consider its introduction to the Meccano system.

F. Jarvis (Bethersden).—We are introducing a large size circular flanged plate this year.

M. G. S. Gaitskell (Lympstone).—The narrow angle bracket is impracticable, because of the impossibility of effecting a secure point on account of the shanks of the bolts fouling on the inside. The wider angle bracket may easily be made from the present bracket.

Harry Williams (Ayr).—We should have to make the loco wheels of harder metal to take a set screw, which would increase the cost somewhat. The same remarks apply to the bolt connection on the pistons.

Eric Smith (Willoughby).—We illustrate a built-up spring in our Chassis Leaflet, and suggest you send for a copy of this leaflet (post free 4d.)

Jean Lafitte (Blagnac).—Your suggested double bent strip may be made from existing parts, i.e., reversed angle brackets and ordinary strips.

Wm. Scott (Kings Cross).—The cost of the double hinge you suggest would very nearly equal two simple hinges, so there would scarcely be much saving in it.

R. Marker (Honiton).—We are engaged at the moment on a slide action.

Donald M. Rankin (Pelaw-on-Tyne).—(1) An angled coupling of 300 would be much more expensive to make than our present coupling, and unless it had a general use, we could not consider its introduction. (2) We should be very interested to have particulars of the standard you have in mind for carrying overhead wires.

Horace Astley (Skelmersdale).—We are at the moment engaged on the manufacture of a slack wagon, supplies of which will be ready very shortly.

Gordon Phillips (Croydon).—A clock escapement may be made from a face plate with eight ½" reversed brackets firmly secured to the rim. This particular escapement is working very satisfactorily in a model of a grandfather's clock we have here.

Roger Debenes (Dunkirk).—A very good cantilever spring may be constructed from existing parts. See illustration in our Chassis Leaflet (post free 4d.)

E. Lindsay Thompson (Lindfield).—The internally-toothed gear wheel has been suggested to us from time to time, but we have not yet found for it any application.

Brian Crispin (Tiverton).—A flange for the 3½" side of the 3½" × 2½" flanged plate may be obtained by means of the 3½" angle girder. We now list angle girders in the same sizes as the strips.

J. R. Cottrill (St. Annes).—We are interested in your suggested slotted curved strips and would appreciate any further uses to which you consider they could be applied.

S. J. Walker (Leigh-on-Sea).—(1) We are afraid that a clockwork mechanism embodying such nicety of control and length of run is quite impractical in the space available in our locos. We agree it would be most desirable. (2) We shall be making modifications to our rails very shortly amongst which the requisite amount of camber will be assured.

Ronald Taylor (Brigg).—(1) We have helical gears already under consideration. (2) We list a fly wheel (No. 132) in our accessories. (3, 5, 6) We should be interested to hear of any general uses you have found for these three items. (4) What precisely do you mean by an "L section girder?"

A. E. Sargent (Shrewsbury).—The question of the filling-in material for Meccano models has been occupying our attention for a considerable time. The standardisation of the sections is the great problem.

Walter Arnold (Blackheath).—Your suggested steering gear is not true to motor car practice. If you have not already seen an illustration of our model chassis, we suggest you send for a copy of the special leaflet (Price 4d. post free).

E. M. van Peborghe (Buenos Aires).—As we do not at present contemplate embarking into higher reaches of Radio, we could not consider the introduction of large-capacity accumulators. We already list a 4-volt accumulator for use with the electric motor. Any firm specialising in electrical accessories can supply you with any size and capacity accumulator.

A. Ormandy (Liverpool).—A Rheostat for the 4-volt circuit is illustrated in our electrical manual.

C. Cowes (London, N.W.).—(1) We already list a flat plate 4½" × 2½" (No. 53a) also 4½" strips (No. 2a). (2) The governor of the Meccano Clockwork Motor is placed immediately adjacent to the brake lever.

W. Blakey (Plaistow, E.).—See our reply to A. Ormandy, Liverpool, regarding an electric controller.

J. A. Pope (Liskeard).—(1) We illustrate an electric loco constructed from Meccano parts on page 19 of the electrical manual. (2) For what do you consider an 18½" curved strip and the larger flanged plate would be useful?

R. Peters (Liverpool).—There may be possibilities in your suggested split-coupling for a big-end bearing and we shall consider it carefully.

Walter Andrews (Cullercoats).—The early type of Hornby Loco is now obsolete, and we have ceased manufacturing this model. Many thanks, however, for your criticisms.

André Billard (Oullins).—Miniature tools such as you suggest would only serve an ornamental purpose, and their inclusion in the Meccano system would not be justified.

Eric Jenkins (Nr. Openshaw).—Our 2" pulley wheel makes an admirable reproduction of an auto steering wheel. It is almost identical in shape to that shown in your sketch.

Douglas Ruffles (Cirencester).—We have in mind a large base plate.

E. J. Curtis (Penge, S.E.).—What is the object of the split in the centre of the large rectangular plate? You do not mention any uses.

Dick Shelton (Swansea).—Two double brackets joined together with a set screw and nut will certainly give your suggested bent strip.

Jean Billant (Paris).—The matter of curved girders is already receiving consideration. It is necessary to prevent the buffers coming together otherwise they lock and derail the train. The type of coupling we at present employ prevents this. (3) We are engaged in a new design of grab made from Meccano parts, and this will probably appear in the revised manual next year.

Kelvin Heagney (Sydney, N.S.W.).—Your idea for the fitting of a cock in the steam pipe on the vertical boiler is sound, and we shall make a note of it.

Roger C. Bennett (Oldham).—The nuts and bolts are packed and assembled exactly as they come through from the testing department. As each unit is handled individually, the cost of the extra handling for disassembling would be prohibitive.

F. H. Staub (Paris).—(1) We have decided to increase the number of perforations in the sector plate. (2) Angle girders are issued in the same sizes as the strips. See our latest price list.

F. A. Hill (Peckham, S.E.).—We appreciate your criticisms regarding the tank loco, and we shall give them careful consideration.

Howard D. Jennings (Croydon).—When mounted on a face plate the rack segments give a 3" diameter gear wheel. As this dimension does not mesh with our half-inch standard we do not advocate their use in this form. We are contemplating issuing a 3½" gear wheel shortly.

Ernest Richer (Ilford).—The question of curved girders has already been raised, and we are going carefully into the matter.

André Broc (Arras).—We are interested in your suggested rail, but we fear it may not prove practical to manufacture.

Eric Ponken (Copenhagen).—Your suggested tube rod is applied in sleeve actions, but the difficulty of this method is that the diameter of our present holes would be too small to accommodate both the rod and the sleeve pieces.

J. G. Spackman (Newbury).—We are interested in your suggestion for an internally-toothed ring, but you do not mention the purposes to which it may be applied.

Wynn Arthur (Lichfield).—The model of level-crossing gates illustrated in our No. 3 Manual will make an excellent addition to your Hornby Train system.

FROM OUR RECENT PHOTOGRAPHIC COMPETITION

We have pleasure in publishing two photographs recently submitted in the Overseas Section of our Photographic Competition. These photographs won the third and fourth prizes, respectively. We hope to announce the results of the Third Photographic Competition, now closed, in our next issue.

Photograph by Master R. Bandiera, Florence, Italy. Master Bandiera is fortunate in living in the midst of beautiful Italian scenery of which the above is a good example.

This well-taken photograph shows three Zulu Warriors in native war-dress and was taken by Master G. Adamson, Eshowe, Zululand, S.A.

MECCANO ACCESSORY OUTFITS

Each Meccano Outfit from No. 0 to 6 may be converted into the one next higher by the addition of an Accessory Outfit. Thus, if a No. 2 is the first Outfit bought, it may be converted into a No. 3 by adding to it a No. 2a. A No. 3a would then convert it into a No. 4 and so on up to No. 7. In this way, no matter with what Outfit you commence, you may build it up by degrees to a No. 7 and so be able to make all the many hundreds of models shown in the Books of Instructions. Our illustration shows one of the Meccano Accessory Outfits.

PRICES OF ACCESSORY OUTFITS

No. 0a	converting No. 0 into No. 1	**4/–**
„ 1a	„ „ 1 „ „ 2	**7/6**
„ 2a	„ „ 2 „ „ 3	**8/6**
„ 3a	„ „ 3 „ „ 4	**18/6**
„ 4a	„ „ 4 „ „ 5	**15/–**
„ 5a*	„ „ 5 „ „ 6	**50/–**
„ 5a†	„ „ 5 „ „ 6	**80/–**
„ 6a	„ „ 6 „ „ 7	**210/–**

* Carton. † Wood.

ELECTRICAL OUTFITS

X2 ELECTRICAL OUTFIT.

The application of Electricity to the Meccano system adds a further and wonderful charm. The joys of model-building are now increased by the fascinating pastime of carrying out delightful electrical experiments.

THE MECCANO ELECTRICAL OUTFITS contain a number of specially designed electrical accessory parts, and, used in conjunction with any of the regular Outfits, enable the user to construct models for making interesting and instructive experiments. These include the Electric Railway, Morse Key, Tapper Key, Buzzer, Electric Lamps, Electric Crane, Induction Coil, Electric Iron, Motor-Starter, etc.

PRICES.

X1 (containing electrical parts, without motor or accumulator) ... **12/6**

X2 (containing Meccano motor, 4-volt accumulator and electrical parts) **42/–**

Magazine Binder

In response to numerous requests we have introduced a spring-back binder for *Meccano Magazines*. The binder has a strong stiff back, covered with imitation leather, tastefully tooled. It takes a large number of copies and keeps them neat and clean. In black, lettered gold. Price 3/– each, post free.

Good Things Coming

The following articles will appear in future numbers of the "*M.M.*" Every Meccano boy should place a regular order with his dealer or direct with this office.

The Men Who Gave Us Radio.
Meccano Boys' Hobbies :—
An Adventure in the Tree Tops.
144 miles an hour in a Giant Bomber :—
The Most Powerful Aero-Engine in the World.
A Monster Dredger.
A Unique Coaling Plant.
New York's New Bridge.
A Renowned Cable Ship.
A Message from Dr. de Forest.
1,000 k.w. Radio Valve.

The Meccano Manuals

There are three Manuals, the 0 Manual for simple models built with the 0 Outfit, the 0–3 Manual comprising models built with any of the Outfits from 0–3 and the Complete Manual, which comprises a selection of models that may be built with every Outfit from 0–7. This latter Manual is a very fine publication and should be in the hands of every Meccano boy. It includes instructions for building most of the models shown in the present No. 3 Manual. A limited supply of the No. 3 Manual is still available.

Prices of Manuals :		s.	d.
0 Manual	post free ...	0	6
0–3 „	„ ...	1	2
Complete Manual ...	„ ...	2	10
No. 3 Manual	„ ...	1	4½

Wonderful Radio Results

We have pleasure in printing below a letter received from Messrs. Shrimpton & Cooke, of Market Place Post Office, Bromsgrove, near Birmingham. We feel sure that our readers will be interested to hear of the wonderful results that this firm are obtaining on their Meccano Crystal Receiving Set.

"We were demonstrating your No. 1 Wireless Receiver last night, and after getting Birmingham very loudly and clearly (we could hear every word spoken), we continued on this until about 8.30, when the Birmingham station closed down for an interval of half-an-hour. We then thought we would see if by any chance we could get London or Manchester. We did not expect to, but there is nothing like trying, so we moved the slide down until it was about a third of the length from the beginning of the coil, when much to our surprise we heard a buzzing in the 'phones. After moving the slide a bit we distinctly heard an orchestra playing with a piccolo or clarionette predominating. After that we heard a man speaking, also a lady singing, and afterwards a gentleman singing.

The whole thing was very faint and we could not distinguish any words that were spoken. Manchester is about 90 miles from here, and London about 110 miles, which do you think it was I think we were most likely on the Manchester wave length, but cannot be sure. We were using two 'phones, one to each ear."

But this dismal chap didn't get one.

Sketched by] [*Francis Jeffrey.*

This lucky chap got a "MECCANO OUTFIT" for his Birthday,

OUR MAIL BAG

In this column the Editor replies to letters from his readers, from whom he is always pleased to hear. He receives hundreds of letters each day, but only those that deal with matters of general interest can be dealt with here.

Correspondents will help the Editor if they will write neatly in ink and on one side of the paper only.

M. G. S. Sewell (Weymouth).—In response to innumerable requests we hope shortly to introduce a stamp collector's column in the "*M.M.*"

H. Wilson (Musselburgh).—We are not all duke's sons, as you say Harry, but we should be surprised if even a duke's son is as keen and happy as you evidently are. We are glad to hear from you again, and we hope you found our suggestions were useful.

G. O. Smith (Whitehaven).—Thanks for your friendly criticisms of the "*M.M.*" You would be surprised if you knew the number of boys who ask for *more* Radio pages. We shall commence a Stamp Collector's corner shortly, and we can assure you it will be unusually helpful to boys interested in this hobby.

J. Balmer (Belfast).—You lead a full life and that is the happiest life of all. Your four hobbies are well chosen and they all fit in nicely together. We may publish illustrated instructions for making a Meccano Storage Cabinet soon.

T. B. Wood (Bournemouth).—As you will see we have now introduced a "sale and exchange" column.

R. Tanner (Aberdeen).—

"There was a young fisher named Fisher
Who was fishing for fish in a fissure.
One day with a grin, a fish pulled him in
Now they're fishing the fissure for Fisher."

With the aid of a siphon of soda-water we can say this right through with hardly a pause! Now we are ready for the adventures of the young tanner named Tanner.

H. Beer (Riverton, New Zealand).—Many thanks for the paper telling us about the southern portion of New Zealand. The scenery is gorgeous and we wish we could borrow your climate. We congratulate you on your school successes, and shall be very glad to hear of your further progress.

A. Twist (Blaby).—We have in mind a variety of subjects of general interest for publication in the "*M.M.*" If you are not yet a subscriber we suggest you become one.

R. Peace (Huddersfield).—We are glad you approve of our taking small advertisements, for we consider this column will be a boon to our readers. You are right in your surmise that any boy with something to sell should be able to dispose of it through the columns of the "*M.M.*"

D. Cawley (Hale).—

My first is in furze but not in grass,
My second in tumbler but not in glass,
My third is in bowl and also in bull,
And as for my fourth you'll find it in skull,
My fifth is in bat but not in ball,
My sixth is in dash and also in crawl,
My seventh you will see is in the word snack,
My eighth is my last and you'll find it in knack,
My whole as you will see is a beautiful toy,
That will last for ever and give great joy.

If we receive many riddles as good as this from our readers we shall certainly be compelled to devote a special corner to them.

R. H. Jobson (Prestatyn).—Your praise of the Radio articles in the "*M.M.*" gratifies us. They are written by an expert who possesses the wonderful gift of explaining a complex matter in a clear and lucid manner. They are proving of great assistance to the beginner in this fascinating hobby.

W. Summarsell (Brighton).—Many thanks for your offer to assist in the stamp column of the "*M.M.*" We shall commence this column shortly, and in the meantime if you care to send contributions we will consider them.

Leon Goodman (Stepney, E.).—We shall endeavour to include a drawing competition in our future programme

Sale and Exchange

Small advertisements are inserted in this column at 1/- per line (average seven words to the line), or 10/- per inch (average 12 lines to the inch). Cash with order. Rates for larger space quoted on application. Address your letter to Advertisement Manager, "Meccano Magazine," Binns Road, Liverpool.

FREE. 30 different stamps to applicants for approval. 100 different 6d. 100 Hungary 9d. R. W. Edmondson, 35, Queen Street, Morecambe.

1,000 STAMPS, well assorted, 1/– Post Free. North Brothers, Stamp Dealers, 37, Bostock Avenue, Abingdon.

FREE SETS FREE

10 HUNGARY (Pictorials), 10 GERMANY (including 2 Mark), Set 4 unused surcharged "Koztarsasag," and a SPLENDID COLLECTION of unused stamps from Litwa, POLAND, Russia, BULGARIA, Austria, etc., etc. Sent only to applicants for BARGAIN APPROVALS, POST CARD ONLY (Abroad 6d.) N. M. PATERSON, 19, DORSET AVENUE, RUSHOLME, MANCHESTER.

STAMPS FREE. 20 Unused "Neurope" 2d. 50 1/–. 100 unused mixed 1/–. G. H. Barnett, Limington, Som.

SIXTY DIFFERENT Stamps free to applicants for approvals. All ½d. each. Send postage. Cox, 135, Cambridge Road, Seven Kings.

SET OF 12 UNUSED Batoum 1—50 roubles cat, nearly 40/– for 2/6. This marvellous offer is made to introduce my bargain approvals. State whether beginner, medium or advanced collector.

F. Allan Went, 8, Irston Road, Colchester.

SIXPENCE – POST FREE

Packet F23, containing 80 different Foreign Stamps, including Montserrat (new), Volkstaat Bayern, Fiji, Kenya and Uganda (new), Barbados (Victory), Angola, Hungary, (Koztsarsasag), Germany (2½ marks), etc., etc. Buyers of this packet who ask to see Approval Sheet receive an **Extra Packet of 15 Unused Free.**

Approval Sheets for all Classes of Collectors.

Write for a selection TO-DAY, and state countries you collect. Exchange desired with collectors and dealers abroad. Collections and duplicates bought or exchanged.—**F. G. ROWE, 86, Alma Rd., Bournemouth.**

SPLENDIFEROSUSH! But you must wait until the next issue of the "*M.M.*" I have something that you want. G. Hare, 36, Willis Road, Leamington.

Bargains in Bicycles

8 Guinea Models reduced to

£4 19s. 6d.

Carriage Paid and Fully Guaranteed.
Best Value in Great Britain.
Write for List.

JANES & ADAMS, The North London Cycle Stores,
Palmers Green, N.13.

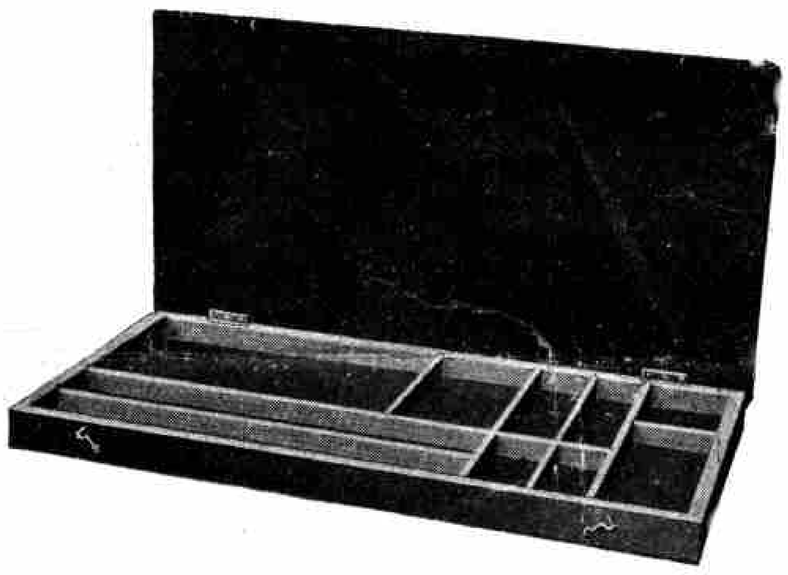
STAMPS FREE to applicants for approval sheets—10 unused, including St. Kitts (1923 view), Egypt (surcharged crown), Malta (Britannia). Without approvals, 4½d. Glass, 72, Birch Road, Southville, Bristol.

FOR SALE. New Meccano, No. 4a, 12/6; Electric Motor (reverse), 10/–. Slightly soiled: No. 4, 30/-; No. 1, 5/6; Inventor's Outfit, 5/6. Also write for list of spares. Box No. 101, *Meccano Magazine*, Liverpool

FREE! TEN SUPERB BOSNIA to purchasers of one of the following sets. Every stamp different. 100 Austria, 9d.; 100 Hungary, 1/–; 32 Finland, 9d.; *25 Feldpost, 1/–; 30 Turkey, 1/–; *62 Austria (1922), 1/–; 30 Jugo-Slavia, 1/–; 50 Roumania, 1/3; 50 Bulgaria and Thrace, 1/9; 50 Danzig, 1/–; 50 Czecho-Slovakia, 1/–; 25 Luxemburg, 1/–; *19 Carinthia, 2/6; *35 Baranya, 5/–; *25 Fiume, 2/–; 70 Greece, 5/–; *16 Armenia, 2/6; *10 Azerbaidjan, 3/–; *12 Montenegro (1907), 1/–. *Denotes Mint. Postage extra. Overseas Orders welcomed. H. Llewellyn, 41, Dereham Road, Norwich (Member J.P.S.).

Storage Boxes

We have in stock a limited number of boxes, in two sizes, suitable for holding Meccano parts.



Box No. 1.

Box No. 1 is stained and polished imitation Walnut. It is fitted with partitions and lined with green baize. The lid is hinged and fastens by means of two outside hooks.

Box No. 1. 20¼″ × 10½″, depth 1¼″. Price 7/6; postage 1/3.

Box No. 2.

Box No. 2 is polished oak, fitted with partitions and hinged lid. This box fastens with lock and key and is provided with two drawers, also with locks and keys.

Box No. 2. 17″ × 15″, depth 9¼″. Price 70/–; carriage forward.

We illustrate the two types and as our stock is only small we advise those of our readers who are interested to take immediate advantage of this opportunity.

Sale and Exchange (*cont.*)

LOOK! 250 Good Stamps. 4½d. (Post Free). Lewis, 362, Wavertree Nook Road, Liverpool.

STAMPS. Sixty different used and unused Colonial and Foreign, 6d.; Ten different Mint British Colonials, 6d.; Twenty different ditto, 1/–; St. Kitts Commemorative ½d. and 1d., mint pair, 2½d.; Gibraltar 1½d. script, mint, 2d.; St. Helena, 1884/94, ½d. Queen, mint 3½d. Postage extra. Alec Kristich, 92, Marchmont Street, London, W.C.1.

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Printed by Stembridge & Co. Ltd., Albion Street, Leeds.

THE NEXT NUMBER OF THE "M.M." WILL BE PUBLISHED ON 15th MAY

No. 33 APRIL 1923

MECCANO MAGAZINE

PRICE 1d

PUBLISHED IN THE INTERESTS OF BOYS

EDITORIAL

HAVE you ever asked yourself what is the difference between work and play? A correct definition is not quite so easy as one might imagine at first sight. To you boys, football is fine exhilarating play, but to the professional footballer it is very serious work. Building Meccano models, or running a Hornby train round its track, are delightful forms of play to all boys, but to the engineer or the engine driver, designing mechanical movements and driving engines are trying and exacting work.

Play and Work.

A young friend of mine whom I asked for a definition replied that play was something you liked doing, while work was something you had to do whether you liked it or not! There is probably more truth in that definition than there is in most off-hand opinions. If you take a lesson from a professional swimmer he is working whilst you are playing; yet you are both doing exactly the same thing. The only difference is that he is compelled to do it, whilst you need not swim if you do not wish to. If you dislike football and the school regulations compel you to join in the game, you are working whilst your companions are playing.

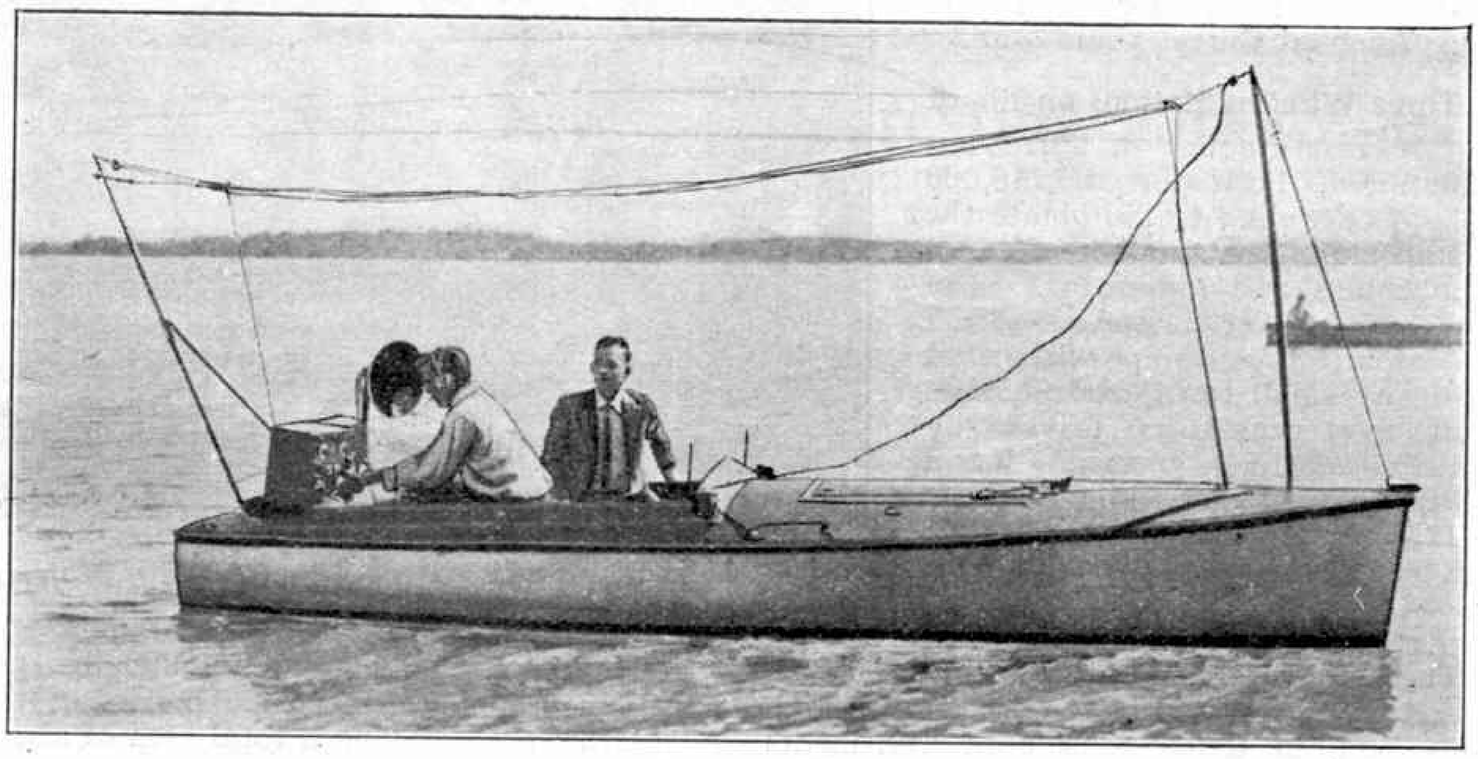
Which is Which?

You will find the situation much the same when you start business. If your work does not interest you, and your mind is on other things, you will feel over-worked, hardly done by, unhappy and unsuccessful. If on the other hand you take a real interest in your work, if you put the same enthusiasm into it that in the past you have put into Meccano model-building, Stamp-collecting, Photography, etc.; in short, if you make it your hobby, you will find it just as fascinating and absorbing as any other game or pursuit in which you have ever taken part. You will find the days pass pleasantly, and you will be happy and successful.

Work the most enjoyable kind of play.

Enjoyment, enthusiasm and keenness are the key-words to success in everything, but most of all in business. Successful men never hanker after holidays. They take a rest for reasons of health sometimes, but they enjoy themselves too much at their work to think of wasting time playing.

A Concert on a Motor Launch



The lucky owner of this launch and Radio Set is Master Fred Mueller, of Fort Worth, Texas, U.S.A. Every week-end Fred is out fishing on Lake Worth and at the same time listens-in to church services and sermons by Radio. The shores of Lake Worth are noted for their beauty, and a large number of people camp out for the week-end there. These campers are able to enjoy the broadcast, for Fred has fitted a loud speaker to his outfit, and entertains and delights large audiences.

American boys are erecting aerials and using their Radio sets under all manner of circumstances. We have already heard of the boy who erected an aerial on his motor car and also of the boy who listens-in to concerts, etc., whilst riding his bicycle around town. These original forms of aerials show the great interest of their builders in Radio, and give scope for endless experiment.

Special Articles in this Issue:

A Town that Travels
Serial Story:
"A Night at the Pool"
Saving Lives at Sea
Competition Results
A Challenge to Meccano Boys
The Men Who Gave Us Radio
Guild Notes and News

A Town that Travels 6,000 Miles each Month

A TRIUMPH OF MODERN SHIP-BUILDING

We print below the concluding instalment of the article dealing with the super-liner, the "*Majestic*." Last month we described this wonder-ship and told of its theatre, hospital, palm-court and luxurious fittings. It carries over 4,000 passengers and a crew of 1,000, and practically every service required by a small town is to be found on board.

(*Continued*).

Electrical and Steam Heating

All the state-rooms and public rooms are heated by steam, and the first-class state-rooms by electricity also, the heat being regulated as desired by the passengers.

The splendour of the first-class accommodation is almost equalled by the second class, where a spacious lounge is panelled in light polished elm-wood. A smoke-room, drawing-room, and large dining-room are also provided, as well as many other conveniences. The third-class accommodation also is comfortable, and equal to that available for first-class passengers thirty years ago.

Three Wireless Stations on Board

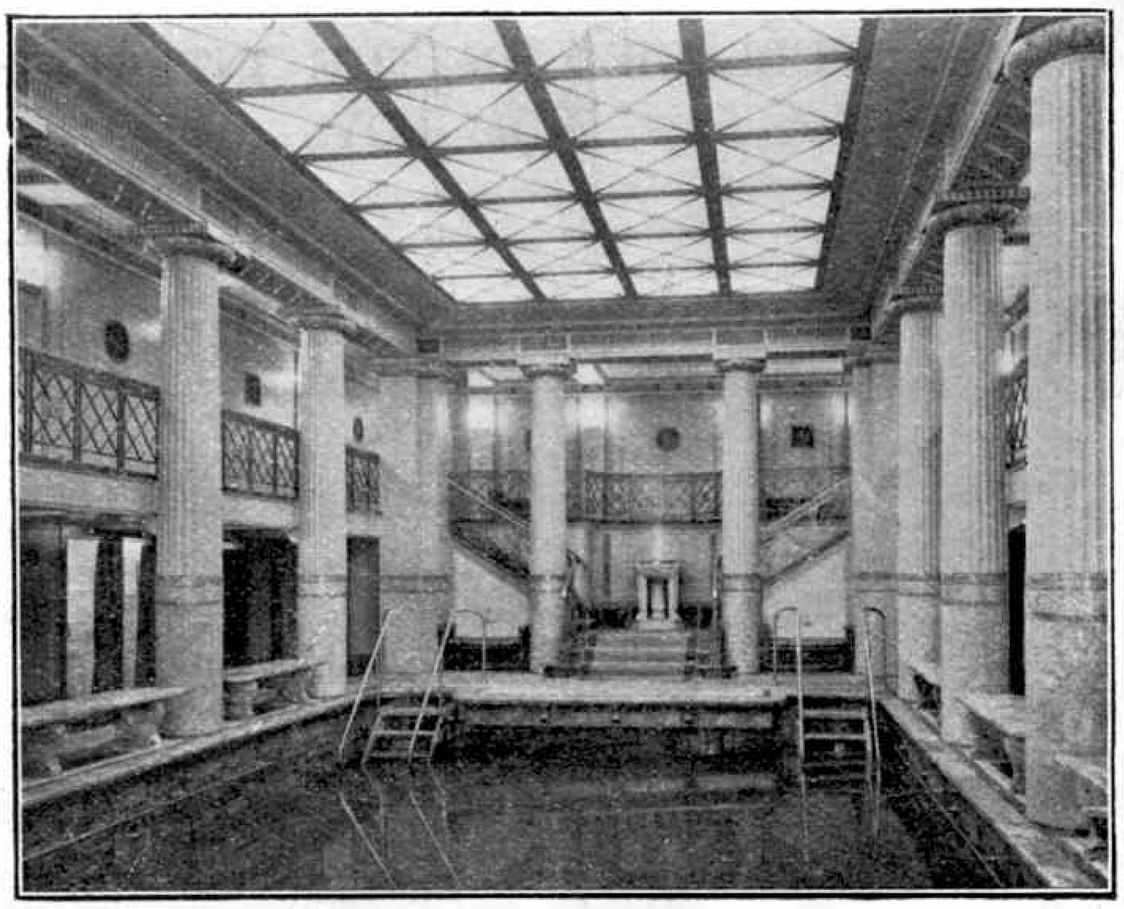
A vast amount of current is required, both for the 16,000 lamps required to illuminate the ship and for a number of small machines and apparatus. The electric power installation will compare favourably with that of any small town, and consists of five generators driven by turbines. Each generator has a capacity of 288 kilowatts at 115 volts and runs at a speed of 2,000 revolutions per minute.

Another feature of great importance is the wireless service. There are three separate stations on board, and the largest of these is powerful enough to keep in touch with both Continents during the whole of the voyage. The second station has a range of 800 miles and the third station is for use in cases of emergency. In addition, two of the ship's motor life-boats are fitted with wireless.

The Most Powerful Plant Afloat

In spite of her great size the "*Majestic*" is not clumsy by any means, for she can be manœuvred with ease. She has a remarkable turn of speed, and while she can travel at 25 knots if necessary, she will comfortably average 23 knots. This fleetness is the result of exceptionally thorough research as regards the design of the ship in regard to such details as the shape of the hull and of the stern.

Motive power is obtained from great turbines of the Parsons type. They consist of one high-pressure, one intermediate and two low-pressure, two being used for driving ahead and four for driving astern. These turbines are necessarily very large, the low-pressure astern turbine, for instance, being over 20 ft. in length and weighing 375 tons. There are in all some 800,000 blades, the largest running to a length of 24 inches. The total available power is approximately 100,000 h.p., forming the most powerful plant ever installed in a passenger vessel. Steam is supplied at a pressure of 260 lbs. per sq. inch by 48 water-tube boilers of the Yarrow type, having a total area of about five acres.



The Swimming Bath on board the "*Majestic*"

An Unusual Arrangement

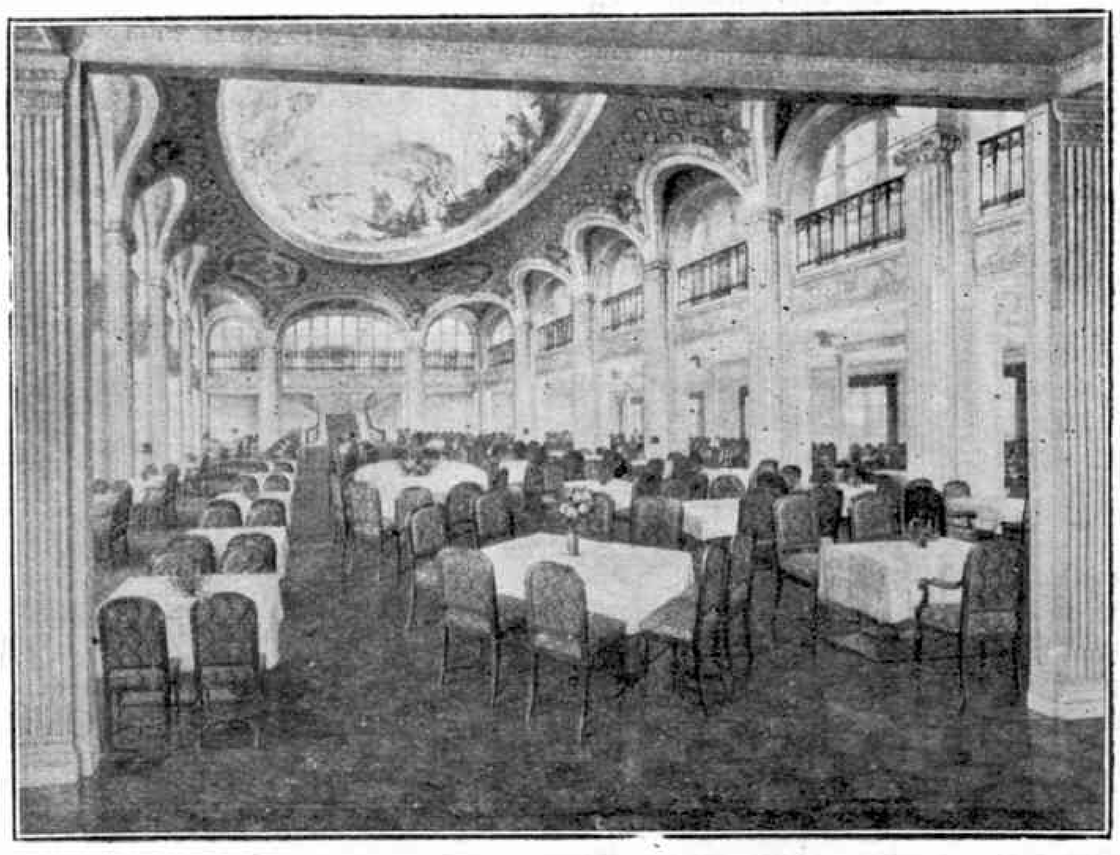
An interesting feature, which has considerably added to the available space and comfort of passengers, is the arrangement of the boiler casings. Instead of being situated centrally these are placed towards the sides of the ship, joining again above the upper rooms. This arrangement enables the centre of each deck to be kept clear. By standing at one end of the main saloon it is possible to obtain an unobstructed view for a distance of 250 feet.

The ship was originally designed to burn coal, but the White Star Line altered this in favour of oil fuel at low-pressure. With coal it would have been necessary to take in supplies at the termination of every voyage, but with the new system sufficient oil is carried for a double trip across the Atlantic. We can realise the space necessary to store this quantity when we learn that the liner burns about 5,700 tons of oil on a single trip.

Advantages of Oil Fuel

In deciding to use oil fuel, the White Star Line realised its great value as compared with coal. Not only is oil fuel less bulky than coal, but in the boiler-room there is a total absence of the smoke and dirt that accompanies coal-fired boilers.

Oil-fuel has many other advantages, one of the greatest being that, compared with re-bunkering with coal, the re-fueling of an oil-burning ship is a simple matter. Oil-tankers lie alongside the ship and the oil is pumped through a flexible pipe, direct into the liner's storage tanks. This not only eliminates the hundreds of labourers that are required for coaling a ship, but also renders it unnecessary to sheet the ship with tarpaulins to protect it from the dust and dirt that arise when coaling.



The Restaurant (First Class)

America to Compete with Britain

The "*Majestic*" is a striking illustration of the enterprise shown by our leading steamship companies. Their efforts to provide increased comforts and greater facilities for Atlantic travellers has resulted in each succeeding ship being larger and speedier than its predecessor. It is no exaggeration to say that the leading companies operating between Southampton and New York provide catering unsurpassed in the best hotels of Europe or America.

These improvements have led to the steamship companies concerned controlling practically the whole of the British-American first-class passenger traffic.

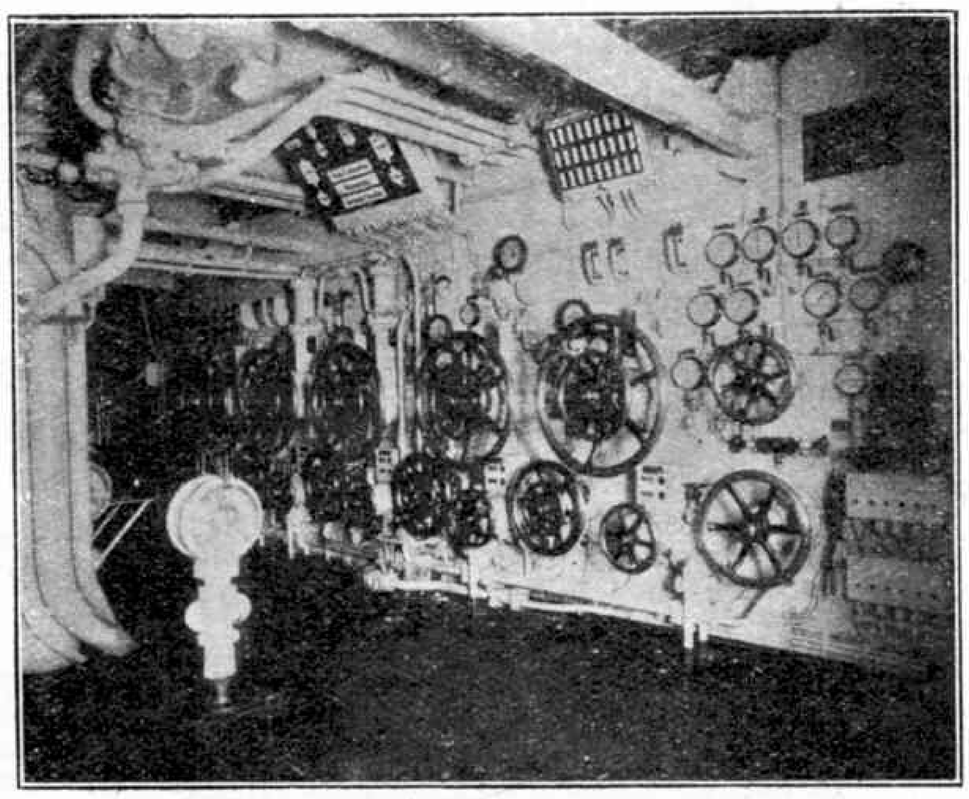
A Town that Travels—(*cont.*)

Whether or not this state of things will continue, remains to be seen. In this connection the Chairman of the United States Shipping Board speaking recently on the future policy of the Board, stated that it was their intention to retain the best of the former German liners. After these had been reconditioned, he said, America would make a strong bid for the Atlantic traffic, now a monopoly of the British companies.

From Troopship to Liner

Before the war Germany was Britain's great competitor in the building of super-liners such as the "*Majestic.*" After the armistice many of her best products were handed over to Britain and America as part reparation for shipping sunk by the German submarines. Of these historic vessels the second largest in the world is the "*Leviathan,*" formerly the "*Vaterland.*" As a troopship in the American service, the "*Leviathan*" on one trip transported 12,000 American soldiers to France.

The "*Leviathan*" is now being converted from a troopship into a luxurious liner, which the Americans hope will excel in luxury even the "*Majestic.*"



The Starting Platform in the Engine Room

Will Larger Ships be Built?

Whether or not larger ships than the "*Majestic*" will be built in the future is a question that cannot at present be answered. Large ships become unwieldy in heavy weather, for they present a very large surface to the wind. They are not so economical as smaller vessels and there are many other considerations against building larger ships.

Alice-in-Wonderland could not grow any more because she filled the room and bumped her head against the ceiling. Similarly the size of large ships is limited by the available harbour accommodation. In England, France, and America it is not possible to deal with ships larger than the "*Majestic.*" If it is decided to build still larger ships in the future, then special provision must be made in all countries, by deepening channels and by increasing the sizes of landing-stages, harbours, and docks.

THE END.

(*For the photographs illustrating this article we are indebted to the courtesy of the White Star Line*).

Improving the "*M.M.*"

PRIZES FOR BEST SUGGESTIONS

In our last issue I drew attention to the large number of letters received from my readers criticising the contents of the "*M.M.*" I mentioned that owing to it being impossible to increase the number of pages in the "*M.M.*," space is not available for the inclusion of all the articles suggested by my readers. I should very much like to deal in each issue with Locomotives, Foreign Stamps, Nature Study, Photography, Conjuring Tricks, Sports and Hobbies, as well as the hundred and one other subjects that appeal to boys. Space forbids this, however, and I am only able to include such articles as will interest the majority of readers.

I have invited all readers to help me to obtain the information as to the subjects in which they are most interested. With this end in view the questions in the next column have been drafted out. *I want every reader to send me a post-card* answering these questions intelligently and thoughtfully. Hundreds of replies have already been received, but I would welcome thousands of further replies!

Every reply will be carefully scrutinized by the Editorial staff and the results tabulated. The contents of future numbers of the "*M.M.*" will be based largely on the information these replies contain.

Those boys who want particular articles to be included in the Magazine each month should not only send in their own replies to that effect, but should also endeavour to get as many of their friends as possible to send in replies. The number of votes cast for any given subject will determine whether or not that subject will be included in future issues.

In order to encourage my readers to suggest original features that, in their opinion, will improve the "*M.M.*" I am offering a prize of a Hornby Train, and a second prize of a Zulu Tank Loco for the best replies to question No. 10.

It is not necessary to write out each of the questions. Simply place the number of the question before your answer. All replies should be received before 30th April and should be addressed "Improve," c/o The Editor, "*Meccano Magazine*," Binns Road, Liverpool.

Questions.

1. Should we print short stories (similar to "How Jimmy Thornton Made Good" in the December issue) written by Meccano boys?
2. (*a*) Should we include instead serial stories?
   (*b*) If so, should they be stories of adventure or of school life?
3. (*a*) Do you like the "Mail Bag" Column?
   (*b*) Should we give it more space?
4. Do you like the new Editorials, or do you prefer the old style of Editorial paragraphs?
5. Do you consider four pages too much to devote to Radio?
6. Do you like reading about Meccano boys and what they are doing?
7. Do you prefer the inclusion of illustrations of new Meccano models such as were published on the front page of the "*M.M.*" last year?
8. Should we publish more articles of a general scientific nature, or should we have fewer of these articles and use the space for articles relating to Meccano?
9. Which kind of Competitions interest you most?
10. *Can you suggest a novel feature for improving the "M.M."*

Interesting Paragraphs

Sir Martin Conway states that the Crystal Palace is 10 inches longer in summer than in winter. This change in length is due to the expansion of the metal framework caused by an increase in temperature, just as railway lines expand in hot weather.

* * * *

Similarly the Eiffel Tower constantly varies in height and inclination, the latter due to the fact that in the daytime one side is warmer than the other. It is said that even the obscuring of the sun for a few minutes by a passing cloud is sufficient to cause a change in the length of the Tower.

* * * *

Divers sent down to remove an obstruction in Lerwick Harbour found the timbers of an old ship. The divers brought to the surface four cannon which, although coated with rust and barnacles, were in a fair state of preservation. Each was over seven feet long, with a bore of about three inches. The timber brought up was found to be well-preserved oak.

* * * *

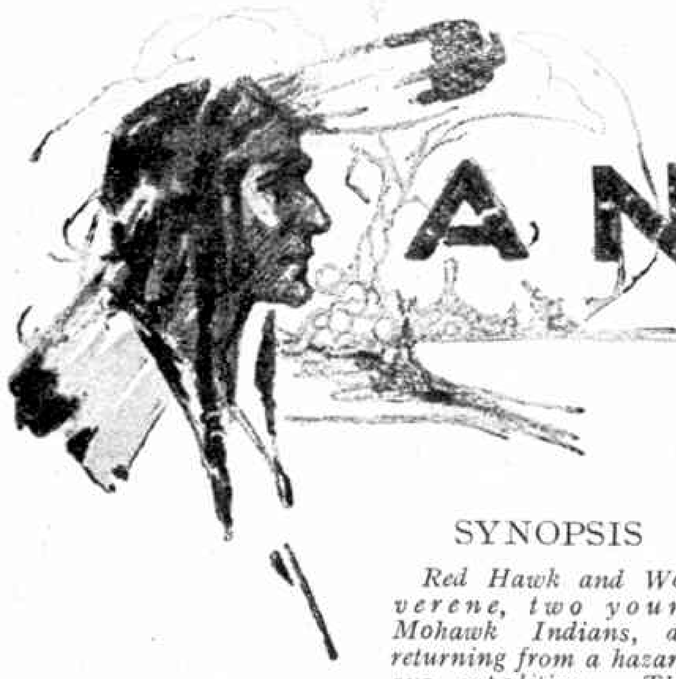
In June 1640 four armed vessels of the Dutch East India Company fought a fierce engagement with ten armed Spanish ships at Lerwick. The wreck now found is apparently that of the Dutch warship "*De Haan,*" which is known to have been sunk in Lerwick Harbour in the engagement mentioned.

* * * *

Turkish firemen are very leisurely in their methods. A correspondent tells how he has seen them line up before burning houses, and there wait more or less patiently before beginning work with the hose, until the inhabitants paid them!

* * * *

At one fire, though the fire was at its height and articles were being thrown out of a window to be caught by the firemen, the whole brigade stopped work to look at a picture of a pretty girl! After inspecting and commenting upon the picture, the firemen returned to their duties.



OUR NEW SERIAL

A NIGHT AT THE POOL

BY

Bernard Sexton

SYNOPSIS

Red Hawk and Wolverene, two young Mohawk Indians, are returning from a hazardous expedition. They are encamped on a sacred Indian mound, enjoying a supper of trout, caught by Red Hawk in the neighbouring stream. The couple are in great danger, for they have been followed for some days by hostile warriors of another tribe.

II.

"THERE are three warriors tracking us," said Red Hawk to Wolverene, examining the tracks.

Wolverene looked at the tracks. Some peculiarity in them puzzled him. "The trackers do not keep together," he said.

"That is true," answered Red Hawk. "My father told me of their custom before I came. The men of this tribe rarely hunt in packs. They are lone wolves, forest runners, and each one follows the enemy alone. If they come they will seek our scalps alone."

Red Hawk then revealed his plan. He knew of the existence of the celebrated Sacred Mound, and with characteristic audacity he decided that they would find a safe sleep at its base. Wolverene was a little scared at the suggestion, but Red Hawk, whose keen mind was already above the vulgar fears of the ordinary Indian, had ridiculed his comrade's fears and had persuaded him to follow Wolverene did so, obeying the choice of Red Hawk as he had done ever since childhood.

It was already dark. The fish, deliciously cooked, were lying on some bark between the friends, and they ate. Wolverene gazed around somewhat fearfully. Above him and at his back rose the Sacred Mound. They were sitting in a little space under two oaks that overhung the brook. Across its murmuring waters they could see the trees of that vast forest through which they had come—a wilderness that stretched from the Atlantic Ocean to the western prairies.

"In the Long House at this hour the women are serving supper," said Red Hawk dreamily. "The old men are filling their stomachs and they are thinking of the tales they will tell the children before retiring to rest."

"Yes," responded Wolverene. "My mother is setting aside a bowl of berries for White Sparrow, my baby sister. I'm sure they're all laughing at her funny little face even now. And my father is maybe just coming in from the hunt. It is the Leaf-Falling Moon. There will be much meat in the lodge. Ah, it is good. How long do you think——"

"Within ten suns we should be at home," answered Red Hawk. "We will be in time for the great autumn festivals. There will be many dances!"

"Yes, and there will be a big dance in our honour," interrupted Wolverene. "I will wear my new buckskin shirt and my new moccasins that mother began to make when I left. Oh, we will have a great time on our return! For fully five nights we will be sitting up all the night feasting. Then there will be a special feast given by the young men of our Totem"

With infinite caution Red Hawk crawled out on the branch . . .

"It is well that we return having accomplished that which we set forth to do," went on the younger man. "We have seen the strangers who came in a great canoe over the salt water. Aye, we have watched them come and for the space of three suns. And we have heard the noise of their thunder-sticks!"

"What does it mean? Why has the Great Spirit sent the white strangers?"

"I do not know the will of the Great Spirit," answered Red Hawk. "I think the coming of these strangers is bad for the red men. It means much war."

Wolverene listened with great respect. Young as he was Red Hawk had attended many of the great Tribal Councils as a listener. Among the Mohawks there were some magnificent orators, and he had listened to these mighty chiefs whose dignity and command of language were at a later time to impress both English and French emissaries.

Wolverene did not answer. Although his eyes were fixed on the fire he had not failed to notice that even while speaking Red Hawk had made a slight signal with his finger—a motion so insignificant that no one would have noticed it unless he had already known its meaning. But Red Hawk and Wolverene between them had a secret code, by which they could communicate with one another whenever they wished to convey information without sharing it with outsiders.

A moment later Red Hawk rose to his feet, stretched out his arms and yawned. Quite casually he stepped behind the trunk of the oak. A second later the darkness had swallowed him up. Wolverene remained motionless for a few seconds thereafter, seeming as though gazing into the fire. Then he gently stretched himself on the ground two yards from the fire. Lying thus half in the shrubbery his shadow became indistinguishable from the surrounding shadows. The fire died down and became a red glow. Wolverene still lay there as if asleep, but he was not asleep. He was listening with all his keen senses.

When Red Hawk stepped back once again into the shadow of the tree he stood for a few seconds entirely motionless, listening, his whole attention bent on the brook. Then, as lightly as the falling of a dandelion "clock," he stole through the woods up stream, keeping close to the bank. When he had travelled thus for fifty yards he came to a place where the brook made a bend. At this point a tree leaned close down over the water. One of its limbs reached entirely across. With infinite caution Red Hawk crawled out on this branch and stretched his body out upon it. His two arms hung free and his face was turned up stream. He became part of the outline of the tree.

III.

The night was not entirely dark, although there was no moon. The large and brilliant autumn stars shone in the sky, and a little of their faint light penetrating the foliage, vaguely showed the passage of the stream. The minutes passed slowly

(*Continued on next page*).

A Night at the Pool—(*cont.*)

while the senses of the youth on the branch, strung to the highest tension, became concentrated in his eyes and ears.

A half hour passed . . . an hour . . . Then it seemed to him that the outline of a tree a few yards higher up-stream, on which he had fixed his eyes, had become subtly different. A moving shadow had melted into it and had increased its bulk. . . . . The shadow had attached itself to something below the tree and a little nearer. . . . The shadow was a tree itself. . . . a tree that moved . . . upright. . . . The shadow suddenly became the outline of a man, stooping and watchful, creeping down the stream with perfect noiselessness. . . . He stooped a little to go under the tree. At that momen some subtle sense in him impelled him to look upward. For a fraction of a second he found himself looking straight into a fierce face. Only for a fraction, for in the same moment a strong hand seized him by the top-knot and drew him up, while a second hand drove home the sharp knife.

Life passed out of the man with a faint gurgle. The bloody knife was withdrawn from his breast and swiftly passed around the scalp. Still holding the sagging body Red Hawk moved quietly down the bank in the direction whence he had come. He brought the body to the camp and set it up against the tree near which he had been sitting himself. Then he uttered a few soft words to Wolverene, who lazily rose and put wood on the fire.

Red Hawk did not come into the light. He crouched behind the tree in the dense blackness cast by its shadow. "One!" he said.

Wolverene sat opposite the body and when he talked he looked at it.

"Will there be others?" he asked slowly.

To anyone watching from the shadows it would seem that Wolverene was still talking to his friend across the fire.

"There will be others," answered Red Hawk. "You will sleep—as before."

"I obey," answered Wolverene. He rolled on the ground again. The fire began to die down. The flames, flaring up now and then threw fantastic shadows on the dead man who sat leaning against the tree. The red that ran down his face and the red that flowed from his breast did not appear any more than the warlike decorations of a savage on the war trail.

IV.

Red Hawk backed slowly away from the fire and stood upright. He raised his head and listened intently. There were many sounds borne to him on the night air, but to most of these he paid no attention whatever. He was listening for the *unusual* sound—the sound that by the slightest variation from *what should be*, revealed that *it did not belong to Nature.*

At last he seemed to hear that which satisfied him. He began to move. With infinite caution he came to the edge of the brook and entered it. Like a drifting cloud-shadow he crossed, crouching low all the time, and watching the opposite bank with the keenest apprehension. It took him half an hour to climb the bank. It took him an hour longer to crawl three yards away from the brook.

A strong hand . . . drew him up.

At this point the streamlet was lined with a hemlock grove, the great dark trees of which had covered the floor of the forest with a soft carpet of leaves. On this he crawled noiselessly until he was opposite to the camp-fire. Looking over he could see the dead man sitting by the fire, and on the other side of the fire, but almost completely enshadowed, the vague outline of Wolverene. From this hiding place it would seem as if one man was sitting up to guard the camp while perhaps the rest of the party slept.

Red Hawk drew himself behind a great hemlock and waited. So still was he and so shapeless that anyone approaching through the dark could but take him for a stone, such as is often found lying against the trunk of a great tree. There was absolute stillness in the forest, save for the skurry of some small animal now and then, or the distant bark of a fox. The little fire had become a red glow. The dead man sitting against the tree was almost merged in its shadow. Now and then the silence was broken nearby by some typical forest sound, such as the soft stalking of a predatory beast, or the splash of a musk-rat down stream.

(*To be continued*).

BRIGHT IDEAS

These columns are reserved for dealing with suggestions sent in by Meccano users for new parts, new models and new ways of making Meccano model-building attractive. We are always pleased to hear from any Meccano boy who has an idea which he considers will be useful in the Meccano system.

Jean Pelletier (Autun).—(1) We shall give consideration to your suggestion for a circular strip. (2) We cannot quite see what advantage would be gained by fitting a collar to our existing eye-piece. Perhaps you will write us again on this matter.

G. Lessens (Roubaix).—(1) We do not quite understand your objection to the present core in the Bobbin 301. What advantage do you consider a soft iron core possesses over the existing core? (2) We have under consideration the introduction of a transverse strip.

Gerald W. Lush (Bath).—The variety of lengths of threaded rods available obviated a joint such as you suggest. We fear that so fine an adjustment of the threads at the joint would be a difficult matter.

W. Scott (London, N.).—(1) We have in mind the introduction of single angle strips. (2) Your idea for springs of shorter length will be carefully considered.

Fred Woodcock (Salford).—Model No. 450, No. 3 Manual, illustrates a pulley-block similar to that which you suggest.

Allan Rickards (Colthurst).—(1) We are afraid it would be impractical to introduce curved braced-girders, in view of the varying diameters that would be required for different structures. (2) We should like to hear of any general uses for the 5½" triangular plate. (3) Models requiring longer strips than 12½" are so infrequently built that we do not consider your suggestion practicable.

M. Foy (Chalantre-la-Grande).—A fairly good representation of boilers and cylinders may be constructed from two face plates joined by double angle strips of the required length. The difficulty of curved plates is the standardisation of diameters.

M. Pierre (Amiens).—(1) A universal joint may be constructed from existing parts as in the Meccano Motor Chassis. Your suggested joint does not lend itself to mass production. (2) A distorted contrate wheel on the lines of your sketch might prove inapplicable to general use. (3) We think that a flattened centre portion in each rod would prove a hindrance rather than an advantage.

W. Brown (St. Helens).—Would not our present 5½" slotted strip serve the purpose of the run-ways you suggest? Alternatively, ordinary 3½" strips may be used flat-ways, spaced with washers to permit of the free action of the rod.

J. K. Hare (Henlow).—(1) See reply to W. Brown (above). Perhaps you could adapt this method to your model. (2) Any new part must be adaptable to general use to justify its inclusion in our list.

F. C. Button (Scottsdale, Tasmania).—Your suggested bush wheel, ¼" across the edge, perforated equidistantly to take rods and fitted with grub screws, would certainly be costly to manufacture. Whilst admitting that it would make an admirable hub, we are afraid its cost and limited use will prevent its introduction.

M. Raynard (Marseilles).—(1) A toothed wheel similar to your suggestion may be constructed from rack segments secured to a face plate. (2) We have introduced a spring buffer which obviates derailment on impact.

Sidney Gough (Smethwick).—(1) We are already engaged on the subject of a sliding shaft. A groove is not practical on account of the smallness of the diameter of the rod, and a flat surface such as you suggest would prevent a smooth action in the bearings. (2) We have overcome the difficulty of the sliding gear by employing 1" gear wheels, which give a fairly wide range. In this connection you will be interested to see the illustration of gear box in our Chassis leaflet.

D. R. Marshall (Leeds).—(1) The new flanged disc attached to the face plate gives a good representation of a loco driving wheel. (2) At the moment we do not contemplate manufacturing steam models and pistons and cylinders alone would be incomplete.

C. Terry (Ealing).—(1) The introduction of circular plates is under consideration. (2) The existing coupling lends itself to corner connections. (3) What are the particular advantages of an 8½" × 6½" plate? We shall consider your idea for a screw coupling that gives a corner connection.

M. Pierre Conderoy (Cosne D'Allier).—(1) Your suggested hollow rod is on the principle of the sleeve. Up to the present we have not seriously entertained the inclusion of the sleeve as an accessory part. (2) Grub screws and set screws may be obtained as accessory parts from any Meccano dealer. (3) The latest type of sprocket wheels are all perforated similarly to the bush wheel.

S. Darby (Erdington).—We realised the weakness in continental rails, hence the additional sleepers in the Meccano Rails and Points.

The Men Who Gave Us Radio:

II. OERSTED, HENRY, FARADAY AND SOMMERING

This is the second of a series of articles that outline the development of Radio and briefly describe the researches of those scientists who preceded Marconi. Progress in all sciences is clearly traced by a study of the lives of the men who devoted themselves to investigation. The manner in which these men overcame their difficulties, and the little or no effects disappointment had upon their work, enables us to realise the nature of a true scientist. It is through the study of these early workers that Radio of to-day has been made possible.

Oersted

AFTER the work of Dr. Gilbert in connection with magnets, we do not find that there were any further advances until a discovery was made by Oersted, a celebrated Danish physicist. Oersted, Professor of Physics at Copenhagen, devoted a great part of his life to the study of electricity and magnetism. In 1820 he noticed that if a freely swinging magnet, such as a compass needle, were placed near a wire through which an electric current was flowing, it was deflected, or made to dip at one end (Figs. 1 and 2). Oersted thus showed that an electric current possesses magnetic properties similar to those of the ancient lodestone.

The principle is now used to detect the presence of electric currents, in the form of a "galvanometer." This instrument consists of a delicately-poised magnetic needle, placed in the centre of a hollow coil of wire. When a current is passed through the coil it affects the needle, just in the same way that Oersted's needle was deflected by the current in the neighbouring wire. The amount of deflection varies according to the strength of the current, and is recorded by a pointer which moves over a graduated scale.

OERSTED

Hans Christine Oersted was born on the 14 August, 1777, on the Danish Island, Langeland. He laid the foundations of the science of Electro-magnetism, and in addition made numerous discoveries in Chemistry. He died 9 March, 1851.

Faraday

No further discoveries of importance in connection with magnetism were made until the work was taken up by Michael Faraday. Faraday was the son of a blacksmith, and was born at Newington Butts, London, in 1791. He was apprenticed to a book-binder when 13 years of age, and little did his master imagine that the boy was destined to become one of the most brilliant of British scientists.

Faraday devoted his leisure hours to science, however, and made experiments with an electrical machine of his own construction. In 1812 he was able to obtain admission to the chemical lectures of Sir Humphrey Davy, and later was engaged as his assistant at the Royal Institution. In 1827 Faraday succeeded Davy as Professor of Chemistry at the Royal Institution.

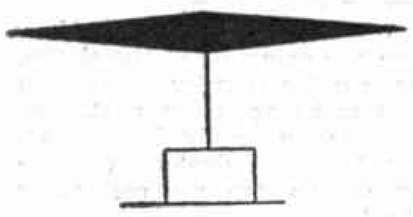


Fig. 1
Normal Compass Needle

Oersted had produced magnetism by electricity, and this suggested to Faraday the possibility of obtaining electricity from magnets, by reversing Oersted's experiment. Following this line of thought Faraday found, in 1831, that if a magnet be moved to or from a coil of wire, an electric current is produced in the wire. He thus showed that there is a close relationship between electricity, magnetism, and motion. Bodies that are electrified and are in rapid motion, produce magnetic fields around themselves, while a magnet in motion has the power of creating currents of electricity in conductors that are close to it.

It is this discovery of Faraday's that forms the basis of Radio, for in an exactly similar manner when the waves of magnetic force, radiated from a transmitting station, encounter the wire of an aerial and sweep across it, they induce in it minute electric currents. At the time Faraday made his discovery, Radio was, of course, quite unknown, and he could not have had any idea of using his discovery for communicating without wires. He simply laid the foundations, as it were, upon which succeeding workers erected the completed building.

In addition to other important discoveries arising from it, Faraday's work was of the utmost consequence to science in later years, for it was the means of leading another great scientist, Clerke-Maxwell, to investigate electro-magnetism with brilliant results, as we shall read later.

FARADAY

Michael Faraday was born at Newington Butts, London, on the 22 September, 1791. He was one of the most distinguished chemists and natural philosophers of the 19th century. For some time he acted as assistant to Sir Humphrey Davy, with whom he travelled on the Continent. On returning to this country Faraday carried out experiments which ultimately led to the discovery of the condensation of gases in liquids by pressure. He died at Hampton Court, 25 August, 1867.

HENRY

Joseph Henry was born in 1799 in Albany, New York. He became professor in Mathematics at the Academy, and in 1846 was elected the first secretary of the Smithsonian Institution. To a large extent his researches in Electricity and Magnetism prepared the way for the inventions of Professor Morse. He died at Washington on the 13 May, 1878.

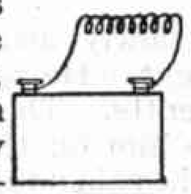
Henry

While Faraday was at work in England, another scientist, Joseph Henry, was studying electricity and magnetism in America. Henry was apprenticed to a watchmaker and studied science as a hobby. Having saved sufficient to pay his fees, he took a course of instruction at the Academy, becoming (in 1823) Professor of Natural Philosophy at Princeton University.

Apart from his great services to the Smithsonian Institution, Henry's name is associated with the discovery of many electrical phenomena, including the relation between a number of coils of wire wound around an electro-magnet and the construction of a battery to work it. He also discovered a singular form of electrical induction by which a current of electricity, passing through one coil of wire, induces another current in a second wire near by, but not connected to the first coil.

Henry's researches in electricity and magnetism prepared the ground for Professor Morse, who, as we shall shortly see, invented one of the earliest practical systems of wireless telegraphy by "conduction."

Towards the close of the 18th century, the advances in electricity caused scientists to devote



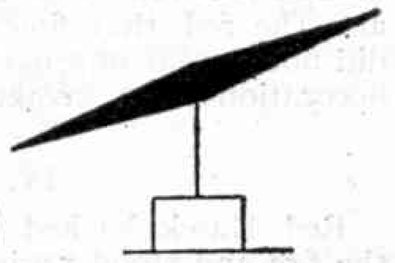


Fig. 2
Compass Needle deflected by electric current

(Contd. foot of next page)

The time is not far distant when passengers undertaking long railway journeys will be able to enjoy selections of music, concerts, etc., from the Broadcasting Stations.

* * *

Twenty-three years ago the first experiments in wireless telegraphy at sea were carried out on a Cunard Liner. A new era in the history of wireless communication with ships at sea commenced last month, the ship chosen for this first demonstration being the Cunard liner "*Berengaria.*"

* * *

This new era commences with the introduction of the Creed instrument, which makes possible automatic reception and transmission of messages at very high speeds. This will prove a great advantage to the trans-Atlantic liners, which, in addition to publishing wireless newspapers, also transmit a vast number of private messages for their passengers.

* * *

The Secretary of the Airdrie Meccano Club writes that the Club is having very fine results with a four-valve Radio Receiver recently installed. A short time ago the members heard a concert transmitted from the north of France. The voices of the singers were very clear, and even the piano could be heard quite plainly.

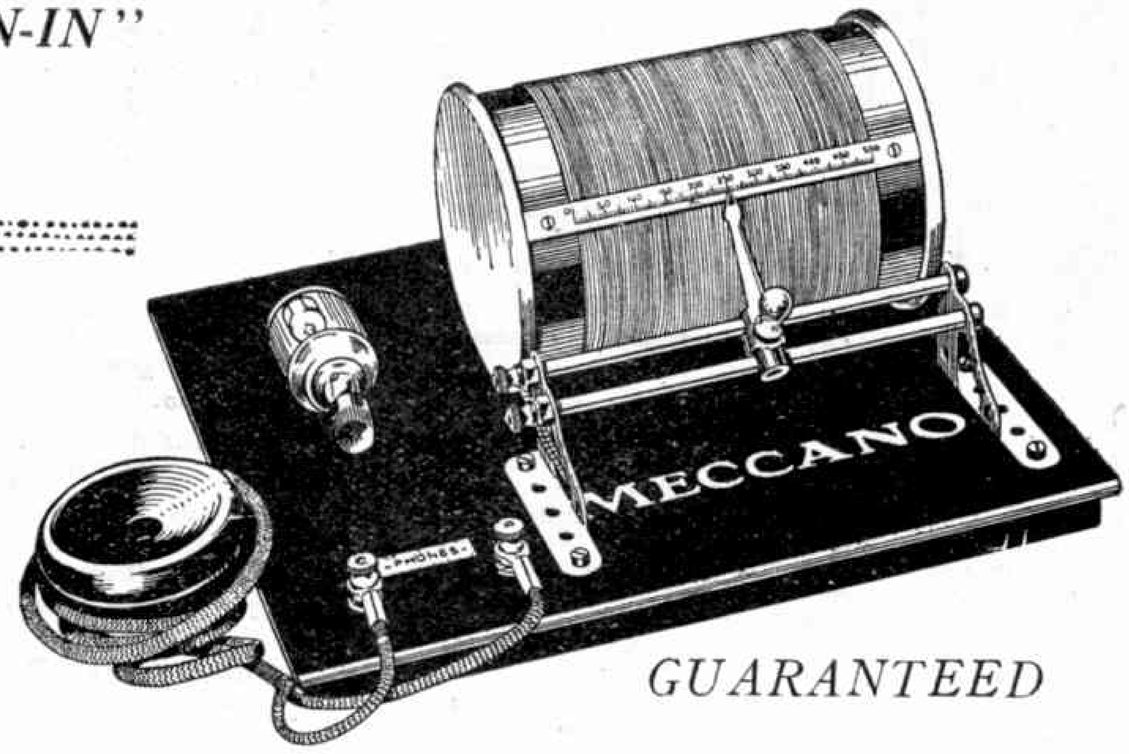
* * *

It is rumoured that Senator Marconi will shortly make another cruise in his yacht "*Elettra,*" with the object of experimenting with a new apparatus he has invented for cutting out interference and "over-hearing" in radio telephony.

* * *

The staff of Leicester Gaol and some of the prisoners recently "listened-in" to a musical programme broadcast from Birmingham. This is the first time that a wireless demonstration has been given in a gaol and it was much appreciated, especially by the prisoners.

"LISTEN-IN"



GUARANTEED

THE

MECCANO

RADIO RECEIVER No 1

For Broadcast and Morse Reception

The Meccano Crystal Receiving Set is a piece of scientific apparatus with which anyone may spend hours of delight and enjoyment "listening in" to broadcasting stations and other telephony transmissions.

It has been thoroughly tested and has received with great clearness music and speech in London, Birmingham, Manchester, and elsewhere, up to distances of 33 miles from the broadcasting station.

Low in cost and complete in itself, ready to be connected to any aerial, the Meccano Radio Receiving Set will provide hours of fun and entertainment.

PRICES:

MECCANO No. 1 CRYSTAL RECEIVING SET, complete 55/-

MECCANO AERIAL SET (including antenna, lead-in and aerial wires and insulators) 12/6

A splendid booklet, "The Meccano Crystal Receiving Set," explaining how easy it is to receive broadcasting, will be mailed free on application.

Address ; Department R1, MECCANO LTD., BINNS RD., LIVERPOOL.

The Men Who Gave Us Radio—(*cont.*)

some time to endeavouring to use this new force for communication between distant places. Their efforts were directed to two methods—with and without wires, with the former of which we are not at the moment concerned. The development of the latter method may be conveniently divided into three stages, Conduction, Induction and Radiation.

We have already mentioned that current electricity is obtained from batteries or cells that consist of copper or zinc, immersed in an acid. Each of these metals gives a different kind of current—copper gives a positive and zinc a negative current. If you look at any electrical apparatus, such as an electric bell or an electric globe, you will see that two terminals are provided to accommodate the two wires, carrying the positive and the negative current. These currents cannot be made to do work separately, but must both be used together. For this reason it is said that "a circuit must be completed" to allow a current to flow through the battery to enable an electric bell to be rung. The circuit is completed, through the bell and through the lamp, when the "bell-push" is pressed or when the light switch is "on." Then, and only then does the current flow, because it is able to find an unbroken path along the wire, through the bell or lamp, and back to the battery along the other wire.

Sommering.

In the early days of the telegraph it had been found that, just in the same way, two wires must be used in order to actuate the instrument. In 1811, however, a German scientist named Sommering, who was experimenting with a form of telegraph, suggested using water in place of wires to conduct the current. He found that if each wire was interrupted by a tub of water, the current was conducted to the instrument just as though wires had been used all the way.

This was one of the earliest methods proposed for communication without wires, but the difficulty was that the signals ceased when both wires were dipped into the same tub. As two separate bodies of water are not often to be found together in natural conditions, Sommering believed his suggestion to be impracticable. As a matter of fact, had he been able to use a more delicate instrument for recording the signals, he would have noticed that a minute current did cross the water, even when both wires were introduced into the same tub.

NEXT MONTH

STEINHEIL, MORSE & LINDSAY

C. R. King (Acton, London, W.3.)—A licence for the reception of broadcast costs 10/– and is obtainable from any Post Office. It is not necessary to approach the British Broadcasting Company in any way.

J. Moxham (Preston).—You have certainly misunderstood the advertisement as regards being able to receive in England concerts, etc., broadcast from Paris and New York upon a Meccano Crystal Receiver. Broadcast has been received perfectly on Crystal Receivers installed within the usual radius from each of the above-named centres.

P. Maitland (Chester).—It is not possible to gain perpetual motion from an electric motor that drives a dynamo and by using the current thus made to drive the motor. One reason only why this is impracticable is that perpetual motion should last for ever, and both machines would wear out in a very short time.

C. Trotman (Brighton).—The Meccano Set will receive on wave lengths from zero to approximately 1,000 metres.

N. Reynolds (Middlesbro').—The concerts broadcast from Newcastle are not connected with the concerts that are broadcast from Marconi House. Anyone at a distance of 20—25 miles from Newcastle or London with a Meccano Receiver and a good aerial can hear either but not both.

T. Williamson (Darlington).—The Meccano Crystal Set gives perfectly satisfactory results within a normal range. The addition of a low frequency valve amplifier would not increase the range but would only strengthen the signals received.

D. Davies (Great Yarmouth).—As you are situated 100 miles from a Broadcasting Station a Crystal Receiver would not be serviceable for the reception of broadcast. It would enable the reception of code signals from ships at sea, however, and telephony within a range of 10—20 miles from Paulhan, the Air Station in Norfolk. Within this radius you should be able to hear the operator in conversation with aeroplanes on the cross-Channel route, and also in conversation with the Air Station at Croydon.

L. C. Dennis (London, W.11).—You would probably be able to receive broadcast on a large indoor frame aerial with a Meccano Crystal Set, in view of the fact that you are so near a Broadcasting Station. From what you tell me of the distance of your house from Marconi House, I think you would obtain better results with an aerial formed of wires strung across the room.

H. G. Chick (Barry).—In order to receive broadcast from London, Paris and New York, it would be necessary for you to employ a four or five Valve Set.

S. Marsh (Bradley, Staffs.)—If your difficulty in regard to aerial and earth wires is that of connecting them to the Meccano Receiving Set, we would mention that the terminals on the Set are clearly marked "Earth" and "Aerial."

N. G. Pagam (Johannesburg).—You would not, of course, be able to receive broadcast from Cape Town at Johannesburg because the distance between the two places is over 1,000 miles. We are afraid that you cannot expect to hear anything interesting in the way of broadcast, unless there are amateur stations in your district. At the moment, we have no information on this point, but are making enquiries from our South African Depot.

F. Hulatt (Lambeth, S.E.1).—It is not clear what type of condenser you contemplate making. Is this a blocking condenser or a variable condenser? We shall be pleased to give you further information on hearing from you.

A. Johnson (Liverpool).—As we do not know the particular type of varnish you are using, we cannot give you any information regarding thinning it. If the solvent is methylated spirits, you should add more methylated spirits, or if alcohol—which is the solvent for shellac—you should add more alcohol.

N. Wilson (Stalybridge).—In regard to your aerial you will gain better results by having the two wires more than two feet apart. Your spreaders should be at least 5 ft. in length. Your aerial is not high enough to be efficient, and we suggest that you raise it at least 10 ft. at each end, and, if possible, make it longer. If you follow these instructions you should have no difficulty whatever in receiving broadcast from Manchester.

R. F. Archer (Greystones).—At present we have no knowledge of any Broadcasting Station in Ireland. In order for you to receive Concerts, etc., broadcasted from London and Paris, it would be necessary for you to employ a Valve Set, as telephony can only be received with a Crystal Set at distances up to about 20 miles.

S. Thompson (Glasgow).—(1). A condenser may be made with sheets of mica and pieces of tin-foil. The more numerous these are, the greater will be the capacitance. (2). This is determined by the circuit used and the purpose for which the receiver is employed.

Saving Lives at Sea

One of the greatest benefits that Radio has conferred upon humanity is the possibility of communicating with ships at sea. Not only is this a commercial advantage, enabling messages to be sent by passengers on the high seas to stations on land, but it has been of inestimable benefit in cases of emergency or disaster at sea.

Already thousands of lives have been saved by the fact that by wireless, ships in distress were able to call other ships to their assistance. No more famous example of the benefit of Radio in this connection could be given than the case of the "*Volturno*," which (on the 9th October, 1913) caught fire in mid-ocean.

A Famous "S.O.S."

The "*Volturno*," a British steamship, was carrying over 600 emigrants from Rotterdam to New York when fire broke out. The flames spread rapidly through the hold, explosion succeeding explosion.

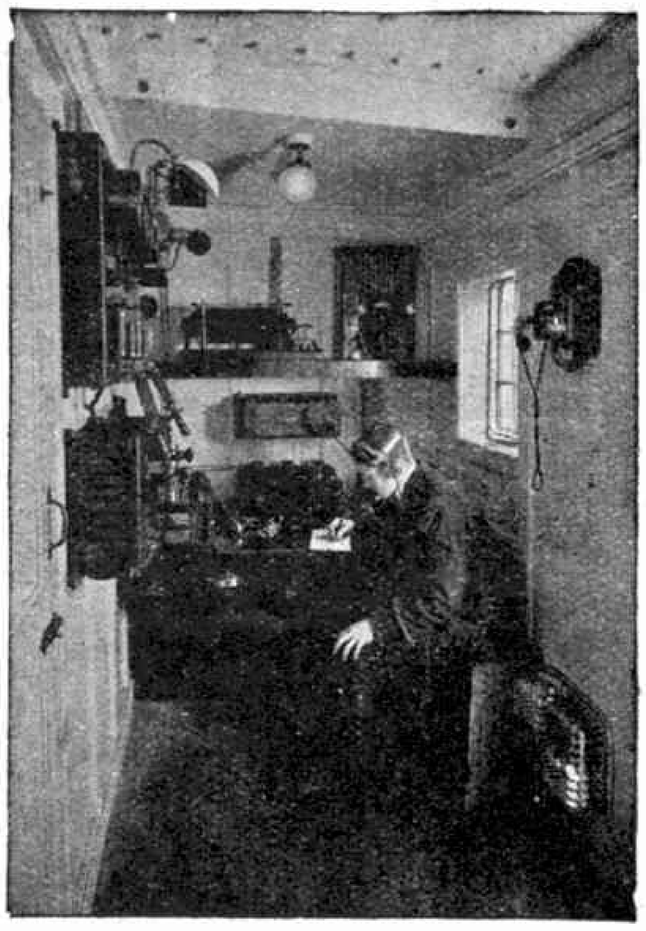


Photo by courtesy] [*Cunard Co. Ltd.*

A gale that was raging at the time prevented the passengers taking to the boats, and many lives were lost in the attempts to escape by these means.

The captain of the "*Volturno*" ordered the wireless operator to send out "S.O.S." calls for help. The Cunard liner "*Carmania*," receiving the call, steamed full speed to the rescue, repeating the "S.O.S." to all vessels within her range. Ten vessels in all responded to the call. They stood by the burning ship but were powerless to help because of the furious gale. Boats were launched but were staved in. Rafts were lowered but could not combat the fury of the waves.

In the meantime the wireless operators of the ships that were standing by, were in close touch with the operator on board the "*Volturno*" and pointed out that it was impossible to effect a rescue until the sea calmed. At last there came this despairing message from the "*Volturno*." "For God's sake help us, or we perish."

Oil on the Troubled Waters

In the meantime the "*Carmania's*" operator had been calling far and wide "Is there an oil-tanker boat in the neighbourhood?" At last a reply came from the "*Narragansett*," which promised to "be with you with oil at 6-0 in the morning."

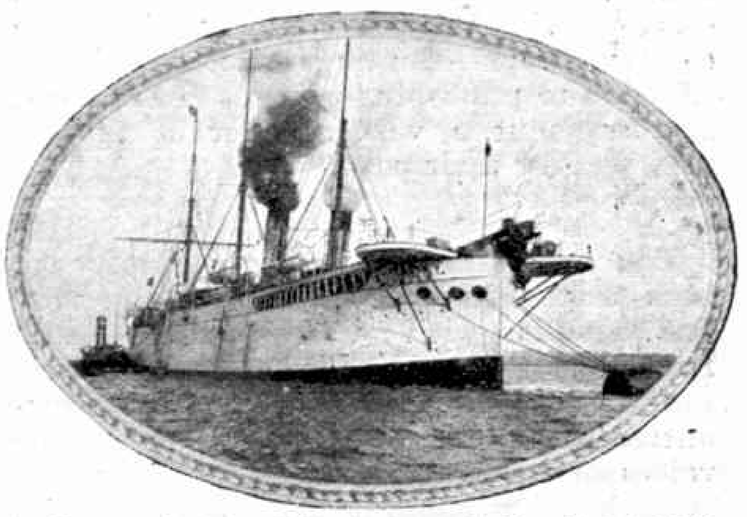
"Can you make it an hour earlier?" queried the "*Carmania's*" operator.

"Yes," replied the captain of the oil-tanker, "I will be with you at 5 o'clock."

By daybreak the oil-tanker was in position and pumped out tons of oil upon the sea, thus calming the waves. This action enabled a flotilla of boats to surround the "*Volturno*," and the work of saving the passengers proceeded apace. Of these 521 were saved, all of whom owe their lives to wireless.

Our illustration shows the Marconi cabin on board a Cunard liner, similar in detail to that on board the "*Carmania*." The apparatus shown is a Marconi 5 k.w. spark transmitter with a coil emergency set. The receiver is a multiple tuner and the old form of magnetic detector, which in the modern ships is now replaced either by a crystal or a valve detector.

A Famous Cable Ship



In next month's issue of the "*M.M.*" we shall publish a short account of the famous cable ship "*Faraday*," illustrated above. If you have not yet placed a regular order for the "*M.M.*" with your dealer do so without delay, or order direct from this office. The price is the same in either case, 6d. for six issues or 1/– for 12 issues.

The installation of the stations at Cardiff and Glasgow will probably complete the chain of broadcasting stations that will be proceeded with at present.

* * *

The Cardiff Broadcasting Station is now in nightly operation on a wave length of 353 metres, the call-letters being 5 W A. Transmission commences at 6.30 and continues until 10.0 p.m.

* * *

The Sunday concerts from the Hague are still being continued, but it is not contemplated that the Thursday evening concerts will be resumed.

* * *

The call-letters of the Birmingham Broadcasting Station have now been changed from 2 W P to 5 I T.

The Secretary's Notes

The activities of the Clubs in general have been very varied and considerable during the Second Winter Session. Undoubtedly enthusiasm for Club work continues to grow, as is evidenced by the fact that the membership of nearly all Clubs shows large increases. Although several Clubs closed the Session with an Exhibition, Concert, or Social, the majority have decided to continue in Session during the Summer months. This is an excellent decision, for it gives an opportunity for forming Cricket or Rambling Clubs by which the members not only may continue to enjoy the Club fellowship, but also are kept together, ready to commence the First Winter Session in September.

Second Winter Session

Last year we introduced a Club Membership Card, and this has been in very great demand. Will Club Leaders and Secretaries please note that my stock of these Membership Cards is now entirely exhausted and that further supplies will not be available until the Autumn. In the meantime I shall be pleased to receive any suggestions for alterations in the form or design of the existing Membership Card.

Club Membership Cards

To "lone members" of the Guild, the Correspondence Club offers a splendid opportunity for making friends with some other Guild member. Many lasting friendships have been made through this channel, and thousands of Guild members have been placed in touch with other Guild members in all parts of the world. In almost every country in the world there are Meccano boys eager to correspond with other Meccano boys.

Guild Correspondence Club

At present I know of several American Meccano boys of 10—12 years of age who are desirous of being placed in touch with Meccano boys in England. Any Guild member of 10—12 who is desirous of corresponding with an American boy, or with a boy in any other part of the world, should ask me for particulars of the Correspondence Club.

CLUB NOTES

St. John the Baptist's (Toxteth, Liverpool) M.C.—Has concluded a very successful session which included a lecture on "Wireless" by the Club Secretary, who brought his Wireless Set for the occasion. The lecture was greatly enjoyed, and secured Master Adams a Special Merit Medallion. *Secretary:* Master W. H. Adams, 11, Ballington Street, Liverpool.

Central Secondary School (Sheffield) M.C.—The programme for the Second Session included visits to local Printing Works and Railway Carriage Works, Wireless Demonstrations, Lectures and Model Building. Good progress is reported in every direction. *Secretary:* A. S. Taylor, Fern Lea Villas, 19, Roach Road, Eccleshall, Sheffield.

Bradford Wireless M.C.—Meetings are held every week at Drummond Road Schools, and the present membership stands at thirty. The Club Leader has presented the Club with a two-valve Set and broadcast has been well received from 2ZY Manchester, 5NO Newcastle, and 2LO London. *Secretary:* L. Jowett, 19, West Park Terrace, Four Lane End, Bradford.

Sparkbrook M.C.—The Club has been divided into four sections, under which arrangement considerably better progress is made. An interesting Lantern Lecture was given recently, and a Concert and Exhibition have been held. *Secretary:* F. J. Hubball, 71, Turner Street, Sparkbrook, Birmingham.

1st Herne Bay M.C.—The Club is proceeding very satisfactorily. The two Meccano Lectures "*The Story of our Ships*" and "*Lives of Inventors*" were both greatly enjoyed. All the members are keen and enthusiastic. *Secretary:* C. W. Russell, 4, Clifton Villas, South Road, Herne Bay.

Meccano Club Leaders

No. 1. Mr. F. W. BULL
(Leamington M.C.)

Mr. F. W. Bull is the energetic Club Leader of the very successful Leamington Meccano Club. This Club, which has 38 members, was affiliated with the Guild early in January 1920. The Club's Minstrel Troupe has been very successful, and is a great asset in raising Club funds. Under the active leadership of Mr. Bull the Club has taken up Radio. Many of the members possess Receiving Sets, some of which have been constructed by themselves.

Kenyon Hall College M.C.—A very interesting series of Lectures have been given in connection with the Club programme, including; "Mining" (G. R. D. Grattan), "The Steam Engine" (Arthur Morgan), "Bridge Building" (Ronald Lydiatt), "Cotton Spinning" (J. C. Brindley), "Chemistry" (Stanley E. Wood). In a Lecture on "Indian Curries," F. Osborn Sefton, after having described how curries are made, demonstrated the use of the same by making, in Indian fashion, sufficient curried rice to provide a good supper for all the house, to the intense enjoyment of everyone. The Kenyon Hall M.C. are to be congratulated on their excellent series of lectures. *Secretary:* Master J. W. Mayhew, Kenyon Hall College, Kenyon, nr. Manchester.

Victoria (Glasgow) M.C.—A "Visitors' Night" is held occasionally in connection with this Club, on which occasion friends and parents of members visited the Club. Interesting Lectures included such subjects as "Ship Construction" and "How Ships are Driven." Recently a Whist Drive and Dance, held in order to raise funds, realised sufficient to purchase a No. 5 Outfit for the general use of the Club. *Secretary:* Ian Kerr, 57, Victoria Park Drive, Whiteinch, Glasgow.

Wisbech M.C.—The membership is increasing and the Club is making good progress. Exhibitions are held frequently, and the Meccano Lecture "*The Story of our Ships*" was received with enthusiasm by the members. The Club may produce the play "*Nonsense Nana*" in the near future. *Secretary:* S. Kettering-ham, 99, Norwich Road, Walsoken, Wisbech.

South Kirkby M.C.—Towards the end of the Second Session a very successful "At Home" was held, at which was a fine display of models. A sketch entitled "*The Judge*" was performed, and proved highly entertaining and amusing. The usual Club work is being carried out with enthusiasm. *Secretary:* J. Williamson, School House, South Kirkby, nr. Wakefield.

Butt Lane Council School M.C.—The Second Winter Session commenced on 12th January, and meetings have been held regularly throughout the three following months. Competitions have been held from time to time, and the Session has been very enjoyable. *Secretary:* P. Ray, 147, Congleton Road, Talke, Staffs.

Stanley Road (Worcester) M.C.—This is one of the most flourishing of our Meccano Clubs, and the progress made has been steady and continued. The enthusiasm of the boys never flags, and it is evident in all the Club work. The Club accounts show a good balance on the right side, and the Club membership is increasing. *Secretary:* R. J. Greenway, 173, Wylds Lane, Worcester.

Luton M.C.—The very interesting programme arranged for last Session included Lectures and Papers by members, a Wireless Demonstration, and a Bazaar. The latter was held in connection with the Church, and a very fine display of models was given by the Club. *Secretary:* W. Humby, 34, Adelaide Street, Luton.

Grimsby Central M.C.—The Club membership is increasing and many interesting Lectures, including "Wireless" and "Locomotives" have been given during the past Session. A model of the Transporter Bridge was loaned from Headquarters to the Club, for a demonstration and talk by the Leader. Towards the end of the Session a very successful Exhibition was held. *Secretary:* Leon Whiten, 53, Torrington Street, Grimsby.

Southall M.C.—Making excellent progress, and membership growing every week. A Club Competition was held recently in the Public Library, when some splendid models were exhibited. The models were divided into three classes, and Mr. Jensen, engineer of the Maypole Works, judged the exhibits. Prizes were awarded as follows:—Class 1, Master Carpenter (Railway Crocodile Lorry), Master Carr (Gramophone). Class 2: Master Bradley (Railway Tank Engine), Master Gale (Planing Machine). Class 3: Master Watson (Motor Cycle and Side Car), Master Arnold (Motor Chassis). *Secretary:* R. Watson, 2, Waltham Road, Southall.

Westview M.C.—The enthusiasm of the members of this Club increases rapidly. New attractions and hobbies are constantly being introduced, the latest being Stamp-collecting. The members are fortunate in that the Leader of this Club, Mr. Cousens, has a splendid collection and is an ardent philatelist. A novel Exhibition, held during the Second Winter Session, was the Nottingham Goose Fair in miniature. A very creditable display of models was given, including Cakewalks, Try-your-Strength Machines, Cocoanut Shies, Mountain Railways and Swings. Interesting Competitions have been held also, and altogether the Club is a very alert and progressive one. *Leader:* Mr. H. Cousens, 494, Mansfield Road, Sherwood, Nottingham.

Clubs Recently Affiliated.

Combe St. Nicholas (Chard) M.C.—Formed last November, this Club has only recently become affiliated with the Guild. It is connected with the Combe St. Nicholas School, and is under the direction of the Headmaster, Mr. F. H. Wheaton, and at present there are sixteen members. The Leader of the "Chard" has taken a keen interest in the formation of this Club. *Secretary:* A. Long, Combe St. Nicholas School, Chard.

King Edward (Birmingham) M.C.—This Club was established by the members, and when meetings were being held regularly they obtained an adult Leader. Affiliation was then granted, and I have no doubt that the Club will make excellent progress. *Leader:* Mr. I. McMaster, King Edward School, Birmingham.

United Schools (Melton Mowbray) M.C.—Connected with a Boys' Class at the Wesleyan Chapel in Melton Mowbray, this Club has already made good progress and the membership is rapidly increasing. *Leader:* Mr. C. R. York, Danetree Cottage, Welby Lane, Melton Mowbray.

Clubs not yet Affiliated.

Purley M.C.—Meetings are held every Monday, and when the Club comes under the guidance of a responsible adult, it is hoped to affiliate it with the Guild. *Secretary:* J. Telford Haywood, The Anchorage, Brighton Road, Purley.

Bombay (India) M.C.—This Club, whose members are keen and enthusiastic, will probably become affiliated in the near future. *Secretary:* K. R. Dholoo, Lentin's House, Foras Road, Tardec, Bombay.

Third Photographic Competition Results

First Prize :

Photograph by] [Master F. Done

"A Wintry Sky"

IT certainly seems that each Photographic Competition is destined to be a greater success than the last, and to bring specimens of work of increasing merit. The entries I have received for the Third Photographic Competition, the subject of which was "A Winter Scene," prove beyond doubt that among Meccano boys are to be found photographers sufficiently expert to obtain really fine out-of-door pictures, even during the dull days of winter when the light is admittedly none too good for photography.

The past winter has been of a notably mild character, and in many places until the middle of February there was no snow. This fact did not deter one competitor, however, who liberally besprinkled his "scene" of a (Hornby) train accident with whitning, giving a very realistic representation of a blizzard!

Master F. Done, of Northwich, who has been awarded the first prize, contributes an excellent picture in which bare trees

Second Prize :

Photograph by] [Master Webb

"Hawarden Gardens in Winter"

Third Prize :

Photograph by] [Master C. McCusker

"After the Snowfall"

are silhouetted against a wintry sky and reflected in a lake. Master Webb, of Stockport, winner of the second prize, brings out to the best advantage the effect of the snow-laden branches of the fir trees in Hawarden Gardens. The third prize has been awarded to Master C. McCusker, Thornaby-on-Tees, whose line of gaunt trees stretching away into the distance form the only relief in a white landscape, with an impression of miles of snow-covered land laying beyond.

Famous Hidden Treasure Story

Heads List of "Six Best Books for Boys"

Results of our Recent Competition

THE entries for this Competition were very numerous, and it appears to have been one of our most popular Competitions. It is very evident, from the post-cards received, that adventure stories easily hold first place in the heart of the modern boy. "*Treasure Island*" heads the list of favourites, but "*Robinson Crusoe*" comes a very good second with only 30 votes less, "*Tom Brown's Schooldays*" is not far behind, whilst "*Coral Island*," "*Swiss Family Robinson*," and "*The Fifth Form at St. Dominic's*" follow in the order mentioned.

I have pleasure in announcing that Master B. J. Riordan, of Belfast, is the winner of the Competition, and the prize, a No. 1 Hornby Train Set, has been despatched to him. The second prize (Meccano Clockwork Motor), has been awarded to Master L. Elledge, of Wolverhampton.

For some time I have been in doubt as to the type of books that appeal most to boys of to-day, and I therefore looked forward to the results of this Competition with more than usual interest. It is interesting to find that adventure stories have proved to be the favourites, with school stories a good second. The fact that Robert Louis Stevenson's "*Treasure Island*" comes out "top of the poll," will not surprise those who have read this enthralling adventure story. Incidentally it may be mentioned that "*Treasure Island*" is now to be seen at one of the leading theatres in London with the well-known actor, Mr. Arthur Bourchier playing the part of Long John Silver.

It will be noticed that the most popular books are stories that have been favourites for many years—indeed many of the competitors' fathers will remember some of the books referred to as being favourite books when they were boys! It is gratifying to know that these old favourites have not been excluded in favour of the more recent adventure stories which, however thrilling they may be, sometimes seem to lack the atmosphere of genuine adventure.

IMPORTANT NOTICE.

We are constantly asked to supply back numbers of the "M.M." We print only sufficient copies to fill our regular orders, and back numbers cannot therefore be supplied. In order to prevent disappointment our readers are advised to place a regular order, either with a Meccano dealer or direct with us.

Have you Sharp Eyes?

A Challenge to Meccano Boys

We have always maintained that among Meccano boys are to be found the sharpest and most intelligent boys in the world. We were very surprised, therefore, a short time ago, when in conversation a gentleman maintained that Meccano boys had no more intelligence than any other kind of boys!

As he claimed that he could submit a test that would demonstrate his contention, we, of course, accepted his challenge at once, and invited him to send along his suggestion. It is so long since we heard from him that we had concluded that he intended going no further with the matter, but we have now received a drawing from him, which we must confess is both singular and puzzling. It is a picture of a locomotive, and nothing seems right on it, except that there is no doubt that it really is meant to be a locomotive! Our friend writes to say that he is prepared to give a handsome prize to the Meccano boy who will specify every error that he has made in his drawing, and our readers can accept our word for it that this will not be too easy a task.

The drawing is now in the hands of the block-makers, and we shall be able to reproduce it in the *next issue of the* "*M.M.*" The fair name of a million Meccano boys is at stake, and we want the help of every reader to ensure that the Meccano reputation for intelligence and sharpness is maintained.

OUR MAIL BAG

In this column the Editor replies to letters from his readers, from whom he is always pleased to hear. He receives hundreds of letters each day, but only those that deal with matters of general interest can be dealt with here.

Correspondents will help the Editor if they will write neatly in ink and on one side of the paper only.

L. Show (Rugby).—We may resume the featuring of a new Meccano model in each issue a little later. Why not enter your suggestions for the improvement of the "*M.M.*" in the special Competition now running?

A. Ritchings (Putney).—We are afraid we cannot tell you much about Irish terriers. Why not consult a local dog fancier? One of our young friends, who has a dog of this breed, calls it "Meccano," and it is always healthy and lively. You might try re-naming yours!

L. Goodman (Stepney).—"Every day in every way the '*M.M.*' gets better and better." It is also going to get bigger and bigger, Leon. We are still considering a drawing competition.

R. J. Peace (Halifax).—Perhaps it was "absurd" to ask you if you still read the "*M.M.*" However, we know now that you are a regular reader, and we hope to hear from you often.

R. Gandey (Wainscott).—You carry with you our best wishes for your success in Canada. We hope to find you a suitable correspondent in this country.

Rev. D. W. Robson (Chesterfield).—"My boys and myself are too much interested in Meccano, and in your fine Magazine, for us to cease taking it in." We thank you for your kind communication, and we are gratified that Meccano has brought additional pleasure to your home.

B. G. Papaconstantino (Athens).—We quite believe that few boys understand the theory of Relativity, and the great difficulty is to explain it in simple language to boys who have not yet acquired a knowledge of the numerous and powerful forces that are operating in our universe. All this, however, will probably not deter us from making the attempt some day.

P. Harthill (Wolverhampton).—Thank you for your nice group photograph, Philip. Your combined smiles come like a ray of sunshine to us. Father certainly looks a little stern, but being a father ourselves, we know why! Mother is just mother, and you are all lucky children.

J. Locke (Victoria, B.C.).—"I got a bike the other day and I like it. I fell off it the day before yesterday and now I can't ride it. Darn!" You shouldn't say that, Junior! We hope the bruises are all healed up now and the bandages off; but go carefully in future. We think we shall be able to use your riddle.

M. Dohrn (Auckland, N.Z.).—Your letters are always interesting, and some day we may be able to publish some of your descriptions of life in Auckland. We look forward to receiving photographs of local subjects that you will no doubt take with your new camera.

Ernest Taylor (Northenden).—

"Each Outfit is with pleasure filled
And so is the Meccano Guild,
And now I shout with happy glee,
Meccano is the toy for me."

Your Headmaster sent us your little poem, the last verse of which we quote. It is a commendable effort, and we have no doubt you gained full marks for it. We should like to hear from you and to know how you are progressing with Meccano model building.

J. E. Goran (Melrose).—"How can a person run through a book without making a hole in it? And how can a person stand sitting in a chair?" These problems are getting the better of us. Can anyone help us?

John Railton (Blyth).—

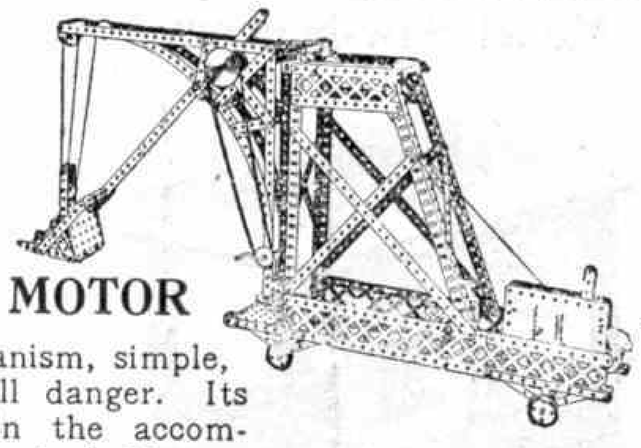
"Weeping Willie Dadd
Was always very sad
Until Meccano he did get
And now he's very glad."

You have given us Willie's life story in a nutshell, John! That kind of thing is happening daily all over the world, hence the extraordinary success of Meccano.

C. Channon (Wellington).—Occasionally we have been a little late in issuing the "*M.M.*," but we are making such arrangements with our printers as will ensure prompt publication in future. You will presently see even further improvements in the "*M.M.*"

E. J. Pearce (Bristol).—Your poem on the joys of Meccano, composed after the style of Longfellow's "*Hiawatha*," is very good indeed, but a little too long to print here.

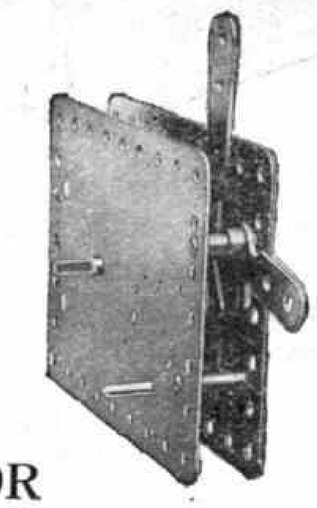
Drive Your Models With Your Own Power

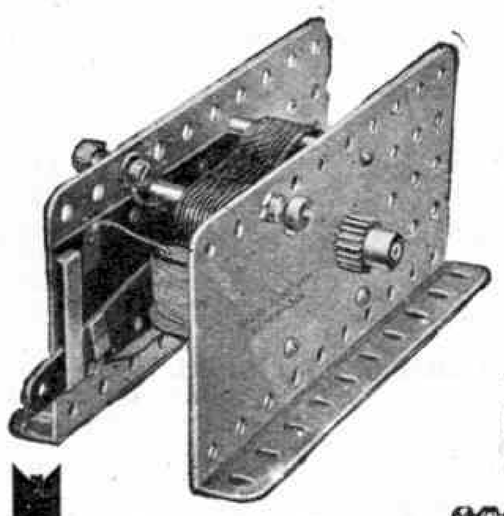


MECCANO CLOCKWORK MOTOR

This is a splendid piece of mechanism, simple, powerful, reliable and free from all danger. Its adaptability is strikingly shown in the accompanying illustration of the Mechanical Navvy, one of the many models into which it may be built. It is fitted with starting, stopping, and reversing levers, and all its movements are fully explained in the instructions that accompany it.

Price ... 9/-

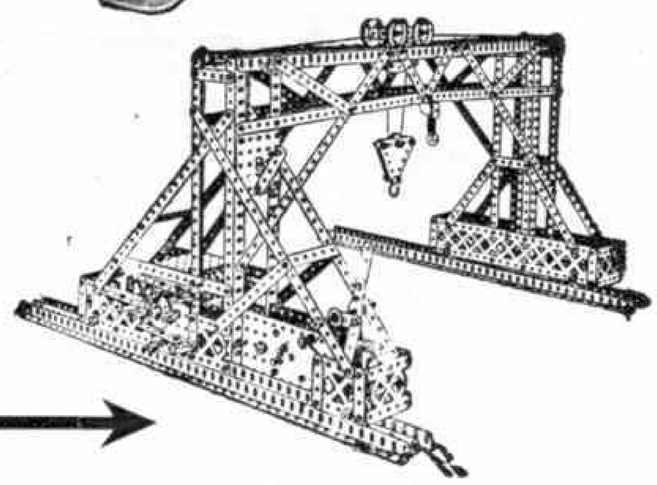




MECCANO ELECTRIC MOTOR

The Meccano Electric Motor is strongly made, and has been specially designed to build into Meccano models, as is shown in the accompanying illustration of the Travelling Gantry. It is the most reliable and powerful model electric motor made, and when suitably geared will lift over 30 lbs. dead weight. It may be run by a 4-volt accumulator or, by employing the Meccano Charging Board and 4-volt accumulator, direct from the main, where the current supplied is direct. It is fitted with reversing motion and stopping and starting controls.

Price 12/6



The King and the Meccano Motor Chassis

The British Industries Fair held recently in London was a very wonderful exhibition. Hundreds of stands displayed the very latest novelties in toys and other lines that will shortly be put on the market.

H.M. the King, and his party, were very interested in the various stalls and were very keen upon learning all there was to know about the various exhibits. Of course, Meccano Ltd. were represented, and His Majesty stopped to admire the Hornby Train Pullman set that was merrily running around its track at the time of his visit. The King, however, was more especially interested in the model of the Meccano Motor Chassis, of which he expressed his appreciation. The various points of its realistic mechanism were demonstrated to him by the representatives on our stand.

Meccano Competition at Malta

A very successful Meccano model-building Competition has been held at Malta, and a large number of enthusiastic Meccano boys took part. The Competition was judged by Capt. L. C. Humphreys, A.S.C., himself an exponent of Meccano, and the names of the prize winners were published in the local press. The models submitted were many and varied, and several of the entries showed particular ingenuity and constructive skill.

It gives me great pleasure to see the names of several of my young friends among the winners, and I heartily congratulate them upon their successes. The following are the names of the winners of first prizes:—

Section A. Tom Calman (Deck Chair).
,, B. Edward Bonnici (Motor Omnibus).
,, C. Alec Issigorins (Lathe).

G. Hopkins (Upper Parkstone).—Thank you for your neat letter which, for a beginner, is very nicely typed. We hope you will keep well and strong and not have to go to the hospital any more. We shall always be pleased to hear from you.

J. F. Harris (Tuchbrook).—It was bad luck to be taken ill just as you were about to launch on your business career. Undoubtedly Meccano played a strong part in restoring you to health. We hope soon to hear that your recovery is quite complete, and that you have taken up work in real earnest.

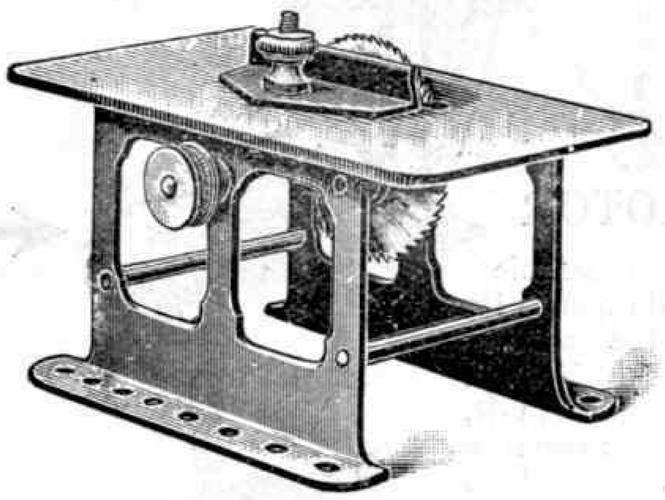
J. Smith (South Shields).—We are pleased to see your interesting photographs, which we should like to keep by us. We have many interesting articles on famous engineering wonders waiting their turn to appear in the "*M.M.*"

W. G. Miller (Westcliff-on-Sea).—We are very glad indeed to know that Meccano has been such a help to you, and that you consider the hobby has played a big part in securing for you the position that you hold. We very much appreciate your promise and your good wishes.

H. Ray (Tettenhall).—Most boys are very fond of Red Indian stories, and you must surely be the rare exception which proves the rule. We hope that "*A Nigh at the Pool*" will cause you to change your mind.

H. Atkins (Lethernead).—"I was grieved to hear of the untimely end of my subscription. The coroner brought in a verdict of 'Death through Neglect' and severely censured the subscriber, who promised that it should not occur again!" A promise is a promise, Harry, and your good name has now no stain on it. You will receive the "*M.M.*" regularly for a year.

Model Saw-benches



We have a number of model saw-benches suitable for use with electric motors or vertical steam-engines. Our stock is limited and readers are advised to take advantage of this offer immediately, as the stock will be quickly exhausted.

Model saw benches as illustrated, each 4/– (postage 7d.).

New Meccano Parts

116 Fork Piece ... ... each 3d.
117 Steel Balls, $\frac{3}{8}$" ... per doz. 6d.

A Useful Tool

Our illustration shows a type of screwdriver useful for reaching bolts in inaccessible places on models. For this reason the blade has been made so that it may be passed through the standard Meccano hole to reach bolts so placed. We are disposing of these screwdrivers whilst our stock lasts, at the special price of 10d. each, post free.

Sale and Exchange

Small advertisements are inserted in these columns at 1/– per line (average seven words to the line), or 10/– per inch (average 12 lines to the inch). Cash with order. Rates for larger space quoted on application. Address your letter to Advertisement Manager, "Meccano Magazine," Binns Road, Liverpool.

10/6 FOUNTAIN PENS, twelve only left, 1/9 each, post free. Box No. 21, c/o "*Meccano Magazine*," Liverpool.

HORNBY TRAIN SET No. 1 PASSENGER complete with rails, etc., post free 25/–. Meccano No. 2 Outfit, 10/6, post free. As new. Box No. 29, c/o "*Meccano Magazine*," Liverpool.

CLOCKWORK MOTOR 5/–. Clark, The Retreat, Ulpha, Broughton-in-Furness.

SIXTY DIFFERENT STAMPS FREE to applicants for approvals. All ½d. each. Send postage. Cox, 135, Cambridge Road, Seven Kings.

3 JAMAICA PICTORIAL FREE

to all buyers of Packet No. 444 who ASK FOR APPROVAL SHEETS. The packet contains 55 BRITISH COLONIALS, including Malta (War Tax), Gibraltar, Bechuanaland, Cayman, Morocco Agencies, "China" on Hong Kong, Bhopal, etc. Price 6d., postage 1½d (abroad 5d.)

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Several sections. Suit all classes of collectors. Write for a selection and say what countries interest you.
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MECCANO, cost £3. £2 or nearest offer. Taylor, 5, Greenfield Street, Birkenhead.

SPLENDID WORKING MODEL, comprising Beam Engine, Lathe, Drill and Mechanical Blacksmiths, length 43", breadth 15½", height 17". Complete with 4-volt motor, particulars and prices on application. All Meccano Outfits, spare parts in stock. J. S. Savile & Co., Meccano Dealers, 12, Otley Road, Headingley, Leeds.

FORTH BRIDGE MECCANO MODEL, sent assembled or in parts. Cost 33/–, price 15/–. No. 3 Outfit, 15/6 post free. Never used. Box No. 35, c/o "*Meccano Magazine*," Liverpool.

BRITISH EMPIRE. ALL MINT.
Australia, King's Head, new colours, 1½d. and 2d. the pair, 4d.
Fiji, new Scripts, ½d., ½d., 1d. and 2d., set of four, 5d.
Ireland, Maps, 1d. and 1½d., the pair, 3d.
Malta, Queen, ½d. green (Cat. 6d). 3d.
St. Helena, pictorials, ½d., 1½d. and 2d., the three, 5d.
ASK FOR MY PRICE LIST.
ALEC. KRISTICH (Member N.R.P., No. 279), 82, Marchmont Street, Russel Square, London, W.C. 1.
Please note the address is 82, Marchmont Street, and not 92, Marchmont Street, as given in the last number of the "*M.M.*"

MECCANO ELECTRIC LOCO in working order. Cost over £2, price 20/–. Sixteen Electric Rails for same, cost 16/–, price 7/6. Covered Luggage Van, 2/6. Box No. 22, c/o "*Meccano Magazine*," Liverpool.

SPLENDIFEROSUSH! Complete instructions for recharging flash-lamp batteries, 7d. post free. Every sixth applicant has his money returned with the instructions. G. Hare, 36, Willes Road, Leamington Spa.

25 GOOD STAMPS, Catalogued 7/6. Price 6d. post free. Lewis, 362, Wavertree Nook Road, Liverpool.

SETS UNUSED SETS

FREE Fine Set of AUSTRIA (high values), Set REAPERS (Hungary Pictorials), Set RUSSIAN (surcharged), Set POLAND (unused), and a set of GERMANY (used), together with a collection from Spain, Litwa, Finland, Roumania, etc. POST CARD asking for APPROVALS brings this WONDERFUL PACKETS. **FREE**

N. M. PATERSON, 19, Dorset Avenue, RUSHOLME, MANCHESTER.

FREE. NINE AIRMAILS to purchasers of stamps to the value of 1/–. Every stamp different. 100 varieties, 5d.; 500 for 2/9; 1,000 for 7/6. *20 Bavaria (1920 cpt.) (cat. 24/10), 9d.; *20 Hungary Tanacs cpt., 6d.; *14 Fieldpost in Italy, 7d.; *14 Polish Silesia, 7d.; *100 Poland, 2/–; *50 Danzig, 2/–; *5 ditto, 100 to 1,000 M, 1/–; *4 Lettland Red X (printed on banknotes), 6d.; *2 Lettland Airmails 1/–; *3 Lithuania Airmails, 9d.; *5 Austrian Airmails, 9d.; *5 Russia Soviet (1st issue rare), 1—40 R., 1/6; *6 ditto, 100—1,000 R., 1/–; 5 Soviet Jubilee cpt., 1/6; *11 Jugo on Bosnia Pictorials, 1/3; *7 Lettland Pictorials, 1/–; *19 Carinthia I., cpt. (cat. 18/–), 2/–. * Denotes Mint.
Postage extra. See last month's bargains. Overseas Orders welcomed. H. Llewellyn, 41, Dereham Road, Norwich (Member I.P.S.)

50 French Cols.	9d.	50 Portugal Col.	9d.
100 U.S.A. ...	1/–	40 Belgium ...	1/–
150 Germany	1/–	50 Railway ...	1/–
150 Austria ...	1/–	50 Poster ...	1/–
150 Hungary	1/–	50 Entire Cards	1/–
50 Czecho-Slov.	1/–	50 War Envs.	1/–
50 Roumania	1/–	300 Postage ...	1/–
50 Sweden ...	1/–	600 Postage ...	5/–
40 Italy ...	9d.	500 Revenue ...	5/–
40 Bavaria	9d.	1000 Revenue	17/6

Postage Extra.

Fine selections ready in separate countries.

J. Russell, Chetwynd, Shanklin Drive, Westcliff-on-Sea.

For Sale, **MECCANO CLOCKWORK MOTOR,** in perfect working order. Price 7/6. Frank Fitzgerald, Newtown Butler, Co. Fermanagh.

When replying to advertisements in these columns, please state that the advertisement was seen in the "*M.M.*" By so doing you will help us.

BOYS You are not alive if you do not know what can be done with SECCOTINE. Make your models. Mend your books. Affix tyres to bicycles with it.

GIRLS Dress dolls. Make new hats and repair old ones. Mend house shoes. Patch clothes. Fix drawings to prevent rubbing. Put rings on curtains without sewing, etc., etc.

SECCOTINE

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The best general adhesive the world knows. Sticks wood, leather, bone, paper, etc., objects large or small.

Firmas (Heat Seccotine) for glass, china, delph, etc. Articles joined with it can be boiled without coming asunder.
Regd. Trade Mark.
Tubes **6**d.

Tubes **4½**d., **6**d., **9**d. Everywhere.

McCAW, STEVENSON & ORR LIMITED,
The Linenhall Works : : Belfast
Telegrams: "Glacier, Belfast." *Telephone:* 4261 (3 *lines*).

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Ladies can do a thousand things in the house with it. Silks, Satins, Laces are renewed with a weak solution.
WRITE TO THE WORKS FOR A FREE BOOKLET

PUBLISHED BY MECCANO LTD., BINNS ROAD, LIVERPOOL.
Printed by Stembridge & Co. Ltd., Albion Street, Leeds.

HAVE YOU SHARP EYES?—A CHALLENGE TO MECCANO BOYS—see page **3**

No. 34

MAY 1923

MECCANO MAGAZINE

PRICE 1d

PUBLISHED IN THE INTERESTS OF BOYS

MONTHLY

EDITORIAL

IN this issue I am making a departure from my usual talk with my readers, and propose saying a few words about the "*M.M.*" and its future policy.

A Successful Competition

For some weeks past I have been following very closely the course of our "Improving the '*M.M.*'" Competition, and I have been gratified by the splendid response from my readers. The large number of communications received shows the great interest taken in our contests. Large, however, as the number of entries is, they do not represent half of those who read the "*M.M.*" regularly.

Those readers who have not written to me in connection with this competition are keen enough to buy and read the "*Meccano Magazine*," and they fall into one of three classes. Either (1) they are too lazy to write to me, or (2) they are perfectly satisfied with the "*M.M.*" in its present form, or (3) they have no ideas to give or criticisms to make, and are content to take whatever comes.

Brainy Suggestions Appreciated

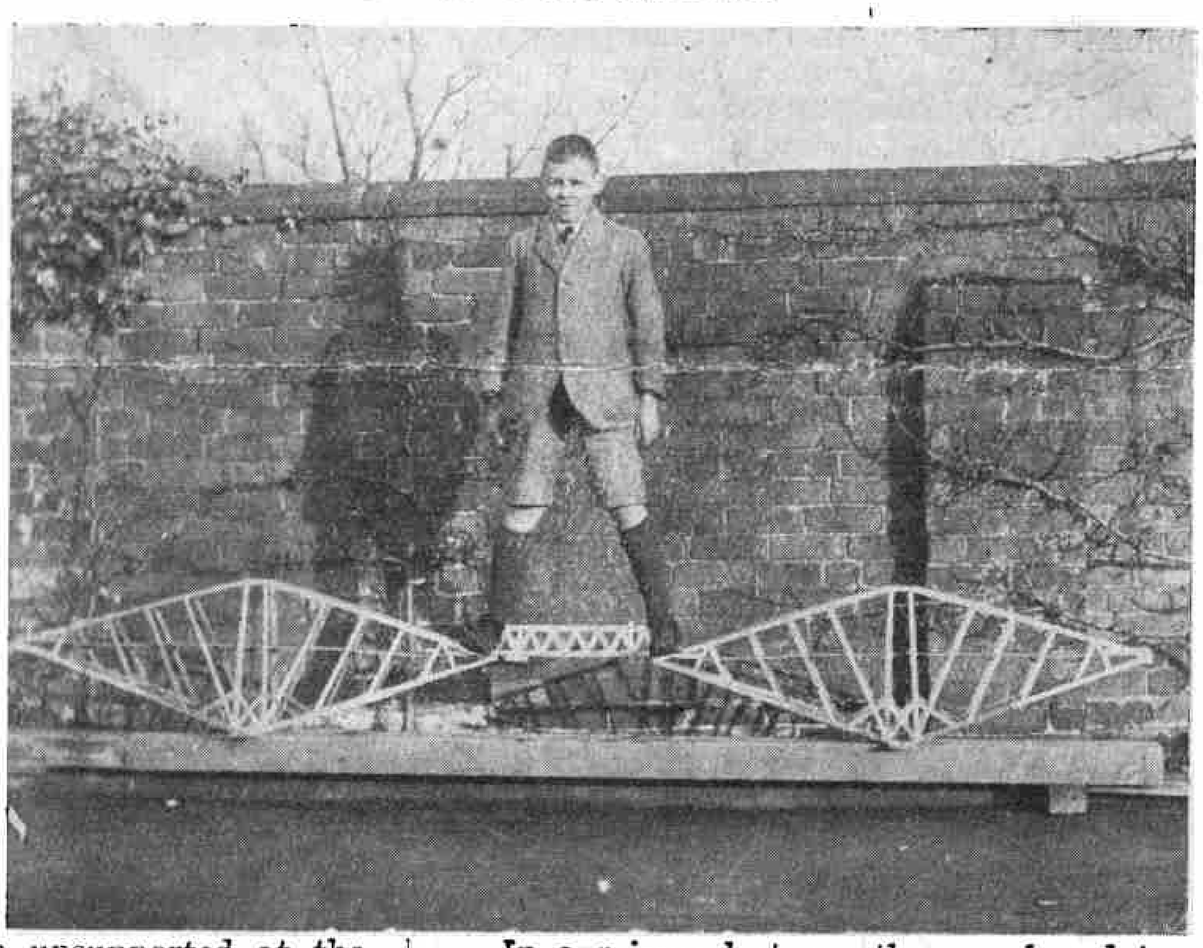
I must say I appreciate more those thousands of readers who have shown sufficient keenness and enthusiasm to give me the benefit of their assistance, in accordance with my original request. Their views are cordially welcomed, and will be reflected in future issues of the "*M.M.*" which will continue to show improvement.

I am not able to say a great deal in this issue regarding the results of the competition, for the replies are now in process of classification. I may say, however, that I am strongly impressed by the insistent demands for "more Meccano models" that have run through almost all the letters received. I shall have occasion to refer to this important feature again in future issues, but in the meantime

An Important New Feature

I have pleasure in making the preliminary announcement that arrangements are being made to commence a series of articles on Meccano models and model-building immediately. The subjects dealt with will be special models that are not already described in our existing Manuals of Instructions for building. The issues in which these models are described will not only form a very valuable supplement to our regular Manuals but will also give additional attraction and enjoyment to the Meccano hobby.

A Firm Foot-hold



Our illustration shows a model of the Forth Bridge, built by Master J. C. Ward of Ilkeston, which, incidentally, pays a remarkable tribute to the strength of Meccano, for it is supporting unaided the weight of this happy Meccano boy.

As most of our readers know, the Forth Bridge is built on the cantilever principle, the triangular trusses resting upon columns sunk in the river. The meaning of cantilever is "a projecting beam unsupported at the outer end," and it is this principle that is used in many of the world's largest bridges. It is interesting to note that the Chinese used the cantilever hundreds of years ago, anchoring the beams of their bridges in masonry towers and spanning the gap across a stream or river by placing a long beam on the anchored beams.

In our issue last month we referred to the effect of temperature on the Crystal Palace and the Eiffel Tower, which causes these structures to expand in summer and contract in winter. It is interesting to note that in the case of the Forth Bridge the contraction and expansion allowed for, due to the changes in temperature of the atmosphere, is about 7 ft.

Special Articles in this Issue:

144 Miles an Hour in a Giant Bomber

Have You Sharp Eyes? A Challenge to Meccano Boys

Serial Story "A Night at the Pool"

The Meccano Crystal Receiving Set No. 2 (Constructive Type)

The Men Who Gave Us Radio

Guild Notes and News

The Passing of the "*Faraday*"

144 Miles an Hour in Giant Bomber:

The Most Powerful Aero-Engine in the World

AN extraordinarily powerful aero-engine has recently been produced by Messrs. D. Napier and Sons Ltd., a firm well-known as manufacturers of aero-engines of high grade.

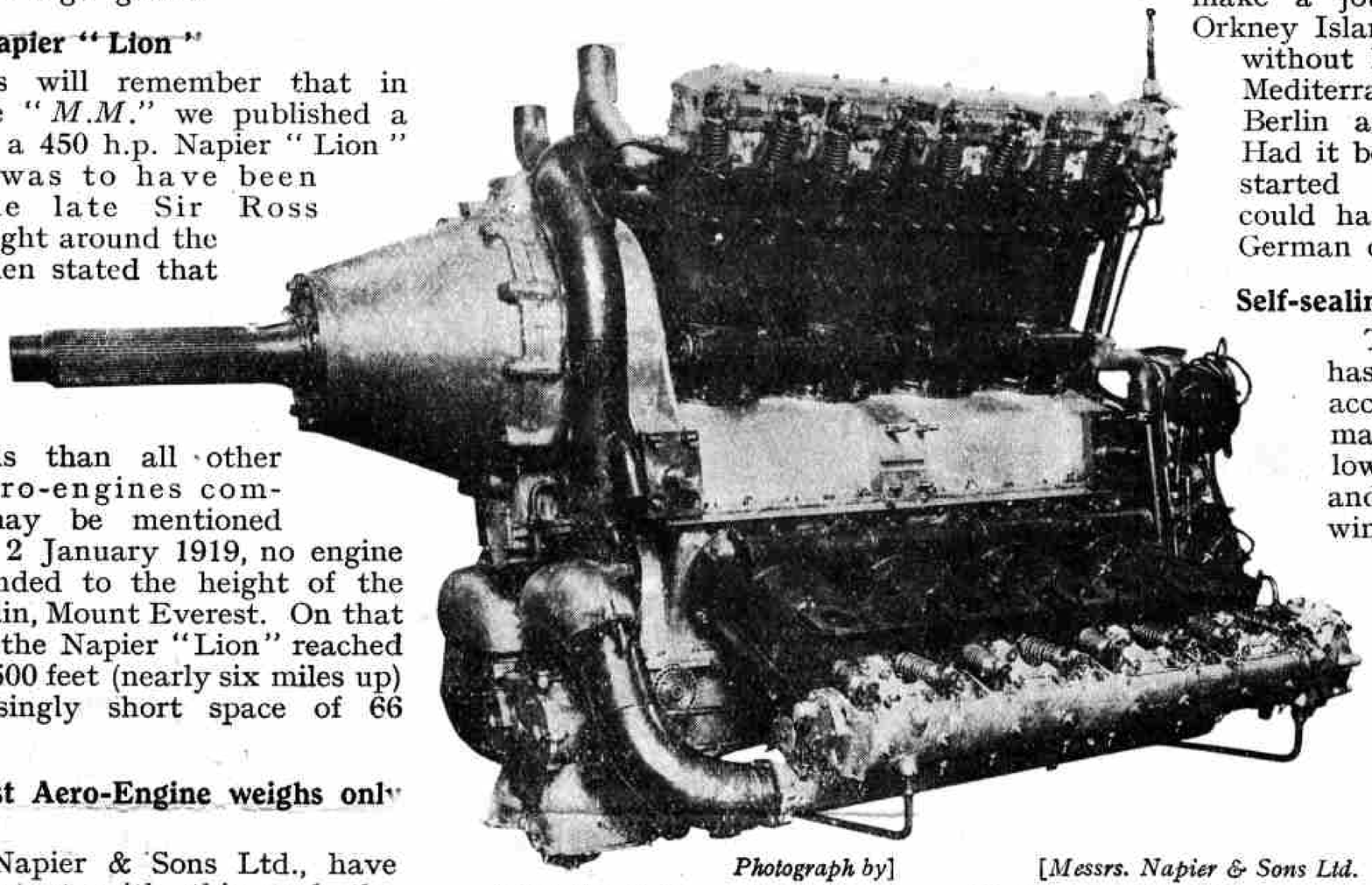
The Famous Napier "Lion"

Our readers will remember that in No. 29 of the "*M.M.*" we published a photograph of a 450 h.p. Napier "Lion" engine that was to have been used by the late Sir Ross Smith in his flight around the world. We then stated that the Napier "Lion" engine is claimed to hold more British records than all other makes of aero-engines combined. It may be mentioned that until the 2 January 1919, no engine had ever ascended to the height of the highest mountain, Mount Everest. On that date, however, the Napier "Lion" reached a height of 30,500 feet (nearly six miles up) in the surprisingly short space of 66 mins. 15 secs.

World's Largest Aero-Engine weighs only 2 lbs. per h.p.

Messrs. D. Napier & Sons Ltd., have not rested content with this and the many other records of height, speed and reliability that stand to their credit. They have now "gone one better" and built the largest aero-engine in the world, the subject of our illustration.

Although this engine develops over 1,000 h.p., it is remarkable that its complete weight is only just over 2,000 lbs. In the accompanying photograph we show an interesting comparison of the 1,000 h.p. Napier Aero-engine alongside a locomotive. Although the latter develops approximately the same horse-power, yet it weighs 147,840 lbs.!



Photograph by] [*Messrs. Napier & Sons Ltd.*

The Most Powerful Aeroplane Engine in the World: The 1,000 h.p. Napier "Cub"

The Massive Propeller

It is not permitted to disclose detailed information in regard to this new Napier monster, but it may be stated that it is built on the X-principle, and has 16 cylinders. It is fitted with an enormous four-bladed air-screw, or propeller, which is a fearsome object.

The designing and developing of such an engine as the 1,000 h.p. Napier "Cub" is a task involving considerable thought and foresight and one that occupies a great deal of time. It is interesting to learn that although the firm commenced to design the "Cub" in the early part of 1919, the engine was not delivered until two years later.

A Monster of Great Destructive Power

This enormous engine has recently been built into an Avro metal aeroplane, which has the distinction of being the largest single-engined bomber in the world. The machine has been specially built for the British Air Ministry and is of a new type. It has been designed to give a very wide range of action and in service will carry several tons of bombs. In addition there will be a crew of three, each of whom will be able to change places whilst the aeroplane is in flight.

From London to Norway and back, non-stop!

The giant bomber will be capable of non-stop out-and-return flights of 1,000 miles. The machine could therefore make a journey from London to the Orkney Islands, or to Norway, and back without landing. It could fly to the Mediterranean and could nearly reach Berlin and return, without landing. Had it been used in the war and been started from France, it certainly could have reached and bombed the German capital with ease.

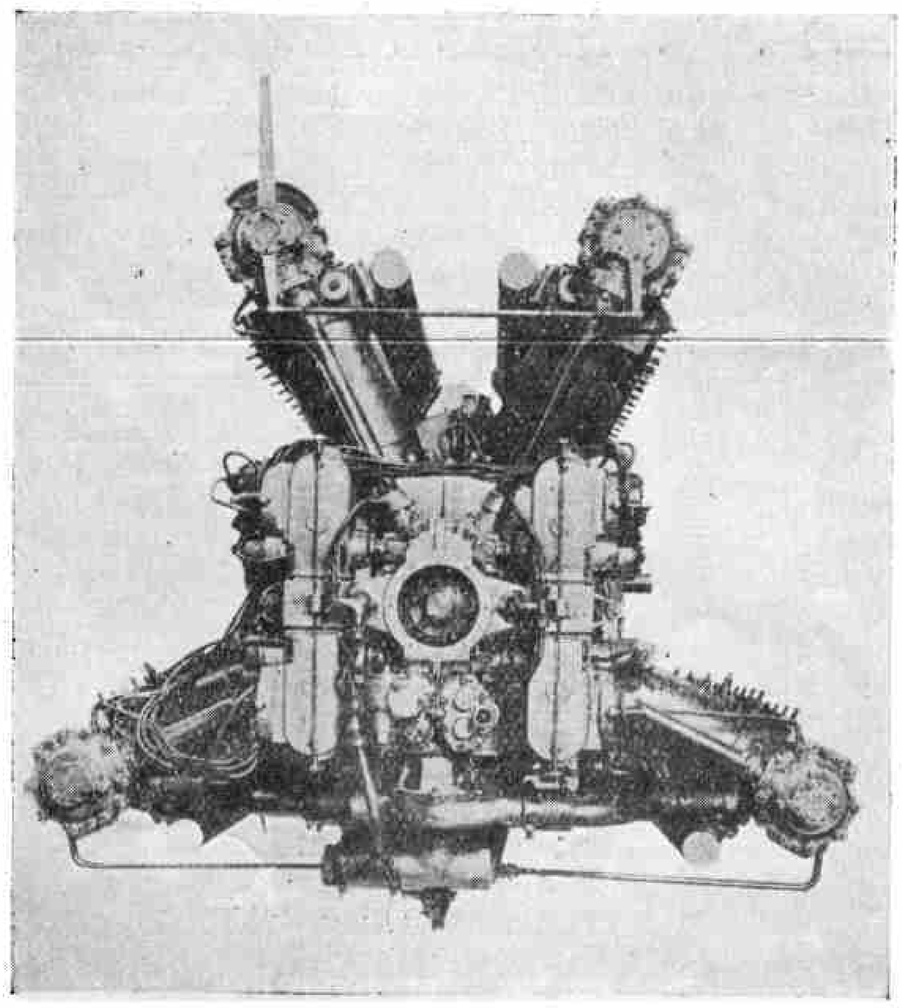
Self-sealing Fuel Tanks

The hull of this giant bomber has two decks. The uppermost accommodates the pilot and the machine-gunner, whilst on the lower deck is the bomb-sighting and bomb-dropping gear. The wings are designed to fold back so that the aeroplane will not occupy a great deal of space, and can thus be accommodated in a comparatively small hangar. The fuel tanks are self-sealing, so that should they be pierced by enemy bullets they will not leak. The aeroplane may be controlled from two points, and electrical heating apparatus is installed.

The engine is started by a small two-cylinder petrol engine, operated from the pilot's cock-pit.

We hope to give an illustration of the giant bombing aeroplane in our next issue.

(To be continued)



Photograph by] [*Messrs. Napier & Sons Ltd.*

End-on view of the 1,000 h.p. Napier Aero-Engine

Photograph by] [*Messrs. Napier & Sons Ltd.*

Dignity and Impudence

The 1,000 h.p. Napier Aero-Engine alongside a locomotive that develops approximately the same power

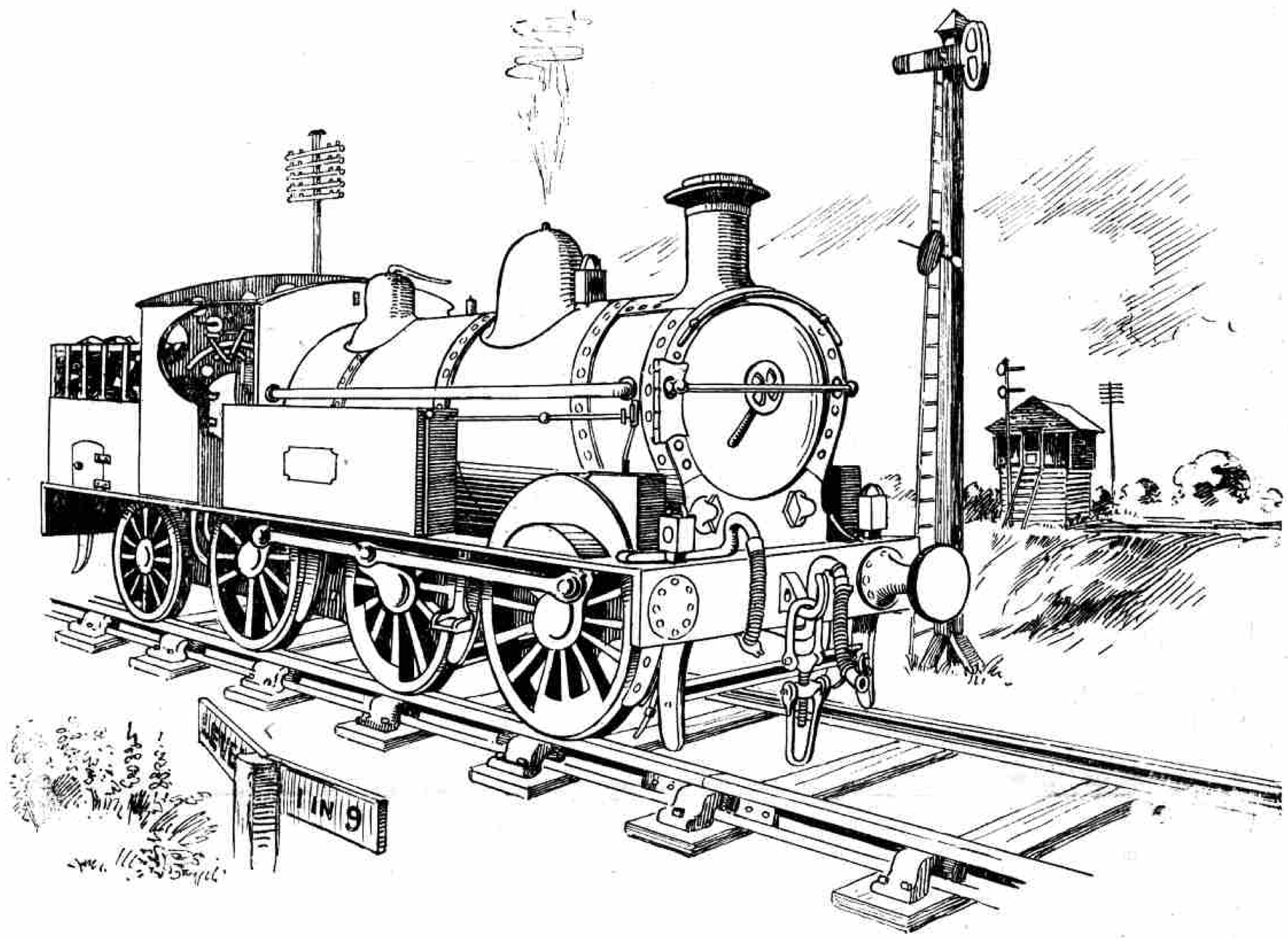
A CHALLENGE TO MECCANO BOYS

Have You Sharp Eyes?

AS I told my readers in the last number of the "*M.M.*", I have always maintained that among Meccano boys are to be found the sharpest and most intelligent boys in the world. You can imagine my feelings, therefore, when some little time ago a gentleman expressed it as his opinion that Meccano boys had no more intelligence than any other kind of boys! He claimed, moreover, that he could submit a test that would demonstrate the truth of his statement, and on behalf of the readers of the "*M.M.*" I at once accepted his challenge.

Some weeks elapsed before I heard from him again and I concluded that the matter had fallen through. One morning, however, I received from him an extraordinary drawing, and then I understood the reason for the delay. It happens that this gentleman is an artist, and it is evident that he had spent a busy three weeks in designing a locomotive of such a peculiar type as had never been seen on any railway under the sun! Look at the drawing reproduced on this page and I warrant you will be puzzled. Nothing seems right, except that there is no doubt it really is intended to be a representation of a locomotive.

The artist writes that he is prepared to give a handsome prize to the Meccano boy who will specify every mistake that he has made in his drawing. If every error is not pointed out, the prize will go to the boy who points out the greatest number of mistakes. I shall supplement this gift by giving a prize to the second and third lists, in order of merit.



Now boys, here is a test of your powers of observation. Those of you who have followed the articles on "Super-Locomotives" that have appeared recently in the "*M.M.*" will be able to see several errors immediately. Others, who are not familiar with locomotive construction, will probably make their way to the nearest railway station and spend some time in a minute examination of the locomotives to be seen there!

Entries must be received by the 30th June next (Abroad 31st August). Each error pointed out should be numbered, and the total given at the foot of the list. The mistakes should be described as briefly as possible. Do not write a long treatise on locomotive construction, as we feel sure that the gentleman who put forward this challenge is too busy to give such entries consideration! He will have quite enough to do as it is, to read through the thousands of replies that we feel sure will be sent in. We have no hesitation in saying that every Meccano boy worthy of the name will respond to this challenge, so that the reputation of a million Meccano boys for intelligence and sharpness will be vindicated.

Bright Ideas

Bernard F. Bell (Balham).—Your suggested spring point is on the lines of the catch point. Whether it can be applied in a practical way to the Hornby trains we do not quite know, but we shall carefully consider the idea.

M. Progent (Toulouse).—(1) A flexible joint such as is employed in our model Chassis may be constructed from existing Meccano parts. (2) As we do not advocate the use of Meccano parts for making railway tracks, we regret we are unable to consider your idea.

Alec Issigorins (Malta).—Your suggested forked rod for operating the shift gear is on the lines of automobile practice. We think there may be uses for your suggested dogs or claws, but in a modified form.

Norman F. Keith (Geelong, Victoria).—Your ideas for threaded rods with holes at either end for handles, and threaded collars to be fitted to a short length strip will be considered if you will state to what particular uses these two items are applicable.

M. Langendorff (Paris).—We endeavour to adapt all Meccano parts to general use, and your suggested wheel to represent a grindstone in a mill would serve no practical use apart from the instances mentioned.

G. E. Farr (Bristol).—We illustrate an electro magnet in our Electrical Manual. This is practically the same as the circular magnet you suggest, the difference being merely in the shape.

Leonard Winter (Eltham, S.E.).—We are continually adding to the accessories for the Hornby Train, and no doubt we shall introduce turntables and signal boxes in due course.

M. Flonches (La Fleche).—The use of the Meccano Clockwork Motor as motive power in the Hornby Loco would make the construction too bulky for use with Gauge 0 rails.

E. Newton (Sheffield).—(1) A connecting rod may be made from existing parts, i.e., a rod and two couplings. This adaptability is one of the great features of Meccano. (2) The whole question of curved sections will shortly be under review.

K. J. Watson (Wigton).—The four ideas you send are already receiving careful consideration.

A. Thuanet (Blois).—Good representation of a boiler or cylinder can be constructed from two face plates, joined together by double angle strips of the desired length.

H. Richardson (Northwich).—Your sketch of a circular saw is designed on the lines of a clock escapement wheel. We think perhaps it might serve the dual purpose, and we shall give it consideration.

F. Shaw (Gt. Ouseburn).—There may be possibilities in your suggested sliding point. We shall consider it and see how it fits in with our present radii.

P. S. Evetts (Streatham, S.W.).—(1) We have in view a large variety of new additions to the Hornby Train rolling stock. The milk-van and turntable are already on our list. (2) The crank handle may be extended to any size by adding a rod of requisite length, making the connection by means of the coupling.

A. Dubois (Paris).—The wheels used in the model motor chassis are our standard 3" wheels (No. 19b).

L. Nash (Uxbridge).—We are introducing a crane-truck shortly. Your sketch apparently represents a following-truck, supporting the jib. The Hornby crane truck will be a complete unit.

R. J. Warr (Manchester).—We are introducing a bolster or boiler truck very shortly. We heartily reciprocate your good wishes.

F. Jarvis (Brethersden).—(1) The slight projection of the boss on one of the sides of the bush wheel is caused by pinching the boss into the wheel. One or two washers between your connecting strip and the wheel will prevent the boss interfering with its free action. (2) Regarding your suggestion for a piston, see our model No. 307 (Oscillating Steam Engine), for the method we have adopted.

A NIGHT AT THE POOL

BY

Bernard Sexton

SYNOPSIS

Red Hawk and Wolverene, two young Mohawk Indians, were returning from a hazardous expedition. Encamped on a sacred Indian mound, they were in great danger, for they had been followed for several days by three hostile warriors. Leaving Wolverene by the camp fire, Red Hawk had slain one of these hostile warriors by his Indian subtlety. Carrying the body to the camp fire, he set it up against a tree, so that the remaining enemy warriors would think it was the Mohawk himself, asleep. Red Hawk then disappeared in the forest to track down his second enemy. After waiting behind a great hemlock for over an hour he heard a minute sound, which he knew was caused by the approach of one of his pursuers.

V.

AN hour later, the form of Red Hawk had not perceptibly changed its position. He still stared with penetrating vision down the forest aisles. Now and then he closed his eyes so that he might see more clearly in the dusky air.

After an hour and a half had passed he thought he saw a stone lying between two of the trees, where hitherto his watchful eyes had seen nothing. He stared at that stone, putting forth all his powers of perception. About the same time there came to his ears the minutest of sounds, an infinitely slight vibration of matter, similar perhaps to the crunch of a soft paw on the soft hemlock leaves. . . . But Red Hawk knew this tiny sound was not caused by a paw.

The creature passed in front of the hemlock behind which Red Hawk was crouching. It moved with infinite care, and so well did it simulate the shape of a wild beast that it was with difficulty that the young Mowhawk made out its true form. At last, however, he saw that this creature was indeed a warrior, advancing on hands and knees towards the camp. When he moved he lifted leg and hand with infinite caution. They hovered in the air and descended softly as a snowflake. Then he waited with tireless patience, studying the man who sat against the tree by the fire to see if he exhibited any trace of alarm.

The arrow hummed the air . . . . .

As he went by, Red Hawk shifted his position to the other side of the tree. The creeping warrior seemed now as near to the camp fire as he wished to be, and remained motionless for a long time. But this was only in seeming. He was really rising to his feet, but so slowly that he seemed more like the stump of a tree that has been struck by lightning than anything human. As he rose to his feet so did Red Hawk. He saw that the warrior had a bow in his hand and that he was fitting an arrow to the string. Slowly the archer took position. From where he stood a faint red glow of the fire still illumined the shape that leaned against the tree.

He fired a perfect shot. The arrow hummed the air and struck home. It quivered in the breast of the dead. The archer having shot his bolt remained frozen to an attitude of attention while he watched the outcome of his act. No doubt he expected an instant outcry. He must have thought that the stricken man would stagger to his feet, and perhaps call aloud in his death agony. Nothing happened, however, and the man by the fire with an arrow projecting from his breast remained as quiet as before. . .

Behind the archer as he fired crouched the tense figure of Red Hawk. He saw the arrow strike home. For a moment he permitted the archer to stand in that attitude of frozen surprise. The man was about to turn, to flee from an adventure which bore such incredible results, when a strong hand seized him by the throat and he was dragged violently back. In silence he received the knife into his heart. He became limp and sank in the arms of Red Hawk.

The young Mohawk crossed the brook in silence, carrying the body. He laid it by the fire opposite the other so that it seemed a sleeping man. Then again he stepped back in to the shadow.

"Two," he said softly. "Put wood on the fire. Cover him."

"Two," answered a voice from the bushes.

Wolverene crept close behind the dead man in such a way that he was indistinguishable from him. He thrust out an arm that seemed the arm of the dead and put wood on the fire.

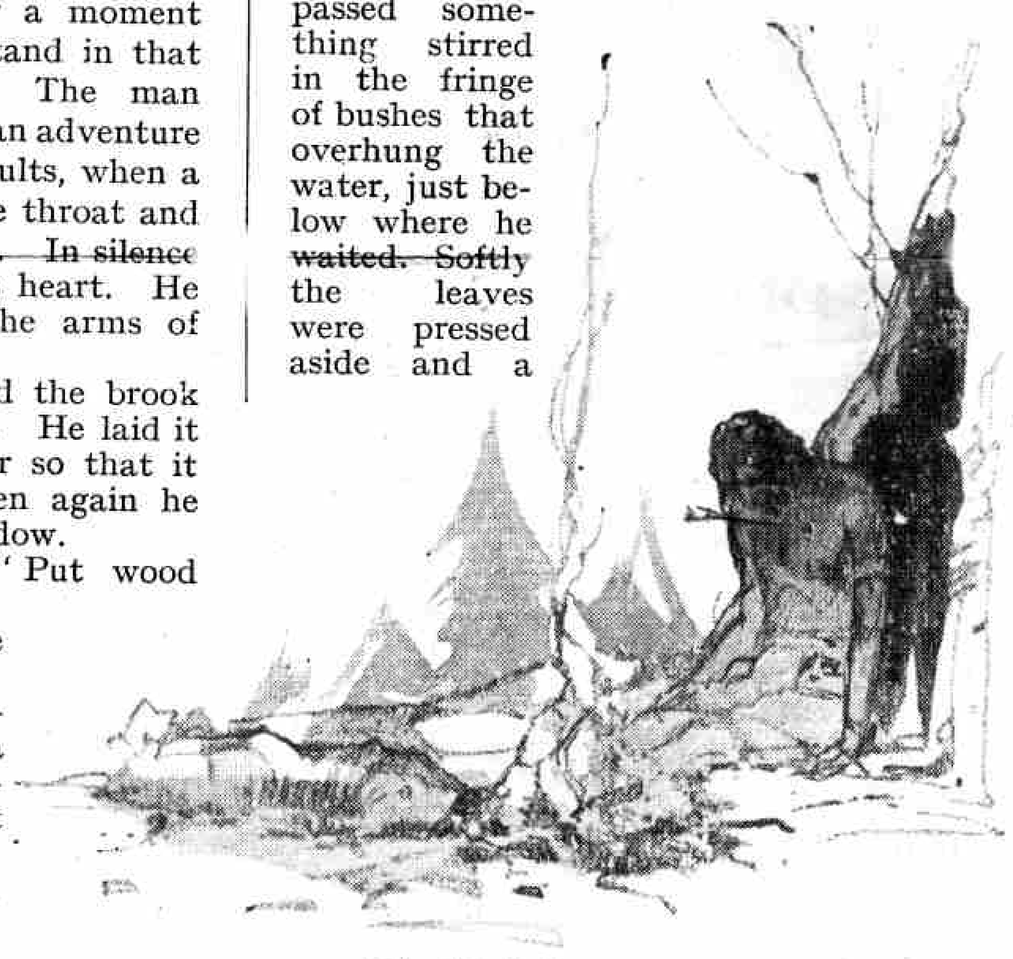
VI.

The fire blazed up after a minute or two of smouldering and revealed a man sitting against a tree. His head stooped on his breast like a watcher who is drowsy, while across the fire a sleeper lay sprawling.

Red Hawk crouched in the shadow listening. It was now the middle of the night. The woods were more silent than before. His ears drank in the soft murmuring of the brook, and the splash of a musk-rat working downstream. From the hill that blocked the eastern sky came the faint and mournful cry of an owl. Red Hawk paid a tribute to the ghostliness of that sound by a slight tremor of the body. Like all the Mohawks he was fierce, implacable, utterly without the manifestation of fear when dealing with a living enemy. But there were hours of the night when, with the hooting of the owl, he remembered for a brief moment the fears of his childhood. Then he experienced that terror of darkness from which few brave men are immune.

Nearly an hour passed as he listened without changing his position. Then as softly as the drift of thistle-down he moved around the camp in the darkness. Passing between it and the hill, he moved down stream. Fifty paces away he paused. At this point the stream ran between high banks, and from the edge of the take-off to the surface of the water there was a distance equal to the height of a man. Here the water ran smooth and deep. There was no noise of stones or gravel. The place was steeped in silence.

Above this stretch of water Red Hawk crouched waiting, his eyes fixed on the shrubbery downstream. He had not long to wait this time. Before half an hour passed something stirred in the fringe of bushes that overhung the water, just below where he waited. Softly the leaves were pressed aside and a



and struck home . . . . .

A Night at the Pool—(*cont.*)

lithe figure emerged. Stepping in the centre of the stream it moved slowly towards the watcher. At every step the man in the brook lifted his head and held his senses suspended.

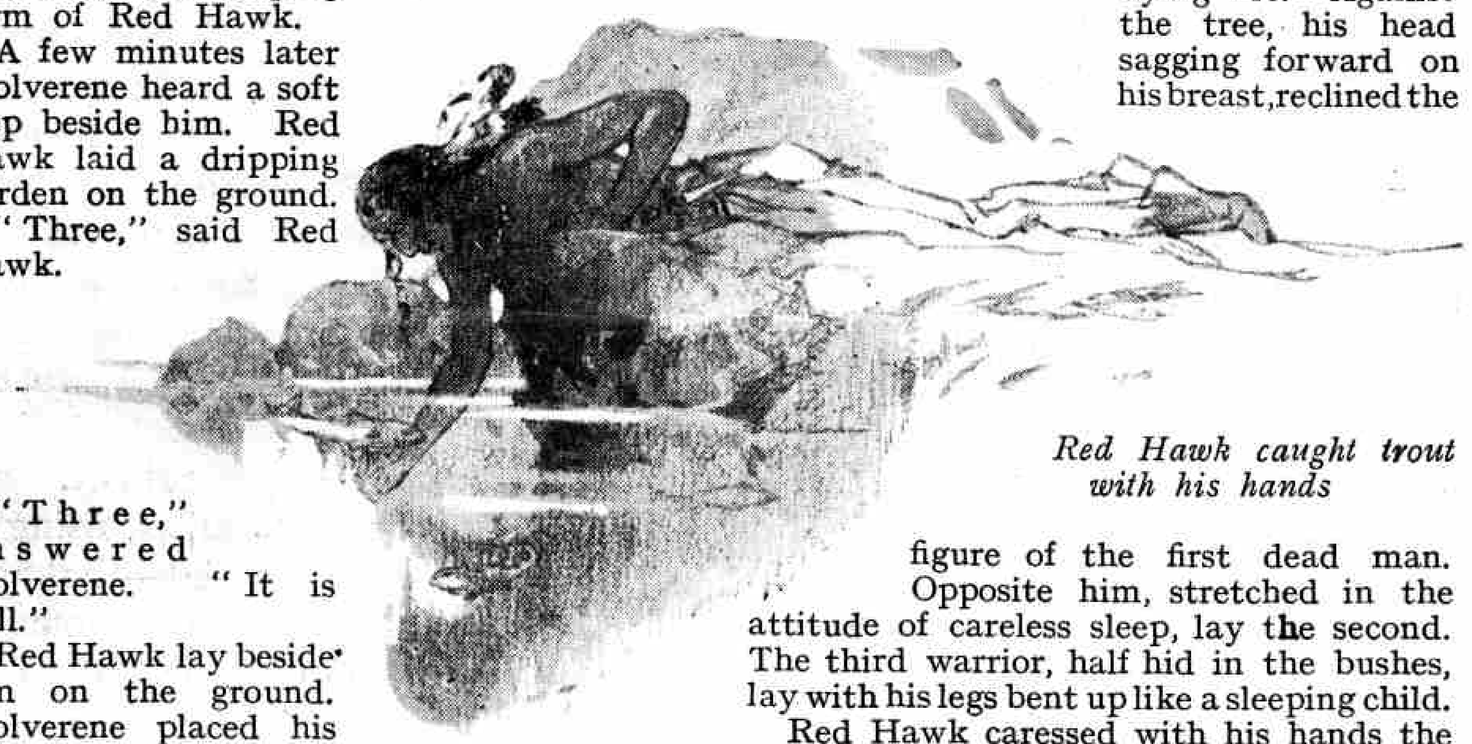
A dead twig fell from a tree just above the Mohawk, and he saw the figure in the water stiffen and remain motionless for a long time, until convinced that the sound conveyed no menace. At last he moved on and arrived just below Red Hawk, who peered down at him from a tangle of shrubbery that would make him invisible except to the keenest eyes. The Mohawk remained perfectly motionless. His enemy was now only the length of a man away and Red Hawk was nerving his muscles for a spring. At this moment, however, he must have made some trifling noise which, barely perceptible as it was, betrayed to the savage below that somehow he was in peril. The first sign he showed of his knowledge was to crouch still closer to the water. He turned his head slowly from side to side, gazing around in every direction, seeking to penetrate the mask of night.

At last his eyes rested on the very spot from which the face of Red Hawk peered forth. The youth remained motionless. Now was the supreme test of his nerve. He must absolutely trust the concealment offered by his own stillness and the confusion created by the crossing of a few twigs before his face. For a long time neither of the men stirred. Each one stared into the face of the other, but while Red Hawk was sure of his man the other was uncertain as to what he saw.

His uncertainty did not lessen his caution, however, and he slowly began to edge towards the other side of the stream. As he moved his feet through the water, he was impelled to believe that he discerned a slight movement in the bushes that he had just been watching. He reached the bank and was putting one foot slowly up the bank to find a hold, when there was a swift motion. He ducked just as a tomahawk whizzed by his topknot, and a moment later he was thrown into the stream and crushed under the water by the leaping form of Red Hawk.

A few minutes later Wolverene heard a soft step beside him. Red Hawk laid a dripping burden on the ground.

"Three," said Red Hawk.



Red Hawk caught trout with his hands

"Three," answered Wolverene. "It is well."

Red Hawk lay beside him on the ground. Wolverene placed his hand on the hand of his comrade. His voice was full of wonder.

"You are a great warrior," he said. "In one night you have slain three armed enemies. Truly the Long House will ring with your praise."

"I expected three," answered Red Hawk, "and it is easy to kill when you know that the enemy is coming to seek you. I knew that none would come from the Hill. Now I will sleep, for morning comes soon and we must be on the way."

"I will watch while you sleep."

VII.

Wolverene sat and watched the woods. Patient, motionless, he waited by the side of his comrade for the coming of dawn. The fire had gone down to smouldering ashes, but in the starlight he could still see the dead man sitting by the fire, his head fallen forward on his chest, and the other lying as if asleep where he had been laid. The third man was stretched at the feet of Wolverene.

When the dawn came the two young men rose and built up the fire. Again Red Hawk caught trout with his hands, while Wolverene tended the fire and cooked. Before eating they stripped off their buckskin shirts, took off mocassins and hunting trousers, and bathed themselves in the pool. Before the sun rose over the hill to the east they had finished. Then they quenched the fire with handfuls of water, and stood for a space looking down at their camp before leaving. A moment later they were on their way through the woods, skirting the sacred mound—on their journey homeward to the fires of the Mohawks.

Before they were entirely out of sight of camp, by a common impulse they turned to look back. A faint steam rose from the dying fire. Against the tree, his head sagging forward on his breast, reclined the figure of the first dead man. Opposite him, stretched in the attitude of careless sleep, lay the second. The third warrior, half hid in the bushes, lay with his legs bent up like a sleeping child.

Red Hawk caressed with his hands the three scalps that hung at his belt.

"Ho!" he said softly, turning his handsome boyish face to Wolverene "They were brave men. I will be glad to meet them when I go to the land of spirits."

He turned with light and certain steps towards the west, towards home.

THE END.

A strong hand seized him by the throat and dragged him violently back

Our New Serial

This is Jack Bulmer, the hero of our New Serial

From the forests of North America to the playing fields of St. Winifred's is, indeed, a big change. But so successful has been our first serial story that I feel compelled to respond to the request of the large number of my readers who have asked for a school story.

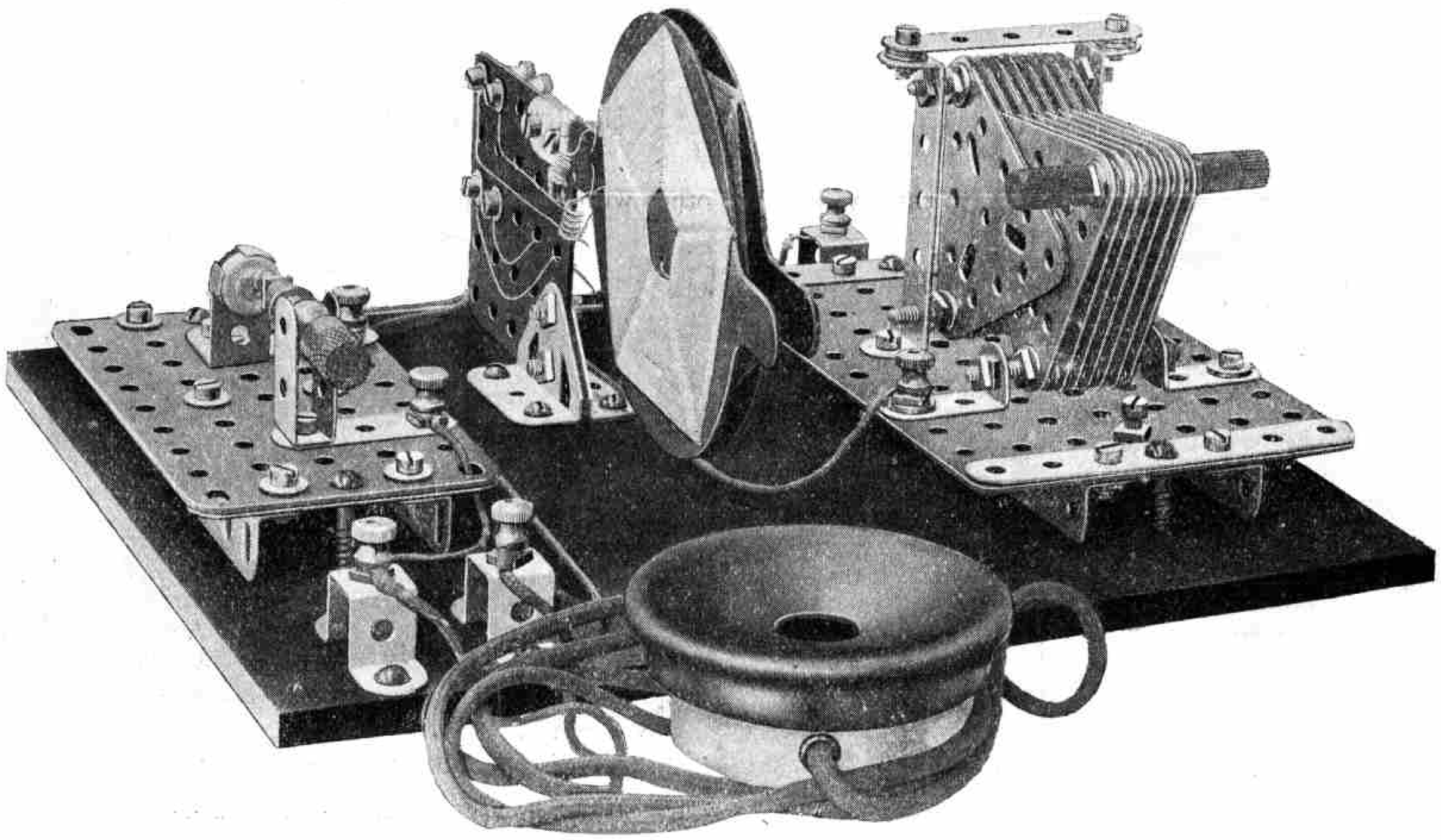
I have pleasure in announcing, therefore, that I have arranged to publish a short serial story entitled "*Bulmer's Father.*"

The story, which will be illustrated, will commence in our next issue and will run through the following two issues. Do not miss this splendid story of school life—but order your copy of the "*M.M.*" *NOW*, either from your dealer or direct from this office. The price is the same in either case, 6d. for six issues, 1/– for twelve

Editorial Office: Binns Road, Liverpool.

The Meccano Crystal Receiving Set No. 2

CONSTRUCTIVE TYPE



The Meccano Crystal Receiver No. 2

In the next issue of the "*M.M.*" we shall commence a series of illustrated articles giving full particulars for the assembling of this set, so that any intelligent boy may construct it. Those who wish to proceed immediately with the construction of this set should send for the complete illustrated instruction leaflet, price 4d. (post free).

OUR illustration shows a Crystal Receiving apparatus made from Meccano parts. The full set of parts may be purchased complete in strong carton, price 40/- Those boys who already have a number of the parts, may purchase separately any additional parts necessary to complete the set.

How to Build the Set

We are very desirous that all Meccano boys shall be able to participate in the joys of Radio, and that they may keep in close touch with the developments of this wonderful science. We therefore announce the Meccano Receiver No. 2, which is of great simplicity in design, and may be assembled in one evening.

Experimental Licence Necessary

This set cannot be used under the ordinary broadcasting licence. Negotiations are now taking place with the Postmaster and with the British Broadcasting Company, however, so that a special licence may be issued for home-constructed sets such as this. If this special licence is available it will be possible to use the Meccano Crystal Set No. 2 under it. Full particulars of the new licence will be announced in the "*M.M.*" as soon as they are available. In the meantime the Meccano Receiver No. 2 may only be used with an Experimental licence.

Those who possess a broadcast licence should use the Meccano Receiver No. 1, full particulars of which are announced elsewhere in these pages. The Meccano Receiver No. 1 has been fully approved by the Postmaster General for use under the Broadcast licence. Although of different design to No. 2 Set, it gives results equal to those obtained with the latter.

The Meccano Receiver No. 1 receives on wave lengths from zero to approximately 1,000 metres.

Of Proved Efficiency

Both No. 1 and No. 2 Sets have been tested thoroughly in London, Paris, New York and in many other cities. In each case excellent reception has been obtained from broadcasting stations within a radius of 20—30 miles. In London, broadcast from 2 L O has been received with great clearness. In New York, the set has proved to be as efficient as the more costly and elaborate instruments in use there. In Paris we have heard with perfect clarity, concerts broadcast from the Eiffel Tower. In Liverpool broadcast from the Manchester station is satisfactorily received at distances of up to 33 miles, using a standard P.M.G. aerial—that is, an aerial that does not exceed 100 ft. in combined height and length.

The Meccano Crystal Set No. 2 is suitable for receiving telephony or Morse signals on wave lengths of from 300—400 metres. Reception on higher wave-lengths is possible by adding additional inductance discs.

The Men Who Gave Us Radio:

III. STEINHEIL, MORSE, LINDSAY, Etc.

Previous articles in this connection have dealt with the work of Gilbert, Galvani, Volta, Ampère, Oersted, Faraday and Henry. A special article on Professor Morse and the code that he invented appeared in No. 29 of the "M.M.", a few copies of which are still available.

In this series of articles we are outlining the development of Radio by briefly describing the researches of those scientists who, before Marconi's time, laid the foundation of communication without wires. As will be seen from these articles, the invention of wireless telegraphy was not solely due to Marconi, although he was the first to put into operation a practical system. Many boys are surprised to find that Radio is the result of researches that extend over the past century. Progress may be traced by studying the lives of those men who devoted themselves to the science. The manner in which they overcame difficulties and step by step gained the desired end, is a splendid object lesson for every Meccano boy.

Steinheil

IN 1838, a further step forward was made when Steinheil, of Munich, a pioneer of the electric telegraph, accidentally discovered that the earth itself was conductive, just as Sommering had found was the case with water. Steinheil used the earth instead of a second wire in his telegraph systems, thus effecting a considerable economy both in wire and labour. Steinheil wrote that the conductive nature of the earth may be classed among the most extraordinary phenomena that science has revealed to us. He pointed out, however, that "it only holds good for short distances, and it must be left to the future to decide whether we shall ever succeed in telegraphing to long distances entirely without metallic connection."

Steinheil ultimately came to the conclusion that the amount of power that would be required for communication without wires would be so great as to render it impracticable. He showed that even the most powerful electrical means produced only small effects at distances as short as only 50 feet.

"Had we the means that could stand in the same relation to electricity that the eye stands to light" he wrote, "nothing would prevent our telegraphing through the earth without conducting wires, but it is not probable that we shall ever attain this end." Little did Steinheil think that in the short space of some seventy years, wireless telegraphy across continents and oceans would become an accomplished fact.

Morse

In 1832 Professor Morse conceived the idea of an electro-magnetic telegraph. He worked on his system and gave a demonstration of it in 1837. He developed the Morse Code for use in connection with this system of telegraphy, and it is upon this code that our modern system of telegraphy both with and without wires, has been built up. He laid a mile of insulated wire across the river at New York to demonstrate his new system of cable telegraphy. A passing ship fouled one of his wires, however, and cut it in two.

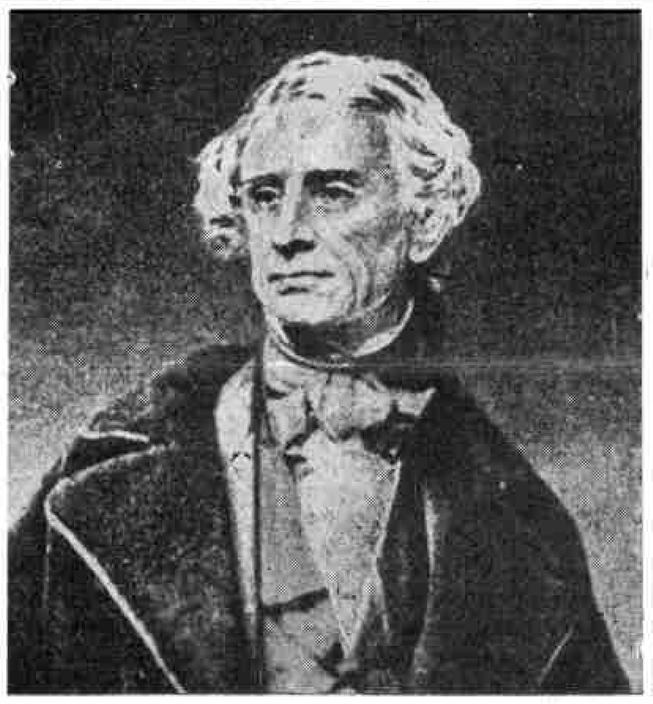
This annoying occurrence turned out to be a happy accident, for it suggested to Morse that he might avoid such accidents by arranging his wires along the banks of the river and using the water itself to conduct the electricity across. He experimented successfully with wires laid in this way on the banks of the canal at Washington, at a point where it was 80 feet in width. He stretched a wire along each bank of the river, connecting one wire with the transmitter and with a battery, and the other with a receiver, both wires being fastened to copper plates sunk in the river. The water, acting as a connecting medium between the two plates, enabled signals to be transmitted from one river bank to the other.

Morse found that the strength of the current passing from bank to bank depended on the size of the plates sunk in the water, and on the distance of the plates on each river bank from each other. Using this method, two of Morse's assistants were able to communicate successfully over a distance of nearly a mile.

Lindsay

About this time a linen-weaver named Lindsay was experimenting at Dundee. Lindsay, who is described as having been a man of profound learning and untiring scientific research, studied the electric telegraph as early as 1830. In 1843 he suggested telegraphing across the Atlantic by principles similar to those of Steinheil and Morse. Lindsay's idea was ridiculed at the time, but until the time of his death (1862) he believed that trans-Atlantic wireless would become possible. In order to fully appreciate Lindsay's work we must remember that at the time of his suggestion the electric telegraph had scarcely come into general use, whilst cable-laying was but a dream.

Lindsay carried out several experiments across the River Tay, and succeeded in signalling by conduction without wires over three-quarters of a mile. In 1854 he submitted his method to the Electric Telegraph Company, who instructed W. H. Preece to report on the matter. Subsequently Preece himself became a worker in wireless, and some forty years later greatly assisted Marconi in his early experiments. Lindsay's work played an important part in interesting Preece in the subject.



MORSE

S. F. B. Morse graduated at the University of Yale in 1810. He visited England to study painting with Benjamin West, and returning to New York in 1813 become a Professor at New York University. He devoted considerable time to electrical experiments, and was the first to communicate without wires across a river, by means of conduction. He invented a system of telegraphy and developed the Morse Code which is used to-day throughout the world in practically its original form. Morse was born on 27th April 1791 at Charleston, Mass., U.S.A., and died at New York on 2nd April, 1872.

Highton

About 1852 Henry Highton installed an instrument in his house on the banks of the Thames, and without connecting wires succeeded in receiving signals from a boat down-stream. His method was similar in detail to that introduced by Morse, and in 1872 he thought it "possible, by erecting a very thick line-wire from the Hebrides to Cornwall, to transmit a current that would be sensibly perceived in a similar line of very thick wire on the other side of the Atlantic." He pointed out, however, that "the trouble and expense would probably be much greater than that of laying a cable across the ocean."

Bonelli, Gintl and others

In the meantime investigators in other countries were also at work. Bonelli in Italy, Gintl (the inventor of a duplex telegraph) in Austria, and Bouchotte and Douat in France. There were also many other workers in the same field in Britain during the nineteenth century, but as their work does not show any advance on that of Morse and Lindsay we must pass it over.

NEXT MONTH.

WILLOUGHBY SMITH, PREECE, HUGHES, and HERTZ

Radio Replies

M. Thomkinson (Wakefield).—(1) As you are well beyond the 25-mile radius, you could not receivebroadcast from Manchester with a Crystal Receiver. (2) Signals in the Morse Code may be received on a Crystal Set up to about 100 miles of the transmitting station. If you learn the Morse Code, a knowledge of which is not very difficult to acquire, you will be able to understand the messages received in this way.

Roger R. Webb (Plymouth).—We hear that a Broadcasting Station is shortly to be established at Plymouth. You will then have no difficulty in receiving broadcast with a Crystal Set.

Jack A. Batcup (Swansea).—A new powerful valve has been invented by the General Electric Company of New York. The filament is coated with oxide of thorium. We hope shortly to publish an illustrated article dealing with this new valve.

Matthew S. Briggs (Stoke-on-Trent).—The regulations governing the erection of an aerial are that the combined height and length shall not exceed 100 ft. As many wires as desired may be used for the antennæ, providing that the length between the two supports, plus their height from the ground, does not exceed the limit mentioned.

Thomas Stokes (Liverpool).—The instruction leaflet for building the Meccano Crystal Receiving Set is now ready. (Price 4d. post free).

T. F. Storey (Newark-on-Trent).—You are too far from a Broadcasting Station to receive telephony with a Crystal Set.

Peter Parker (London, E.C.).—Radio transmissions are not sent in one certain direction, but travel everywhere. A message broadcast by a station in London, for instance, may be picked up with suitable apparatus in any part of any room in any house, in any part of the country.

D. M. Montgomery (Chepstow).—You are well within the 25-mile radius of the Cardiff Broadcasting Station and will therefore be able to "listen-in" with a Crystal Receiving Set quite successfully.

Bernard Dooley (St. Leonards-on-Sea).—(1) You are outside the London broadcast radius, which is on the average limited to 20—30 miles for a Crystal Receiver. (2) You should have no difficulty in hearing Morse signals from ships in the Channel.

Q. Y. (Chester-le-Street).—The Postmaster-General will not allow the Meccano Receiving Set No. 2 to be used under a Broadcasting Licence because it is particularly adaptable to further experiments. The Set in question can, however, be used with Experimental Licence, and we hope soon to be able to announce that a special licence will be issued to allow its use.

Ronald Carslake (Stratford).—The specimen wire you send is cotton-covered copper wire of a very small gauge and cannot be used to advantage in a Radio Set.

T. J. Grice (Settle).—You are beyond the 25-mile radius from Manchester and therefore could not "listen-in" with a Crystal Receiver.

E. W. Willett (Cardiff).—Your detector made from Meccano is good, but a little too elaborate.

M. F. Davies (Marcross).—Your friend at Pontypool should be able to receive broadcast perfectly with a Crystal Set, as he is within the 25-mile radius from the Cardiff Station.

L. Constantine (London, N. 2).—(1) Licences are granted only to persons over 21 years of age. You should therefore ask your father or elder brother to obtain one. (2) The Broadcast Licence entitles you to use any Crystal or Valve Receiver stamped "B.B.C." To use a home-constructed Crystal Set you will require an Experimental Licence. This costs 10/–, the same fee as that charged for the Broadcast Licence.

Basil Conway (Mold).—The resistance of a conductor is directly proportional to its length, and inversely to its cross-sectional area.

M. J. Turner (Holyhead).—The use of Radio Sets is not permitted in South Ireland at present.

E. R. Jamieson (Hull).—(1) A Receiving Set constructed to your own design, even if used solely for broadcast reception, may be used only under an Experimental Licence. (2) A Broadcasting Licence covers the use of apparatus made by Companies who have previously obtained the Postmaster's approval of their Sets, which sets are stamped "B.B.C."

L. Evans (Durham).—The Meccano Radio booklet is sent to any reader post free on request.

F. C. Carlton (Hastings).—The Inductance Coil of the Meccano No. Receiver consists of 38 yards of enamelled copper wire wound on a former $5\frac{1}{4}'' \times 3\frac{3}{4}''$. This gives a range of wave-lengths from zero to 1,000.

N. Delamere (London, E. 2).—(1) Broadcast from Marconi House may be heard every evening until 10 p.m. (2) The price of the complete Meccano Detector and Crystal, in dust-proof glass case, is 6/6.

"LISTEN-IN"

GUARANTEED

THE

MECCANO

RADIO RECEIVER No 1

For Broadcast and Morse Reception

The Meccano Crystal Receiving Set is a piece of scientific apparatus with which anyone may spend hours of delight and enjoyment "listening in" to broadcasting stations and other telephony transmissions.

It has been thoroughly tested and has received with great clearness music and speech in London, Birmingham, Manchester, and elsewhere, up to distances of 33 miles from the broadcasting station.

Low in cost and complete in itself, ready to be connected to any aerial, the Meccano Radio Receiving Set will provide hours of fun and entertainment.

PRICES:

MECCANO No. 1 CRYSTAL RECEIVING SET, complete **55/–**

MECCANO AERIAL SET (including antenna, lead-in and aerial wires and insulators) **12/6**

A splendid booklet, "The Meccano Crystal Receiving Set," explaining how easy it is to receive broadcasting, will be mailed free on application.

Address ; Department R1, MECCANO LTD., BINNS RD., LIVERPOOL.

C. I. Lamb (Presteign).—Bare copper wire would not be suitable for winding a tuning inductance, which consists of wire covered with either silk or cotton, or preferably, enamel.

D. Bushell (Wallasey).—If you will send fourpence to the Radio Department, full instructions for building the No. 2 Crystal Receiving Set, including prices of parts required, will be sent.

R. Stansfield (Middleton).—A grid leak is a high resistance that dissipates the charges acquired by a condenser connected to the grid lead of a valve circuit.

E. Moore (Bradford).—A variable condenser consists of stationary and movable brass, steel, or alluminium plates, insulated from one another and so arranged that the movable slide between the stationary plates. It enables very fine tuning to be obtained, and the point of greatest signal strength located.

H. Hills (Leicester).—The ohm is the unit of resistance. A circuit is said to have one ohm resistance when a pressure of one volt is required to send a current of one ampere through it.

B. Bland (Langport).—(1) A single aerial is generally regarded as being more efficient than a twin aerial. I hope soon to publish an illustrated article in the "*M.M.*" explaining the various types of aerial at present in use. (2) Permission will have to be obtained from the City Engineer before an aerial may be erected across a street.

T. Richardson (Short Heath).—The fact that you are only a few yards from the telegraph wires is not likely to prove detrimental unless they run parallel with your aerial.

J. Batcup (Swansea).—(1) The minimum and maximum wave-lengths of a coil such as you describe is 200 and 2,500 metres respectively. (2) Ordinary electric light bulbs might be adapted so as to be used as valves, but the results would not be satisfactory. (3) There is a vacuum inside an ordinary flash lamp bulb. (4) We fear it will not be possible for you to receive concerts from the Hague with your Crystal Set, even if you use a H.F. Valve with reaction.

G. H. Smith (Waterloo).—The approximate range of the Meccano Receiving Set No. 1 is from zero to 1,000 metres. The sliding of the pointer along the inductance coil enables "tuning-in" to be accomplished.

R. Roberts (Southport).—It is impossible to judge the exact wave-length of the coils you have made without the employment of a wave-metre, which is a somewhat expensive instrument.

J. Brown (Halifax).—Effective insulators for lead-in wires of Receiving Sets may be made from pieces of rubber tubing.

Dennis Hausford (Hockley).—A crystal does not wear away in the sense that it gets smaller. By constant use it gradually loses its power of detection, or in technical terms, its sensitiveness.

THE PASSING OF THE "*FARADAY*"

A SHIP THAT LAID 50,000 MILES OF CABLE

EVEN though dozens of high-power radio stations are continuously flashing their messages across continents and oceans, communication by means of cable is not by any means obsolete. On the contrary, new cables are being laid in many parts of the world, and Messrs. Siemens Bros. & Co. Ltd., of Woolwich, have such confidence in the future of cable telegraphy that they have actually built a new cable-ship.

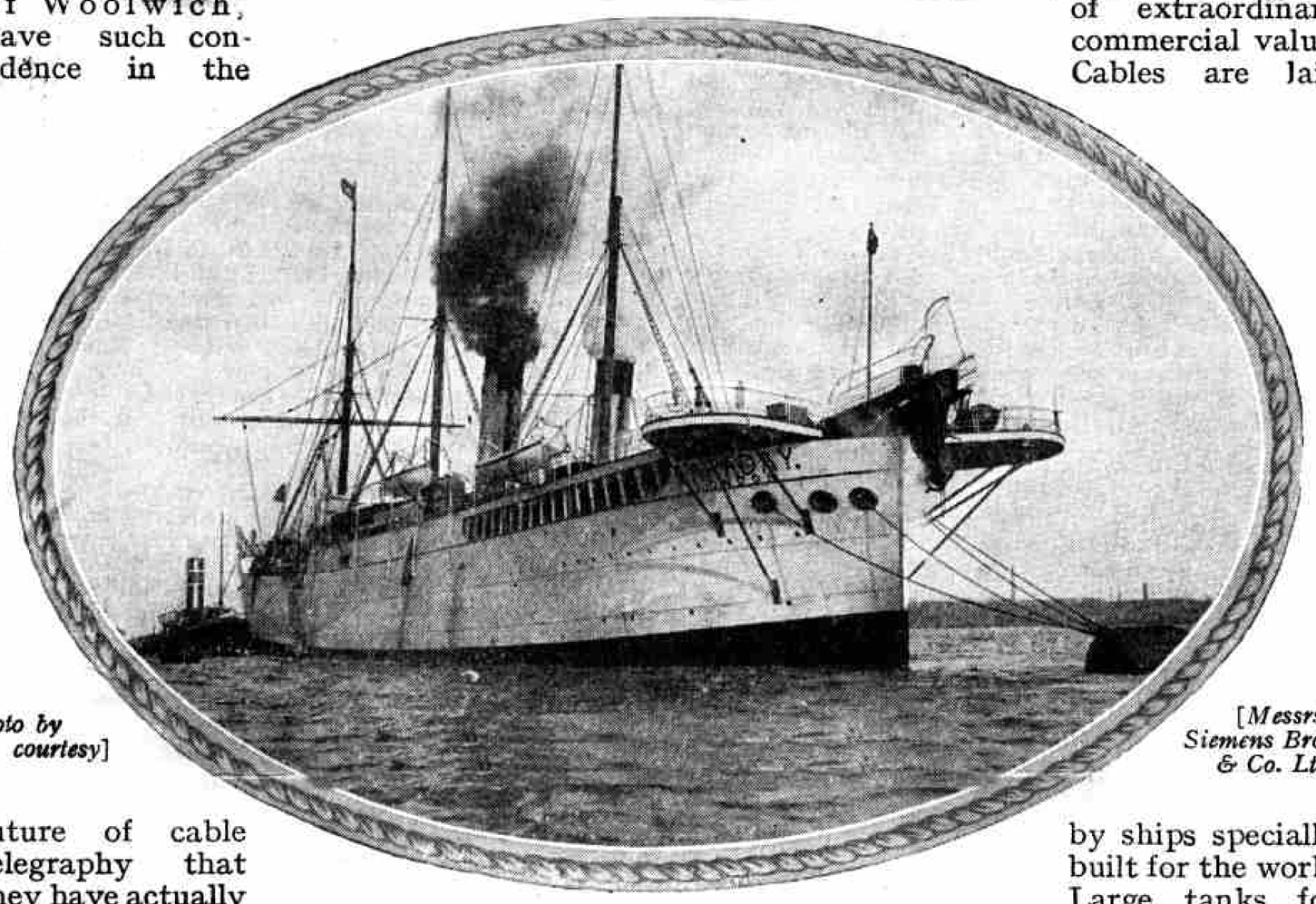


Photo by courtesy] [*Messrs. Siemens Bros. & Co. Ltd.*

The Famous Cable Ship "*Faraday*"

The First Atlantic Cable

R. M. Ballantyne, whose books are first favourite with all boys, wrote an interesting story around the laying of the Atlantic cable. The first attempt was a failure, for when the cable-laying ship was 330 miles out, the cable broke. On a second attempt the cable parted and the ship again returned home. When the cable was finally laid in 1859 it was a dismal failure from a financial point of view. From an engineering standpoint, however, it was a great success, for it demonstrated beyond doubt that submarine telegraphy was thoroughly practical.

Many cables have been laid from this country, not only to our Colonies and Dominions overseas, but also to almost every country of importance in the world. These cables have linked together widely-separated parts of the world, made possible speedy communication, and have proved of extraordinary commercial value. Cables are laid by ships specially built for the work. Large tanks for the storage of the cable take the place of the holds usually found on other vessels. Machinery for paying out the cable is installed, and there is special apparatus for testing the cable during the whole time it is being laid.

A Famous Cable Ship

Our illustration shows one of these special vessels, the cable ship "*Faraday*," named after Michael Faraday, the brilliant British scientist. This ship, which was specially built for cable-laying, has completed nearly half-a-century's arduous work in laying and repairing submarine cables in all parts of the world.

The first cable laid by the "*Faraday*" was in 1874 across the Atlantic, and the last cable laid was in 1921 from Cuba to Puerto Rico. Altogether she has laid some 50,000 miles of submarine cable, including eight cables across the Atlantic. She has also been employed in repairing cables, in which connection she has sometimes worked in water as deep as 3,000 fathoms.

The "*Faraday*," launched in 1874, is 360 ft. in length and 52 ft. in breadth, and has a gross tonnage of just over 5,000. She is propelled by twin screws, each driven by a compound engine of 500 h.p.

The Latest Cable Ship

Although still sea-worthy, the "*Faraday*" has become obsolete in many ways, and has now been replaced by a new cable ship, 380 ft. in length and 48 ft. 3 ins. in width, the gross tonnage of which is 5,370. The new vessel is equipped with triple expansion engines, driving twin screws, and her boilers are oil-fired. She carries sufficient oil fuel to give a steaming range of 10,000 miles, and her four cable tanks are capable of carrying approximately 4,500 tons of cable.

This vessel, built at Palmer's Shipyard on the Tyne, has been designed on the most modern lines and is complete in every respect. Every refinement that experience can suggest has been included, and no doubt she will play her part in establishing and maintaining communication even more satisfactorily than did her predecessor.

We hope to be able to publish a photograph of this new cable ship in the next issue of the "*M.M.*"

IMPORTANT NOTICE.

We are constantly asked to supply back numbers of the "*M.M.*" We print only sufficient copies to fill our regular orders, and back numbers cannot therefore be supplied. In order to prevent disappointment our readers are advised to place a regular order, either with a Meccano dealer or direct with us.

Are you Absent-Minded?

Every week I receive hundreds of letters from Meccano boys in all parts of the world. Some of these letters I am unable to answer because the addresses are totally, or partially omitted. Of course, there are some cases in which I can trace the correspondent's address in my files, but naturally this is only possible with my regular correspondents. In any case this entails considerable extra work and causes delay, both of which are avoided when the address is given.

I would therefore impress upon my correspondents the necessity for giving their full postal addresses to ensure a prompt reply.

If the boys whose names are given below will forward their addresses, I shall be pleased to answer their letters.

Henry Kutner,	Hackney Road.	?
F. Moore,	——	?
B. Gooday,	——	?
R. Chick,	Av. National 3571.	?
N. Stephen,	——	?
John Rimington,	Venner Road,	?
Terence Gilmore,	Richmond Row,	?
Frank Fryer,	——	Dunbridge.
Allan E. Smith,	Amerson Ave.,	?
Royce Cox,	South Street,	?
Mr. L. Braithwaite,	——	?
J. McIntyre,	Golborne Road,	?
L. G. Truman,	——	Mansfield.
E. E. Ledger,	——	?
Arthur Banks,	Redstone Road,	?
R. Greenhorn,	——	?

Successful Meccano Competition

A very successful model-building Competition was held recently by Mr. Arber, of Roman Road, Bow, London. The Competition was divided into three classes, and many interesting models were submitted, the entries being judged by our London representative. The following boys won first prizes:—

Class A. A. Cornell. Beam Engine.
Class B. L. Stubbings. Aerial Roundabout.
Class C. G. Higgins. Hoist.
Girls (Special Prize). Miss M. Botley. Lift.

The standard of work submitted was high, and well up to that of previous years, and Mr. Arber is to be complimented upon organising a very successful Competition.

The Secretary's Notes

Reviewing the work of the past two sessions I am pleased to find that our Clubs have not only made greater progress than ever, but also that many new features have been added to the programme. These include Gymnastics, Ambulance Classes, Radio, Stamp-collecting, Dramatic Sections and Minstrel Troupes. Evenings devoted to reading part of a favourite book have also been inaugurated by several clubs with marked success. All these suggestions have helped to provide the Club members with busy and enjoyable Winter sessions.

The Close of the Winter Sessions

The majority of Clubs intend to carry-on during the Summer months, and many and varied are the programmes that are being arranged. Instead of the usual indoor meetings some Clubs are devoting one evening a week to exercises out of doors, to keep the members fit. Others are organising Cycling and Rambling Clubs, and intend to take to the road, with Cricket, Tennis or Swimming as alternative attractions. All such arrangements are fascinating and the pursuits healthy, and I am confident that they will be greatly enjoyed by the members who are so fortunately placed as to be able to participate in them.

Summer Activities

From time to time Club Leaders send me group photographs of their Clubs. Often I notice that some of the members are not wearing their badges. I want every member of the Guild to constantly wear his badge, for this is not only the badge that marks the movement, but it is the sign by which one Guild member may recognise another. If a member loses his badge he should make a point of purchasing another, for it is very desirable that a member should always be in possession of the official badge.

Wear Your Badges

Inter-Club Competition

The Inter-Club Model Competition for 1922-3 has now closed, and I have pleasure in announcing below the names of the successful Clubs. It has again proved very difficult to adjudicate between the various models that have been submitted, and it was finally thought advisable to combine the two prizes of £5 and £3 and to divide it between five Clubs who submitted models of equal merit.

(Continued at foot of next column)

CLUB NOTES

1st Belfast M.C.—During the past Session this Club has made speedy progress in every direction. Many interesting Lectures have been delivered to the members, and the Club has a successful Football team. Mr. Lowry, a local gentleman, has taken a great interest in the Club work. Master E. Moorhead, one of the members, has been awarded a Special Merit Medallion. *Secretary:* John Sinclair, 39, Oakland Avenue, Bloomfield, Belfast.

Model Engineering (Edinburgh) M.C.—The present membership of the Club is twenty-five, and the members are very keen on model-building. Papers are an important feature of the programme, and are followed by discussions. *Secretary:* W. M. Gemmell, "Glenbourne," 6, So. Oswald Road, Edinburgh.

Cobham M.C.—The Meccano Lecture "*Lives of Inventors*" was received with great enthusiasm. Swedish Drill has been included in the regular programme, and the Club in general is making excellent progress. *Secretary:* Wm. Phillips, The Fox and Hounds, Cobham, Surrey.

Small Heath M.C.—Programme for the last Session included Table Games, Lectures and Model Building, in addition to Football. A Cycling Club is being formed. *Secretary*: Master W. Edge, 131, Whitehall Road, Smallheath, Birmingham.

St. Paul's (Hammersmith) M.C.—A successful Session has been held and included two interesting Lectures, on "Literature" by the Club Leader, and "Electricity" by Master R. A. T. Atkinson, for which he has been awarded a Special Merit Medallion. Master R. Mason was awarded the other Medallion for his all-round good work. *Secretary*: Mr. V. J. Scott Warrell, 41, Bridge Road, London, W. 6.

Meccano Club Leaders

No. 2. Mr. R. BAILEY

(Princes Risborough M.C.)

Mr. R. Bailey is the enthusiastic Club Leader of the Princes Risborough Meccano Club, which has been in existence since April 1921. As in the case of the Leamington Meccano Club, this Club has a troupe of Meccano Minstrels, which is of great assistance to the financial side of affairs. Mr. Bailey introduced a Handiwork Section into the Club programme during the first Winter Session, and he personally supervises all Club activities. The Club has also a strong Football Team.

Inter-Club Competition—(*cont.*)

The prize-winning Clubs are:—"Kilmarnock (Academy) Meccano Club," who submitted a model of a novel Engine; "Leamington Meccano Club," who constructed a model Railway Station; "Chard Meccano Club" also for a model Railway Station; "Knutsford Lecture Hall Meccano Club," a Mining Village, and "Kilmarnock (Riccarton) Meccano Club," a Transporter Bridge.

These models are all perfectly constructed, and I regret that lack of space only prevents me from publishing illustrations of them in these columns.

Central Secondary School (Sheffield) M.C.—The Session included evenings devoted to indoor games, in addition to Model Building. Towards the end of the Session a very interesting Electrical Demonstration was given. *Secretary*: Master A. S. Taylor, Fern Lea Villas, 19, Roach Road, Eccleshall, Sheffield.

St. Mary with St. Gabriel (London) M.C.—This Club has been in existence since 1920 and has made rapid progress. When first inaugurated it had a membership of nine, and at the beginning of this year there were 90 members on roll. Radio, Fretwork and Photography have been introduced into the Club, and in March last a Magazine was started. The last Session has been particularly busy and enjoyable. *Secretary*: Mr. C. Curle 37 Pullen's Buildings, Peacock Street, London, S.E.

Chard M.C.—Interesting Lectures have been given by Mr. Miller and Mr. Wheaton and several of the members. Master Frank Poole won a Special Merit Medallion for a Lecture he rendered entitled "Gas and Gas Lighting," Master Frank Macey was awarded the Medallion at the end of the Second Winter Session for his Lecture on "Ships." *Secretary*: Master Frank Macey, 17, Ashfield, Chard, Somerset.

Garstang and District M.C.—Table Tennis and Table Football have proved very popular during the last Session, Masters R. Sayer and H. O. Irwin winning the respective handicaps. During the latter part of the Session a Radio Concert was greatly enjoyed by all the members. It is hoped to organise a Cricket Club for the summer months. *Secretary*: Master H. O. Thomas, Sunny Bank, Garstang.

St. Cedds (London) M.C.—The Second Winter Session has been very busy and successfully concluded with a Social. *Secretary*: Master S. F. Elliott, 142, Beckton Road, Canning Town, London, E. 16.

Southall M.C.—A splendid Concert was given at the end of the last Session by the members, in aid of the Club funds. The Club is making rapid progress, and every week new members are enrolled. *Secretary*: Master K. Watson, 2, Waltham Road, Southall.

Sparkbrook M.C.—Towards the end of last Session an Exhibition and Concert was arranged and was an unqualified success. The division of the Club into four sections has promoted a spirit of healthy rivalry, each section endeavouring to excel in its display of models. Several members of the Club wore fancy costumes, which gave a bright touch to the evening. Models of the Chassis and Forth Bridge were loaned from Headquarters. *Secretary*: Master Francis J. Hubball, 71, Turner Street, Sparkbrook, Birmingham.

Special Merit Medallions

RECENT AWARDS.

Special Merit Medallions are awarded each session to the member of each Club who (1) gives the best lecture, and (2) does efficient work for the Club. The Medallions, which are here illustrated, are beautiful both in design and finish.

They have been specially produced by a well-known firm, and on each is engraved the winner's name.

I give below a list of the boys, followed by the names of their Clubs, who have recently been awarded Special Merit Medallions:—

LECTURES:

J. L. Hills (Leamington), R. Bloore (West View), C. Gunnell (Malvern, S.A.), A. Osborne (Sparkbrook), C. Curle (St. Mary-with-St. Gabriel), L. Clements (Dudley).

GOOD WORK:

A. Billiald (West View), S. Pagani (Malvern, S.A.), J. Hinks (Sparkbrook), J. Hart (St. Mary-with-St. Gabriel), W. G. Barrett and T. Macquhae (Observatory), J. Feast (Holy Trinity), J. W. Whitworth (Hanson, Bradford), S. Knight (Knutsford Lecture Hall), F. S. Hart (St. John the Baptist), H. Kerridge (Woodville, Thornton Heath), H. Jepson (Holy Trinity, Blackburn), W. Humby (Luton), C. Boden (Dudley), D. Tilt (Bromsgrove), E. Cornell (Cobham), L. Sutton (Thornton Heath), E. Moorhead (1st Belfast), S. Bridle (Parkstone Congregational), E. Chapman (Mount Gould), R. Green (Swaffian), R. D. Millar (Kelvinside), F. C. Miles (Leamington).

MECCANO ACCESSORY OUTFITS

Each Meccano Outfit from No. 0 to 6 may be converted into the one next higher by the addition of an Accessory Outfit. Thus, if a No. 2 is the first Outfit bought, it may be converted into a No. 3 by adding to it a No. 2a. A No. 3a would then convert it into a No. 4 and so on up to No. 7. In this way, no matter with what Outfit you commence, you may build it up by degrees to a No. 7 and so be able to make all the many hundreds of models shown in the Books of Instructions. Our illustration shows one of the Meccano Accessory Outfits.

PRICES OF ACCESSORY OUTFITS

No. 0a	converting No. 0 into No. 1		4/–
„ 1a	„ „ 1 „ „ 2		7/6
„ 2a	„ „ 2 „ „ 3		8/6
„ 3a	„ „ 3 „ „ 4		18/6
„ 4a	„ „ 4 „ „ 5		15/–
„ 5a*	„ „ 5 „ „ 6		50/–
„ 5a†	„ „ 5 „ „ 6		80/–
„ 6a	„ „ 6 „ „ 7		210/–

* Carton. † Wood.

X2 ELECTRICAL OUTFIT.

ELECTRICAL OUTFITS

The application of Electricity to the Meccano system adds a further and wonderful charm. The joys of model-building are now increased by the fascinating pastime of carrying out delightful electrical experiments.

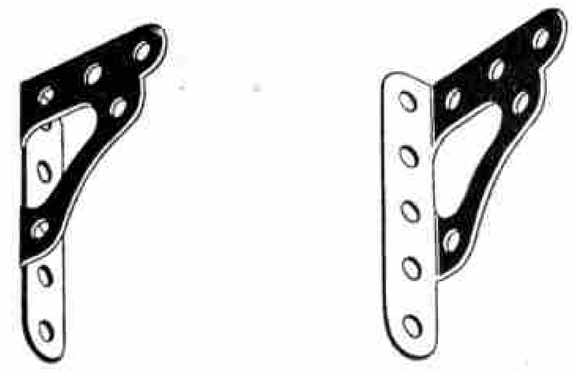
THE MECCANO ELECTRICAL OUTFITS contain a number of specially designed electrical accessory parts, and, used in conjunction with any of the regular Outfits, enable the user to construct models for making interesting and instructive experiments. These include the Electric Railway, Morse Key, Tapper Key, Buzzer, Electric Lamps, Electric Crane, Induction Coil, Electric Iron, Motor-Starter, etc.

PRICES.

X1 (containing electrical parts, without motor or accumulator) ... **12/6**

X2 (containing Meccano motor, 4-volt accumulator and electrical parts) **42/–**

New Meccano Parts



(Right). (Left).

139 Flanged Brackets (Right) each 2d.

139a „ „ (Left) „ 2d.

A Useful Tool

Our illustration shows a type of screwdriver useful for reaching bolts in inaccessible places on models. For this reason the blade has been made so that it may be passed through the standard Meccano hole to reach bolts so placed. We are disposing of these screwdrivers whilst our stock lasts, at the special price of 10d. each, post free.

The Meccano Manuals

There are three Manuals, the 0 Manual for simple models built with the 0 Outfit, the 0–3 Manual comprising models built with any of the Outfits from 0–3 and the Complete Manual, which comprises a selection of models that may be built with every Outfit from 0–7. This latter Manual is a very fine publication and should be in the hands of every Meccano boy. It includes instructions for building most of the models shown in the present No. 3 Manual. A limited supply of the No. 3 Manual is still available.

PRICES OF MANUALS:	s.	d.
0 Manual ... ... post free ...	0	6
0–3 „ ... ... „ ...	1	2
Complete Manual ... „ ...	2	10
No. 3 Manual ... ... „ ...	1	4½

Storage Boxes

We have in stock a limited number of boxes, suitable for holding Meccano parts. These boxes are in polished oak, fitted with partitions, and hinged lids. They fasten with lock and key, and are provided with two drawers, also with locks and keys.

The dimensions of the boxes are 17″ × 15″ depth 9¼″, and the price is each 70/–, carriage forward.

As our stock is only small we advise those of our readers who are interested to take immediate advantage of this opportunity for securing a strong and serviceable box for storage of their Accessory Parts.

Improving the "*M.M.*"

This Competition has been extraordinarily successful and we have been inundated with entries. These are now being scrutinised and we hope to announce the result of the Competition in our next issue.

Sale and Exchange

Small advertisements are inserted in these columns at 1/- per line (average seven words to the line), or 10/- per inch (average 12 lines to the inch). Cash with order. Rates for larger space quoted on application. Address your letter to Advertisement Manager, "Meccano Magazine," Binns Road, Liverpool.

FOUNTAIN PENS complete with filler and box marked 10/6. Our price 1/9 post free. Box No. 21, c/o "*Meccano Magazine*," Liverpool.

NEW COLONIALS. ALL MINT.

AUSTRALIA, King George, 1½d. green,	2d.
BERMUDA, ½d. & 1d. Script, the pair,	2½d.
CYPRUS, 30 paras green, Script,	1½d.
IRELAND, ½d. green (Sword of Light),	1d.
MAURITIUS. 1 cent, black, Script,	½d.
MONTSERRAT, Scripts, ½d., 1d., & 1½d., the three	4d.
SARAWAK, 2 cent purple,	1½d.

POSTAGE EXTRA. ASK FOR PRICE LIST.

ALEC KRISTICH (Member N.R.P., No. 279), 82, Marchmont Street, Russell Square, London, W.C. 1.

A SPLENDID WATCH FREE to every boy who sells twelve 10/6 Fountains Pens at 1/9 each. Send for full particulars. Box No. 41, c/o "*Meccano Magazine*," Liverpool.

Free Pictorials Free

GRAND PACKET OF PICTORIALS, including Nyassa and Mozambique, absolutely free to applicants for my bargain approvals. Send postcard to-day.

L. C. Jones, 13, North Road, Bourne, Lincs.

MECCANO ELECTRIC LOCO in working order. Cost over £2, price 20/-. Sixteen Electric Rails for same, cost 16/-, price 7/6. Covered Luggage Van, 2/6. Box No. 22, c/o "*Meccano Magazine*," Liverpool.

WANTED. Articles and photographs of general interest, suitable for publication in the "*Meccano Magazine.*" Accepted contributions will be paid for at our usual rates and will be returned if unaccepted, if stamped addressed envelope is enclosed. Although every care will be taken of same, no responsibility can be accepted for lost or mislaid manuscripts. THE EDITOR, "*Meccano Magazine*," BINNS ROAD, LIVERPOOL.

100 DIFFERENT STAMPS (Catalogued over 10/-) 6d. Kraus & Co., 137, Cheapside, London, E.C. 2.

ELECTRIC RAILWAY SET PIECE by Jubb & Co., Sheffield, as exhibited at Industrial Fair, White City, in 1922. Size 13′ 9″×7′, gauge 1 made in five sections, bolted together continuous circuit, with high and low levels, bridge, tunnels, complete with Railway Stations, Engine Shed, Signal Boxes, Foot-Bridge, Signals, etc. A great attraction for Xmas Bazaar, worth £100, will accept £40 for quick sale. Messrs. Cross Bros. Ltd., 2 & 4, St. Mary St., Cardiff.

STAMP COLLECTORS. Sell your duplicates by advertising them in the "Sale and Exchange" column of the "*Meccano Magazine.*"

POWERFUL STEAM ENGINE (reversible), nearly new, 15/-, cost double.
2, Sea Breeze Cottage, Prinsted, Emsworth

50 STAMPS, catalogue value 17/6. Price 7½d. post free. Lewis, 362, Wavertree Nook Road, Liverpool.

WE BUY STAMPS FOR CASH, both loose and in albums. Good prices given.
Lewis, 362, Wavertree Nook Road, Liverpool.

SIXTY DIFFERENT STAMPS FREE to applicants for approvals. All ½d. each. Send postage.
Cox, 135, Cambridge Road, Seven Kings.

FREE! *10 LARGE RUSSIAN PICTORIALS, to purchasers of one of the following: Every stamp different. 100 Austria, 9d.; 100 Hungary, 1/-; 32 Finland, 9d.; 25 Turkey Pictorials, 1/-; 30 Jugo-Slavia, 1/-; *25 Austrian Fieldpost, 1/-; *62 Austria (1922), 1/-; 50 Roumania, 1/-; 50 Bulgaria and Thrace, 1/9; 50 Czecho-Slovakia, 1/-; 25 Luxemburg, 1/-; 100 Poland, 2/-; *25 Fiume, 2/-; 100 different, 5d.; 500 for 2/9; 1000 for 7/6. * Denotes mint. Postage extra. Selections on approval willingly to responsible applicants.
H. Llewellyn, 41, Dereham Road, Norwich (Member J.P.S.).

100,000 FREE!!!

THE FIRST 100 APPLICANTS for my famous approvals will receive 1,000 best quality Stamp Mounts and a Set of Good Austrian Stamps. Send at once and enclose a 2d. stamp to cover cost of postage. N. M. Paterson, 19, Dorset Avenue, Rusholme, Manchester.

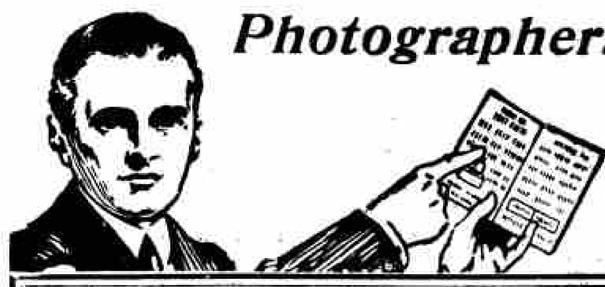
FOR SALE. Meccano Vertical Steam Engine in perfect working order. Price £1 1s. 0d. H. Robinson, Church Avenue, Holywood, Co. Down.

FREE! 125 ALL DIFFERENT.
Including **British Colonials,** and long mint sets, and pictorials, war issues, obsolete and new issues, etc., sent **FREE** to genuine applicants enclosing 1½d. postage, and requesting bargain discount approvals. Abroad 6d. Send satisfactory reference, or if under 21 the written consent of a parent should be sent.
Fine approval selections in book and sheets for beginners, medium, and advanced collection at low prices. **Best Quality Stamp Mounts** 6d. 1000 post free. **R. Alcock, Stamp Dealer, "Bangrove," Ewlyn Road, Cheltenham.**

AUSTRALIA AND N.Z. PACKETS (stamps); 70 varieties, 3/-; 50 varieties, 2/-; 5% Reduction £1 orders, Australian unused, 5% above face value, Cash with Order, sure and prompt reply. C. A. Brown, 30, Mary Street, Sidcombe, Sydney, N.S.W.

CLOCKWORK MOTOR, 7/6. Rowland, c/o Wilkinson, Llantwit-Major, Cardiff.

SPECIAL OFFER.
LEVER WATCHES.
Post 5/6 Free.
Every Watch thoroughly Tested and Guaranteed.
Address: **J. W. BAILEY, Watchmaker, 271, HIGH STREET, WEST BROMWICH.**



Photographers!
Send for this FREE Book

"RIGHT METHOD IN PHOTOGRAPHY" contains information which no photographer should be without. Put your name and address on a post card and send off at once to
BURROUGHS WELLCOME & CO.
19, Snow Hill Buildings, LONDON, E.C. 1
xx 3802 COPYRIGHT

BARGAINS

Useful Pocket Knives,	excellent steel, 4d. each, postage 2d.
Metal Cash Boxes,	4″, fitted lock & key, 4d. each, postage 2d.
Solid Oak Bowls,	7″. Invaluable for holding screws, nuts, and small parts, 9d. each, postage 9d.

The 3 articles together, 2/- post free.

Electric Motors for driving Meccano sets and models, 1/100th h.p., d. or c. current, solidly constructed by experts. State voltage. 17/6, postage 2/-
CORBETT & CO., 7, Hart Street, London, E.C. 3.

CATALOGUE FREE
Watches, Jewellery, Rings, Boots, Suits, Costumes, Raincoats, Clocks, etc., Cash discount or monthly payments. Write for Catalogue. All you require on easy terms. Foreign applications invited. Special C.O.D. terms abroad. Write for our free catalogue to-day.
Masters Ltd., 55, Hope Stores, Rye, England.

DYNAMOS 5/- Post 6d. (inland)
Make your own Electric Light

These wonderful machines light brilliantly a 4/6-volt lamp and take very little power to drive. Lamps to suit 3d. each.

GREENS Dept. N., 85, New Oxford St., London

36,000 STAMPS SOLD, send now for 1,000 assorted, 1/-. North Bros., 37, Bostock Avenue, Abingdon.

UNUSED STAMPS of colonies and foreign countries at face value. Assorted stamps to value will be sent on receipt of remittance for 6d. or over. 1½d. should be added for postage, orders for over 2/6 sent post free. Box No. 27, c/o "*Meccano Magazine*," Binns Road, Liverpool.

NO REASONABLE OFFER REFUSED for Electric Motor, Outfits 5, 2, 1 Inventor's A, and many extra parts. R. Burston, Old Bank, Tiverton, Devon.

SPLENDIFEROSUSH! See last month's advertisement. Next month something special for Radio boys. G. Hare, 36, Willes Road, Leamington.

500 STAMPS, unsorted, collector's duplicates, 7½d. post free. Powell, 73, Bond Road, Surbiton, Surrey.

BOYS You are not alive if you do not know what can be done with SECCOTINE. Make your models. Mend your books. Affix tyres to bicycles with it.

GIRLS Dress dolls. Make new hats and repair old ones. Mend house shoes. Patch clothes. Fix drawings to prevent rubbing. Put rings on curtains without sewing, etc., etc.

SECCOTINE

The best general adhesive the world knows. Sticks wood, leather, bone, paper, etc., objects large or small.

Firmas (Heat Seccotine) for glass, china, delph, etc. Articles joined with it can be boiled without coming asunder.
Regd. Trade Mark.
Tubes **6**d.

Registered Trade Mark.
Tubes **4½**d., **6**d., **9**d. Everywhere.
McCAW, STEVENSON & ORR LIMITED,
The Linenhall Works : : Belfast
Telegrams: "Glacier, Belfast." *Telephone:* 4261 (3 *lines*).

IN THE HOUSE
Ladies can do a thousand things in the house with it. Silks, Satins, Laces are renewed with a weak solution.
WRITE TO THE WORKS FOR A FREE BOOKLET

PUBLISHED BY MECCANO LTD., BINNS ROAD, LIVERPOOL.
Printed by Stembridge & Co., Ltd., Albion Street, Leeds.

HOW TO BUILD A RADIO RECEIVER FROM MECCANO PARTS—see page 6

No. 35

JUNE 1923

MECCANO MAGAZINE

PRICE 1d

PUBLISHED IN THE INTERESTS OF BOYS

MONTHLY

EDITORIAL

NEXT month the "*M.M.*" will appear ~~in an entirely new dress, for it will~~ be contained in a coloured cover. It will include all the usual features, which have made it so popular, and there will also be one or two important new features. These, I have no doubt, will meet with appreciation, and will add considerably to its value and reputation.

Good News

I find that most of my readers are very interested in books, and this is only what I expected, for to intelligent boys books are the source of much knowledge. In some we read of the adventures and brave deeds of such men as Drake and Raleigh, who did so much to make our country what it is to-day. In others we read about the great discoveries of science. We learn of the pleasures of the telescope and of the wonders of the microscope, with hosts of other amazing things in the realms that lie between. "Of the making of books there is no end," said one of our wise men, and we realise this when we visit any public library and see the thousands of volumes on the shelves, each book only waiting to be opened and read to give up the knowledge it contains.

A Bookshelf Column

It is impossible for anyone to read more than a fraction of the books that are published, and much time can be lost in reading books that do not matter. As I am most desirous of encouraging a taste for good reading amongst Meccano boys, I have arranged to start a Bookshelf Column in our next issue. In this column we shall review new books and other publications suitable for boys. I strongly advise each reader to read this column with care, for it will not only keep him in touch with the latest literature published for his benefit, but will also guide him in the choice of additions to his bookshelf.

A Good Books

Another new feature in the July issue will be a column for stamp collectors. This will be conducted by an expert who has made the subject his special study for many years. Pursued in a haphazard, unmethodical manner, stamp collecting gives no pleasure whatever, and is soon abandoned. If followed intelligently, systematically, and under proper guidance, however, this fine hobby is most pleasurable and instructive, and in many cases may even be profitable. My stamp-collecting readers will undoubtedly find our new column of very great service to them.

A Stamp Collector's Column

As I remarked in our last issue there is a very insistent call for more Meccano models, with full descriptions and illustrations, and we have some wonderful material available for this feature. In this issue we commence with instructions for building the Meccano Crystal Radio Receiver. This article will be followed by instructions for building the wonderful Meccano Loom, the Motor Chassis, a Grandfather's Clock that keeps perfect time, and made entirely with Meccano parts, and later by a new model of the High-Speed Ship Coaler.

More Meccano Models

The first few models which we shall illustrate and describe will be of the bigger type, although well within the capacity of any Meccano boy. Later, however, we shall commence the description of a series of new models of a simpler type, that any boy will be able to construct with the smaller Meccano Outfits.

As most of the models dealt with will not be included in our regular Manuals, I strongly advise all Meccano enthusiasts to carefully keep their copies of the "*M.M.*" by means of the serviceable binder described on another page.

The Meccano Smile

Our photograph is of Master John Potts, a happy Meccano boy at his home in Queensland. The model shown in the photograph is of a locomotive he has just finished constructing.

John is a keen Meccano enthusiast, as are hundreds of other Overseas boys, and he devotes a great deal of time to the invention of new models.

He is a typical Australian boy, with a smile as sunny as his native climate, and is happy because he has learned that perseverance, determination, and cheerfulness are the stepping-stones to success in Meccano model building, as in real life.

Good Things Coming

The following articles will appear in future numbers of the "*M.M.*" Every Meccano boy should place a regular order for the "*M.M.*" with his dealer or direct with this office.

The Men Who Gave Us Radio.
Meccano Boys' Hobbies :—
An Adventure in the Tree Tops.
Holiday Essay Competition.
Stamp Collector's Column.
A Monster Dredger.
A Unique Coaling Plant.
New York's New Bridge.
A Message from Dr. de Forest.
Photographic Competition.
1,000 k.w. Radio Valve.

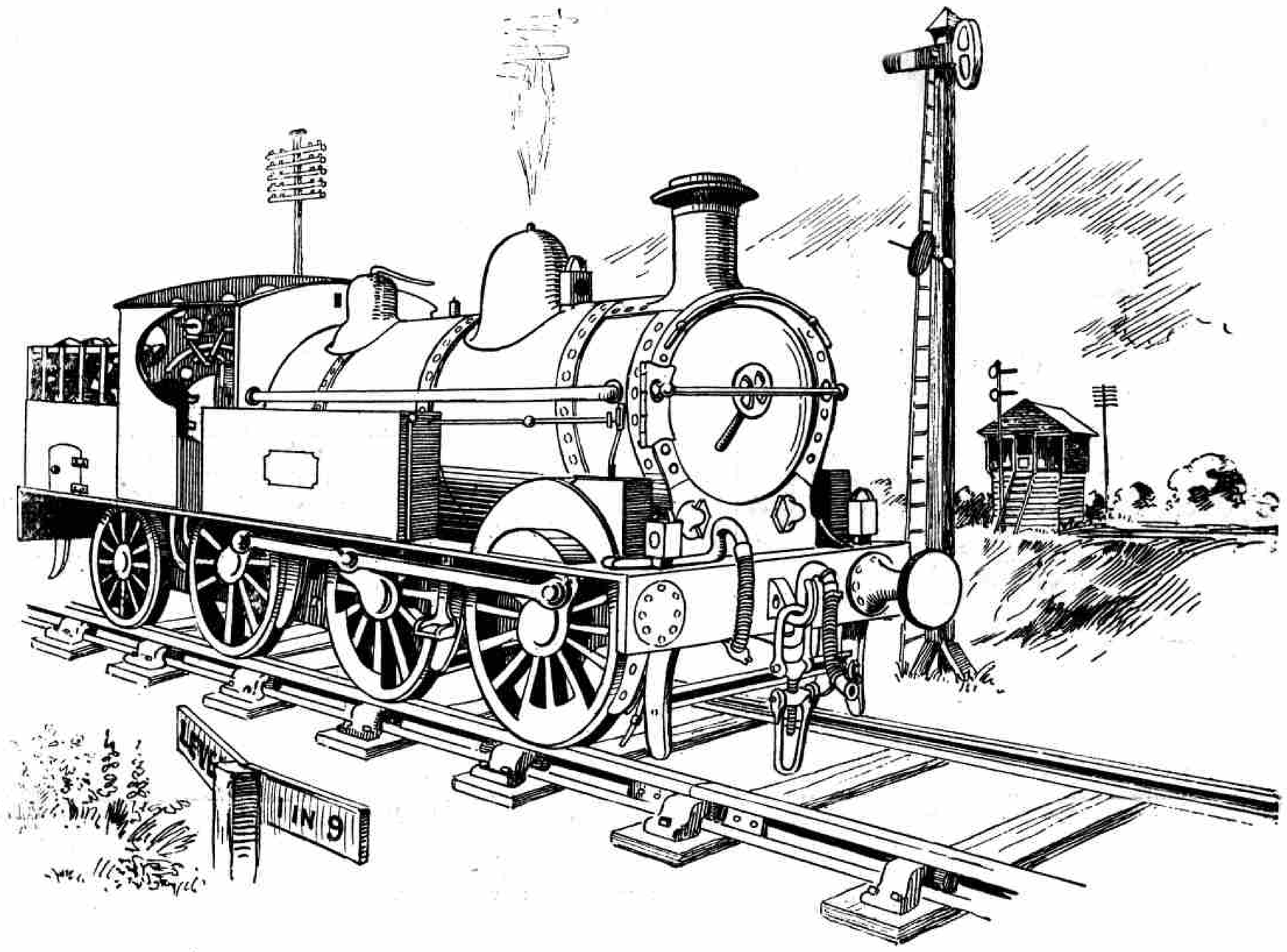
A CHALLENGE TO MECCANO BOYS

Have You Sharp Eyes?

IN last month's issue I announced the fact that a challenge had been offered to Meccano boys by a certain gentleman, whose opinion it is that Meccano boys have no more intelligence than any other kind of boys. This gentleman has submitted the accompanying drawing of a locomotive in which he has purposely made a number of errors. He is giving a handsome prize to the Meccano boy who specifies every mistake that he has made in the drawing.

If every error is not pointed out, the prize will go to the boy who lists the greatest number of errors. I shall supplement the gift by giving a second and third prize in order of merit. Entries must be received by the 30th June (abroad 31st August). Each error pointed out should be numbered, and the total given at the foot of the list. The mistakes should be described as briefly as possible.

Already a large number of readers have responded to this challenge to the fair name of Meccano boys. I want all readers of the "*M.M.*" to enter for this competition at once, so that their entries may be received before the closing date. The result will be announced in our July issue, and the result of the entries from abroad in the September issue.



Our New Serial

This is Jack Bulmer, the hero of our New Serial

Our new serial, "*Bulmer's Father*," will commence in the next issue of the "*M.M.*" So many articles are claiming immediate attention that it has been crowded out this month.

The July "*M.M.*" will include also several new features and will be packed from cover to cover with articles that are of greatest interest to all Meccano boys. If you have not already placed a regular order for the "*M.M.*" you should do so without delay, either with your Meccano dealer or direct with this office. The price is the same in either case, 6d. for six issues or 1/- for twelve.

BRIGHT IDEAS

These columns are reserved for dealing with suggestions sent in by Meccano users for new parts, new models and new ways of making Meccano model-building attractive. We are always pleased to hear from any Meccano boy who has an idea which he considers will be useful in the Meccano system.

J. Hernsley (Littlehampton, Sussex).—Suggestions for new parts should be accompanied by instances of their application. We should be interested to hear any uses you have found for 12½" curved or slotted strips.

T. H. Oddie (Carranballac, Victoria).—(1) We are interested in your various suggestions, but it would have been helpful if you had mentioned their applications, particularly those of the rack-rod and cog and pinion and gear combined. (2) See our reply below to G. Hare re sliding action.

J. Candler (Tuke Hill, S.W.).—Your sketch does not convey any information as to the utility of the part you suggest. Perhaps you would explain this a little more fully.

D. Markham (Leyton).—We do not advocate the bending of the strips except to fairly wide radii. In our revised models we endeavour to eliminate such mutilations.

M. W. Dolman (Newark).—We hope to introduce a grappling hook very shortly.

G. Burgess (Adelaide, Australia).—As the capacity of the spring of the Clockwork Motor is so small, we scarcely think any great advantage would be derived from introducing a different type of governor.

G. Hare (Leamington).—At the moment we are engaged on a suitable sliding action.

F. Ellis (Farnborough).—Regarding your suggestion for twin flanged or pulley wheels, why not secure two of either of the existing wheels to the axle of your model? A permanent twin wheel has no function apart from the example you mention.

H. W. Bird (Ulverston).—Evidently you do not read the "*M.M.*" regularly, Harold, otherwise you would have seen the articles on engineering feats and achievements that we publish from time to time.

D. M. Tucker (Leyton).—We shall shortly introduce a swivelling crane for use with Hornby trains.

Cuthbert Knowles (Keighley).—What special object would there be in adapting the eye piece to take the rack strip?

C. Wilkinson (Appleton Wiske).—We are introducing a 5½" flanged disc shortly, and later separate sections that may be superimposed to give a wheel of larger diameter.

G. Taylor (Deganwy, N. Wales).—Your suggested cross-over switch may be adopted later.

I. Moore (Belfast).—In the Meccano Chassis Leaflet we illustrate a motor car spring constructed from Meccano parts

Robert Mowbray (Old Trimdon).—See our reply (above) to G. Taylor, re switch.

A. E. Schuil (Newcastle-on-Tyne).—(1) We propose introducing a signal similar to that you suggest. (2) Your idea for fitting hinged sides to the trucks is interesting, and we shall go into it. (3) In view of the recent re-grouping of the railway system we do not consider it advisable to elaborate too much on individual colouring. (4) We keep adding to the variety of our trucks each year, and some of those you mention are already on our list.

Arthur Perry (Northwich).—Unfortunately we have abandoned the flat type of screwdriver which you suggest should have a hole at the back to fit the nut.

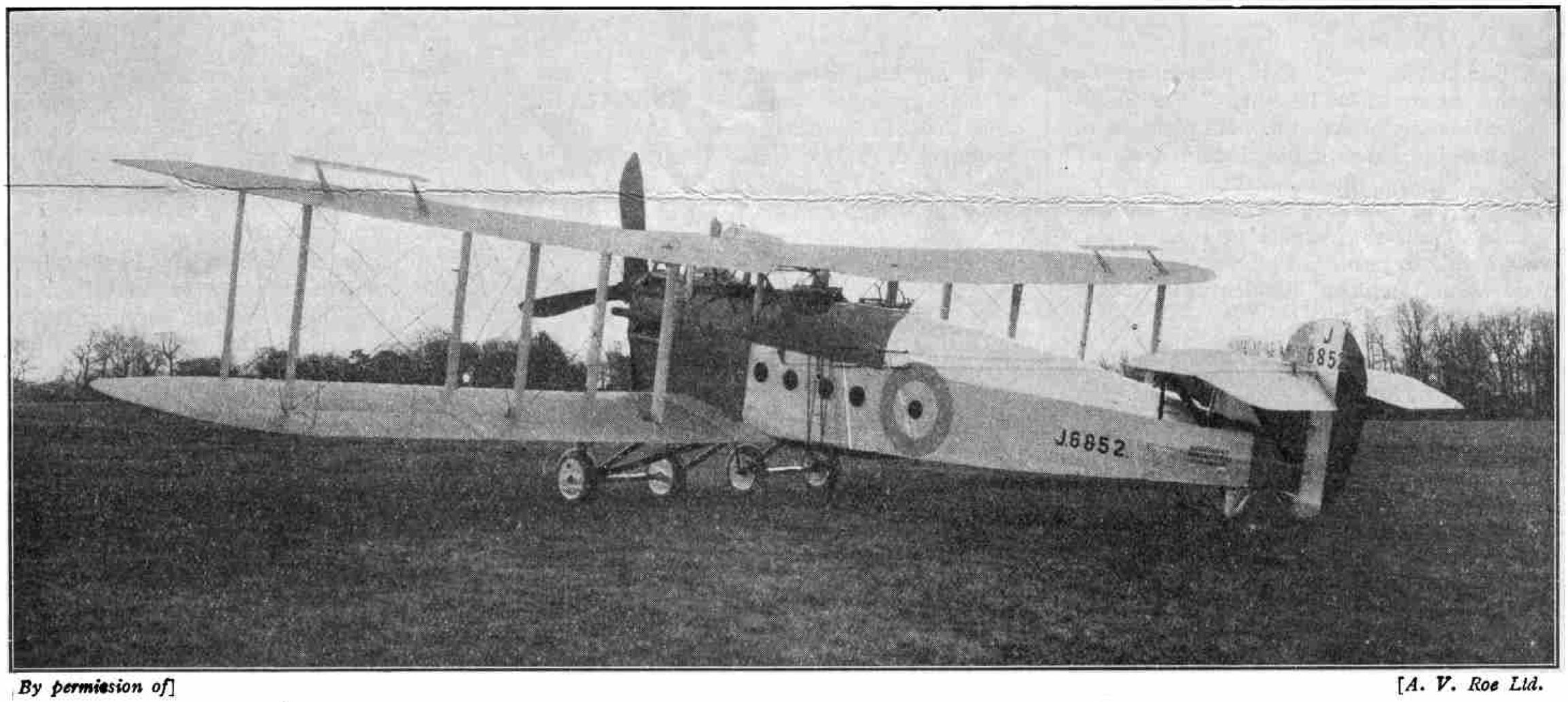
F. Palmer (Portsmouth).—(1) See our reply (below) to A. Hardie re cylindrical plates. (2) The cord may be secured to the crank handle by giving it two or three turns round the handle finishing off with two ordinary half hitches.

A. Hardie (Aberdeen).—The introduction of cylindrical plates is as yet premature. In the meantime we are endeavouring to obtain information as to their application to general use.

Leslie Thompson (South Petherton).—The double cross-over point is an accessory that we may introduce in due course.

A Giant Bomber

New Aero Engine with Power Increased 100-fold



By permiesion of [*A. V. Roe Ltd.*

The largest single-engined aeroplane in existence. The metal Avro into which the 1,000 h.p. Napier "Cub" has been built.

IN our last issue we gave some interesting particulars of the new 1,000 h.p. Napier "Cub" engine, and we now have pleasure in illustrating above the Avro bombing aeroplane into which this engine has been fitted.

This giant bomber is the largest single-engined aeroplane that has yet been constructed, and as such it is an object of great interest to which the eyes of the world are turned.

Air Power Will Count

Interest in these "giants of the air" is occasioned not only because of their immediate commercial use, but also because of the future purposes for which they may be employed in war. It has been stated repeatedly that the next war will be a "war in the air," and it is therefore not surprising to find that many nations are closely following every development in aeronautical engineering. There seems but little doubt that any nation possessing a large number of well-designed aeroplanes will be a power of account in any future hostilities.

Wonderful Progress

Great strides have been made in the last few years in the building of large aeroplanes, and in the development of aero-engines. At the commencement of flying in 1908 the largest aeroplane in existence was fitted with a 40 h.p. engine. As the engines of most other 'planes were then only of about 20 h.p., this 40 h.p. engine seemed to be a tremendously powerful piece of mechanism.

Six years later at the time war broke out, engines of from 80–100 h.p. were often used, whilst the faster planes, employed for "speed-work," were equipped with engines of from 160–200 h.p. At that time it was thought that the h.p. of these so-called powerful engines would never be surpassed. During the war, however, fighting 'planes of 300 h.p. made their appearance, and large bombing planes were equipped with engines of 500 h.p. or even 750 h.p.

Britain's 4,000 h.p. Aeroplane

With the introduction of the 1,000 h.p. Napier "Cub," even these high figures were exceeded, and to-day there are in existence giant aeroplanes (driven by several motors) developing over 2,000 h.p. In Germany, for instance, a monoplane of 2,400 h.p. is being produced, and in the United States a hydroplane of 3,600 h.p. is now being constructed.

Britain is not behind in this race for super-'planes, however, and tests are now being made with an even more powerful aeroplane, the engines of which it is anticipated will touch 4,000 h.p.!

The Caproni Hydroplane

In this connection it is interesting to recall that in 1921 a 4,000 h.p. hydroplane, designed to carry 100 passengers, was constructed by Caproni in Italy. Unfortunately this giant was accidentally destroyed some weeks after its first trial flight.

Its tremendous power was obtained from a group of eight motors, each of 500 h.p. The dividing up of the power of aeroplanes in this way leads to many complications, and what is particularly difficult is the efficient controlling of so many units.

Developing a New Field

Until the Napier "Cub" was produced, the largest single aero-engine did not exceed 750 h.p. This seemed to be the limit of power available, unless more than one motor was used, as in the Caproni hydroplane. For this reason the production of a 1,000 h.p. motor opens up an entirely new field in the forward progress of aviation. It is interesting to know that the engine was constructed to the order of the British Air Ministry.

One of the most surprising features in regard to this wonderful engine is the fact that it weighs only approximately 2,000 lbs., this being about 2 lbs. per h.p.

It is, perhaps, not very difficult to construct a single aero-engine of 1,000 h.p., but it *is* difficult to design so powerful an engine that will be so light in weight and yet strong and reliable. The weight of the engine has a very important bearing on the carrying capacity of the aeroplane, and for this reason only, the 1,000 h.p. Napier "Cub" is remarkable, and everyone interested in engineering will congratulate the designer and manufacturers upon their achievement.

Giant Bomber's 144 miles per hour

In its first flight the giant bomber, to which the experimental "Cub" was fitted, took off in the surprisingly short distance of 130 yards. It climbed rapidly and landed without incident some 15 minutes later. In more recent tests at Southampton the machine has attained the remarkable speed of 144 miles per hour, and was manœuvred with ease. The trials were entirely successful, and proved the immense advantage of such a machine fitted with a powerful and efficient engine. The machine's performance won the commendations of Sir Geoffrey Salmond and of other officials from the Air Ministry, who were present at the demonstration.

(*Continued on page* 11)

Largest Cable Ship Afloat

The Recently-Launched "*Faraday*"

IN our last issue we gave particulars of the famous cable ship "*Faraday*," now being broken up. Its place is to be taken by a new cable ship, at present being built by Messrs. Palmers Ltd., of Jarrow. By the courtesy of Messrs. Siemens Ltd., the owners of these ships, we are able to publish a photograph of the new vessel which, incidentally, bears the same name as its predecessor.

A Life of Adventure

As is only to be expected, during half a century's laying and repairing cables in all parts of the world, the "*Faraday*" has had many adventures.

In December 1895 she left London for Para, where she laid a cable up the River Amazon. The voyage was full of incident, the ship running aground on numerous occasions owing to the shallowness of the river. It was during this expedition that several newly-formed islands were discovered in the River Amazon.

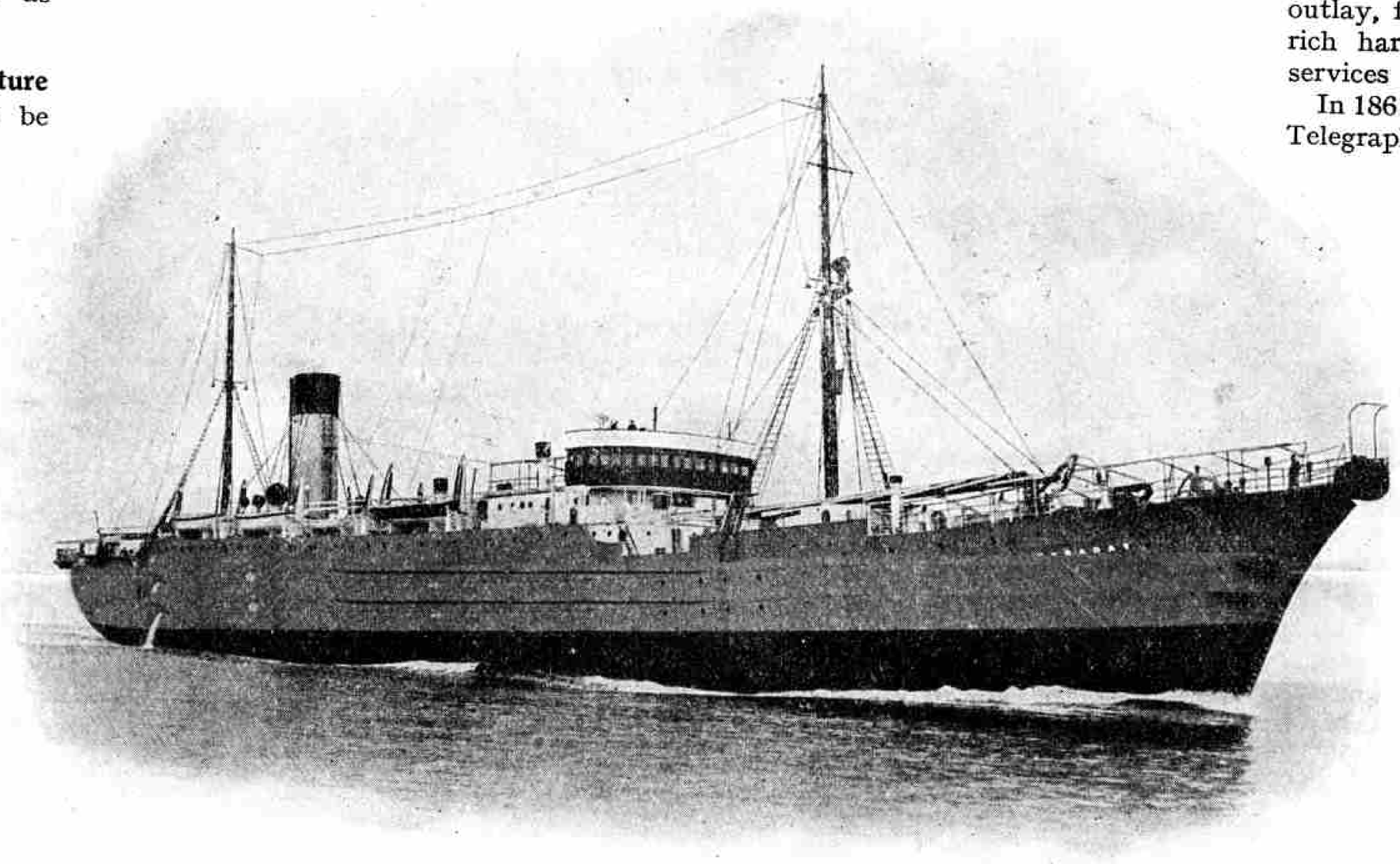


Photo by courtesy] [*Messrs. Siemens Bros. & Co. Ltd.*

The New Cable Ship "*Faraday*"

The "*Faraday*" in an Earthquake

A most alarming incident occurred in 1906, whilst a cable was being laid in South American waters. The ship called at Valparaiso to coal, and whilst thus engaged the great earthquake took place. Although badly shaken, the "*Faraday*" was uninjured, and eventually was able to proceed to another port for coaling and to be dry-docked for examination.

Not the least exciting of her adventures occurred during the war, for in 1918, when the enemy submarine activities were at their height, the "*Faraday*" was engaged in repairing Atlantic cables. She ran many risks from the submarines, and on one occasion was absent from England for 6½ months, during which time all operations had to be carried out without showing any lights.

The Largest Cable Ship

The new "*Faraday*," launched on 16th February last, is one of the largest vessels of her type afloat. Her length is 415 ft. and breadth 48 ft. and she has a gross tonnage of 5,375 tons. Constructed of steel, she is equipped with the latest appliances for laying and repairing cables, and her four cable-tanks are large enough to contain the whole length of a trans-Atlantic cable.

At the forward end of the upper deck is a large steel house, containing a suite of rooms for each of the officers. There is also a drawing office, above which is situated the navigating bridge with chart-room. The ship carries a crew and cable staff of over 150, and five lifeboats are provided, also two motor boats fitted with special mechanical davits.

The machinery for paying-out the cable, and the instruments for registering its pull and other important details, are located at the bow of the ship.

Fuel for 10,000 miles

The vessel is fitted with twin-screw triple-expansion engines developing nearly 3,000 h.p., and has a normal speed of about 12 knots. The engines are also so arranged as to be capable of working at very low revolutions in order to drive the vessel, when necessary, at the low speed of about ¾ knot.

Steam is supplied by three boilers which, it is interesting to note, burn oil fuel. About 1,500 tons of oil are carried, this being sufficient for a voyage of 10,000 miles.

Cables are Expensive

Laying cables is a costly business, but cable companies are able to afford the outlay, for they reap a rich harvest from the services they render.

In 1861 The American Telegraph and Cable Company enquired from Messrs. Siemens their price for supplying two Atlantic cables. The estimated price exceeded one million sterling, and this information was cabled to America. Within a few days a reply was received, "*Make and lay two cables. Fifty thousand pounds deposited on account at your bankers.*"

Mountains Below the Sea

These two cables were laid in 1881, and during the work a range of submarine mountains was discovered in the Atlantic Ocean. At this point the water became less deep, varying from 1216 fathoms to 620 fathoms in a distance of a little over one mile. This shallow region is now known as the "Faraday Hills."

Cables link up continent with continent and make it possible to keep in touch with events in all parts of the globe. They permit of a rapid interchange of news between the countries of the world, and even Radio has not eliminated them. There are still many circumstances in which cables are used in preference to Radio. Cable ships such as the new "*Faraday*" are important units in the vast and complicated commercial system by which we live.

Improving the "*M.M.*"

By **THE EDITOR**

THIS Competition has been extraordinarily successful, and I have been inundated with entries. Every entry has been carefully considered, and the results have been classified, with a view to finding the opinions of the majority of our readers, on the contents of our pages.

The Prize Winners

The best list of replies and suggestions for improving the "*M.M.*" was sent in by Master C. W. Maxwell Reekie, of 7, Rousley Avenue, West Didsbury, Manchester, and to him the first prize of a Hornby Train has been despatched. The second prize of a Zulu Tank Loco has been awarded to Master L. O. Marsden, 29, Dering Road, South Croydon, and I congratulate these two ardent competitors on their well-merited success.

"More Meccano Models"

Many novel suggestions were submitted in the competition, and it is significant and satisfactory to note that a very large number of our readers make insistent demands for "more Meccano models."

As is announced in this month's Editorial, I am making arrangements to immediately give effect to these demands. Illustrated instructions for building the Meccano Crystal Receiver (No. 2) appear in this issue, and we have hundreds of new models that we shall describe and illustrate in future issues.

Good Things in Store

Many readers ask for more scientific articles, and I am able to announce that I have made arrangements with a well-known writer to contribute a regular article of this nature, as space permits. Articles from his pen will include such subjects as "*The Spider as an Engineer*," "*A Voyage to the Moon*," "*Marvels in a Drop of Water*," "*How and Why a Bee Stings*," "*Giant Monsters of the Past*," and many other wonderful articles that are of the greatest interest to all intelligent boys.

Famous Engineers

I have been much impressed by the number of requests for articles dealing with the lives of Engineers and of Inventors, and I hope shortly to be able to announce a series on these lines. In these articles we shall describe the difficulties and dangers that engineers have had to face in the past, and show how perseverance and determination enabled them to triumph over all obstacles.

These are just a few of the good things in store—there are many more to come, and the "*M.M.*" will continue to improve and to increase in size, maintaining its claim to be *the* paper for Meccano boys.

A Journey through Space

Scores of other good suggestions have been carefully noted and many of them will be reflected in our future issues. I have dealt with a few of the more interesting in the replies below, and in these I feel you will all be interested.

Some of the suggestions cannot be adopted, however. For instance one from a Tyneside boy, who seriously suggests that the "*M.M.*" would be improved if the Editor takes a trip, "leaving the Earth in a gigantic special rocket, visiting the planets and cool stars!" I fear it would have to be a very "special rocket." Although I have often seen the sunrise on the mountains of the Moon, and have seen the polar regions of the planet Mars with my telescope, I would give a good deal if I could have a near view of the "cool stars" to which my young friend refers. But I should want to be quite sure that I could get back to Earth again, so that I could describe these wonders of the heavens to the readers of the "*M.M.*"

Thank You!

Well, boys, the competition was a great success, and I wish to thank those who wrote to me for the helpful spirit they showed. It is very encouraging for an Editor to hear his readers' views, for editing a paper is something like broadcasting—you never see your audience. This is very different to speaking or lecturing to a hall-full of people, who may applaud or laugh when you make a humorous remark—or perhaps throw things at you when they get desperate!

Replies to Suggestions

R. E. T. Leeman (Pangbourne).—We have arranged to start a Stamp Column, and this will commence in our next issue.

John W. Leighton (Burnley) **and many others.**—We are giving consideration to the suggestion to include with the "*M.M.*" a photograph of the same size as cigarette cards, depicting Meccano models, and other similarly interesting subjects.

W. Lane (Kanturk).—We shall add four more pages to the July "*M.M.*" and shall continue with 16 pages until further notice. Photographs of the Meccano Works have already appeared in the "*M.M.*" and short plays are loaned by the Guild.

B. Bruce (Derby).—We shall endeavour to introduce electrical problems when space permits.

F. Foster Langley (Buxton).—We have already dealt with the manufacture of Meccano in the serial "*The Life Story of Meccano*," which ran through many issues of this Magazine.

A. Longley (Glasgow).—A page of formations obtainable with the Meccano Rails, would only be repeating the information contained in the special Rail Formation Leaflet (price 4d.) which gives a large number of diagrams.

Arthur W. Gaskins (Gorton).—We do not see how a list of Meccano models sent in by winning competitors would improve the "*M.M.*," Arthur, as a full list of prize winners and their models is published every year.

Harold Vlies (Manchester).—We hope sometime to print a series of articles "How Things are Done" in accordance with your suggestion, which we consider a very good one.

H. Carter (Stoneycroft).—We have already arranged to include nature articles in our pages.

C. Gregory (Reading).—We fear we could not increase the "*M.M.*" to 24 pages at present, even if we increased the price to 3d.

E. Richardson (Louth).—Thanks for your suggestion for a column dealing with Meccano boys' pets, such as rabbits, dogs, and pigeons. We shall endeavour to give effect to it at a later date.

J. D. Maybury (Kenmare).—We may be able to print one or two astronomical articles in the near future. We have been endeavouring to do so for some months, but have been unable to find space for them.

P. I. Hall (Lancaster).—Your suggestion that we should print a "Meccano Annual" every year would scarcely improve the "*M.M.*," Peter, nor is your suggestion to print every Meccano boy's name and address practical. To do this would require thousands of pages, and the cost of printing it would be enormous. Who would read it through, when it was printed?

J. Roberts (Co. Kerry).—We shall introduce a Painting Competition, at some future date.

H. E. Jones (Shipbourne).—We fear we cannot devote six pages to Radio at present, much as we should like to do so.

T. Perkins (Bradford).—Photographs of engineering appliances already appear in our columns, and many readers use them as ideas for models, which they enter in the big £250 Competition.

D. Cayley (Devon).—We think the majority of enthusiastic Meccano boys are fully acquainted with mechanical movements, and therefore a competition on the lines you suggest would scarcely be of general interest.

E. Knights (Chelmsford).—Articles dealing with Meccano boys' hobbies are now in hand. The first article, on photographing birds, will appear very shortly and will be followed by others.

D. Maish (Sheffield).—Your suggestion for articles dealing with the history of the Steam Engine is a good one, and will have consideration.

F. Pandale (Southport).—Articles on ships and locomotives have already appeared in Nos. 30 and 31. We have in hand a series of articles dealing with famous bridges.

T. Griffiths (Swansea) **and others.**—Next winter we shall probably run a Puzzle Corner with "really good, hard puzzles."

J. Marsden (Matlock).—We do not think your suggestion for a News Column would be of interest, as we rather imagine most Meccano boys obtain this information from the daily newspapers.

E. Becker (Deptford).—We feel sure that your suggestion that readers of the "*M.M.*" should make a drawing of Mr. Hornby, as each imagines him to be would certainly "afford much amusement," particularly to Mr. Hornby! But would it improve the "*M.M.*"?

W. Gorton (Stalybridge).—We fear that your suggestion that we should devote two pages each month to publication of an Encyclopædia "dealing with every subject from A to Z," would not find favour with most of our readers.

V. Bennell (Willesden).—We may publish articles dealing with pets in the future, but as we have had no experience of keeping lions, we shall not be able to include any hints in this direction, as you suggest!

B. W. Smith (Grantham).—We already have a Correspondence Club in connection with the Meccano Guild, Bert, and we would suggest that you write to the Secretary for full particulars if you are interested.

L. Miller (Cap d'Ail, France).—We fear your suggestion that we should print coupons in the "*M.M.*" would not meet with general satisfaction, as most of our readers keep their Magazines, using the "*M.M.*" binder. They do not therefore wish to cut or mutilate the pages in any way.

T. C. Rogers (Liverpool).—Your suggestion that we should include chemical experiments and formulæ sounds too much like school. Next Winter we may be able to include some interesting chemical effects, suitable for demonstration at Christmas parties, along with other conjuring tricks.

D. J. Gillan (London).—We shall consider your suggestion to publish articles on famous inventors and their inventions. In this connection we would mention that the Guild loans a Meccano Lecture to affiliated Clubs, on the "*Lives of Inventors*."

J. Dean (Ashington).—Your suggestion has already been dealt with in the "*Life Story of Meccano*," which ran over several issues of the "*M.M.*" We may perhaps publish this as a booklet some time in the future.

F. Brewin (Chesterfield).—We fear we should not be justified in devoting a page in each issue to comic pictures. We prefer to leave this feature, which we do not think appeals to many Meccano boys, to papers specially catering for this class of reader.

? Hill View, Holt (Trowbridge).—The cost of printing the illustrations in the "*M.M.*" in colours places your suggestion completely out of court. Colour printing is a very expensive process.

L. Tivey (Melbourne, Derbys).—We endeavour to cater for those readers of the "*M.M.*" interested in photography by special competitions. We may be able to find space for a regular column on photography at some future date, and will bear your suggestion in mind.

HOW TO MAKE

A Crystal Receiving Set

WITH

MECCANO

THE construction of a Crystal Receiving Set with Meccano parts is just as easy as is the construction of any of the hundreds of Meccano models, that boys all over the world build every day. A Meccano Receiver not only gives great pleasure by providing constant entertainment, but from it may be obtained a sound knowledge of the principles of radio reception.

The parts necessary to construct this set may be obtained complete in strong carton, price 15/-*. Those boys who already possess some of the necessary parts may complete their set by purchasing the other parts separately, at prices shown elsewhere in these pages.

Experimental Licence Necessary

It is important to remember that, in common with other receivers of the constructional type, this receiver may, at present, only be used with an experimental licence. Negotiations are now proceeding between the British Broadcasting Company and the Post Office, however, with a view to the issuing of a special licence under which these sets may be used.

The Meccano Receiver consists of three sections (1) Detector (2) Inductances and (3) Tuning Condenser, and is suitable for the reception of telephony and Morse code signals. The wave length is approximately 300 to 500 metres, but this may be varied at will by tuning. The limits of 300 to 500 metres may be increased, if desired, by adding more inductance discs.

The distance at which a crystal set will receive broadcast depends largely upon the nature of the country in which the receiver is situated, and the distance from the broadcasting station. With a good aerial broadcast should be easily received up to 20 miles from a broadcasting station. Morse signals may be received up to and exceeding 100 miles.

Assembling the Detector

The Detector is made by securing a single bent strip (23 Fig. A) and a flat bracket (24) to the mounting board; this forms the bearing for the detector arm (29). To the upper end of a 1" angle bracket (26), bolted to the board as shown, is bolted the cup (4) holding the crystal.

*Or with 2000 ohm single telephone receiver, 25/-

The detector arm (29) is then placed between the faces of the bent strip (23) with which it forms a universal joint, thus allowing the arm to be moved, until the best position is found on the crystal for the fine contact wire called the "cat-whisker."

The oscillations induced in the disc (39) are rectified by the Meccano Crystal, a new highly sensitive substance giving results considerably more efficient than those given by any other crystal. Not only may signals be received from greater distances with the Meccano crystal, but the signals are also very much clearer and stronger than when the other crystals are used.

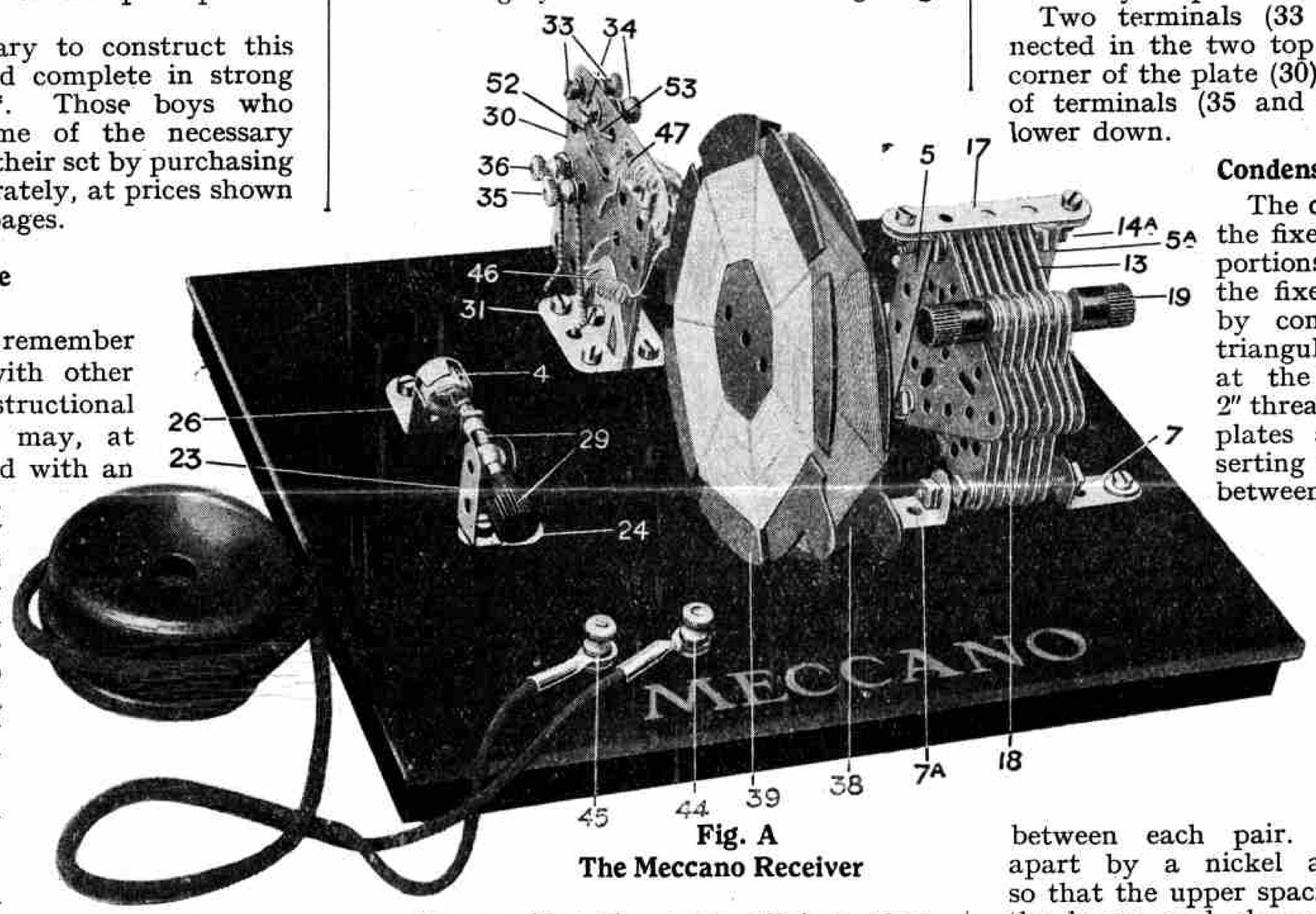


Fig. A
The Meccano Receiver

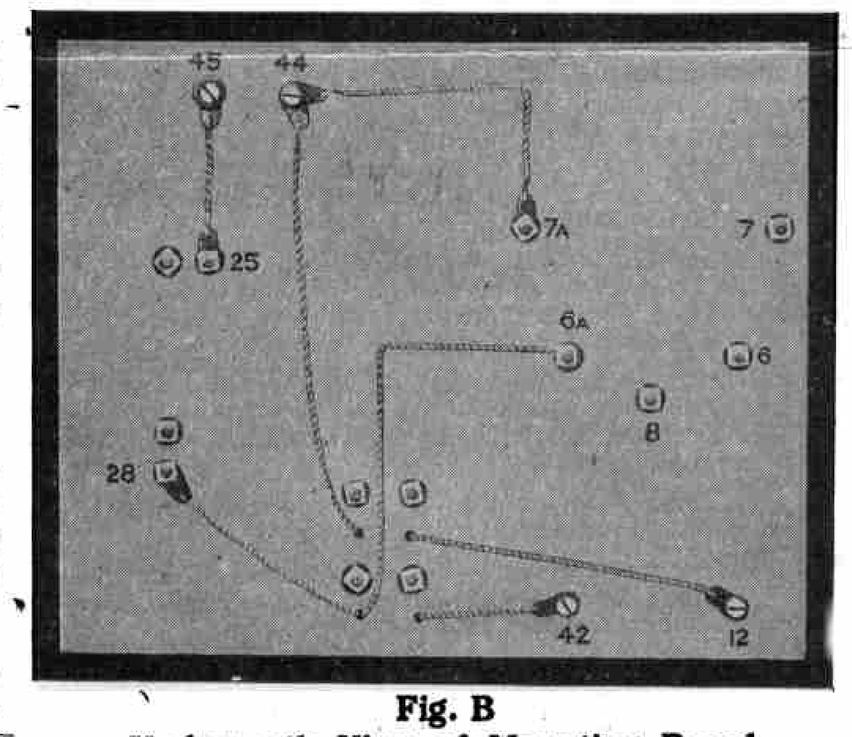


Fig. B
Underncath View of Mounting Board

Mounting the Inductances

To one corner of a $2\frac{1}{2}" \times 2\frac{1}{2}"$ Special Fibre Plate (30) are attached two trunnions (31) one on each side of the plate as shown. At the upper corresponding corner of the same plate are attached the inductance discs (38 and 39) by hinges, so arranged that the discs may be brought together as closely as possible.

Two terminals (33 and 34) are connected in the two top holes of the outer corner of the plate (30), and a second pair of terminals (35 and 36) are connected lower down.

Condenser

The condenser comprises the fixed and the movable portions. First assemble the fixed portion (Fig. C) by connecting eight $2\frac{1}{2}"$ triangular plates together at the lower end by a 2" threaded rod (14). These plates are spaced by inserting two nickel washers between each plate, and clamped at each end by a washer and a nut. At the upper end a 2" threaded rod (14A) is used.

Before threading the rod through the plates two Triangular Fibre Plates are placed between each pair. They are spaced apart by a nickel and brass washer, so that the upper spacing is uniform with the lower, and clamped together in the same manner as the lower end. It will be noticed that in these Triangular Fibre Plates one of the corner holes is cut out, to enable them to clear the washers on the rod (14) in order to make a better electrical contact.

The triangular plates may now be fastened in position between two $2\frac{1}{2}" \times 1\frac{1}{2}"$ angle strips (5 and 5A). A $2\frac{1}{2}"$ strip (17) is bolted at the top, with a spacing washer at each end, and extra nuts (15) are threaded to both ends of the rod (14 and 14A) to centralise the plates. The strips (5 and 5A) are then secured to the board at 6 and 6A by two No. 6 B.A. bolts, with an insulating fibre bush between each angle strip and the board.

The movable portion (Fig. D) is composed of seven triangular plates threaded in a similar manner to those of the fixed portion. They have two nickel spacing washers at the top and bottom, but no Triangular Fibre Plates are used. This movable portion is then passed between the apertures between the plates of the fixed portion, connected to the $1" \times \frac{1}{2}"$ brackets (7 and 7A Fig. A) and locknutted on the outside of the same brackets.

(Cont. on next page)

A Meccano Crystal Receiving Set (*cont.*)

The insulating handles (19) may now be screwed on; these allow of the position of the movable portion being varied without causing the contact of the operator's fingers to interfere with signals received.

Wiring

The wiring will be made clear by reference to Figs. A, B and E, and by remembering that Fig. B is an underneath view of Fig. A. From the aerial terminal 12 the wire 41 (Fig. E) carries the oscillations to the terminal 34 and from here through one end (53 Fig. A) of the winding of the disc (38) through the winding to terminal 33 by the other end 52, and thence by the wire 43 to the earth terminal.

The impulses are induced from the disc 38 in the winding of the second disc (39) and carried through one end (47) of the wiring to terminal (35) and the wire (51) to the 'phone terminal (44). Thence through the other end (46) of the disc (39) to terminal (36) and wire 54 to the Detector terminal (28) through the crystal and detector arm (29) to terminal 25 and by wire 40 to the 'phone terminal (45). Another wire (54A) from terminal (36) also carries the impulses to the condenser (6A), thence through the condenser to 7A and by wire (54B) to the 'phone terminal (44).

Operating the Receiver

Having assembled the receiver and connected to aerial and earth wires, the movable portion of the condenser should be placed in about the centre of its arc of movement, and the inductance discs (38 and 39) brought close together. At the same time the detector arm should be gently moved, so that the "cat-whisker," or copper wire contact, selects the most sensitive point on the face of the crystal.

The "cat-whisker" should press only lightly on the crystal, the pressure being varied by the insulated handle of the detector arm, which allows a very fine adjustment to be made. When the most sensitive point is reached, the discs or the condenser (or both) should be moved until the signals or telephony are heard at maximum strength.

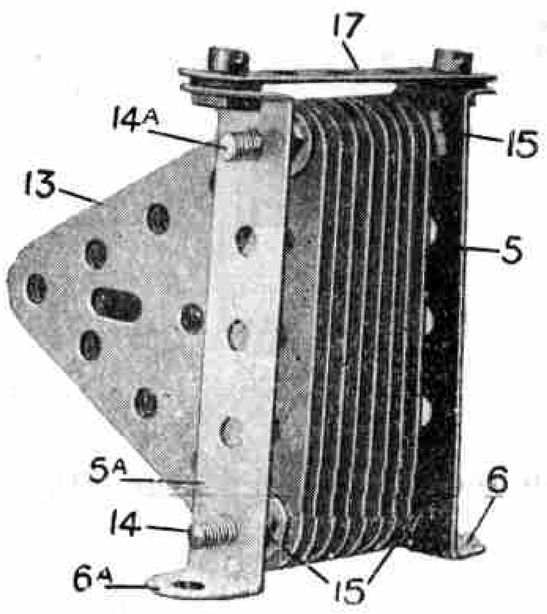
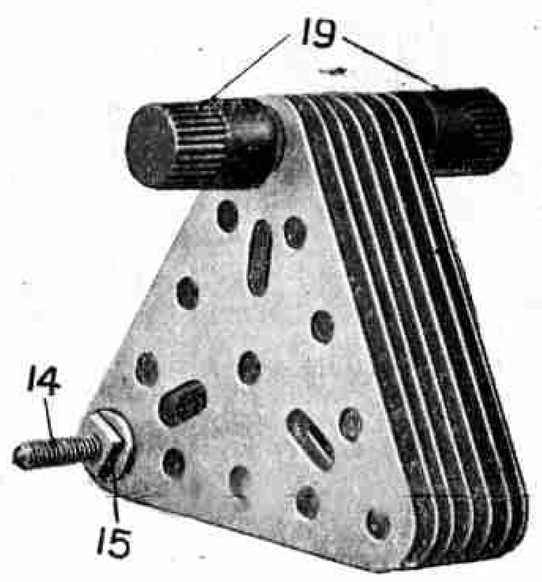


Fig. C. Fixed Portion



Condenser

Fig. D. Movable Portion

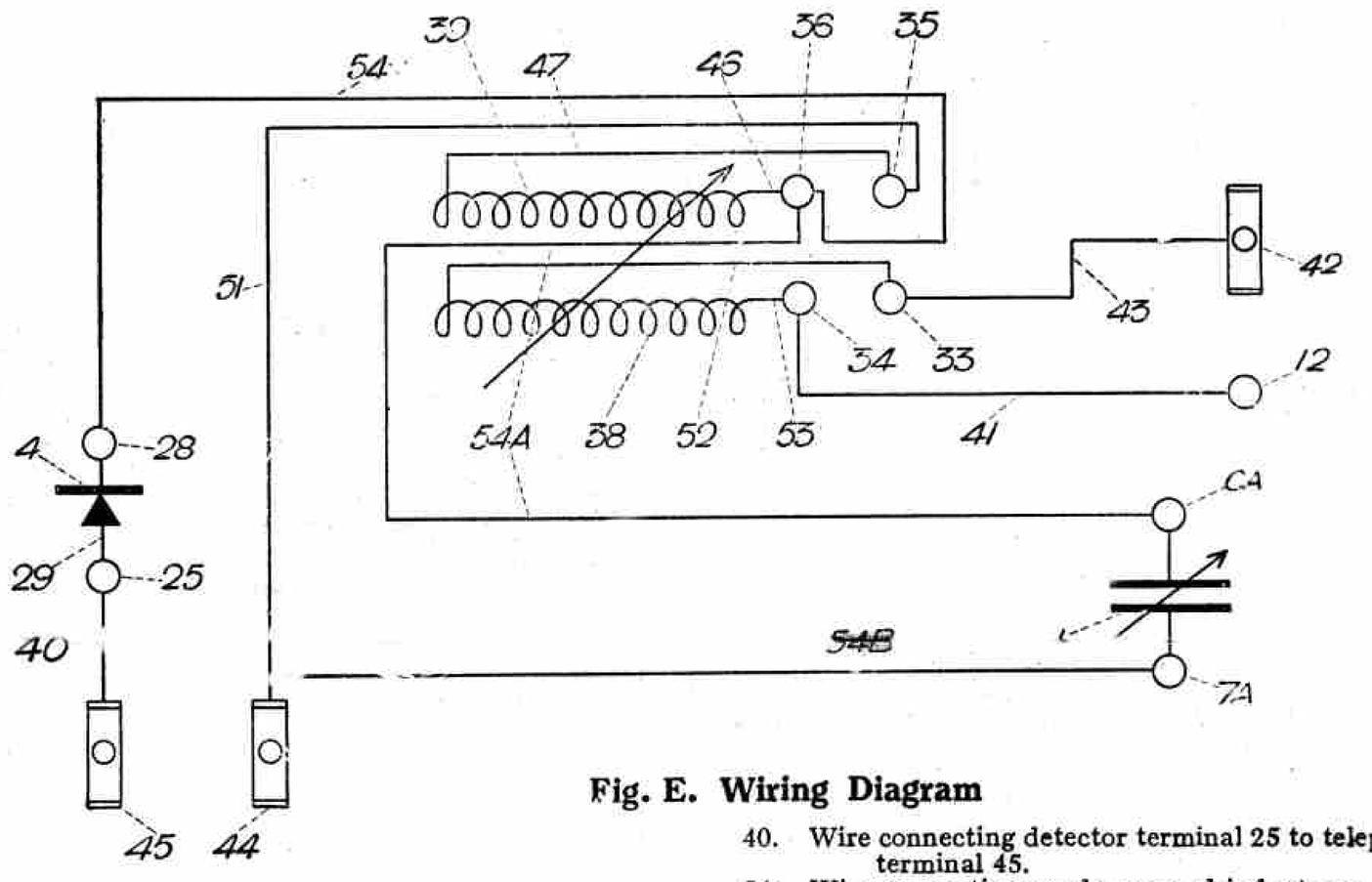


Fig. E. Wiring Diagram

1 & 7a. Condenser terminals.
12. Aerial terminal.
25. Detector-arm terminal.
28. Detector terminal.
29. Detector arm.
4. Crystal and cup.
35 & 36. Terminals for inductance disc 39 and connections.
33 & 34. Terminals for inductance disc 38 and connections.
38 & 39. Inductance discs.
40. Wire connecting detector terminal 25 to telephone terminal 45.
54a. Wire connecting condenser and inductance discs.
42. Earth terminal.
43. Wire connecting terminal 33 to earth terminal.
44 & 45. Telephone terminals.
46 & 47. Winding of inductance disc 39 connected to terminals 35 and 36.
51. Wire connecting terminal 35 to telephone terminal 44.
52 & 53. Winding of inductance disc 38 connected to terminals 33 and 34.
54. Wire connecting terminal 33 to detector terminal 28.

Meccano Radio Parts

			s.	d.
403	Insulating Triangular Plates, 2½" (for Condensers)	each	0	1
404	Insulating Handles ...	„	0	3
405	Brass Washers, 1/32" ...	doz.	0	4
406	9" lengths 22G Bell Wire with Tags	each	0	2
407	Inductance Discs, hinged (Wave length approx. 500 metres)	pair	4	0
407a	Inductance Discs, hinged (not wound)	each	1	0
408	Single Telephone Receivers (2,000 Ohms)	„	10	0
409	Detector Arms, complete	„	1	0
410	Crystals, mounted (complete with clips No. 411)	„	1	6
410a	Crystals, mounted only	„	1	3
411	Clips for Crystals ...	„	0	3
412	Mounting Boards ...	„	5	0
413	Condensers, complete ...	„	5	6
414	Detectors, complete, as contained in outfit of parts RS2	each	3	0
415	Inductances, complete ...	„	5	6
421	Sliding Contacts with Rods and Brackets, complete ...	„	4	6
422	Sliding Contacts only ...	„	1	6
423	Pointers for Sliding Contacts	„	0	4
424	Rods, 5/32" Whitworth thread at ends ...	„	0	4
425	Brackets for Sliding Contacts, right	„	0	3
425a	Brackets for Sliding Contacts, left	„	0	3
441	Detectors, complete, as fitted to Meccano C.R.S. No. 1	„	4	3
442	Detector Rods	„	0	3
443	Sleeves for Detector Rods	„	0	6
444	Cat Whiskers	„	0	1
445	Ball Brackets with 6 B.A. Screws...	„	0	4
446	Plain Brackets	„	0	2
447	Glasses for Detectors ...	„	0	4
448	Caps for Detector Glasses, Crystal Ends	each	0	4
449	Caps for Detector Glasses, Detector Ends ...	„	0	4
461	Inductances, complete with scales	„	4	6
462	Inductances, wound ...	„	2	3
463	Inductance Tubes ...	„	0	4
464	Ends for Inductance Tubes	„	0	6
465	Stay Bolts for Inductance Tubes	„	0	4
466	Metric Scales	„	0	6
467	Special Insulating Washers	doz.	0	6
481	Hexagonal Nuts, tapped, 5/32" Whitworth thread	„	1	6
482	Small Terminals, 5/32" Whitworth thread ...	each	0	2
483	Large Terminals, tapped, 5/32" Whitworth thread	„	0	2
484	Bifurcated Rivets ...	doz.	0	2
485	Indication Labels (Phone, Earth and Aerial) ...	each	0	1

Next Month we shall list Special Meccano Radio Parts in Brass and Fibre.

F. Williams (Warrington).—At the present time the most powerful Radio Station is the Sainte Assise in France, but the most powerful Broadcasting Station is the Westinghouse at Newark, New Jersey. In answer to your second enquiry, messages from Sainte Assise are received at Saigon in Indo-China, a distance of 8,000 miles.

B. Thomas (Manchester).—We do not supply indoor aerials, but these simply consist of winding the necessary aerial wire on a light frame-work—the larger the framework the better. An article on aerials will appear shortly in the "*M.M.*"

H. E. Pelling (Guernsey).—A Crystal Set is generally regarded as being satisfactory for the reception of telephony up to 15 or 20 miles. Even though the Meccano Receiving Set has received broadcast perfectly at 33 miles from Manchester, you would not be able to receive from Paris, Amsterdam, or London.

A. Boscow (Warrington).—It is impossible for us to state the wave-length of your set, but judging from the particulars given this should be capable of receiving on wave length up to 1,000 metres. You would require a special and costly instrument known as a "wave-meter" to find the exact wave length obtainable.

W. Gordon (Stalybridge).—We shall be interested to know of what your set is made and to have further particulars of the wiring. Your sketch is not really a very clear one, but we have no hesitation in saying that with the wiring as shown the set will not work.

E. Austin (Atherstone).—Full instructions for the construction of a Buzzer are to be found on page 9 of the Meccano Electrical Manual (1/8, post free).

J. Davies (Cardiff).—We suggest that you should see that you have a good earth connection. A water pipe is the best form of earth connection, and the pipe should first be scraped bright and clean, and the wire firmly clamped. Gas-stove pipes are not suitable for making earth connection, for the red lead in the joints often causes a break in the electrical contact.

J. T. Fawkes (Cheadle Hulme).—Manchester Broadcasting Station commences to send out messages at 5.55 p.m. each evening.

T. Brown (Glasgow).—A Crystal will remain serviceable for a considerable time. If it should be lost or have to be renewed, however, a new Meccano Crystal may be obtained at a cost of 2/6.

G. Thompson (Birmingham).—An ordinary telephone receiver is not suitable for Radio reception owing to the fact that it is not sufficiently sensitive. For the best results we recommend the Meccano Telephone as supplied with the Meccano Receiving Set.

W. E. Dowding (Upper Eastville, Bristol).—The wave length is the distance from the crest of one wave to the crest of the following wave, whether the waves are waves in water, air, or ether. The statement that "a message was received on a wave length of 360 metres" means that the individual waves composing that message were each separated by 360 metres. In the longer wave lengths the distance separating the individual waves is measured by miles.

K. Miller (Haslemere).—The cost of the Meccano Aerial Set complete is 12/6. A good illustration of an aerial is to be found in the Meccano Radio booklet.

A. Fawcett (Balham).—The British Station at Carnarvon transmits direct to Australia—a distance of 12,000 miles, but it is not as powerful a Station as the Sainte Assise in the sense of its equipment.

B. Jones (Barmouth).—If you erect a double aerial, the two wires should be separated by spreaders made either of bamboo or wood, at least 5 ft. in length, and if possible at an elevation up to about 40 ft. An article will shortly appear in the "*M.M.*" dealing with the erection of aerials.

How to Obtain the "*M.M.*"

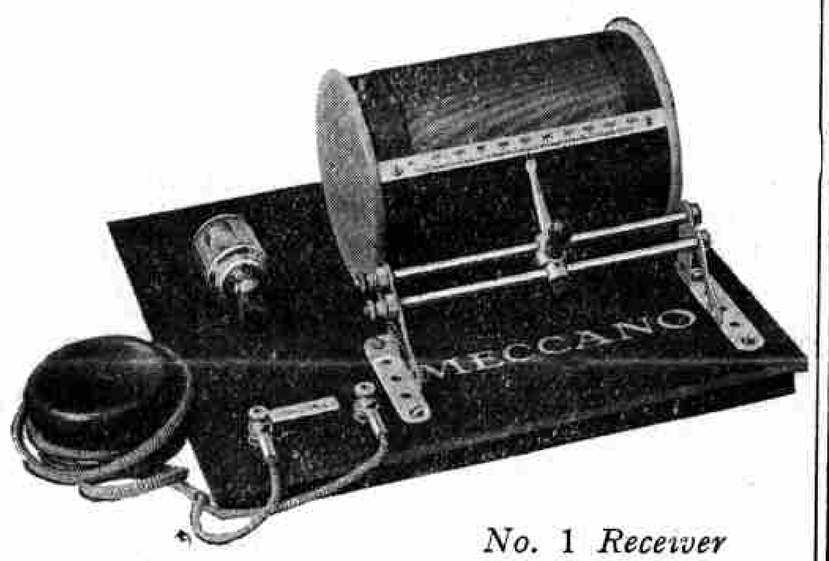
The "*Meccano Magazine*" may be obtained from your regular Meccano dealer, or direct from this office (post free). The price is the same in either case, 6d. for six issues, or 1/– for twelve issues. The "*M.M.*" is issued on the 15th of each month, and you should place a standing order to ensure regular delivery, for, as a rule, back numbers cannot be supplied.

Listen-in with a Meccano Receiver

No. 1

Meccano Crystal Receiver

With a good aerial this set will receive telephony up to about 25 miles from a broadcasting station, and Morse signals up to, and exceeding, 100 miles. The set, which may be used with a broadcasting licence obtainable from any Post Office at a cost of 10/-, will receive on wave lengths from zero to approximately 1,000 metres.



No. 1 Receiver

R.S. 1 – Receiving Set complete, tested and guaranteed, price **32/6**
Compulsory Broadcasting Fee **7/6**
40/-

No. 2 Receiver

No. 2

Meccano Crystal Receiver

This set is of the constructional type and is specially adapted to the requirements of those who wish to carry out simple experiments. Its range is the same as that of No. 1 set described above, and it receives on wave lengths of approximately 300-500 metres It may only be used with an experimental licence, which costs 10/- and is obtained from the Postmaster General, London.

R.S. 2—Complete Set of Parts, in strong carton, including single telephone 2,000 ohms resistance, price **25/-**
R.S. 2a—Complete Set of Parts, in strong carton, without telephone, price **15/-**

MECCANO LIMITED BINNS ROAD LIVERPOOL

In connection with the efficiency of crystal receivers over long distances, it may be mentioned that the opera, broadcast from Covent Garden recently, was received with a Crystal Set at Southport.

* * *

Master Guy Hare, the energetic Secretary of the Leamington Meccano Club, regularly receives London broadcast on his Crystal Receiver.

* * *

Good transmission from amateur stations is to be heard every night in London, Manchester, Liverpool and elsewhere. Some of the musical items are very good and compare favourably with items from the Broadcasting Stations.

A wireless lighthouse, recently erected on Inchkeith (Firth of Forth, Scotland) is specially designed for use in fog.

* * *

The transmissions from the lighthouse are concentrated in a beam that carries for about 100 miles. As the beam passes each point of the compass it gives a different and distinctive signal. It is of service only to vessels equipped with suitable receiving apparatus.

* * *

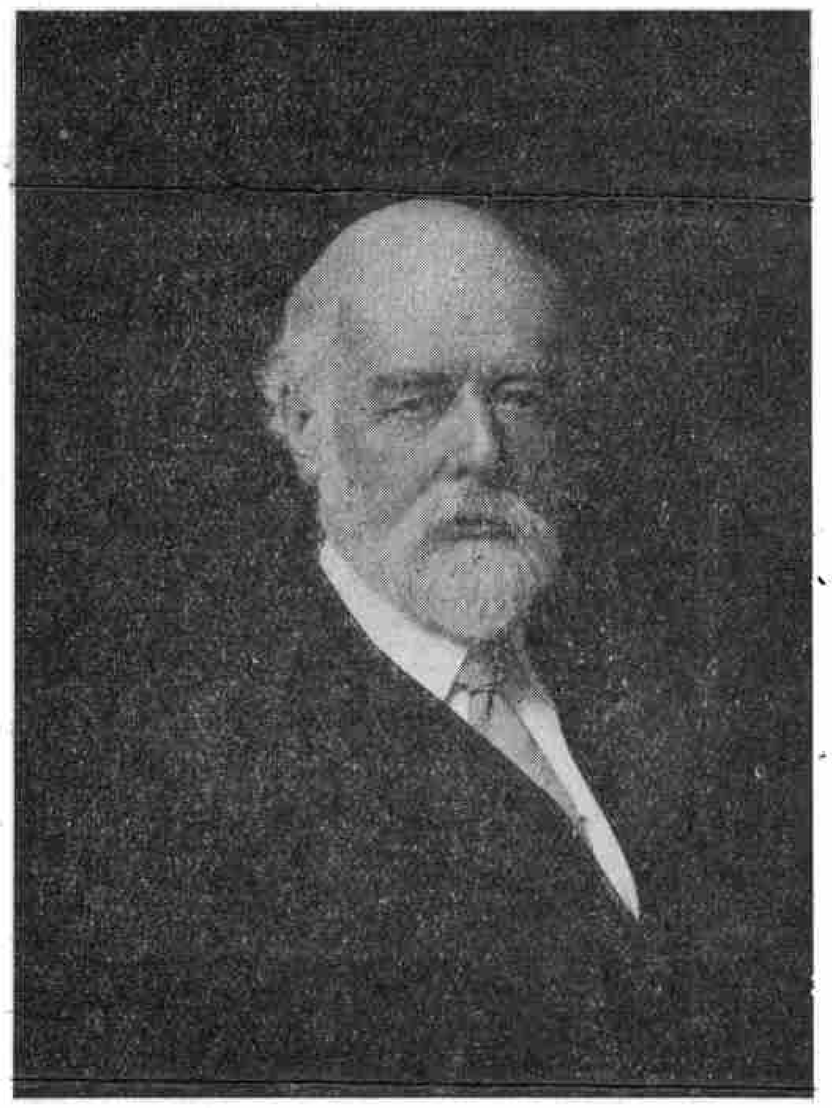
A radio rescue was effected recently when the "*City of Honolulu*" caught fire off the coast of California. The ship was 670 miles off land when the fire broke out, and after three hours it was found necessary to abandon her.

* * *

Radio signals had carried the message of distress far and wide, however, and ships of every description were rapidly racing to the scene. Fortunately the sea was calm, and the rescuers found all the passengers and hands in the lifeboats, watching the ship go to her doom.

A Message from Sir Oliver Lodge

to Readers of the "*M.M.*"



Sir Oliver Lodge, F.R.S., D.Sc., LL.D.

We have pleasure in publishing herewith a facsimile of a letter received from Sir Oliver Lodge, F.R.S., in response to our request that he would send a message to Meccano boys through the columns of the "*Meccano Magazine.*"

Sir Oliver Lodge was one of the earliest workers in connection with Radio. As early as 1894 he experimented with Hertzian Waves and was able to detect wireless signals at 150 yards distance. He is regarded as one of the foremost authorities on the ether, and has recently answered an American scientist, who explains the phenomenon of Radio on the assumption that the ether does not exist. Sir Oliver frankly disagreed with the American, and stated that "to deny the existence of forces that we cannot perceive, is stupid." He further pointed out that "one cannot really think of Radio waves without some medium for their conveyance."

Telegrams:
"LODGE, NORMANTON, AMESBURY."
Station for Goods: AMESBURY.
Telephone: 42 AMESBURY.

NORMANTON HOUSE,
LAKE,
SALISBURY.

Dear Sir,

In reply to your request I send you a photograph which was taken at midnight in his laboratory by Mr. A.A. Campbell Swinton, F.R.S., who is a considerable authority on Wireless, and who is acquainted with some of my early work in that direction.

I had no idea in the '80's and 90's of last century that the subject would develop so rapidly as it has. The theoretical aspects of it intensely interested me. The present mode of harnessing electrons has rendered reception much easier, and could have been anticipated. And the transmission of the human voice over great distances is a surprising achievement.

Your readers are to be congratulated on being able to make use of these discoveries: and perhaps some of them will be able to do work which will lead to still further improvements, the ultimate end of which no one can foresee.

Yours faithfully,

Oliver Lodge

To the Editor of the
"Meccano Magazine."

Sir Oliver Lodge was President of the Physical Society of London 1899-1900 and President of the British Association 1913-14. He received the Rumford Medal of the Royal Society, and the Albert Medal "as a Pioneer in Wireless Telegraphy." We believe that this message from so eminent a scientist will be of the greatest interest to our readers.

The Men Who Gave Us Radio

Owing to the large demands on our space in this issue, the instalment of "The Men who Gave us Radio" is held over until our next issue. In it we shall describe the invention of the telephone by Graham Bell, the work of Professor Trowbridge, and a brillant prediction of Clerke-Maxwell. It is the fourth instalment of a serial article dealing with the work of scientists who contributed to the invention of Radio. Order your July "*M.M.*" early, if you have not already done so.

THE MECCANO GUILD

The Secretary's Notes

Guild members are located in all quarters of the globe, and each feels that he has many friends among fellow members of the Guild. It is interesting to know we are thus represented far and wide, and I look forward with confidence to the time when Meccano Clubs will exist in every country. There are many difficulties in the way, however, which you boys perhaps do not appreciate. The greatest difficulty, of course, is that of language. Where English is not universally spoken it necessitates the printing of the Guild literature in different languages—as well as making special badges and medallions.

The Guild Abroad

All this takes time and much labour, but we are steadily progressing to this great end, and our Clubs in Africa, Australia, New Zealand, Ceylon, India, Dutch East Indies, and Iceland are firmly established. These Clubs are doing good work, and more recently-established Clubs in Holland and Italy give promise of considerable success.

A great impetus has been given to the Guild abroad by the movement being taken up in France, and I feel that we are well on the way to a fulfilment of my ambition.

Clubs Overseas

During the Summer the indoor activities of the Clubs are necessarily suspended and the majority of Clubs follow outdoor pursuits, as detailed in previous issues of the "*M.M.*" I think this plan is highly commendable, for it keeps the members together in happy companionship, and maintains their enthusiasm for the Club in readiness for the following indoor Sessions.

Club Activities in Summer

I have been pleased to note that the majority of Club Secretaries gave effect to my recent announcement, when sending in reports at the end of the second Winter Session. There are still some Secretaries, however, who send in reports written on both sides of the paper in very illegible writing. Others include a casual paragraph on the Club in a lengthy letter dealing with other subjects.

Club Notes

I would, therefore, again point out that it will help me considerably if reports are written on separate sheets of paper, on one side of the paper only, and are as concise as possible. Any Secretary who is in doubt about his report should approach his Leader on the subject, for these reports are important, and in some cases are the only means I have of judging a Club's work and progress.

CLUB NOTES

Holy Trinity (Blackburn) M.C.—A successful Exhibition was organised recently at which the Meccano play "*Nonsense Nana*" and "*Billy Bunter's Treasure*" were produced. Both the Exhibition and the two plays were very successful, and the members hope that a similar function will be organised next Session. *Secretary*: Master J. Catlow, 183, Whalley New Road, Blackburn.

Victoria (Glasgow) M.C.—Has just completed a most successful Session of indoor work. An Exhibition held towards the close of the Session proved both a social and financial success. Interesting visits have been paid to the Glasgow Central Fire Brigade Station, a local Foundry, Electrical Works, Gas Works and Shipbuilding Works. *Secretary*: Master Ian Kerr, 57, Victoria Park Drive South, Whiteinch, Glasgow, W.

1st Herne Bay M.C.—Still making progress, although the small membership curtails the activities of the Club. A small Exhibition was held recently at which Mr. Russell, the late Club Leader, was present to award the prizes. *Secretary*: Master C. W. Russell, 4, Clifton Villas, South Road, Herne Bay.

Meccano Club Leaders

No. 3. Mr. STUART H. WILSON

Mr. S. H. Wilson decided to start a Meccano Club while he was in the army. By the end of 1918 the "Holy Trinity Meccano Club" was inaugurated. This Club was the first to be affiliated with the Guild and is the oldest of our Clubs. It is interesting to learn that Mr. Wilson possesses one of the original "Mechanics Made Easy" Outfits which came on the market about 1900, and was the name under which Meccano was then known. Although his first Meccano Outfit was a No. 1, Mr. Wilson has since gradually increased his set, until now it is about equal to several No. 6 Outfits!

Den Haag (Holland) M.C.—Has made excellent progress. Recently an Exhibition was held, extending over a fortnight, and at this some very excellent models were on view. These included Eiffel Tower, Factory, Giant Auto Swing, Cake Walk, Drop Hammer, etc. All the members are keen and enthusiastic, and it is hoped to accomplish great things next Winter. *Secretary*: Mr. H. C. van der Sluis, 54 Ant. Duijck Straat, Den Haag, Holland.

Wisbech M.C.—The Savings Bank recently introduced has been well supported. An Exhibition and a Social both proved most successful. Some splendid models were exhibited at the former function, and the judge experienced so much difficulty in awarding the prizes that he appealed to the spectators to vote. The prizes were awarded to Masters S. Kettering (Motor Bus), L. Stagles (Swing Bridge), and C. Royal (Railway Wagon Swivel Crane). *Secretary*: Master S. Ketteringham, 99, Norwich Road, Walsoken, Wisbech.

New Malden M.C.—Continues to flourish and progress. In addition to increasing the membership to 50 the Club has now a Meccano Crystal Receiving Set of which the members are making good use. The Club has been divided into two sections. (1) Boys under 12 years of age, and (2) Boys of 13 and over. During the Second Winter Session an Exhibition, followed by a series of short lectures was held, at which a large gathering of parents and adult friends attended. Over £2 10s. 0d. was collected towards a Summer outing to some place of engineering interest. Two Football Matches have been played between this Club and the "Claygate Meccano Club," and after the games musical evenings have been given. *Secretary*: Master A. Barnwell, Coombe Wood Nursery, Kingston Hill, Surrey.

Holy Trinity M.C.—The chief feature of the past Session was the commencement of a Radio Section. The construction of two Receiving Sets was commenced and one has been finished, Meccano Radio parts being used in the work. The fact that the Club is in possession of an Experimental Licence will enable this set to be used to advantage. Visits to several works have been made, and visits to "The Times" Printing Works; Royal Mint; the London General Omnibus Co.'s Works at Chiswick, and Pascall's Chocolate Works, are to be made during the Summer. It is hoped to organise the 5th Annual Exhibition next Session, and several London Clubs have promised to co-operate. *Secretary:* Master Stanley Bone, "The Rosary," Kents Hill Road, North Benfleet, Essex.

Invercargill M.C. (New Zealand).—At an Exhibition held recently there was a fine display of Meccano models. The members are all keen and enthusiastic, and are doing their utmost to make their Club more widely known. The Club Leader is helping to form other Clubs, and shortly I hope to be able to affiliate Clubs at Lime Hills, Woodlands, and Christchurch. *Secretary:* Master M. Ridger, Alice Street, Gladstone, Southland, New Zealand.

Wisbech M.C.—Meetings are being held during the Summer and a Cricket Team has been organised. Visits to local places of interest are also being arranged, and it is hoped also to organise a few rambles. *Secretary:* Master S. Ketteringham, 99, Norwich Road, New Walsoken, Wisbech.

New Malden M.C.—Many of the members have delivered Lectures to audiences of both boys and adults on such subjects as "Wireless," "Electric Motors," "Ships," "Motor Bicycles," "The Great Eastern," etc. Interesting visits have been paid to Leyland's Motor Works, Engineering Exhibition at Olympia, Portsmouth Dockyard and the Southampton Docks. *Secretary:* Master A. Barnwell, Coombe Wood Nursery, Kingston Hill, Surrey.

Gulgong M.C. (Australia).—The Club Leader writes: "The Club is keen, active, and interested. The training the boys are receiving is calculated to make them morally sound and useful citizens. It is a pleasure for me to act as their Leader." The Club is indeed making rapid progress. *Secretary:* Master N. E. Wallis, "Yarrawin," Gulgong, New South Wales, Australia.

Southall M.C.—It is hoped to obtain a Club-room in connection with one of the local schools for next Session. During the Summer a number of outings have been arranged, although indoor Club work has been suspended. *Secretary:* Master K. Watson, 2, Waltham Road, Southall.

1st Ceylon M.C.—Recently a stall was organised by the members of this Club in connection with the Dharmaraja College Fancy Fair and in conjunction with this the sum of £6 was handed over to the Fund. *Secretary:* Master B. K. Billimoria, Dharmaraja College, Kandy, Ceylon.

Church of Christ M.C.—The past Session has included Lectures, two Model Competitions, and also a Concert and Exhibition. A Cricket Team has been organised for the Summer months. *Secretary:* Mr. Chapman, 264, Lee Street, Oldham.

West View M.C.—During the past month members of this Club have been taking full advantage of outdoor sports, and several practice cricket matches have been played. In a recent "Fox and Hounds" run the foxes completely outwitted the hounds. Lectures and Model Building are being arranged for when the weather proves unfavourable for outdoor sports. *Leader:* Mr. H. W. R. Cousens, 494, Mansfield Road, Sherwood, Nottingham.

Clubs Recently Affiliated

Triangle (Coventry) M.C.—This Club was formed at the beginning of February and became affiliated shortly afterwards. Already good progress has been made and a new Club-room has been obtained. *Secretary*: Master R. Mayell, "Zolo," Crescent Avenue, Coventry.

House (Guernsey) M.C.—Is formed in connection with the Elizabeth College, and meetings are held every week. Excellent progress has already been made. *Secretary*: Master H. Griffith, Elizabeth College, Guernsey, Channel Islands.

Leckhampton M.C.—Formed during the Christmas holidays, affiliation was granted in April. An interesting Exhibition of Meccano work is to be held in connection with the Church Bazaar at the end of May. *Secretary*: Master B. Rhodes, Cotswold View, Charlton Lane, Leckhampton, Cheltenham.

OUR MAIL BAG

In this column the Editor replies to letters from his readers, from whom he is always pleased to hear. He receives hundreds of letters each day, but only those that deal with matters of general interest can be dealt with here.

Correspondents will help the Editor if they will write neatly in ink and on one side of the paper only.

M. Buring (Launceston, Tas.).—We are glad to see that after five years of model building you are as keen as ever on Meccano, and that in fact you are suffering from "Meccanoitis." The word "*bonza*" with which you describe the "*M.M.*" is new to us, but it sounds good!

D. Nyes (Darjeeling).—Thanks for your article on Darjeeling. This is good, but photos are not sufficiently clear to allow of reproduction. If you can send us better ones we shall be able to publish your article.

P. Jones (Smethwick).—Your suggestion for a special Meccano badge, with sides measuring 2½" and a fastening to fit cycle handlebars, shall have consideration.

H. E. Jones (Shipbourne).—Many thanks for your suggestions and criticisms. Your last remark that you "would not be an Editor for £100 a week" shows us that you appreciate the many difficulties that we have to face.

F. Williams (Warrington).—We think you could scarcely call "*A Night at the Pool*" a "blood-and-thunder" story! At any rate a very big number of boys have written in to say how much they have enjoyed reading it. We hope you will like our new serial "*Bulmer's Father.*" Your list of suggested contents is on good lines, and will be considered.

Dickie Jones (Churchdown).—We are pleased you are getting along so well with your correspondent in France. We wonder how she will translate into French your own characteristic phraseology! Your life appears to be full of happiness and holidays.

A. H. Lambley (Morton).—Thanks for your suggestion that we include photos of engineering subjects with the "*M.M.*" suitable for keeping in albums. We shall consider this.

G. Burnham (Barnet).—If you will read our Editorial in this issue you will see that we intend to carry out the suggestion that you and many other boys have made.

A. Taylor (Lincoln).—We feel quite sure that you can make models sufficiently good to stand a chance of winning a prize in our Best Model Competition. We advise you to persevere with the tractor on which you have spent so much time. Perhaps the suggestion we have sent to you by post will help you.

R. Peace (Halifax).—Your solution of Master Cawley's hidden word riddle is correct. We are glad to know that you consider the "*M.M.*" is perfect in its present form. We shall go on improving it, just the same!

L. C. Edwards (Hull).—As you say, this would be a monotonous world if we all thought the same! Judging by the entries to the "Improving the '*M.M.*'" Competition there is not much danger of this. If we adopted every reader's views, each issue would be the size of a Family Bible! Thanks for your own well-considered suggestion.

W. Cowlishaw (Swindon).—We are glad to receive your first letter and we hope to hear from you often. We were interested in reading the poem that won for you a first prize of a Meccano Outfit.

H. Atkins (Leatherhead).—We are so busy working on the "*M.M.*" in 1923 that we have little time to speculate what it will look like in 1970. We are certainly planning ahead, but not so far as that. Sorry we addressed you incorrectly in our last letter.

M. I. Rowlands (Corwen).—Your solution of the cipher message was correct. Mr. Hornby had no difficulty in deciphering your message: "*Bibqqy fbtufs bre qmfony pg fbtufs fhlit gps ns Gsbol Ipsoeg*" and he thanks you.

C. Brearley (Leeds).—Asks us if we can tell him the difference between the "*M.M.*" and a stoat. Just as we are deciding to give it up, he tells us on the next page that it is quite easy, "*because the latter's toatally different!*" Who would be an Editor?

R. Pearce (Halifax).—You have deciphered G. Orton's code message quite correctly. Here is your own. "Bar uncel n qan rsvy taby n rinu loaebu ez lns." We hope other Meccano boys will not find it too difficult.

J. Simpson (Bradford).—

"A cheerful old bear at the Zoo
Said: 'I never have time to feel blue,
When it bores me, you know, to walk to and fro,
I reverse it, and walk fro and to.'"

We have often seen him pacing his cage, and now we know the reason why!

New Rolling Stock

Send for list of Train Accessories and Rails, Points and Crossings.

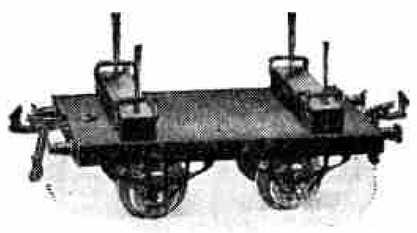
We are pleased to announce that the range of our Clockwork Train Rolling Stock and Accessories is being considerably extended, and many good things are in store for owners of Hornby and Zulu Train Sets.

Supplies of the four wagons illustrated below are now ready and may be procured from any Meccano dealer.

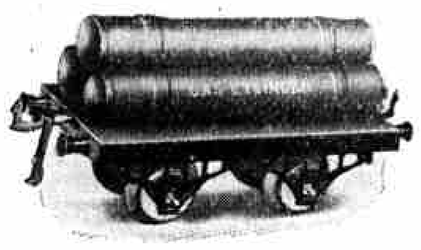
Further accessories will include Lamp Standards, Signals, Turntables and many additional types of Rolling Stock, full particulars of which will be announced in the "*M.M.*" in due course.

The whole series, when complete, will comprise the finest selection of rolling stock obtainable.

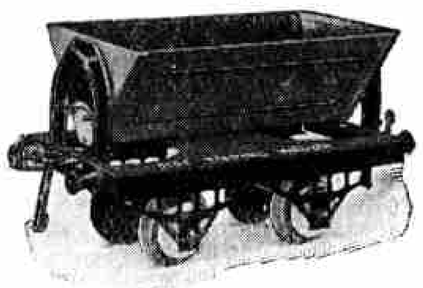
ASK YOUR DEALER TO SHOW YOU THESE NEW LINES.



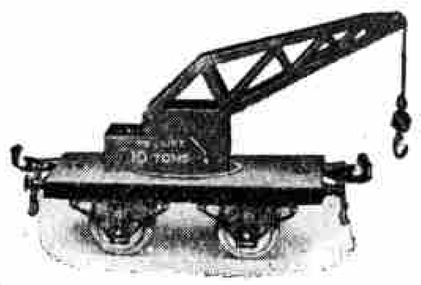
No. 1 Lumber Wagons, each 2/6



Gas Cylinder Wagons, Finished in Red, each 4/-



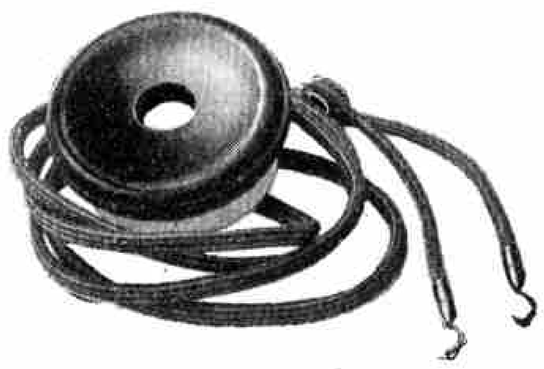
Side Tipping Wagons, each 3/6



Crane Trucks, each 4/6

MECCANO LTD. BINNS ROAD LIVERPOOL

Telephone Receivers



We have a limited number of single telephone ear-pieces similar to the illustration, of which we are disposing at 10/- each, postage 1½d. These telephone ear-pieces are of 2,000 ohms resistance. They are of the highest grade of British manufacture and give loud and clear reproduction, free from distortion. They are suitable for use with any receiving set, and are useful as additional 'phones to enable a second person to listen in. They may be converted into a double head 'phone by attaching two together with a metal band, or with a 12½ inch Meccano strip.

Those desirous of acquiring a high-grade telephone are advised to take advantage of this opportunity, as our present stock is limited and will soon be exhausted.

A Giant Bomber—*(cont. from page 3)*

Dignity and Impudence

As a contrast to this large bombing aeroplane may be mentioned the glider, fitted with an engine of only 15 h.p., that successfully crossed the Channel and returned to France on the 5th May last.

These two types of aeroplanes, of 1,000 h.p. and 15 h.p. respectively, show that development is not only being made by the production of engines of increasingly high power, but that progress is also being made in the opposite direction. Every increase in the efficiency of the aeroplane itself enables lighter engines to be used, for greater constructional strength is obtained by improving the design, thus allowing the weight of the structure to be cut down to a minimum, consistent with safety.

In the other direction, that of pilotage, our increased knowledge of air-currents and other matters of vital importance to airmen, enables greater advantage to be taken of existing circumstances. One immediate result of this is that it has been proved possible to "glide" across the Channel and back to France. The wonder of such an achievement is evident from the fact that if an aviator had put forward such a proposal only a few years ago, he would have been looked upon as being more fitted for a lunatic asylum than for the pilot's seat of an aeroplane!

THE END.

Small Advertisements

Small advertisements are inserted in these columns at 1/– per line (average seven words to the line), or 10/– per inch (average 12 lines to the inch). Cash with order. Letters to Advertisement Manager, "Meccano Magazine," Binns Road, Liverpool.

FOUNTAIN PENS (British Made) complete with filler and box, marked 10/6. Our price 1/9 post free. Box No. 21, c/o "*Meccano Magazine*," Liverpool.

SIXTY DIFFERENT STAMPS FREE to applicants for approvals. All ½d. each. Send postage. Cox, 135, Cambridge Road, Seven Kings.

NEARLY 50,000 STAMPS SOLD, send now for 1,000 assorted, 1/–. North Bros., 37, Bostock Avenue, Abingdon.

BRITISH EMPIRE. ALL MINT.
My No. 1 Packet contains twelve different **BRILLIANT MINT BRITISH COLONIAL STAMPS,** including Bermuda tercentenary issue; British Somaliland, Fiji, Kedah, Palestine, Mauritius, &c., &c. **Price only 7½d. Post Free.**
ASK FOR MY PRICE LIST.
ALEC KRISTICH (Member N.R.P. No. 279), 82, Marchmont Street, Russell Square, London, W.C.1.

Packet of 60 Greek Stamps, 2/-. Approvals sent.
P. DROSSOS. 2, St. Denis Place, Athens.

FREE! SET 14 PICTORIALS (catalogued 2/9) to applicants for cheap approval sheets enclosing 1½d. postage.
Powell, 73, Bond Road, Surbiton, Surrey.

O.K. 20 DIFFERENT UNUSED STAMPS FREE to genuine approval applicants.
Kraus, 137, Cheapside, London.

HUNGARY 10 (PICTORIALS), GERMANY (10), AUSTRIA (10). Postcard asking for approvals, to Paterson, 19, Dorset Avenue, Rusholme, Manchester. Exchange wanted with readers abroad.

100 DIFFERENT STAMPS FREE!
including many mint, British Colonials, War, etc.
Send no Money, just a Postcard, and request our approvals (clients abroad 6d.).
Lisburn & Townsend, 166, Islington, Liverpool.

CUT THIS OUT

"Meccano" Pen Coupon. Value 3d.
Send 5 of these coupons with only 2/9 direct to the **Fleet Pen Co., 119, Fleet Street, E.C. 4.**
You will receive by return a splendid British 14-ct. Gold Nibbed Fleet Fountain Pen value 10/6. (Fine, Medium, or Broad Nib). If only 1 coupon is sent, the price is 3/9. 3d. less for each extra coupon up to 4 (Pocket Clip 4d.). Satisfaction guaranteed. Your own name gilt letters, either pen 1/– extra.
Lever Self-Filling Model with Safety Cap, 2/- extra.

No. 6 MECCANO OUTFIT for sale (owing to death of owner). A few parts missing, but additional parts (including pulleys, couplings, cloth roller, etc.) to the value of £1 18s. 6d. Best offer. Box 6, "*Meccano Magazine.*"

ACCUMULATORS. 2-volts price 7/3, postage 1/–; 4-volts 9/9, postage 1/–; 6-volts 20/–, postage 1/6; 8-volts 30/–; 12-volts 45/–. F. Barling, Stowting, Ashford, Kent.

SPLENDIDFEROSUSH CALLING!
HELLO, EVERYONE!
Wonderful Crystal Receiving Sets, guaranteed to hear broadcast music clearly for 35 miles, although on most of them 2 L.O. has been heard (about 95 miles away). Price complete, 5/–. Foreign, 6/–. Seimens Headphones, 32/– extra.
G. Hare, 36, Willes Road, Leamington Spa.

WANTED. Articles and photographs of general interest, suitable for publication in the "*Meccano Magazine.*" Accepted contributions will be paid for at our usual rates and will be returned if unaccepted, if stamped addressed envelope is enclosed. Although every care will be taken of same, no responsibility can be accepted for lost or mislaid manuscripts.
THE EDITOR, "*Meccano Magazine,*" BINNS ROAD, LIVERPOOL.

Magazine Binder

In response to numerous requests we have introduced a spring-back binder for *Meccano Magazines*. The binder has a strong stiff back, covered with imitation leather, tastefully tooled. It takes a large number of copies and keeps them neat and clean. In black, lettered gold. Price 3/- each, post free.

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8 Guinea Models reduced to
£4 19s. 6d.
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WRITE TO THE WORKS FOR A FREE BOOKLET

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JULY 1923

MECCANO MAGAZINE

Published in the interests of Boys

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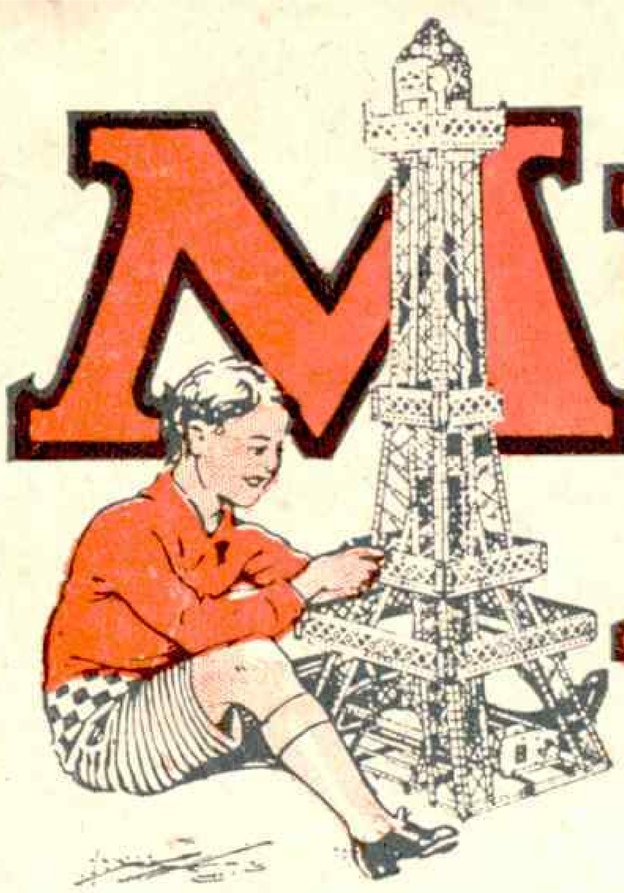
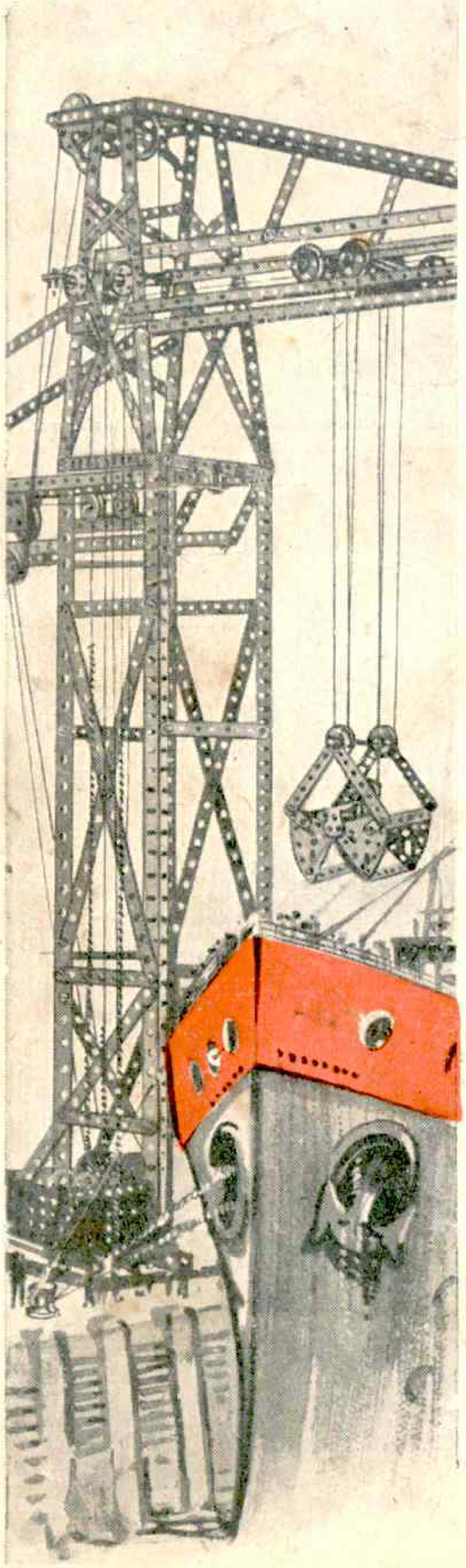
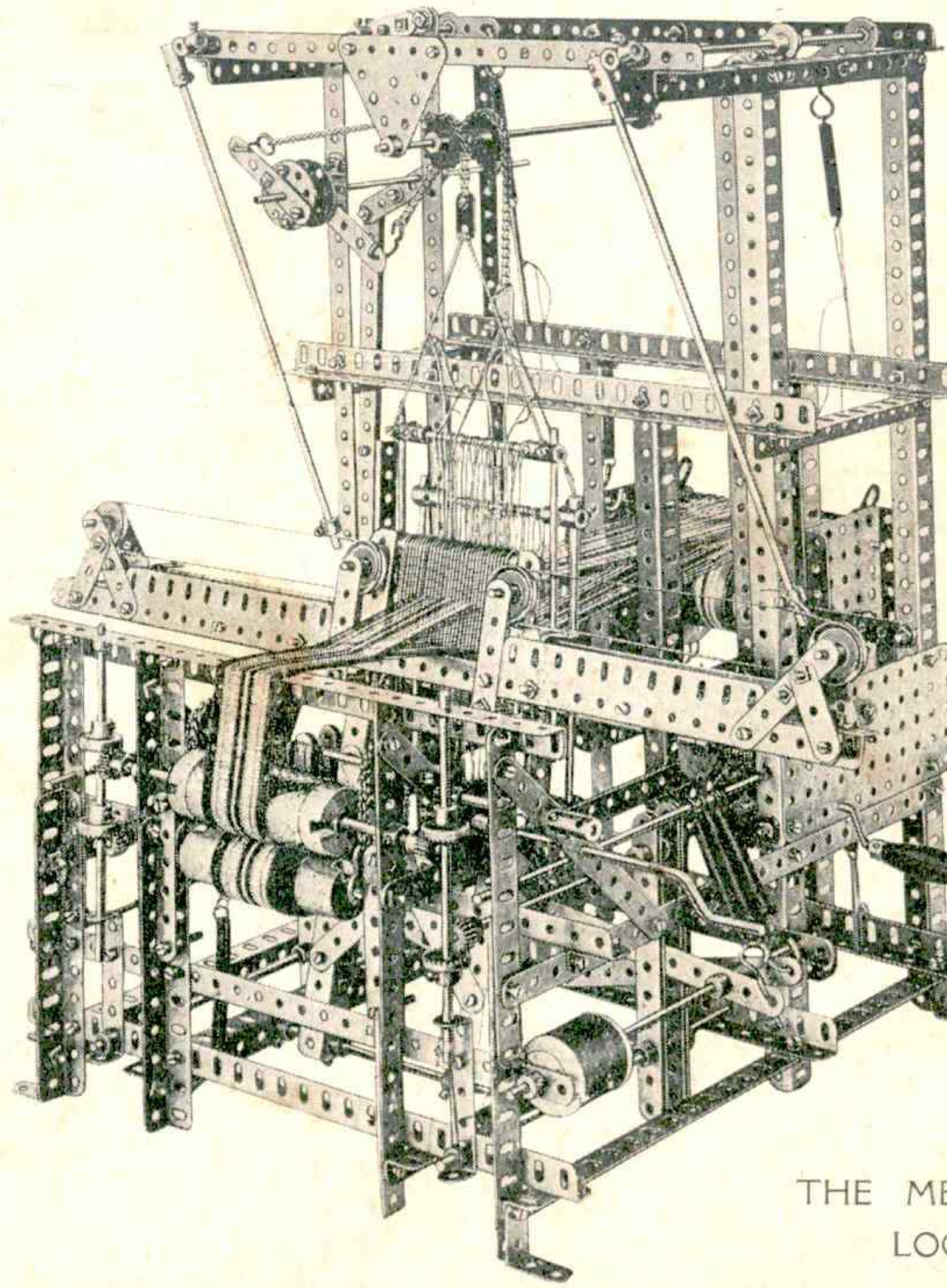
VOL. VIII

NO: 7







THE MECCANO LOOM

HOW TO BUILD A LOOM THAT WEAVES

FOR FULL INSTRUCTIONS—see page 74

THE SUPER LAUNCH

PEGGY

31 ins. long. 4 in. beam.

The Meccano Boy will find hours of sport and enjoyment with this boat. It is planned for speed and beauty, is simple and safe.

Send Your Order Now!

Complete with lamp, funnel and directions

22/6

Postage 9d. extra

WILL RUN 20 MINUTES UNDER ITS OWN STEAM A WONDERFUL BOAT BEAUTIFULLY FINISHED WITH DETACHABLE ENGINE

Quite a good turn of speed can be obtained by the oscillating type of engine, and the patent lamp beneath is enclosed to hold the heat.

Other Models are obtainable at 9/6, 12/6, and 30/-.

Hobbies

Call and see one or write for leaflet to

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Steam Models Dept.,
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65, New Oxford St., London, W.C.;
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326, Argyle Street, Glasgow;
10a, Piccadilly, Manchester;
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15, County Arcade, Leeds;
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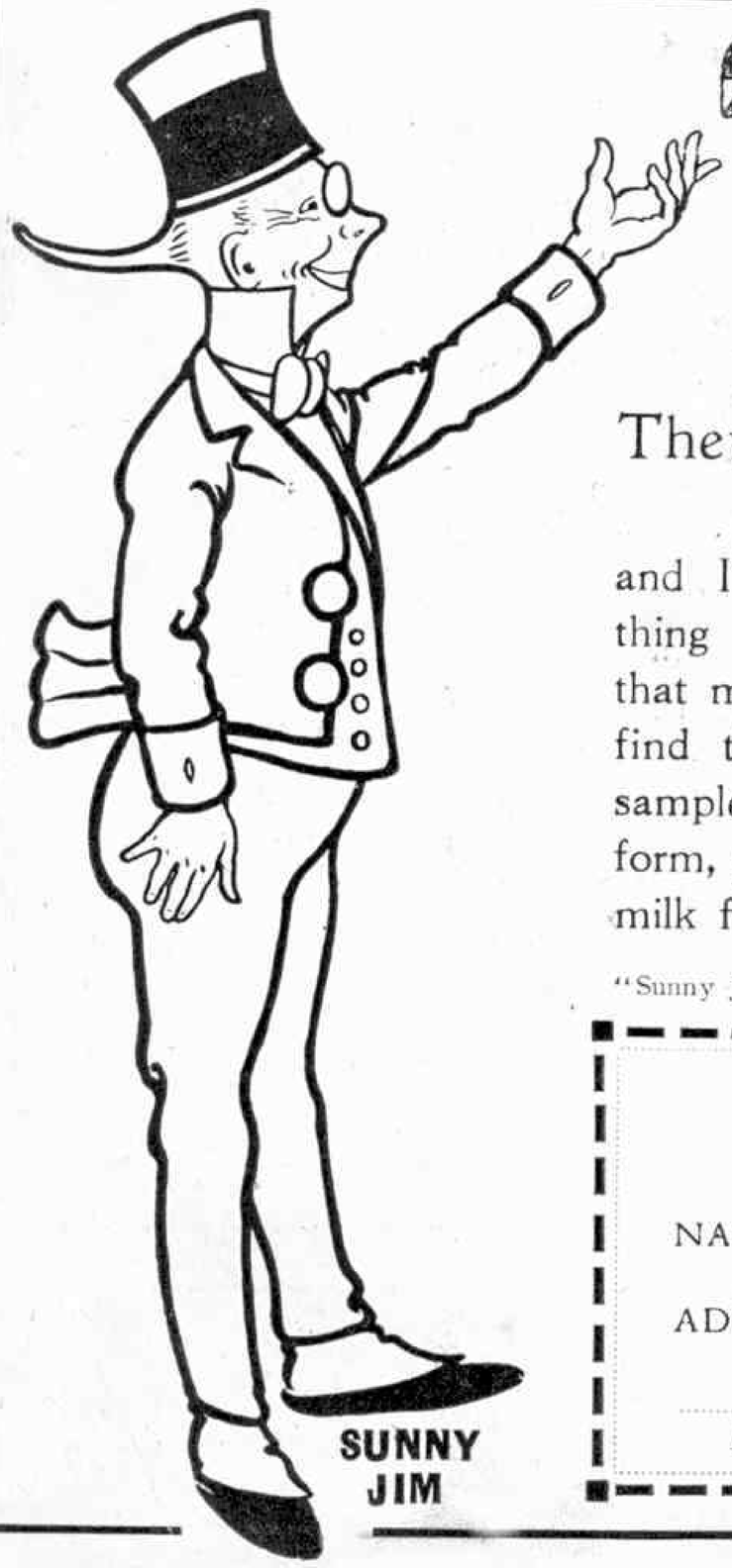


SUNNY JIM

"FORCE"

TOASTED MALTED WHEAT FLAKES

They put me in here to have a chat with you "Meccano" boys,

and I'm going to start on a very important subject. It's about something very good to eat. Yes—it's "FORCE." Now there is no doubt that many of you know what jolly good stuff "FORCE" is—I want to find those who don't know, and to them I am going to give a free sample, and then we'll all know, won't we? So write me, or fill in the form, at once and let's hear from you. "FORCE" is very nice with milk for breakfast and delicious with fruit and custard. Yours,

Sunny Jim

"Sunny Jim," 2/3, Charterhouse Square, London, E.C.

Post this to "Sunny Jim" for FREE SAMPLE

NAME .....

ADDRESS .....

.....

Meccano Magazine

EDITORIAL OFFICE
Binns Road,
LIVERPOOL

MECCANO MAGAZINE

PUBLISHED IN THE INTERESTS OF BOYS
on the
15th of each month

EDITORIAL

FOR the first time in its history the *Meccano Magazine* appears this month in a cover, and I am sure my readers will consider it a great improvement. Our distinctive title will be retained in future covers, but the illustration of the model in the centre will be changed from time to time, according to the model that is dealt with in that particular number of the "*M.M.*"

A new "dress" for the "M.M."

In our recent competition there were insistent demands for "more Meccano models." As already announced, I am making arrangements to meet the wishes of the majority of my readers in this respect. In our last issue we described how a Crystal Receiving Set for radio could be made from Meccano parts. In these pages we commence an article describing the building of the Meccano Model Loom for real weaving. This article, which will be concluded in our August issue, will be followed by instructions for building the Meccano Motor Chassis. Another article will follow showing how to build a Meccano "Grandfather's Clock" that will keep time as accurately as any grandfather's clock ever made, and later, instructions for building a new model of the High-Speed Ship Coaler.

More Meccano Models

There will also be a special series of companion articles, which will deal with the subjects with which the models themselves are concerned. For instance, in this issue we commence an article dealing with spinning and weaving, which serves as a companion to the article on the Meccano Loom. In the same issue that deals with the Motor Chassis we shall tell the story of the motor car, and so on. The articles are being specially written for us by a well-known writer, and they will be illustrated by some splendid photographs. By these means I feel sure that our readers will thoroughly understand the subject with which the particular Meccano model is concerned.

A Novel Feature

There is one other point that I would like to explain. On the cover of this issue we are commencing to show the volume number of each issue. The "*M.M.*" has now been published since 1916, and allowing one volume per annum, the number of the present volume is "VIII." There will be twelve monthly parts to a volume, and the next volume will commence in January, 1924. In this issue and in future issues, the paging will be consecutive—that is to say instead of the pages being numbered 1 to 12 each month, they will commence on page 1 with the January number, and continue consecutively until the end of the year. We have published six issues this year, each of twelve pages, so that the first page of this present issue is numbered 73.

Serial Numbers of "M.M." pages

OUR £250 CONTEST

The Judges are now hard at work on the thousands of entries in our £250 Model Building Competition. Full results in the August "*M.M.*"

At this stage in its career it is very interesting to go back to the time when the "*M.M.*" was first issued, and to mark its subsequent progress. Publication commenced in 1916, with a single sheet, and I well remember the chorus of approval that heralded its appearance. Each day I received hundreds of letters from enthusiastic Meccano boys, and the circulation was at once a large one. The "*M.M.*" went on this way for some years, and owing to the shortage of paper, high cost of printing, etc., and the many difficulties created by the war, it was impossible for a long time to enlarge it. Things became a little easier in 1920, and in September of that year we increased the number of pages to eight.

The Growth of the "M.M."

In September, 1922, the size was again increased, this time to twelve pages, in order to find room for many additional topics of interest to all Meccano boys. Now we are able to increase the size of the "*M.M.*" to 16 pages and to provide a cover. We hope that the "*M.M.*" in its new dress will find favour both with our older readers, and with the big army of new readers who will swell the ranks during the coming months.

The increase in the number of our pages is largely made possible by the inclusion of advertisements. I have assured our advertisers that Meccano boys will support the "*M.M.*" and that, all things equal, if our readers wish to purchase any article they will certainly purchase it from advertisers in the "*M.M.*," rather than from other firms. Now, in order that our advertisers may realise the value of their advertisements in the "*M.M.*" it is desirable that all readers who reply to them should state that they "saw the advertisement in the '*Meccano Magazine.*'" By doing this they will support me, and show advertisers the value of the "*M.M.*" as a means of selling their goods.

A New Departure

Before I close my monthly "talk" I would draw your attention to two new features in this issue—the Bookshelf and the Stamp columns. In the former column we shall describe books that are of special interest to our readers, so that they may be kept in touch with the latest and best literature that is published for their benefit. Those who are members of the Free Libraries that exist in most towns to-day, will know at once which books to borrow, whilst those who are lucky enough to be asked to name a book for a birthday or other present will be able to do so at once! Thus both readers will be saved much time in their choice of suitable books. The Stamp Collectors' column is being conducted by an expert who has made a close study of the subject for many years. Our stamp enthusiasts may therefore depend upon receiving much reliable information and help. I am a keen stamp collector myself and I am always pleased to hear of boys who collect, for the hobby teaches geography in a delightful way, calls for care and orderliness, and accustoms one to be observant and to study detail.

Books and Stamps

Of the very attractive programme I am mapping out for our future issues I have not space to write this month, but I shall deal with this subject more fully in my Editorial Notes next month.

IMPORTANT NOTICE.

We are constantly asked to supply back numbers of the "*M.M.*" We print only sufficient copies to fill our regular orders, and back numbers cannot therefore be supplied. In order to prevent disappointment our readers are advised to place a regular order, either with a Meccano dealer or direct with us.

THE MECCANO LOOM

FOR REAL WEAVING

INSTRUCTIONS FOR BUILDING THIS REMARKABLE MODEL

No model could better illustrate the wonderful genius of the Meccano system than the Meccano Loom. In this model every technical operation in the process of weaving is perfectly carried out in miniature, exactly as in every-day practice in actual manufacture. The Loom is operated simply by the turning of a crank handle, which sets in motion the whole of the necessary operations.

THE main framework of the loom is made up as shown in Fig. B, both sides of the framework being similar in construction.

When the framework is built, proceed to insert the driving mechanism, Fig. C.

The main operating handle 1 on the rod 2 drives a ¾" pinion 3 meshing with a 50-toothed gear wheel 4 on the spindle of which is a ¾" pinion 5 meshing with 50-toothed gear wheels 6 and 7 driving them in opposite directions.

Picking Motion

On the rod 8 of the gear wheel 7 are fixed 2 1½" bush or pulley wheels 9 connected by 3 double angle brackets 10 forming a cam, Fig. D, upon which 2 5½" strips 11, placed together, pivoted at 12 ride, and are held in contact by the springs 13. The cams at each side of the loom are disposed oppositely, that is to say, the 3 double brackets 10 on one cam are on the top when the corresponding 3 double brackets on the other side are beneath. To the outer end of the strip 11 is bolted a 12½" angle girder 14 the top of which is connected to a crank 15 formed of two cranks butted together with a 2" strip between, secured on the rod 16. At the far end of this rod is another crank 17, to the outer end of which is connected a spring 18 which normally tends to hold the crank 15 down, and return it after it has been moved up by the cam. To the outer end of the rod 16, by means of 2 couplings 19, is attached the picking stick 20 formed by a 9½" rod, the lower end of which is connected to a cord 21 passing round 2 1" pulleys 22. This cord is connected to a double bent strip 23 which engages a shuttle and flicks it across the slay 24. As the cams 10 are oppositely disposed, the picking sticks at each side of the machine work in unison and throw the shuttle to and fro.

Take up Motion

This is shown in Fig. C. On the rod 63 of the gear wheel 6 are also mounted 2 worms 64 which engage and drive 57-toothed wheels 65 on rods 66. ½" pinions 67 (Fig. A) drive ¾" contrate wheels 68 on the vertical rods 69. It is to be noted that the contrate wheels 68 are reversed. Other ¾" contrate wheels 70 on the rods 69 engage and drive ½" pinions 71 on the sand roller 72. Owing to the gearing of the worm 64 and gear wheels 65 the necessary slow "take up" motion of the sand roller is imparted, and the woven material, after passing beneath the sand roller, passes over the rod 73 to the lower roller 74, on which the fabric is wound. The lower roller (74) is driven

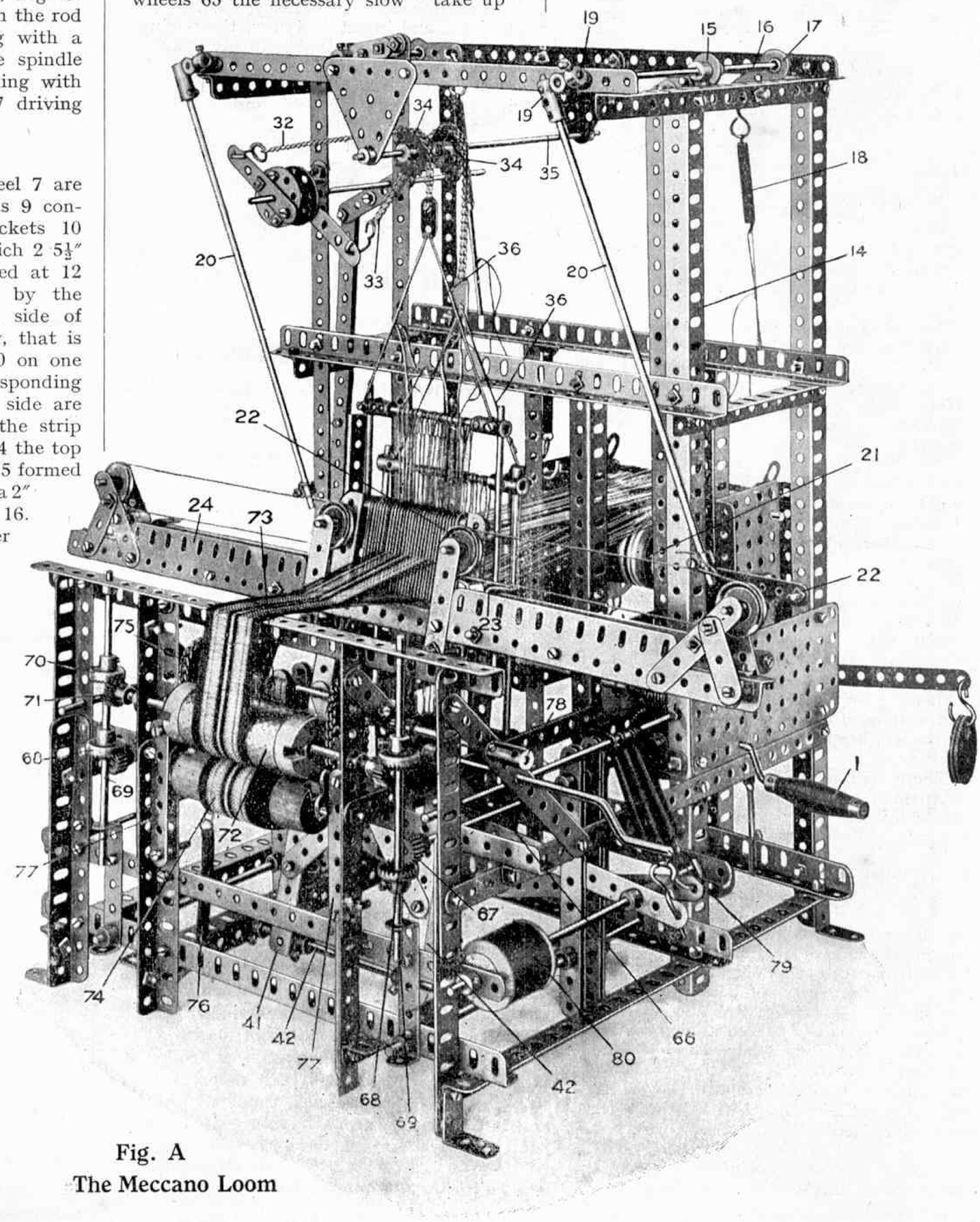


Fig. A
The Meccano Loom

The Meccano Loom—(*cont.*)

frictionally from the sand roller and is kept in frictional contact therewith by means of the chains 75 at either side, which are hooked on the rod of the roller 74 and are kept taut by springs 76 connected to the other end of the chains 75. The rod of the lower roller 74 is enabled to move away from the sand roller 72 so as to allow for the increasing diameter of the woven fabric thereon by causing the ends of its rod to engage between 2½" strips 77 and the frame of the machine at each side.

The Heald Frames

The construction of the heald frames will be clear from the detail given in Fig. E. The lower ends of the heald frames as shown in Fig. C are connected to 3½" strips 37 coupled to 5½" strips 38 controlled by the springs 39 which tend always to draw the heald frames down.

To adjust the healds correctly set them so that the eyes of both heald frame sets are level when the cranks 45 are vertical and the strips 47 (Fig. C) are horizontal.

As in actual practice, the healds are assembled vertically. In the Meccano Loom there are two frames, but there may be many more frames in actual looms. Whatever the number the frames are so arranged that when some are raised the others are pulled down. The healds thus serve to lift and depress the warp, so that the shuttle may be passed between the threads.

Purpose of the Healds

The healds consist of a number of wires, called "leaches," each having in its centre an eye, or "mail," which to a certain extent resembles the eye of a needle. The depression of the warp, referred to above, is made possible by passing the warp threads through these mails.

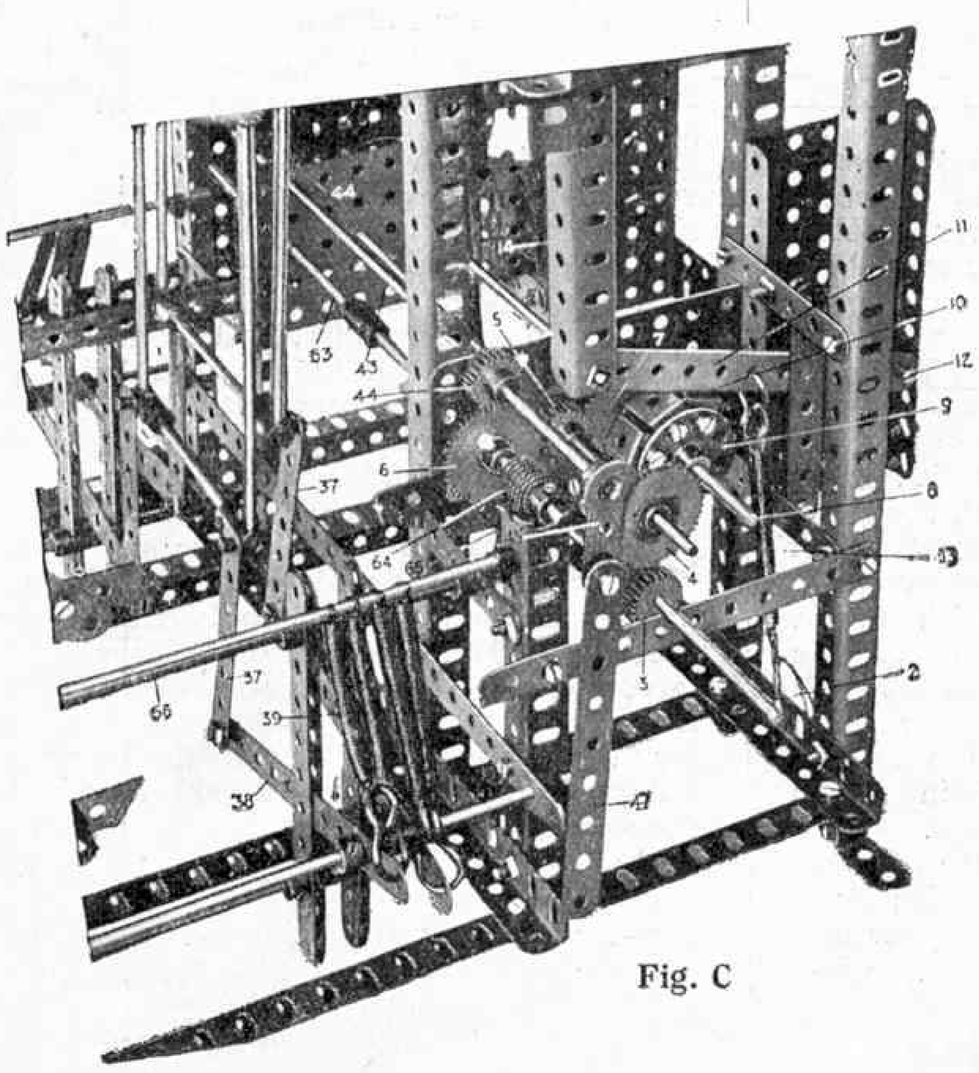


Fig. C

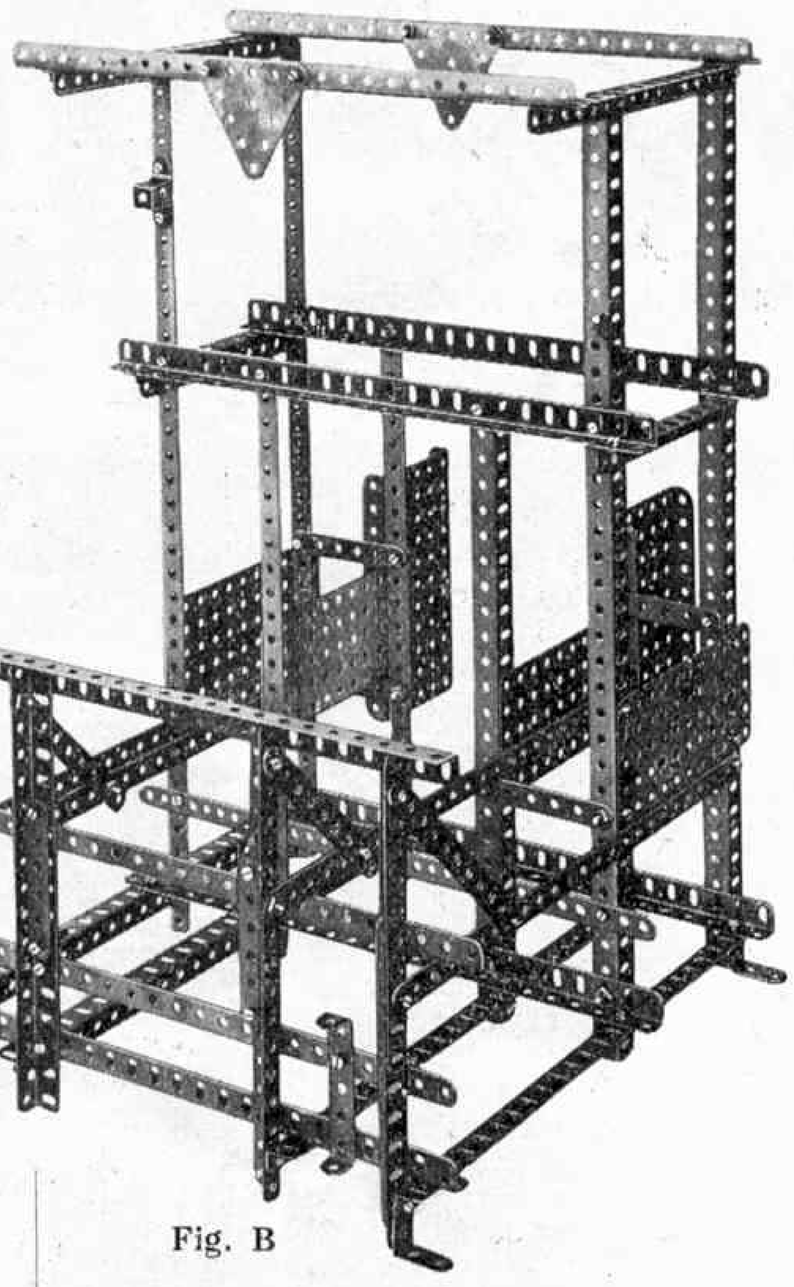


Fig. B

The warp is the thread that runs longitudinally, from the back to the front of the loom. The thread at right-angles to it is the "weft," which is introduced by the passing of the shuttle between the warp threads and pressed into position by the reed, both of which operations will be described in next month's "*M.M.*"

Pattern and Texture

It may here be remarked, perhaps, that the pattern depends upon the number of healds, the greater the number employed, the more complex is the resulting pattern. For the weaving of very complex figures the warp must be divided among a large number of healds.

When the Loom has been built, it is necessary to determine what pattern you will weave. Whether it be a tie or a hat-band that is your first effort, the choice of colours for the warp, and the colour of the weft will call into play your artistic qualities to no little extent, in addition to your manipulative abilities in the actual process of weaving.

In cases where specially intricate patterns are being worked, each individual warp thread may have its separate lifting apparatus. In such a case some automatic mechanism is necessary, in order that the pattern may be preserved when working at a high speed. Such a lifting mechanism is used in the "Dobby" loom, a model of which can also be successfully constructed by means of Meccano.

The pattern, which as we have seen depends on the number of healds employed, does not have any bearing on the texture of the woven fabrics. The closeness of the texture of any material depends upon the number of warp and weft threads to the inch. In actual manufacturing, fine cloth may have 125, or even more, threads to the inch both in warp and in weft.

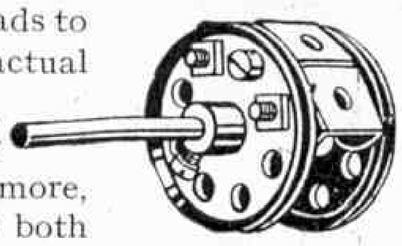


Fig. D

Thus in addition to the colour and the pattern, you will have to decide of what texture your fabric is to be.

Next month we shall continue these instructions for building the Meccano Loom by describing the Heald Motion, the construction of the Slay and the Reed, and of the warp thread Tension Mechanism. The article will conclude with some useful hints on preparing to weave, and full instructions will also be given in that issue for the construction of the Beaming Frame, a necessary model to those who build the Loom. We shall also give an illustration of some of the fabrics that have been woven on the Meccano Loom.

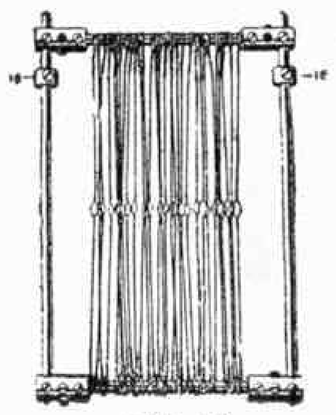


Fig. E

Parts Required

The following is a complete list of parts required for building the Loom, both those referred to in the above instalment and those that will be required to complete the model in accordance with the further instructions in next month's "*M.M.*"

6	of No.	1	3	of No.	27A
22	,, ,,	2	4	,, ,,	29
8	,, ,,	3	2	,, ,,	32
9	,, ,,	4	6	,, ,,	35
39	,, ,,	5	195	,, ,,	37
4	,, ,,	6	33	,, ,,	37A
4	,, ,,	6A	198	,, ,,	38
6	,, ,,	7A	15	,, ,,	43
17	,, ,,	8	2	,, ,,	44
3	,, ,,	8A	5	,, ,,	45
15	,, ,,	9	2	,, ,,	48A
2	,, ,,	10	2	,, ,,	52
8	,, ,,	11	17	,, ,,	57
4	,, ,,	12	55	,, ,,	59
4	,, ,,	12A	15	,, ,,	62
4	,, ,,	13	13	,, ,,	63
13	,, ,,	13A	4	,, ,,	67
10	,, ,,	14	4	,, ,,	70
1	,, ,,	15	2	,, ,,	76
1	,, ,,	15A	4	,, ,,	82
6	,, ,,	16	12	,, ,,	94
8	,, ,,	18A	4	,, ,,	96
2	,, ,,	19	42	,, ,,	101
2	,, ,,	20A	6	,, ,,	103
4	,, ,,	21	1	,, ,,	104
4	,, ,,	22	1	,, ,,	106
2	,, ,,	24	1	,, ,,	106A
5	,, ,,	25	2	,, ,,	109
5	,, ,,	26	7	,, ,,	111
5	,, ,,	27			

(*To be continued*)

The Fascinating Story of Spinning and Weaving

I.

MAN is the only creature that has to make clothes, and certainly a good deal of trouble would be saved if our bodies were covered with feathers or fur, thus making clothes unnecessary!

Sometimes people think that animals and birds are fortunate because they have not to provide themselves with clothes. Yet, on the other hand, there would be many drawbacks, if we were subject to the same conditions. For instance, we should not be able to change our winter clothes for the lighter apparel of summer when hot days came; nor could we wrap ourselves in extra heavy overcoats to brave the stormy days of winter. There would be many other disadvantages, too, for we could not change into flannels for cricket nor into "shorts" for footer. There would be no school colours, and no special caps for those boys in the school XI's! Then again, our mothers and sisters could not have pretty hats nor jumpers, and this in itself would be a terrible calamity indeed, from their point of view, though it would certainly save our fathers a good deal of expense!

Clothes the Result of Progress

Clothes are the result of civilisation. We read in our history books that, thousands of years ago, before man was civilised, when his battle axes were made of stone and his tools and weapons of flint, he was clothed in the skins of wild animals. Before he thus thought of robbing the animals of their "clothes," primitive man was himself clothed only by a hairy skin. Indeed, in those days he probably more closely resembled an animal than a man. As his intelligence developed, however, and as he pushed further and further into the cold regions, he found the necessity for a covering for his body. Thus it came about that he thought of using the skins of the animals he hunted for food.

Spinning was One of the Early Arts

As time went on and man rose higher in intelligence, weaving was invented, and fabrics made of flax and similar materials took the place of skins. Some of these fabrics were dyed different colours, and others were decorated with bright patterns, giving a pleasing effect. In this respect we imitate the ancients even to-day, for we like to wear clothes of different patterns, and to have in our homes curtains and carpets in which colours play an important part.

But spinning and weaving are of great antiquity, and as is the case with most arts and crafts, they were first practised in the East. Even at the time when Britain was covered with forests, and its inhabitants were uncivilised and clothed in skins, the people of Eastern nations were wearing woven cloth.

Weaving in Ancient Egypt

In accounts of the late Lord Carnarvon's wonderful discoveries we read of the fabrics found in the tomb of Tut-ankhamen, the mighty Pharoah who lived over 4,000 years ago.

Linen was known in Egypt in very early times, for in the Bible we read of Joseph being arrayed in fine linen. We read also that at the opening of the tabernacle constructed in the wilderness by Moses "the women . . . did spin with their hands and brought that which they had spun, both of blue and of purple and of scarlet and of fine linen."

In India, cotton cloth was the ordinary wear of the inhabitants at least five hundred years B.C. The ancient historian, Strabo, speaks of flowered cottons or chintzes, and he particularly refers to the lustre and vivid quality of the dyes with which the Hindus figured their cloths. In early times, the ports beyond the Red Sea did a large trade in cotton cloth. We are reminded of this fact by the names of calico and muslin, for they are called after the towns, Calicut and Mosul respectively, in which they originated.

Vegetable and Animal Materials Make Clothes

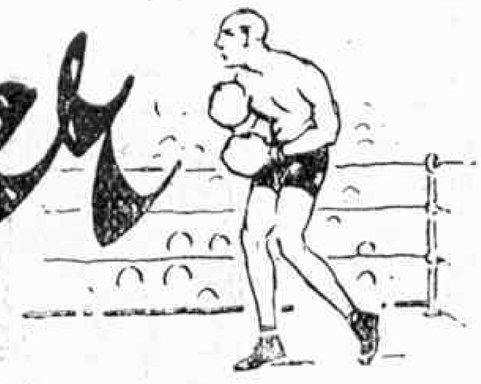
To-day our clothes are generally made either from cotton or from wool, and it is wonderful to think that

(*Continued on page* 85)

The story of spinning and weaving is extremely interesting and contains endless instances of how perseverance and ingenuity have triumphed over great difficulties. Numerous inventions have converted the original hand loom into the wonderful power loom used in our factories to-day.

OUR NEW SERIAL

Bulmer's Father



A Stirring Story of School Life

By Arthur Hutchinson

I.

IT was the first day of the winter term at St. Winifred's. Morning lessons were over, and knots of excited boys were grouped about the main corridor. Here and there a newcomer was to be found gazing tremulously at the outbursts of activity around him—a stranger in a strange land.

In front of a notice board, and eagerly scanning the news items upon it, stood Lawson major—the leader of the Upper Fourth—together with a few of his satellites. Suddenly Lawson sprang aside from the rest, and brought his hand down with a sweep upon the shoulder of a youngster who was trying to pass unnoticed.

"Hi! you," he cried, "What's your name?"

The youngster started back and gazed defiantly at his questioner.

"Are you deaf?" shouted Lawson, tightening his grip, "Can't you hear what I say? What's your name?"

"Bulmer," answered the boy unperturbed.

"How old are you?"

"Nearly fifteen."

"What's your Christian name?"

"John."

Lawson sniggered.

"And what's your father?"

"A man."

Lawson's snigger subsided into a frown.

"None of that," he said ominously, "You know what I mean. What does he do?"

The new boy drew himself up, and stared calmly into the eyes of his questioner.

"He minds his own business," he answered coolly, "which is more than a good many other people seem able to do."

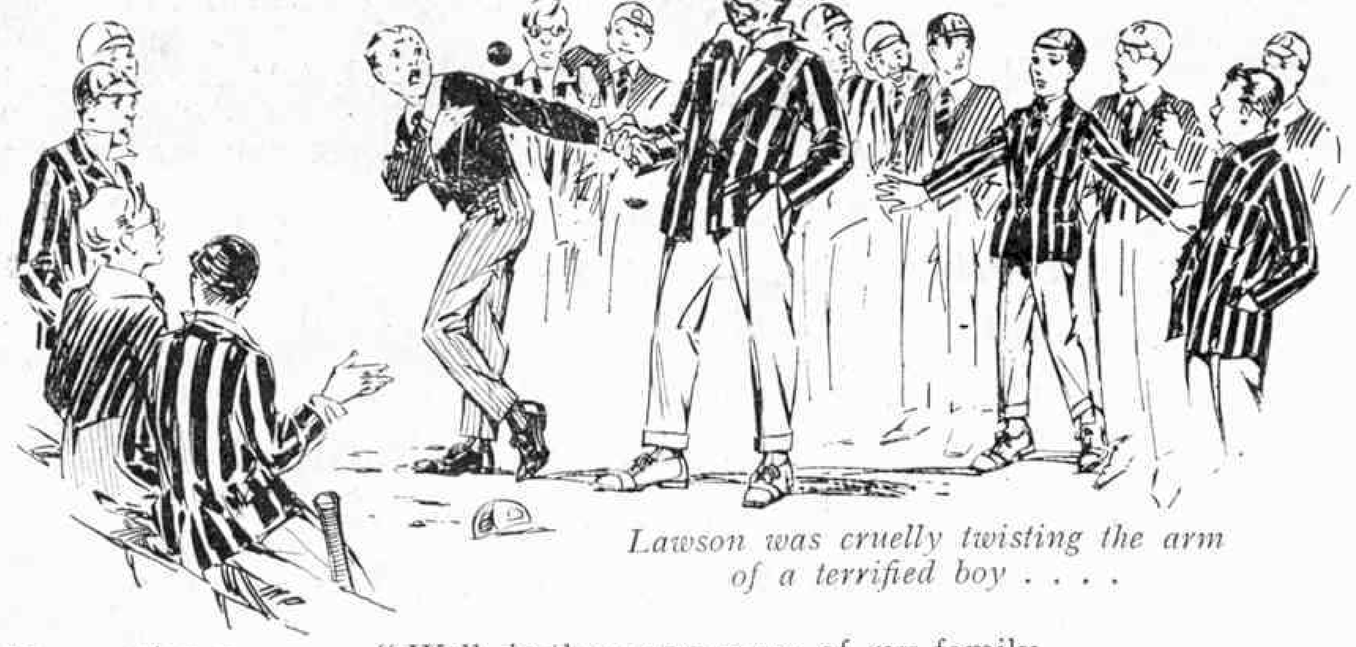
The crowd that had now circled round the newcomer gasped. This from a new boy—it was incredulous! As for Lawson, his face reddened with fury, and he clenched his free fist.

"Here, none of your confounded cheek, you wretched numb-skull," he spluttered. "When you're asked a civil question, just you give a civil answer—see."

The youngster drew back and half closed his fists. Then in a flash he controlled himself and an aggravating smile played round the corners of his mouth.

"I really don't see what on earth my father's got to do with you," he answered quietly. "He's my father, not your's. Besides, what he does is his affair, not mine."

Again the group gasped, and anxiously awaited the next move, whilst Lawson remained speechless with wrath and indignation.



Lawson was cruelly twisting the arm of a terrified boy . . . .

"Well, is there any more of my family history you want to know?"

The audaciousness of this question broke the spell, and with a muttered exclamation of rage, Lawson grabbed the new boy by the collar.

"You confounded young puppy," he cried, "I'll teach you ——"

The rest of the sentence was drowned by hurried exclamations from the surrounding group. "Here comes the Doctor," passed from lip to lip, as a black-gowned figure appeared on the horizon. The next minute the group of boys had melted away, and young Bulmer was left standing alone. For a few seconds he remained gazing in the direction of the vanishing boys, and then, straightening his crumpled collar, he followed in their rear, and away from the approaching figure.

II.

It is a significant fact that so far as a boy's life at a public school is concerned, the first impression that he creates will really always remain a permanent one. It takes a good deal more than the sands of time to alter it. Woe betide, therefore, if that impression has been on the debit side of his account, especially if the principal creditor happens to be none other than the school bully.

By a stroke of sheer bad luck, young Bulmer had, within practically an hour or so of his arrival at the school, run up against the very type referred to, and had immediately gained the enmity of the one boy of whom he should have steered clear. Outwardly, Bulmer did not seem to care a straw, and, to all intents and purposes, he went about with an air of unconcern, merely looking the other way whenever Lawson approached. Inwardly, however, things were altogether different, for deep down in his heart the boy nursed an intense feeling of resentment against the scorn and ridicule to which he was subject, not only from Lawson, but also from those—and they were many—who toadied to him.

If the truth were only known—Jack Bulmer was a type of boy quite different from the majority. Extremely sensitive to ridicule, he fell an easy victim to the force of a spiteful tongue, whereas a physical blow would leave him indifferent to the antagonism behind it. Warm-hearted and responsive by nature, he had it within his power to attract anyone to his side, but unfortunately his extreme sensitiveness prevented his giving full rein to his wish to do this. The result was that he was looked upon by a good many as "stand-off-ish."

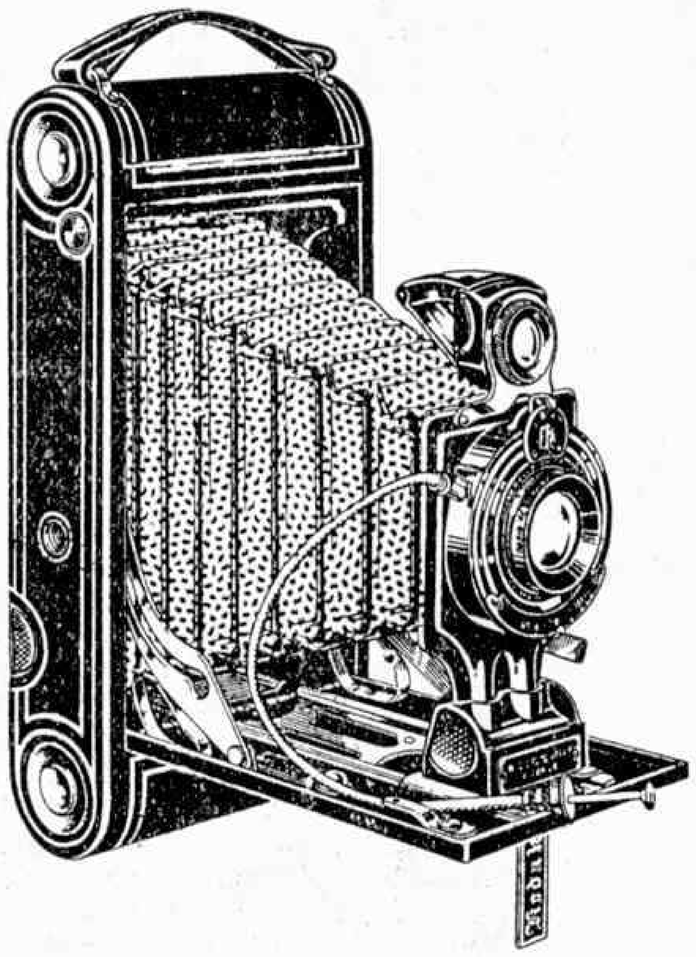
There was one individual who had read between the lines, however, and who had taken a strange interest in Bulmer. This was none other than Brailsford, the captain of the school "rugger" fifteen and heavy-weight boxing representative at Aldershot. For some reason or other Brailsford had conceived a great liking for the new boy, and the two were often to be seen strolling and chatting together. This fact, needless to say, only added more fuel to the resentment harboured by Lawson and his satellites.

Thus matters went on, until an event happened that even to this day is referred to at St. Winifred's, and which, incidentally, placed young Bulmer upon another footing altogether.

III.

It was about the middle of the term on a certain Saturday afternoon. Owing to a last-minute scratching on the part of the opposing team, there was to be no football match, and the school was left to its own devices as to recreation. One

(*Continued on page* 85).



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The little camera that takes big pictures

The 2C Kodak is the "Kodak" you need for your own pictures. It takes capital pictures of the same pleasing proportions as a post-card—$4\frac{7}{8} \times 2\frac{7}{8}$—almost as large as a postcard but without the weight and bulk of postcard cameras. This new long narrow shape is admirably suitable for horizontal pictures of holiday groups and vertical portraits.

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Ask your nearest Kodak dealer to show you a 2C Kodak and some 2C pictures.

Kodak Limited, Kingsway, London, W.C. 2

THE

Meccano Photographers' Corner

TWO SPLENDID COMPETITIONS

Holiday Essay Competition

THE Holiday-essay Competition held last year proved such a success that it has been decided to hold another similar competition. The subject will again be some holiday experience, but this year the Competition will be divided into two sections :— (1) Photo-essay and (2) Essay Competition.

For those with Cameras

In the Photo-essay Competition the essay should be illustrated with photographs. These must be taken by the competitor, but may be developed and printed by others, if desired, though this point will be taken into consideration when making the awards. A boy who sends in an essay illustrated with photographs taken, developed, and printed by himself will naturally stand a better chance of winning a prize than will a boy who has only exposed the plate or film, and left the finishing-off of his prints to others, who perhaps have more experience.

Photographs may be of any size and of any finish, but it should be clearly stated whether or not they are the sole work of the entrant. They may be sent separately, or lightly gummed in position in the essay. The first prize in this section will be Meccano products to the value of £1 1s. 0d., and the second prize, to the value of 10/6, to be chosen by the winner.

For those without Cameras

Section (2) is for boys who have no cameras, and prizes will be awarded for the best unillustrated essay. This section will be divided into two classes :—

(1) For those of 14 years of age and under,

(2) Those over 14 years of age.

In this section three Hawk-Eye cameras, made by the Kodak Co. Ltd., will be awarded as prizes. These cameras take photographs $2\frac{1}{4}'' \times 3\frac{1}{4}''$, and the lucky winners will be able to enter the photographic competitions which will be announced from time to time in our future issues.

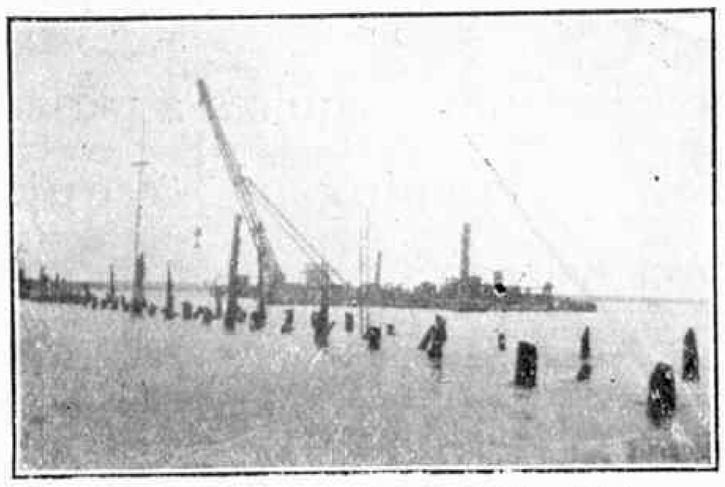
Photo by [*G. A. Short*

The Crucifix, Cournas, France

Subjects to Choose From

As to the subjects of the essays, these we leave to our readers, the only stipulation being that the subject chosen must be a holiday topic.

Some may deal with a thrilling and adventurous holiday expedition; others may choose to describe a visit to some beautiful and historical ruin : others, again, may write of a pleasant holiday in some interesting place where they had a very happy time. Last year the winning essay, which was published in No. 28 of the "*Meccano Magazine*," described a holiday in Ireland. On this page we print three photographs that accompanied another prize-essay, which described a Meccano boy's holiday on the Continent, and dealt in an interesting way with some relics of the War seen on the coast of France.



Raising Sunken Ships at Dunkirk

General Conditions

All essays should be neatly written, and on one side of the paper only. See that your full name, age, and address appear on the back of every sheet of paper, for there is always the possibility of a page becoming detached, in which case it might be mislaid if it does not bear the entrant's name on the back.

The Competition closes on 30th September next for entries from the United Kingdom, and 30th December for Competitors Overseas and abroad. Send in your essays well before that date if possible.

Fourth Photographic Competition

FROM the majority of entries in the recent competition "Improving the '*M.M.*'" it is evident that the Photographic Competitions are among the most popular competitions with our readers. I have therefore pleasure in announcing a Fourth Photographic Competition.

The rules are the same as in our previous Competitions. Although the photograph must be taken by the competitor, he is at liberty to obtain outside help with the developing and printing. Photographs may be of any size, mounted or otherwise as the size will not be taken into consideration.

Photo by [*G. D. Davies*

Swallow Falls, Bettwys-y-Coed

A view well known to holiday-makers in North Wales.

Write your name and address clearly on your entries and state whether the printing and developing has also been done by yourself, as naturally this will be taken into account when judging the entries.

The subjects are to be either

(1) A SUMMER SCENE

or

(2) AN ANIMAL STUDY.

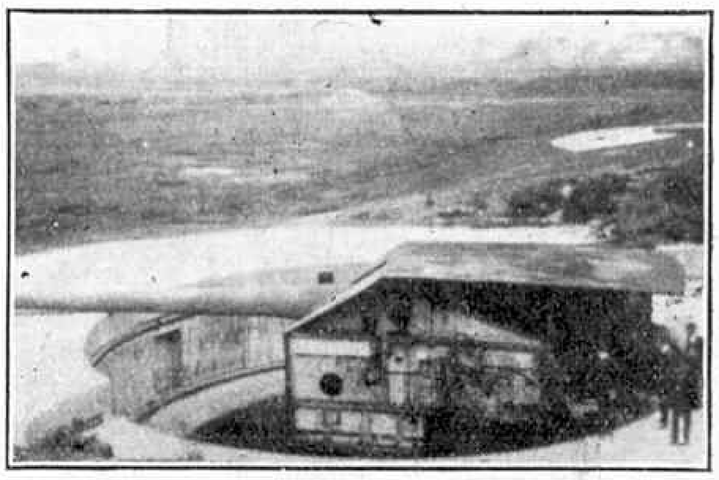
The Competition will be divided into two classes :—

Class A. Boys of 14 years of age and under

and

Class B. Boys over 14 years of age.

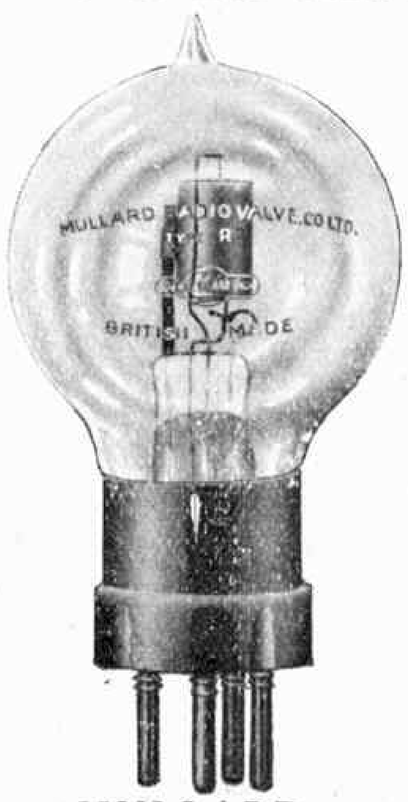
The first prize in each section will be a Hawk-Eye Camera, made by the Kodak Company. The winning photographs will be published in the "*M.M.*," and any other photographs that may be used in the "*M.M.*" after the competition will be paid for at our usual rates.



German Gun on the French Coast near Dunkirk

The closing date for entries from the United Kingdom is 31st August, and for entries from Overseas 31st October next.

"The Silence
that is in the starry sky"



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Price:
15/-

THE human ear can only detect from 12-33,000 vibrations per second. *A Valve translates up to 1,000,000 vibrations per second.*

Turning Silence into Sound

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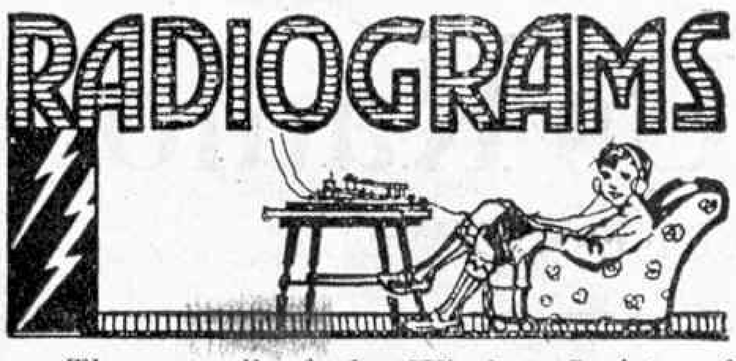


The council of the Wireless Society of London, of which organisation the Prince of Wales is a patron, have opened a movement to assist the blind to operate receiving sets and so bring entertainment and instruction within their reach.

* * *

Captain Ian Fraser, the blind chairman of St. Dunstan's, recently broadcast a speech from Marconi House, London. He earnestly asked wireless amateurs to teach one or more of the two thousand totally blinded ex-Servicemen the art of operating a receiving set.

* * *

It is well known that the blind develop a wonderful sense of hearing, and for this reason they are perhaps better equipped for "listening-in" than the average person. The comparative simplicity of operation of a receiving set should enable them to quickly become efficient operators.

* * *

Amateurs in and around Liverpool are able to hear the Lightship at the Mersey Bar telephoning the Dock Office at 7.0 a.m., 9.0 a.m., 11.0 a.m., 12 noon, 1.0 p.m. and then every two hours until 9.0 p.m. The Lightship when commencing conversation merely calls "Dock Office," the call being answered by "Bar Ship."

* * *

Radio dances recently inaugurated at Highgate, London, are proving an unqualified success.

* * *

The Radio installation of the Detroit Police Department has been given the call letters "K O P." This is surely pure genius on somebody's part!

N. T. Brown (Birmingham).—The Buzzer illustrated in the Electrical Manual will serve your purpose, and you should proceed in the following manner:—From the frame, run a wire to earth, and from the point number 5 shown in the illustration, conduct to aerial.

G. Robinson (Romford).—Wave length has nothing to do with the distance from which messages may be heard. This depends, firstly upon the power with which the messages are being transmitted, and secondly upon the sensitiveness of the receiving apparatus.

J. Parkinson (Grimsby).—A frame aerial is not to be recommended, and should only be used as a matter of interesting experiment. You may obtain better results if you sling an aerial wire between the walls of your room, insulating it from the walls and slinging it, if possible, in an upper room. Only actual experiment can show whether this would be satisfactory. A wire attached to the window frame of an upper room and run to the bottom of the back garden is much to be preferred.

W. Robinson (Kilmarnock).—As you are well beyond the 25 mile limit, you could not receive telephony at Kilmarnock with a Crystal Set.

P. N. Leopold (Hamilton).—There is no Broadcasting Station at Aberdeen, although we believe that one may be established there in the near future.

C. Cyril Harris (Fleet).—The Meccano Crystal Receiver may be supplemented by a high frequency amplifier, which would considerably increase its range, and under favourable circumstances enable telephony to be heard up to a distance of 50—100 miles.

Jack Marsden (Sheffield).—(1) The Meccano Receiving Set does not include an aerial. This is sold separately, price 12/6 complete. (2) Very fine tuning may be obtained with the adjustments on the Meccano Set without the aid of a variable condenser. (3) Regarding ear-phones see our reply to H. J. Rickards, Birmingham. (4) You cannot use a loud-speaker with your Set without a valve amplifier, and only then if you are near a Broadcasting Station.

Harold Robinson (Nottingham).—The lead-in wire from the antenna is connected to the terminal on the Receiving Set labelled "Aerial."

Michael Petros (Narbethong).—As wireless regulations are not so strict in Australia as in the United Kingdom you will no doubt be able to use our Constructional Receiving Set (No. 2) without having to obtain a special licence. An Instruction Leaflet for assembling this Set may be obtained from the Meccano Depot, 379, Kent Street, Sydney.

H. J. Rickards (Birmingham).—(1) The Meccano Receiving Set is provided with one head-phone, but if desirable, double head-phones may easily be connected; these should have a resistance of 2,000 ohms. (2) All transmitting stations are given call letters for purposes of identification. (3) The length of the aerial between the insulators, plus the length of the lead-in wire must not exceed 100 feet.

John McCaskill (Gaerloch).—(1) The Meccano Radio Receiver No. 1 is not provided with a condenser or inductance discs. It is specially adapted for very fine tuning without the aid of these accessories. (2) A double wire aerial is quite satisfactory with a Meccano Receiver.

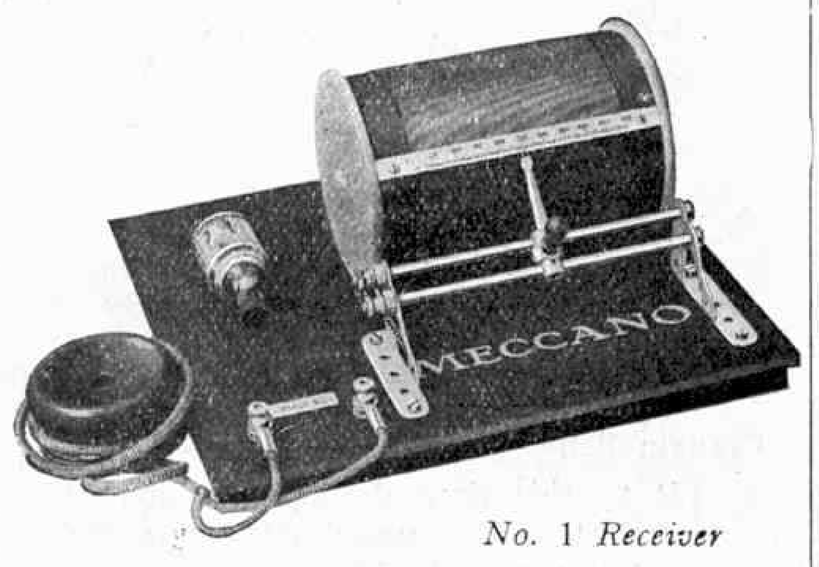
D. O. Boyd (Scorrier).—See our reply above to C. Cyril Harris.

Listen-in with a Meccano Receiver

No. 1

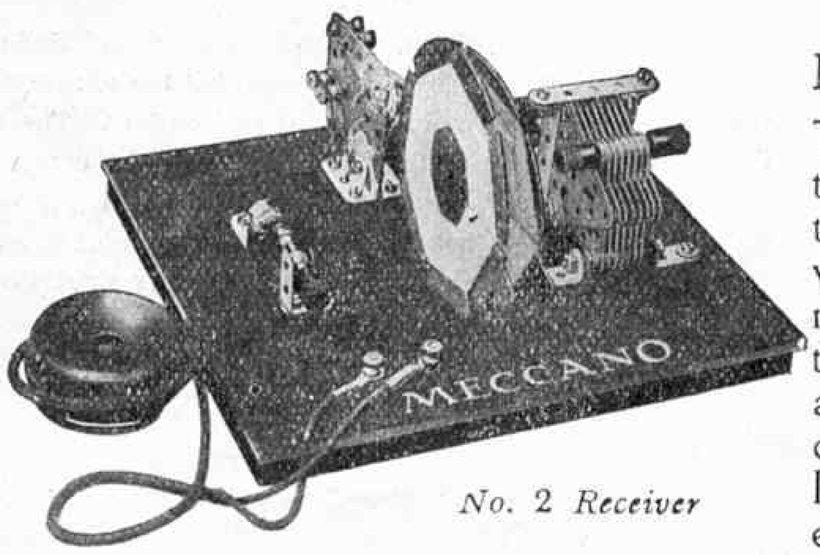
Meccano Crystal Receiver

With a good aerial this set will receive telephony up to about 25 miles from a broadcasting station, and Morse signals up to, and exceeding, 100 miles. The set, which may be used with a broadcasting licence obtainable from any Post Office at a cost of 10/-, will receive on wave lengths from zero to approximately 1,000 metres.



No. 1 Receiver

R.S. 1—Receiving Set complete, tested and guaranteed, price **32/6**
Compulsory Broadcasting Fee **7/6**
40/-



No. 2 Receiver

No. 2

Meccano Crystal Receiver

This set is of the constructional type and is specially adapted to the requirements of those who wish to carry out simple experiments. Its range is the same as that of No. 1 set described above, and it receives on wave lengths of approximately 300-500 metres. It may only be used with an experimental licence, which costs 10/- and is obtained from the Postmaster General, London.

R.S. 2—Complete Set of Parts, in strong carton, including single telephone 2,000 ohms resistance, price **25/-**
R.S. 2a—Complete Set of Parts, in strong carton, without telephone, price **15/-**

MECCANO LIMITED BINNS ROAD LIVERPOOL

Build your own Radio Receiver

In the last issue of the "*M.M.*" we gave full particulars for building a Radio Receiver from Meccano parts. These instructions may now be obtained in the form of a beautifully illustrated leaflet, printed on art paper (price 4d., post free).

In addition to Meccano parts being of service for the construction of a complete Crystal Receiving Set, they are of particular use for experimenting in Radio. Their standardisation and universal adaptability enable new circuits to be tried out, and changes to be quickly made. For this purpose some of the Meccano parts are made in special fibre, which gives perfect insulation. Certain of the parts are also available in brass, useful to experimenters on account of its non-magnetic qualities.

If you are building a Radio Receiver or experimenting in any way, you will find these special Meccano Radio parts of great assistance. Send for a full list, which will be mailed post free on application.

The Men Who Gave Us Radio:

IV. GRAHAM BELL, TROWBRIDGE AND CLERKE-MAXWELL

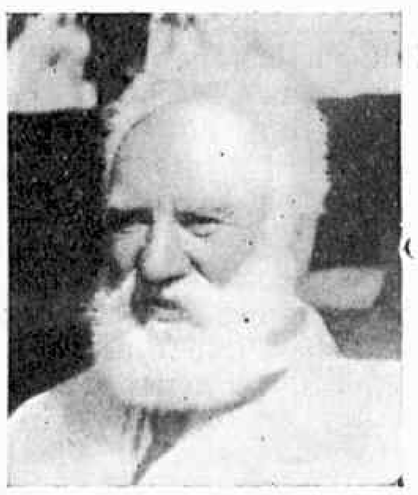
In previous articles under this heading we have described the work of several scientists who contributed to the invention of Radio as we know it to-day. In our last issue we showed how Steinheil, Morse and Lindsay transmitted messages without wires by using the earth and water as conducting media. On this page we deal with the invention of the telephone, an instrument that played a very important part in the development of Radio. We also describe experiments in signalling by induction which marked an important advance in the progress of the science.

Graham Bell

UP to this time the only means of electrical communication was the telegraph. In 1876, however, Dr. Graham Bell invented the telephone, the introduction of which played an important part in the study of wireless communication.

In 1871 young Bell was employed teaching at Boston University, and in his spare time experimented with tuning forks, magnets and electrical batteries. For three years he worked in this way, and in 1874 evolved what he called the "harmonic telegraph," a device for sending ten or twelve Morse signals over a single wire at the same time.

The manner in which he came to invent the telephone, and the first messages spoken with it, have already been described in the pages of the "*M.M.*" As far as wireless is concerned, the importance of Bell's discovery is difficult to estimate, for the telephone placed in the hands of scientists a marvellously delicate instrument. It was infinitely more sensitive than any apparatus previously employed and was found of much greater sensitiveness than the mirror galvanometer, which previously had been employed to detect minute currents. Professor Pierce, in America, found that the Bell telephone was so sensitive that it gave audible signals with 1/100,000th part of the current of a single Leclanché cell.



Alexander Graham Bell was born in Edinburgh in 1847. He attended the Edinburgh High School and proceeded later to the University and to London. In 1870 he went to America and taught at the Boston University. He experimented with telegraphic systems, but his greatest discovery was the telephone. He died on 2 August, 1922, at Nova Scotia.

Nine people out of ten, if asked who invented Radio, would reply "Marconi." They are surprised to find that the science of Radio is the result of researches extending over the past century. Those who devoted themselves to a study of the science in the early days made valuable contributions to the store of human knowledge. It was only as a result of their investigations that Marconi was able to evolve in a practical form the first system of Wireless Telegraphy, by which signals could be transmitted and received over considerable distances.

Trowbridge

About 1880 Professor John Trowbridge, of Harvard University, suggested a method by which he thought it possible for ships at sea to communicate one with another. In his plan a ship was to be provided with a powerful dynamo, one terminal of which was "earthed" in the water at the bow of the vessel. The other terminal was connected to a long wire, insulated except at its extreme end. This wire trailed over the stern and its end was kept near the surface by a buoy. The current was thus spread over a large area of water. According to Trowbridge's plan, this current could be detected by any other ship, fitted with a similar wire, the signals being received by means of a telephone. The suggestion was never proceeded with, however, because the power required was so great as to make it impracticable.

Clerke-Maxwell

We must now mention James Clerke-Maxwell, a brilliant mathematician, whose studies in connection with the theory of electricity and magnetism were of the greatest assistance to workers who followed him. Clerke-Maxwell was educated at Edinburgh Academy, and before he was fifteen years of age his first scientific paper was read to the Royal Society of Edinburgh. He studied for three years at the University of Edinburgh, going up to Cambridge in 1850, where he gained several honours. In 1871 he was appointed Professor of Experimental Physics in the University of Cambridge.

Clerke-Maxwell's greatest work was his treatise "*Electricity and Magnetism,*" published in 1873. In this book he advanced a new theory of electrical and magnetic phenomena. He also investigated many other interesting subjects, including the measurement of colour-sensation; the construction of the wonderful ring-system of the planet Saturn; and studied Molecules, Matter and Motion.

In addition to this formidable list, he devoted a considerable time to the investigation of Heat and Light. He was surprised to find that there was a striking resemblance between the value of certain electrical mathematical formulæ and the figure representing the velocity of light. As a result of further investigations he announced (in 1863) that both light and electricity travel through space by means of the ether, and that they are composed of electric-magnetic waves. At that time it was not possible to prove this statement, and indeed it was not until 1888 that the truth of Clerke-Maxwell's brilliant prediction was demonstrated experimentally by Professor Hertz.

Trowbridge's Inductive Method

Up to this period all systems advanced for solving the problem of communication without wires were based on the methods of Morse and Lindsay. If they varied at all it was only in regard to unimportant details, all depending upon the principles of conduction, first discovered by Sommering and Steinheil.

In 1891, however, Trowbridge suggested a new method of signalling without wires by the use of electro-magnetic induction. This phenomenon is produced by passing a current through a coil of wire, when

James Clerke-Maxwell was the brilliant mathematician who predicted the existence of the Hertzian waves. He was Professor in Marischal College, Aberdeen; in King's College, London, and later at Cambridge. Born 13 June 1831 at Edinburgh, he died 5 November 1879.

The Men who Gave Us Radio—*(cont.)*

another current is induced in a second coil a few feet away, even though there is no connection between the two coils of wire.

Trowbridge suggested that induction might be used for signalling between two ships by forming a large coil by stretching several wires from the masts and connecting these wires to a powerful battery. According to his theory a second ship would be able to receive the signals with a telephone connected to a coil formed by a similar series of wires on the masts. In theory Trowbridge had solved the problem of wireless communication, but the difficulties were too great to make the scheme practicable. To enable communication to take place over more than half a mile would have necessitated coils over 800 ft. in radius.

It may be mentioned, however, that Professor Graham Bell subsequently experimented with an improved method, similar in principle to that of Trowbridge, nd claimed that signals had passed between vessels over two miles distant.

NEXT INSTALMENT

DOLBEAR, WILLOUGHBY SMITH, EDISON and PREECE.

SOME FAMOUS COLLECTORS

IT appears to be human nature to collect and classify. Every boy collects something—birds' eggs, cigarette cards, coins, etc. Soon he collects Treasury notes, and later on, when he has sufficient of these he collects pictures, antiques, curios, or whatever objects may take his fancy.

The collecting of postage stamps is one form of collecting that attracts both young and old of all classes. No one is too young and no one is too old, to collect stamps. High and low, rich and poor, may share the enjoyments afforded by the hobby.

Unlike many hobbies, stamp collecting may be carried out at but little cost, or large sums may be spent on it. The schoolboy may get together as interesting a collection as the millionaire, and I am not at all sure that the rich enthusiast enjoys his hobby any more than does the collector whose resources are of a more modest nature.

The King's Stamp Party

H.M. the King may be considered to be one of the leading collectors of stamps in this country. His collection of stamps from British colonies is exceedingly fine and includes many rarities. The King recently received over a hundred stamp collectors (exhibitors and officials of the Stamp Exhibition being held in London) at Buckingham Palace. He showed them his wonderful collections, and afterwards entertained them to tea.

On receiving his guests the King entered keenly into a discussion regarding their collections and his own. The experts were astonished at his philatelic knowledge, and listened with great admiration to his comments on the Royal collection. To Mr. Arthur Hind, the millionaire owner of the famous £7,000 British Guiana Stamp, the King said "your wonderful stamp fills me with envy. But come along with me," he added, smiling, "and I will show you some that even you haven't got!" Amongst the stamps that the King showed with special pride was his extremely rare "Post-Office Mauritius" collection. "Aren't they beautiful?" he asked, and his guests admitted they had never seen any so fine.

The Prince Collects Stamps

The Prince of Wales is also a stamp enthusiast, and although the King confines his attention to British stamps, his son and heir goes further afield, and collects stamps of all countries. We can imagine how eagerly the Prince would seize the many opportunities afforded by his numerous tours of adding to his collection.

Amongst other royal stamp collectors may be mentioned the Queens of Italy, Belgium and Norway; the King of Spain and ex-King Manoel. Amongst peers, Viscount Burnham (the proprietor of the "*Daily Telegraph*") and Lord Birkenhead have each a particularly fine collection, and statesmen are represented amongst collectors by Sir Philip Lloyd-Greame, the President of the Board of Trade. Mark Hambourg, the great pianist, and Lady Auckland Geddes, wife of the British Ambassador at Washington, are two other well-known collectors.

The Meccano Writing Pad

In response to numerous requests, we have now prepared a special Writing Pad for Meccano boys. The Pad consists of fifty sheets of tinted bank paper, with cover and blotting paper. Each sheet bears a reproduction of the block shown on the cover.

The Meccano Writing Pad may be obtained from your regular Meccano dealer (price 1/-), or direct from this office (price 1/3, post free). It is just the thing to use when writing to your friends, for it shows them at once that you are a Meccano boy.

OUR MAIL BAG

In this column the Editor replies to letters from his readers, from whom he is always pleased to hear. He receives hundreds of letters each day, but only those that deal with matters of general interest can be dealt with here.

Correspondents will help the Editor if they will write neatly in ink and on one side of the paper only.

M. Buring (Launceston, Tas.).—We are glad to see that after five years of model building you are as keen as ever on Meccano, and that in fact you are suffering from "Meccanoitis." The word "*bonza*" with which you describe the "*M.M.*" is new to us, but it sounds good!

H. Jacobsen (Johannesburg, S.A.).—Thanks for photos of yourself and Willie Cooper. We have not seen two such cheery faces for many a long day. We read with much interest your account of the swarm of locusts that devastated your neighbourhood.

S. E. Gardner (Feltham).—We are pleased to hear that "the neat Meccano Guild Badge" that you wear is attracting so much attention amongst your friends. We are sending you the Guild application forms, for which you asked, by separate post.

P. Gregory (Hull).—Your suggestion for an inventors' page is good, but we fear that we should have some difficulty in filling a page every month with contributions of this nature from our readers. This subject is already partly covered by the "Bright Ideas" column.

G. S. Marsh (Thornton-le-Fylde).—We read your bright cheerful letter with interest, and were surprised to learn from the last paragraph that you have been an invalid all your life. Your mind and intelligence are vigorous and healthy enough, at all events! We are pleased to know that the fire-guard that your friend made from Meccano parts is so effective. Your radio queries have been replied to by post.

E. Borthwick (St. Albans, N.Z.).—Your letters are always interesting, and if you could send us photos of the exciting incidents about which you write, we should be very glad to publish them.

H. R. Wright (Mansfield).—

"There was a young girl in the choir,
Whose voice went up hoir and hoir,
Till one Sunday night,
It went right out of sight,
And next day was found on the sphoir."

Quite good if you composed it yourself, but it seems somehow to strike a responsive chord in our memory. You will find an announcement of the new Meccano note-paper on this page.

W. R. (Stepney).—We quite appreciate your point of view when you say you would rather the "*M.M.*" was devoted entirely to engineering. We are certainly giving more space in future to this subject, and to the delights of model building. At the same time there is a strong and insistent call for the new features which we have commenced in this issue. As we know that we can make them exceptionally interesting, we have decided to run them for a time at least. Many thanks for your intelligent and thoughtful criticism.

F. Memmory (Derby).—We fear that your suggestion for a column dealing with poultry would appeal only to a few of our readers, the great majority of whom, we imagine, are more interested in engineering structures.

F. D. Cawley (Hale).—We gather from your letter that you passed your examination and we congratulate you. It is gratifying to know that in the wireless essay you attribute your success to the knowledge gained through reading the articles in the "*M.M.*" Thanks for description of the Meccano change-over switch you have invented; we will give this careful examination.

L. King (Hyde).—Judging from the account, your double-decker motor bus, carrying 48 toy soldier passengers and electrically lighted, is a very fine accomplishment, and no doubt yourself and your chum get lots of fun playing with it. Thanks for drawing of the shock-absorbers used in your model, and for your promise to send photos of the complete model.

H. A. Rees (Birkenhead).—We are inclined to agree with you that an improvement in the "*M.M.*" might be effected "by leaving something out one month, and putting something else in its place." What we desire to know, however, is *what* shall we leave out and *what* new articles shall we put in!

H. P. Thompson (Winnipeg).—"What a wonderful bird the frog are. When he stand he sit, almost. When he hop he fly, almost. He ain't got no tail, hardly, either; when he sit, he sit on what he ain't got, almost.' In writing this essay your little Norwegian friend certainly showed that he had closely observed the frog's activities! The last sentence is a masterpiece. We are glad to know that you think of us so often, and that Meccano is such a boon to you in the Winter.

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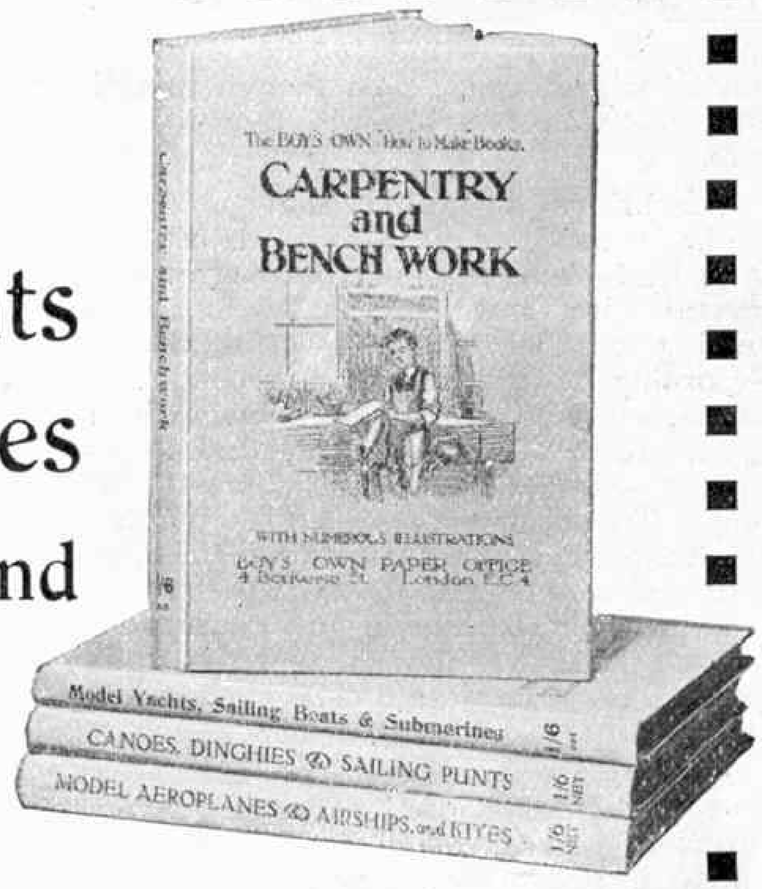
2.–Model Aeroplanes, Airships, Kites
3.–Model Yachts, Sailing Boats and Submarines Also
4.–Carpentry & Bench Work



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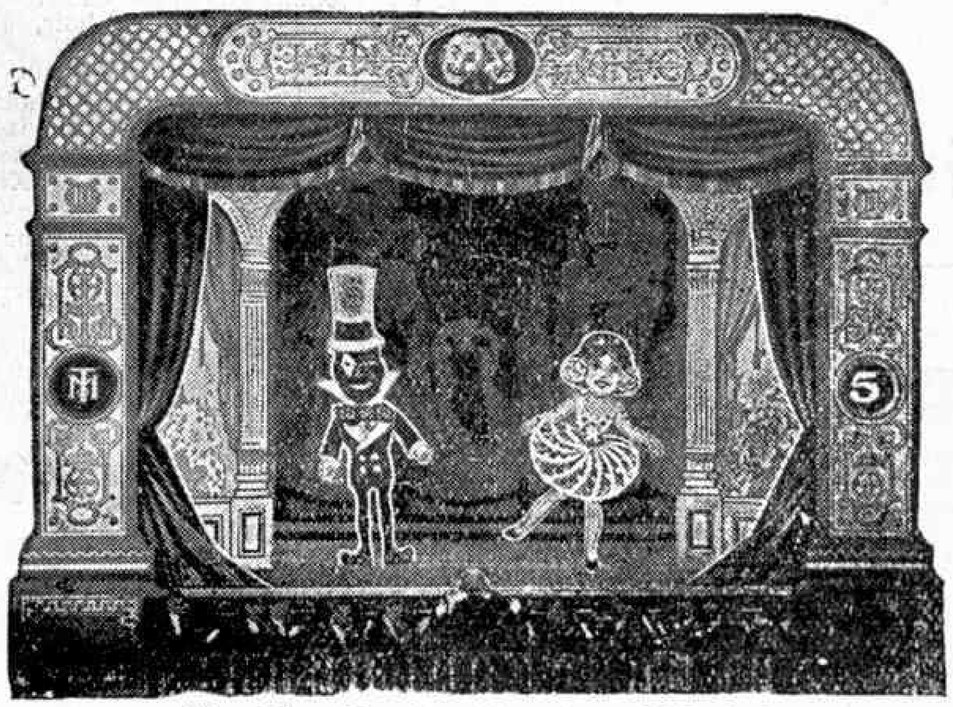


No. 11. Empire Theatre of Varieties.

This is a beautiful and entertaining toy, with all the romance and glamour of the stage. The pleasure to be derived from the performance, given by the eight Artistes, is extreme. The show is a tremendous success at a Children's Party, and a supply of Programmes can be given round by the "Ushers." All the Stars are billed on Special Posters.

Price ... **6**/– complete, post free.

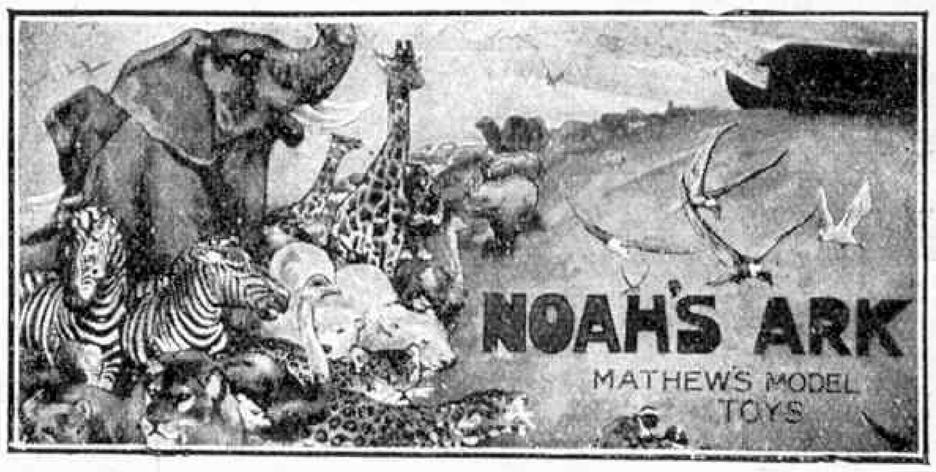
Buy only one and you will want others

SEND FOR FULL LIST

FROM

Mathews' Model Toy Factory

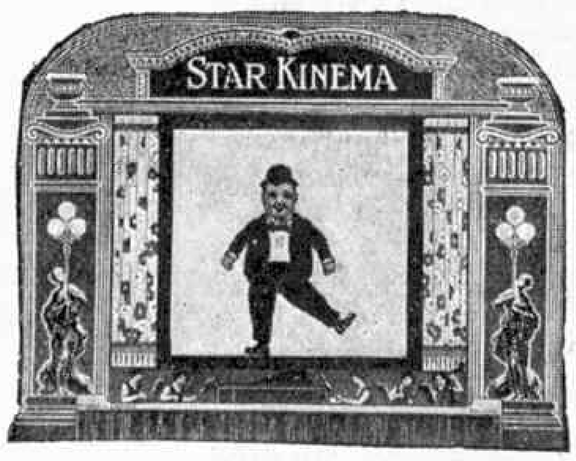
Short Street, LEICESTER



No. 5. Noah's Ark.

What a beautiful toy for a child; the Animals are exactly like the real ones, in natural colours and stand up. It is great fun to watch them marching into the Ark with Mr. and Mrs. Noah behind them.

Price ... **6**/– complete, post free.



No. 24. Star Kinema.

A Real Kinema Performance at home. Easily operated, and causes endless amusement.

Price ... **4**/– complete, post free.

Readers frequently write to me asking if I can recommend books that are both of interest and of use. In this column I hope to review books that I consider specially appeal to Meccano boys. I do not actually supply these books, which may be obtained either through any bookseller or direct from the publishers.

Carpentry for Beginners

(*Published by Evans Bros. Ltd., London. Price* 3/6).

With this book before him any boy will soon learn to make many useful articles for the house. The subjects dealt with include marking-out; gauging; the use of saws, planes, chisels, boring-bits and the spoke-shave; filing, glass-papering and glueing. Among other interesting items, there are designs for light woodwork, working diagrams and instructions for making a wood-worker's bench.

The book is a clear and complete guide to carpentry, with practical examples, and is very suitable for those boys who are handy with their tools.

The Romance of Modern Railways

by Thos. Corbin

(*Published by Seeley Service Co., London. Price* 7/–).

At some time or other we all have an ambition to be an engine-driver. Though many of us never realise our ambitions, our interest in Locomotives and Railways does not diminish. All boys will be delighted with this recently-published book. Its pages include the history of railway pioneering and many other interesting subjects, such as the making of locomotives, how locomotives work, and also descriptions of the different types. Chapters are devoted to brakes, rail-making, signals, traffic control, fogs, tunnels and bridges. In fact the book is full of those subjects that delight boys particularly interested in everything appertaining to railways.

The Boy's Guide

by A. Williams

(*Published by Nelson's, Edinburgh. Price* 7/6).

This wonderful book will appeal to every boy, for it is filled with advice and information. The large number of carefully-chosen subjects are of interest to boys generally, and cover more particularly the recreational side. The book is a complete guide to such subjects as Athletics, Cricket, Riding, Rowing, Sailing and all outdoor sports. Chapters are also devoted to Guns, Gardening and Photography.

Indoor pastimes are catered for by the inclusion of Poker-work, Stencilling, Tools —how to choose and how to use them, Workshop Hints, Lathes, Soldering, etc. A considerable amount of useful information is also included in the book, such as abbreviations, foreign expressions and phrases, legal points, and a chapter entitled "What shall I be?" may help boys in choosing a career. Altogether the volume will prove a mine of information to Meccano boys.

Catalogues Received

A tempting price list comes from Messrs. Kodak Ltd., Kingsway, London, W.C. The Kodak catalogue always convinces us that life without snapshots would be a blank. Cameras of all sizes and prices are shown, and everything is made easy and pleasant.

* * *

Messrs. A. W. Gamage Ltd., Holborn, London, E.C., send us a catalogue that seems to contain everything necessary to make a boy happy. Camping-out gear, cycles, cameras, neat school and sports suits, etc. A house famous for good value, courteous, and generous treatment of customers.

Have You Sharp Eyes?

The number of entries for this Competition has been overwhelming. The results will be announced in next month's "*M.M.*"

Bulmer's Father (*continued from p.* 77)

or two scratch games of football were organised amongst a number of the boys, whilst the rest found outlet for their energies in various forms of "ragging." Soon even this became monotonous, and Lawson and company conceived the idea of carrying out "stunts" of a torturesome nature upon the persons of certain small boys who had gained their disapproval.

It was while one of these "stunts" was in progress that young Bulmer arrived upon the scene of activity. Standing upon the outskirts of the crowd of boys, and unaware of what was going on in its midst, he suddenly heard a yell of sharp distress. Without a moment's hesitation he elbowed his way through the crowd where, in an open space in the centre, he beheld the doings of Lawson, who was cruelly twisting the arm of a small and terrified boy. Disregarding the hostile looks of those around him, Bulmer strode up to the bully, and with a quick motion knocked his hand away from the tortured boy.

(*To be continued*)

Magazine Binder

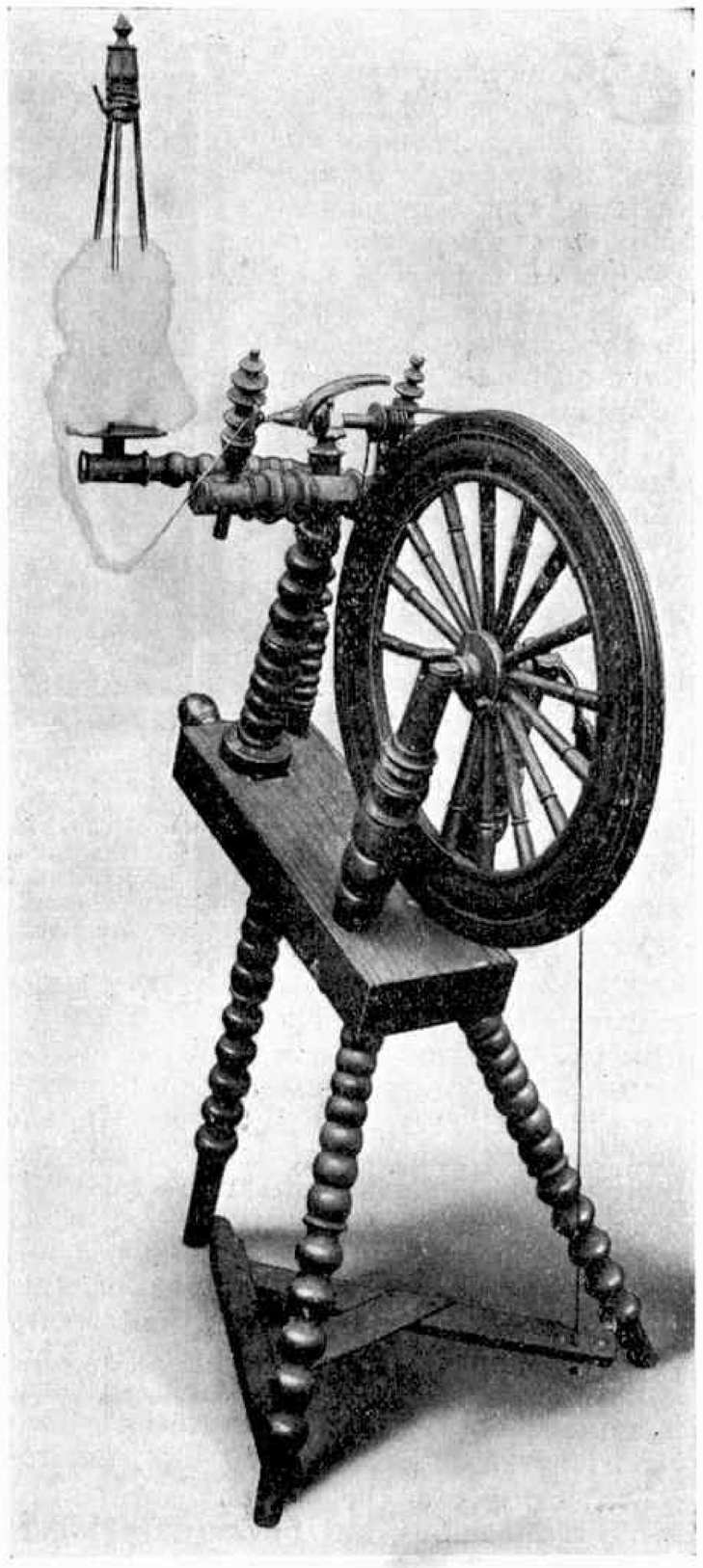
In response to numerous requests we have introduced a spring-back binder for *Meccano Magazines*. The binder has a strong stiff back, covered with imitation leather, tastefully tooled. It takes a large number of copies and keeps them neat and clean. In black, lettered gold. Price 3/– each, post free.

When replying to advertisements in these columns, please state that the advertisement was seen in the "*M.M.*" By so doing you will help us.

Spinning and Weaving (*continued from p.* 76)

these raw materials can be changed so that in their finished form they bear not the slightest resemblance to their original state.

Cotton comes from the pods of the cotton plant, and in this state its appearance resembles cotton wool. It is picked



An Early Spinning Wheel

in the fields and packed into great bales, large quantities being pressed into small compass by hydraulic presses. Any of you boys who have visited Liverpool will have seen heavy loads of these cotton bales passing through the streets from the docks to the warehouse.

Spinning and Weaving

Before it is possible to use the raw cotton and wool they must be converted into thread, or "yarn" as it is called. This is accomplished by a spinning machine, of which there are several types. The yarn is then supplied to the weaver who, with the aid of a loom, weaves it into cloth. This must then be bleached and sized, and dyed and finished, before ready for delivery to the shops where we buy it by the yard.

Cotton grows in all tropical countries, and is obtained largely from Egypt and other parts of Africa, from certain parts of Central and Southern America, and from India and China. In these countries the climate is particularly suitable for its growth.

(*To be continued*)

Famous Bridges : I.

THE WORLD'S LONGEST BASCULE BRIDGE

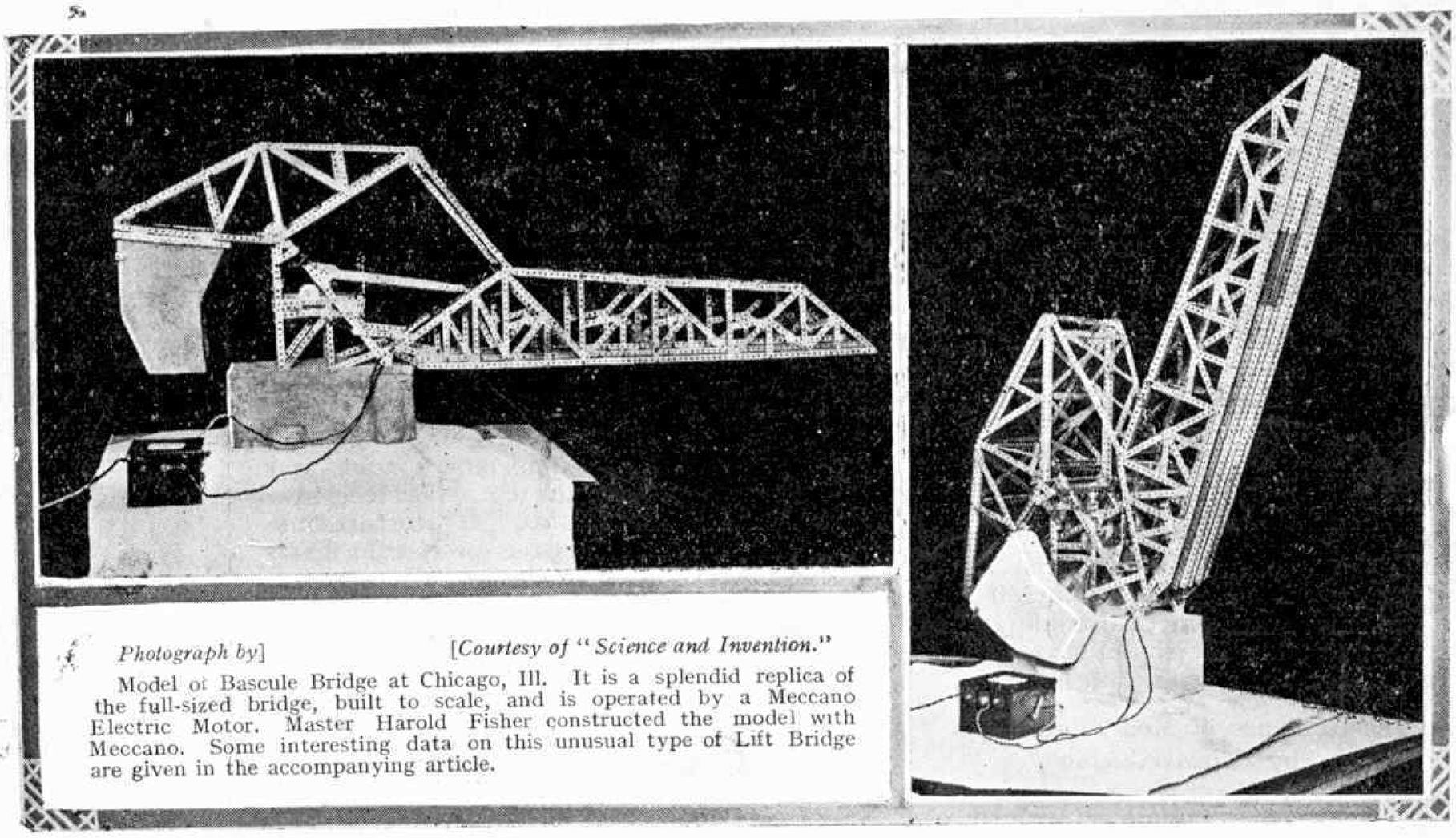
ACCURATELY REPRODUCED IN MINIATURE WITH MECCANO

OF the many types of bridges the Bascule Bridge is one of the most interesting. Bridges of this type are usually employed when the introduction of a swing bridge is impossible, owing to the width of the river to be bridged not allowing sufficient space for the bridge to open. In America bridges of the bascule type are extensively used and are known as " Jack Knife " bridges, because the leaf, or moveable portion, resembles the blade of a jack-knife.

This splendid scale model of the Bascule Bridge at Chicago was built by Harold Fisher (17 years of age). The model is operated by a Meccano Electric Motor and rises and falls in a realistic manner. The Chicago Bridge is the largest of its kind in existence, and crosses the Chicago River at 16th Street. It is a double track, single leaf bridge, and was built for the Illinois Central Railroad.

The moving leaf is 260 ft. in length, as measured from centre to centre of bearing points. To balance the weight of this enormous mass of steel, a counterpoise of over 2,000,000 lbs. is required. This is built upon a rocker arm which, in turn, is supported by a triangular tower. Two electric motors, each of 150 h.p., are required to operate the bridge.

Very ingenious air buffers are incorporated in order to gradually check the movement as the leaf approaches the fully-open position, at which it stands at an angle of 83 degrees. These buffers, which are provided in addition to the regulation air-brakes, also take up the shock when the bridge closes.



Photograph by] [*Courtesy of "Science and Invention."*

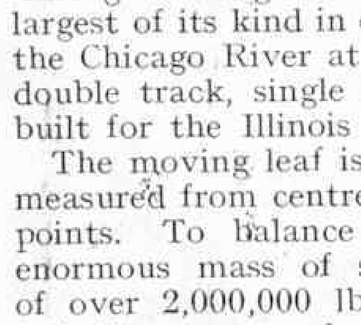
Model of Bascule Bridge at Chicago, Ill. It is a splendid replica of the full-sized bridge, built to scale, and is operated by a Meccano Electric Motor. Master Harold Fisher constructed the model with Meccano. Some interesting data on this unusual type of Lift Bridge are given in the accompanying article.

This fine bridge has been quite an inspiration to Meccano boys in the Chicago district, and many different models of the structure have been entered in the big model building competition that we hold in America.

One ingenious competitor conceived the idea of making his dry batteries not only operate the motor, but also act as the counter-weight. Probably our readers can discover many other ways of improving the model.

This is the first of a splendid series of articles that will briefly describe famous bridges of the world. These articles will appear in the " *M.M.*" from time to time as space permits.

In the near future we hope to publish an illustrated article describing another Chicago bridge of a similar type, but with two leaves, and in subsequent issues we shall deal with the Brooklyn Suspensic Bridge, the Britannia Tubular Bridge, the Arch Bridge across the Zambesi Gorge, and other similar famous engineering structures.



BRIGHT IDEAS

These columns are reserved for dealing with suggestions sent in by Meccano users for new parts, new models and new ways of making Meccano model-building attractive. We are always pleased to hear from any Meccano boy who has an idea which he considers will be useful in the Meccano system.

Reginald Hayward (Eye, Sussex).—Our 2" pulley wheel gives an excellent representation of a motor steering wheel, especially if a rubber ring is placed in the groove.

Ronald Peace (Ovenden).—We are engaged at the moment on a suitable sliding action.

John Hickman (Chorlton-on-Medlock).—(1) We are introducing a 5½" flanged disc that might serve the same purpose of your suggested 4½" wheel. (2) For what do you consider curved braced girders might be useful ?

A. W. Hammonds (Bristol).—As an alternative to your suggestion for clamping your model to the table, why not obtain a piece of board, stained mahogany or oak, and secure your model to this ? This board has the dual advantage of showing-off your model and at the same time allowing it to be moved about.

Thomas S. Peters (Forfar).—Our threaded coupling No. 63c will serve the purpose of your idea.

Elen Atkin (Glasgow).—We have overcome the difficulty of the sleeve-piece. We hope to publish details of our clock in the " *M.M.*" for November next.

D. M. Rankin (Pelaw-on-Tyne).—We are interested in your sketch of a free wheel action, but for what do you suggest it could be used ?

R. S. Sanderson, Jr. (Edinburgh).—(1) We use a flanged architrave in our Crystal Receiving Set, and it is quite possible we may incorporate it in the Meccano system. (2) There would be no point in introducing a special accessory outfit containing plates. Many plates are already in the regular outfits and duplication would obviously follow.

P. Reid (Ryde, I.O.M.).—We shall have a selection of signals on the market very shortly.

D. J. Davies (Tottenham, N.).—Regarding your idea for a flange on the 3½" side of the 3½" × 2½" plate we would point out that you can always obtain this formation by attaching a 3½" girder.

D. Ackerley (Manchester).—Your suggestion for lock-nutting is already covered by the collar and set screw.

Horace Parsons (Little Dean).—We hope shortly to introduce a toothed wheel larger than the 1½" gear wheel. 1" pinions are already listed (No. 31).

P. A. Greenhill (S. Woodford).—We suggest you enter your model electric loco in our next competition.

J. Wilkinson (Barnsley).—We have in mind the suggested T and L pieces.

F. Cooper (Leighton Buzzard).—Your suggestions for piercing a hole in the centre latticing of the braced girder was dealt with in the " *Meccano Magazine* " of December last.

E. Shipley (Walsall).—(1) We quite realise that the existing radii of our lines does not lend itself to the formation of a double track. At present we regret we are not able to make any modification in the direction you mention. (2) We shall probably introduce larger rolling stock as time goes on. (3) We shall go into the idea for a universal joint as a complete unit.

Douglas Murison (Buenos Aires).—We are considering the question of forming the five-holed side of the architrave into a flange.

Noel Batham (Farnworth).—We are at the moment manufacturing a boiler truck or well wagon and supplies will be available very shortly.

A. Benedictus (Brussels).—We have come to the conclusion that helical gears do not offer any great scope in the Meccano system. They only duplicate the functions of existing wheels in almost every case.

The Secretary's Notes

Welcome Letters

One of the things that pleases me most is the fact that there do not appear to be any idle Guild members. All members seem to be industrious, and have the same splendid enthusiasm for their Clubs, their Sports and their School work. Every day I receive letters from my young friends who have passed examinations, won various scholarships or competitions, or who have achieved some other success. I am interested in the doings of every Guild member, and I like to hear of a cricket match that has been won—or lost! I delight in receiving letters telling me of pets and hobbies; of Radio Sets; of new Meccano models, and of the thousand and one other things in which boys delight. Write to me whenever you can, and remember that I am here to help you.

Guild Stamp Collectors

I am sure that all Guild members will be interested in the Stamp Collectors' Column that appears for the first time in this issue. Stamp-collectors should note that the Guild Correspondence Club brings members who are interested in stamp-collecting into communication with other members, similarly interested. Particulars of the Correspondence Club will be sent on application.

A Helpful Booklet

The booklet "*Suggestions for Club Secretaries*," is undergoing revision, but I expect the revised edition to be available by the time that these lines are in print. This booklet contains full particulars concerning the formation and running of a Meccano Club. Any member who is contemplating establishing a Club should not fail to send for a copy, if he has not already received one. If the booklet is not ready when his application is received, his name will be listed and the publication sent to him as soon as it is received from the printers.

Joining the Guild

I frequently receive letters from boys who do not possess Meccano Outfits but who wish to join the Guild. I regret that it is impossible to enrol these applicants, for a boy without an Outfit is not a Meccano boy. I would mention, however, that where the Leader of a Club agrees, boys without Outfits may become associates of Meccano Clubs. The general rule is, of course, that every full member of a Meccano Club must be a member of the Guild.

CLUB NOTES

Triangle (Coventry) M.C.—A Sports Programme arranged for the Summer months, includes an outing to Marton in August. Indoor work is not neglected, and a model of the Meccano Motor Chassis was recently loaned from Headquarters for demonstration purposes. At present there are 180 members, and Mr. W. F. Spragg has accepted the position of Assistant Club Leader. *Secretary:* Master R. Mayell, "Zola," Crescent Avenue, Coventry.

Knutsford M.C.—Continues to make good progress. Gymnastics are very popular among the members. Master W. Osborne has been awarded a Special Merit Medallion for his good work during the last Session. *Secretary:* Master L. J. Shepherd, Grove Lodge, Knutsford.

Leckhampton M.C.—A recent picnic to the Cotswold Hills was greatly enjoyed by all the members. The Cricket Club plays matches every Saturday afternoon. The members are considering the possibility of running a magazine in connection with the Club. *Secretary:* Master B. Rhodes, Cotswold View, Charlton Lane, Leckhampton.

St. Mary with St. Gabriel (London) M.C.—Small Competitions have been held at the majority of meetings and these have proved very popular. Wireless and Electricity Sections have been organised in connection with the Club, under the supervision of Mr. G. Dowsett, the Secretary of the late "Herne Hill Meccano Club." Twelve additional members have joined the Club during the last month. Several interesting visits have been paid to local notable places such as the Science Museum, Tower of London, London Docks, and London Electric Light Works. The Club Magazine has now entered its second volume and the circulation is steadily increasing. *Secretary:* Mr. C. Curle, 37, Pullen's Buildings, Peacock Street. London, S.E.

Meccano Club Leaders

No. 4. Mr. DANIEL E. STRETTON

Mr. Daniel E. Stretton is the Assistant Club Leader of the "Holy Trinity Meccano Club," the leader of which was featured in this column in the last issue of the "*M.M.*" Mr. Stretton was the Secretary of the Club from 1918 until the middle of 1922, when he undertook the greater responsibility of the position he now holds.

The activities of this Club are very varied and include, in addition to Model-building and Lectures, Fretwork, Stamp-collecting, Photography and Radio. Mr. Stretton is an "all-round man" at those hobbies in which boys delight. His services in connection with the Club have been invaluable.

Meads M.C.—A Cricket Team has been organised for the Summer months, and fixtures are being arranged with local teams. *Secretary:* Master F. Coombe, Fire Station, 44, Meads Street, Eastbourne.

St. John the Baptist's (Liverpool) M.C.—It is clear that the members of this Club are keen cricketers, for out of seven matches, six have been won and the seventh drawn. The Cricket Team are naturally very proud of their achievements. Indoor Club-work has been temporarily suspended. *Leader:* Mr. J. S. Lewis, 46, Durning Road, Liverpool.

Gulgong (Australia) M.C.—Many interesting lectures have been given during the past Session on such subjects as "The North Sydney Suspension Bridge," "The Electric Bell," "The Telephone," "Evolution of a Bicycle," "Railway Signalling," etc. A Reading Circle has been organised and this has proved very popular. *Secretary:* Master N. Wallis, "Yarrawin," Gulgong, New South Wales, Australia.

White Notley M.C.—Was first organised at the beginning of the year and affiliated last month, this Club has every prospect of becoming successful. *Secretary:* Master F. W. Fox, c/o Mrs. Lewsey, The Green, White Notley, nr. Witham.

Clubs Recently Affiliated.

Davenport M.C.—Established under the direction of Mr. T. Main, this Club has made rapid progress. Interesting visits have been paid to the Manchester Gas Works, John Horne's Toffee Works and the L.M. & S.R. Engine Sheds and Repair Shops. The members hope to be able to arrange to come to Liverpool and visit the Meccano Factory in the near future. *Secretary:* Master A. D. Stoker, 124, Bramhall Road, Stockport.

White Notley M.C.—Although only small in number, the members of this Club are all keen and enthusiastic, and good progress has been made. The Meccano Lecture "*The Story of our Ships*," was greatly enjoyed by all the members. *Secretary:* Master F. W. Fox, c/o Mrs. Lewsey, The Green, White Notley, nr. Witham.

Alassio (Italy) M.C.—This is the first Meccano Club in Italy to become affiliated with the Guild. It has been established under the direction of Prof. A. D. Zampetti, who has kindly placed at the disposal of the Club a suitable Club-room, books for the Club Library, etc. The Club has already made considerable progress and became affiliated with the Guild early in June. *Secretary:* Master Furio Zampetti, Villa Merlina, 114, Alassio (Geneva), Italy.

Clubs not yet Affiliated

Theddlethorpe M.C.—It is hoped to establish this Club in the near future. In the meantime any boys living in Theddlethorpe who would like to join should communicate with Master Norman Parrish, Ashleigh Farm, Theddlethorpe, Louth.

Westmount (Canada) M.C.—Has recently secured a Club-room in the Mechanics Institute through the kindness of Mr. Pemberton Smith. It is hoped that it will become affiliated with the Guild very shortly. *Secretary*: Mr. W. A. Slater, 79, Selby Street, Westmount, P. Quebec, Canada.

Lahore (India) M.C.—All the members are keen and enthusiastic, and as soon as the Club comes under the direction of an adult Club Leader, affiliation will be granted. A Dramatic Section, organised in addition to the regular Club work, is proving very popular. *Secretary*: Master H. C. Manchanda, 29 "Ramour," Mozang Road, Lahore, India.

Holt M.C.—A Club has been formed in Holt, Norfolk, and a Stamp-collecting Section has been introduced, as all the members are ardent collectors. *Secretary*: Master J. D. T. Pickering, Valley Farm House, Holt, Norfolk.

Albion Field (London, S.E. 13) M.C.—Any Guild members living in Lewisham or Catford who are anxious to join a Club should communicate with Master L. Jones, 39, Wellmeadon Road, Lewisham, London, S.E. 13.

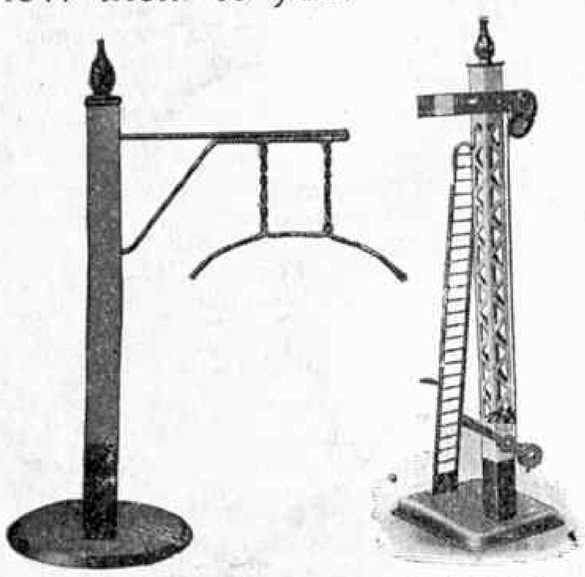
Byker (Newcastle-on-Tyne) M.C.—A Club has been opened at Byker and the Secretary is anxious to get into communication with any Meccano boys who are interested. The Club has good prospects, and I hope that all Guild members in that district will communicate with the Secretary without delay. *Secretary:* Mr. B. Gilbey, 46, Raby Street, Byker, Newcastle-on-Tyne.

Blackford (Cannock) M.C.—This Club has been formed recently by a number of enthusiastic boys in Blackford, and new members will be welcome. *Secretary:* Master Wilson K. Butler, 49, Heath Gap Road, Blackford, Cannock, Staffordshire.

Clockwork Train Accessories

We have pleasure in illustrating two further types of clockwork train accessories, the addition of which will greatly enhance the appearance of any model railway.

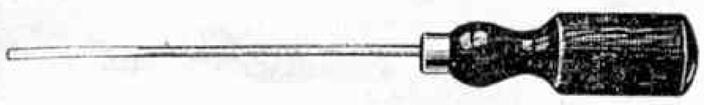
These accessories are now available. Ask your dealer to show them to you.



LOADING GAUGES each **1/9**

SIGNALS each **2/6**

A Useful Tool



Our illustration shows a type of screwdriver useful for reaching bolts in inaccessible places on models. For this reason the blade has been made so that it may be passed through the standard Meccano hole to reach bolts so placed. We are disposing of these screwdrivers whilst our **stock lasts**, at the special price of 10d. each, post free.

Small Advertisements

Small advertisements are inserted in these columns at 1/- per line (average seven words to the line), or 10/- per inch (average 12 lines to the inch). Cash with order. Letters to Advertisement Manager, "Meccano Magazine," Binns Road, Liverpool.

FOUNTAIN PENS (British Made) complete with filler and box, marked 10/6. Our price 1/9 post free. Box No. 21, c/o "*Meccano Magazine*," Liverpool.

FREE! AZERBAIDJAN SET OF SIX **107** DIFF. STAMPS
A marvellous offer inc. Scarce Flying post stamp, Set Czecho-Slovakia, Bavaria 1884, Set unused Austria (crowns) over 60 different Neurope, finally the beautiful Set of Azerbaidjan just issued, depicting shepherd, river scene, mountain, animals, peasant, etc., with a total face value of 39,500 roubles. 107 different stamps inc. this fine set absolutely free. Send P.C. only requesting our famous approvals (abroad 6d). **Lisburn & Townsend, 166, Islington, Liverpool.**

BOYS !! MAKE POCKET MONEY, by selling Fountain Pens. 2/6 to 5/- per week easily earned. Send for full particulars. Box No. 31, c/o "*Meccano Magazine*," Liverpool.

ASTOUNDING VALUE. Headphones for Wireless Sets, 17/6 per pair. Postage 6d. extra. Birmingham Wireless Co. Ltd., 7 & 9, Pershore Street, Birmingham.

O.K. 20 DIFFERENT UNUSED STAMPS FREE to genuine approval applicants.
Kraus, 137, Cheapside, London.

STAMP COLLECTORS. Sell your duplicates by advertising them in the "Sale and Exchange" column of the "*Meccano Magazine*."

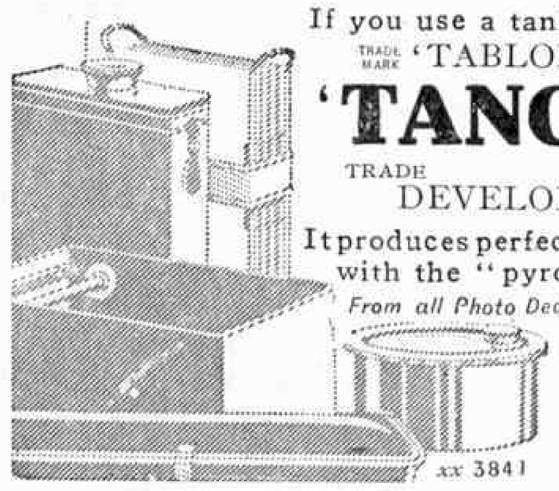
Remarkable value in sets of Stamps.

12 Persia (1911-13) used	1/4
20 Leichtenstein (mint)	10d.
14 Germany (1921) mint	9d.

Postage Free.
Lewis, 362, Wavertree Nook Road, Liverpool.

BRITISH EMPIRE.

My No. 2 Packet contains sixteen **BRILLIANT MINT STAMPS,** both old and new watermark, from Barbadoes (including Victory issue), Bermuda, Cayman Islands, Fiji, Leeward Islands, Malta (provisional), Palestine, Turks Island, Brunei, G.E.A., Kenya and Sarawak. Price **Only 9½d. Post Free.**
My No. 1 Packet advertised last month entirely sold out.
ALEC KRISTICH (Member N.R.P. No. 279), 82, Marchmont Street, Russell Square, London, W.C.1.



If you use a tank you need
TRADE MARK 'TABLOID' BRAND
'TANCOL'
TRADE MARK
DEVELOPER
It produces perfect negatives with the "pyro" quality.
From all Photo Dealers, price **1/6**
Burroughs Wellcome & Co. London
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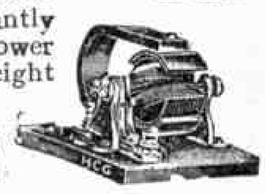
SPLENDIDFEROSUSH CALLING !
HELLO, EVERYONE !
Wonderful Crystal Receiving Sets, guaranteed to hear broadcast music clearly for 35 miles, although on most of them 2 L.O. has been heard (about 95 miles away). Price complete, 5/-. Foreign, 6/-. Siemens Headphones, 32/- extra.
G. Hare, 36, Willes Road, Leamington Spa

SIXTY DIFFERENT STAMPS FREE to applican for approvals. All ½d. each.
Cox, 135, Cambridge Road, Seven Kings.

STAMPS. Set of 4 late German, large type, 50 to 300 marks—3d. Limited number only. Say if approvals required. 1, Down Road, Weymouth.

DYNAMOS 5/- Post 6d. Inland
Make your own Electric Light
These wonderful machines light brilliantly a 4-6 volt lamp and take very little power to drive. Lamps to suit 3d. each. Weight for reckoning postage abroad, 2 lbs.



GREENS Dept. N., 85, New Oxford St., London

A GOOD FOUNDATION
for any model can be made with Plasticine—in 16 Colours. By mixing, various kinds of Marble can be imitated. Plasticine has scores of uses besides modelling. Let us tell you of some. Specimen Box of 5 Colours, The Rainbow, Post Free, **1/2.**

ALSO PLAY-WAX AND NOVLART.

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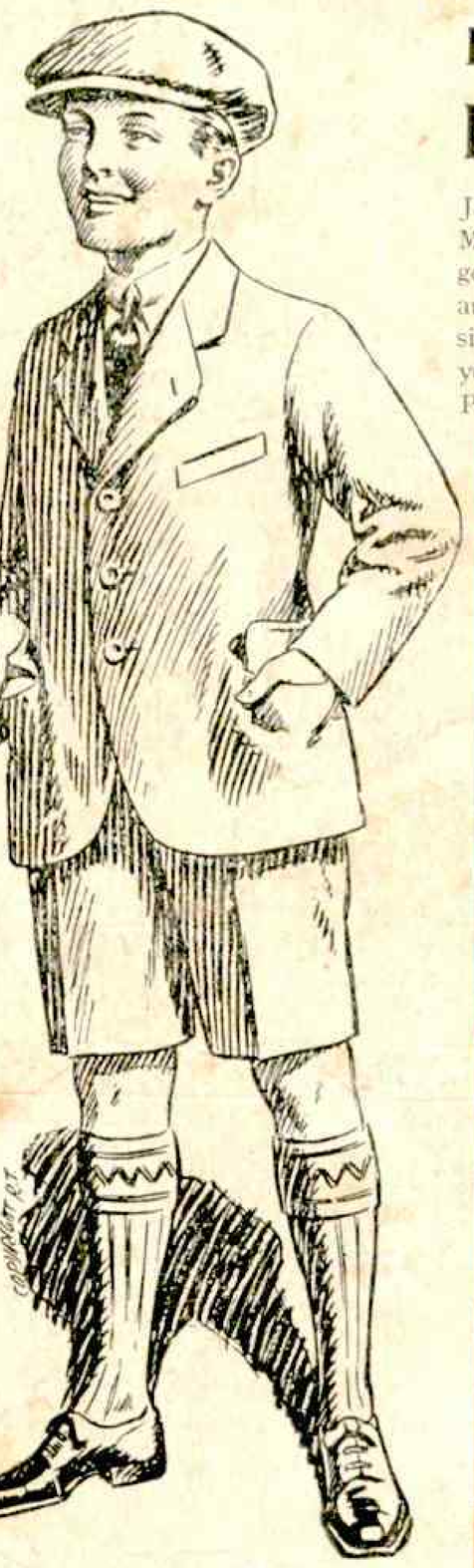

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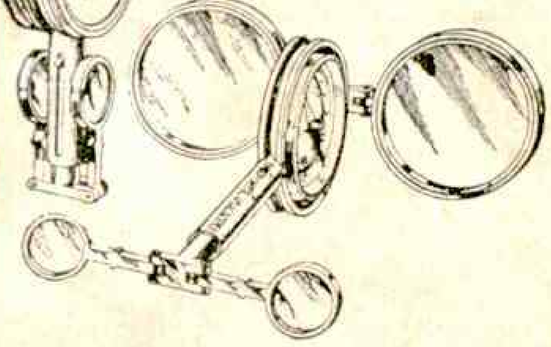

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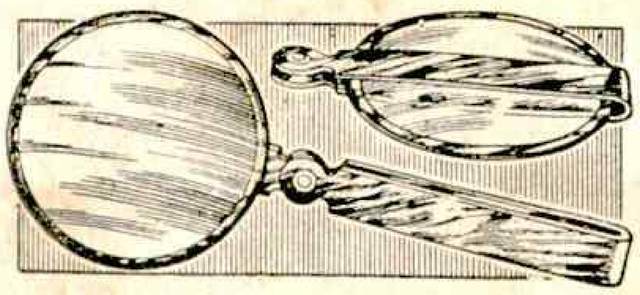

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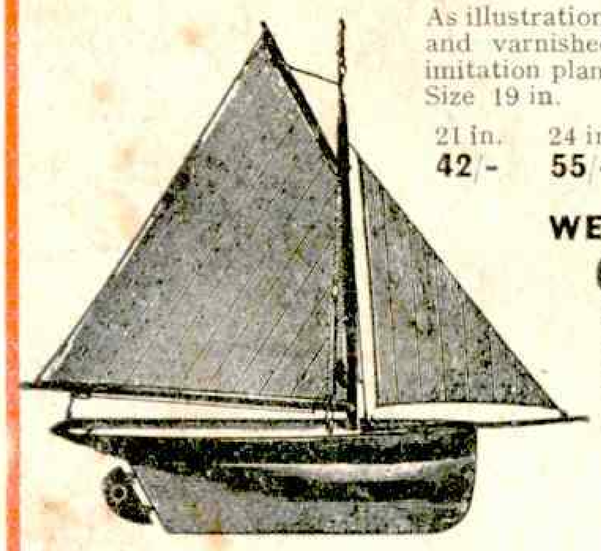

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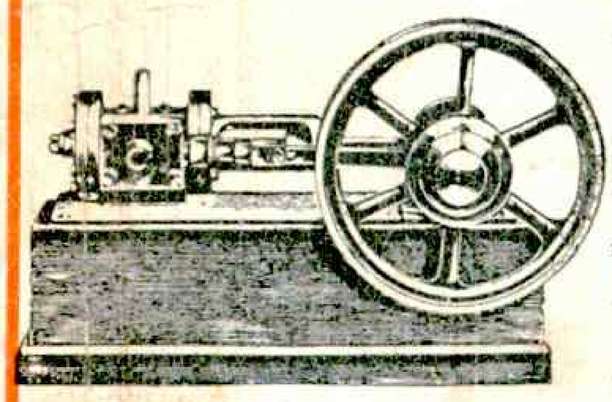

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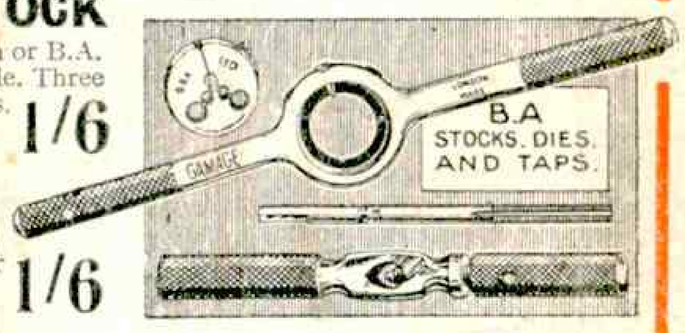

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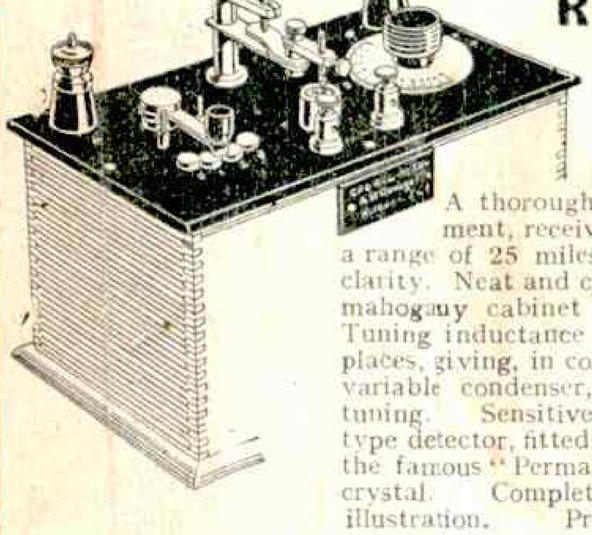

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AUGUST 1923

MECCANO MAGAZINE

PRICE 1D

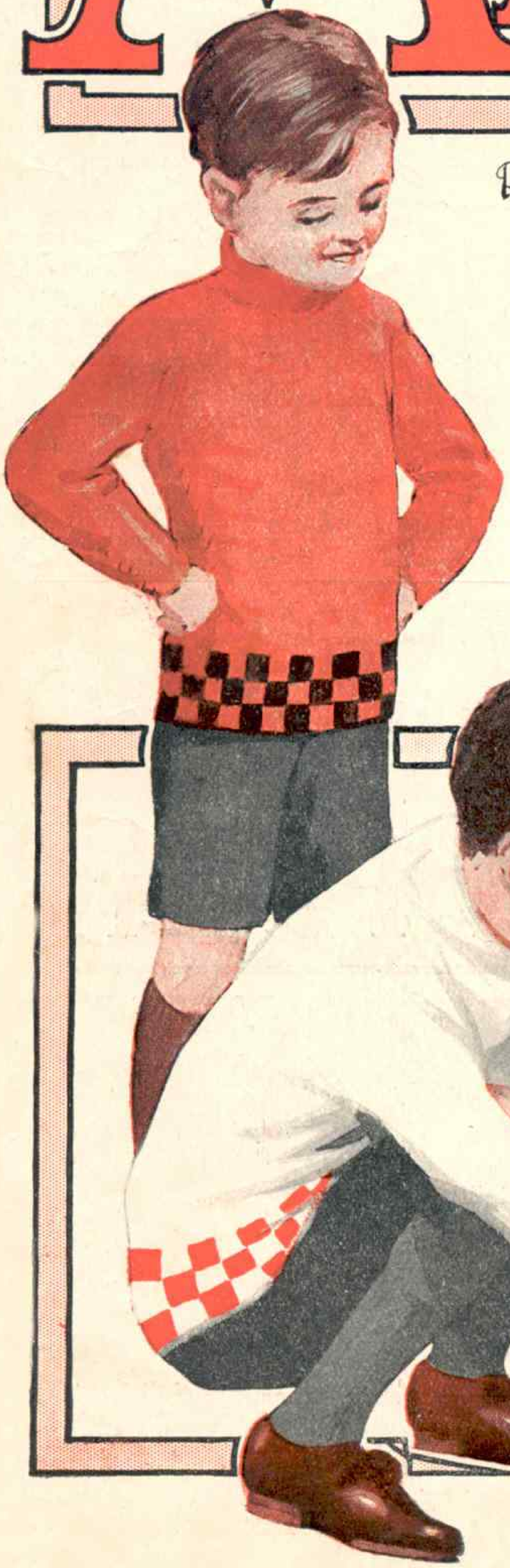
VOL. VIII

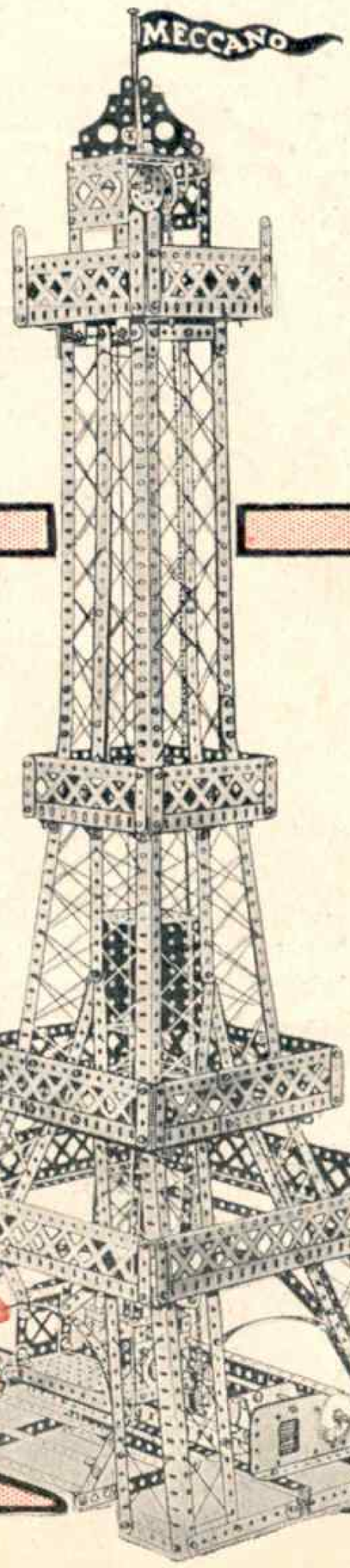
NO. 8

Published in the interests of Boys

RESULTS OF OUR £250 MODEL BUILDING CONTEST

See Page 98





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For AUGUST, 1923

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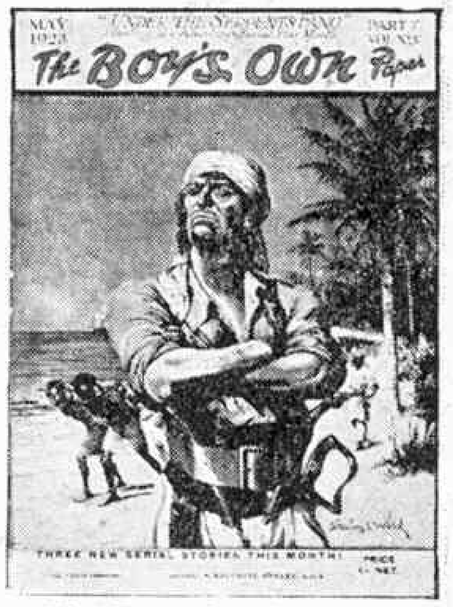

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Binns Road,
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MECCANO MAGAZINE

PUBLISHED IN THE INTERESTS OF BOYS
on the
15th of each month

EDITORIAL

AS was only to be expected, the July issue of the "*M.M.*" met with a tremendously enthusiastic reception. The demands were so great that although many thousands of extra copies were printed, we were sold out a few days after publication. As a consequence, when readers whose subscriptions had not been received, applied for copies, they were disappointed to learn that there were none available. The moral is, of course, to place a regular order, either with your Meccano dealer or direct with this office. In orders dealt with at this office, a reminder is inserted with every Magazine with which the subscription expires, and the subscription should always be renewed in good time so as to avoid disappointment.

Sold Out!

Every day my mail bag has been filled with letters of congratulation from readers. The introduction of a coloured cover places the Magazine on a high level, and I hope shortly to be able to announce that arrangements have been completed by which the "*M.M.*" may be ordered from any newsagent or bookstall. I am glad to think that my readers are pleased with the July issue, and I can assure them that our future numbers will be even better and more interesting. We have many surprises in store and many interesting features are being arranged, including several novel competitions. Altogether I am endeavouring to make the "*M.M.*" *the* paper for Meccano boys.

Surprises in Store

In my remarks last month I promised to tell you something of the attractive programme I am mapping out for our future issues. In this connection I largely have in mind the suggestions made in the recent competition for "Improving the '*M.M.*'" In the first place, the article on "How to Build the Meccano Loom," which concludes in this issue, will be followed next month by the first instalment of an article on building the Meccano Motor Chassis, the second and final instalment of which will appear in October. In November we shall publish instructions for building a splendid new model of a Grandfather's Clock. This Meccano clock has been thoroughly tested here during the past twelve months, and improvements in its design have been effected from time to time. The resulting model stands about 6 ft. in height and keeps as accurate time as any Grandfather's clock ever made.

Good Things Coming

Later we shall publish instructions for building an entirely new model of the High-Speed Ship Coaler. I have always thought that this is one of the most interesting of our Meccano models, for all the movements for loading and unloading are controlled from the gear box. This model will appeal to all my readers, because when it has been built it affords endless fun, and no little dexterity is required for its operation. There are so many operations that the Meccano boy has to use intelligence and be quick with his fingers in order to carry out all of them successfully.

Another New Model

In next month's issue we shall commence an article dealing briefly with the wonderful story of the Motor Car. It will describe motoring in early days, when it was necessary for a man to walk in front of each car with a red flag. It will briefly describe the evolution of the petrol engine and its application to many purposes. The author of the article, who has himself ridden at Brooklands, will also give impressions of speed work on this wonderful racing track. Altogether the article is one that I feel sure will appeal to our readers in general, and more particularly to those who construct the Meccano Motor Chassis.

Thrills at Brooklands

I am pleased to say that many difficulties in the way of reproducing illustrations of stamps have now been overcome, and special arrangements are being made with the Postmaster-General to allow of our printing illustrations in this column. A Stamp Column without illustrations would be like a Meccano model without nuts and bolts! In our future numbers we shall illustrate, where possible, interesting new issues that are received from time to time, and we shall also reproduce illustrations of famous stamps as well as of stamps of general interest.

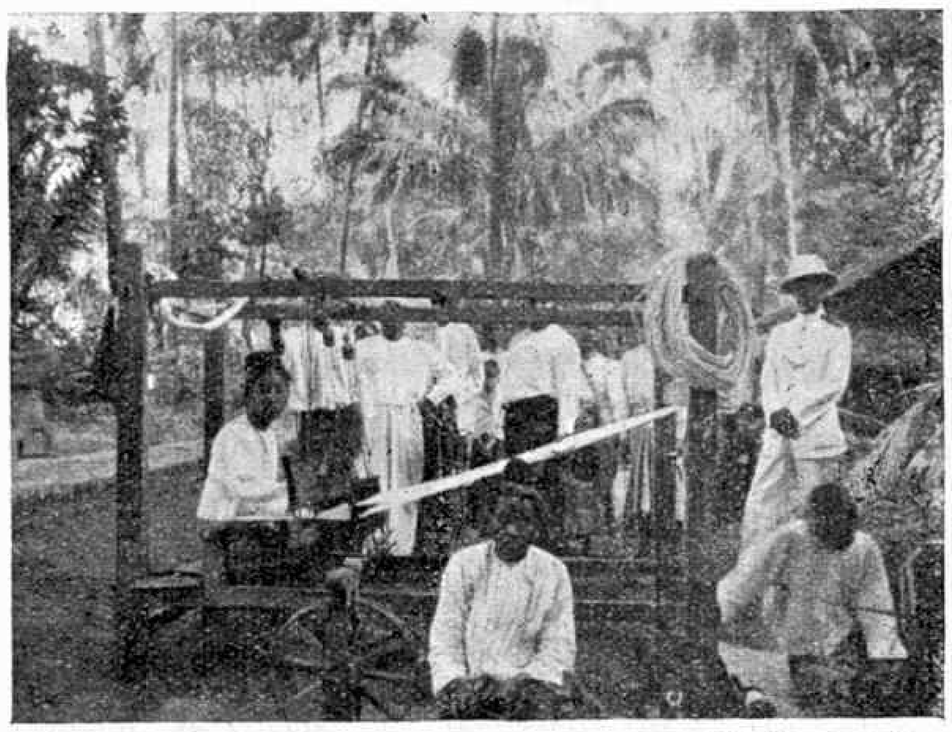
Our "Stamp" Column

Several engineering articles have been arranged, and include a description of the wonderful new Coaler at Crewe Station, Giant Excavator at Essen in Germany, Planing Machines, Steam Navvies and Draglines.

Wonderful Machinery

In our last issue we published the first of a series of articles on famous bridges, and we shall shortly print an article dealing with the proposed new bridge across the Hudson River at New York. This will be followed by a description of "A Notable Engineering Feat," in which a double leaf Bascule Bridge at Chicago is concerned.

Hand-Loom in Use To-day



Photograph by] [*W. M. Gerrard*

OUR photograph shows a Burmese woman working a hand-loom in far-away Burma. Here the peasant classes are being encouraged by the Government to earn their living by weaving in this way. In this native loom the warp threads are first placed in position across the loom, and the reed moves towards the weaver, who passes the shuttle between the warp by hand. It is interesting to note the healds, and the crude arrangement for lifting them. In the foreground is shown a primitive spinning wheel.

When we compare this Burmese hand-loom with the machinery of a modern weaving factory as shown on page 93, we are better able to realise the great advances made by civilisation, as a result of the inventive genius of such men as Kay, Hargreaves, and Arkwright.

THE MECCANO LOOM

FOR REAL WEAVING

INSTRUCTIONS FOR BUILDING THIS REMARKABLE MODEL

In this instalment we conclude the article on building the Meccano Loom, commenced in our July issue. This model illustrates the wonderful genius of the Meccano system, for every technical operation in the process of weaving is perfectly carried out, exactly as in actual manufacture. Hat-bands, ties and other similar fabrics may be woven with the Meccano Loom; and the skill and artistic abilities of the model-builder are expressed in the resulting patterns and combinations of colours.

(*Continued*).

Heald Motion

THIS is brought out in Fig. J. On the far end of the rod 8 is a crank 25 (two cranks butted together), the outer end of which is connected to 9½″ and 5½″ angle girders, overlapped 9 holes, forming a connection 26, the top of which is coupled to an extended crank 27 fixed to a rod 28. The element 27 is made up of a 2½″ strip the end hole being on the rod 28, and with 2 cranks reversed and bolted through the strip.

On the other end of the rod 28 are secured 2 bush wheels 29, which are fastened together by ¾″ bolts. A 2½″ strip 30 and 3″ strip 31 are bolted to the bush wheels, and hooks are connected to the outer ends of these 2 strips. The chains 32 and 33 are passed over 1″ sprocket wheels 34 on the rod 35 and are connected to the heald frames 36.

Slay

The construction of the slay 40A is shown in Fig. I, the reed consisting of a number of 2½″ strips (spaced with washers) 40, mounted on upper and lower rods and carried on the angle girders 41 pivoted on the rod 42. The slay is rocked to and fro from a rod 43, Fig. C*, which is driven from the gear wheel 6, a ¾″ pinion 44 on the rod 43 meshing with the gear wheel 6.

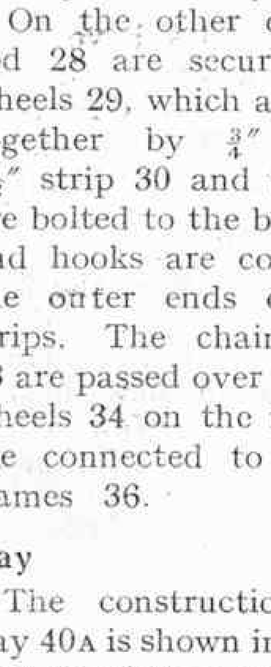


Fig. G
Weaver's Slip-Knot

On both ends of the rod 43 are fixed cranks 45 which are connected to the cranked bent strips 46, Fig. F, on the slay by means of 4½″ strips 47. In Fig. B the near strip is shown hanging down disconnected.

The sides of the slay consist of 5½″ flat girders 48, and the pulley wheels 49 round which the picking cords run are carried as shown in illustration, Fig. I.

* Illustrated in the July "*M.M.*"

The shuttle moves along the "slay," which supports and guides it as it is jerked from one side of the loom to the other by means of the "picking stick," suspended from above. Attached to the

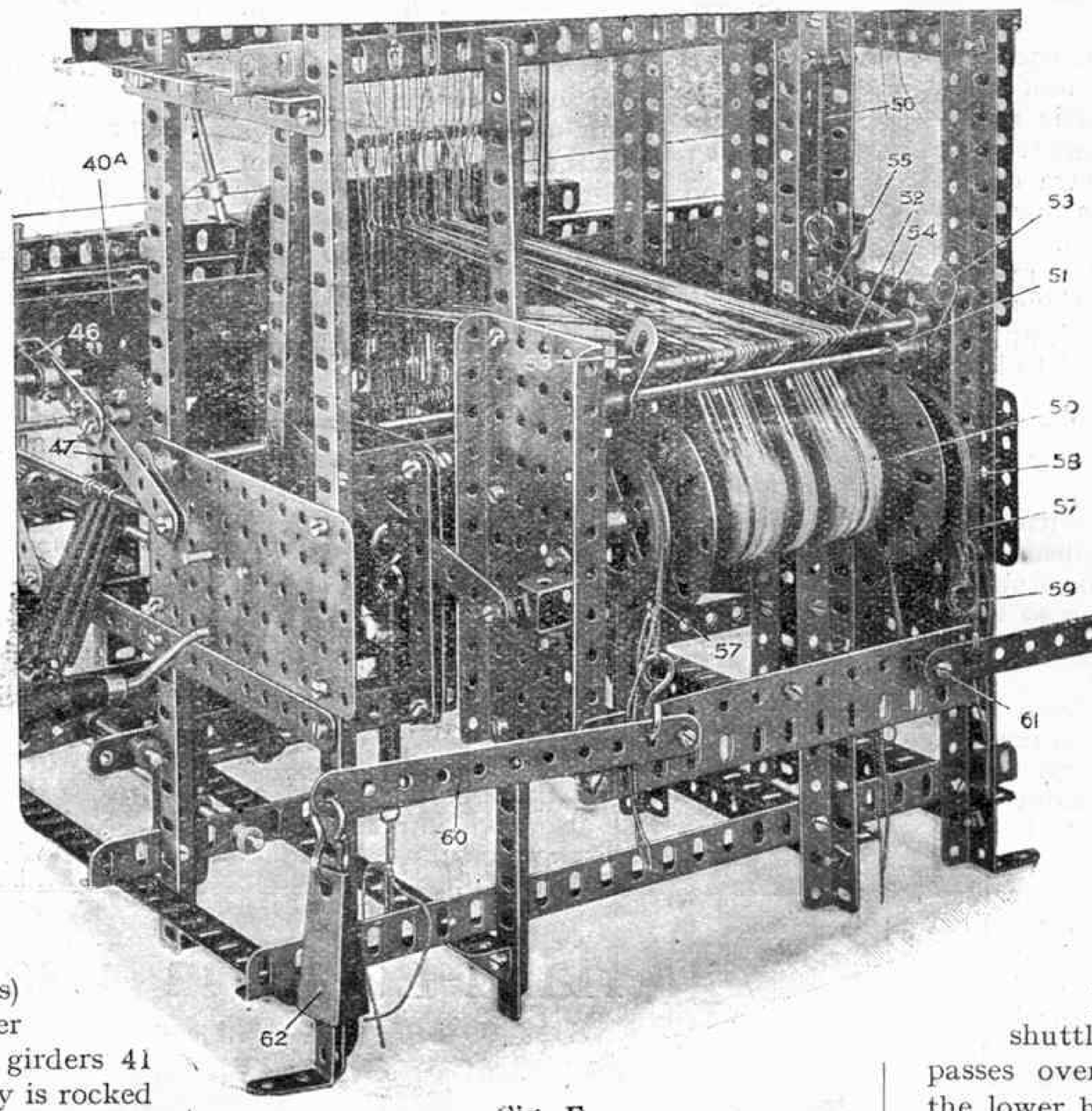


Fig. F

slay is the "reed," which moves forward with the slay, after every crossing of the warp by the weft.

Warp Thread Tension Mechanism

In order to compensate for the slacking of the warp threads which develops when the shed is formed by the motion of the healds, the warps are passed from the beam 50, Fig. F, under the rod 51 and over another rod 52 and thence through the eyes of the healds to the reed.

The rod 52 is given a continuous rearward tensional movement as follows: it is carried on cranks 53 fixed on the lower rod 51; another crank 54 to which is connected a 2½″ strip 55, the end hole being threaded on the rod 51, is connected on its outer hole by a hook coupled to a spring 56. The spring 56 therefore rocks the upper rod rearwardly, and takes up the slacking formed by the shedding action of the healds.

The beam 50 is braked by means of cords 57 passing over 2″ pulleys 58 and secured to the frame of the loom, the other ends being connected to hooks 59, engaging a hole in the strip 60 pivoted at 61, weights 62 on the outer ends of the strip 60 putting the required frictional resistance on the beam 50.

Preparing to Weave

In preparing to weave, the first thing to be done is to pass the ends of the warp from the beam (situated at the back of the loom) through the mails of the healds and then through the reed. One or more threads are passed through each division of the reed, and attached to the taking-off roller.

By turning the crank, the shuttle is jerked across the loom and passes over the threads held down by the lower heald and beneath those raised by the upper heald, at the same time leaving in its wake a loose thread of weft. The slay then moves forward and brings up the reed, which drives before it this thread or "first pick" of the weft. By continuing to turn the handle, the same process is repeated, the shuttle being again jerked back and across the loom, this time from the other side. The reed again moves forward and presses up the second pick against the first. The taking-off roller in the meantime slowly rotates, and as the weaving proceeds it rolls around itself the woven fabric.

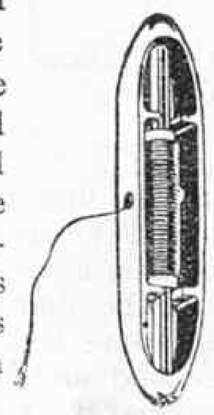


Fig. H
Shuttle

A suitable material for use in this model is No. 8 Star

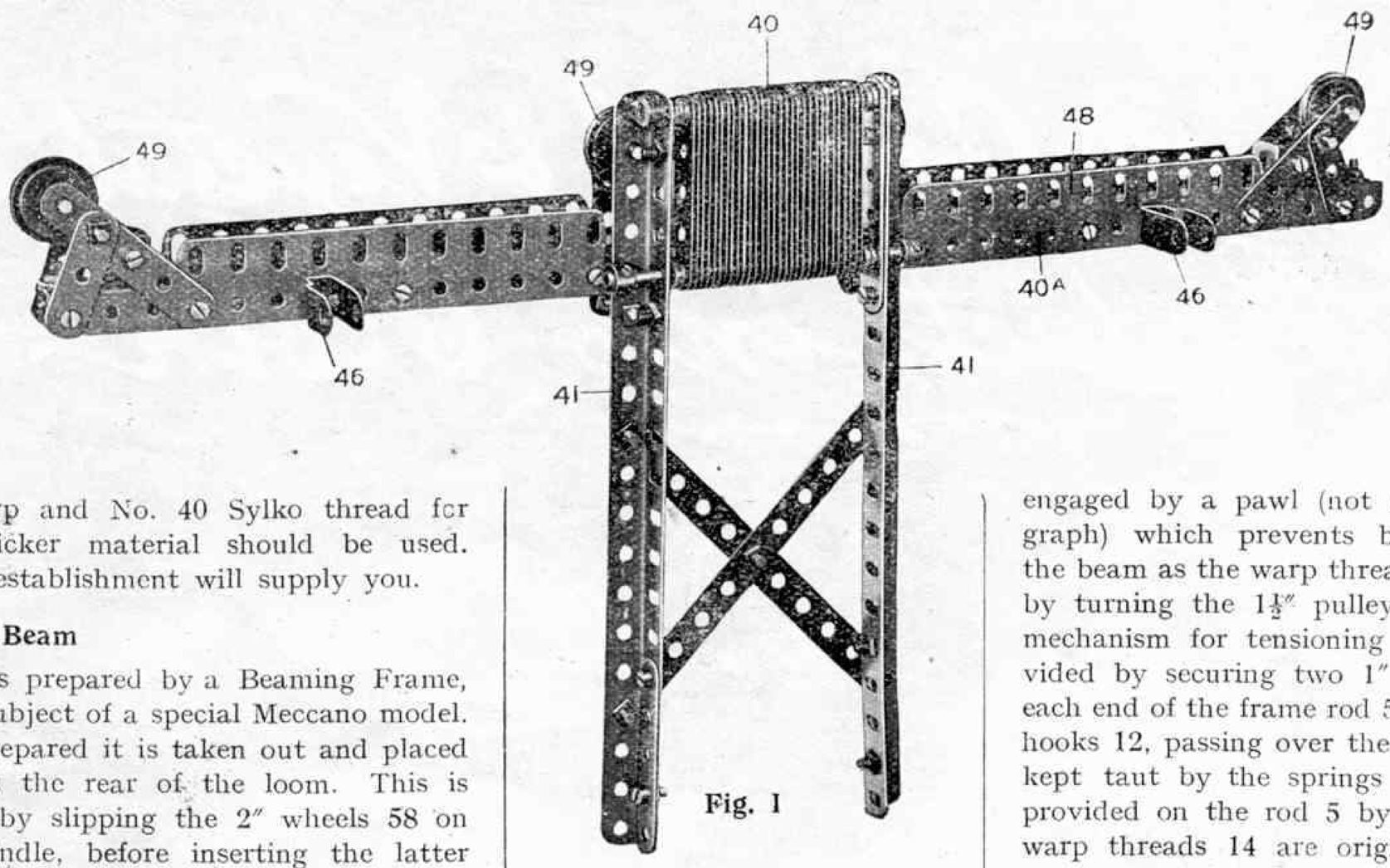


Fig. 1

Sylko for warp and No. 40 Sylko thread for weft. No thicker material should be used. Any drapery establishment will supply you.

Preparing the Beam

The beam is prepared by a Beaming Frame, which is the subject of a special Meccano model. After being prepared it is taken out and placed a position at the rear of the loom. This is accomplished by slipping the 2″ wheels 58 on the beam spindle, before inserting the latter in the holes of the side flanged plates. After doing this the pulley wheels are secured to the spindle at each end to hold the beam in position.

All the ends of the threads are drawn under rod 51 and over 52, long enough to permit each thread to be passed through the healds in the following manner: the first warp thread is passed through the eye of the first heald in the near frame, and thence through the first aperture of the reed; the next thread is passed between the first two healds in the near frame and through the eye of the far frame and thence through the next aperture of the reed. The warp threads may be threaded through the reed spaces in pairs. This process is continued until all the ends are threaded through the reed. They are then carried over the front angle girder, under the sand roller 72 over the rod 73 and on to the take-up roller 74, where they are gripped under a rod in the slot of the ller. This operation is more conveniently performed by two persons with the aid of a reed hook.

For winding the weft thread on the spindle forming the cop the spindle should be removed from the shuttle, and one end inserted in the coupling 78, and the thread from bobbin 80 wound around it by turning the crank handle 79.

Fig. G illustrates a weaver's slip-knot, which is used when adjustments or tension is necessary.

In one of our future issues we hope to illustrate some of several patterns obtainable with the Meccano Loom.

How to Build the Beaming Frame

The Beaming Frame is illustrated on page 102 of this issue, and may be built as follows:

The frame 1, upon which the warp threads are wound, is built up of 12½″ angle girders, 2 overlapped seven holes and bolted to a 5½″ girder and 5½″ strip crossed and connected to face plates 4 on the 11½″ rod 5. Inside the frame, two 5½″ angle girders are bolted nine holes from each end to form the inner bearings for the rods 5.

Another 5½″ girder is bolted crosswise to these in the centre to form a stay. The warp threads are first wound upon the frame 1, and pass through the holes in a 24½″ angle girder 6, and, converging together, pass between the 2½″ strips 7 forming the reed, and so on to the beam 8. On the far side of the beam rod is a ½″ pinion

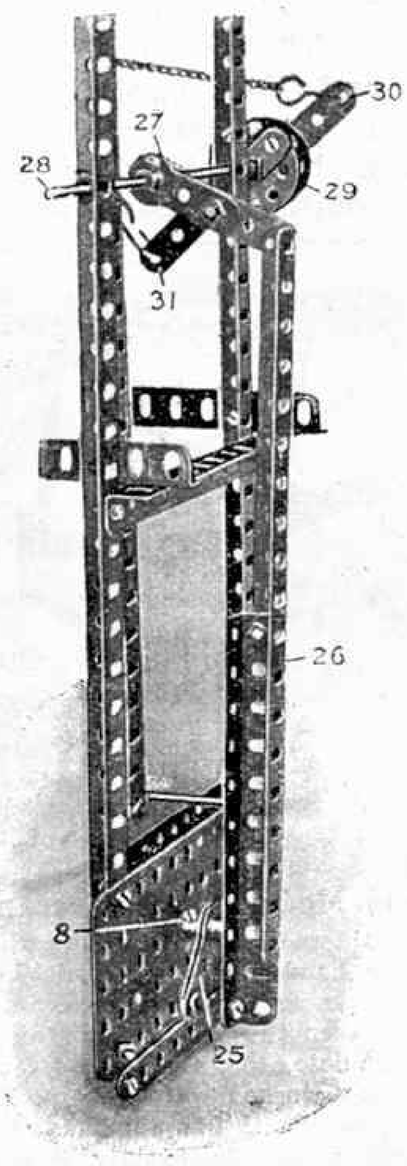


Fig. J

engaged by a pawl (not shown on the photograph) which prevents backward rotation of the beam as the warp threads are wound thereon by turning the 1½″ pulley wheels 9. A brake mechanism for tensioning the frame 2 is provided by securing two 1″ pulley wheels 10 at each end of the frame rod 5, cords 11, secured by hooks 12, passing over the pulleys 10 and being kept taut by the springs 12. A handle 13 is provided on the rod 5 by means of which the warp threads 14 are originally wound on the frame 2.

Parts Required for Building the Loom

6	of No.		1	3	of No.		27A
22	,,	,,	2	4	,,	,,	29
8	,,	,,	3	2	,,	,,	32
9	,,	,,	4	6	,,	,,	35
39	,,	,,	5	195	,,	,,	37
4	,,	,,	6	33	,,	,,	37A
4	,,	,,	6A	198	,,	,,	38
6	,,	,,	7A	15	,,	,,	43
17	,,	,,	8	2	,,	,,	44
3	,,	,,	8A	5	,,	,,	45
15	,,	,,	9	2	,,	,,	48A
2	,,	,,	10	2	,,	,,	52
8	,,	,,	11	17	,,	,,	57
4	,,	,,	12	55	,,	,,	59
4	,,	,,	12A	15	,,	,,	62
4	,,	,,	13	13	,,	,,	63
13	,,	,,	13A	4	,,	,,	67
10	,,	,,	14	4	,,	,,	70
1	,,	,,	15	2	,,	,,	76
1	,,	,,	15A	4	,,	,,	82
6	,,	,,	16	12	,,	,,	94
8	,,	,,	18A	4	,,	,,	96
2	,,	,,	19	42	,,	,,	101
2	,,	,,	20A	6	,,	,,	103
4	,,	,,	21	1	,,	,,	104
4	,,	,,	22	1	,,	,,	106
2	,,	,,	24	1	,,	,,	106A
5	,,	,,	25	2	,,	,,	109
5	,,	,,	26	7	,,	,,	111
5	,,	,,	27				

Parts Required for Beaming Frame

2	of No.		1	6	of No.		21
4	,,	,,	2	1	,,	,,	26
44	,,	,,	5	1	,,	,,	33
4	,,	,,	6	253	,,	,,	37
4	,,	,,	7	88	,,	,,	38
2	,,	,,	7A	4	,,	,,	43
12	,,	,,	8	8	,,	,,	57
10	,,	,,	9	10	,,	,,	59
8	,,	,,	12	1	,,	,,	63
2	,,	,,	13	1	,,	,,	103
3	,,	,,	14	4	,,	,,	109

(THE END)

The Fascinating Story of Spinning and Weaving

(Continued)

This is the second instalment of this article, the subject of which contains many instances of the triumph of perseverance and industry over great difficulties. There is no more wonderful story than that of the textile industry.

INCLUDED in these processes are "picking" and "carding," which respectively clean the cotton of impurities, and arrange the fibres so that they all lie in the same direction.

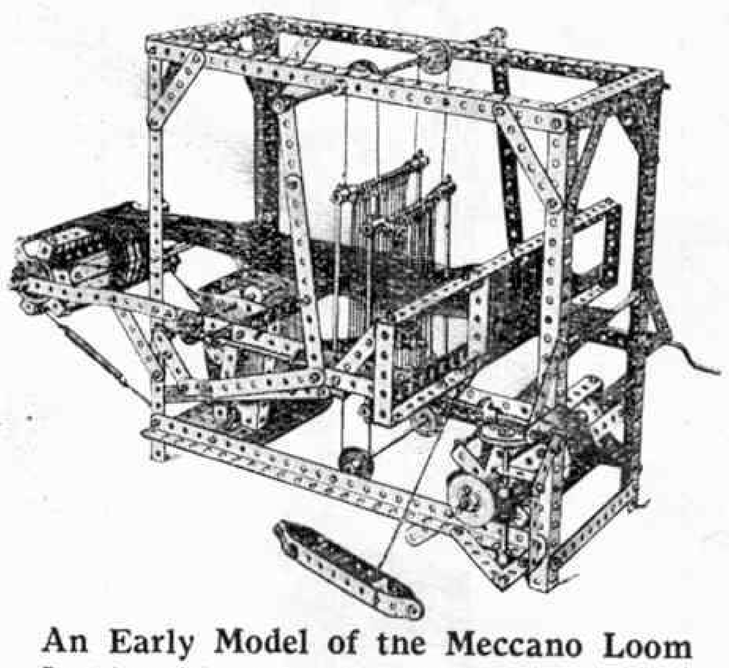
Drawing and Twisting Cotton

These fibres are only 1/2000 inch diameter, and under the microscope are seen to resemble a flat ribbon, twisted like a stick of barley sugar. It seems almost impossible that these tiny fibres could by any process be disciplined into a long and continuous thread, yet the feat is accomplished by the process called "drawing." Here the fibres are drawn out into long strands, called "sliver," and in this form they resemble a thick tape. They then pass through a machine called a "slubber," where they are given a twist and wound on to bobbins. From here they pass to the "roving frame" and then to the spinning machine, which further twists the thread and tightens it up until it reaches the requisite quality and strength. It is not until the cotton fibres reach this stage that they are ready for the final process of weaving into cotton cloth.

Making Woollen Yarn

Wool, of course, is obtained from the fleece of sheep, and is imported into this country in large quantities from Australia and New Zealand, in which countries large numbers of sheep are reared. A small quantity of wool is also obtained from sheep reared in this country.

As in the case of cotton the raw wool must first be treated by several processes, before it is suitable for weaving, an additional process being that which extracts the grease. The wool is first picked and cleaned, and then carded and twisted into yarn of varying thicknesses. It also has to be dyed before the cloth is made, if a pattern is desired in the finished cloth, but if the finished article is to be of a uniform colour, the fabric may be dyed after weaving.



An Early Model of the Meccano Loom

In this article we describe how the earliest improvements in the hand-loom were made in connection with the shuttle which, in the early days, had to be passed between the warp threads by hand. It is interesting to note, too, that in its early form the Meccano Loom worked on this principle. One of the first improvements was to make the movement of the shuttle automatic, exactly as in the case of real loom practice. Compare the above illustration with the illustration of the Meccano Loom that appeared on the cover of our July issue, and note the wonderful improvements that have been effected in this model.

The Hand-Loom

All weaving was done on hand-looms until 1785, when the power-loom was invented. Hand-looms are still in use in many parts of this country, in Scotland and Ireland for instance, and also in France. Nearly every farmhouse in Lancashire in the early days was an independent little factory, and hand-looms were to be found in most of the cottages and houses in the towns and villages. The weaver himself generally bought the raw cotton. This was picked by his children, spun into thread by his wife or the elder girls, and then woven at the loom by his sons, whilst he carried it to the merchant for sale.

There were very few hand-looms in England until about the second half of the 16th century, however, when religious persecutions drove the Protestant weavers from Holland, Flanders, and France, to this country. These refugees established themselves here, and many of the Flemish weavers settled in the neighbourhood of Manchester, now the centre of the cotton industry.

Improving the Loom

We have not space in this article to recount the story of the improvements and inventions in spinning machinery. These we shall hope to describe in some future issue, for they include many stories of courage and daring among men who had to overcome innumerable obstacles.

The Story of Spinning and Weaving (*cont.*)

Not the least of these difficulties was the hostility of the weavers themselves to the introduction of machinery into their daily lives.

In this article we must confine our remarks to dealing with the loom itself and describing as briefly as possible the principle on which it works and the chief inventions that have contributed to make the textile industry one of the most important in the world.

Warp and Weft

The earliest improvements in the ancient hand-loom were those made in connection with that part known as the shuttle. To understand exactly what this means we must remember that a woven fabric is composed of two elements, the "warp," or longitudinal threads, and the "weft," or cross-threads. If you examine your handkerchief or a tablecloth, you will see exactly what I mean. Notice how a woven fabric differs from one of another texture such as a stocking, jumper, or crochet pattern.

The interweaving of the warp by the weft, called the "picking motion," is effected by passing a thread from the shuttle between some of the threads of the warp. The shuttle moves from one side of the loom to the other, and each time it passes between the threads of the warp, it leaves behind a thread of weft.

Three Important Operations

There are three distinct operations necessary to enable the shuttle to accomplish this movement. The first is the opening of the warp, when some of the threads are raised for the second operation of picking. The third operation, which is called "beating up" the weft, consists of pressing the weft into position by the reed.

These three primary operations must be carried out on every loom, no matter whether it be the hand-loom of a cottager or the largest power-loom used in a modern spinning factory.

Up to the early part of the eighteenth century, the shuttle had to be "thrown" backwards and forwards by hand. This was accomplished by two persons, who stood one on either side of the loom. As the shuttle was heavy, throwing the shuttle was very hard work, as well as being a very laborious and slow process. In 1750, however, John Kay, of Bolton, invented the "flying" shuttle. This consisted of a "picking stick" that drove the shuttle and saved the weavers from throwing it with their hands.

Not only did the invention halve the necessary labour, but it also increased the production of the looms. Thus more yarn was required and attention was turned to improving the method of spinning, to keep pace with these increased demands.

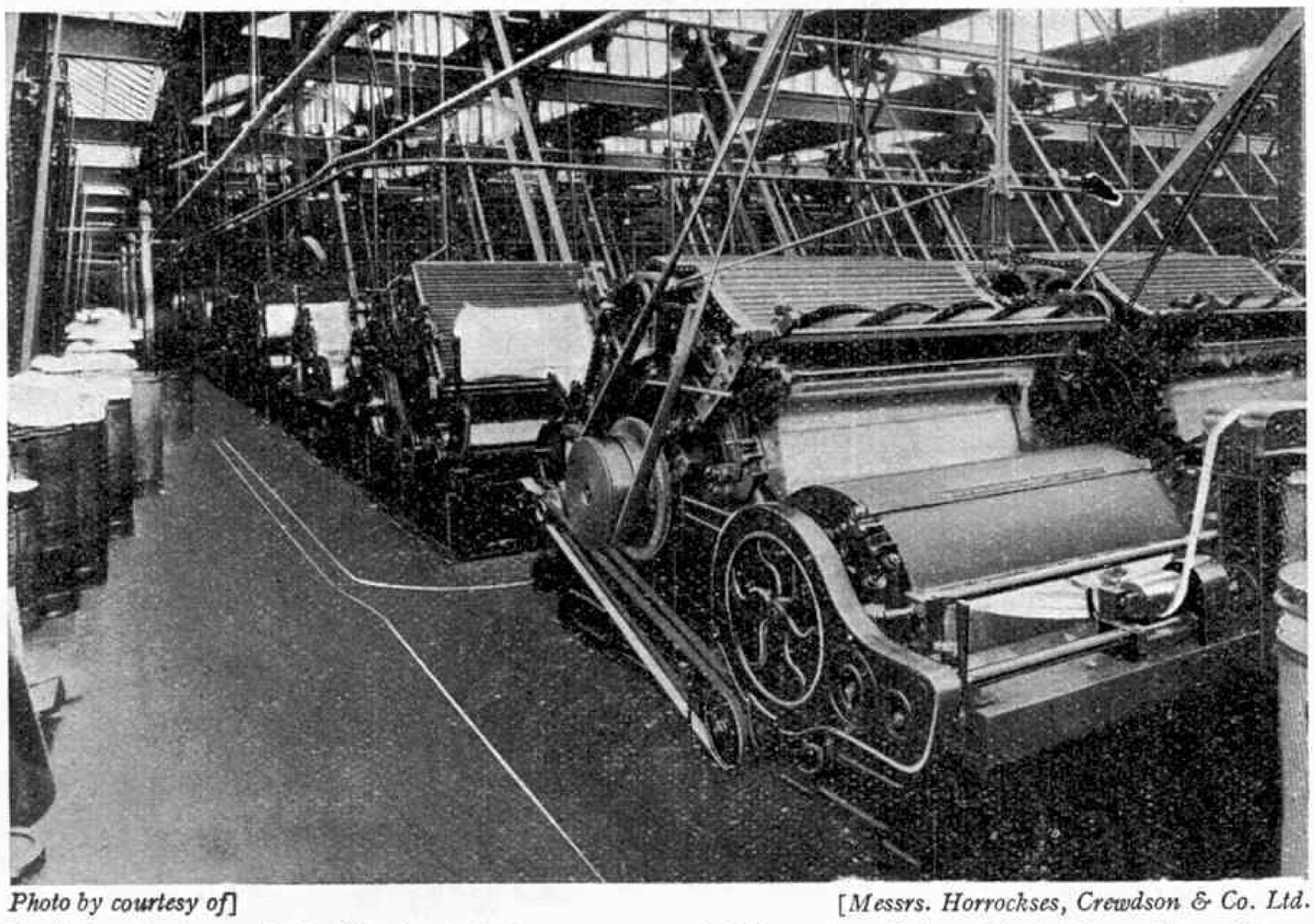


Photo by courtesy of] [*Messrs. Horrockses, Crewdson & Co. Ltd.*

In this photograph is illustrated the process of "drawing," in which the cotton fibres are drawn into long strands called "sliver." The sliver is seen issuing from the machine on the right of the photograph.

The Inventors' Opportunity

These were, indeed, wonderful times for inventors, and many are the romantic stories that could be written about this period. Men who were in lowly walks of life were able to amass great fortunes from their inventions and discoveries in such days of golden opportunity, and many English families to-day owe their prosperity to the inventions of this period.

James Hargreaves, of Blackburn, and Richard Arkwright, a Preston barber, both brought out inventions that improved the output of yarn. Crompton in 1787 invented his spinning "Mule," which combined the features of Hargreaves' and Cartwright's inventions. The steam engine, then lately perfected by Watt, was harnessed to drive the spinning mule, and a great increase in cotton production followed.

In 1785, Edmund Cartwright, an English clergyman, invented the power-loom, which enabled cloth of more uniform texture to be produced at a lower cost and in greater quantities.

Strange though it may seem, yet it is a fact that the power-loom was only slowly taken up. It was first used in Glasgow about the end of the eighteenth century, but about a century ago, it was rapidly adopted, especially after it was made so that the cloth was taken up mechanically, instead of it having to be continually pulled forward by the weaver.

Water Power and Horse Power

In these early days the power that was available was limited, and often advantage had to be taken of a waterfall to drive the mill, by means of a water-wheel. The alternative method was to drive the mill by a horse attached to a rotating capstan in the centre of a circle, around which it continuously walked.

Mills were built first at Nottingham and at Cromford in Derbyshire, and about 1776 at Oldham. Seven of these mills were worked by horses and three by water-power. Later, mills were erected all over Lancashire in the valleys so as to obtain the advantage of power from the rivers and their tributaries.

It was not until 1785 that Watt's newly-invented steam engine was first applied

(*Continued on p.* 97)

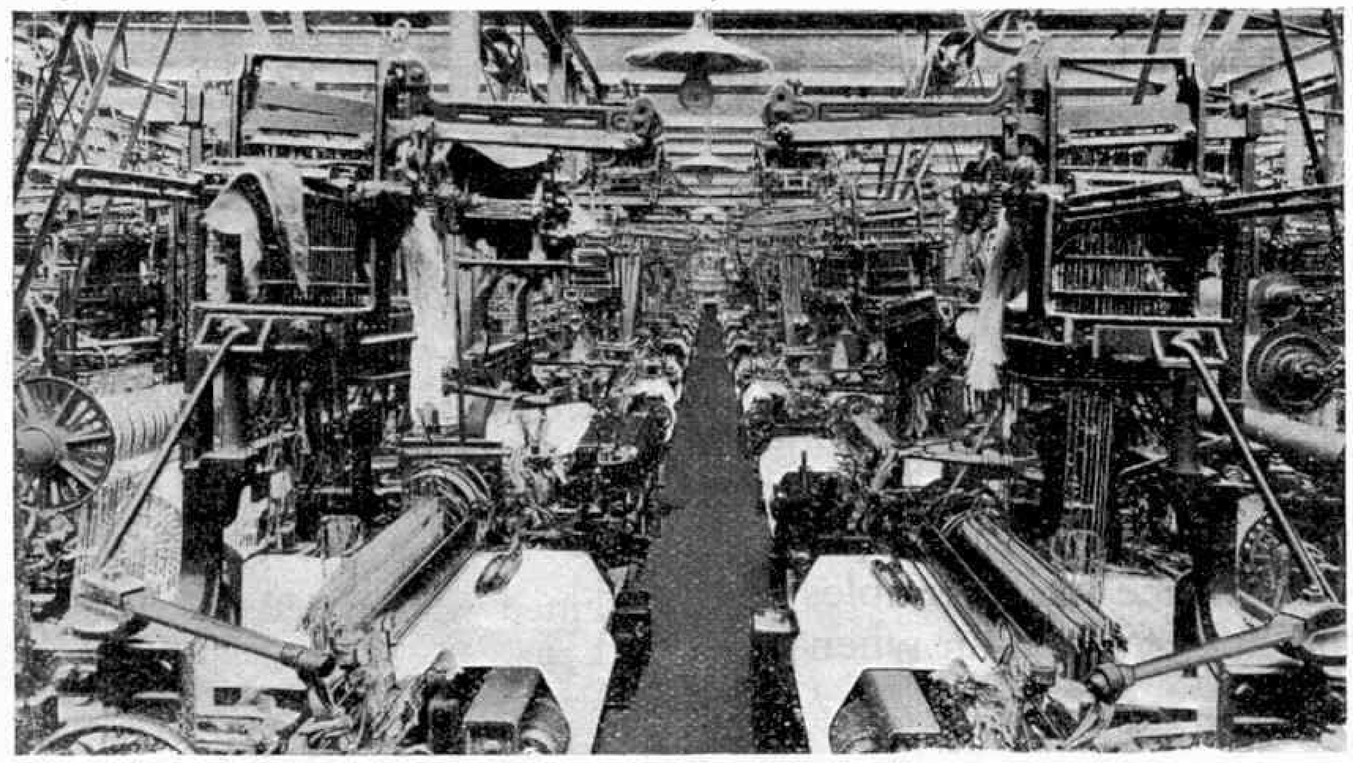
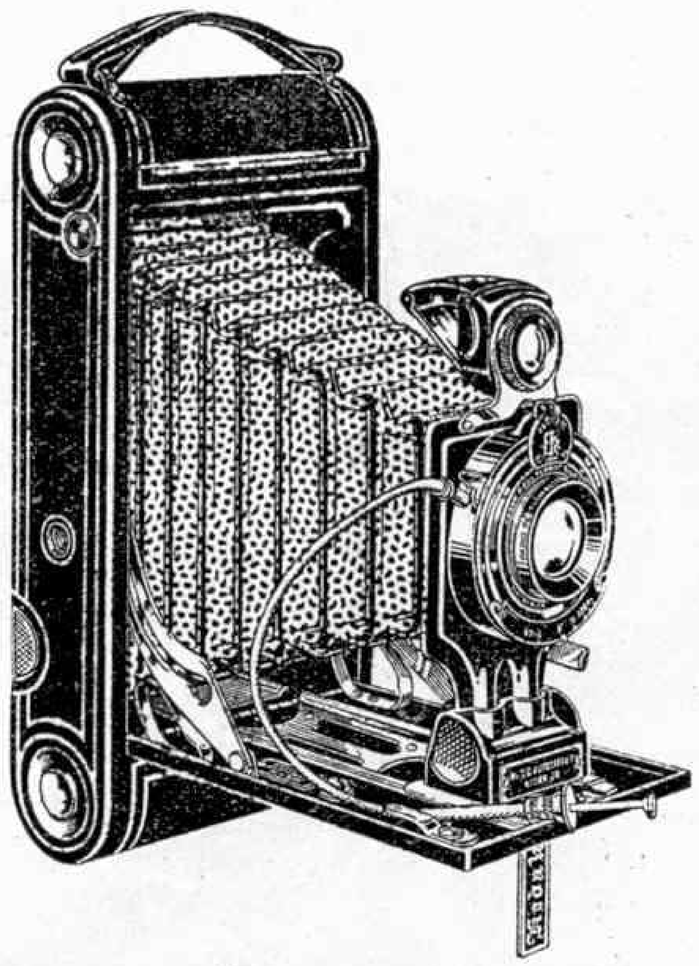


Photo by courtesy of] [*Messrs. Horrockses, Crewdson & Co. Ltd.*

A scene in a modern weaving factory. Here the looms are shown weaving fancy cloth. Healds and shuttles are to be seen on the two machines in the immediate foreground, whilst a weaver's beam, with the warp threads in position, is shown on the loom to the left.



Here's a capital "Kodak" for the holidays

The 2C Kodak is the "Kodak" *you* need for *your own* holiday snapshots. The pleasing post-card proportions of the pictures are admirably suited to holiday groups, horizontal landscapes, and vertical portraits. It is only a small "Kodak" but it takes a picture just a fraction of an inch smaller than a post-card—$4\frac{7}{8} \times 2\frac{7}{8}$ ins.

2C Kodaks weigh little, cost little, and are strong enough to stand any reasonable amount of hard wear. They are compact enough to fit the pocket with room to spare. But although they are made as light and as small as possible, nothing has been sacrificed which makes for efficiency—you can make good pictures from the start. Both models are fitted with the Autographic Feature—the device which enables you to write the title on the film when you make the picture. Call at your nearest Kodak dealers and ask to see some 2C pictures. You can learn to use a "Kodak" in half-an-hour.

2C Autographic Kodak Juniors

No. 2C Autographic Kodak Junior. Fitted with Meniscus Achromatic Lens and Kodak Ball Bearing Shutter. Price £4 : 7 : 6

Fitted with Rapid Rectilinear Lens. Price £5 : 0 : 0

2C Folding Autographic Brownies

No 2C Folding Autographic Brownie. Fitted with Meniscus Achromatic Lens and Kodak Ball Bearing Shutter. Price £3 : 5 : 0

Fitted with Rapid Rectilinear Lens. Price £5 : 0 : 0

Then there are the 2C Box-form Brownies, 25/-

Ask for the 2C Kodaks

Kodak Ltd., Kingsway, London, W.C.2

THE

Meccano Photographers' Corner

TWO SPLENDID COMPETITIONS

Holiday Essay Competition

AS announced in our last issue, we are holding a Holiday Essay Competition on the same lines as the similar Competition held last year. The subject will again be some holiday experience, and this year the Competition will be divided into two sections (1) Photo-Essay, and (2) Essay Competition.

Photo-Essay Competition

In the Photo-Essay Competition the essay should be illustrated with photographs. These must be taken by the competitor, but may be developed and printed by others, if desired. This point will be taken into consideration when making the awards, however, for a boy who sends in an essay illustrated with photographs taken, developed, and printed by himself will naturally stand a better chance of winning a prize than will a boy who has only exposed the plate or film, and left the finishing off of his prints to others, who, perhaps, have more experience.

Photographs may be of any size, and of any finish, but it should be clearly stated whether or not they are the sole work of the entrant. They may be sent separately, or lightly gummed in position in the essay. The first prize in this section will be Meccano products to the value of £1 1s. 0d., and the second prize to the value of 10/6, to be chosen by the winner.

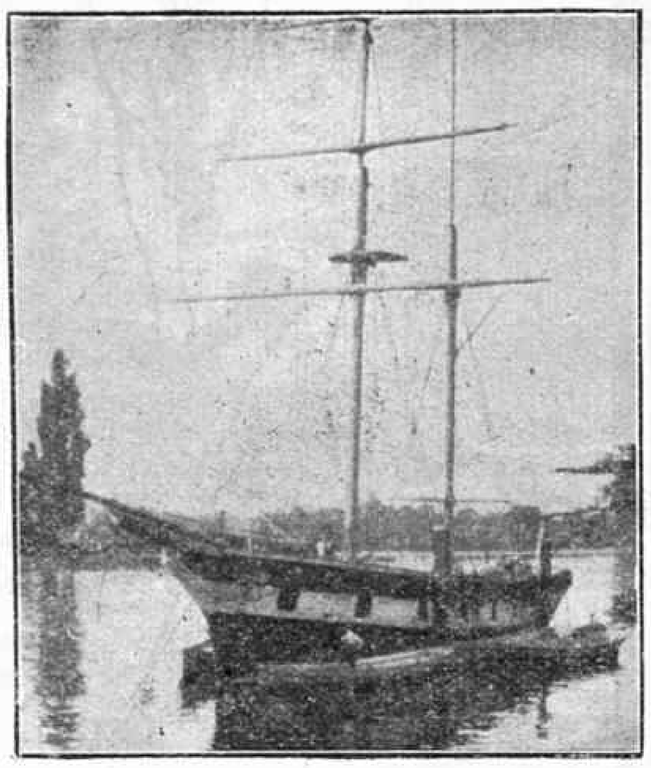


Photo by [*L. G. Davy*

"An Old Stager"

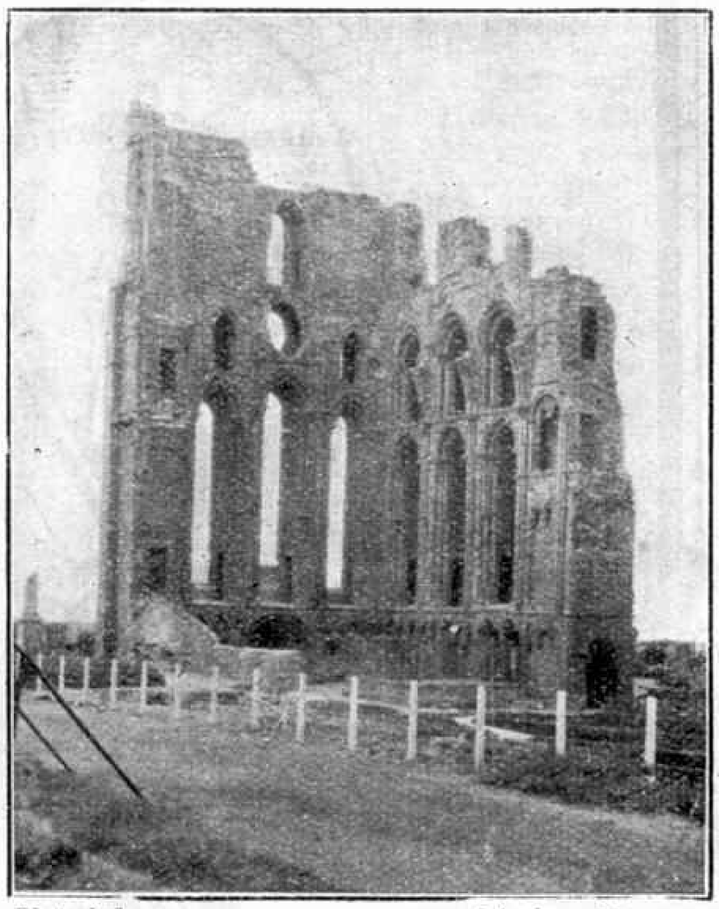


Photo by [*Andrew Macara*

Tynemouth Priory

For those without Cameras

Section (2) is for boys who have no cameras, and prizes will be awarded for the best unillustrated essay. This section will be divided into two classes. (A) For those of 14 years of age and under, (B) those over 14 years of age.

In this section three Hawk-eye cameras, made by the Kodak Company Limited, will be awarded as prizes. These cameras take photographs $2\frac{1}{4}'' \times 3\frac{1}{4}''$, and the lucky winners will be able to enter the Photographic Competitions, which will be announced from time to time in our future issues.

There are many subjects about which your essay may be written, and there are no limitations, except that the subject should be something connected with holidays.

General Conditions

All essays should be neatly written on one side of the paper only. See that your full name, age, and address appear on the back of every sheet of paper, for there is always the possibility of a page becoming detached, in which case it might be mislaid if it does not bear the entrant's name on the back.

The Competitions close on 30th September next for entries from the United Kingdom, and 30th December for competitors overseas and abroad. Send in your essays well before that date if possible.

The winning essays will be published in the "*M.M.*," and this fact should be borne in mind by the entrants in the Photo-Essay Competition. It is impossible to make satisfactory blocks from "flat" or under-exposed photographs. Bright prints, in which there is plenty of contrast and clear detail, are best for this purpose—and every reader delights in seeing good illustrations in these pages!

Fourth Photographic Competition

THE rules of this Competition, which was announced in our last issue, are the same as in our previous Photographic Competitions which have been so successful. The subjects of this Competition are :—

(1) A SUMMER SCENE

or

(2) AN ANIMAL STUDY

and these subjects give plenty of scope for Meccano boys with cameras.

Photographs must be taken by the competitor, but need not necessarily be developed or printed by him. Each entrant should say if the printing and developing is his own work, as naturally this will be taken into consideration when judging the entries.

Photographs may be of any size and may be mounted or otherwise, and they may be printed on P.O.P., gaslight or bromide paper. The finish of the photograph will not be taken into consideration, the subject and its treatment being the main point. For instance, a boy who takes a photograph of a church steeple that looks as though it were falling backwards will not have so good a chance of a prize as a boy whose photograph shows the church steeple in a normal position, because it is much more difficult to obtain the latter photograph, as every photographer knows.

The Competition will be divided into two classes :—

(A) Boys of 14 years of age and under, and

(B) Boys over 14 years of age.

The first prize in each section will be a Hawk-Eye camera, made by the Kodak Company. The winning photographs will be published in the "*M.M.*," and any other photographs that may be used in the "*M.M.*" after the Competition, will be paid for at our usual rates.

The closing date for entries from the United Kingdom is August 31st, and for entries from Overseas, 31st October next.

A PHOTOGRAHIC PICTURE CALENDAR

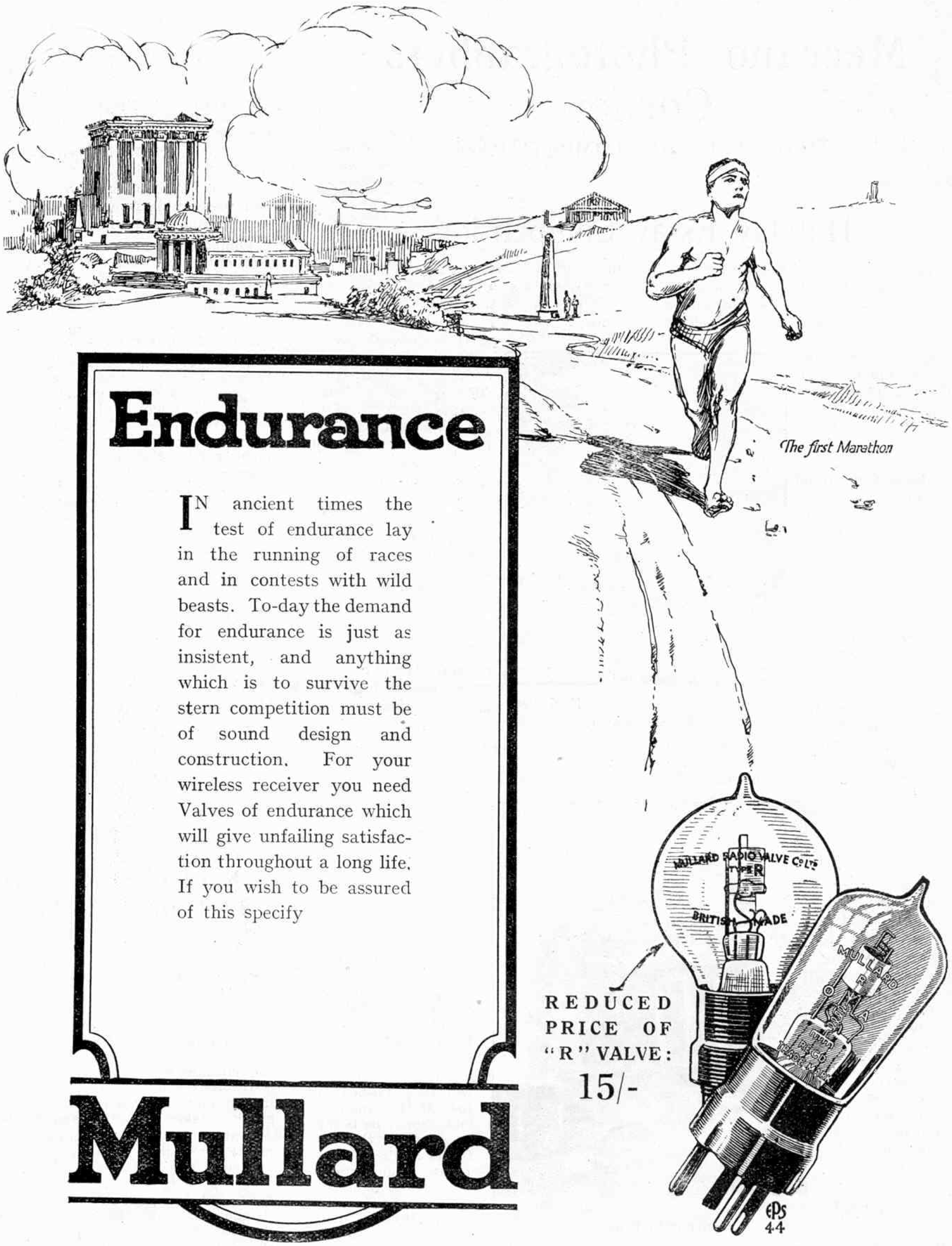
By Master J. Mellish.

Those boys who have cameras will find the making of a picture calendar a very fascinating pastime.

First of all it is desirable to choose a pretty scene, in which trees and bushes are outstanding features. When this has been done, a photograph is taken of it and the spot from which the exposure was made is carefully marked. On the same date in the following month, another photograph is taken from the same position.

Continue to take a photograph each month, until the end of the year, when, of course, you will have twelve plates or films. It is interesting to compare each print and to notice how the scene has changed in appearance each month, showing the difference between Summer and Winter, Autumn and Spring.

I am sure this idea will appeal to many thousands of Meccano boys, especially those who make photography their special hobby.



The first Marathon

Endurance

IN ancient times the test of endurance lay in the running of races and in contests with wild beasts. To-day the demand for endurance is just as insistent, and anything which is to survive the stern competition must be of sound design and construction. For your wireless receiver you need Valves of endurance which will give unfailing satisfaction throughout a long life. If you wish to be assured of this specify

Mullard

REDUCED PRICE OF "R" VALVE: 15/-

Obtainable from all leading electricians, wireless dealers, etc.

Advt. of THE MULLARD RADIO VALVE CO. LTD., Balham, S.W.12.

Dennis Hausford (Hockley).—A crystal does not wear away in the sense that it gets smaller. By constant use it gradually loses its power of detection, or in technical terms, its sensitiveness.

V. Boulton (Llanharan).—(1) A condenser is made up of separate conducting plates, each insulated from the other. The conducting surfaces are commonly tinfoil, copper, brass or aluminium. The insulating mediums are usually mica, impregnated paper, air, glass or oil. (2) By the use of a variable condenser very fine tuning may be accomplished.

K. Heywood (London, W.3).—It is undesirable to use two Sets receiving on different wave lengths with one aerial. Disturbances would be almost sure to occur which would prevent your being able to receive clear messages on either.

Build your own Radio Receiver

In a recent issue of the "*M.M.*" we gave full particulars for building a Radio Receiver from Meccano parts. These instructions may now be obtained in the form of a beautifully illustrated leaflet, printed on art paper (price 4d., post free).

In addition to Meccano parts being of service for the construction of a complete Crystal Receiving Set, they are of particular use for experimenting in Radio. Their standardisation and universal adaptability enable new circuits to be tried out, and changes to be quickly made. For this purpose some of the Meccano parts are made in special fibre, which gives perfect insulation. Certain of the parts are also available in brass, useful to experimenters on account of its non-magnetic qualities.

If you are building a Radio Receiver or experimenting in any way, you will find these special Meccano Radio parts of great assistance. Send for a full list, which will be mailed post free on application.

The Story of Spinning and Weaving

(*Continued from p.* 93).

to a cotton mill. After being successfully employed in this connection, however, it gradually superseded water-power, and power-looms became common. Weaving by hand-looms was discontinued and the weavers came into the towns and became operatives at the mills. Previous to this time, a farmer's business had been almost equally divided between cultivating the land and weaving cloth. The introduction of spinning and weaving by machinery, however, caused the farmer to give up this side of his business, being unable to compete with the power-looms of the newly-established factories.

It is a far cry from the hand-looms of the Ancient Egyptians to the giant power-looms of such a factory as that, for instance, of Messrs. Horrockses, Crewdson and Co. Ltd., where there are over 8,000 looms installed and where the weekly output is 600 miles of cloth! Nevertheless, the story of these intervening centuries is one of the greatest interest, and not the least extraordinary is the fact that all the changes and improvements have taken place in the last two hundred years!

THE END.

Singing to an Audience of 10,000

Our illustration shows a duet being broadcasted from the London Broadcasting Station. As will be seen, there are two microphones in use, thus enabling the sound to be transmitted more effectively. Behind the pianist is the famous peal of tubular bells, which delight many listeners-in. It is estimated that at least 10,000 people listen-in to the London station every night.

The world's most northern Radio station has just been fitted up on Jan Mayen, an extinct volcano in the Arctic Ocean, north of Iceland. As the world's weather originates in the Arctic zone, warnings of coming storms can now be sent from Jan Mayen. Arrangements are being made for the erection of three other stations in the Arctic to assist in broadcasting daily weather forecasts.

* * *

The highest radio station in the world is situated on the peak of Mount Corcovado, South America. It is over 2,100 ft. above the city of Rio de Janeiro.

* * *

Loud speakers have been fixed to the ceiling of the House of Representatives, Washington, and connected to microphone transmitters at the members' tables. The voice currents are carried to an amplifying apparatus situated in the basement, and from thence to the loud-speakers. They are also sent on to the radio station at Anacostia, from whence they are broadcast.

* * *

The largest crystal radio receiving set ever built has recently been on view in New York. The set is 5 feet long, weighed over 200 pounds, and was wired up ready for use.

On the table in front of the speakers, at a political meeting the other day, a bouquet of beautiful flowers concealed the receiver of a new telephonic invention. By means of concealed wires a number of scientists in another part of the building were able to hear every word of the speeches, even the faintest whisper being clearly transmitted.

* * *

Radio-telephony has now been established in the British West Indies, and the inhabitants of the Grand Turk Islands will now be able to know when steamers are leaving Santo Domingo for their island. The Islands will benefit greatly, and the authorities will be able to keep in touch with the officials of the neighbouring Islands.

* * *

Mr. T. A. Nikirk, of Los Angeles, California, claims to be the first amateur to transmit radio messages across two oceans with a home-made set. He has sent messages that have been heard in France and also on the Chinese coast. He uses a 250-watt transmitting valve, or about one-quarter the power of the British broadcasting stations.

Meccano Radio Prices

		s.	d.
RS1	Meccano Crystal Receiving Set, complete. Efficiency tested. Packed in strong carton	40	0
RS2	Outfit containing parts to make Receiving Set, in strong carton ...	25	0
RS2a	do. do. do. less Phone	15	0
AS1	Aerial Set, complete, and ready for connecting to Receiver (including earth wire)	12	6

Results of the £250 Model Building Competition

Every year our annual Model Building Contest brings an increased number of entries and more excellent models. The Contest just closed has been no exception. It is very gratifying to me to see the high standard of the models submitted, and the ingenuity displayed by the competitors in designing new movements. The entries from our Colonies and Dominions overseas, from France, Italy, Spain and Belgium are again very numerous, and the task of selecting the winners has been one that has called for considerable discrimination and judgment.

The entrants from the countries named are to be congratulated, because of the fact that they have made a very fine show in competition with Meccano boys of many years' standing in the United Kingdom.

I congratulate the winning competitors on their successes, and would say that many of the unsuccessful competitors missed prizes by only a very few points. I look forward to seeing their names in lists of awards in future competitions.

Frank Hornby

SECTION "C" (Competitors over 14 years of age)

Devan, P., 171, Avenue du Roule, Neuilly, Seine, France. Sewing Machine.
Mason, S., 39a, Bridgewater Street, Tamworth. Horizontal Compound Engine.
— **First Prize (Divided) - - - £20**

Bradley, J. F., Ganton Place, Woodhouse, Leeds. Stone Plane.
Hastings, H. C., 24, Brownswood Road, Finsbury Park, N.4. Railway Wrecking Crane.
— **Second Prize (Divided) - - - £15**

Guy, A. W., Kimberley, Summerheath Road, Hailsham. Lathe.
Jovellar, J., Coso-176-3°, Zaragoza, Spain. Electric Printing Machine.
— **Third Prize (Divided) - - - £10**

Additional Prizes of Meccano Outfits and Train Sets, etc.

Aillaud, V., Quartier Antelme, Six-Fours la Plage, Var, France. Compound Steam Engine.
Allen, T. S., 9, Whitley Gardens, Southall. Printing Machine.
Anglodette, M., 16, Rue d'Orleans, Paris XIV. Machine for Sounding.
Aquilina, A., 58, Strada Reale, Malta. Spinning Mill.
Archer, A. J., 22, Lions Flats, Mandeville Street, Clapton Park, London, E.5. Railway Engine.
Badré, P., 15, Avenue de la Republique, Colmar (Ht. Rhin). Giant Excavator.
Berni, P., via Pampi No. 5, interno 3, Sampierdarena, Italy. Electric Loco.
Bianchi, V., Via Sabbione 461, Villa Alice, Bologna, Italy. Polistereoscope.
Bing, R. L., 67, Boulevard Lannes, Paris XVI. Machine for Tracing Designs.
Blair, F. J., "Hawkesbury," St. Annes-on-Sea, Lancs. Knight.
Bounds, E., 11, Arundel Street, Glebe, Sydney, N.S.W. Paper-Cutting Machine.
Brayer, G., 134, Rue Chiers, Boulogne, France. Helicoidal Wire.
Bricourt, L., 2, Rue Sivel, Paris XIV. Village Pump.
Brown, A. Junr., Farmerton, Fern, by Brechin, N.B. Ship Transporter.
Capitaine, J., 6, Rue Fantin Latour, Grenoble, (Isère), France. Clock.
Carel, B., 8, Rue Dutailly, Chaumont, France. Curule Chair.
Chevahei, M., 52, Rue Gambon, Bourges, France. Universal Wood-Saw.
Clare, P. Chalfont Cottage, Station Road, Winslow. High-speed Hand Lathe.
Clark, H., West Cliffe, Guiseley, nr. Leeds. Lathe.
Clarke, W., 33, Oxford Road, Gee Cross, Hyde, Cheshire. Monkey Race.
Colby, A. B., 47, George Street, Providence, Rhode Island, U.S.A. Radio Inductance Winding Lathe.
Cowell, J. A., 29, Cotterill Road, Surbiton, Surrey. Meccanotroupe.
Cunningham, W., 22, Baltic Avenue, Antrim Road, Belfast. Ransome Concrete Mixer.
Davidson, P., 8, Hermand Terrace, Merchiston, Edinburgh. Meccano Electric Car.
Derrier, M., 27, Rue David, Laon (Aisne), France. Sismograph.
Dorsey, H. R., 5, Barrack Street, Meanwood Road, Leeds. Tamping Machine.
Fantova, J. G., Calle Comercio N.3, Mahon, Balearic Isles, Mediterranean. The Whip.
Featherstonhaugh, W. S., Caia House, Caia Road, Wrexham, Coil Winder and Counter.
Fouchaux, J., 19, Rue St. Bartholémy, St. Symphorien, Pres Tours, France. Fire Engine.
Freeman, H. A., Renfrew, Willingdon, Sussex. Penny-in-slot Machine.
Grey, L. W., 131, Kempton Road, East Ham, Essex. Light Cruiser.
Guerendiain, A., Alfau 7, Ceuta, Spanish Morocco. Circular Wood Saw.
Guimiot, H., Boulevard Dupin, Perception, Varzy, (Hievre), France. Chronometer.
Guisepponi, N., Valle 1286, Beunos Aires, S. America. Steam Locomotive.
Hall, E., The Cottage, 36, Heath Road, Leighton Buzzard. Track Layer.
Hare, J. Kelland, Westholt, Henlow, nr. Biggleswade. Ford Chassis.
Hart, E. M., Cranford, Newland Park, Hull. Electric Dockside Coal Hoist.
Heeramaneck, D. R., 44, Alexandria Road, Harvey Road, New Gamdevi, Bombay, India. Concrete Mixer.
Hitchcoe, S. H., "Strathmore," Solihull, nr. Birmingham. Rotary Tippler.
Huizinga, M., Van Palandtstraat 5, Arnhem, Holland. Large Plough.
Humbert, G., Soultz-sous-forêts, Frohnacker, Bas-Rhin, France. Dynamo.
Janne, E., 17, Rue d'Algésiras, Brest, Finistère, France. Printing Machine.
Jenkins, J., 8, Anderson Terrace, Longcroft, by Bonnybridge, Stirlingshire. Electric Coal-Cutting Machine.
Ioamopoulos, J., 21, Rue Farges, Marseille, France. Three-Wheel Motor Lorry.
Lafitte, J., Ecole Maternelle de la Jeunesse, Toulouse, France. Spherometer.
Lautel, F., 9, Rue Gierre Bayen, Chaons sur Marne, France. Hydrostatic Balance.
Lavie, J., 32, Rue de Brest, Morlaix, Finistère, France. Sieve.
Lemercier, H., 95, Rue Ordener, Paris XVIII. Electric Shovel, Scourer and Loader.
Lowe, W. H., 8, St. Andrew's Crescent, Blackhill, Co. Durham. The Mammoth.
Luke, R., "Brondaeg," Woodcote Park, Purley, Surrey. S.S. "Majestic."
Maguier, L., 49, Avenue Verdier, Montrange, (Seine), France. Cinematograph Apparatus.
Mante, C., 5, Place Petit Scel, Montpellier, France. Parallel Ruler.
Marken, L. M., 359, Sumatra Avenue, Akron, O., Goodyear Heights, U.S.A. Braiding Machine.
Maucherat, G., 11, Rue Montévidéo, Marseille, France. Combined Sifting, Elevating and Distributing Machine.
Miller, R., 58, Harcourt Street, Newark, Notts. Single Deal Frame Saw.
Morgan, G. H., 1, Alexandra Street, Dunfermline. Pit Head.
Moriere, A., Chateau d'Oex, Canton de Vaud, Switzerland. Dray.
Nault, A., 751, Maple Street, Manchester, N.H., U.S.A. Touring Automobile.
Nelson, J. H., Riccall Grange, Riccall, Yorks. Thrashing Set.
Nichols, H. Birdsall, 13809, Orinoco Avenue, E. Cleveland, Ohio, U.S.A. Shaper.
Norris, F. E., 50, Middleton Hall Road, King's Norton, Birmingham. Locomotive Coaling Plant.
Nyss, D. R. B., "Victoria Lodge," Darjeeling, India. Transporter Crane.
Page, E. W., 52, Warwick Road, New Southgate, London, N. Calculating Machine.
Parrish, J. A., 108, Savage Gardens, New Beckton, London, E.6. 3-ton Electric Crane.
Parry, G. R., 11, Byfleet Road, Weybridge, Surrey. Turret Lathe.
Péquignet, C., Ingénieur à Bruay, (Pas de Calais), France. Differential Reversing System.
Pitkethly, R., Beehive Flats, Bendigo, Victoria, Australia. Designograph.
Porter, J., 13, High Street, Freetown, Bury, Lancs. Rope-laying Machine.
Prudhommeaux, W., 20-22, Rue de l'Abbaye, Solesmes (Nord), France. Radio Telegraphic Transmitter.
Radclyffe, L., Laburnum Street, Blackburn, Victoria, Australia. Automatic Electric Drop Hammer.
Ramvez, Ch., 1, Rue Galliot, Namur, Belgium. System for Changing Speed by Degrees.
Rant, M. R., French Bridge, Grant Rd. Post, Bombay 7, India. Spinning Machine.
Rapaz, G., Rue des Moulins 14, Neuchatel, Switzerland. Automatic Machine for Sawing and Splitting Wood.
Rishworth, J. C., Post Box No. 67, 15, Armenian Street, Georgetown, Madras, India Coal-Shipping Plant.
Roberts, T. J., 170, Dryden Street, Liverpool. Hydraulic Bridge.
Robineau, L., 51, Rue de Roumanie, Brussels, Belgium. Steam Engine.
Robinson, D. F., 23, Hill Street, Parkside, S. Australia. Wool Spinner.
Rossignol le L. P., 22, St. Saviour's Road, Jersey. Workshop.
Rowlands, A. F., "Roslin," 92, Erddig Road, Wrexham. "The Great Bear" Engine.
Ruy d'Arnellas, G., Calcada do Pico 41, Funchal, Madeira Islands, Atlantic. Meccano Caricaturograph.
Saddler, J. A., "Narbethong," Myall Avenue, Kensington Gardens, Adelaide, S.A. Railway Traverser.
Saligot, J., 53, Rue de Loincy, Montargis, (Loiret), France. Alternating Log Saw.
Schwartz, R., 255, Fg. St. Martin, Paris X. Coste's Air Motor.
Septfours, P. de., Villa Cantoria, Avenue du Docteur Cazin, Berck-Plage (P.-d-C.), France. Locomotive.
Sereno, P., Via Sicilia 154, Roma, Italy. Writing Telegraphic Receiver.
Stals, M., Chaussée de Termonde 51, Mont St. Amand, Gand, Belgium. An Errand Boy.
Stillwaugh, Anna K., 37, Pacific Avenue, Toronto, Canada. Brick-making Plant.
Surault, J., 108, Rue de la Tranchée, Poitiers, (Vienne), France. Automatic Hand Fan.
Surroca, E., Fernando Puig 25 (G), Barcelona, Spain. Electric Motor.
Tamblyn, D. A., 6, Bond Street, Redruth, Cornwall. Automatic Reversing Gear.
Tarrant, A. R., "Myora," Athelstan Road, South Camberwell, Melbourne, Victoria, Australia. Australian 5-Head Mine Battery.
Taylor, A. S., 19, Roach Road, Sheffield. Workshop Micrometer.
Thompson, E. L., Russell Avenue, Lindfield, N.S.W., Australia. Pontoon Crane.
Visvikis, S., Maison Sarkissian, 1 Crahimieh, Alexandria, Egypt. Electric Clock.
Wattrelo, A., 12, Place de l'Hôtel de Ville, La Ferté-sous-Jouarre, (S.-et-M.), France. Printing Machine.
Wheeler, R. T., 32, Gladstone Street, Abertillery. Motor Chassis.
Wild, J. H., 4814, Grand Boulevard, Chicago, Ill., U.S.A. Automatic Push-button Elevator.
Wolf, G. de, Via Vittorio Veneto 6, Varese, Coma, Italy. Gantry Crane.
Woodall, H. H., 2, Lestrange Street, Cleethorpes. Heavy Cargo Crane.
Wulf, L. de, Rue Borluut 23, Gand, Belgium. Gear Box.
Yeadell, W. H., 15, Oakley Square, London, N.W.1. Motor Car.

SECTION "B"

Happe, W. H., Junr., 365, Quincy Street, Brooklyn, New York, U.S.A. Quilted Lining Sewing Machine.
Horsley, V., 11, Ashbourne Road, Eccles. Titan Crane.

First Prize (Divided) - - - £15

Smart, R., 47, Meldrum Road, Kirkcaldy, Fifeshire. Compound Steam Engine.
Spazier, L., 9, Rue Cavallotte, Paris XVIII. Glass-Polishing Machine.

Second Prize (Divided) - - - £10

Coll, C., Cortes 458, Barcelona, Spain. Rotating Mechanical Excavator.
Fieux, J., 13, Rue Cortambert, Paris XVI. Water Mill.

Third Prize (Divided) - - - £6

Additional Prizes of Meccano Outfits and Train Sets, etc.

Allnutt, P. L., 34, Wolsley Grove, Brighton Beach, P.D.11, Victoria, Australia. Goliath Crane.
Ancona, R., Via Saracco (Portici) No. 1 Acqui, Alessandria, Italy. Machine for Polishing Marble.
Agusti, F., Mallorca 313, Principal, Barcelona, Spain. Electric Wagon Chassis.
Babu, P. V. R., Door No. 57, East Anjaneya Road, Basangudi, Bangalore City, India. Automatic Dumping Tractor.
Ball, J. N., "Makura," Queenscliff Road, Queenscliff, via Manley, N.S.W., Australia. Wool Skeiner.
Barnes, F., Hilborough Farm House, Herne Bay. Big Wheel.
Bedford, W., Kyancutta, via Port Lincoln, S. Australia. Scrub Roller.
Bernard, A., Nouvelles Galeries, Neuchâtel à Pans, Switzerland. Scenic Railway.
Botto, A., Via Piemonte 63, Roma, Italy. Pendulum Clock.
Boudier, M., 5, Rue Jeanne d'Arc, Rouen, France. Lighthouse.
Bremner, D. T., 11, Frost Street, Queenstown, Cape Province. Electric Shovel.
Brouard, J., 36, Rue Vercingétorix, Paris XIV. Machine for Whip-Stitching.
Brown, B. F. A., "Halstead," Bellevue Avenue, Greenwich, Lane Cove, Sydney, N.S.W., Australia. Railway Breakdown Crane.
Buchet, M., rue Corday 3, Yverdon, Switzerland. Propeller-driven Sledge.
Candler, J. L., 103, Palace Road, Tulse Hill, London, S.W.2. Meccano Motor.
Caney, R. J. T., Cathedral Choir School, Worcester. Sheep-Shearing Machine.
Carpenter, R., 56, Hammond Road East, Southall, Middlesex. G.W. Railway Trolley Crocodile H.
Catalini, E., via del Colosseo 18, po 2, Roma, Italy. Carriage for removing Railway Trucks from one line to another.
Chabot, R., Nouvelle Poudrerie, St. Medard en Jalles (Gironde), France. Horse Racing.
Couffon, J., 11, Rue Hoche, Angers (Maine-et-Loire), France. Slate Quarry Extraction Gear.
Craulle, P., 2, Rue Blériot, Hénin-Liétard, Pas-de-Calais. Bird Target.
Debib, V., F. Venezian 30, (IV), Trieste, Venezia, Giulia. Transportable Crane.
Degrave, A., Rue de la République 14, St. Pol S/Mer, près de Dunkerque, Nord, France. Electric Pile Driver.
Desbruslais, E., The Mall, Amritsar, Punjab, India. Coal Tippler.
Dufour, R., Rue du Doyen 8, Aire-sur-la-Lys, Pas-de-Calais. Suspension Bridge.
Faura, J., Aribau 95, Barcelona, Spain. Wimshurst Machine.
Fenner, R. H., Third Avenue, Roodepoort North, Transvaal, South Africa. S.A. Railway Freight Engine.
Ferdinand, F., Place de l'Hôtel de Ville, Viviers, Ardèche, France. Derrick Crane.
Fisk, R. L., 30, Oxford Street, Bridlington. Meccano Motor Car Race Game.
Forti, P., Via Ariosto N.3, Milano, Italy. Treadle Sewing Machine.
Fromageot, A., 6, Avenue de l'Eglise, Le Chemay, Seine-et-Oise, France. Jib Crane, with Indicator.
Füri, H., Hôtel du Lac, Gunten, Lac de Thoune, Switzerland. Knife-Cleaning Machine.
Glauser, H., Quai de la Thiele 27, Yverdon-les-Bains, Switzerland. Cylinder Gramaphone.
Glenn, A. G., 115, Rushmere Road, Ipswich. Anemometer.
Gozzi, M., Via Canalino 1, Modena, Italy. Steam Engine.
Heeramaneck, G. R., 44, Alexandria Road, Harvey Road, New Gamdevi, Bombay, India. Truck Tractor.
Heeramaneck, V. R., 44, Alexandria Road, Harvey Road, New Gamdevi, Bombay, India. Aerial Ropeway.
Hewison, C. H., Marr Vicarage, Doncaster. Locomotive.
Hipperson, H. M., Waveney Walk, Beccles, Suffolk. Single Blade Log Saw.
Hollamby, A. H., 7, Surrey Street, Goodwood, Adelaide, South Australia. Silk Winder.
Jendron, Y., 72, Avenue Clement, Boulogne-sur-Seine, France. Battle Crusier.
Jobson, R. H., Canfield, Pendre Avenue, Prestatyn. Grain Unloader.
Jones, K., 45, Victoria Street, Whitstable, Kent. Cantilever Crane.
Kirby, A. D., 8, Avenue Road, Trowbridge, Wilts. "Sentinel" Motor Steam Lorry.
Kohring, W., Basildon Villa, Mawney's Road, Romford. Hydraulic Swivelling Crane
Lama, E., Campo di Marte, Casa Guocchi, Arezzo, Italy. Propeller Toy.
Leclercq, A., 32, Rue du Logelbach, Colmar, (Ht. Rh.), France. Aeroplane Roundabout.
Leigh-Hunt, C. J., 11, Soper Road, Berea, Johannesburg. Artesian Well.
Lemaire, F., 12, Rue St. Remy, Epernay, Marne, France. Light Lorry.
Malkani, T. K., c/o Messrs. Malkani Optical Company, Camp, Hyderabad Sind, India. Lift Tower.
Marato, T., Cortes 704, Principal, Barcelona, Spain. Electric Lorry Chassis.
Martin, A. T., 26, Bowden Road, Observatory, Cape Town. Cornish Pump.
Mateos-Baron, O., Claudio Coello No. 109, pral Drcha, Madrid, Spain. Static Electricity Machine.
McIntyre, H., Saginaw R. No. 6, Michigan, U.S.A. Tutankhamen's Cat.
Morange, J., 21, Rue Eugene Destengne, Reims, France. Morse Telegraph Apparatus.
Morton, A., Home-acres, Colinton, Midlothian. Cotton-winding Machine.
Nibaret, S., 15, Rue des Jardins, Albi, Tarn, France. Sluice Gate.
Nicholls, A., 40, Dorset Road, Levenshulme, Manchester. "Laxey Water Wheel."
O'Connor, W. J., Stephen Terrace, Walkerville, South Australia. Pontoon Crane.
Odero, L., Passo Caffaro No. 2-int 5, Genova, Italy. Racing Car.
Osborn, C. B. L., 190, Church Street, British Guiana. Metronome.
Parpia, I. S., c/o R. P. Parpia, Esq., c/o Messrs. Manchersaw & Narvadshanpar, Solicitors, Military Square Lane, Fort, Bombay, India. Indian Bullock Cart.
Perraud, L., 38, Rue du Commerce, Sous-le-Saunier, Jura, France. Motor Bike and Sidecar.
Perrin, R., 3, Rue Cavout, Genève, Switzerland. Electric Tramcar.
Reichelt, T., Kulga, Via Gilgandra, N.S.W. Reaper-Thresher.
Reymond, M., Rue des Moulins 69, Yverdon, Switzerland. Travelling Crane.
Robins, H., 51, Rue Victor Hugo, Tourcoing, France. Cyclometer.
Rosado, C., Caracas N 7, Madrid, Spain. Printing Machine.
Sabbatini, S., Corso V.E. 37, Ancona, Italy. Meccanophone.
Savona, J., 18, Strada St. Ursola, Valletta, Malta. Motor Scooter.
Sellar, E. W., Sheep Street, Winslow, Bucks. Flip-Flap.
Stanley, J., 2, Market Place, Ripley, Derbysh. Battleship.
Theodoropoulo, N. G., Rue Canope, Camp-César, Alexandria, Egypt. Triple Extending Ladder on Running Carriage.
Thomas, G., Rue du Tir 29, Meulhouse, Alsace. World's Largest Crane.
Tinsley, A., 23, Sandford Road, Bradford. Road-sweeping Machine.
Ulmann, E., 34, Rue du Petit Potet, Dijon, France. Transporter Bridge.
Vassallo, E., Viale Attilio Frosini No. 357, Pistoia, Firenze, Italy. Chinese Villa.
Veldhuyzen, J., Keizersgracht 100, Amsterdam. Table Telephone.
Verdan, J. C., Saint-Aubin, Canton-du-Neuchâtel, Switzerland. Agricultural and Industrial Motor.
Ward, J. G. D., 86, Merivale Lane, Christchurch, N.Z. Meccano Grafonola.
Wharton, G., The Court Yard, Ringstead, King's Lynn. Spring Balance.
Williams, A. H., 4, Springfield Road, Northfleet, Kent. Farm Wagon and Horses.
Williams, D. H., 24, Ivy Street, Ipswich, Suffolk. Mammoth Crane.
Willmer, H., 197, Shirebrook Road, Sheffield. "The Rocket."
Wiltshire, A. N., 5, Westholm, Letchworth. Leather Roller.
Wood, L., 87, Hutt Road, Petone, Wellington, N.Z. Lawn Tennis Marker.

SECTION "A"

Boudart, B., 19 Bd. de la Gare, Beauvais (Oise). Mechanical Crane.
Grech, G., 173, Prince of Wales Road, Sliema, Malta. Maltese Passenger Dghaisa.
Lacey, D., 16, Grayham Road, New Malden, Surrey. Railway Breakdown Crane.
Melville W., 44, Woodville Gardens, Langside, Glasgow. Giant Cantilever Crane.
Round, C., 29, Elm Street, Hoyland Common, Yorks. Coal-Cutting Machine.

First, Second and Third Prizes (Divided) £25

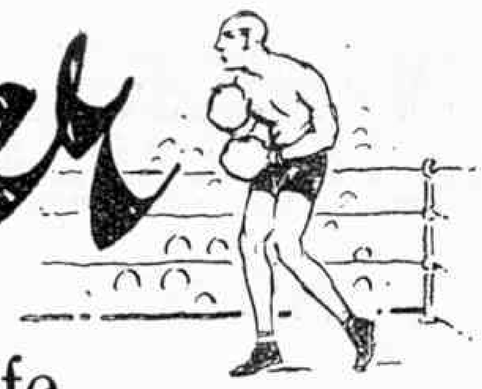
Additional Prizes of Meccano Outfits and Train Sets, etc.

Akkeren, C. V., Spuistraat 98, 1 hoog, Amsterdam. Sawing Machine.
Beuret, M., 21, Rue Marceau, Dijon, France. Quayside Crane and Lorry.
Brochier, P., Chez le Notaire Brochier, Sennecay-le-Grand (Saône-et-Loire), France. The Boxers.
Bruet, J., Longue rue Des Aulnes 31, Anvers, Belgium. Windmill.
Cardon, J., 116, Rue Nationale, Lille, France. Omnibus.
Cook, K. L. W., The Bungalow, 3b, Weyhill Road, Andover. Monkey on Stick.
Devaux, R., 67, Avenue du Clos, St. Amand-les-Eaux. Locomotive.
Doumain, E., Rue Marengo 114, Marseille, France. Child's Go-Cart.
Fenner, H. H., Third Avenue, Roodepoort North, Transvaal, South Africa. Dutch Ox-wagon.
Fuhrlinger, A., Faubourg de Belfort, Altkirch, Alsace. Multiple Saw, with Trolley.
Huckett, A. J., Box 135 P.O., Stanthorpe, Queensland. Tin-Dredging Plant.
Jacqueminart, J., Etat Civil Française, Poperinghe. Wind Motor.
Kodel, J., 8, rue du Tir, Vesoul, France. Steam Packet Boat.
Lennox, S., "The Bield," Chryston, Glasgow. Builder's Crane.
Migliorati, L., Via Alessandro Monti 4, Brescia, Italy. Grape-Crusher.
Neve, C., Holly Lodge, North Malvern. Crossley Gas Engine.
Piezi, A., 85, Ponte a Moriano, Lucca, Italy. Aerial Motor, Working Pump and Transmission.
Probst, H., Reichensteinstrasse 40, Basel, Switzerland. Military Biplane.
Richards, J., Misterton Rectory, Lutterworth, Rugby. Express Tank Engine.
Ripamonti, E., Corso Garibaldi 10, Borgomanero, Italy. Sewing Machine.
Ruffier, R., 3, jeu de Paume, Château Thierry, France. Backward and Forward Movement Balance Wheel.
Stock, D. A. I., 23, Ditton Road, Surbiton. Galloping Horse.
Tachella, L., Via Case Nuovo 14, Marina di Campo, Livorno, Italy. Torpedo Destroyer.
Teenstra, R., Oostzeedijk 288b, Rotterdam. Double-action Rotating Crane.
Thys, R., Avenue des Calliés 32, Louvain, Belgium. Big Wheel.
Wheaton, P. G. L., 61, Junction Road, Andover. Letterpress.
Wilson, J. D., 54, Richmond Avenue, Auckland Park, Johannesburg. Motor Repair Car.
Winterbottom, M., 22, Isabella Street, Malvern, Victoria, Australia. Electric Mule.
Wright, A., 487, Tuam Street, Linwood, Christchurch, New Zealand. Horse and Cart.
Yeadell, R. D., 15, Oakley Square, London, N.W.1. Locomotive and Tender.

Special Certificates of Merit have been awarded to several hundreds of other entrants.

OUR NEW SERIAL

Bulmer's Father



A Stirring Story of School Life

By Arthur Hutchinson

SYNOPSIS

On the first day of the new term at St. Winifred's, Lawson, the school bully, asks some impertinent questions of Jack Bulmer, a young newcomer. A fight is only prevented by the appearance of the headmaster. One Saturday afternoon Lawson, surrounded by a group of grinning boys, is twisting the arm of a junior when Jack Bulmer elbows his way through the group, strides up to Lawson and knocks his hand away from his grip of the younger boy.

IV.

"YOU infernal bully," he cried, as the astonished Lawson swung round upon him. Lawson's face instantly became a study in expression.

"It's you, is it, you wheedling imp?" he shouted, his face as black as thunder. "Get out of this before I kick you out!"

Young Bulmer never flinched.

"Leave go of that kid then!" he said quietly.

"Get out of it, do you hear?" roared Lawson, catching hold of the youngster again.

In a flash young Bulmer caught hold of his arm, and in a determined voice said :—

"Will you fight?"

At the words of this challenge a silence of astonishment fell upon the assembled group of boys. Faces became tense with excitement, and necks stretched forward to obtain a better view of this unexpected state of affairs. As for Lawson, he gazed for a moment in fury upon the calm figure that confronted him. Then rapidly he drew off his coat.

"I'll make you wish you'd never been born!" he cried, flinging his coat to the ground.

Jack Bulmer, too, removed his coat.

"We shall see!" he said grimly, as he faced the bully.

The next minute Lawson bore down with a mad rush upon young Bulmer. Blindly he flung out one fist and then another with no attempt at defence whatever, but only animated by a wild desire to flatten out his opponent as quickly as possible. Bulmer watched the avalanche about to descend upon him, and with a rapid step to one side, caused Lawson to pitch forward into space. Then promptly he shot out his left fist, and caught the bully a stinging blow on the side of the head, as he was in the act of recovering his momentum.

There was an immediate gasp of surprise from the onlookers, whilst the surprised Lawson staggered back and blinked with outraged astonishment.

Again he lurched forward, but with a little less recklessness, and once more there sprang up into his face a hammer-like blow. Then someone shouted "Time!" and for a few seconds the two opponents stood apart breathing heavily.

"I'll make you wish you'd never been born"

V.

Almost at once they were at it again, but this time Lawson was more cautious, and contented himself for a while with manœuvering his arms and fists in the manner of an excited windmill. Bulmer, remaining on the defensive, awaited the blow that he expected would soon be aimed at him. It was not long in coming. Suddenly one of Lawson's fists shot out like a piston, and landed—nowhere. And then it was that, for the first time, young Bulmer assumed the aggressive, and treated the astounded spectators to a display of scientific fighting that entirely took their breath away.

With surprising agility he danced round the bully, hitting him just when and where he pleased. As for Lawson, he was completely overwhelmed, and only the blindness of his fury prevented him from giving in there and then.

Soon the inevitable happened. With a cunning feint, young Bulmer drew Lawson's guard, and then, easily breaking through, dashed his left to the body, and, with a quickly followed right upper cut to the point of the chin, sent the bully crashing to the ground, where he lay in a huddled heap.

There was a tense silence during which Lawson, with the assistance of two of his friends, rose painfully to his feet. He was completely beaten and he knew it, and young Bulmer, also perceiving this, reached down for his coat. A boy stepped forward, and helped him on with it, representing by his action a curious change in public opinion.

Almost at the same moment a deep voice from somewhere called out "Well done, young 'un!" and, to the astonishment of everybody, Brailsford, who had been an unobserved witness of the fight, stepped out into the ring.

"Well done, youngster," he repeated, and Bulmer, glancing across at him, traced in the look in his eyes a subtle message that filled him with a strange secret joy.

Then another sound became audible, and it proceeded from the boys who now were gazing at young Bulmer with an expression on their faces which he had never seen there before. Without a word he strode forward to where Lawson stood, and held out his hand.

"Will you shake?" he asked.

Lawson remained irresolute for a second, and then suddenly something from within seemed to prompt him. Some little urging voice that for so long had failed recognition, but which now at last, through some curious psychological reason, had gained a hearing. He put out his hand, and grasped that of Bulmer.

"Good!" cried Brailsford, with a smile of approval, as Bulmer, unable to control his emotion any longer, gave Lawson's hand another vigorous shake and hurried from the ring in the direction of the school buildings.

VI.

As soon as he had gone, Brailsford raised his hand.

"Listen here, you fellows," he said, as curious eyes were directed towards him. "I've got a few things I want to say, and I mean to say them, whether you like it or not."

There was a slight stir of uneasiness as he uttered these words, and Lawson, together with a few others, began to edge away.

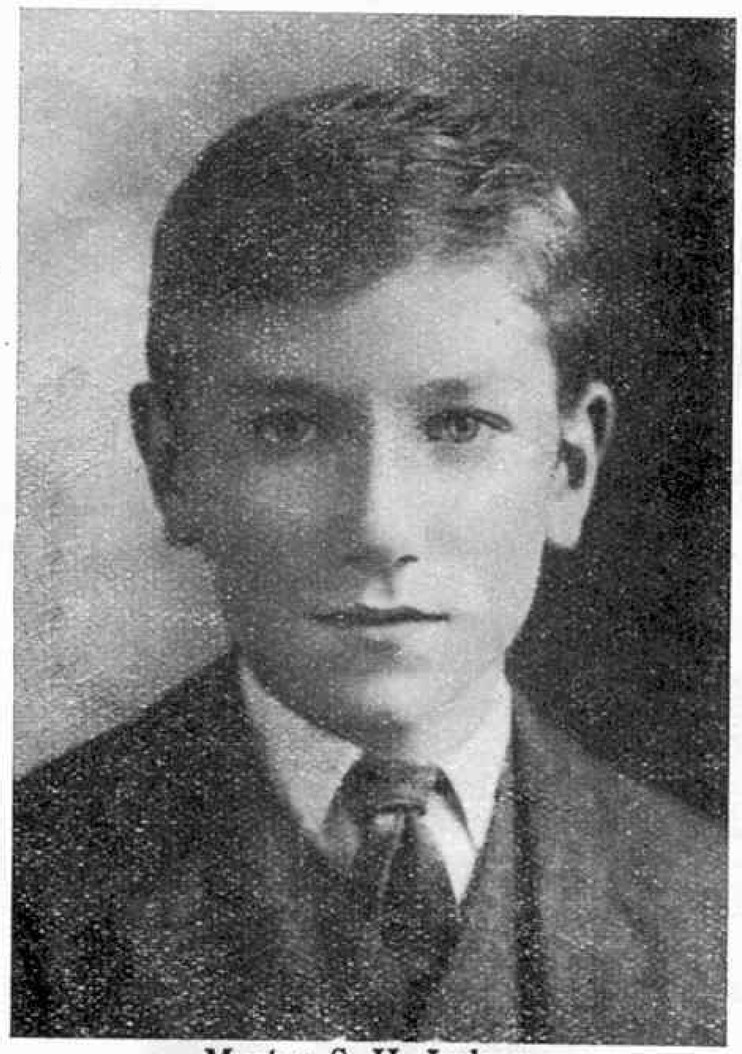
(*Continued on p.* 102)

Meccano Boys Vindicate their Good Name

Result of the recent "Sharp Eyes" Competition.

During the past two months my Mail Bag has been made very much heavier by the thousands of entries that have been received in the above competition. Sacks and sacks of entries have reached me, and you will understand how pleased I am at my readers' response to the challenge that I accepted on their behalf.

It will be remembered that a few months ago I mentioned to a gentleman, whom we will call "Mr. X," that Meccano boys were the keenest and most intelligent boys in the world, and how proud I was of them. I was very much taken aback when Mr. X. maintained that probably Meccano boys were just the ordinary type of boy with no more than the usual intelligence! When he claimed that he could submit a test that would demonstrate his contention, I at once accepted his challenge. Later I received a drawing of a Locomotive in which Mr. X. stated that he had purposely made several mistakes, and that he was prepared to give a prize to the Meccano boy who specified every error. The drawing was published in our May and June issues.



Master S. H. Judson,
winner of the Second Prize

When the closing date came I telephoned Mr. X., inviting him to Binns Road to judge the entries. When he came, I took him into a special room, where there was a heap of entries on the table. Mr. X. seemed very surprised to see that so many Meccano boys had responded to his challenge. You may imagine his consternation, however, when I showed him some mail bags crammed with further entries!

"Why," he exclaimed, "it will take me weeks to go through these!"

I felt like saying "It would serve you right if you had to do it!" but refrained.

He begged me to help him in his difficult task, and so I arranged for our competition staff to deal with the matter on his behalf, and sort out and classify the entries ready for his final consideration.

Master A. D. Smalley,
winner of the First Prize

I would have given a great deal if I could have had the thousands of entrants with me to enjoy the look of utter bewilderment on the face of Mr. X. when he left the building. He was even more bewildered when he called the second time and was told that the boy who had found the most mistakes had tabulated 184 errors in the drawing! To say that Mr. X. was dumbfounded is no exaggeration, but it was my turn to be surprised when I learned that he himself had purposely *shown only 39 mistakes in his drawing!*

Mr. X. has gracefully admitted that he had completely under-rated the intelligence and ability of Meccano boys, and he has addressed to me this letter with the request that I should reproduce it in these columns:—

Liverpool,
July 16th, 1923.

My Dear Meccano Boys,

I feel that in some measure I owe you an apology, and it is with appropriate humility that I write this letter to ask your pardon for ever having questioned your sharpness and intelligence. The results of the competition have shown me that Meccano boys *do* possess exceptional powers of observation and alert brains, and, what is more, they know how to use them. I am not ashamed to acknowledge myself in the wrong, and henceforth I shall always regard Meccano boys as being the embodiment of all that is best in the youth of the country.

Under separate cover I am sending the prize to the winner of the competition.

Yours faithfully,

JOHN X.

As will be gathered from the foregoing remarks, the judging of the entries has been a long and arduous task, which was not made any the lighter by the fact that it took place during a week of tropical weather. The winner of the competition is Master A. D. Smalley, of 18, Girdler's Road, London, whose entry shows 184 errors, which have been checked over and confirmed by Mr. X. I am sure that you will all join with me in extending hearty congratulations to Master Smalley on his keen powers of observation, and the wonderful patience he has shown in listing the errors. The special prize of a handsome Silver Watch has been forwarded to the successful competitor.

The second prize of Meccano Goods to the value of half-a-guinea to the runner-up, has been won by Master S. H. Judson, 11, The Grove, Highgate Road, London, who found 145 mistakes. A third prize of Meccano Goods, also to the value of half-a-guinea, has been awarded to Master H. R. Smith, 8, Sunnycroft Road, Leicester, who listed 130 errors.

A large number of readers submitted entries showing over one hundred errors, but in almost every case the total was reduced by the judges, owing to mistakes being shown that were not really genuine.

Master H. R. Smith,
winner of the Third Prize

The following is a list of competitors who, in the opinion of the judges, submitted entries of one hundred errors or over:—

Beresford, M. Winspear, "Beech House," Walton, Liverpool.
Boyce, E., "Eastrop," 147, Ashby Road, Loughborough.
Butler, H. T., "Ellerkeld," Brigham, nr. Cockermouth.
Day, Ernest, 42, Oriel Road, Bootle, Liverpool.
Hobbs, H., 23, Grove Park Avenue, Brislington.
Howell, Reginald, 32, Aubrey Road, Small Heath.
Maxwell, J., 9, Athol Street, Birkenhead.
Moore, Ivor C., "Burcot," Harbord Road, Cromer.
Peacock, D. W., St. Bartholomew's Vicarage, Bradford.
Thornburn, Wellington Cottage, Berwick.

OUR MAIL BAG

In this column the Editor replies to letters from his readers, from whom he is always pleased to hear. He receives hundreds of letters each day, but only those that deal with matters of general interest can be dealt with here.

Correspondents will help the Editor if they will write neatly in ink and on one side of the paper only.

H. Atkins (Letherhead). –"I was grieved to hear of the untimely end of my subscription. The coroner brought in a verdict of 'Death through Neglect' and severely censured the subscriber, who promised that it should not occur again!" A promise is a promise, Harry, and your good name has now no stain on it. You will receive the "*M.M.*" regularly for a year.

T. Holmshaw, Jr. (Sheffield).—Your comments on our competition prizes are just, and we shall in future work more on the lines you suggest. In the meantime if any winning competitor prefers to have the value in Meccano parts instead of taking the prizes offered, this will be quite in order. Thank you for your promise of an article on railways in August.

N. Hill (Helston).—We are glad to receive interesting photos and short articles from Meccano boys at any time, and to pay for them when published. You live in a lonely corner of the earth, Norman, and we are pleased you find Meccano and the "*M.M.*" such good company.

H. Thomson (Scotstoun).—To improve the "*M.M.*" by publishing two Magazines instead of one, each devoted to different subjects, is, we fear, impracticable. In any case, what about the poor Editor?

J. M. Crowther (Morecambe).—Your suggestion is already covered by the Guild Correspondence Club, which enables Meccano boys in other countries to describe their lives to other Meccano boys. Write to the Secretary of the Guild for full particulars.

H. Davies (Portsmouth).—We note that your friend in a recent examination replied to the question "What is Oceania?" by saying that it was "that Continent which contains no land." His strong point is evidently not Geography! We hope you have an enjoyable holiday.

A. Nutting (Boston, Mass.).—At first we were inclined to be surprised at your statement that "there are 75,000 people in Massachusetts, all native-born Americans, who can neither speak nor write the English language." On thinking the matter over, however, we have come to the conclusion that probably the accuracy of your figures may be explained by the fact that every one of the 75,000 inhabitants is under two years of age! Is our solution correct?

Alec Yorke (Nottingham).—"Stand erect on the right foot, raise the left foot behind you and grasp the toe of the boot of the left foot with the left hand, balance carefully and lower the body until the left knee touches the floor, now rise to an erect position retaining your hold on the left foot." It is exercises such as these that keep Editors young, Alec, and although we have not succeeded in accomplishing this difficult feat as yet, we mean to try again to-morrow morning before breakfast! We quite agree that there must be "a certain knack necessary (not a trick in any way) otherwise it is impossible."

P. H. Gregory (Hove).—We often read letters that make us feel that we would very much like to know the writers personally, and that was how we felt after reading your cheery letter, Philip! We were sorry to hear of the sad end of your Meccano Club, but we quite understand the difficulties. We are most pleased to hear that your health is so much improved and that you can now get along with your studies. We note that you do not wish to "mess up the '*M.M.*' by introducing blood-and-thunder serials, football forecast competitions," etc. There is really no danger of this happening. Your typing is good for a beginner, but you should use double spacing.

F. C. Poultnoy (St. Helens).—We are inclined to agree with you that a little more humour in the pages of the "*M.M.*" would be appreciated. We must see what we can do in this connection. We are afraid we cannot start a page for girls and a page for grown-ups at present, as 16 pages are all too few in which to cater for Meccano boys.

J. Wyllie (Leith).—We do not think stories of the Great War would be appreciated, as most of us would like to forget it!

Bulmer's Father—(*cont*).

"No, you don't," said Brailsford in a warning voice. "You can just remain where you are. You've got to stop and listen, for it's to you that I want particularly to address myself." He paused, then continued, "It's about young Bulmer that I'm chiefly concerned, and I'm going to tell you straight out that ever since he's been here you've acted like a pack of downright cads towards him. I don't say you're all to blame, for a good many of you—well—you've been led by the nose to do it. Yes, you may well look round at Lawson. I'm not blind. I know only too well where the trouble lies, and it's jolly well got to stop, although I'm inclined to think that from to-day it *will* stop, and of its own accord. You've had an object lesson to-day, and it's done you more good than any amount of gassing that I could give you."

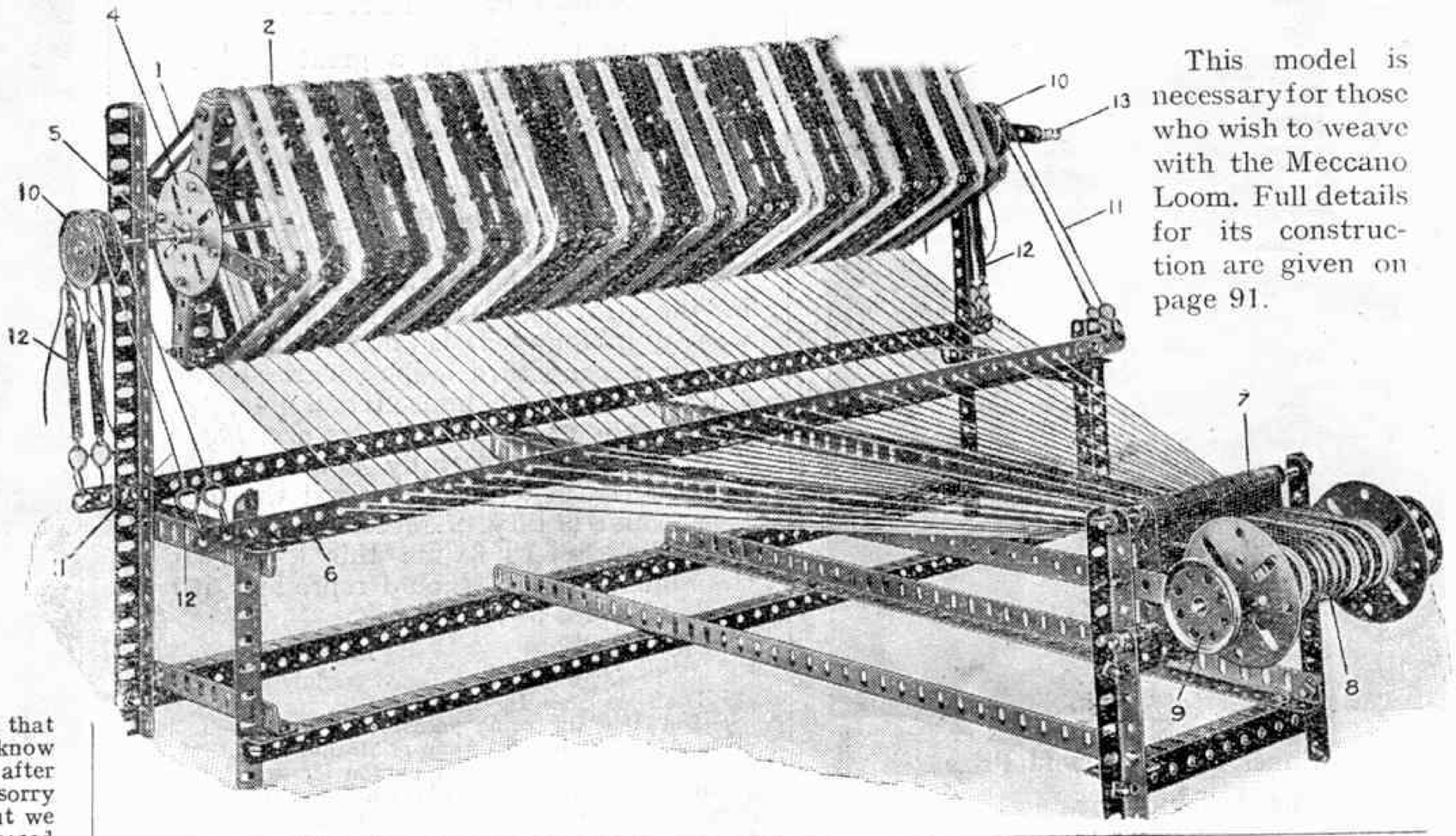
"Now there's another thing I'm going to tell you," he went on, "and I have my reasons for doing so, as I'll point out directly. I refer to Bulmer's father. Fifteen years or so ago, Bulmer's father was a professional boxer." Here Brailsford paused, for the effect of his statement had been almost electrical. "Yes, a professional boxer," he repeated with emphasis. "In fact, at that particular time he held the light-weight championship of Great Britain. Now perhaps some of the snobs amongst you will stare, and that's exactly what I want you to do. That's exactly why I'm publishing this fact—to *make* you stare." He paused again and then went on, "I know what public schools are, and St. Winifred's is no better or no worse than any of them. They all contain a certain element of snobbery, so there you've got it. Why is it that one of the first things that you ask a new boy is 'What's your father?' I'll tell you. It is simply because you are prompted to do so by sheer snobbery and nothing else. What *does* it matter what a fellow's father is, so long as the youngster himself is 'white,' and knows how to play the game. I wouldn't care a rap what my father was, so long as he did his duty by me and, by jove, if ever a man's done his duty by his son it's Bulmer's father. I happen to know, you see. I happen to know that they idolise each other, and that it is Mr. Bulmer's hope and ambition to see that whatever opportunities of—well—smoothing the rough edge that he lacked in life, will not be denied to his boy."

Once more he paused and smiled encouragingly. "Now then, you fellows, I've had my say, and I hope it's done you good. Young Bulmer has taught you a lesson in chivalry even though his father *is* a professional boxer, and, by the way, I may as well tell you that I'm asking his father to come down to watch the match here next Saturday. He will be my guest, and I'm jolly proud of the fact!"

Without another word he strolled off, leaving behind him a crowd of dumbstruck boys.

(To be continued).

The Meccano Beaming Frame



This model is necessary for those who wish to weave with the Meccano Loom. Full details for its construction are given on page 91.

Mail Bag—(*cont*).

J. Smith (Sheffield).—We hope to adopt your suggestion when we print the second instalment of "Dick's Visit," which deals with Dick in the Meccano Works.

R. Johnson (Lytham).—Your suggestion for a page in which Meccano boys describe their new parts is already covered by our "Bright Ideas" column.

W. Singeisen (Brixham).—Unfortunately, we are unable to increase the "*M.M.*" to the size you suggest because of the much greater cost in printing.

T. H. Lyons (Skipton).—As we already answer such questions under headings of "Bright Ideas," "Radio Replies" and "Mail Bag," your suggestion is scarcely a novel one.

STAMP COLLECTORS

Unfortunately, owing to extra demands on our space made by the list of Prize Winners in our £250 Model Building Competition, we have been compelled to omit our Stamp Collecting Column from this issue.

The Secretary's Notes

The Summer Session is now at its height and the majority of Guild members are enjoying their Cricket, Tennis, Rowing and Cycling. Several Swimming and Rambling Clubs have been formed, and my mail bag is filled with letters of appreciation of the great organisation that has enabled Guild members to take part in these pleasant recreations. From the enthusiastic letters received it would almost seem that a Sports Session is the best method of keeping the members together during the Summer months. Our President, who has recently returned from America, was delighted to hear of the Summer activities of the Guild, for he takes a very keen interest in all out-door recreations. Nothing pleases him more than to hear that Guild members are actively engaged in sport these fine days.

Summer Sports

Although the Meccano Writing Pad was only announced in our last issue, I have already received many letters written on this paper. The Writing Pad was introduced at the request of Guild members who suggested that Meccano boys should have their own notepaper. I think the Meccano Writing Pad will serve the purpose admirably. Those who have not done so, should order a Pad at once, so that their correspondents will know immediately that Meccano is their favourite hobby. Full particulars will be found elsewhere on this page.

Meccano Writing Paper

The attention of Guild members is drawn to the two splendid Competitions now running. The Fourth Photographic Competition is governed by the same rules as the previous successful Competitions, and I hope that Guild members who possess cameras will compete. The Holiday Essay Competition affords considerable scope to those members who are good at pen pictures. I do not think that much difficulty will be experienced in choosing a suitable subject. See that your essay is neatly written on one side of the paper only, and make sure that your name and address appears on the back of each sheet.

Have you a Camera?

CLUB NOTES

St. Mary (Newington) M.C. (London).—Resulting from a meeting held recently, the rules have been revised and the name of the Club has been altered from the "St. Mary-with-St. Gabriel M.C." to the above. A Lecture on the "Metropolitan Railway" was given by the Club Leader, whilst the Radio Section has been given instruction on Wireless construction and electricity by Mr. Dowsett (Superintendent of the Wireless and Electricity Section). A visit was recently paid to the County of London Electric Supply Co.'s works, and an interesting insight obtained into commercial generation. On June 23rd the annual Summer Outing was held. The Club in general continues to make steady progress. *Secretary:* Mr. C. Curle, 37, Pullen's Buildings, Peacock Street, London, S.E.

Holy Trinity (London) M.C.—Advices from the Leader indicate that the members are busily preparing for their 5th Annual Exhibition, which will be of two days duration. Several other London Clubs are helping with the function, and there will be displays of Electrical Models, Models demonstrating mechanical principles, Wireless and Morse Apparatus, Photography, Fretwork, etc. There will also be Radio and Lantern Demonstrations, Concerts, etc. The exhibition promises to be the most successful yet held. A Printing Press has been purchased and the Club hope to publish their Magazine in print next September. *Secretary:* Master S. Bone, "The Rosary," Kents Hill Road, South Benfleet, Essex.

Leamington M.C.—Continues to make excellent progress. The popular Meccano Minstrel Troupe recently gave a very successful performance in the Pavilion of the Jephson Gardens. I hope to be able to publish a photograph of the Minstrels in an early issue of the Magazine. *Secretary:* Mr. G. Hare, 36, Willes Road, Leamington.

Claygate Juvenile Club (Meccano Section).—Model building and carpentry were very popular during the last indoor Session. A very successful Sports and Fancy Dress Carnival was recently held, and several of the members wore costumes representative of various Meccano models. *Secretary:* Mr. Brittnal, Vale Road, Claygate, Surrey.

Meccano Club Leaders

No. 5. Mr. J. S. LEWIS

Mr. J. S. Lewis is the Club Leader of the "St. John-the-Baptist's M.C.," Liverpool. Mr. Lewis is very interested in the welfare of boys, and although this Club is not very large, it is very energetic. At present the members are busy playing cricket with the same amount of enthusiasm as they engage in their indoor work in the Winter Sessions. It is pleasing to know that, under the coaching of Mr. Lewis, the Club team has won six out of the seven matches played, and drawn one. Both Mr. Lewis and his Club have our very good wishes for a successful future.

Luton M.C.—The last indoor Session was concluded by a successful Exhibition. Meetings are held during the Summer. The Radio Section of the Club is making good progress. *Secretary:* Master W. Humby, 34, Adelaide Street, Luton.

West View (Nottingham) M.C.—Excellent progress has again been made by this Club and the membership is steadily increasing. By the kind permission of Mr. F. W. Davies, Engineer and General Manager of the Nottingham Water Dept., a visit was paid to the Waterworks. Descriptions of interesting machinery and valves were given by the managers of each particular department. Two additional activities of the Club are a Camera Section and a Library. A Photographic Competition is being held, and a prize will be awarded for the best photograph taken during the Session. *Leader:* Mr. H. W. R. Cousens, 494, Mansfield Road, Sherwood, Nottingham.

Cobham M.C.—Has held a very successful Session. The members entered for a Competition at the Cobham Flower Show, and in a similar Competition held in March last, Master O. Impey won a prize with his model of a Loading Crane. *Secretary:* Master Wm. Phillips, The Fox and Hounds, Cobham, Surrey.

Buckfastleigh M.C.—Have had Paper Chases and Cycle Runs. Hope to secure a new Club-room for the next Winter Session. *Secretary:* Master H. Parsons, Bell Cottage, Buckfastleigh, S. Devon.

Leckhampton M.C.—Recently held a very successful Exhibition, for which every member constructed a separate model. Over £6 was realised and the members enjoyed every moment spent in connection with the work. The Club membership is increasing. Some enjoyable games of cricket have been played. *Secretary:* Master B. Rhodes, Cotswold View, Charlton Lane, Leckhampton, Cheltenham.

Club Recently Affiliated

Boston Model Making M.C.—Recently established under the leadership of Mr. P. T. Oliver, of Boston, this Club has now become affiliated with the Guild and good progress is being made. At present there is a membership of eight, all of whom are keen and enthusiastic. *Secretary:* Master A. Robinson, 30, Woodville Road, Boston, Lincs.

Club not yet Affiliated

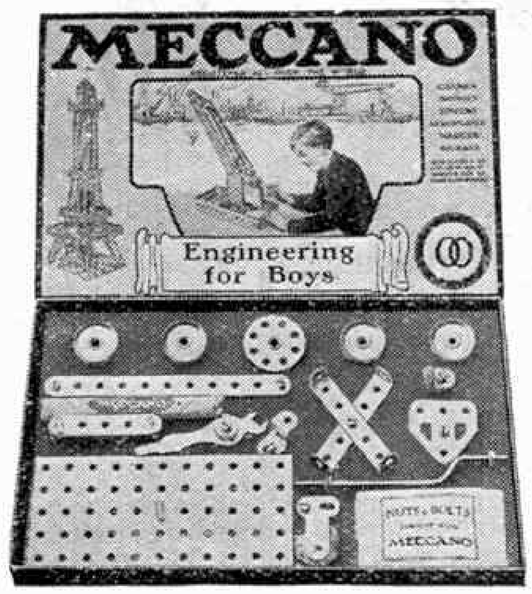
Tanunda (S. Australia) M.C.—This Club has only just been organised and as soon as it comes under the direction of a responsible gentleman it will be affiliated with the Guild. [*Secretary:* Master H. Wallent, Tanunda, South Australia.

The Meccano Writing Pad

In response to numerous requests, we have now prepared a special Writing Pad for Meccano boys. The Pad consists of fifty sheets of tinted bank paper, with cover and blotting paper. Each sheet bears a reproduction of the block shown on the cover.

The Meccano Writing Pad may be obtained from your regular Meccano dealer (price 1/-), or direct from this office (price 1/3, post free). It is just the thing to use when writing to your friends, for it shows them at once that you are a Meccano boy.

New Meccano Outfits



A new Outfit has been introduced for beginners in the Meccano hobby. This is the 00 Outfit, which is capable of building 40 models. The price is 3/6 each. An 00a Outfit has also been introduced for converting the 00 into an 0 Outfit, price 1/6.

The No. 6 Outfit may now be obtained in a strong carton at the reduced price of 105/–. This Outfit is additional to the No. 6 Outfit, at present sold in an oak cabinet, price 140/–. The contents of the new carton Outfit are identical with the No. 6 Outfit as at present sold.

NEW NUMBERS FOR MECCANO PARTS

In future all double angle strips will be grouped together and known by the following serial numbers :—

Double angle strips, size		Old Number	New Number
$2\frac{1}{2}'' \times 1\frac{1}{2}''$	...	112	47
$3'' \times 1\frac{1}{2}''$	...	112a	47a
$1\frac{1}{2}'' \times \frac{1}{2}''$	...	60a	48
$2\frac{1}{2}'' \times \frac{1}{2}''$	...	60	48a
$3\frac{1}{2}'' \times \frac{1}{2}''$	...	60b	48b
$4\frac{1}{2}'' \times \frac{1}{2}''$	...	60d	48c
$5\frac{1}{2}'' \times \frac{1}{2}''$	...	60c	48d

There is no change in the number (46) of double angle strips, $2\frac{1}{2}'' \times 1''$.

Small Advertisements

Small advertisements are inserted in these columns at 1/– per line (average seven words to the line), or 10/– per inch (average 12 lines to the inch). Cash with order. Letters to Advertisement Manager, "Meccano Magazine," Binns Road, Liverpool.

FOUNTAIN PENS (British Made) complete with filler and box, marked 10/6. Our price 1/9 post free. Box No. 21, c/o "*Meccano Magazine*," Liverpool.

BOYS! MAKE POCKET MONEY, by selling Fountain Pens. 2/6 to 5/– per week easily earned. Send for full particulars. Box No. 31, c/o "*Meccano Magazine*," Liverpool.

ADVICE, HANDBOOK & CONSULTATIONS FREE. King, Registered Patent Agent, 146a, Queen Victoria Street, London, E.C. 37 years references.

SPLENDIDFEROSUSH CALLING!
HELLO, EVERYONE!
Wonderful Crystal Receiving Sets 5/– each, post free. Foreign 6/–. Boys, take this opportunity while the offer remains. Absolutely Genuine. High Finish. G. Hare, 36, Willes Road, Leamington.

UNUSED STAMPS AT FACE VALUE. We have a large number of unused stamps from the colonies and foreign countries, which have been sent from time to time in payment for goods. We are prepared to dispose of these stamps as long as our stock lasts, at face value. We will endeavour to send stamps of any country specified, but we cannot exchange these stamps, or enter into any correspondence in regard thereto, once they have been despatched. For 6d. or 1/– we will send assorted stamps to that value, and $1\frac{1}{2}$d. should be added for postage. Orders over 2/6 will be sent post free. Stamp collectors are advised to order early and so secure the advantage of this unique offer.
"STAMPS," MECCANO LTD., BINNS ROAD, LIVERPOOL.

STAMP COLLECTORS. Sell your duplicates by advertising them in the "Sale and Exchange" column of the "*Meccano Magazine.*"

25 DIFFERENT STAMPS 1/-, post free. Remit P.O. Wood, 75, Moorfield Road, Pendleton, Manchester.

BRITISH EMPIRE

LATEST ISSUES. ALL MINT SETS.	
ANTIGUA, $\frac{1}{2}$d. yellow-green, Script, ...	1d.
BRITISH HONDURAS, 2 c. brown, Script ...	2d.
IRAQ, Pictorials, $\frac{1}{2}$ 1, $1\frac{1}{2}$, 2 & 3 A's	11d.
LEEWARDS, 1d. & 2d., Script	4d.
ST. KITTS-NEVIS, 1d. & 2d. Script	4d.
SARAWAK, 2 c. & 10 c., new colours	6d.

POSTAGE EXTRA.
ALEC KRISTICH (Member N.R.P., No. 279), 82, Marchmont Street, Russell Square, London, W.C.1.

Photographers
TRADE MARK **'TABLOID' BRAND**
SEPIA TONER
for bromide and gaslight prints
Makes your album distinctive
Try it to-day. 2/-, all Dealers
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MAKE YOUR OWN ELECTRIC LIGHT
These wonderful Dynamos light brilliantly a 4-6 volt lamp and take very little power to drive
Post 6d. Lamps 3d.
5/-

GREENS, Dept. N., 85 Ne Oxford St., London

100 DIFFERENT STAMPS FREE!
including many mint, British Colonials, War, etc.
Send no Money, just a Postcard,
and request our approvals (clients abroad 6d.).
Lisburn & Townsend, 166, Islington, Liverpool.

A GOOD FOUNDATION
for any model can be made with Plasticine—in 16 Colours. By mixing, various kinds of Marble can be imitated. Plasticine has scores of uses besides modelling. Let us tell you of some. Specimen Box of 5 Colours, The Rainbow, Post Free, **1/2.**

ALSO PLAY-WAX AND NOVLART.

HARBUTTS' PLASTICINE LTD.,
99, Bathampton, Bath.

A Useful Tool

Our illustration shows a type of screwdriver useful for reaching bolts in inaccessible places on models. We are disposing of these screwdrivers, whilst our stock lasts, at the special price of 10d. each, post free. MECCANO LTD., Binns Road, Liverpool.

When replying to advertisements in these columns, please state that the advertisement was seen in the "*M.M.*" By so doing you will help us.

CUT THIS OUT
"Meccano" Pen Coupon. Value 3d.
Send 5 of these coupons with only 2/9 direct to the **Fleet Pen Co., 119, Fleet Street, E.C. 4.**
You will receive by return a splendid British 14-ct. Gold Nibbed Fleet Fountain Pen value 10/6. (Fine, Medium, or Broad Nib). If only 1 coupon is sent, the price is 3/9. 3d. less for each extra coupon up to 4 (Pocket Clip 4d.). Satisfaction guaranteed. Your own name gilt letters, either pen 1/– extra.
Lever Self-Filling Model with Safety Cap, 2/- extra.

LOTT'S BRICKS :: Build :: Model Houses

A Fascinating and Amusing Toy for Boys and Girls of all Ages

Series "B"

Box 1.	18	Models	8/6
,, 2.	18	,,	9/-
,, 3.	42	,,	17/6

Series "C"

Box 1.	6	Models	3/6

Garden Sets, containing Trees, Shrubs, Fences, Shells, etc., 4/6 & 6/6 per box.

Sets are complete and self-contained, with Plans, Bricks, and Roofs.

Write for Illustrated List and Free Samples, enclosing $1\frac{1}{2}$d. stamp.

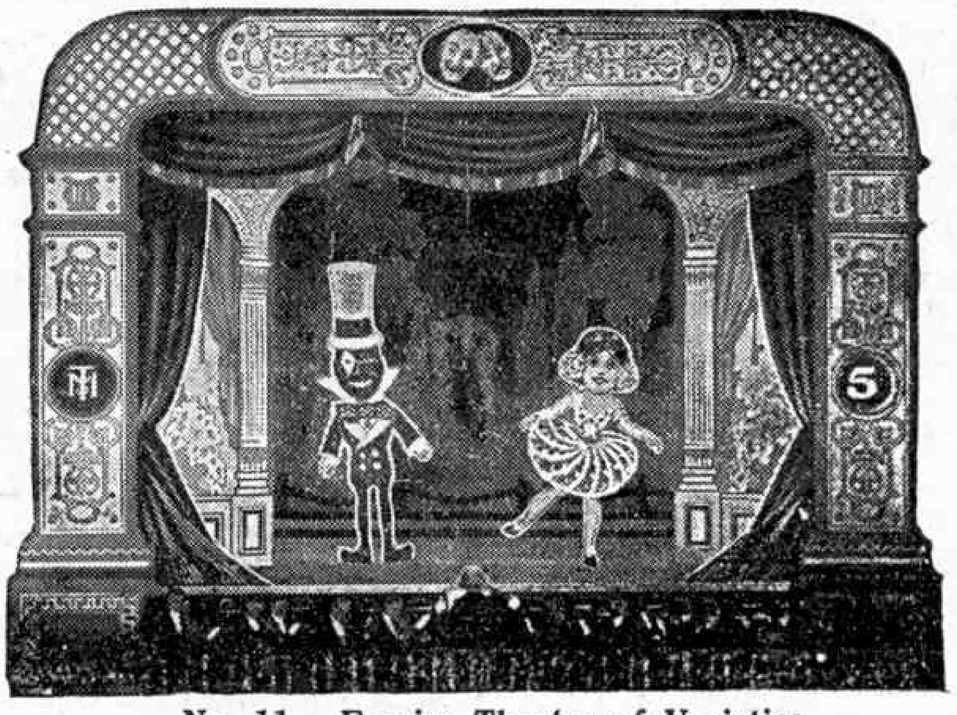
STONE BLOCKS FOR MODEL RAILWAY CONSTRUCTION
Packed in 1/- Cartons

Dimensions of Blocks :

$3'' \times 1'' \times \frac{1}{2}''$
$2'' \times 1'' \times 1''$
$2'' \times 1'' \times \frac{1}{2}''$
$1'' \times 1'' \times 1''$
$1'' \times 1'' \times \frac{1}{2}''$
$1'' \times \frac{1}{2}'' \times \frac{1}{2}''$
$1'' \times \frac{1}{2}'' \times \frac{1}{4}''$

If not obtainable at your Local Dealer's, write for Sample Carton, enclosing 1/3 in stamps.

Lott's Bricks Ltd., Watford, England.



No. 11. Empire Theatre of Varieties.

This is a beautiful and entertaining toy, with all the romance and glamour of the stage. The pleasure to be derived from the performance, given by the eight Artistes, is extreme. The show is a tremendous success at a Children's Party, and a supply of Programmes can be given round by the "Ushers." All the Stars are billed on Special Posters.

Price ... **6**/– complete, post free.

Buy only one and you will want others

SEND FOR FULL LIST

FROM

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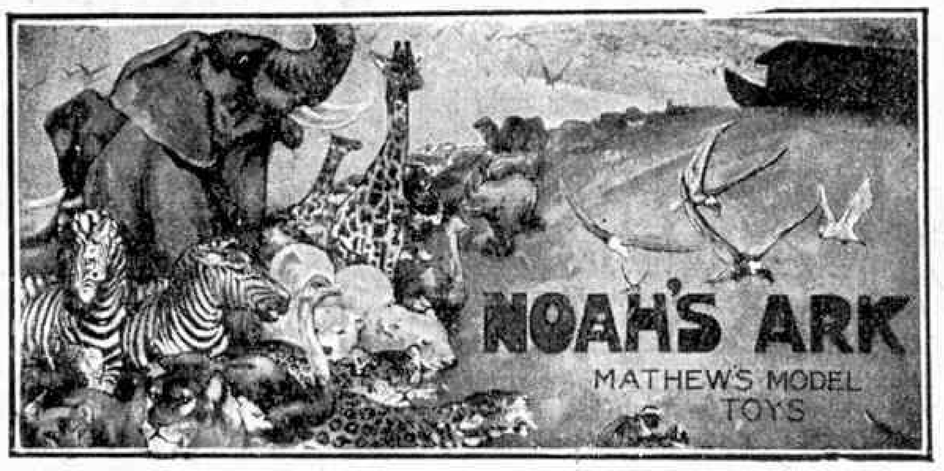

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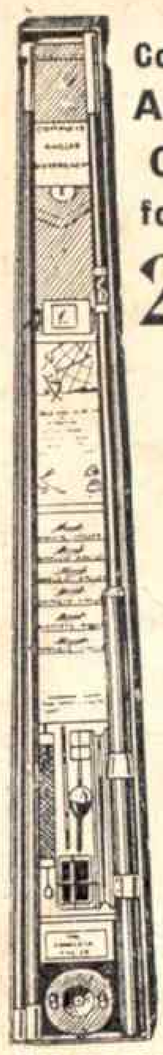

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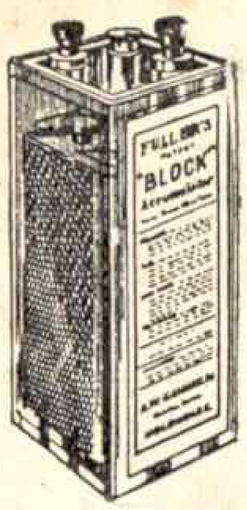

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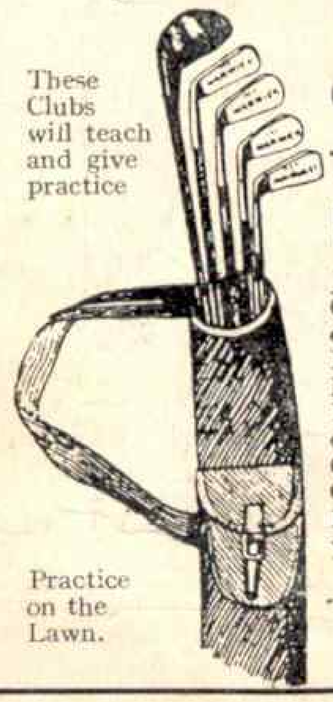

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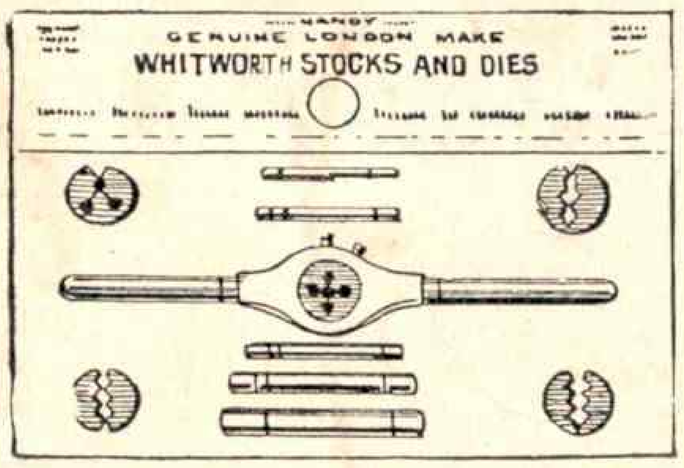

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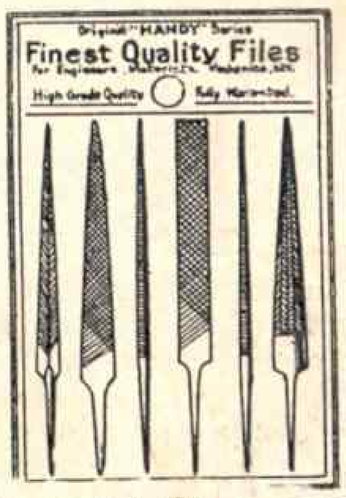

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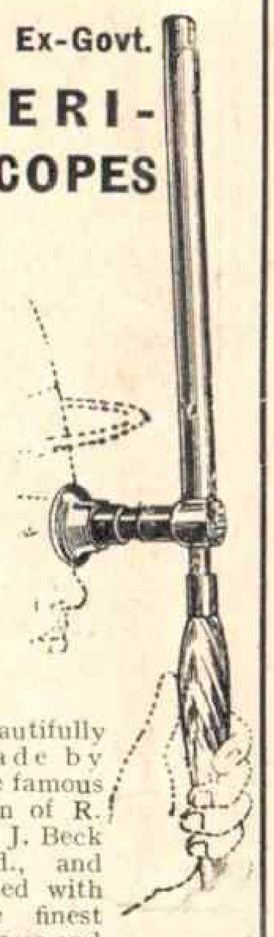

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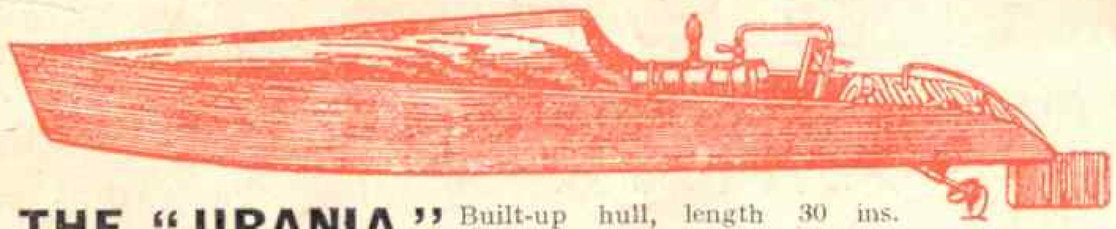

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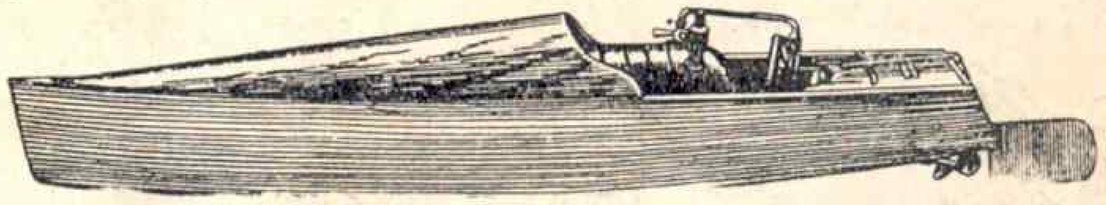

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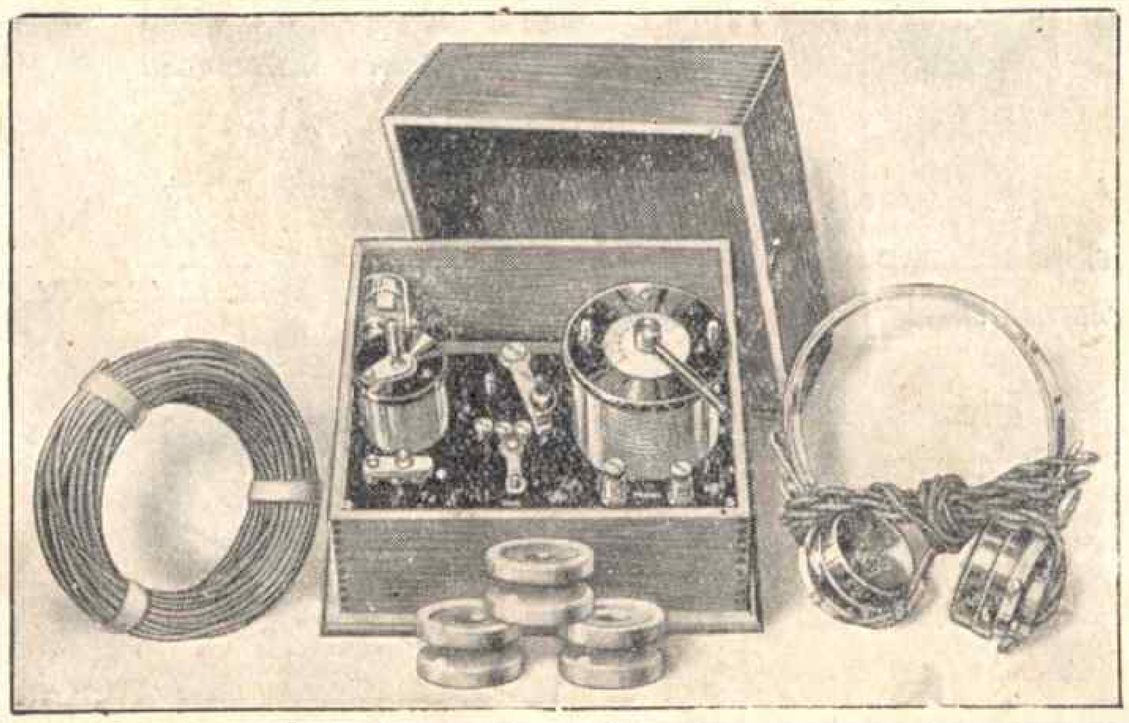

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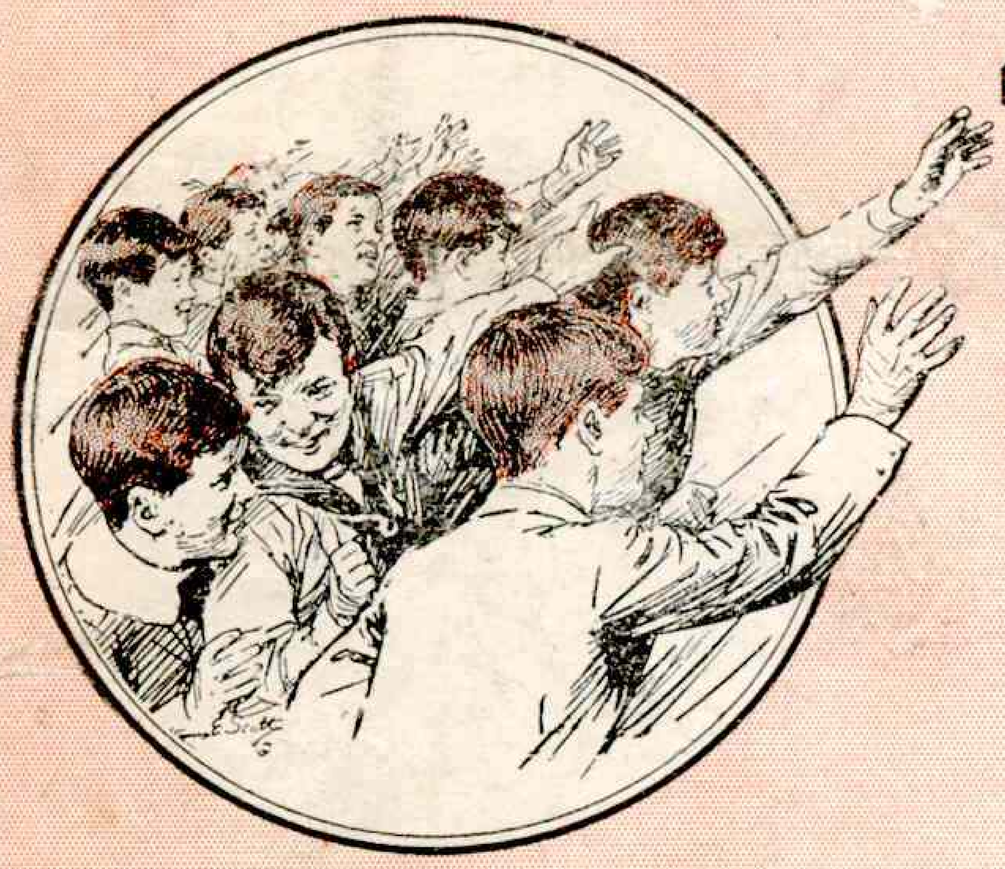
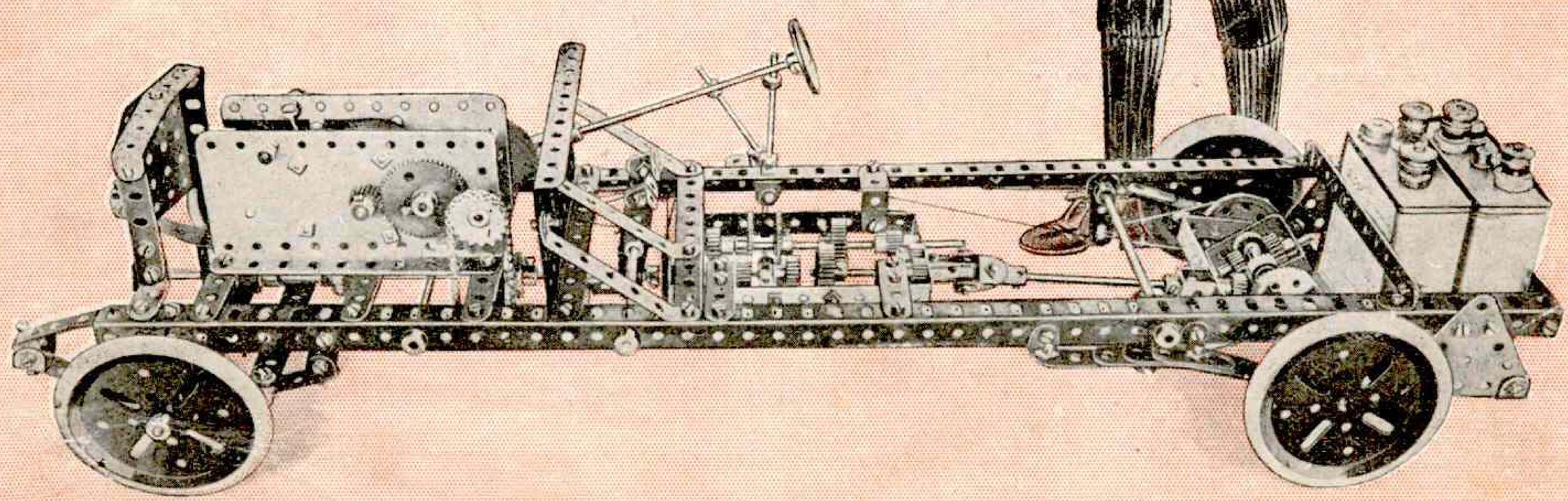
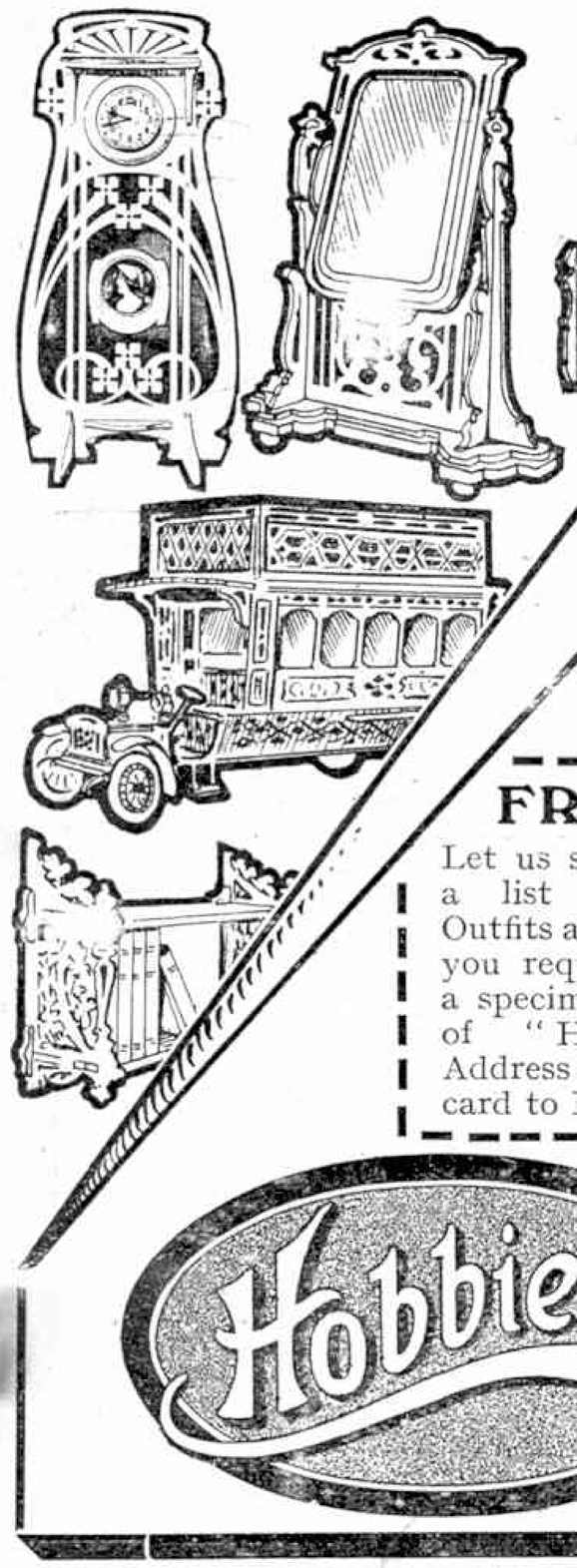


'The New
MECCANO CHASSIS

SEE PAGE 106





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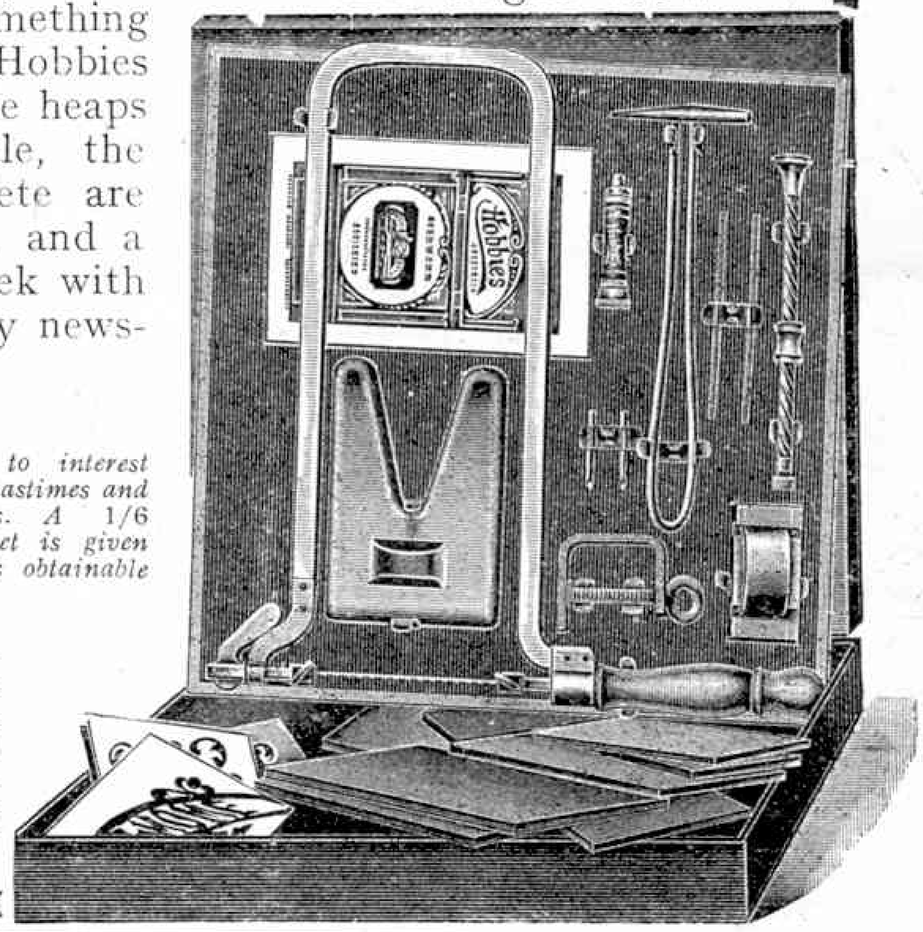

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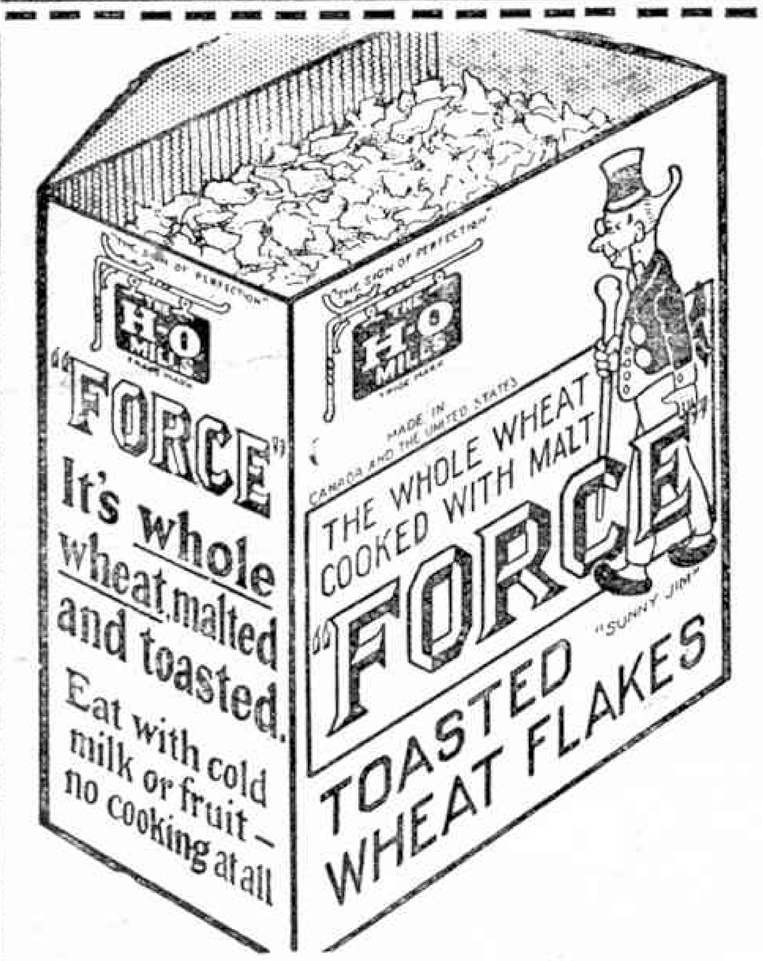

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MECCANO MAGAZINE

PUBLISHED IN THE INTERESTS OF BOYS
on the
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EDITORIAL

WHEN I was a boy I was very fond of reading Mark Twain's books, and to the boy who has not already sampled this master writer, I am sure that "*Tom Sawyer*," "*Huckleberry Finn*," "*Life on the Mississipi*," "*The Prince and the Pauper*," and a dozen others, will come as a revelation of excitement, adventure, and humour.

Good Books.

One of Mark Twain's stories made a strong impression on my young mind. It is an incident in the life of Tom Sawyer, the happy-go-lucky, generous, imaginative, work-dodging hero of one of this author's best books.

One day Tom had an appointment to play highway robbers with the boys, but his aunt told him that he must stay at home to whitewash the fence. This was a tragedy, deepened and made more harrowing by the fact that the fence to be whitewashed would be passed by all the boys on their way to the woods.

Tom surveyed the long stretch of fence with gloom and despair, and commenced work with a heavy heart. Presently a thought struck him, and he set to work with new energy and enthusiasm. When the first boy came along and suggested that it was rough luck on Tom having to work whilst all the other boys were playing, Tom replied that some people might call it work, but it suited him anyhow!

Turning Stumbling-Blocks into Stepping-Stones.

The boy stopped to watch for a while, and presently asked Tom if he might paint a little bit of the fence himself. Tom said he daren't let him, however, because his aunt was very particular how it was done, and wanted it to be first rate. In a little while the boy offered Tom all the treasures in his pocket if he might have just one little try, and Tom reluctantly allowed him to take a turn.

Other boys came along, commenced by stopping to watch, and remained to whitewash. Tom finished not only by becoming owner of everything that the boys possessed in the way of toys and other personal treasures, but also by having all the whitewashing of the fence done for him!

There is a point to this story which should appeal to every boy who reads it. I wonder how it strikes my readers? Here is an offer. I will give a Meccano No. 1 Radio Crystal Receiving Set complete, value 40/–, to the boy who sends me the most sensible comments on this Tom Sawyer story, before 30th October next (overseas readers, 31st December). Limit your remarks to not more than about 100 words, and please write clearly and on one side of the paper only.

A Prize Offered.

How to obtain the "*M.M.*"

NEW SUBSCRIPTION RATES

THE *Meccano Magazine* may now be ordered from regular Meccano dealers, or from any newsagent or bookstall. It will be a convenience to us if as many of our readers as possible will place a regular order with their Meccano dealer or newsagent. There is a great amount of work entailed in wrapping, addressing, stamping and posting 40,000 copies of the "*M.M.*" every month. By obtaining your copy from a Meccano dealer or newsagent you help to considerably reduce this work.

If you have any difficulty in obtaining the "*M.M.*" regularly and promptly, write to the Editor, giving the name and address of your newsagent, and he will take the matter up on your behalf. When you place your order it may help your newsagent if you mention that the *Meccano Magazine* is now on the list of the following wholesalers :—

Messrs. Smith & Son Ltd. and Messrs. Wyman & Sons Ltd., of London, and Messrs. Menzies & Co. Ltd., Glasgow.

In many cases, of course, it will be necessary for subscribers to continue to have their Magazines sent from this office. On and after 31st October the subscription for mailing six copies will be 9d., and for twelve copies 1/6 post free. Until the 31st October we will accept subscriptions and renewals at the old rates of 6d. and 1/– for six and twelve mailed copies respectively. All subscriptions at present on our books will be executed at the price of 1d. per copy post free, until the subscription expires.

A Fine Loco

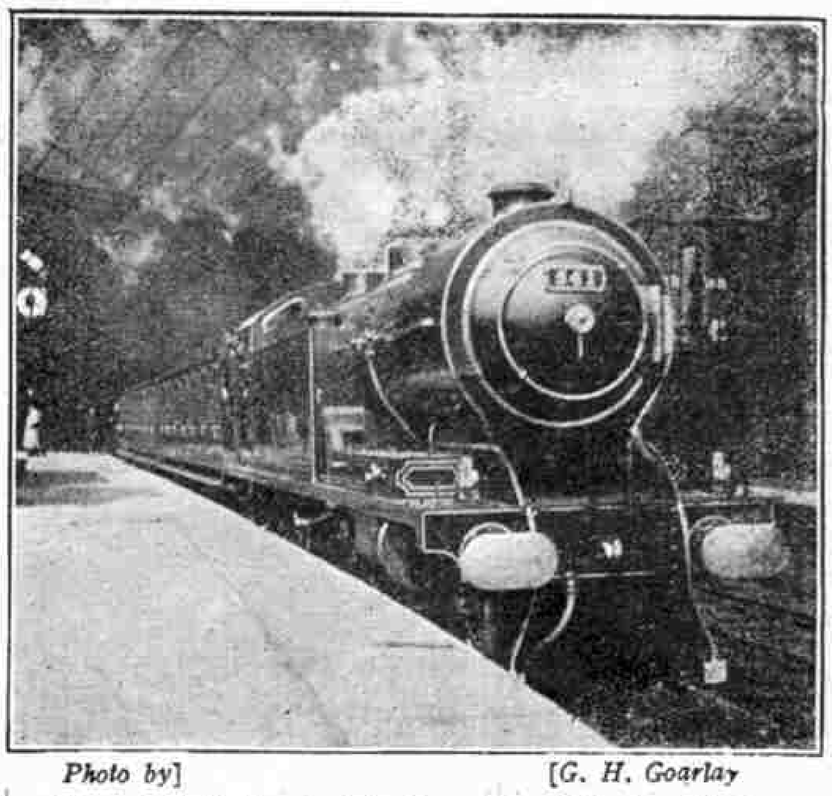

Photo by] [*G. H. Goarlay*

The 4-6-4 Tank Engine No. 541 hauling the Stranraer Express from St. Enoch's Station, Glasgow

Obtaining the "*M.M.*" Overseas

IN future the Overseas edition of the *Meccano Magazine* will be discontinued. The English edition may be ordered by readers Overseas and in foreign countries, however, from regular Meccano dealers, or by subscribing direct to this office. The "*M.M.*" is sold overseas at 1d. per copy, or it will be mailed (post free) direct from this office or from the Meccano Agencies, price 1/– for six issues, or 2/– for twelve issues. Orders at present on our books will be executed at the old rates until they expire.

IMPORTANT

Overseas readers are reminded that the prices shown throughout the "*M.M.*" are those relating to the home market. Current Overseas Price-Lists will be mailed free on request to any of the following agencies :—

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THE

MECCANO MOTOR CHASSIS

Full Instructions for Building this Interesting Model

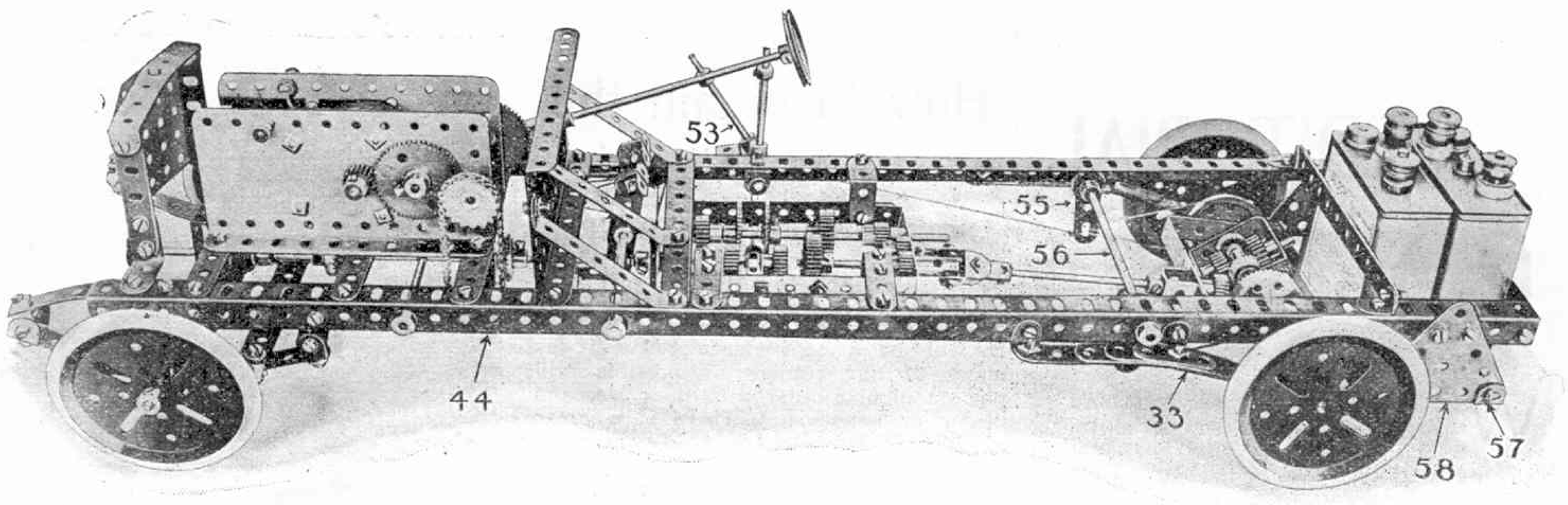


Fig. A. The Complete Chassis

IN printing these full instructions for building the Meccano Motor Chassis we hope that many of our readers will be induced to construct this splendid model, which we consider to be a triumph in model making. When exhibited at the British Industries Fair the Chassis claimed the attention of His Majesty the King, and was also the centre of marked attention from thousands of other visitors to the Fair. It is an accurate reproduction of "the real thing," as are all Meccano models, and so perfectly does it demonstrate the main mechanical features of a modern motor-car that it is in use at several schools of motoring for teaching purposes.

A Real Gear-Box

The Chassis frame is made of 24" angle girders connected by $5\frac{1}{2}$" strips, the overall length being 26" and breadth $7\frac{3}{4}$". It is driven by a Meccano Electric Motor, mounted in the position occupied by the engine in real automobile practice. The current is obtained from a 4-volt accumulator, mounted at the rear of the Chassis. The drive is through a two-speed, sliding-pinion gear-box and universal-jointed propeller shaft to a gear-driven back axle, on which is situated the built-up differential. Direct drive is obtained on top gear and the change-speed gear is actuated by a cross shaft connected to the gear lever, the gears sliding into position by successive backward or forward movements of the lever.

The universal joint of the propeller shaft is a combination of the cross-pin and sliding types, and operates in exactly the same manner as on a real Chassis. The steering, which is on the Ackermann principle, also follows actual car practice. Worm and pinion is used, and the shaft is connected by rods and strips to the steering swivels. The Chassis, which is underslung—resting on built-up cantilever elliptical-springs—is fitted with a gear-box having two forward speeds and reverse.

Begin by Building the Frame

The Meccano Chassis is not difficult to build, and a great amount of fun and practical instruction may be obtained when the model is completed. It is very realistic to see this chassis running around under its own power, or to set it to run up a steep incline and drop into low gear by flicking the change-speed lever with the finger, when the gradient causes the speed to fall off.

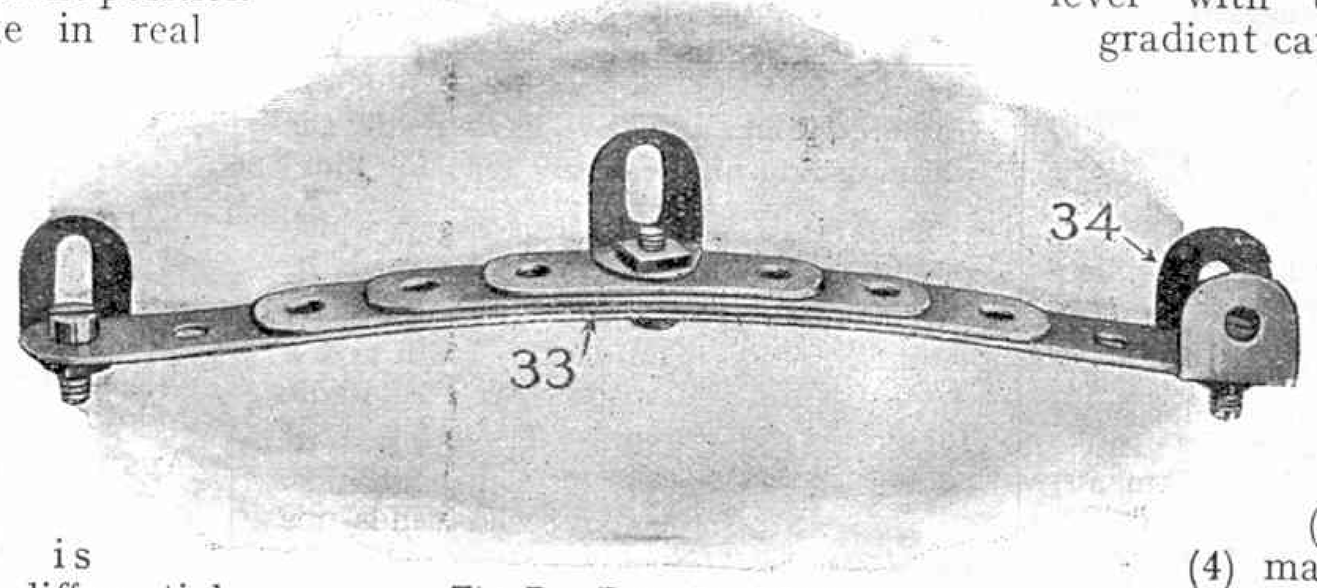


Fig. B. Rear Leaf-Spring

As in building a motor-car it is best to begin to build this model by making up the Chassis frame, the sides (1 Fig. C), of which are $24\frac{1}{2}$" angle girders connected by $5\frac{1}{2}$" strips (2). The front steering axles (3) and their springs (4) may then be built on to the frame as shewn.

The stub axles (3) are fitted into the couplings (5) and swivel in 1" reversed angle brackets (6) which are bolted to two overlapped $5\frac{1}{2}$" strips in order to give a projecting end hole on each side to form a bearing

Meccano Motor Chassis—(*cont.*)

for the couplings (5). These $5\frac{1}{2}$″ strips also support the springs (4). The couplings (5) are moved to steer the car by means of a 1″ rod which is gripped in the lower part of the coupling 5A and fitted with a crank (7) connected by a strip (8) to another $1\frac{1}{2}$″ strip secured to a crank (9) on the rod of a gear wheel (10) which is rotated by a worm (11) on the steering wheel (12). The strip 8 is connected to the crank 9 extension by an angle bracket lock-nutted to give free pivotal movement.

The wheels are caused to turn together by nipping the 2″ threaded rods (14) into the couplings 5 and 5A by screws, the outer ends of the two threaded rods screwing into threaded bosses (13) connected to the outer ends of $5\frac{1}{2}$″ and $2\frac{1}{2}$″ strips overlapped three holes. The bosses are coupled to the strips by screws (15) threaded into the bosses with washers beneath.

The brake lever (53) and change speed lever (54 Fig. D) are bolted to the side frame. The brake lever (53 Fig. A) is connected by a cord to a crank (55) nipped on an axle rod (56) which carries a similar crank on the near side. From the ends of these cranks the brake cords are carried round the brake drums The change speed lever (54 Fig. D) is fitted at the lower end with a coupling (55) carrying a 2″ rod on which is a collar (55A) which engages between the gear wheels, as will be described later.

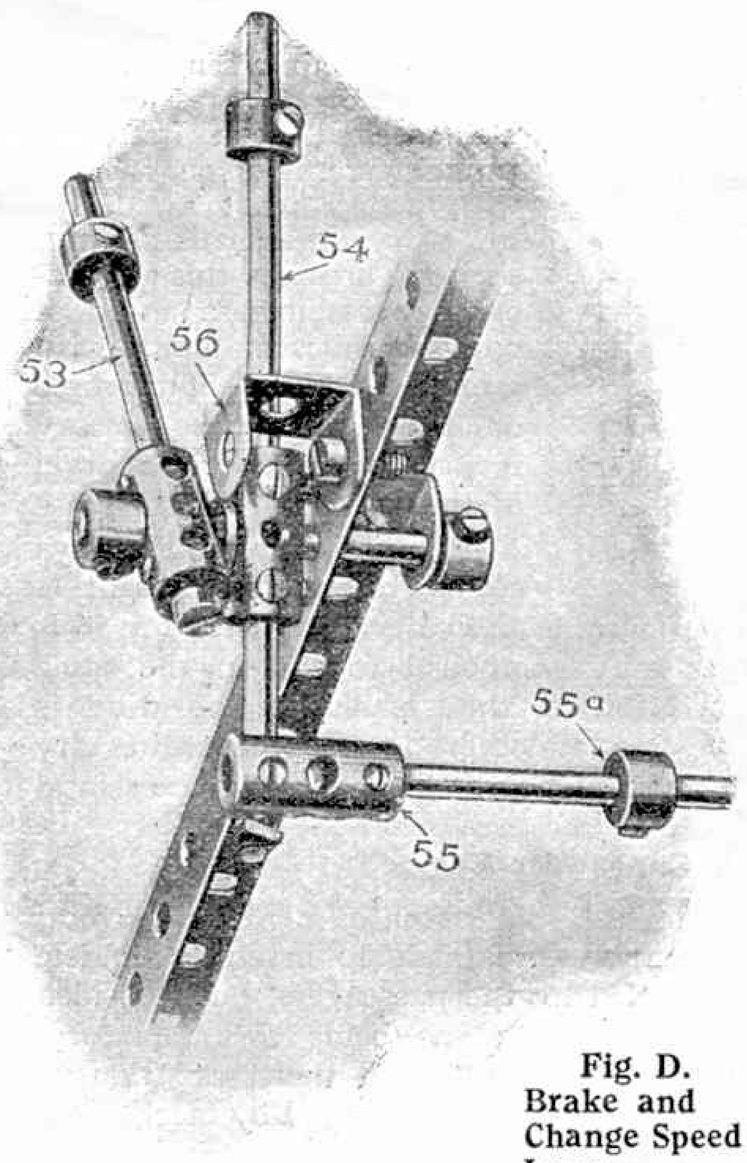


Fig. D. Brake and Change Speed Levers

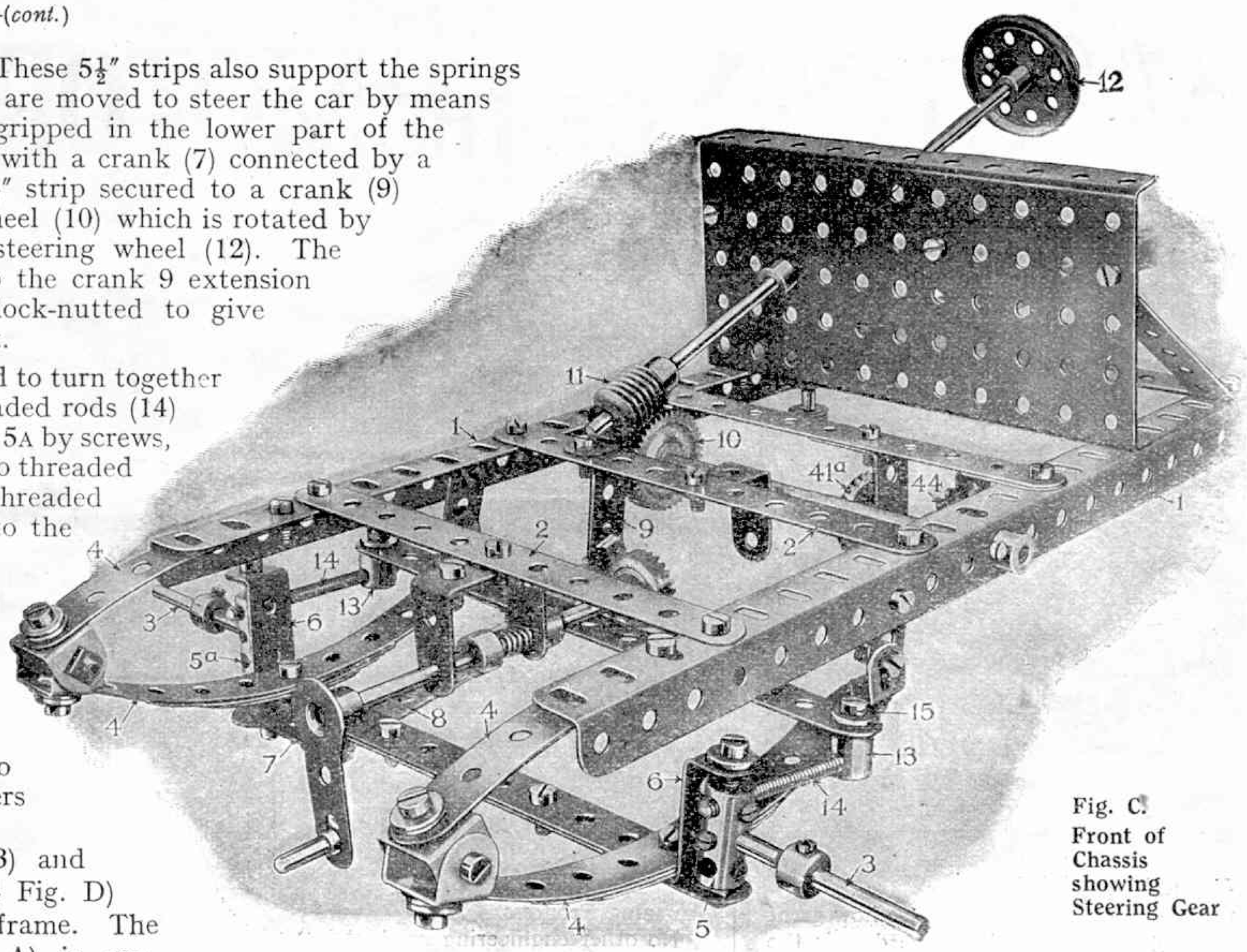


Fig. C. Front of Chassis showing Steering Gear

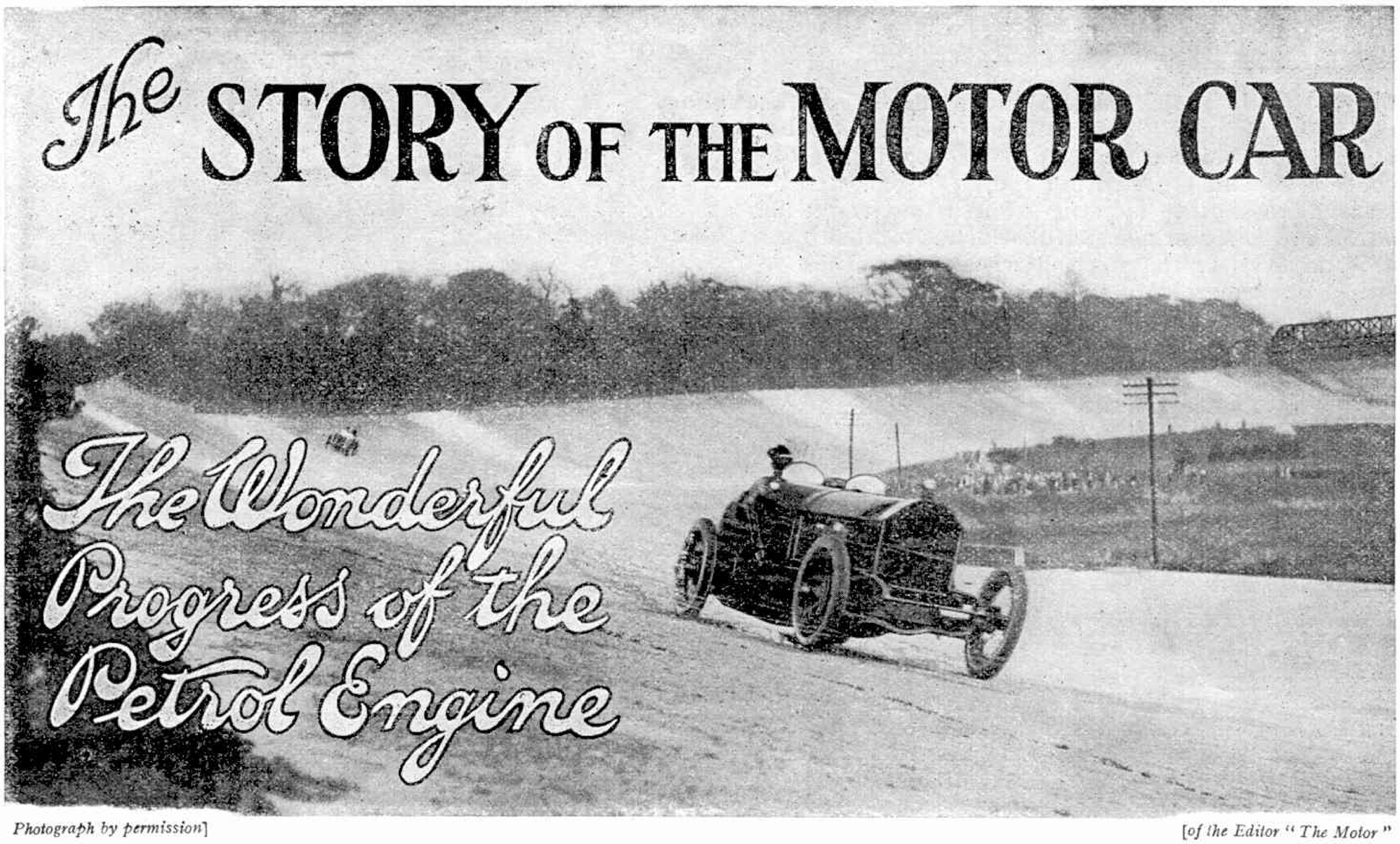
The concluding instalment of this article will appear in next month's issue and will deal with the construction of the gear-box and differential.

Parts required to Build the Meccano Chassis

12	$5\frac{1}{2}$″ Perforated Strips	2	$\frac{1}{2}$″ Pulley Wheels (fast)	1	$5\frac{1}{2}$″ × $2\frac{1}{2}$″ Flanged Plate
3	$4\frac{1}{2}$″ ,, ,,	1	Bush Wheel	1	$3\frac{1}{2}$″ × $2\frac{1}{2}$″ ,, ,,
7	$3\frac{1}{2}$″ ,, ,,	6	$\frac{3}{4}$″ Pinion Wheels	24	Collars
3	3″ ,, ,,	4	$\frac{1}{2}$″ ,, ,,	5	Cranks
7	$2\frac{1}{2}$″ ,, ,,	4	50 Toothed Gear Wheels	8	Couplings
2	2″ ,, ,,	1	56 ,, ,, ,,	2	Threaded Bosses
6	$1\frac{1}{2}$″ ,, ,,	3	1″ Gear Wheels	2	$2\frac{1}{2}$″ Triangular Plates
2	$24\frac{1}{2}$″ Angle Girders	1	$1\frac{1}{2}$″ Contrate Wheel	2	2″ Screwed Rods
3	Flat Brackets	4	$\frac{3}{4}$″ ,, ,,	2	1″ ,, ,,
10	Double ,,	2	Bevel Gear Wheels	2	1″ Sprocket Wheels
18	Angle ,,	1	Worm Wheel	2	$\frac{3}{4}$″ Bolts
11	1″ Angle ,,	12	Nuts	1	Threaded Pin
2	8″ Axle Rods	90	,, and Bolts	2	Pivot Bolts
4	6″ ,, ,,	1	2″ Spring	29	Washers
1	5″ ,, ,,	1	Double Bent Strip	4	3″ × $\frac{1}{4}$″ Rubber Rings
1	$4\frac{1}{2}$″ ,, ,,	2	$1\frac{1}{2}$″ × $\frac{1}{2}$″ Double Angle Strips	2	1″ Reversed Angle Brackets
2	$3\frac{1}{2}$″ ,, ,,	1	$3\frac{1}{2}$″ × $\frac{1}{2}$″ ,, ,,	1	Hank of Cord
5	$2\frac{1}{2}$″ ,, ,,	3	$5\frac{1}{2}$″ × $\frac{1}{2}$″ ,, ,,		9″ Sprocket Chain
3	2″ ,, ,,	3	$2\frac{1}{2}$″ × 1″ ,, ,,		
5	1″ ,, ,,	1	3″ × $1\frac{1}{2}$″ ,, ,,		
1	Flanged Wheel				
4	3″ Pulley Wheels				
4	$1\frac{1}{2}$″ ,, ,, (fast)				

(This article will be concluded in our next issue.)

The STORY OF THE MOTOR CAR



Photograph by permission] [*of the Editor "The Motor"*

IT is not easy for us to realise how great a change has taken place during the past twenty years in the traffic of our streets. Twenty years ago the motor car was almost unheard of, and the appearance of a self-propelled vehicle in the streets was the occasion of so much curiosity that great crowds collected wherever one was seen. The change-over, from horse-drawn traffic to motor cars, has been of such a gradual nature that it has not generally been noticed.

After Twenty Years

In this connection there is an interesting story of a well-known criminal, who was brought to London on his release from one of our large prisons. He had been serving a "life" sentence, and had therefore been cut off from all knowledge of the outer world for many years. When he was sentenced, the traffic in the London streets was all horse-drawn, and the old horse 'buses were the most convenient means of getting from one part of the city to the other.

On arriving at London, once again a free man, this discharged prisoner saw at a glance the full effect of the changes that had taken place gradually during the twenty years or so that he had been in prison. Instead of the cabs and hansoms, he saw hundreds of taxis. Instead of the carriages-and-pairs and the broughams of society, he saw Daimlers and Rolls-Royce limousines. Instead of the old horse 'buses he saw the familiar motor 'buses. The unending streams of self-propelled traffic, moving without the assistance of horses, so terrified him that he collapsed from sheer fright!

Amazing Progress

No other engineering product has made so rapid an advance as the petrol engine, whether applied to land, sea, or air. Even within the last few years there has been extraordinary progress, and of this we have read—more particularly in regard to aero engines—in recent articles in these pages.

Less than twenty years ago Brooklands, the great racing track, was unknown, but a visitor to the track to-day would scarcely credit this statement. Here, giant racing cars attain record speeds of 100 miles and over per hour, and motor-cycles and light cars flash past with a rattle and a roar, at speeds only slightly below those of their large brothers. It seems almost inconceivable to think that all these machines have been invented, evolved, and perfected within so short a space of time as twenty years, but the fact remains.

It is a remarkable fact that although the first practical motor car was built over 160 years ago, it was not until the commencement of the present century that motor cars came into general use. It is interesting to compare illustrations of early motor cars with a modern car, for by so doing we are better able to understand the extensive progress that has been made in a comparatively short space of time. This article describes the various developments that have led to the motor car of to-day—a veritable triumph of engineering.

Harnessing the Wind

For several centuries engineers and mechanics had been endeavouring to invent and perfect a self-propelled vehicle. As early as the beginning of the eighth century a Chinaman first conceived the idea of moving a vehicle without a bullock or a horse. He built a small wagon mounted on four wooden wheels and climbing into it, pushed it along the road by means of a long pole, somewhat after the manner of a punter!

In the fifteenth century the famous Italian, Leonardo da Vinci, conceived the idea of a wonderful auto-car and made some drawings of it. His idea seems to have been impracticable, however, for his auto-car was never actually constructed.

Two centuries later, Simon Stevin, a Dutch mathematician, attracted a great deal of attention by the invention of his "wind-carriage," which to a certain extent resembled the ice-yacht of the present day. It consisted of a frame of timber mounted on wheels, with a tall mast amidships to carry the sails. In a strong breeze this wind-carriage attained a speed of over 20 miles an hour, with a load of twenty-eight people on board. Needless to say it was considered the marvel of the time!

A wind-carriage always seems to me to present a considerable difficulty, however, for it is generally compelled to sail in the same direction as that in which the wind is blowing, and there is always the difficulty of getting home again, against the wind!

A Gunpowder Engine

In the seventeenth century several attempts were made to invent a vehicle propelled by the passengers, but this idea was abandoned as being unsatisfactory. Engineers then turned their attention to vehicles that were propelled by mechanical means.

The Story of the Motor Car (*cont.*)

One of the earliest attempts, and incidentally one that was also a near approach to the petrol engine, was made in 1680, when a vehicle was invented in which the engine was worked by gunpowder. Neither the name of the inventor nor the history of his machine is known—perhaps because the inventor and invention met with a sudden and speedy end!

On the introduction of the steam engine, thoroughly established by Watt's invention of the separate condenser, several engineers attempted to make steam carriages for use on the highway. The roads were in such a bad condition, however, that no mechanically-propelled vehicle could travel very far, and soon the work was abandoned and attention turned to locomotives that ran on a specially prepared "road" of metal rails. Thereafter the greater importance of the locomotive overshadowed, for the time being, the development of the self-propelled vehicle for use on the roads.

First Practical Horseless Vehicle

In 1769 a Frenchman named Cugnot brought out a locomotive steam lorry, a model of which is to be seen in the South Kensington Museum. Cugnot's vehicle included an engine and a cumbersome boiler with a furnace inside it. It had two single-acting brass cylinders, the pistons of which acted alternately, through cranks, on the single driving wheel. The vehicle, steered through suitable gearing, attained a speed of 2¼ miles per hour with four passengers. The supply of steam lasted only ten or fifteen minutes, however, when it was necessary for the passengers to dismount and wait until steam was again raised!

Cugnot's steam lorry opened up wonderful possibilities of locomotive traction, but unfortunately it did not meet with the success it deserved. After several exciting trials in the streets of Paris it was considered a danger to the public safety, and was locked up in the Arsenal to prevent further mischief! It is now exhibited in the Museum of Arts and Crafts, Paris.

The Old Road Laws

When the railways were introduced they met with considerable opposition from interested parties. These included owners of canals, horse-keepers, and landlords of inns, all of whom thought their businesses would suffer if railways became established.

This opposition was repeated subsequently when steam-driven motor cars were suggested, and additions were made to our Highway Laws in order to deal a crushing blow to the pioneers of motoring. To a large extent the additional clauses were introduced by those who had money invested in horses and horse-haulage. These people thought that they would suffer financially if motors gained a place on the highway, because it seemed to them that all horse traffic would be eliminated.

Among many absurdities, the Highway Law included the provisions that (1) a motor car must be driven by not less than three persons; (2) a man must walk in front of every motor with a red flag; (3) the speed of the motor was at no time to exceed four miles per hour, and (4) no vehicle was to blow off steam on the highway! No industry could possibly flourish under these ridiculous restrictions, and for the time being the people interested in horse-haulage came out "top dog." Little was heard of the motor-car for the next twenty years, but engineers were at work in the attempt to evolve a satisfactory self-propelled vehicle. Step by step this was becoming more practicable.

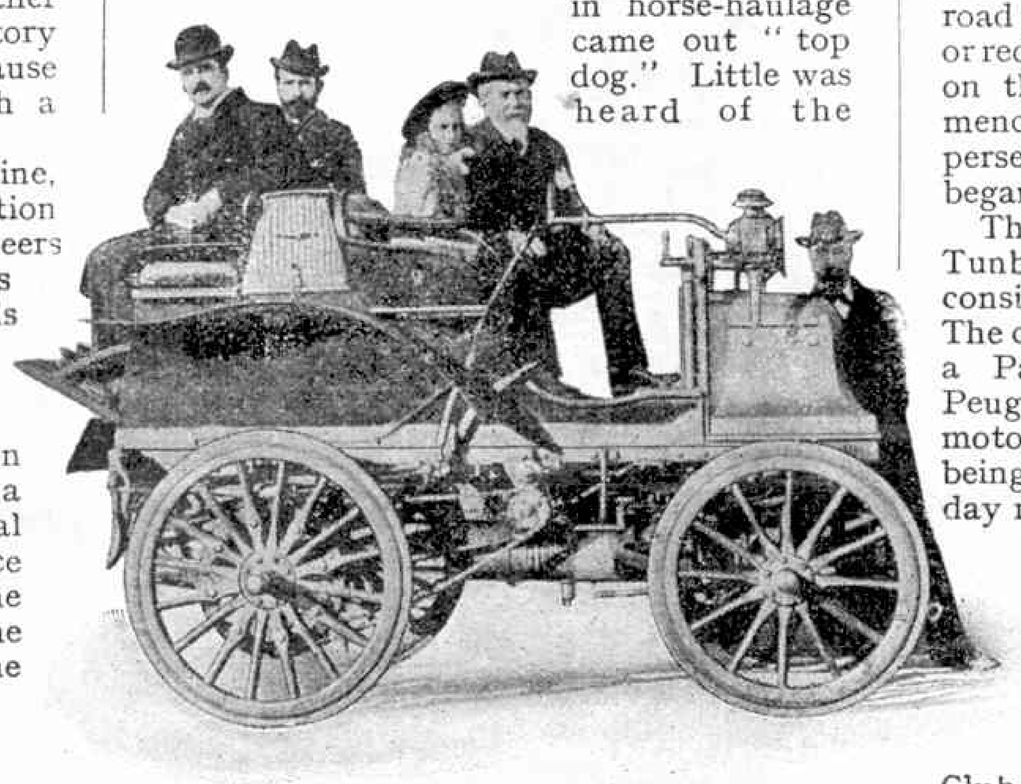


Photo by permission [*Board of Education*

One of the first Motor Cars in this Country

The Internal-Combustion Engine

In 1794 experiments were made with the explosion of gases as a source of power, but not until 1860 was the first successful gas engine produced by Lenoir. The propelling power was obtained from explosion of gas in the cylinder itself, thus eliminating the heavy boiler and furnace of the steam engine. This invention marked one of the greatest forward steps in the history of the motor car and was followed by the introduction, by Gottlieb Daimler in 1884, of a light high-speed petrol motor. This resembled the gas engine in many respects, the main difference being that vaporised petrol was used as fuel instead of some explosive gas obtained from other sources. This enabled the engine to be moved about whilst working, a necessity in a motor car that had been impracticable of accomplishment when coal-gas was used as the source of power.

Daimler improved his first model so considerably that a well-known firm of engineers, Messrs. Panhard and Levassor, obtained the right to build cars equipped with his engine. The year following the granting of this concession over 100 motor cars were manufactured. It is interesting to learn that the engines of these cars were of about the same horse power as a modern motor-cycle!

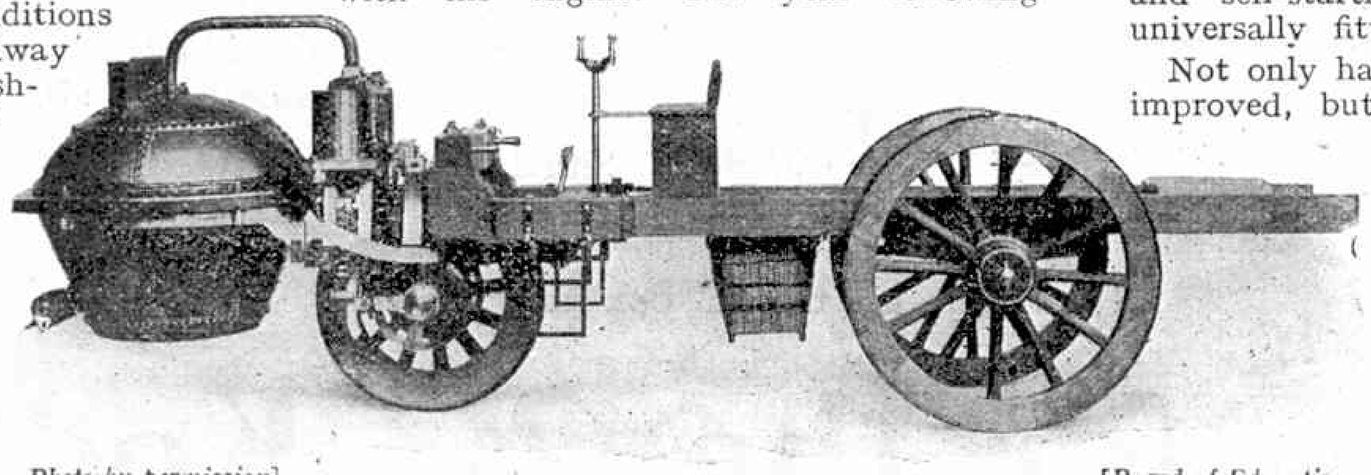


Photo by permission [*Board of Education*

The First Practical Motor Car: Cugnot's Steam Lorry

The First Motor Show

The next step forward in the story of the Motor Car, was marked by a reform of the Highway Laws, and the much-needed Light Locomotives Act was passed. This measure repealed the former unjust road laws and also abolished the toll bars, or reduced the taxes imposed upon travellers on the highway. British engineers commenced to construct motor-cars, and by perseverance and skill the industry soon began to make headway in this country.

The first Motor Show was held at Tunbridge Wells in 1895 and created a considerable interest all over the country. The cars on view at this Exhibition included a Panhard with a Daimler engine, a Peugeot petrol-driven car, a de Dion steam motor car and a petrol bicycle, the latter being the "ancestor" of our present-day motor cycle. It is interesting to know that the firms who exhibited at this first show are to be found among the famous names in the motor industry to-day.

Soon after this Show, the Richmond Hill speed trials were held by the recently-formed Automobile Club. In these trials the winning car was an 8 h.p. Panhard which, when hill climbing, attained the wonderful speed of 8 miles per hour! We wonder what the proud driver of that Panhard would think were he offered a seat in a modern racing car capable of tearing around the track at 90 or 100 miles an hour!

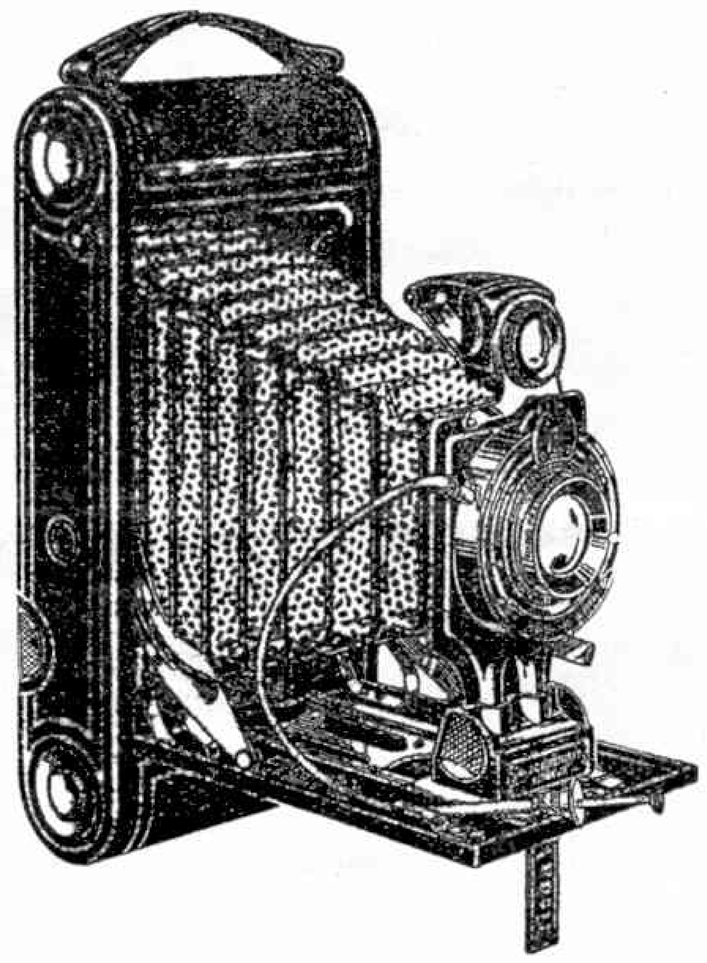
Heavier and More Powerful Cars

Since its invention some thirty years ago, the principle of the internal combustion engine has not changed in any way, a fact that shows the first invention to have been on sound lines. After the first cars were sold, heavier cars were called for, and manufacturers soon found that more power was required. There were two alternatives to choose from; the first was to increase the size of the cylinder and the second to increase the number of cylinders. The latter alternative has been generally adopted and to-day we sometimes find motor-cars with as many as twelve cylinders. Petrol consumption has been improved and, with increased experience, better engines have been designed. The result is that greater speed and more power have become available every year.

The development of the motor car engine was accompanied by many other refinements, such as better springing for the chassis, wire wheels with pneumatic tyres, and more efficient gear boxes. More recently, magnetos and dynamo lighting and self-starting appliances have been universally fitted.

Not only have mechanical details been improved, but the body work and the design of the chassis in general has been very considerably altered. The seats in the early motor-cars were high up, almost like a dog-cart, but year by year the cars have been built lower and lower. Cars are now often built "underslung," which arrangement allows a very much lower position for the body of the car, thus decreasing wind resistance, an important consideration, particularly in racing cars.

(*To be continued*)



Here's a capital "Kodak" for the holidays

The 2C Kodak is the "Kodak" *you* need for *your own* holiday snapshots. The pleasing post-card proportions of the pictures are admirably suited to holiday groups, horizontal landscapes, and vertical portraits. It is only a small "Kodak" but it takes a picture just a fraction of an inch smaller than a post-card—$4\frac{7}{8} \times 2\frac{7}{8}$ ins.

2C Kodaks weigh little, cost little, and are strong enough to stand any reasonable amount of hard wear. They are compact enough to fit the pocket with room to spare. But although they are made as light and as small as possible, nothing has been sacrificed which makes for efficiency—you can make good pictures from the start. Both models are fitted with the Autographic Feature—the device which enables you to write the title on the film when you make the picture. Call at your nearest Kodak dealers and ask to see some 2C pictures. You can learn to use a "Kodak" in half-an-hour.

2C Autographic Kodak Juniors

No. 2C Autographic Kodak Junior. Fitted with Meniscus Achromatic Lens and Kodak Ball Bearing Shutter. Price £4 : 7 : 6

Fitted with Rapid Rectilinear Lens. Price £5 : 0 : 0

2C Folding Autographic Brownies

No 2C Folding Autographic Brownie. Fitted with Meniscus Achromatic Lens and Kodak Ball Bearing Shutter. Price £3 : 5 : 0

Fitted with Rapid Rectilinear Lens. Price £5 : 0 : 0

Then there are the 2C Box-form Brownies, 25/-

Ask for the 2C Kodaks

Kodak Ltd., Kingsway, London, W.C.2

THE

Meccano Photographers' Corner

THREE SPLENDID COMPETITIONS

Holiday Essay Competition

IT is very interesting to look through snapshots taken during your holidays, and to be reminded of many happy hours by some little photograph. The photograph on this page is so realistic that we can almost imagine we are standing in the pine-woods on the edge of the sea-shore. Such photographs are refreshing to everyone, and are filled with happy memories for the photographer.

In order to encourage Meccano boys to use their cameras, we have announced photographic competitions from time to time. Last year we announced, in addition, the Holiday Essay Competition, and as this Competition was so successful we are repeating it again this year. Intending entrants should write a description of some interesting holiday event and illustrate same with their cameras. The photographs may be either sent separately or mounted in position in the essay. Although the exposure must be made by the competitor, the photographs need not necessarily be developed or printed by him, although this point should be mentioned when submitting entries.

Photo by] [*Master L. Almeras*

The above photograph shows a view of the French coast taken during the holidays this Summer

Photographs may be of any size or finish and there are no restrictions and no age limit, although the age of the competitor will be taken into consideration in judging the entries. The first prize will be Meccano goods to the value of £1 1s. 0d., and the second prize Meccano goods to the value of 10/- to be chosen by the winners from our catalogue. Closing date 30th October (Overseas: 30th December).

For those without Cameras

As announced in our issue last month, there will be a section of the above-mentioned Holiday Essay Competition for unillustrated essays. This section will be divided into two classes.

(A) Boys under 14 years of age, and

(B) Boys over 14 years of age.

In this section two Hawk-Eye cameras, taking pictures $2\frac{1}{4}'' \times 3\frac{1}{4}''$, and made by the Kodak Company, will be awarded. The winners will thus be able to enter the Photographic Competitions that will be announced from time to time in future issues of the "*M.M.*"

All essays should be neatly written on one side of the paper only, and the full name and address should appear on the back of each sheet. Essays may be of any length but should be of about 500 words. There are many subjects to choose from, such as a visit to some beauty spot or a ruined castle; some thrilling adventure or some new experience gained on holiday.

This competition closes on the 30th October for the United Kingdom, and the 30th December for competitors abroad. The winning essays will be published in the "*M.M.*"

Fifth Photographic Competition

JUDGING from the number of entries received for the Fourth Photographic Competition it would appear that there is no end to the popularity of these competitions. The work submitted continues to maintain a very high standard and many excellent pictures are included in the entries.

It has been decided to hold a Fifth Photographic Competition, on similar lines to those previously held. Competitors must themselves take the photographs, but may obtain assistance in the developing and printing if desired. The name and address must be clearly written on the back of each photograph submitted, which may be of any size and either mounted or unmounted, as these points will not be taken into consideration when judging. It should be stated whether the photograph has been developed and printed by the entrant, as this will, of course, be taken into consideration. The competition will be divided into two sections as usual:—

(A) Boys of 14 years of age and under.

(B) Boys over 14 years of age.

The subjects this time are to be either

(1) A FAMILY GROUP,

(2) AN ANIMAL STUDY, or

(3) MISCELLANEOUS SECTION.

The first prize in each section will be a Hawk-Eye Camera, made by the Kodak Company, and it is hoped to publish the winning photographs in the "*M.M.*"

The closing date for entries from the United Kingdom is the 30th November, and for entries Overseas, 29th February, 1924.

Interesting Paragraphs

Two prospectors in the White Creek District, British Columbia, recently shot a huge grizzly bear, which weighed 1,800 lbs. The skin alone weighed 100 lbs., and was 12 ft. in length and 9 ft. in width. When standing erect the grizzly measured 15 ft. in height and its footprints were 18 ins. in length and 9 ins. in width. The bear put up a fierce fight, and it took five bullets to kill it.

* * * *

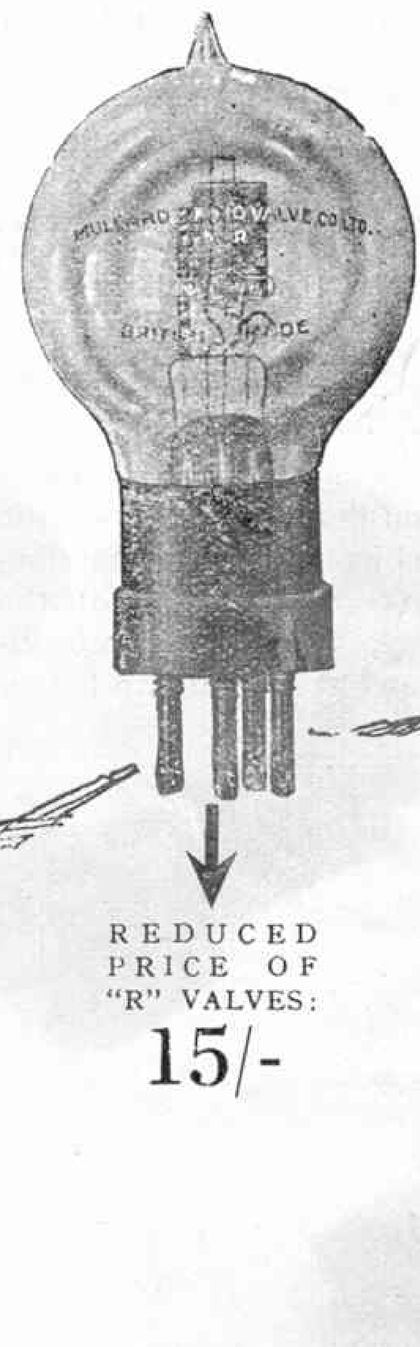
A demonstration has recently been given at the Middlesex Hospital, London, of a new form of cinematography in which paper films are used instead of the usual celluloid, thus greatly reducing the risk of fire. Instead of showing the picture by projecting direct light through the film, the new system reflects the light.

* * * *

Sir Keith Smith, brother to the late Sir Ross Smith, whose flight to Australia was recently described in these columns, proposes to attempt the round-the-world flight, planned by his brother. Sir Keith has recently arrived in England after travelling through Australia, China, Japan, Siberia, Canada and America. In each of these countries he has been making arrangements for his projected flight, which it is anticipated will begin very shortly.

After Rodin

EPS 40



REDUCED PRICE OF "R" VALVES:
15/-

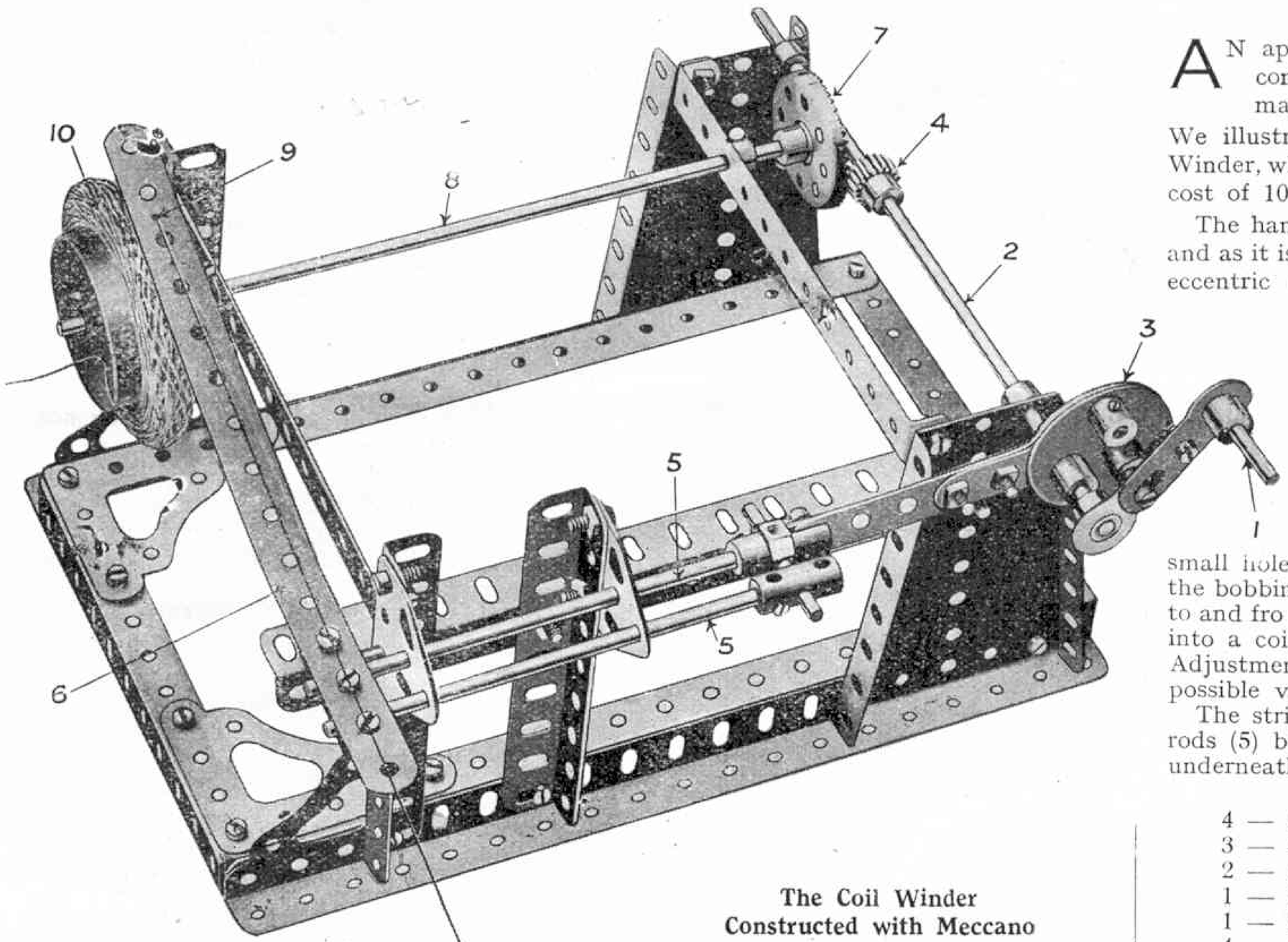
DROBLEMS arise in every phase of life, and the power of concentration does not always solve them, but when the problem is one of wireless valves you can see The Thinker straightening his heavy back and smiling because there is only one solution—

Mullard

Obtainable from the Leading Electricians, Wireless Dealers, etc.

Advt. of the Mullard Radio Valve Co. Ltd., Balham, S.W. 12.

The Meccano Coil Winder



The Coil Winder Constructed with Meccano

AN apparatus that will wind honey-comb coils for receiving sets may be constructed with Meccano. We illustrate herewith the Meccano Coil Winder, which may be made at a total cost of 10/6, as follows:—

The handle (1) is formed of two cranks, and as it is turned, the rod (2) carrying the eccentric (3) reciprocates, the rods (5) carrying the strip (6). A pinion (4) on the rod (2) engages and drives a contrate wheel (7) on the rod (8) on the other end of which is fixed any suitable bobbin or former for the coil of wire. The wire to be coiled is passed through a specially drilled small hole (9) in the strip (6), and while the bobbin is being rotated the strip slides to and fro and causes the wire to be wound into a coil (10) of honey-comb formation. Adjustment of the eccentric (3) makes possible variations in the windings.

The strip (6) is held in position on the rods (5) by a clamp action of a $1\frac{1}{2}$" strip underneath.

PARTS REQUIRED.

4	— $9\frac{1}{2}$" girders	(8a)
3	— $4\frac{1}{2}$" ,,	(9a)
2	— sector plates	(54)
1	— $7\frac{1}{2}$" strip	(1b)
1	— $2\frac{1}{2}$" ,,	(5)
4	— architraves	(108)
1	— $1\frac{1}{2}$" strip	(6a)
2	— flat trunnions	(126a)
1	— eccentric	(130)
2	— $5\frac{1}{2}$" × $\frac{1}{2}$" double angle strips	
2	— $5\frac{1}{2}$" girders	(9)
2	— cranks	(19)
1	— $1\frac{1}{2}$" contrate wheel	(28)
1	— bush wheel	(24)
1	— $\frac{1}{2}$" pinion	(26)
2	— 8" rods	(13a)
2	— $4\frac{1}{2}$" ,,	(15a)
1	— 2" rod	(17)
1	— 1" ,,	(18b)
1	— octagonal coupling	(63a)
1	— coupling	(63)
3	— collars	(59)
34	— nuts and bolts	(37)
2	— washers	(38)

James A. Lamb (Selby).—The question of the introduction of a Meccano valve set is at the moment in abeyance.

R. Kirkwood (Darlington).—(1) As you are approximately 30 miles from Newcastle and situated in an ideal position you will probably be able to receive broadcast with a Meccano Crystal Receiver. I know of instances in which telephony is regularly received with our Crystal Set up to distances of 33 miles. (2) Your best plan will be to erect your aerial on the top of the house at the height you mention.

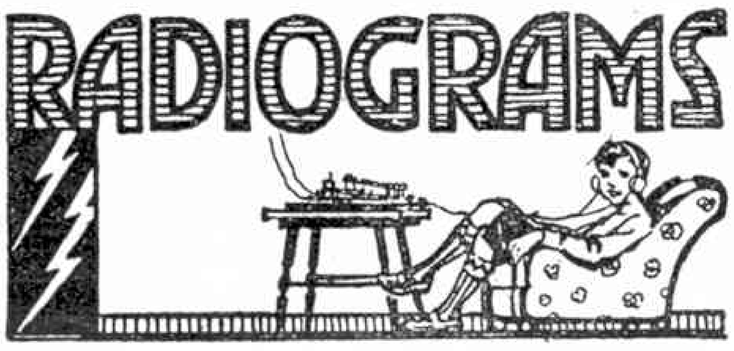
R. Smith (Wool).—Unfortunately you are too far from London to receive messages broadcast from Marconi House. If you acquire a knowledge of the Morse code you will be able to spend many happy hours receiving telegraphic messages transmitted from ships in the English Channel. The subscription to the "*M.M.*," enclosed with your letter, has been passed to the Editor.

H. A. Hall (Cape Town).—I am glad to know that you have not entirely forgotten me. The Radio Instruction Leaflet may be obtained from Mr. A. E. Harris, P.O. Box 1199, Johannesburg, and I advise you to write for a copy.

H. G. T. Harris (Sandy).—The variometer you illustrate and describe is already well known, and I have no doubt that in actual practice it is a very excellent instrument. Your order for the "*M.M.*" has been passed to the Editor.

Peter Cecil Previte (Turvey).—Before you can obtain an experimental licence it will be necessary for you to write the Postmaster General for an application form, which must be filled in and approved before such a licence is granted. It is hoped that a new licence will shortly be issued for those who desire to construct their own receivers.

P. Parrett (Brighton).—You will not be able to receive at Brighton broadcast from Marconi House with a crystal receiver.



The Marconi Company and its associated companies are to spend about £6,000,000 in erecting wireless stations at home and abroad. The greater part of the material will be supplied from Great Britain.

* * *

It is rumoured that stations for the relay of broadcasting will shortly be established in several large towns throughout the country.

* * *

Recent statistics show that about 1,500,000 radio sets are being regularly used in the United States of America.

* * *

In one of the big London hotels, the page-boy's duty of calling out the names of guests for whom enquiries are made, is now performed by loud-speakers installed in each room. The name required is transmitted from the hotel enquiry office, constituting a decided improvement on the old method.

* * *

An interesting experiment is being carried out in Paris, where lectures given at the College de France are to be broadcast. It is hoped in the future to broadcast courses on technical and specialised subjects, but at first the lectures will be confined to topics of general interest.

Build your own Radio Receiver

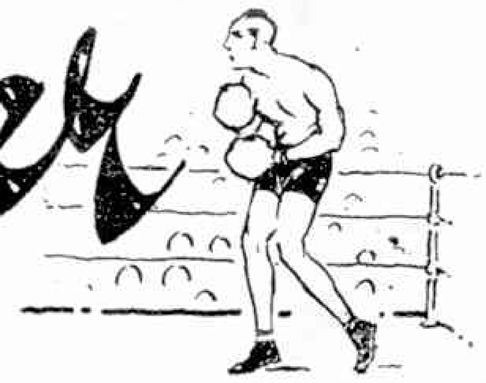
In a recent issue of the "*M.M.*" we gave full particulars for building a Radio Receiver from Meccano parts. These instructions may now be obtained in the form of a beautifully illustrated leaflet, printed on art paper (price 4d., post free).

In addition to Meccano parts being of service for the construction of a complete Crystal Receiving Set, they are of particular use for experimenting in Radio. Their standardisation and universal adaptability enable new circuits to be tried out, and changes to be quickly made.

If you are building a Radio Receiver or experimenting in any way, you will find these special Meccano Radio parts of great assistance. Send for a full list, which will be mailed post free on application.

OUR NEW SERIAL

Bulmer's Father



A Stirring Story of School Life

By Arthur Hutchinson

SYNOPSIS.

Jack Bulmer, a new boy at St. Winifred's, runs foul of Lawson, one of the bullies, on his first day at the school. Later, he finds Lawson bullying a young boy and offers to fight him. Bulmer fights with skill, and the bully is beaten. After the fight Brailsford tells the boys that Bulmer's father is a professional boxer, and that he is expected to visit St. Winifred's to watch the forthcoming match.

VII.

ON the following Saturday afternoon, just before the school match was to take place, three figures were observed strolling across the ground in the direction of the pavilion. Two were recognised at once as Brailsford and Jack Bulmer. The third, a man well past middle age, attracted special comment and observation. He was powerfully built and of medium height, and his features, although perhaps a little coarse and irregular, wore an expression of kindliness and good humour. There was nothing about him to indicate the traditional appearance of the boxer or prize-fighter. And yet, this kindly-looking man walking across the greensward with an arm linked through that of his son, was none other than Stephen Bulmer, at one time light-weight boxing champion of Great Britain and the most popular boxer of his day.

The three figures drew near the pavilion, and one or two boys greeted young Bulmer with a friendly smile as they passed. This fact brought a happy look into the eyes of his father, and a proud comment to his lips.

"They seem to like you here, Jack," he said in a voice tinged with a faint shadow of relief, as he squeezed his boy's arm. "I'm *so* glad. I thought perhaps . . ." He broke off abruptly, and Brailsford looked across at Jack with a twinkle in his eyes.

"Of course they like him, Mr. Bulmer," he said promptly. "Why shouldn't they? Besides, he's your son, and . . . well, they're proud to think it."

"Proud!" Stephen Bulmer spoke the word almost immediately. "Proud! Well, well!"

Jack looked up at his father and smiled.

". . . . The wide playing fields, their setting of giant oaks, and the historical school buildings . . . ."

"Why, Dad," he said, "you're one of the best—by jove you are."

VIII.

Together the three entered the pavilion, where Brailsford introduced Mr. Bulmer to several of the boys. With feelings that he could not describe, the old boxer found himself the centre of a crowd of youngsters, whose words and actions clearly indicated the respect and admiration they felt towards him. Somehow it all seemed very overwhelming, but the secret joy that filled his heart was boundless.

Soon the match commenced, and for the first time in his life, Stephen Bulmer found himself initiated into the mysteries of a public school Rugby match. His interest was immense, and nothing escaped his keen eyes as he sat taking note, not only of the many thrilling episodes of the match itself, but also of every detail of his surroundings. Now and then he would look round and gaze with solemn awe upon all those things that constitute the outer glory of St. Winifred's. The wide playing fields, their setting of giant oaks, and, above all, the historical school buildings.

It was all very wonderful, he thought, and his simple heart rejoiced to think that the hard-won fruits of his many victories enabled him to give his son that which had been denied him.

IX.

When the match was over, Brailsford found Stephen Bulmer surrounded by a number of enthusiastic boys, including Lawson. He approached with a smile, for he guessed only too well what was happening. He knew that the old boxer was once again going over the Homeric battles of the past, and that the boys were eagerly drinking-in every word, and feeling their young manhood stirred by the old boxer's vivid descriptions of the ring.

"Yes, boys," Mr. Bulmer was saying, "It's a great life for those who like it, and can endure it. But it's a mighty hard life, and although I've taught Jack all there is to know of the art, I wouldn't for the world have him be a professional boxer." Here he paused, but after a moment continued, "Do you know I'm—I'm so glad Jack's able to be here at St. Winifred's amongst you all. I thought . . . well, you know, I'm naturally a bit rough and tumble myself, and you're all so smart that I thought maybe . . ."

Here Brailsford broke in with:

"Maybe you thought, Mr. Bulmer," he said, with a significant glance round,

Bulmer's Father—(*cont.*)

"that we'd be a bit of a stuck-up lot, eh?"

Stephen Bulmer turned in his direction.

"Well, Mr. Brailsford, I won't exactly say that. I've imagined so much you see without actually seeing for myself. But of one thing I'm certain, and that is that you're 'white,' every one of you—through and through!"

At these words, uttered with such genuine enthusiasm, something seemed to stir the hearts of the listening boys. Suddenly a voice full of excitement cried:

"Three cheers for Bulmer's father!"

"Three figures were observed strolling across the ground"

As if that very thought had been uppermost in the minds of one and all, there broke out such a cheer as had seldom been heard within the precincts of St. Winifred's! Amidst it all Mr. Bulmer sat back in his chair, utterly carried away by an emotion that touched his heart to the core.

"Thanks, lads. Thanks!" he said huskily, as the cheers died away, "And . . . God bless you all!"

Then he rose to his feet, and said, "That's the most wonderful thing that's occurred to me. . . ."

". . . Since you won the light-weight championship, eh, Mr. Bulmer?" interjected Brailsford.

Stephen Bulmer looked the Rugby captain straight in the face.

"No, Sir! In all my life!" he said quietly.

THE END.

Stamp Collectors under Suspicion

IN 1840 Great Britain led the world by being the first country to issue postage stamps. Since then her lead has been followed by various nations, one after another, until to-day it is difficult to find a country that does not possess distinctive stamps of its own.

Even before postage stamps were a year old, and while Great Britain was yet the only country issuing them, the stamp collector had appeared. At first, the authorities looked with a certain amount of suspicion upon those who valued the little scraps of coloured paper, for they could not understand why anyone should collect used postage stamps for any other purpose than to clean them surreptitiously, so that they might be used to prepay postage a second time! Even now non-collectors class stamp-collectors with those who save tram tickets, cigarette cards and the like!

A Bishop's Ignorance

George Robey, the famous comedian, is an assiduous stamp collector, and recently gave a paper at the Philatelic Conference. He mentioned that anyone who found pleasure and recreation in stamp collecting naturally had the desire to help others to collect, and, apart from his own collection, nothing had given him greater pleasure than persuading his young friends to take up the hobby. In Mr. Robey's opinion, there are few lines of human occupation and interest that are not reflected in some way, directly or indirectly, in a stamp album. "Stamps themselves," he said, "give a broader view of life, which is a great asset to all classes. It is not very long ago," continued Mr. Robey, "that the Bishop of a great colonial diocese ordered a clergyman to take the morning service one day in Mauritius and the evening service in Seychelles. Had the Bishop collected stamps he would have known a little more about the diocese, and would have realised that the two Colonies, so near on a small map, are, in reality, a very long distance apart!"

Learning from Stamps

Stamp collecting not only teaches us Geography, but from the pictures on the stamps in our albums we gain a very good idea of History. The discoveries of Columbus, depicted on the U. S. A. stamps, and the different Kings and Queens of the world are but two instances of this. Then again, stamps help us to learn more about a host of other subjects—not the least of which is Natural History. Bears, ourang-outangs, tapirs, giraffes, lyre-birds, and a host of other animals are depicted on the beautiful stamps of Labuan, North Borneo, Nyassaland and New Zealand. No matter in what direction our fancy leads us, we are certain to find something of interest and of educational value in a stamp album.

How to Begin

In this column next month we shall commence a series of articles dealing with stamp collecting for beginners. Many of our readers are already collectors, but even so we think that they will find these articles of considerable interest. We shall deal with such subjects as what stamps to collect; how to classify your stamps; the best album to buy; how to mount the stamps, and so on. We wish every reader of the "*M.M.*" to possess a representative collection, the acquisition of which will afford him pleasure and instruction, and our articles will be written with this object in view.

OUR MAIL BAG

In this column the Editor replies to letters from his readers, from whom he is always pleased to hear. He receives hundreds of letters each day, but only those that deal with matters of general interest can be dealt with here.

Correspondents will help the Editor if they will write neatly in ink and on one side of the paper only.

B. S. Faulks (Brighton).—Thank you for your congratulations on the enlarged "*M.M.*" We were sorry that the Stamp Collecting Column was crowded out of our last issue. The sentiment you express in Latin ("*Meccanus bonus est*") is perfectly accurate and reminds us of our school days, when we spent much time wrestling with the first book of Cæsar and other interesting works by his countrymen!

F. Bowen (Carroge).—The saving in using a cheaper quality paper for the printing of the "*M.M.*" would not be considerable, and it would make it impossible to print the beautiful illustrations that now appear in its pages.

R. Moses (Calcutta).—We are pleased to hear from you, Ralph, and to note that in your opinion the "Sharp Eyes" type of competition is best because "everyone starts on the same level." We assure you that this will not be the last competition of this kind, and that "more drawings of different subjects with mistakes" will appear in our future numbers.

M. Yates (Ashstead).—You are quite right, and we wonder how many other boys noticed the mistake on page 77. We are pleased that you wrote to us about it, for it shows that you really have "sharp eyes," and know how to use them.

G. Kottovkir (Barnes).—An autobiography of the Editor would, no doubt, interest many readers, but we fear the Editor would not have time to write it!

M. Vaccrio (Milan).—We shall certainly bear in mind your suggestion for articles on the different processes of manufacture, such as boots, bicycles and motor cars.

A. W. Heyes (York).—We hope to publish something about "the secrets of the moon, stars and planets" in one of our future issues. We are particularly interested in this subject.

Alan McNaughton (Invercargie).—

"Meccano's the toy which the brainy boy,
With mechanical turn of mind,
May a motor 'bus make, a bridge, or a brake,
A model of every kind.
With screws and clips, and plates and strips,
And girders strong and true,
He may fashion and frame, like men who win fame,
A miniature airship, too."

We like your verse, Alan, and no one can say that your statements are incorrect!

L. Beyloos (Crouch End, London, N. 8.).—As soon as the opportunity occurs, we shall publish a manual showing a selection of models that have won prizes in our annual competitions. In the meantime, new Meccano models will be published in the pages of the "*M.M.*" from time to time.

M. F. Prout (Plymouth).—We do not quite understand your request that we should include in the "*M.M.*" "conjuring tricks about ships like the Majestic." It would certainly have to be a very big hat from which such a ship could be produced by any conjuror!

W. King (Darwen).—Our £250 Model Building Competition already covers your suggestion.

J. Earwaker (Tokonui).—

"Meccano is what I got one day,
The best of toys in every way,
I invent with it some wonderful things,
Meccano is fit for sons of kings,
I use my mind, and reason so,
Turn quickly Meccano to I-can-Oh."

We have pleasure in printing your verse, John, feeling sure that many of our readers will agree with you.

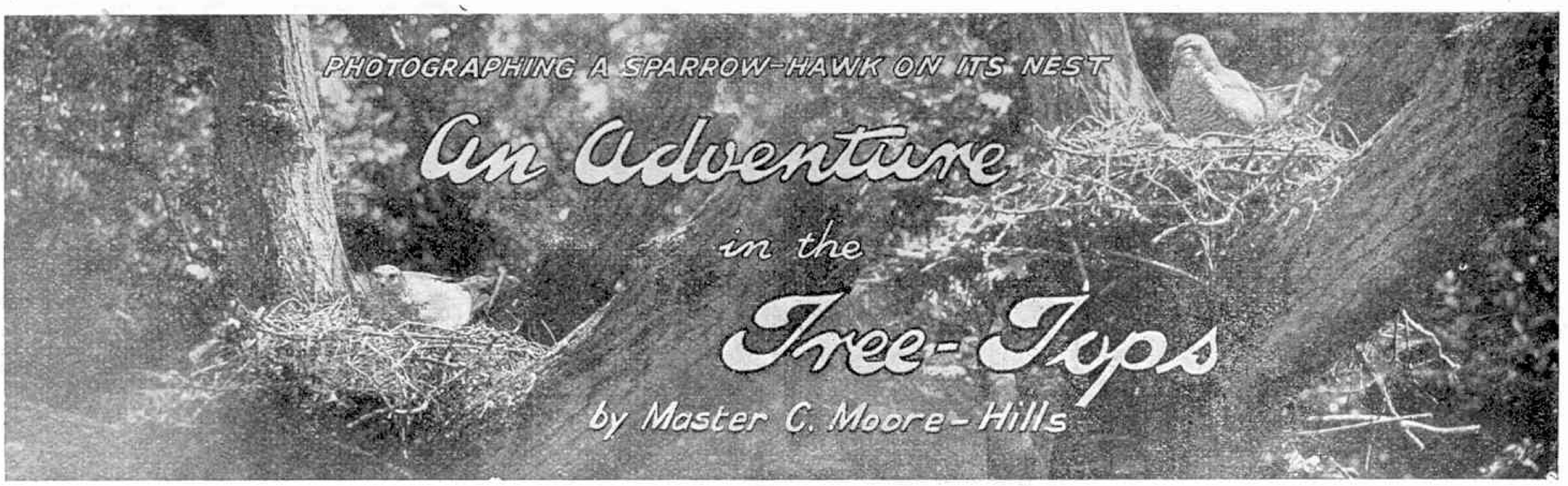
S. C. Smith (Whitehaven).—We fear your suggestion for a list of questions and marks for correct answers each month, sounds too much like school to be acceptable to most of our readers.

M. Hoyle (Lymm).—The objection to giving a Jig-Saw Puzzle to be cut out of the Magazine is that many of our readers keep their Magazines, and do not wish to mutilate the pages by cutting anything out.

A. J. Spear (Launceston).—We have in mind a series of articles on "When I Leave School," dealing with the various positions open to boys.

L. S. Herney (Brighton).—Your suggestion to include news items in the Magazine is one that is not practicable, as most of our readers are able to obtain this information from the daily papers.

W. Johnson (Huddersfield).—We hope to print an account of Dick's Visit to the Meccano Factory some time in the future.



There are few hobbies so interesting, or more worthy of study, than that of the new form of bird-nesting. In the old days this hobby consisted of finding as many nests as possible, robbing, and then destroying them. It is much more interesting, however, to locate the nests and to leave them untouched, and by returning at short intervals, to watch the progress of the rearing of a brood of young. It is delightful to be able to photograph the nest with the hen-bird sitting, and, later on, when the young chicks hatch out. This work entails a great deal of patience, however, as those of our readers will discover should they try to emulate Master Moore-Hills' very creditable example.

IT was about the middle of May, 1921, when we first discovered the Sparrow-Hawk's nest in Saling Grove, Essex. The nest itself was an old one, probably a Jay's or a Magpie's, the Sparrow-Hawk having taken possession.

The birds soon began to re-build the nest with twigs, and by the end of May it was of quite respectable size. About this time the hen-bird laid the first egg. This particular hen was a young bird, and the question was whether she would allow us to build a "hut," or hiding-place, in the tree from which to photograph her, or whether she would desert the nest when we commenced operations.

When she had laid the fourth egg we started preparations to build the hut. When we commenced work the hen-bird was at first very frightened and flew round the nest in a perfect frenzy. After a few days, however, she calmed down and we found that we should certainly be able to photograph her.

The nest was situated in an oak tree about 25 ft. up, and to make a place for the hut we had to build a wooden platform on one of the boughs. On this platform we erected four corner poles, around which we hung old sacks, with a flap in the front to enter the hut.

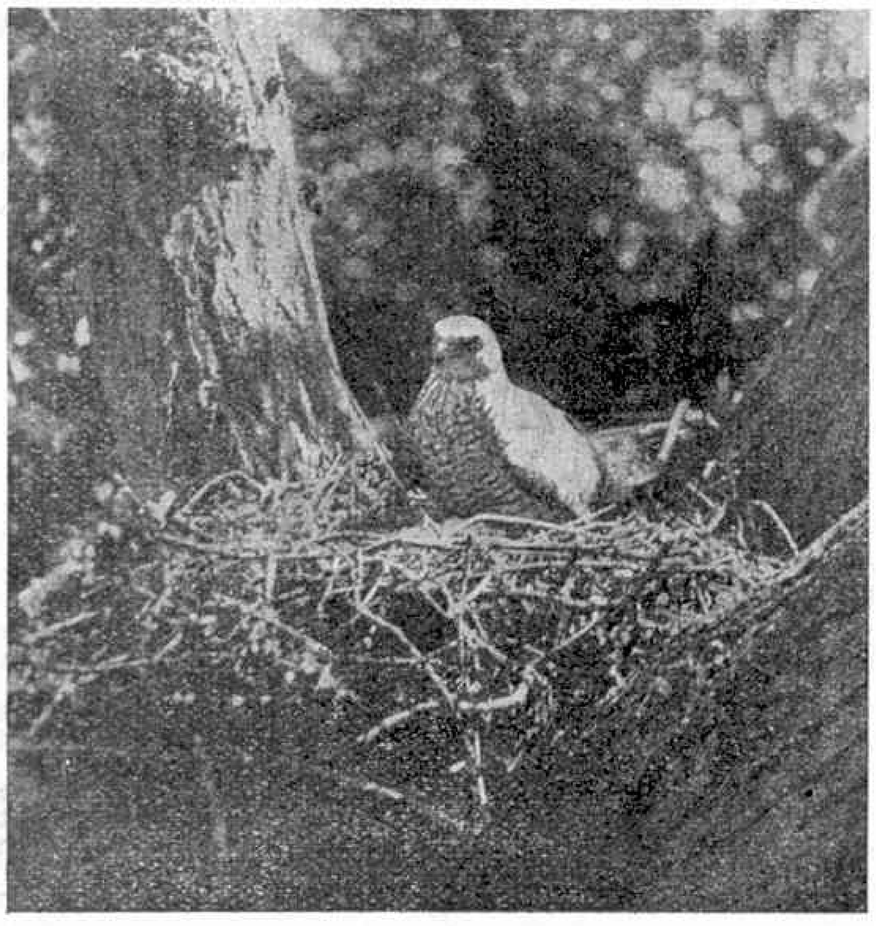
Soon after we finished building the hut, the hen threw one of the eggs out, because it was addled. About the 12th of June she began sitting, and then we brought the cameras into the hut. To begin with, the hen was very frightened at the click of the camera. She left the nest on one or two occasions, but at last she became accustomed to the unfamiliar noise. It is interesting to note that during the latter part of the time the hen bird would let us climb the tree and enter the hut without her leaving the nest, which was only about nine feet from the hut.

Up to that time we had seen nothing of the cock-bird, but he now became very attentive and brought dainty morsels to his sitting mate. He used to fly low, behind some hedge adjacent to the wood, and drop on some unsuspecting small bird, such as a linnet. He then came down-wind to the wood and perched at the edge, calling to his mate. If she did not answer him he repeated the process a little nearer the nest. If he still remained unanswered, he came to the tree and sat on a bough near the nest, calling all the time. After this the hen would generally leave the nest and help him to devour the prey, but if she did not, he would drop the food on the nest and depart, returning later with another victim. He often came as many as seven times a day.

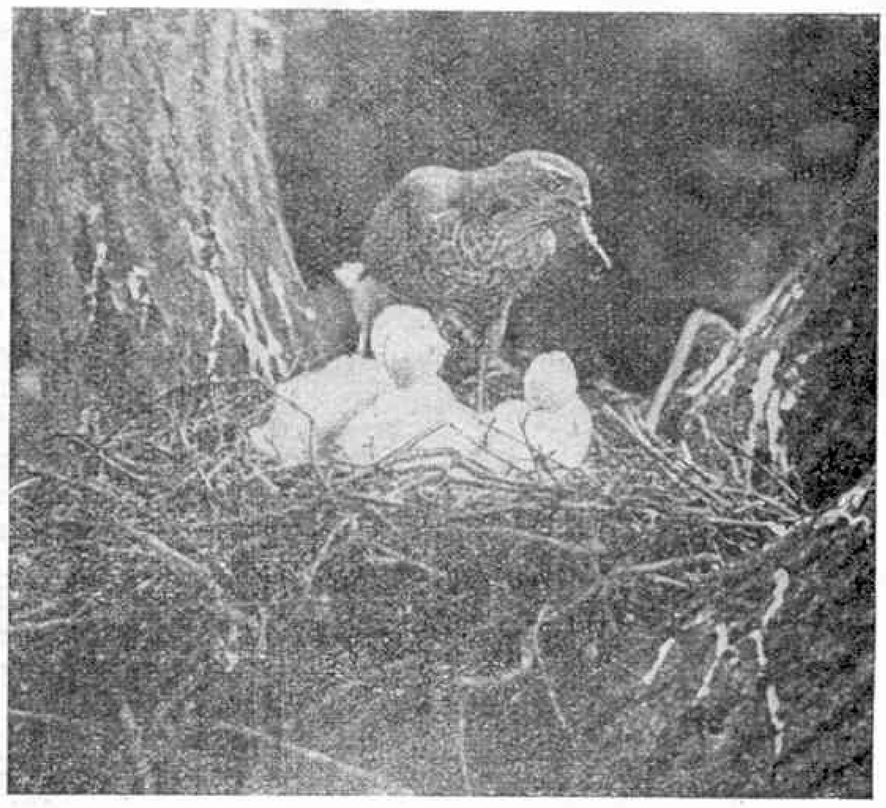
It was rather a remarkable thing that only once during the two months that I watched this pair of Sparrow-Hawks did I see the cock and the hen bird both on the nest at once. Then it was for such a short time that I was not able to photograph them.

About the 8th of July the eggs were chipped, and two days later the young birds emerged. The cock-bird now had a very busy time, because for the next six days the hen did not leave the nest. The food he now brought were very tender morsels, each of which was feathered, beheaded, and properly dressed. They were very carefully torn up and distributed by the hen-bird, who kept the legs and bones for herself, only allowing the young ones the tenderest portions.

About this time the weather was very hot, and the hen had to keep the young sheltered from the sun by spreading her wings and tail over them, with her back



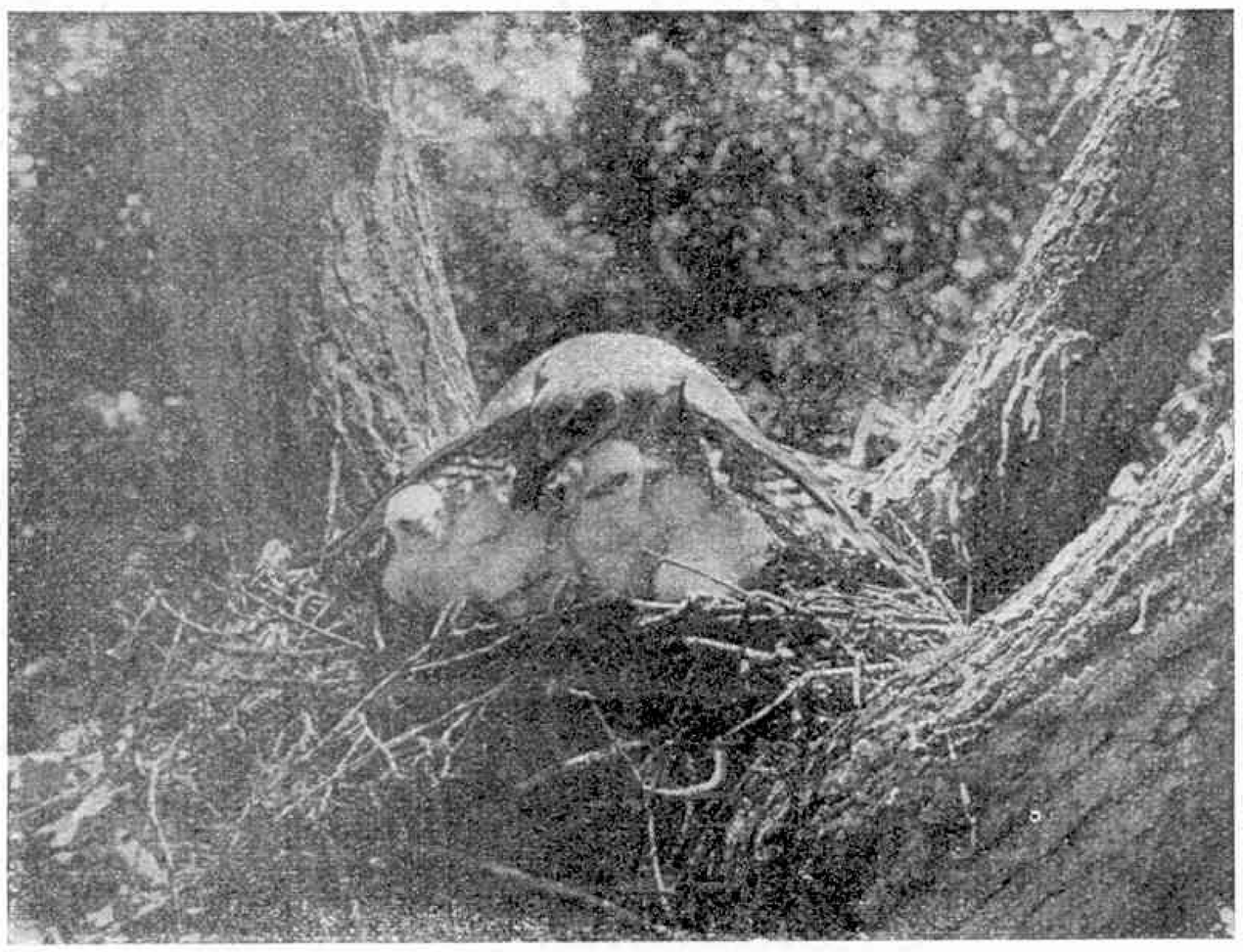
Hen bird sitting on her eggs



Hen bird feeding young Sparrow-Hawks. Notice the food in the bird's mouth

An Adventure in the Tree Tops—(*cont.*)

to the sun. The young grew rapidly, and in about ten days were able to start tearing up food for themselves. At this stage the chief food was young starlings, and I have seen as many as four dressed starlings on the nest at once. Sometimes mice were brought, and other small mammals.



The Female Sparrow Hawk sheltering her young from the fierce rays of the Summer sun

The young birds grew very quickly and were soon able to fly. Even then they used to return to the nest to feed, however, and the cock-bird placed food there for them and also for the hen. If two of the young birds returned to feed at the same time, a fight generally ensued, and always resulted in one of them retiring without his meal. At last the time came when they felt they could cut themselves adrift from their "mother's apron strings," and one fine day, when I last visited the nest, it was deserted. Altogether, however, I thoroughly enjoyed my opportunity of studying the birds at such close quarters, and look forward to repeating the experience with other birds in the future.

Railway Changes

by Master H. R. Smith

Now that the grouping of railways has taken place, a number of changes have been brought about. Four N.B. "Atlantics" were recently seen at Leicester travelling up to Marylebone, and the day after one of the new Great Northern "Pacifics" (4–6–2) went up. It is quite probable that some "Great Central" engines have gone up on to the Great Northern, North Eastern and North British lines.

All the engines that went up to Marylebone had the letters L. & N.E.R. (London and North Eastern Railway) inscribed on their tenders. One of the 4–6–0 engines of the late Lancashire and Yorkshire Railway was seen the other day with the letters L.M. & S.R. (London Midland and Scottish Railway) on its tender.

Boys who are interested in railways should look out for exchange working of locomotives, as a number of interesting changes will no doubt take place.

IMPORTANT NOTICE

We are constantly asked to supply back numbers of the "*M.M.*" We print only sufficient copies to fill our regular orders, and back numbers cannot therefore be supplied. In order to prevent disappointment our readers are advised to place a regular order, with a Meccano dealer, a newsagent, or direct with us.

BRIGHT IDEAS

These columns are reserved for dealing with suggestions sent in by Meccano users for new parts, new models and new ways of making Meccano model-building attractive. We are always pleased to hear from any Meccano boy who has an idea which he considers will be useful in the Meccano system.

W. H. Buckler (Grantham).—Why not introduce in the transmission between your Clockwork motor and your model, a clutch action consisting of toothed wheels to be thrown out of gear by means of a lever strip? This method will give you the desired effect and will obviate the use of the free-wheel action you suggest.

S. Sergio (Ancona).—Bronze gives a pleasant ringing tone. It would, of course, be impossible to incorporate this agent in our steel strips and plates.

J. H. Kettle (Loughboro').—We do not quite see the point in your suggested gear wheels with a limited number of teeth. Will you demonstrate their application a little more clearly?

G. R. Offer (Catford, S.E.).—(1) We do not stock rubber rings as an accessory on account of their perishable nature. (2) The 2" pulley makes an admirable steering wheel for an automobile.

A. Timms (Birmingham).—(1) What advantages do you consider a $2\frac{1}{2}" \times 2\frac{1}{2}"$ flanged plate possesses? (2) We have in mind the introduction of single angle strips (or angle brackets as you term them) and shall consider carefully your suggestion for a $12\frac{1}{2}" \times \frac{1}{2}"$ double angle strip.

Jim Stapley (Maidstone).—In suggesting new parts it is always helpful if an instance of their use is quoted. Have you found any general uses for your suggested ratchet wheel?

A. Farne (Gironde).—(1) We refer you to Model 307 (Oscillating Steam Engine) for examples of cylinders with pistons. (2) The piston rod is journalled in the two flanged wheels that form the cylinder ends, thus ensuring an easy action.

Percy Levermore (Barnet).—A ratchet screwdriver is certainly useful, if perhaps a little costly, and we shall consider the idea.

Bright Ideas (*cont.*)

Robt. A. Miller (Lincoln).—We have in mind the introduction of channel sections.

Stanley Wilkinson (Skegness).—By lapping the cord two or three times around the crank handle, and knotting with two ordinary half hitches, a firm fastening is obtained.

Jack Jennings (Dublin).—(1) Your suggestion for the issue of "Cigarette Cards" has already received consideration, and we hope shortly to make an interesting announcement in this connection. (2) The perforation of the sector plate is already under consideration.

V. J. Kitson (Ingeniero Blanco, Argentina).—We realise that a Meccano boat would be attractive, but the caulking of the joints would present difficulties. However, we shall examine the possibilities.

W. G. F. Thorley (Wellingboro').—We could not undertake the manufacture of the type of rail you suggest, and the manufacture of large size buffers is too costly.

Harold Javer (Wolverhampton).—We have recently added a flanged architrave R. and L. (Nos. 139 and 139a).

Cyril H. Shepherd (Bedford Park, W.).—We do not think that there is any advantage in the type of tooth you suggest. We have found the present type of toothed wheel quite efficient for every degree of Meccano practice.

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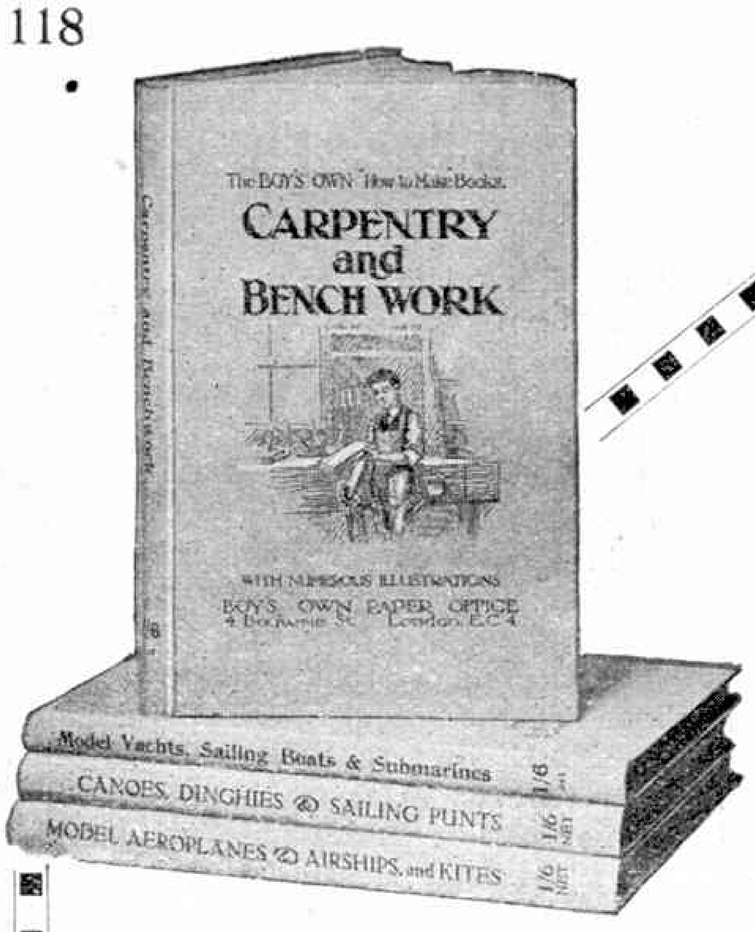

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—METHODIST RECORDER.

What is the first principle of building construction?

IT does not matter how carefully a building is planned or how beautifully it is built; the skill of the finest craftsmen in the world may be lavished on it—all will be in vain unless the *foundations are sound.*

All over the world there are splendid buildings, which are cracking and collapsing because the foundations are giving way.

You yourself are rather like a building—it does not matter how clever you are with your brains or your hands. It does not matter how strongly you feel you will be able to do great things when you are grown up, unless your foundations are sound, unless you have *good health,* you will collapse.

Now the very foundation of good health is good teeth—you cannot be really fit and well unless you have sound teeth. Sound teeth are *clean* teeth.

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The Secretary's Notes

By the end of this month the light evenings will be considerably shorter and the Summer Sessions, which have proved most enjoyable and successful, will very soon give place to the busy indoor Sessions. Club Leaders and Secretaries are now drawing up attractive programmes on the lines that they know will be most popular amongst their members. In many cases new quarters are being sought, in order to accommodate the ever-increasing number of Club members. From several Secretaries I hear that members are exceptionally keen and enthusiastic at the prospect of the Winter Sessions.

Close of Summer Sessions

I often receive letters from boys who have made happy friendships in connection with the Correspondence Club, and I would announce that the Club is open to every Guild member whether he be a member of a Club or not. I have at present quite a number of Canadian boys who require English correspondents, and any boy who is interested should write to me without delay. Those members who wish to correspond with boys in other countries may be placed in communication with members in almost any country in the world, from Iceland to Australia! Full particulars, and enrolment form, will be mailed free on application.

The Guild Correspondence Club

The Meccano Lectures met with a great reception last Winter, and I am arranging to extend the series by adding some additional subjects to the list. These Lectures are compiled specially for Leaders to read to the Clubs. Many Leaders have not time to prepare suitable papers for Club nights, and the Meccano Lectures help them to overcome the difficulty. Sometimes, too, arrangements break down, and what would otherwise be a blank evening is filled by the Leader reading a Meccano Lecture. Very often an interesting discussion follows, and the time passes merrily enough. An innovation this Winter will be the introduction of short stories, the reading of which affords a pleasant change from model building and Club routine.

Meccano Lectures

Successful Meccano Minstrels

All Guild members will be interested to see this flashlight photograph of the Leamington Meccano Minstrels. The photograph was taken on the stage in the Jephson Gardens, where the Minstrels recently gave a very successful performance in conjunction with a Cantata. The Minstrels who, at the request of Lady Ilkestone, have performed for charity in the grounds of Warwick Castle, wear black nigger wigs, white shoes and gloves, red sashes, and pie-dish frills. I am sure that all Meccano boys will agree that they look a very capable troupe, and by working in harmony they give an excellent performance.

Our photograph also shows Mr. Guy Hare, the energetic secretary of the Leamington Meccano Club, and on the right (with baton) Mr. F. Reade, to whom, as Conductor, the Minstrels owe a great deal of their success. The Members of the Leamington Meccano Club are very proud of their Minstrel Troupe, as also is the Club Leader, Mr. F. W. Bull.

Meccano Club Leaders

No. 6. Mr. V. HAMMOND

The "New Malden Meccano Club," of which Mr. Hammond is the Leader, was formed in November 1920. The membership has steadily increased until to-day it stands at 50. Mr. Hammond found this membership too large to handle satisfactorily as a whole, and the Club was divided into two sections, Junior and Senior. This has proved a highly successful innovation. In the opinion of Mr. Hammond the finest Club work accomplished has been the Lectures delivered by the members to audiences consisting of members and adult friends. Lectures have been given on such subjects as "Radio," "Electric Motors," "The *'Great Eastern,'*" etc., and many of the visitors have often expressed their appreciation. Mr. Hammond is undoubtedly doing a good work in encouraging the Club members to lecture in this interesting manner.

CLUB NOTES

West View (Nottingham) M.C.—The Club Leader informs me that the members of this Club are all sportsmen, whether they are at work or play, and that as a consequence he greatly enjoys all his work in connection with the Club. I have noticed that his programme always caters for both the educational and social sides of Club life, and from what I hear it certainly seems that the next Session will be the most successful and interesting yet held. *Leader:* Mr. H. W. R. Cousens, 494, Mansfield Road, Sherwood, Nottingham.

Claygate Juvenile Club.—Considerable progress has been made in connection with this Club, which, incidentally, has a very successful section for girls. At a recent sports gathering the programme included Marathon races of four and seven miles. A Fancy Dress Parade attracted nearly 60 competitors, whose costumes ranged from the sublime to the ridiculous. There was also an Old English Fair, including numerous side-shows, and the whole programme was greatly enjoyed by both spectators and participants. *Leader:* Mr. J. W. Haynes, "Fontmell," Covers Road, Claygate.

Malvern (S. Africa) M.C.—Continues to make good progress. The attendance has been excellent and the Session very successful. Many interesting papers have been given, and Master W. Sims has been awarded a Special Merit Medallion in this connection. Master E. Workman was awarded a Medallion for good work. Successful sports were held, for the members are very keen on Cross-Country Runs and other outdoor exercise. *Secretary:* Master E. Sykes, c/o T. Henderson, P.O. Cleveland, Transvaal, South Africa.

Gulgong (Australia) M.C.—When first organised this Club held its regular meetings during school hours, but meetings are now held on Monday evenings. Model building is very popular with the members, and some of the members' work was recently exhibited at a local show. Lectures have been given from time to time, and these have been followed by interesting discussions. *Secretary:* Master N. Wallis, "Yarrawin," Gulgong, New South Wales, Australia.

Chard M.C.—This Club is most successful and the members are keen and enthusiastic in regard to the coming Winter Sessions. Unfortunately, the Club Secretary has recently been very ill, but he is now well on the way to recovery and will be able to take part in the Club's activities in the near future. *Secretary:* Master Frank Macey, 17, Ashfield, Chard.

Den Haag (Holland) M.C.—It is with regret that I have to announce that this recently-formed Club has been bereaved of its Club Leader. Mr. Regoort, the Treasurer's father, has kindly undertaken the Leadership temporarily. *Secretary:* Mr. H. G. van der Sluis, 108, Stadhoudersplein, Den Haag, Holland.

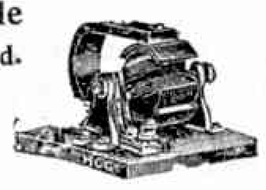
MAKE YOUR OWN ELECTRIC LIGHT

These wonderful Dynamos light brilliantly a 4-6 v. **5/-** lamp and take very little power to drive. Lamps, 3d.

Post, 6d.

Postage Abroad extra (Wt. 2lbs.)

GREENS Dept. N, 85, New Oxford St., London.



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AN EXAMPLE OF ONE OF THE BUILDINGS IN SERIES "B."

A FASCINATING AND AMUSING GAME FOR BOYS AND GIRLS OF ALL AGES.

HOUSES, GARAGES, BRIDGES, CHURCHES, STATIONS, PUBLIC BUILDINGS, TOWERS, ETC. Can be readily constructed from plans enclosed.

SERIES B—COMPOSITE SETS.

Box A	Contains Plans, Bricks, Roof, Trees, Fences and Shells, 6 Models		5/-
Box B	6 Models		5/6
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,, 3	Plans for 49 Models ...		17/6
,, 6	,, 71 ,, ...		35/-

"TUDOR" Series, Half-Timbered Design.

Box 1	6 Models		3/6

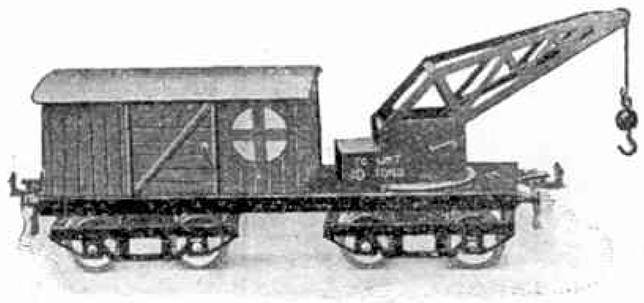
Write for Illustrated List and Free Samples, enclosing 1½d. stamp.

LOTT'S BRICKS LTD., WATFORD, ENGLAND

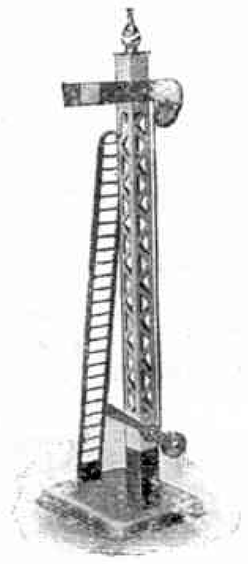
New Rolling Stock and Accessories

Many new types of Rolling Stock and Train Accessories have now been added to the Hornby Train system, and the introduction of further models will be announced later. Ask your dealer to show you these new models. Each model is strongly built, of excellent design and beautiful finish.

LOADING GAUGES
each 1/9



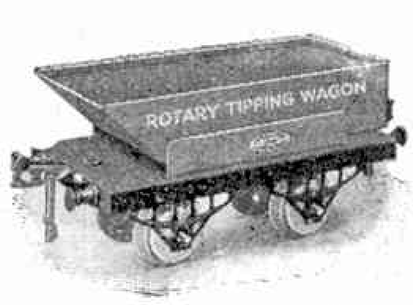
BREAKDOWN VANS AND CRANES
Excellent finish in steel-grey. Suitable for 2 ft. radius rails only ... ... each **7/-**



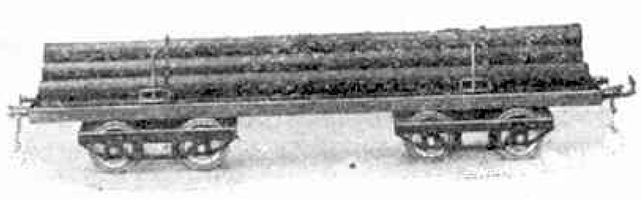
SIGNALS
each **2/6**

COLMAN'S MUSTARD VANS
Finished in colour ... each **4/6**

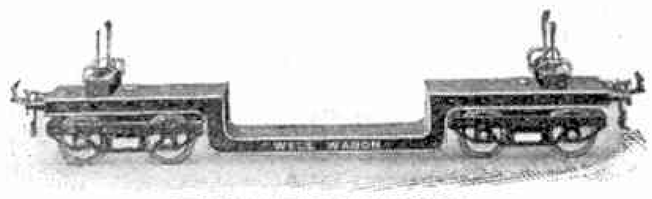
TURNTABLES
each **4/6**



ROTARY TIPPING WAGONS
Finished in grey ... each **3/6**



No. 2 LUMBER WAGONS
Provided with bolsters and stanchions for log transport. Suitable for 2 ft. radius rails only each **5/6**



TROLLEY WAGONS
Finished in colour. Suitable for 2 ft. radius rails only ... ... each **6/6**

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Small advertisements are inserted in these columns at 1/- per line (average seven words to the line), or 10/- per inch (average 12 lines to the inch). Cash with order. Letters to Advertisement Manager, "Meccano Magazine," Binns Road, Liverpool.

STAMP COLLECTOR'S OUTFIT FREE!
Contains over 50 different stamps. Actual contents: Vest Pocket Wallet, Perforation Gauge, Pkt. Stamp Hinges, over 50 different stamps.
Send Postcard requesting approvals.
Lisburn & Townsend, 166, Islington, Liverpool.

250 DIFFERENT STAMPS. Catalogued over £1, 1/- Post Free. Kraus & Co., 137, Cheapside, London.

50 GENUINE STAMPS FREE to applicants for our approvals. Send postcard now. Griffiths & Holden, 36, High Street, Cradley Heath, Staffs.

FREE! SET 14 PICTORIALS (Catalogued 2/9), to applicants for cheap stamp approvals enclosing 1½d. postage. Powell, 73, Bond Road, Surbiton, Surrey.

BRITISH EMPIRE.
LATEST ISSUES. ALL MINT SETS.
BRITISH HONDURAS, 2 c. brown and 5 c. blue, Script, the pair ... ... 5½d.
CAYMAN ISLANDS, 3d. yellow, Script ... 4½d.
LEEWARD ISLANDS, 6d. purple, Script ... 7½d.
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ADVICE, HANDBOOK & CONSULTATIONS FREE. King, Registered Patent Agent, 146a, Queen Victoria Street, London, E.C. 37 years references.

A Useful Tool

Our illustration shows a type of screwdriver useful for reaching bolts in inaccessible places on models. We are disposing of these screwdrivers, whilst our stock lasts, at the special price of 10d. each, post free. MECCANO LTD., Binns Road, Liverpool.

FREE. 30 DIFFERENT STAMPS. Send ½d. E. R. Jones, Aresfa, Rhostyllen, Wrexham.

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SIXTY DIFFERENT STAMPS FREE to applicants for approvals. All ½d. each.
Cox, 135, Cambridge Road, Seven Kings.

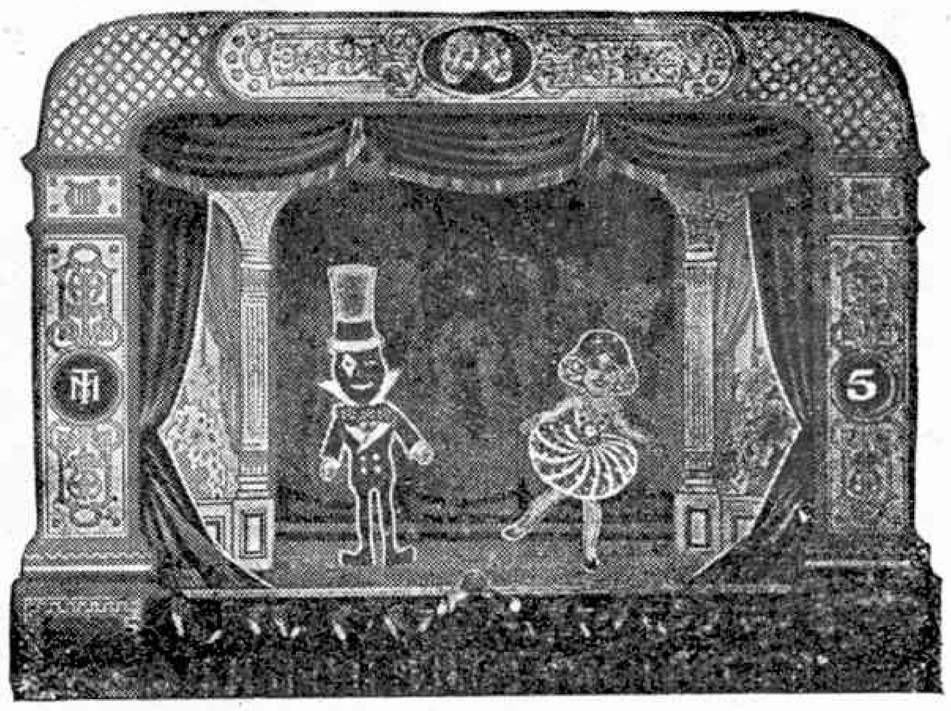
WIRELESS! WIRELESS!! WIRELESS!!!
Don't pay high prices!
7/22 Aerial Wire, 100 ft. coil, 3/3 post free.
Boys, send 1d. stamp for list of accessories.
G. Hare, 36, Willes Road, Leamington Spa.

A GOOD
FOUNDATION
for any model can be made with Plasticine—in 16 Colours. By mixing, various kinds of Marble can be imitated. Plasticine has scores of uses besides modelling. Let us tell you of some. Specimen Box of 5 Colours, The Rainbow, Post Free, 1/2.

ALSO PLAY-WAX AND NOVLART.

HARBUTTS' PLASTICINE LTD.,
99, Bathampton, Bath.

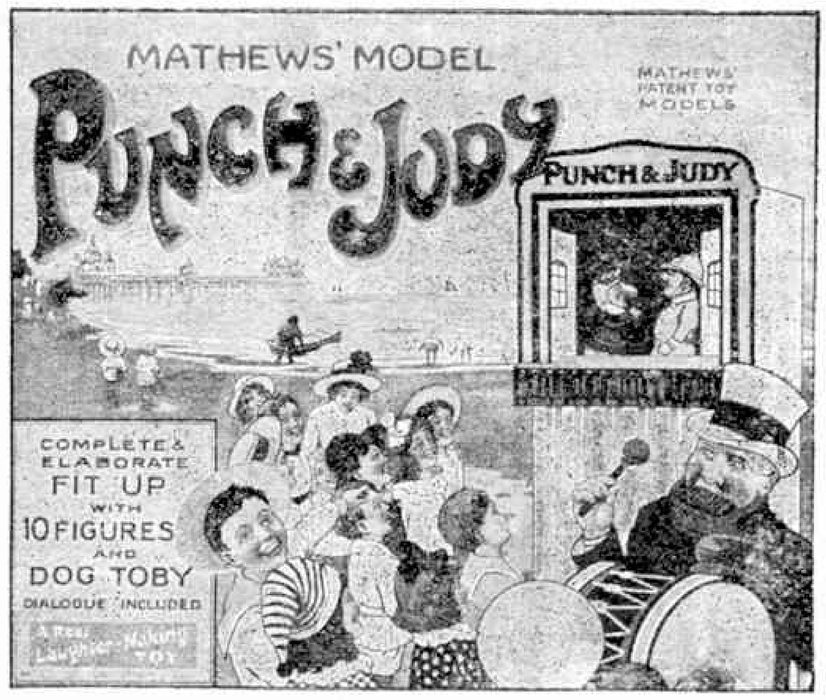
CUT THIS OUT
"Meccano" Pen Coupon. Value 3d.
Send 5 of these coupons with only 2/9 direct to the **Fleet Pen Co., 119, Fleet Street, E.C. 4.**
You will receive by return a splendid British 14-ct. Gold Nibbed Fleet Fountain Pen value 10/6 (Fine, Medium, or Broad Nib). If only 1 coupon is sent, the price is 3/9. 3d. less for each extra coupon up to 4 (Pocket Clip 4d.). Satisfaction guaranteed. Your own name gilt letters, either pen 1/- extra.
Lever Self-Filling Model with Safety Cap, 2/- extra



No. 11. Empire Theatre of Varieties.

This is a beautiful and entertaining toy, with all the romance and glamour of the stage. The pleasure to be derived from the performance, given by the eight Artistes, is extreme. The show is a tremendous success at a Children's Party, and a supply of Programmes can be given round by the "Ushers." All the Stars are billed on Special Posters.

Price ... 6/- complete, post free.



No. 16. Punch and Judy.

A most clever and realistic performance can be given with this show. Have you ever seen old Punch and Judy, and Toby, and the Ghost, and all the other funny old Figures? Whether you have or not makes no difference, because anyone can make heaps of fun. Try one for entertaining your friends!

Price ... 4/6 complete, post free.

SEND FOR FULL LIST OF 21 ENTERTAINING TOYS

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MATHEWS' MODEL TOY FACTORY

Short Street, LEICESTER

NO BOY OR GIRL can afford to be without the world-renowned and largely-advertised

SECCOTINE

(Regd. Trade Mark)

Tubes 4½d., 6d., 9d. Everywhere.

The best general adhesive the world knows. For wood, leather, bone, paper, etc., objects large or small. Used in bulk for manufacturing purposes. Of great utility to boys and girls who long to make things.

FIRMAS (Heat Seccotine)

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Tubes 6d.

For glass, china, delph, etc. Articles joined with it can be boiled without coming asunder.

McCAW, STEVENSON & ORR, LIMITED,

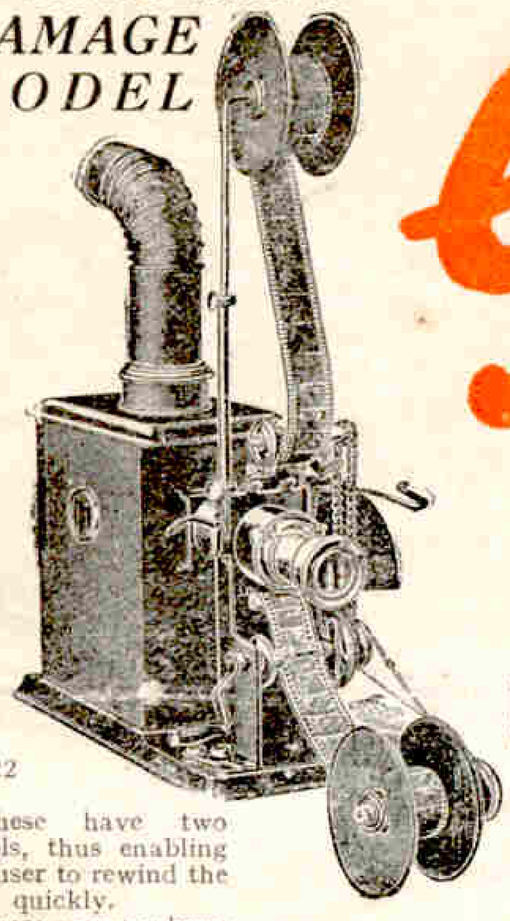
The LINENHALL WORKS, BELFAST.

Telegrams: "GLACIER, BELFAST." Telephones: 4261 (3 lines).

The World's Big Store for Boys

Gamages OF HOLBORN

Have your own Picture Show at Home with a GAMAGE MODEL



P 422

These have two spools, thus enabling the user to rewind the film quickly.

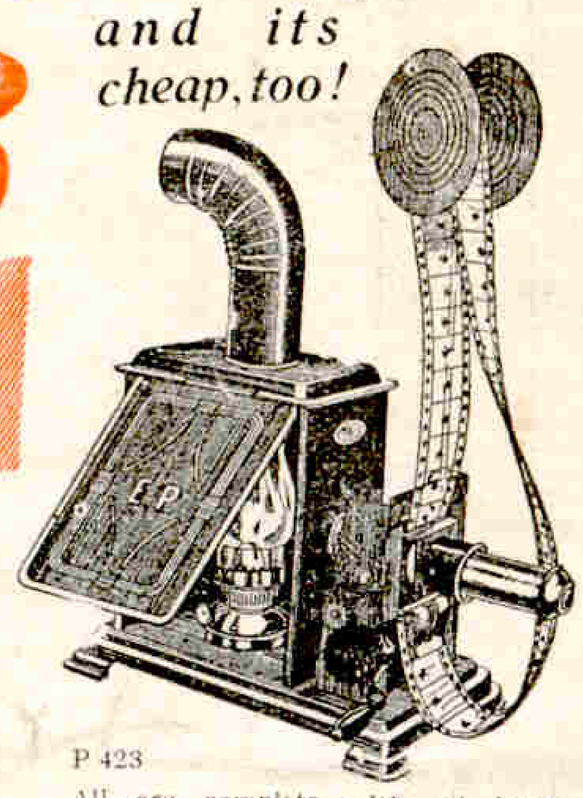
These are very large and of superior quality

35/- 45/- 70/- 84/-

Ditto, but fitted for Electric Light, with lamp holder, wire flex, and plug to attach to any ordinary electric lamp.

4/- extra

Boys! Here's a fine Cinematograph—and its cheap, too!



P 423

All are complete with oil lamp, film and lantern slides. These can be used also as magic lanterns.

5/6 7/6 12/6 21/- Carriage extra

Electric Light Fittings ... **3/6** extra

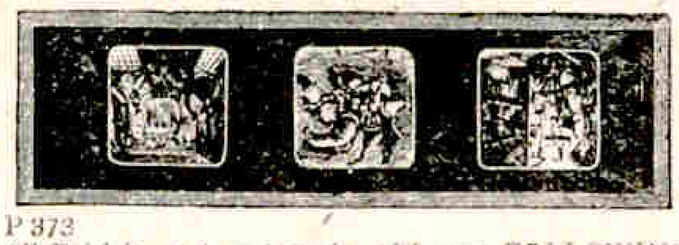
Write for Illustrated List of Magic Lanterns, Cinematographs, etc.— POST FREE ON REQUEST.

No More Dull Winter Evenings!

You know those "nothing-to-do" nights, boys!—When it's raining hard, you can't go out, and you're tired of reading! Just think how splendid it would be to give a "picture-show" to your family and friends!—the fun you could have as the operator! Get a Gamage Cinematograph—You'll find "Home Movies" the best thing ever.

LONG SLIDES FOR JUVENILE LANTERNS

Width of Slide	Gamages Price
$\frac{7}{8}$ in. ...	9d.
1 in. ...	10d.
$1\frac{1}{8}$ in. ...	11d.
$1\frac{1}{4}$ in. ...	1/-
$1\frac{3}{8}$ in. ...	1/3
$1\frac{1}{2}$ in. ...	1/6
$1\frac{3}{4}$ in. ...	1/9
Post up to $1\frac{1}{2}$ in. 4d.	
Post up to $2\frac{3}{4}$ in. 6d.	



P 373

All British, 12 in a box, in ALL THE FOLLOWING SIZES. We can do seven different varieties in each size ... **1/-** Seven boxes post free, any size

Width of Slide	Gamages Price
$1\frac{3}{4}$ in. ...	1/9
2 in. ...	2/-
$2\frac{1}{4}$ in. ...	2/6
$2\frac{1}{2}$ in. ...	3/-
$2\frac{3}{4}$ in. ...	3/3
3 in. ...	4/-
$3\frac{1}{2}$ in. ...	5/-
Post up to $1\frac{1}{2}$ in. 4d.	
Post up to $2\frac{3}{4}$ in. 6d.	

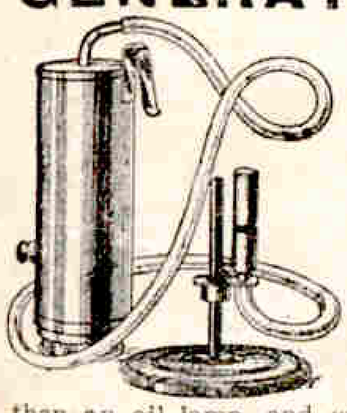
Superior Quality Lanterns

Constructed on the lines of full size Magic Lanterns. These are of an elegant shape with polished Russian Iron Body, Paraffin Lamp and 12 fine Glass Slides, packed in separate specially grooved box. All complete in elegant cardboard box.

Slides $1\frac{3}{4}$ in. wide, lens 1 9/16 in. diam. Price .. **12/6**

Slides 2 in. wide, lens $1\frac{3}{4}$ in. diam. Price ... **21/-**

ACETYLENE GENERATORS



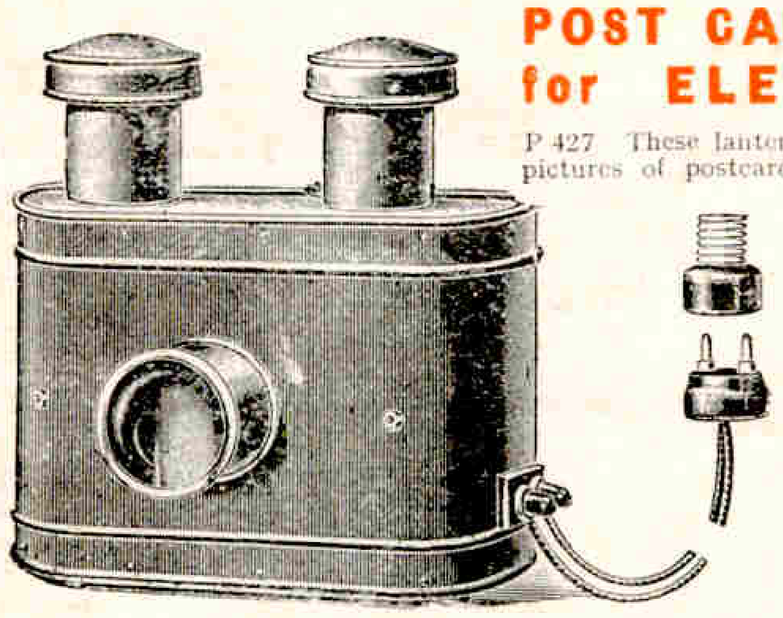
P 419

For the Juvenile Magic Lanterns and Cinematographs.

We are often asked for something that will give a more intense light than an oil lamp, and we have just brought out a little acetylene generator which can be used with any of these machines.

Including generator, container, rubber tubing, gas arm and adjustments, complete. Carr. 6d. **4/6**

POST CARD LANTERNS for ELECTRIC LIGHT



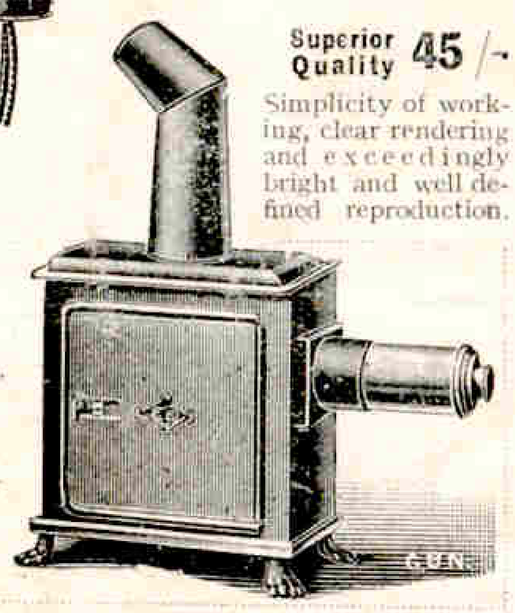
P 427 These lanterns give very large and beautiful pictures of postcards and other opaque objects by reflection. Size of picture at 12 ft. distance 8 ft. by 5 ft. 2 in.

The projector is of a superior type and gives remarkably clear definition.

Size of Lantern 12 by $10\frac{1}{2}$ by 9 in. Price **35/-**

Superior Quality 45/-

Simplicity of working, clear rendering and exceedingly bright and well defined reproduction.



Continuous Cinematograph Films

P 420

(As shown in Machine illustrated above) Suitable for juvenile machines. These are specially made, being very transparent, and giving good pictures with oil lamp where the ordinary film is not always a success.

1. Long coloured films ... **1/6** each
2. Smaller films ... ... **10**d. ,,

Short Lengths of film (ordinary) suitable for machines. In boxes. Per box of approximately 18 ft., **6**d.; 36 ft., **1/-**; 72 ft., **2/-**; 144 ft., **4/-**; etc., to **10/-** for 360 ft. Post extra.

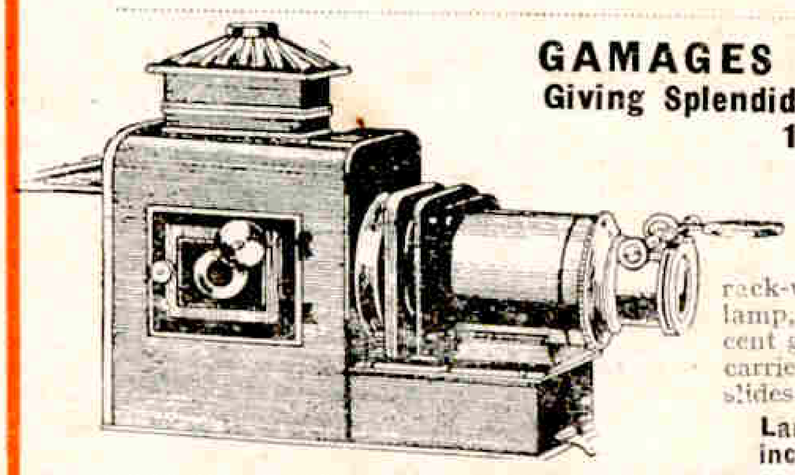
P 241

JUVENILE MAGIC LANTERNS

All metal bodies, objection fitted with good lenses, complete with oil lamp and glass and 6 slides. Packed in cardboard boxes.

Approximate dimensions:

Height with Chimney	Size of Slides	Price	Extra Slides, per box of 1 doz.
10 in.	1×4 in.	2/9	9d.
13 in.	1×4 in.	5/6	9d.



GAMAGES OPTICAL LANTERN

Giving Splendid Results and Complete with 1 Dozen Slides

No. 1. Full-sized japanned body lantern, similar to sketch, fitted with best 4 in. Plano Convex condensers and double combination front lens, with rack-work focus, petroleum three-wick lamp, or incandescent gas outfit, slide carrier, and 1 doz. slides ... Complete **£2 15s.**

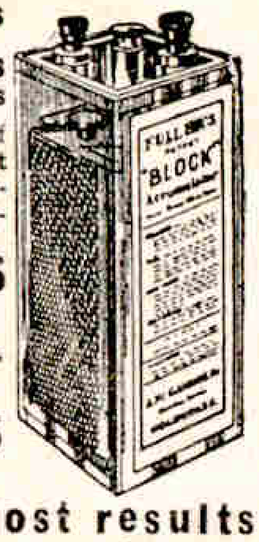
Lantern without lighting, but including carrier and tray ... 42/6

SUPERIOR RUSSIAN IRON LANTERNS

No. 3. Same shape as No. 1 Lantern not having the extension foot as shown in the illustration, and having single rack-work motion and brass sliding front fitted up as No. 1 ... ... Complete **£3 : 15s.**

For the "LISTENER-IN"

FULLER'S BLOCK WIRELESS Accumulators



Special offer of ex-Government Stock, but absolutely unused.

2 volt, 40 amp. **10/6** Post 1/-

4 volt, 40 amp. **21/-** Post 1/-

6 volt, 40 amp. **31 6** Post 1/6

For utmost results use Gamages famous "PERMANITE"

in your Crystal Detector. It will amaze you by the wonderfully clear reception and sensitivity. Per large specimen. Post Free **1/6**

At GAMAGES there is literally everything for wireless enthusiasts. Send for catalogue and judge the wonderful bargains for yourself.

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No matter what you want whether it be Footballs, Boots, Shirts or Knickers —get your kit — at — Gamages and get the very best possible. Visit our huge store at Holborn and see the remarkable values for yourself, or send for our **Illustrated SPORTS LIST** which deals extensively with every Winter Sport *It will be sent Post Free on request.*

GAMAGES, HOLBORN LONDON, E.C. 1

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OCTOBER 1923

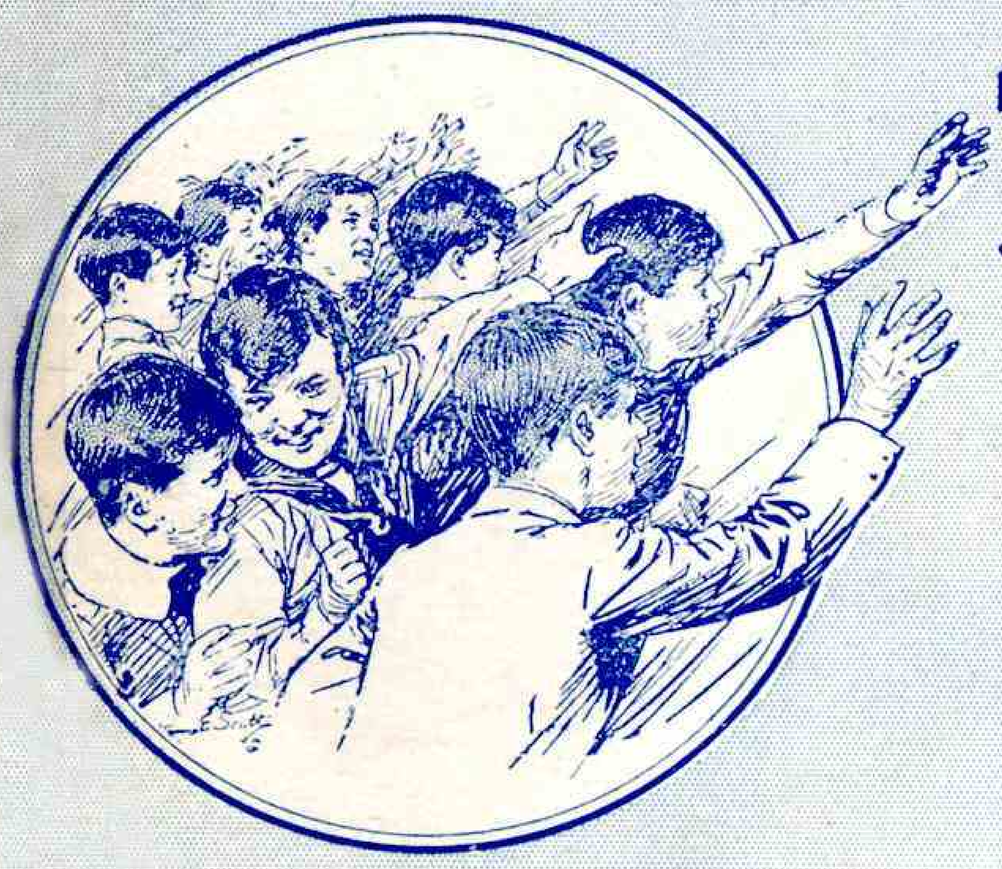
MECCANO MAGAZINE

Published in the interests of Boys

PRICE 1D

VOL. VIII.

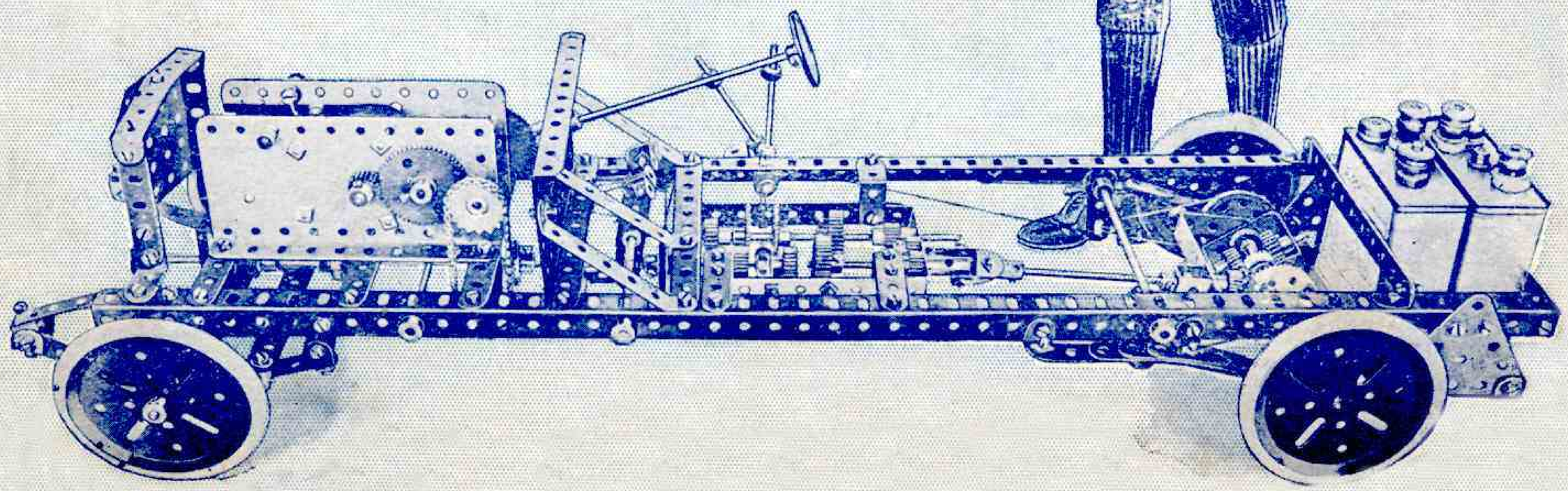
No. 10

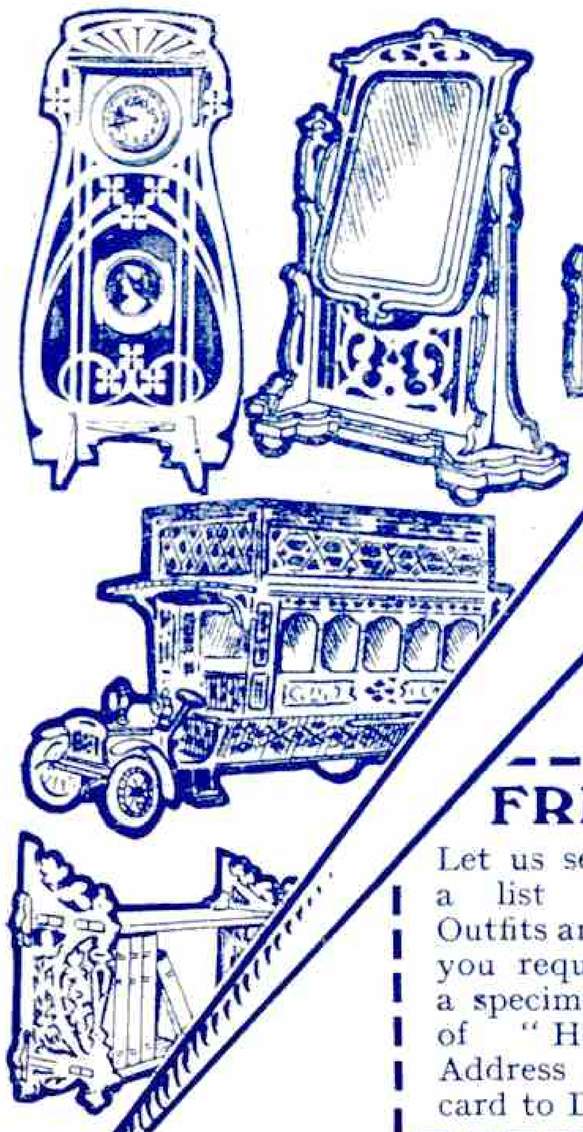


The New

MECCANO CHASSIS

SEE PAGE 122



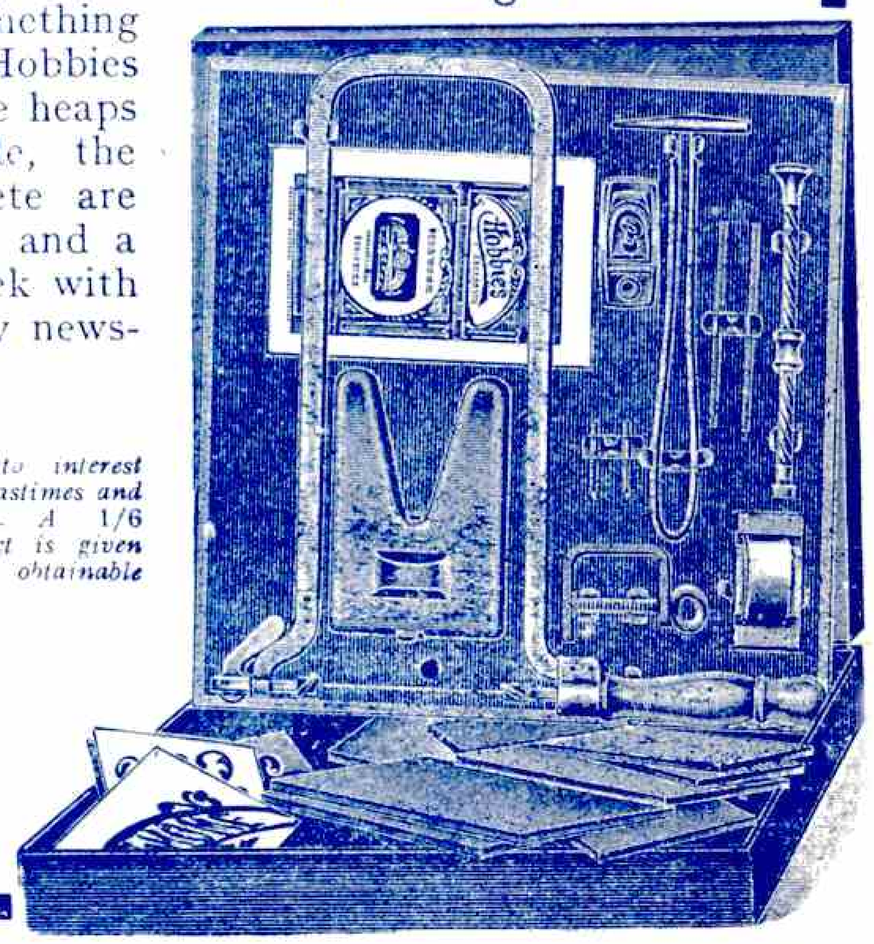


FRETWORK

An Ideal Hobby for the Boy

You don't know the real joy of a hobby until you have actually made something you can use; something to keep and admire. With a Hobbies Fretwork Outfit you can make heaps of things. The cost is little, the return great. Outfits complete are obtainable from 4/- to 57/6, and a free design is given every week with "Hobbies," price 2d. of every newsagent.

Get your Outfit and begin now



FREE!

Let us send you a list of the Outfits and Tools you require and a specimen copy of "Hobbies." Address your card to Dept. 96.

THE 1924 CATALOGUE IS JUST OUT

There are 200 pages to interest and instruct. Covers 15 pastimes and illustrates 575 designs. A 1/6 design for China Cabinet is given away. The Catalogue is obtainable for 1/- post free.

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65, New Oxford Street, London, W.C.; 147, Bishopsgate, London, E.C.; 79, Walworth Road, London, S.E.; 326, Argyle Street, Glasgow; 10a, Piccadilly, Manchester; 9a, High Street, Birmingham; 15, County Arcade, Leeds; and all Authorised Agents.

"Do as I do"

says "Sunny Jim"

You can't do better than this on a cold morning. Hot milk is just added to "FORCE" and . . . . . there you are! Breakfast's ready! "FORCE" is the "big fellow's" food for all times of the year. It is whole-wheat steam cooked with barley malt . . . . . all first class food-stuff.

Keen brains, strong healthy bodies and "FORCE" go together. Every "Meccano Boy" who doesn't know "FORCE" should send for the free sample without further delay.

"FORCE" is more than a food that is "good for you." It's a food you will like. More than that! It's a food you will insist on having . . . . . once you know how nice it is . . . . . and mother will willingly get it for you because it does you good and it needs no cooking. Ask her!

FREE SAMPLE

Send a Post Card to "Sunny Jim" (Dept. AY.2), 197, Great Portland St., London, W.1. and ask him for a FREE SAMPLE of "FORCE." He will be most pleased to send you one, and when you've tasted it you'll be glad you sent for it.

"FORCE"

TOASTED MALTED WHEAT FLAKES

EDITORIAL OFFICE
Binns Road,
LIVERPOOL

MECCANO MAGAZINE

PUBLISHED IN THE INTERESTS OF BOYS
on the
15th of each month

EDITORIAL

AT the commencement of a new Meccano season, I should again like to remind all my readers that damaged or rusty Meccano parts may be replaced at any time by bright new ones at half list prices. The old parts should be returned through your dealer or direct to us, accompanied by a list of the parts, and a remittance covering the cost of the new parts, plus postage.

Damaged Parts Replaced

I am always pleased to receive interesting photographs and short articles from any of my readers and to publish and pay for those of sufficient general interest. Photographs should be clear and sharp, and articles should be neatly written on one side of the paper only. The subjects need not be confined to either Meccano or even Engineering.

Photographs and Paragraphs

I have just read over the conditions and awards of the new Meccano Model Building Competition, and these interest me immensely. It is the biggest thing in competitions of this kind ever held, and I shall follow with great keenness the awarding of the 21 Championship Cups and the hundreds of medals. My greatest concern, however, will be the destination of the Gold Medal and the title of "Meccano Gold Medallist." I have nothing whatever to do with the framing of this competition or the adjudication of the models, but I do hope that this much-coveted title will be secured by a reader of the "*M.M.*" The honour and glory of my great army of readers is at stake, and I confidently believe that each one of them will exercise all his ingenuity and skill to secure and retain the title in our ranks.

The Meccano Gold Medallist

My readers may help me very considerably in obtaining new subscribers, by telling their friends about the "*M.M.*" There are over a million Meccano boys in this country who would all enjoy the "*M.M.*" if only they knew there was such a magazine. Our circulation is growing steadily, but I wish to see it grow even more rapidly, so that I shall be able to still further increase the size of the "*M.M.*" Then I shall be able to print more and more of those hundreds of interesting subjects, for which competitors in our recent competition have made definite requests. If every reader of the "*M.M.*" obtained only *one* new subscriber we should double our circulation and could then add several more pages. Now, boys, will you try and find at least one new subscriber and so help me to make the "*M.M.*" even better, bigger, and brighter than it is at present? If you know of a Meccano boy who is not a regular reader of the "*M.M.*" and will send me his name and address, I will see that he has a free copy mailed to him.

Tell your Friends about the "M.M."

Brains and Bravery

Boys who Rank with Men

BOYS are just men in the early stages. Some develop into man's estate quite slowly, others very quickly. I have known mature men of 18 and young children of 50! One or two seem to have been children for just the first few years of their lives only, whilst others never have been, and never will be, anything else. I am often told that the latter type are the happiest, but they can scarcely be the most useful.

I am not too fond of boy prodigies. They don't seem to fit in with the regular run of life. They are not companionable with other boys, and are out of place amongst men. It is, however, very delightful to see our ordinary everyday boys, our friends at school, our companions at play, giving utterance to manly thoughts and doing manly deeds. We remember that Sir Ernest Shackleton took with him on his last expedition to the Antarctic a young boy called Marr, because he had proved himself to be a manly boy. Marr did good work, and now he has written a very readable book entitled "*Into the Frozen South*," setting out all his adventures during the tragic voyage of the "*Quest*."

Another manly boy is Eddie Meehan, aged 14, who was chosen from 400,000 schoolboys to be Mayor of New York for one day. The fact that he was so chosen sufficiently demonstrates that he had qualities of manliness and character that strongly impressed his selectors.

I have just learned that Arthur Edward Clark, a young boy living at Sawmore, Ballina, Ireland, has gained a Research Studentship in Trinity College, Cambridge, value £600—a highly creditable performance, especially as the studentship was open to all Universities. Last year he took his B.A. degree at Trinity College, Dublin, gaining a Senior Moderatorship with Gold Medal.

When it comes to a question of personal courage, I do not think that boys lose anything by comparison with men. We all know of courageous boys who forced their way into the army during the war, by all manner of daring expedients, years before they were of the age set down by the authorities. We know that those brave boys acquitted themselves like heroes, in France and elsewhere. There were Jack Cornwells in every branch of the service. In times of peace, also, there is no dearth of boy heroism. I read this month of John Burgess, age 13, of the 50th Aberdeen Company, who has received the Cross for Heroism for rescuing a little girl from drowning. Of Robert Watters, 1st Falkirk Company, and Robert Hume, 20th Leith Company, both boys who have received diplomas for similar bravery; and Scout J. Pinnock, of 1st Kingston Troop, who was awarded a life-saving medal for giving his blood to save his sister's life.

There are boy heroes in every community, whose deeds are unknown beyond their own little circle. Boys who are men both in thought and action. I think the Editor of the "*M.M.*" might do worse than ask you boys to report to him any deeds of bravery or special cleverness and manliness, which may come under your observation, so that he may have an opportunity of bringing them to the knowledge of his great army of boy readers.

A. M. D.

We gladly accept our contributor's suggestions, and shall be only too happy to receive any such reports from boys and to give them publicity in our columns.
—EDITOR.

THE

MECCANO MOTOR CHASSIS

Full Instructions for Building this Interesting Model

PART II.

IN our issue last month we printed the first instalment of these instructions for building the Meccano Motor Chassis, which we consider to be a veritable triumph in Meccano model building. This model has been admired by His Majesty the King, and is in use in several schools of motoring for demonstration purposes. It shows in miniature the main mechanism of a modern motor-car, and its gear box and differential clearly illustrate the principles on which these mechanisms depend.

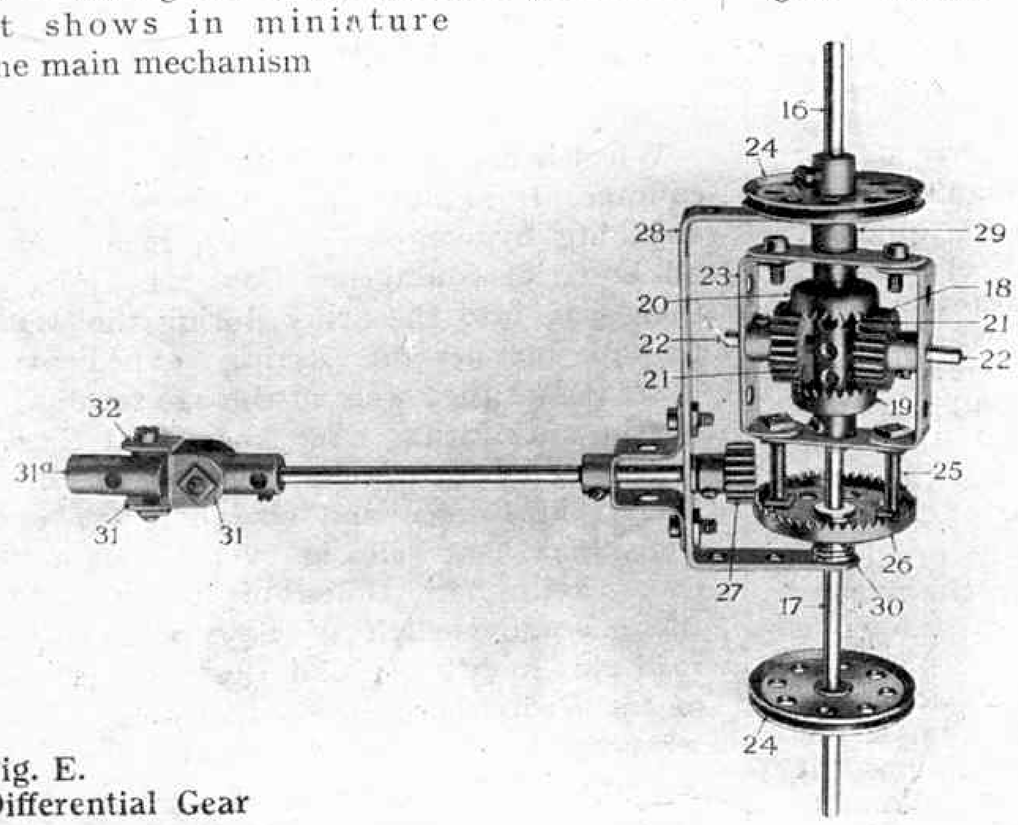


Fig. E.
Differential Gear

The Back-Axle Difficulty

To describe a differential gear on paper is a very difficult task, and it is very doubtful whether in this form even the most lucidly-compiled explanation leaves the motorist very much wiser. On the other hand, a model in Meccano shows exactly how this wonderful piece of mechanism functions.

Every Meccano boy knows that the differential is introduced in the back axle of motor-cars to allow for the difference in the speed of the outer wheel when the vehicle is turning a corner. As the outer wheel has to travel through a greater radius than the inner wheel, it is obviously impossible to use a solid back axle, as otherwise the difference in the speeds of the rear wheels would cause the axle to twist and snap. In the front wheels the difficulty is overcome by mounting them on stub axles, so that each revolves independently of the other. A similar method is adopted in four-wheeled carriages and lorries, but this practice is not possible in the case of motor cars, because the rear-wheels provide the tractive effort and must therefore be solidly coupled to the shaft that transmits the power from the engine.

An Ingenious Device

The difficulty is overcome in a very ingenious manner, as will be seen from Fig. E. The main shaft drives through a pinion (27) engaging with a contrate wheel (26) which is bolted to a cage (23) mounted on the axle rods (16 and 17) which form the back axle. When the shaft (and consequently the pinion 27) rotates, the contrate wheel and cage (23) also rotate, the latter with its enclosed gear wheels (21) enabling either half of the back axle to rotate independently of the other half. Thus we may even hold the wheel at the end of axle (17), and with the finger spin the wheel on axle (16) either backwards or forwards. If the shaft and gear wheel (27) rotate, however, both rear wheels (mounted on axle 16 and 17) must do so also. Should the wheel on axle 16 revolve at a more rapid speed than the wheel on axle 17 or vice-versa, the difference in speed is taken up by the gear wheels (21) in the cage. Thus when the car is turning a corner or moving in a circle, the speed is adjusted by the differential.

Building the Differential

The differential, which is shown in Fig. E as a complete unit, is built as follows :—

The $3\frac{1}{2}''$ and $5''$ axle rods (16 and 17) are in two parts, which abut in and revolve freely in the coupling (18) and the contrate pinions (19 and 20) are nipped on with set screws. The $\frac{3}{4}''$ pinions (21) are nipped on $1''$ rods (22) for which the middle hole of the coupling forms a bearing. The frame (23) is made from two $1\frac{1}{2}'' \times \frac{1}{2}''$ bent strips and two $1\frac{1}{2}''$ strips. If it is found that the frame binds against the bosses of the contrate wheels, it may be pressed out to ease it.

The $1\frac{1}{2}''$ pulley wheels (24) on the rod (16 and 17) are for the brake cords. $1''$ threaded rod (25) holds the frame (23) to the $1\frac{1}{2}''$ contrate wheel (26) which takes the drive from the $\frac{1}{2}''$ pinion (27).

The outer frame (28) consists of a $3'' \times 1\frac{1}{2}''$ bent strip, and the inner frame (23) is distanced by a collar (29) and the washer (30). The universal joint is made of two reversed double angle brackets (31) connected to the couplings by a $\frac{3}{4}''$ bolt with packing nuts (32) between.

The rear springs (33 Fig. B*) are first connected to double bent strips (34) which are threaded on the rear axles and bolted to the side frame, the rear wheels being then secured to the axle.

Constructing the Gear Box

Now construct the gear box (Fig. F) beginning with the frame. The longer sides are composed of $4\frac{1}{2}''$ strips bolted to $2\frac{1}{2}'' \times 1''$ bent strips at each end. These are bolted on the $1''$ angle brackets (35) at each side.

On the $8''$ rod (36) a brake pulley (37) is fitted. Insert the rod (36) into the angle bracket (38) and fit on the two $\frac{3}{4}''$ pinions (39 and 39A) and the 50-toothed gear wheel (40).

The bevel pinion (41) takes the drive from the motor, engaging the bevel (41A Fig. B) and the $\frac{3}{4}''$ contrate wheel (42) is driven from the starting handle.

The clutch mechanism (43) is merely ornamental in this model, although an improvement is now in hand by which it actually functions. The bevels (41 and 41A) are driven by the sprocket (44) from the motor (see Figs. A* and G). The $2''$ rods for the sprocket (44) and the bevel (41A) are mounted in the end holes of $1''$ angle brackets secured to one of the $5\frac{1}{2}''$ cross strips.

* Illustrated last month.

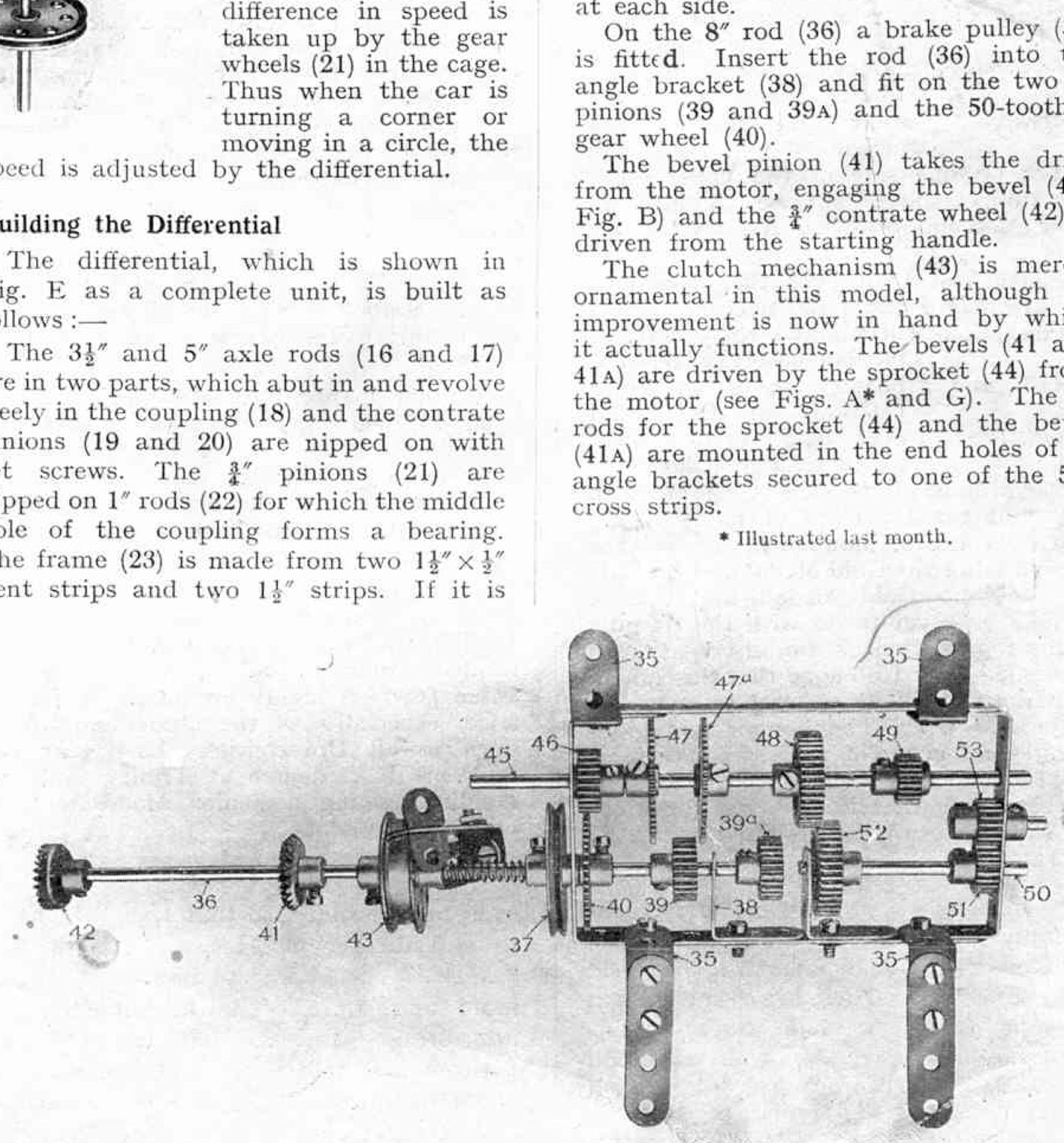


Fig. F.
Gear Box

The Meccano Motor Chassis—(*cont.*)

The lay shaft (45) is then inserted, and the ¾″ pinion (46), two 50-tooth gears (47 and 47A), 1″ pinion (48) and ½″ pinion (49) are left loose on the shaft preparatory to the final adjustments. The driving shaft (50) is then inserted and its ½″ pinion (51) and 1″ gear (52) nipped on. A ½″ pinion (53) is pivoted on a 1″ rod with collar and set screw. The coupling (31A Fig. E) is then connected to the projecting end of the shaft (50).

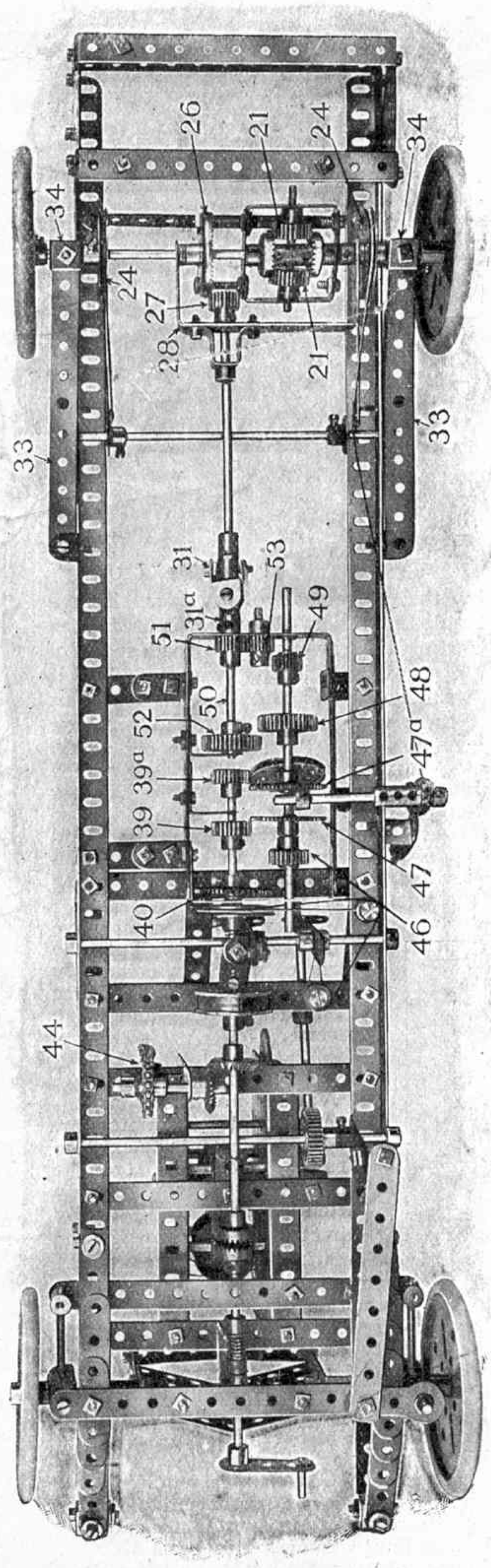


Fig. G.
Under View of Chassis

Changing Speed

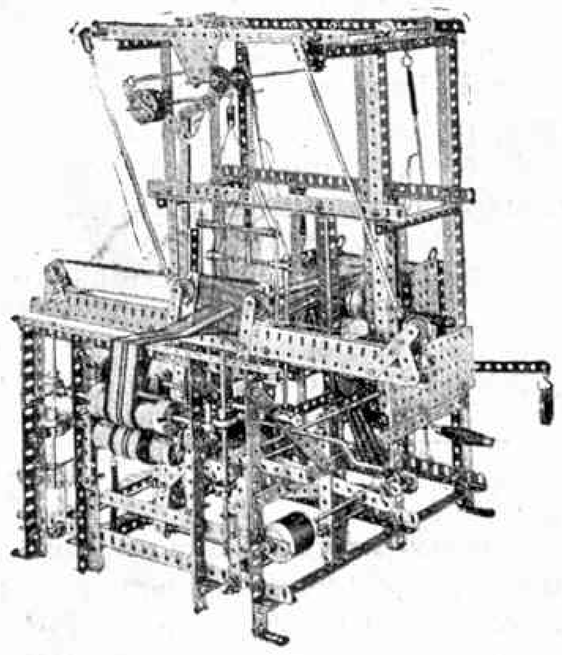
By moving a lever (54) the shaft (45) slides and the changes of speed are controlled. When in top gear the pinion (46) engages the wheel (40) and the pinions (48 and 52) are engaged. For slow speed, the gear (47) engages the pinion (39) and the pinions (48 and 52) are still engaged. For reverse the gear (47A) engages the pinion (39A) and the pinions (49 and 53) are engaged, the latter driving the pinion (51) on the rear shaft (50).

A double bracket (56 Fig. D) is bolted to the side frame to act as a stop for the levers.

As shewn in Fig. G the motor is bolted at the front of the chassis on the 5½″ cross strips, and the 4 volt accumulator from lower cross strips (57) supported by triangular pieces (58).

THE END

How to Build the Meccano Loom



The instructions recently given in the "*M.M.*" for building the Meccano Loom have been reprinted as a leaflet. This is obtainable from all Meccano dealers, or from Meccano Ltd. (post free 4d.) The leaflet clearly describes the construction of this wonderful Meccano model, which weaves neck-ties, hat-bands, etc., in a variety of artistic patterns.

A New Meccano Clock

In our November issue we shall commence an article that describes very fully the construction of a Grandfather's Clock from Meccano. This clock, which stands 6 ft. in height, keeps accurate time and is a triumph of Meccano model building. The article will be fully illustrated, and in the same issue will be published a serial dealing with the fascinating story of clocks and other time-measuring devices. To prevent disappointment order your November "*M.M.*" now if you have not already done so.

OUR MAIL BAG

In this column the Editor replies to letters from his readers, from whom he is always pleased to hear. He receives hundreds of letters each day, but only those that deal with matters of general interest can be dealt with here.

Correspondents will help the Editor if they will write neatly in ink and on one side of the paper only.

H. Warne (Manchester).—You are evidently not a very close reader of the "*M.M.*," Harry, or you would know that we have over a hundred and forty Meccano Clubs in this country.

"Father of Boys" (London).—Thank you for your suggestions, we shall endeavour to include articles of adventures and historical interest as space permits.

N. O. Morden (South Croydon).—Your lengthy criticisms are very helpful, and we shall bear them in mind for future reference.

H. T. Bayliss (Smallheath).—We are at all times pleased to consider contributions from Meccano boys, and we pay for those that are used. We are always pleased to consider articles, no matter what the subject may be.

J. English (Normanton).—We fear there are too many complications involved to allow us to start a Meccano boys' bank. We congratulate you on having saved so much money in five months. Thrift is very excellent, and there is undoubtedly truth in the old saying "Take care of the pence and the £'s will take care of themselves."

W. O. Cantele (Bristol).—Your suggestion is already in force; we pay 2/6d. for any photographs published in the Magazine.

B. Baylis (Port Erin).—Although a Christmas Annual would undoubtedly be a success, we fear it would not greatly help to improve the "*M.M.*"

J. Thornley (Clifton).—We should very much like to print our illustrations in several colours, but unfortunately the expense of doing so is prohibitive.

J. Blandford (Cambridge).—We already provide a Magazine binder for holding the year's copies. This costs 3/- post free.

P. Harvey (Clapham).—We fear there are not many of our readers who would appreciate a column written in French. It would remind them too much of school, and the "*M.M.*" is for brightening their leisure hours.

T. E. Langdale (Cloghan).—To print the names of all the members of the Guild would require hundreds of pages of the "*M.M.*" We fear that the majority of our readers would be very disappointed if they opened their monthly copy to find nothing but names and addresses of Guild members in its pages!

H. R. Wright (Mansfield).—Your accident does not seem to have damped your spirits in any way, and we hope that by now your arm is alright again. We are sorry you could not call to see us when you came to Southport. The New Brighton Tower was taken down some time ago, owing to the cost of upkeep being so high.

D. Horne, Jr. (Kirkwall).—"I thank you very much for all your kindness. One would think that you are not an Editor at all, you are so human." All Editors are really human, David, especially those who, like myself, receive so many human letters from such splendid, sturdy boys. We shall be very glad to receive a photograph of your model of a warship.

J. Chadwick (Huddersfield).—We are very glad that you enjoyed your visit to Liverpool so much, and that your visit to our factory was such an outstanding feature of your holiday. We are always very glad to see any of our Meccano boys. A *Meccano Magazine* binder has been posted to you.

D. M. Murdoch (Ealing).—We have no space just yet for a puzzles column, but this may come later as we have had so many requests for it. We are glad you like the "*M.M.*" so much.

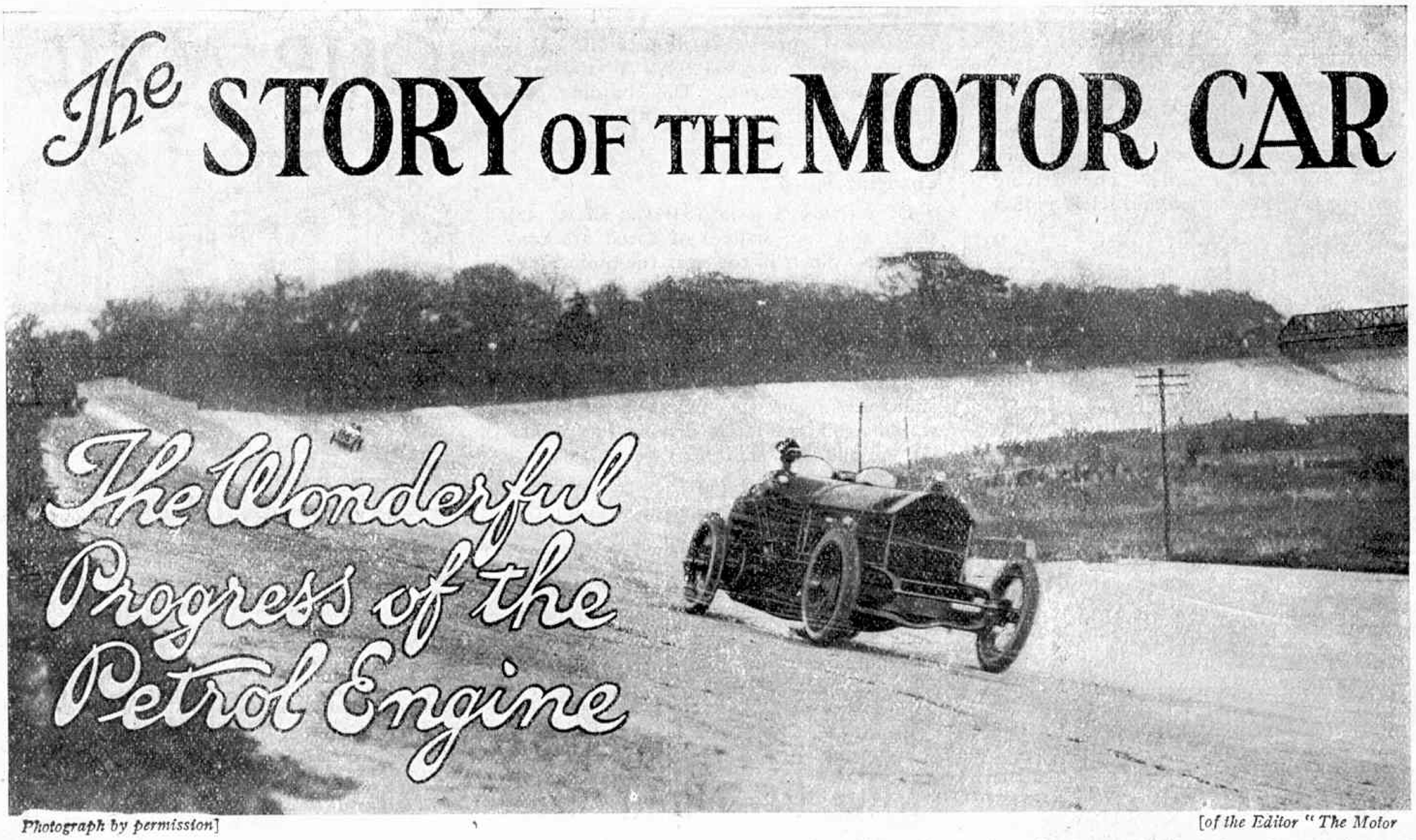
C. J. Bedford (Leeds).—Many thanks for photo of your Meccano photo frame, which will be considered. The "*M.M.*" will grow bigger and bigger, so just watch it.

I. A. Young (West Cholderton).—Photographs of any subjects which are of interest to other boys may be sent in and will be duly paid for if published. Thanks for your suggestion that we start a butterfly-collecting column, but we fear that this would not interest very many of our boys.

D. Abel (Allahabad, India).—Your drawings are quite good and you should persevere. We envy you with the lovely Indian winters of which you tell us. We may be able to start a puzzle column shortly.

J. Miller (Aberdeen).—'I met a chum to-day who asked me to give him one of my 12½″ strips. "Then," he said, "I shall have as many as you." "No," I replied, "you give me one of yours then I can divide equally with your brother and we shall all have the same number as you." How many strips had each of us'? Will somebody help us to solve this puzzle?

The STORY OF THE MOTOR CAR



Photograph by permission of the Editor "The Motor

(Continued)

PART II

THE steam engine derives its power from steam, which is generally generated at some little distance from the cylinder, the resulting steam being accumulated and conducted under pressure to the cylinder. Here it actuates a piston, the to-and-fro motion of which is converted by a crank, assisted by a fly-wheel, into a rotary motion.

How a Petrol Engine Works

The engine used in motor-cars is of the internal combustion type, and in this type the operation is considerably shorter than in the case of the steam or internal combustion engine. Petrol is vaporised by a carburettor and, mixed with air, is led to the cylinder as a highly-explosive gas. Here it is exploded by an electric spark, which jumps across a gap in the sparking plug.

An explosion is really a very rapid change in the nature of gases, which immediately expand with terrific force. As there is no way out from the cylinder, this expansion forces the piston forward and causes the rotation of the fly-wheel, exactly as in the case of the steam engine. After the explosion, the burnt gases are allowed to escape from the cylinder and the operation repeated. The opening and closing of the inlet and exhaust valves, and also the explosions, take place with great rapidity—certainly several hundreds of times each minute, and in some cases perhaps over a thousand times per minute. Instead of hearing a single explosion, therefore, we hear the "hum" of many explosions, the individual sounds merging themselves into the roar of a racing car as it hurls itself around the track.

Motor-Car Mechanism

Motor-car engines have generally four or six cylinders, each cylinder containing its own piston. The explosions do not take place simultaneously, but are timed to occur at different intervals for each cylinder. The pistons are connected to a crank shaft, lying parallel to the main members of the chassis. At the front end of the car the starting handle engages with this crank shaft, whilst at the end near the driver's seat, a fly-wheel is mounted. The purpose of this fly wheel is to keep the engine revolving smoothly.

By throwing in a clutch, controlled from the driver's seat, the power from the engine is transferred by a shaft to the back axle of the car, and the car moves forward. When the clutch is out, however, the engine is disengaged from the road wheels, and the car is able to remain stationary, even though the engine is running.

By means of a gear-box the speed of the engine relative to the driving wheels is controlled. The gears consist of an arrangement of pinions and shafts, the wheels being brought into mesh or released by the movement of a lever situated beside the driver. Low gear is used when starting the car, until the road speed of the car is sufficiently great to allow it to run on second and then on top gear. If there were no low gear, and top gear were put in at the start, the car would shoot forward with a sudden jerk, which would not only be very unpleasant for the passengers, but would also cause serious damage to the transmission and engine. Low gear is used also for hill-climbing and for "crawling" along in traffic.

A few light cars have only two speeds, but the form of gear box commonly used in motor-cars has three forward speeds and one reverse.

In our last issue we gave some account of the remarkable development of the motor-car from the earliest times down to the present day. We mentioned that in the first attempts to solve the problem of the self-propelled vehicle, inventors endeavoured to harness the wind and also tried driving an engine by gunpowder. In the concluding instalment of the article here printed, the writer describes the working of the petrol-engine as compared with steam, and concludes with some impressions of racing at Brooklands.

130 Miles per Hour

Various inventions in connection with the motor-car, and improvements on existing designs, are being brought out every year. Lately attention has been generally directed to improving the wearing qualities, combined with economy of running, rather than to the production of more powerful cars, capable of excessive speeds. In fact, the majority of cars on the road to-day will probably average between 10 and 30 h.p. The most powerful of present day touring cars are unlikely to be fitted with an engine of over 60 h.p. An engine of this power will always give as much, if not more, speed than is required, and the steepest hills will present no difficulty.

With regard to racing motor-cars no definite limit of power can be laid down. Engines of over 200 h.p. have been fitted and numerous cars have attained speeds of over 130 miles per hour with ease, on the track.

Steam v. Petrol Engines

As a boiler and furnace are always necessary for a steam engine, it is a somewhat cumbersome machine compared with the petrol engine, and at a considerable disadvantage where the question of weight is concerned. Not only is the petrol engine the lightest power-unit available, but it is also the most simple and the most economical. Had it not been for the development of the petrol engine, the conquest of the air would probably not now be an accomplished fact, for it is impossible to drive an aeroplane with a steam engine on account of the great weight of boiler and furnace involved.

In this connection the demands made upon engineers by the Great War resulted in a more rapid advance towards perfection of the petrol engine in the air than on the race tracks. A considerable advance was also made during the war in the development of the petrol engine in connection with motor boats and other small craft used for coast defence and scouting.

Photo] [*Board of Education*

King Edward at the wheel of an early motor-car

Petrol Engines in Aviation

Since the Armistice the advance of the petrol motor in aviation has been continued, the tendency being to cut down, as far as possible, the very high powers at one time used, with a great gain in efficiency and saving of weight. Only a few weeks ago, experiments in this connection resulted in James, the well-known pilot, achieving an important record. In a light aeroplane, driven only by a 5 h.p. Douglas motorcycle engine, James attained the amazing speed of 72 miles per hour on a journey between Croydon Aerodrome and Brooklands. The return journey was successfully made at the same speed, even though flying against a strong head wind.

This feat, rightly considered as a veritable triumph for the light-powered petrol engine, opens up wonderful possibilities for the future of civilian flying. If fast and light aeroplanes can be built, it is reasonable to expect that their cost will be within the reach of those who at present run motor-cycles, and when this is an accomplished fact it will be no unusual sight to see business men flying to their offices and landing on some convenient roof near-by!

Latest Engines take 'planes 6 miles high

Great progress has also been made recently in regard to high-powered aeroplane engines. Up to quite recently the most powerful single-engined aeroplane in existence was one of 750 h.p., and less than a year ago a photograph was published in these columns of the Napier 450 h.p. "Lion" engine, which then held more British records than any other aero engine. One of its greatest feats was to climb to a height of 30,500 ft., or nearly six miles, in the remarkably short space of time of 66 minutes and 15 seconds.

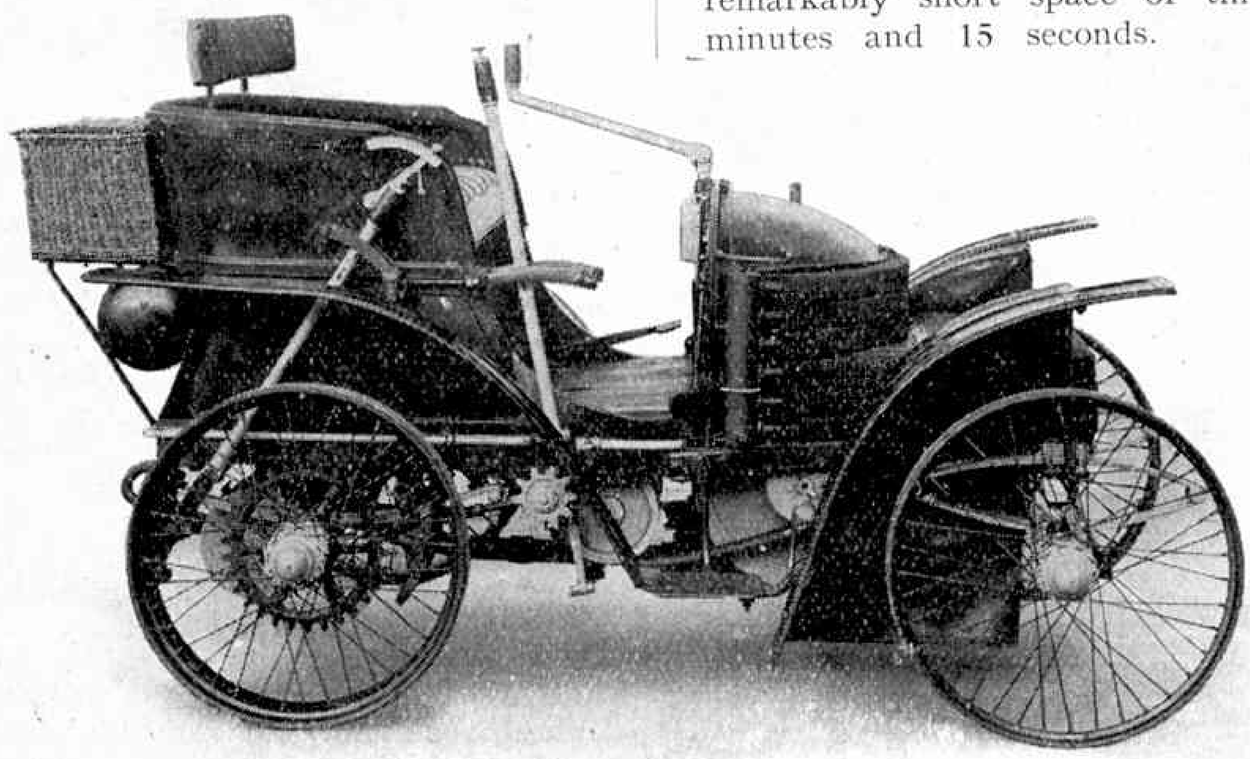


Photo **An early type of motor-car** [*Board o Education*

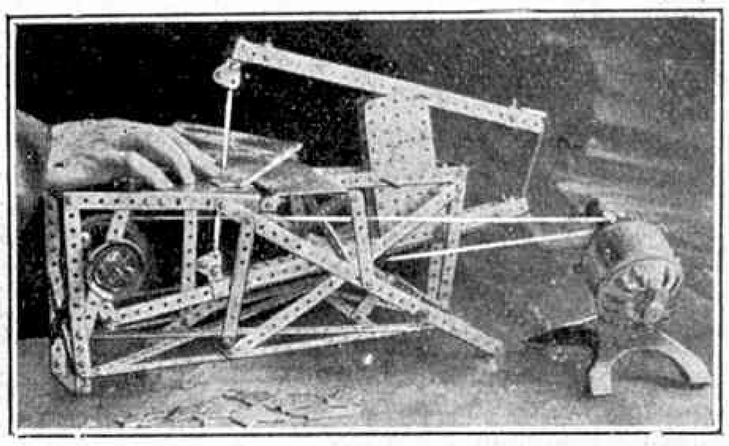
Since this engine was described in the "*M.M.*" the Napier "Cub" aero engine has also been illustrated in these pages. This engine is a marvel of power and skilled construction, and develops 1,000 h.p. The most remarkable fact

(*Continued on page* 127)

A Meccano Fretsaw

By Master E. Bade.

Many readers of the "*M.M.*" are interested in Fretwork, and to them this model of a Meccano Fretsaw will make special appeal. Incidentally it forms yet another proof of the wonderful capabilities of the Meccano system, for the saw is made entirely from Meccano with the exception of the small cutting blade. It is not a difficult model to build and may be used for a variety of useful purposes such as toy-making, cutting out panels with pierced designs, jig-saw puzzles, etc.



A new and useful Meccano Model

To make the saw-holder, two perforated strips, also a spring and a flat plate are required. One of these strips is fastened securely to the flat plate a few inches from one end. The other strip is pivoted to it by means of a bolt, thus leaving the arm free to move. The spring is employed to connect the shorter ends of the arms. This forms a rocking beam which is then loosely fastened to two arms projecting from the back of the table, in such a manner that it may be moved up and down freely. This arrangement can be easily understood by referring to the illustration.

A pulley wheel is fastened to the smaller strip at the side of the table and connected with the lower arm of the rocking beam by means of a connecting rod attached near the rim of the wheel. Thus, as the wheel revolves, the circular movement is converted into an up-and-down movement.

The cutting edge or saw blade is fixed to the upper and lower strips by cutting slots, where the saw is to go, and arranging bolts with wing-nuts so that the slits may be pressed against the blade. The Meccano electric motor or any similar motor with a pulley-band drive is belted to the wheel and provides the power to force the saw up and down. When using this model it is important to remember that the framework forming the table and its support should be as rigid as possible. The best method of ensuring this is to screw up all bolts tightly and then nail the framework to the table.

Suitable saw-blades may be obtained at any good ironmongers or dealers in fretwork tools, such as Messrs. Hobbies or Gamages.

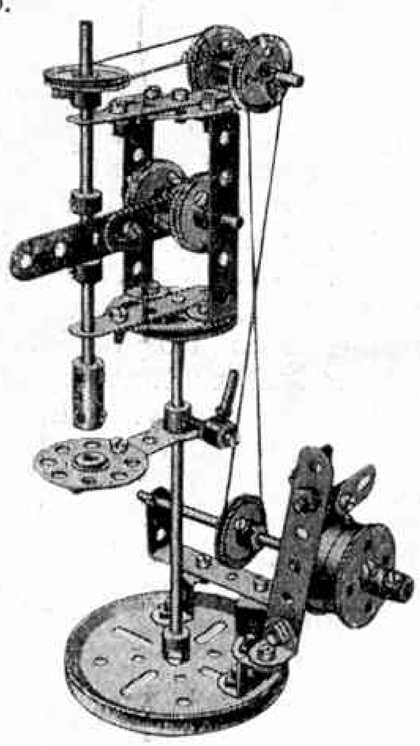
We welcome illustrated articles, such as the above, showing new uses for Meccano. Payment is made for any such articles that we are able to publish.—Editor.

Into the Land of Fun

BY

"SPANNER"

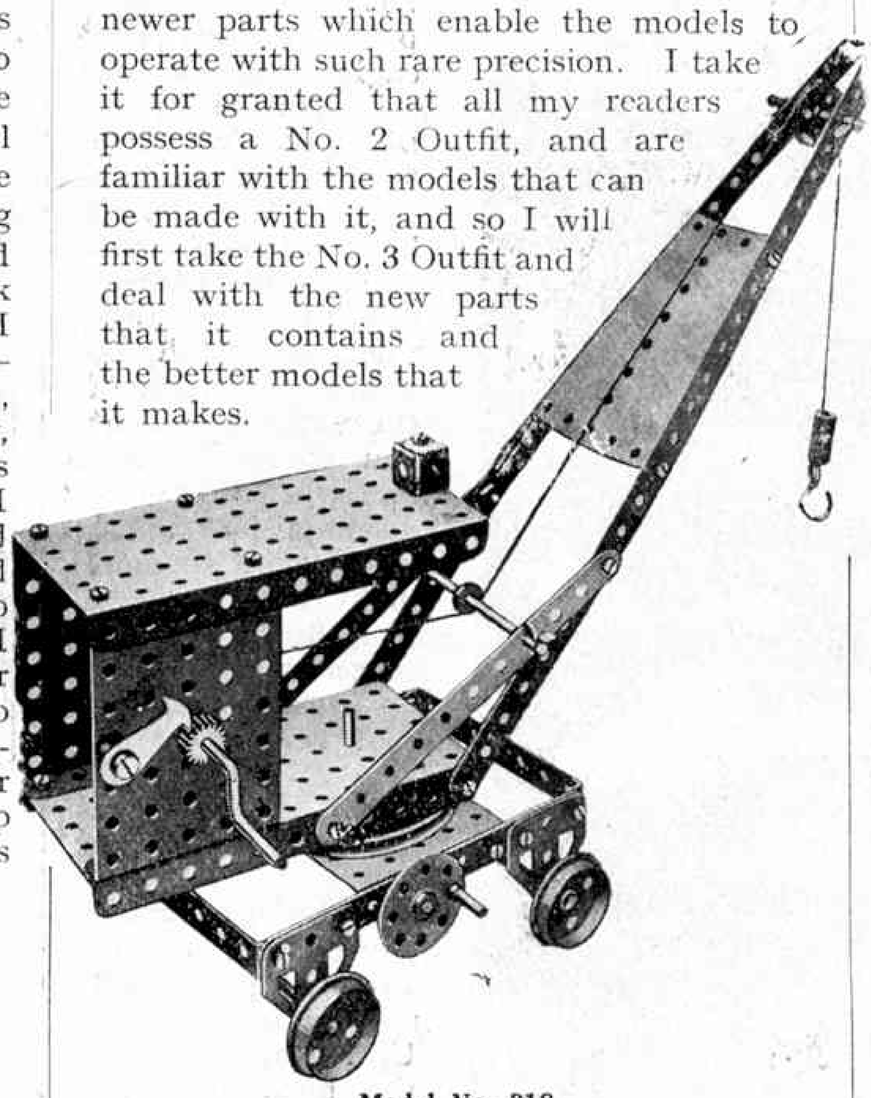
I DON'T quite know how many years it is since I built my first Meccano model, but it seems a very long time ago. I remember the hobby quite well when it was known as "Mechanics Made Easy," and I have followed its amazing career as Meccano with pleasure, mingled with something akin to awe. My work has always been amongst boys, and I know hundreds and hundreds of them—boys of all kinds and shapes: big, little, fat, thin, red-haired, black-haired, chubby, and pale faced ones. I know numbers of crippled and ailing boys, too, whom I love for the rare qualities of patience and gentleness that I have never failed to find in them. All these boys play with Meccano—that's the striking thing to me! I believe that I have seen a larger number and a more varied assortment of Meccano models than anyone. Of course, I encourage the boys, because over and over again I have seen what a joy and a help the hobby has been to every boy who has taken it up.



Model No. 312 Drilling Machine

One little tendency that I have noticed recently, however, is that some of my young friends are apt to stagnate. I mean they build the same models over and over again with little variation, instead of getting into the higher reaches of the hobby, as you might say. Now I think this is a big mistake, because there can be no doubt that one of the very greatest charms of the Meccano hobby is that it is temptingly progressive. I mean, the further you get into it, the more fun you have, the more you enjoy yourself, and the more you learn. I don't like to see a boy with a No. 1 or a No. 2 Outfit just stay there contented, when for a tiny sum he could get a few extra parts, or a new Accessory Outfit, which would add tenfold to his fun and enjoyment.

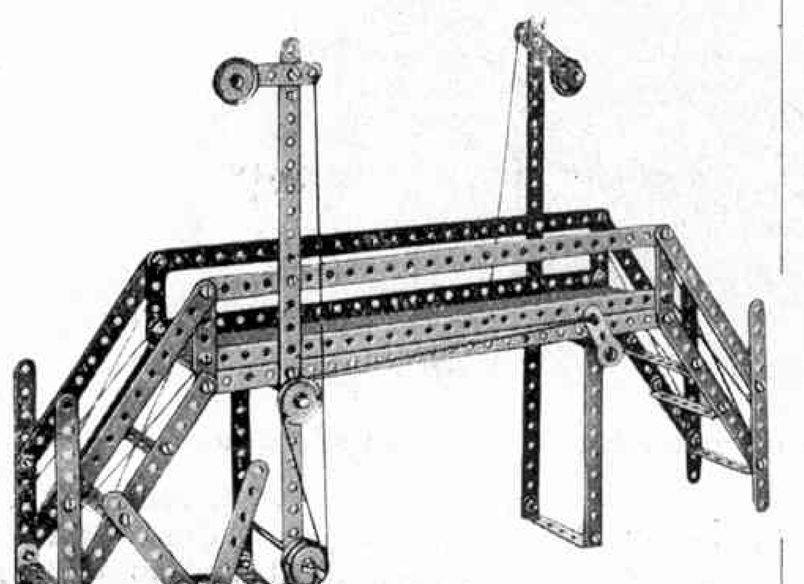
In this short series of articles I shall try to tell beginners something about the bigger Outfits—what they contain and what they will do, and I shall describe some of the more attractive models. In doing this I shall point out their best mechanical features and note the ingenuity and cleverness of design in many of the newer parts which enable the models to operate with such rare precision. I take it for granted that all my readers possess a No. 2 Outfit, and are familiar with the models that can be made with it, and so I will first take the No. 3 Outfit and deal with the new parts that it contains and the better models that it makes.



Model No. 318
Railway Breakdown Crane

And here let me mention that I have just seen a copy of the new edition of the complete Manual, and a delightful production it is. Nearly all the models have been revised and many entirely reconstructed, new parts being used to great advantage. Nothing in the world would please me better than to be able to place a copy of this Manual in the hands of every Meccano boy, because of the increased amount of fun and joy that I know he would obtain from building the models described and illustrated in its pages. I consider this Manual a triumph for those who have compiled it, and I find fresh charms in it every time I open it.

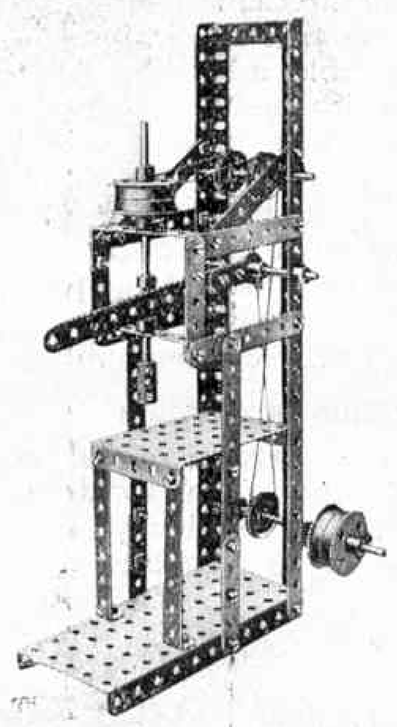
First of all as to the extra parts that a No. 3 Outfit contains, over and above the No. 2. Of course there is a larger number of the regular or basic parts, such as strips, rods, girders, nuts and bolts, etc., and these make possible bigger and more complicated models. It is, however, the new parts, which the Meccano boy meets for the first time, that will interest him most. The 3" and 1½" Pulley Wheels (Nos. 19b and 21), for instance, figure effectively in many of the new models. These, together with the Pinion Wheels, Gear Wheels and Worm Wheels (Nos. 26, 27a and 32), are now used for the first time, and will bring delight to the progressive boy.



Model No. 253
Footbridge and Signals

All these parts are beautifully designed and accurately made, and give an added charm to the models. Talking of these particular gear and worm wheels reminds me of the fact that big quantities of them are now being used in the construction of wireless sets all over the country—an excellent testimony to their accuracy and usefulness. There are other new parts in the No. 3 Outfit such as the new Pawl (No. 33), Curved Strips (No. 90), etc., which I shall mention a little later.

Now in regard to the No. 3 models. There is no limit to the number of different models that may be made by a clever Meccano boy with a No. 3 Outfit. In the New Manual 203 models are illustrated and described, including Cranes, Oscillating Steam Engine, Wagons, Motors, Derrick, Guns, Bridge, Aeroplane, Scales, Lathes and a host of others.



Model No. 326 Hand Punch

An interesting model is the Railway Breakdown Crane (No. 318), with which any amount of enjoyment and fun may be obtained. It is mounted on a four-wheeled truck, and may either be run along the ground, or run on a track made from Meccano strips. The crane will raise and lower its load, and swivel around on its truck by means of a worm and pinion, a movement often used in engineering and essential to the working of many of the improved Meccano models. It is not possible to build this movement into a model without part No. 32 Worm-Wheel, or part No. 26 Pinion-Wheel, both of which are contained in Outfit 2a. The crane will hold its load in any desired position by means of a Pawl (part No. 33) which engages with a Pinion-Wheel (No. 26). Both Pawl and Pinion-Wheel are included in the No. 2a Outfit. The Pawl, introduced about two years ago, has proved of great value in model-building, and moves freely on a pivot bolt.

(*Continued on p.* 137)

Holiday Essay Competition

In order to encourage Meccano boys to use their cameras, we have announced photographic competitions from time to time. Last year we announced, in addition, the Holiday Essay Competition, and as this Competition was so successful we are repeating it again this year. Intending entrants should write a description of some interesting event that took place on their holidays, and illustrate their essay with their camera. The photographs may be either sent separately or mounted in position on the essay. Although the exposure must have been made by the competitor, the photographs need not necessarily have been developed or printed by him, although this point should be mentioned when submitting entries.

Photographs may be of any size or finish, and there are no restrictions and no age limit, but the age of the competitor will be taken into consideration in judging the entries. The first prize will be Meccano goods to the value of £1 1s. 0d., and the second prize Meccano goods to the value of 10/6, to be chosen by the winners from our current catalogue. Closing date 30th October (Overseas : 30th December).

A New Essay Competition

FOR THOSE WITHOUT CAMERAS

As announced in our issue last month, there will be a special Essay Competition for those without cameras. The essays should deal with some holiday experience, and this section will be divided into two classes.

(A) Boys under 14 years of age, and
(B) Boys over 14 years of age.

In this section two Hawk-Eye cameras, taking pictures $2\frac{1}{4}'' \times 3\frac{1}{4}''$, and made by the Kodak Company, will be awarded as prizes. The winners will thus be able to enter the Photographic Competitions that will be announced from time to time in future issues of the "*M.M.*"

In both competitions the essays should be neatly written on one side of the paper only, and the full name and address should appear on the back of each sheet. Essays may be of any length but should not exceed 1,000 words. There are many subjects to choose from, such as a visit to some beauty spot or a ruined castle ; some thrilling adventure or some new experience gained on holiday.

This competition closes on the 30th October for the United Kingdom, and 30th December for competitors abroad. The winning essays will be published in the "*M.M.*"

Fifth Photographic Competition

It has been decided to hold a Fifth Photographic Competition, on similar lines to those previously held. Competitors must themselves take the photographs, but may obtain assistance in the developing and printing if desired. The name and address must be clearly written on the back of each photograph submitted, which may be of any size and either mounted or unmounted, as these points will not be taken into consideration when judging. It should be stated whether the photograph has been developed and printed by the entrant, as this will, of course, be taken into consideration. The competition will be divided into two sections as usual :—

(A) Boys of 14 years of age and under.
(B) Boys over 14 years of age.

The subjects this time are to be either
(1) A FAMILY GROUP,
(2) AN ANIMAL STUDY, or
(3) MISCELLANEOUS SECTION.

The first prize in each section will be a Hawk-Eye Camera, made by the Kodak Company, and it is hoped to publish the winning photographs in the "*M.M.*"

The closing date for entries from the United Kingdom is the 30th November, and for entries Overseas, 29th February, 1924.

The Story of the Motor Car

(*cont. from p.* 125)

about it is, however, that its total weight is only 2,000 lbs. This combination of lightness and power renders the Napier "Cub" very suitable for use in the air.

As might be expected, this powerful engine is capable of very high speeds and long flights ; thus making the 'plane to which it is fitted particularly useful for long-distance bombing work. A speed of 144 miles per hour, or about $2\frac{1}{2}$ miles per minute has been attained ; and the machine is capable of non-stop flights of over 1,000 miles.

36,000 Horse Power Engines

The truly wonderful progress of the petrol engine has not even ceased here, however, for while the Napier "Cub" engine was admitted by experts to be the most powerful of its kind ever manufactured, more recent developments have been introduced. We mentioned last month that in the motor-car industry the manufacturers introduced additional cylinders to gain greater speed. In the same way aero-engine makers increased the number of engines to obtain greater power. By means of this method of combination, it is possible to obtain amazing powers. In America at the present day there is an aeroplane driven by several engines which together develop over 36,000 horse power ! Wonderful flights of endurance and speed have been made by this mammoth machine, and it undoubtedly heralds the dawn of a new era of yet more powerful aeroplanes.

It seems strange, indeed, to realise that this mighty monster of the air owes its existence to the brains and perseverance of those early inventors who drove their weird vehicles at speeds of only two and three miles per hour ! Yet the fact remains, and our present day wonders of colossal power and breathless speed are the direct result of the labours of such men as Cugnot and Gottlieb Daimler.

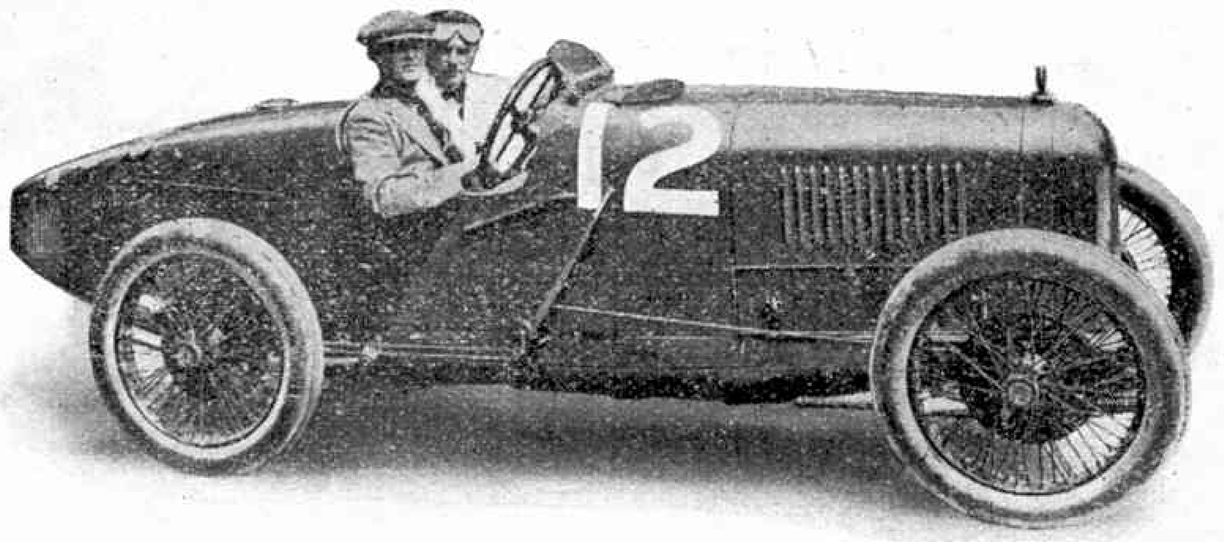
Speed Thrills at Brooklands

The racing track known as Brooklands, at Weybridge, London, has played no small part in the advance and improvement of the motor-car. Brooklands is to-day the Mecca of all enthusiastic motorists, who may here attain high speeds with safety. The wide racing track of concrete is "banked" in places so that it resembles the sides of a shallow basin. It is this banking that enables racing cars to negotiate the bends at speed, for if the track were not banked in this way, the cars would fly off and overturn.

It is an amazing experience to ride at Brooklands in a race, and one cannot help wondering what the pioneers of the motor-car would think if they were able to witness one of these frequent events.

A row of cars is lined up on the track, their engines spluttering and emitting a dull roar from the exhaust pipes. The cars resemble a pack of greyhounds, being low-built, lean-looking and without any superfluous weight. Many of them have special "stream-lined" bodies, in order to cut down to as low a point as possible, the resistance of the wind at speed.

At a signal from the starter, the competitors let in their clutches and the cars jerk forward as the road wheels take up the drive. For a moment or two things are somewhat uncertain, until the racers settle down to their stride. Once they have "got going," however, it is a fight to the finish, and the cars hurl themselves around the track at speeds which our fastest express trains could never maintain.



Photo] [*Sunbeam Motor Co. Ltd.*

The Sunbeam Racer that won the Grand Prix

The Joys of Racing

Mile after mile is covered in this way. Sometimes one or two cars may draw ahead of the field, and if they are particularly speedy they may retain the lead until the end of the race. At other times, however, the result is by no means so certain, and constant changes take place in the order of running.

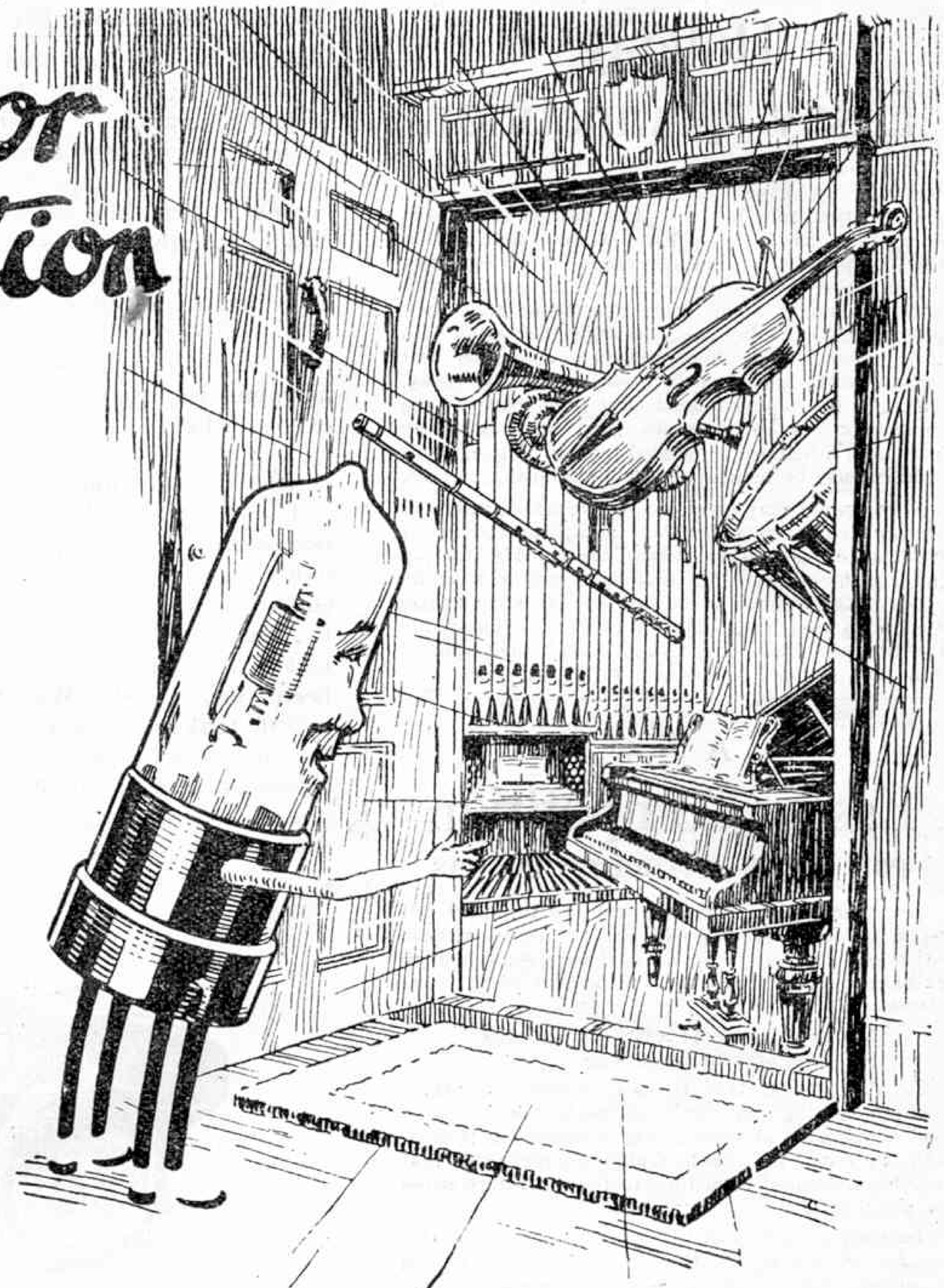
To drive a car in one of these races requires no little skill, and you may be sure that racing motorists do not invite their nervous mothers or aunts to spend Saturday afternoon with them, racing on Brooklands !

It is an experience which I am sure every Meccano boy would thoroughly enjoy, however, for there is nothing more exhilarating than to control one of these monsters that is capable of dashing around the track at racing speed. At times such as these, I am afraid that the wonderful story of the petrol-motor, of the difficulties and achievements of the engineers that have made possible these thrilling experiences, are sometimes forgotten by the drivers of the racing cars !

THE END.

NEXT MONTH :
"The Romance of Clock-Making."

The Valve for perfect reception



The holiday season is over and your thoughts are turning to the pleasures of the longer nights.

Broadcasting has improved by great strides since last winter, both in quantity and quality. To enjoy it to the full, you must use Mullard Valves.

The Mullard Wecovalve for use with a single dry cell. Twice the life of any other type of valve	**£1 10 0**
Type "ORA" and "R" for general reception with 4 volt accumulators	**£0 15 0**
Type L.F. (low filament current) for general reception with 2 volt accumulators or suitable primary batteries . .	**£1 7 6**
Type P.A. for Loud Speakers, giving good volume without distortion	**£1 2 6** TO **£1 15 0**

Ask your usual dealer for them and for particulars of other Mullard Products.

Mullard

Obtainable from the Leading Electricians, Wireless Dealers, etc.

Advt. of the Mullard Radio Valve Co., Ltd., Balham, S.W. 12. (E.P.S.58)

The Men Who Gave Us Radio:

V. DOLBEAR, WILLOUGHBY SMITH, EDISON, and PREECE.

In previous articles in this series we have described the work of numerous scientists of the nineteenth century who contributed to the discovery of wireless telegraphy and radio telephony. In our last article we mentioned the discovery of the telephone and its great importance in wireless invention. We also dealt with the brilliant prediction of Clerke Maxwell of the existence of electric waves, and dealt with the work of Professor Trowbridge, who successfully communicated without wires by induction.

Dolbear

In 1883 Professor Dolbear, an American, succeeded in sending signals through space without wires and nearly forestalled Marconi. "The idea," he tells us, "is to cause a series of electrical discharges into the earth at a given place without discharging into the earth the other terminal of the battery or induction coil—a feat that I have been told many times, is impossible, but which certainly can be done."

Dolbear used very similar apparatus to that subsequently employed by Marconi, and his signals could be heard in any part of a large building. At distances up to 100 ft. from the transmitter the signals could be heard with the telephone at some distance from the ear. At first Dolbear could send signals only over half a mile, but later he claimed to have sent and received them over as great a distance as 13 miles.

Dolbear was evidently under the impression that the air assisted in some way in bridging the gap between transmitter and receiver. To-day, however, we know that he was undoubtedly using the Hertzian waves, though he was in ignorance of their existence. As we shall shortly learn, these waves did not become known until some six years later.

Willoughby Smith

Willoughby Smith, in 1883, suggested a method by which communication with moving trains might be effected by the use of induction. His idea was for a wire to run along the permanent way, parallel with the rails.

WILLOUGHBY SMITH

Willoughby Smith was born at Great Yarmouth on 16 April 1828, and for some time was engaged in experimenting with covering wire for electrical purposes. He was engaged in cable work and underground land lines, and in 1854 assisted in laying the first Mediterranean cable. In 1865 he accompanied the "*Great Eastern*," laying a cable from Ireland to Newfoundland, and later assisted in laying the French Atlantic cable. He died at Eastbourne 17 July 1891 and was buried at Highgate.

Around the engine or carriage, in which the apparatus was to be installed, a coil of wire was wound in such a manner as to get as long a length of wire parallel to, and as near as possible to, the line wire. Willoughby Smith relied on the coils of wire picking up currents from the line wire by induction, and so enabling signals in the Morse code to be received on the train. A transmitting apparatus was installed in the carriage to enable signals to be sent from the train by a reversal of the process.

Sir William H. Preece was educated at King's College, London. He became Engineer-in-Chief to the General Post Office in 1899. He was born in Wales on 15 February 1834, and died at Carnarvon, 6 November 1913.

Edison

T. A. Edison, the famous American inventor and scientist, improved upon Willoughby Smith's method. His method was used in 1887 on the Lehigh Valley Railway, where it worked very successfully. Messages were sent and received without difficulty, even though 25 ft. separated the line and the train wires, and although the train at times attained a speed of 60 miles per hour.

Edison later took out another patent to cover the application of this method of "aerial telegraphy," as he called it, to ships. "Ships at sea," he wrote, "many miles apart, will be able to communicate by means of balloons or kites soaring above their decks."

Preece

So far most of the investigations with the possibility of communicating without wires had been carried out in America. Now, however, England was to make a valuable contribution to the solution of the problem. The work of Trowbridge and Dolbear, and the invention of the Bell telephone, inspired Sir (then Mr.) William H. Preece to carry out further research.

Preece was for many years Chief Engineer to the Telegraph Department of the G.P.O., and when the cable from Southampton to Newport (Isle of Wight) broke down in 1882 he established communication across the Solent without wires. He employed Morse's method of conduction, using a buzzer actuated by thirty Leclanché cells, the signals being sent by means of a Morse key. Signals were clearly heard in a telephone at Newport and replies received at Southampton.

Preece had noticed how readily telephone wires picked up telegraphic signals by induction, even though in some cases they were as much as 80 ft. above the telegraph cables. He determined to carry out a series of experiments, and for this purpose laid out two squares of insulated wire, a quarter of a mile apart, on the Town Moor at Newcastle. In the circuit of one square was a telephone transmitter, and in the circuit of the other a telephone receiver.

It was found that words spoken with the transmitter were audible in the receiver, although the two circuits were not connected in any way. Speech was distinctly heard, even when the squares were separated by 1,000 yards. In 1895, Preece established and maintained communication without difficulty by this method between the Isle of Mull and the mainland, about two miles away.

NEXT INSTALMENT:

HUGHES, HERTZ, ONESTI, and BRANLEY.

EDISON

Thomas Alva Edison was born at Milan, Ohio, on 11 February 1847, and when 12 years of age became a newsboy on the Grand Trunk Line. He commenced to experiment in Chemistry, and later printed the "*Grand Trunk Herald*," the first newspaper to be printed in a railway train. His many inventions include several telegraphic improvements, the megaphone, phonograph, cinematograph, and practical adaptations of electric lighting.

The latest development in radio-telegraphy makes it possible to control ships and aeroplanes from land stations.

* * *

The principle of this new development is very simple, and consists of transmitting on very short wave lengths to the object to be controlled. Reception is by valves, which are made to operate magnets, each having a special duty.

* * *

It is possible that in the near future New Zealand will have direct wireless communication instead of the present chain or relay system.

* * *

On a four-hour watch a Radio operator on the great liner "*Majestic*" recently transmitted two hundred complete messages. As the number of words ranged from 8—65 each message, the rate was a little more than one message in a minute.

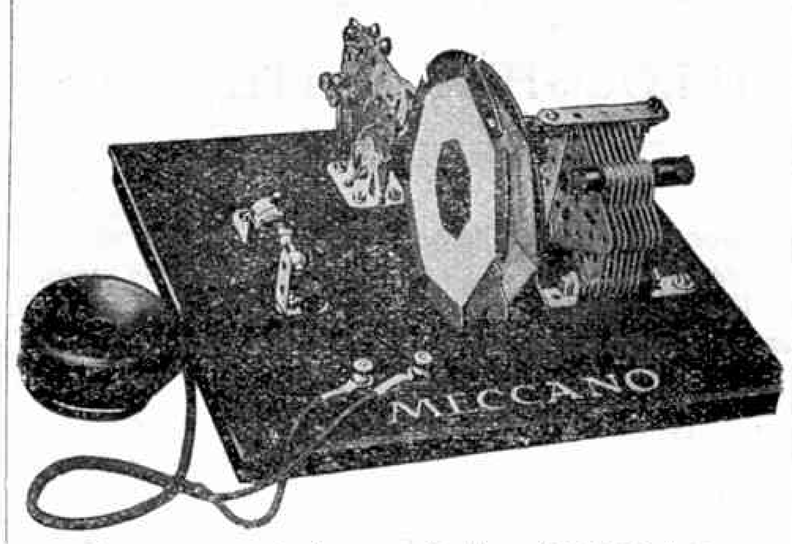
* * *

The Czecho-Slovakian Government has imposed a tax on all owners of radio apparatus.

* * *

A gentleman residing in Aberystwyth, whilst listening-in to an American broadcasting station, distinctly heard the clapping of hands in the concert room.

Build your own Radio Receiver



In a recent issue of the "*M.M.*" we gave full particulars for building a Radio Receiver from Meccano parts. These instructions may now be obtained in the form of a beautifully illustrated leaflet, printed on art paper (price 4d., post free).

In addition to Meccano parts being of service for the construction of a complete Crystal Receiving Set, they are of particular use for experimenting in Radio. Their standardisation and universal adaptability enable new circuits to be tried out, and changes to be quickly made.

If you are building a Radio Receiver or experimenting in any way, you will find these special Meccano Radio parts of great assistance.

Next month we hope to give a full list of Meccano Radio parts in fibre.

H. Foy (Salford).—If you crossed your aerial with your neighbour's in the way you indicate, and both of you were using crystal receivers, there would be no difference in the clarity and strength of the messages received. On the other hand, if one of you was using a valve set, then both your instruments would be affected by oscillation, so that it would be impossible for either of you to receive intelligible messages.

L. Hart (Liverpool).—Using a coil 2″ diameter and 5″ in length you should be able to receive broadcast transmitted on a wave-length of 200 to 400 metres up to a distance of 15 miles. From this you will see that it is impossible to receive telephony from Manchester. If you acquired a knowledge of the Morse code, however, you would find great enjoyment in listening-in to telegraphy transmitted from Seaforth and from ships at sea.

Gerald Briggs and Edwin England (Malta).—The Meccano agents in Malta (Malta Import & Export Agency, 15, Marina, Malta) will always be very happy to answer questions relating to local conditions governing the reception of telephony and telegraphy.

A. L. Chattell (Bedford).—A frame aerial erected in the way you mention would be quite efficient used in conjunction with a valve receiver. A frame aerial is not as good as the open type, however, and should not be used unless absolutely necessary, or by way of interesting experiment.

N. McAndrew (York).—Manchester is the nearest broadcasting station to York, but as it is approximately 70 miles distant the reception of broadcast with a Crystal Receiver would be impossible.

S. Williams (London N.W.6).—One Meccano Headphone is included in the Receiving Set. If desired, additional phones may be purchased separately at a cost of 10/- each.

John Hopkinson (Sowerby Bridge).—An ordinary telephone head-piece is not adapted to Radio receiving, it will be necessary for you to obtain more delicate head-phones.

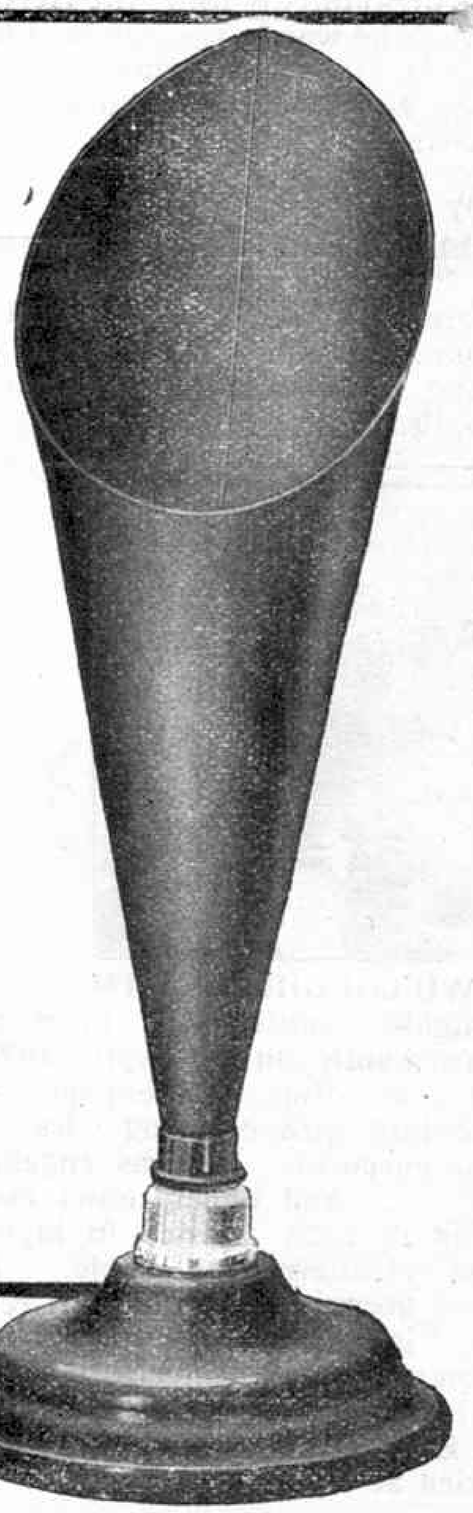
HERE'S A LOUD SPEAKER YOU CAN AFFORD IT ONLY COSTS £1

120 ohms or 2,000 ohms.

We have only been able to secure a limited number of these excellent instruments and consequently can only accept orders with cash. Delivery will be made in strict rotation and as quickly as possible.

These Loud Speakers are thoroughly reliable and efficient and give excellent results.

Black Satin Finish, complete with Cord.



Headphones only 18/-

120 ohms, 2,000 ohms or 4,000 ohms.

Guaranteed efficient. Money returned if not satisfied. Send your order to-day.

H. W. ROSENWALD

21, Dale Street, LIVERPOOL

The MECCANO CHAMPIONSHIP COMPETITION

21 Cups & 460 Medals: total value £250

During the past two or three years our annual Model-building Competition has assumed such proportions and has attracted such world-wide interest, that we are now able to run it in a form we have long had in mind, and which we think will be greatly appreciated by Meccano model-builders all over the world.

For the purpose of the 1923-4 Contest we have divided the various countries into the following groups (1) Great Britain, (2) Australasia, South Africa, Canada, India, and all Countries within the British Empire, (3) United States and South America, (4) France, Belgium and Switzerland, (5) Scandinavia and Holland, (6) Italy, (7) Spain and Portugal.

In each of these groups, three Championship Cups will be awarded for the best models submitted, and the winner of each Cup will hold the title of "Meccano Champion" for his particular group and section for twelve months from the date of the awards.

The Cups, which have been specially designed for us, are of superb quality, very handsome in appearance, and stand over 8 inches in height. Each Cup will be engraved with the name of its winner, and will form a valuable reminder of his prowess and skill. A suitable pedestal will be provided with each cup.

MECCANO GOLD MEDALLIST

The competitor who, in the opinion of the Judges submits the best model in the entire Competition, will be awarded a specially-designed solid Gold Medal, and will be the "Meccano Gold Medallist" for a year. His name and the year in which he gained the title will be engraved on the medal, which will remain his property.

In addition to these special awards, there will be Silver and Bronze Medals in each section and Certificates of Merit to a limited number of other entrants. The total value of the prizes to be awarded will amount to £250.

The following is a complete list of the awards:—

SECTION A. (For competitors under 10 years of age on 15th April next). Championship Cup and the title of "Meccano Champion" for his group and section for the year commencing 1st July next. Twenty Silver Medals and 50 Bronze Medals.

SECTION B. (For competitors over 10 years of age and under 14 years of age on the 15th April next). Championship Cup and the title of "Meccano Champion" for his group and section for the year commencing 1st July next. Thirty Solid Silver Medals and 100 Bronze Medals.

SECTION C. (For competitors over 14 years of age on 15th April next). Championship Cup and the title of "Meccano Champion" for his group and section for the year commencing 1st July next. Sixty Solid Silver Medals and 200 Bronze Medals.

In all there will be 110 Silver and 350 Bronze Medals awarded to the competitors in order of merit, and a limited number of Special Certificates of Merit in each section.

THE TOTAL VALUE OF THE PRIZES WILL AMOUNT TO £250

Full particulars, together with an entry form, will be mailed (post free) on request. Send for your form to-day.

Model-Building Competitions

OUR readers will be pleased to know that many Meccano dealers throughout the country are arranging Meccano Model-Building Competitions for boys living in their districts. Full particulars, together with an Entry Form, will be supplied to any boy by the dealers mentioned below.

Many excellent prizes are being awarded in these local competitions, and the winning models will automatically be entered in the Meccano Championship Competition. Thus, boys entering a local competition stand a double chance of winning a prize, and I hope that all Meccano boys will give their loyal support to these local competitions

List of Dealers organising Local Competitions.

BRIDGEND: Messrs. G. Dobbins & Sons, 26, Caroline Street.
BRISTOL: S. H. Arthur, 15/16, Narrow Wine Street.
BRISTOL: Messrs. Geo. Plum & Co. Ltd., Dolphin Street.
CARDIFF: Messrs. Wilces Toy Shop, High Street Arcade.
CHESTERFIELD: Messrs. S. Johnson & Son, 298, Chatsworth Road.
COVENTRY: Messrs. Jepsons, 1, Cross Cheaping.
CROYDON: Messrs. L. H. Turtle Ltd., 53, North End.
HANLEY: John Peppers, 63/65, Piccadilly.
LLANELLY: R. M. Rowles, 82, Stepney Street.
NEATH: Messrs. Hedges, Windsor Road.
NEWCASTLE, Staffs.: W. Hill, 4, Red Lion Square.
NORTHAMPTON: Messrs. Slade's Stores, 40/42, Abington Street.
NOTTINGHAM: Messrs. Redmayne & Todd Ltd., Carrington Street.
PECKHAM: Messrs. Peckham Gramaphone Stores, 141, High St.
PRESTON: Messrs. Richard Marsden & Son Ltd., 115, Church St.
ROCHDALE: Messrs. Dean & Holt, York Road.
ROTHERHAM: Messrs. Wallace Heaton Ltd., High Street.
STOKE-ON-TRENT: Messrs. Hughes & Barber Ltd., The Royal Press, Longton.
SOUTH TOTTENHAM: W. G. Ames, 693/697, Seven Sisters Road.
TUNSTALL: Thomas Farr, 121a, High Street.
WARRINGTON: T. Prince, 4, Horsemarket Street.
WOLVERHAMPTON: H. H. Speke, 12/14, Bilston Street.
YORK: Messrs. T. Holgate & Sons, St. Helens Square, 1-2, Stonegate.

Birthday Gifts for Meccano Users

When is your birthday?

As most of our readers are aware, Meccano has now been in existence for over twenty years, and its career has been one of uninterrupted success. Ever since its early days, when it was known as "Mechanics Made Easy," the hobby has flourished and grown rapidly. In 1908 its name was changed to Meccano and at the same time the business was established as Meccano Limited. It is thus fifteen years since the present Company was formed—and these have been fifteen years of unbroken success and progress.

In the course of his work, Mr. Hornby, our Managing Director, has met many thousands of happy Meccano boys, and he wishes that during this notable year in the history of his firm he could meet all the others to chat over with them old Meccano experiences. What a gigantic and unique gathering it would be, for there are millions of Meccano boys of all ages and of all nationalities!

Such a gathering is, of course, quite impossible, but Mr. Hornby has thought of celebrating the fifteenth birthday of Meccano Limited in a manner that will, he hopes, bring joy to the hearts of thousands of Meccano boys. He has decided to give a handsome birthday present to each purchaser of a Meccano Outfit, Hornby, Zulu or King George V. Train Set, whose birthday falls on the same date as his own.

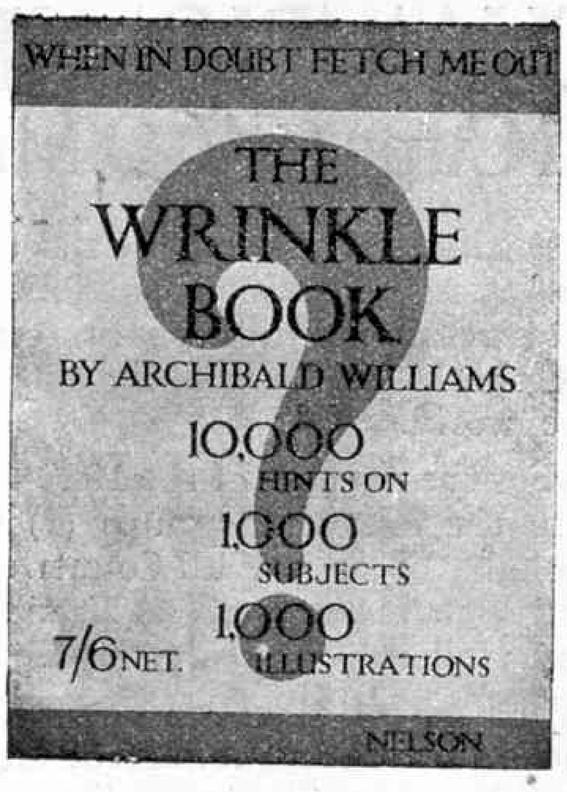
This birthday gift will take the form of a handsome wallet in Morocco leather, and Mr. Hornby has taken the greatest interest and pleasure in its selection and design. It is strong, durable, and of excellent quality, and will wear for many years. Mr. Hornby hopes that it will serve as a pleasant reminder of him to those boys whose birthday is on the same date as his own.

Full particulars, together with special entry form of this offer, are enclosed in every Meccano Outfit or Train Set. All that is necessary is that the purchaser of one of these articles should fill in this form and post it to Meccano Limited. The date of Mr. Hornby's birthday will be announced in the *Meccano Magazine* for May next.

NELSON BOOKS for BOYS

The Wrinkle Book. By ARCHIBALD WILLIAMS. **7/6** net.

10,000 Hints on 1,000 Subjects. 1,000 illustrations.
"A volume it would be worth saving out of a wreck on a desert island."—*The Scotsman.*



The Mechanic's Friend. By ARCHIBALD WILLIAMS. **7/6** net.
Hints, Data, Suggestions, Recipes, Instructions on many Subjects. Useful information of interest to mechanics, professional and amateur.

The Boy's Guide. By ARCHIBALD WILLIAMS. **7/6** net.
An encyclopædia for boys. Hints on all kinds of sports and pastimes, hobbies and handicrafts. A thoroughly practical book. 360 pages. 728 illustrations.

Railways. By GEORGE S. DICKSON. **7/6** net.
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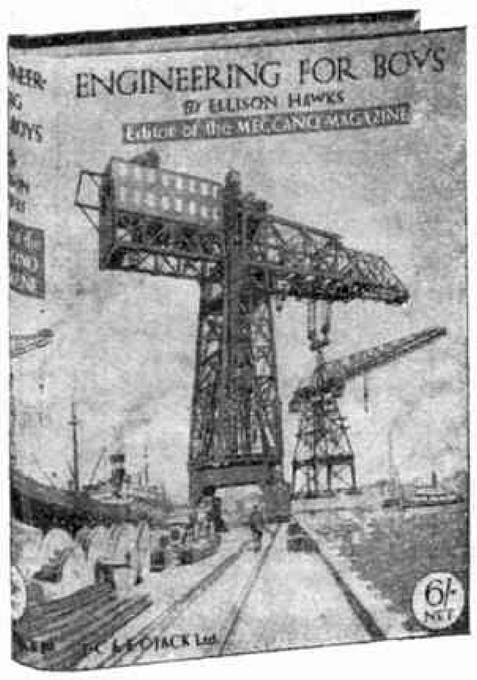
"We can think of no hobby appealing to boys that is not dealt with in this bright, fat volume."—*The Captain.*

Engineering for Boys. By ELLISON HAWKS, Editor of the *Meccano Magazine.* **6/-** net.
Very fully illustrated. Packed with the kind of information that Meccano boys call for.



All About Our British Railways. By G. G. JACKSON. **6/-** net.
From the Earliest Railways to the Present Day Groups. Numerous illustrations.

Romance and Reality of Radio. By ELLISON HAWKS. **3/6** net.
A popular account of the History, Theory and Practice of Wireless Telegraphy and Telephony. Illustrated.

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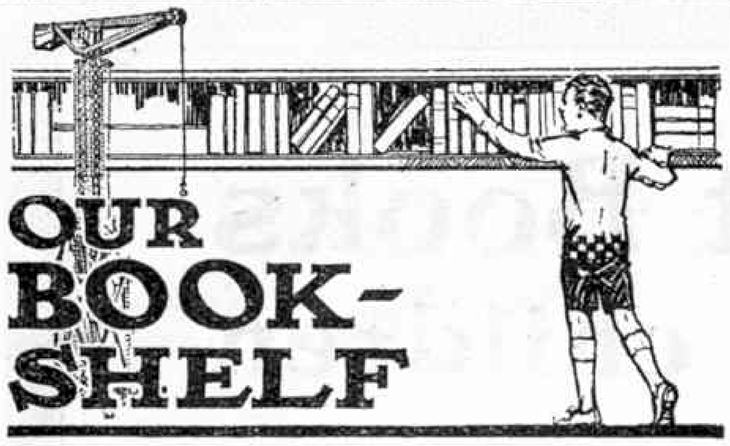

Boys of the Ages
by L. W. L. Scales
(*Published by Ginn & Company, London. Price* 3/6).

Every boy is able to understand and appreciate history, if the events of which he reads are chronicled with human stories surrounding them. Because of this, books that tell of the dreams and deeds, and of the learning and crafts of famous men throughout the ages are a welcome departure from the ordinary method of treating history. The author of *Boys of the Ages* is to be complimented on the manner in which she presents her stories, and we are tempted to journey with her through mysterious ancient Egypt, artistic Greece, romantic Persia, and through the glorious Roman Empire to mediæval Europe.

Our readers will like the story of Hugh, which will take them into the adventurous time of Queen Elizabeth, and they will delight in the story of the Italian painter Francisco, and the Song of the Birds.

Boys—and girls, too—will derive abundant pleasure, and will be stimulated to historical study, by this book, which is well printed and bound.

"How to Identify" Series

(*Published by the Epworth Press, London. Price* 1/9 *each*).

From the large number of letters that I receive from time to time it is apparent that thousands of Meccano boys are students of Nature. They delight in roaming the countryside, in finding birds' nests and in adding wild flowers to their collections. For such boys there can be no better guide to all branches of Nature Study than the books which form this series. The subjects are well covered by such volumes of the series as "*Wild Flowers*," "*Woodland Trees*," "*Birds' Eggs and Nests*" (with coloured plates of the eggs), "*Fresh Water Wonders*," "*Beetles and Spiders*," and "*British Birds*."

The volumes are handy for carrying in the pocket, and are well illustrated and interesting. At some future date I hope to describe some of them more fully.

"Model Yachts, Sailing Boats and Submarines"

(*Published by "Boy's Own Paper" Office. Price* 1/6 *net*).

Published in the same series as "*Carpentry and Bench Work*," this volume forms an excellent guide to the construction of all kinds of model sailing-craft. The explicit directions and numerous diagrams enable any boy of average intelligence to build not only model yachts of large size, but also submarines that dive and rise to the surface; racing yachts, and model steam launches that attain quite a good speed under their own power.

Wigwam Stories
by M. C. Judd

(*Published by Ginn & Company, London. Price* 4/6).

Red Indian stories have always appealed to boys of all ages, and we think they will always do so. Generally we associate Red Indians with exciting fights, scalping and bloodshed, but it is a refreshing change to read this delightful collection of stories, told by North American Indians and gathered from many different scources. Here we read of the Red man's habits, of his mode of living, and, perhaps most interesting of all, of his traditions and myths. In this book are found some of the most beautiful stories ever told; stories of the great forests and rivers; of the winds; of the moon and of the stars. Hunting stories; battle stories; stories of giants and stories of fairies. We recommend this book to all interested in Red Indians, for they will obtain a wonderful insight to their true nature and noble character.

BOOKS RECEIVED

We have received copies of the undermentioned books during the past month, and these will be reviewed in this column in a future issue.

"THE ART OF DRIVING A MOTOR CYCLE" (Temple Press), 2/-

"THE GREAT WHITE SOUTH" *by* Herbert G. Ponting (Duckworth), 7/6

"ALL ABOUT OUR BRITISH RAILWAYS" G. E. Jackson (T. C. & E. C. Jack), 6/-

"THE ROMANCE OF RADIO" *by* Ellison Hawks (T. C. & E. C. Jack), 3/6

"THE LAST SECRETS" The final mysteries of Exploration, *by* John Buchan (Nelson), 5/-

SOME USEFUL BOOKS

PRACTICAL LESSONS IN METAL TURNING. By PERCIVAL MARSHALL, C.I.Mech.E. The best Instruction Book on the Lathe for Young Engineers and Amateur Mechanics. With 220 Original Illustrations. 210 pp. Price **3s.**; post free **3s. 3d.**

THE A.B.C. OF DYNAMO DESIGN. By A. H. AVERY, A.I.E.E. Clearly explains the Principles of a Dynamo and How to Calculate Sizes and Windings of Machines. With Numerous Designs and 70 Illustrations. Price **3s.**; post free **3s. 3d.**

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SMALL ACCUMULATORS: HOW MADE AND USED. The first book of the world-famed "Model Engineer" Series, and one still in great demand. Contains 41 Illustrations, and deals thoroughly with its Subject. Price **9d.**; post free **10d.**

ELECTRIC BELLS AND ALARMS. By F. E. POWELL. Gives Instructions for Fitting same to any Part of any Ordinary Building. 51 Illustrations. Price **9d.**; post free **10d.**

GAS AND OIL ENGINES SIMPLY EXPLAINED. By W. C. RUNCIMAN. An Elementary Instruction Book for Amateurs and Engine Attendants. Fully Illustrated. Price **9d.**; post free **10d.**

WIRELESS CIRCUITS AND CONNECTIONS. This handbook contains 90 useful Diagrams of Circuits and Connections, with Explanatory Notes; making an excellent guide to the most effective arrangement of the apparatus. Price **6d.** net; post free **7d.**

WIRELESS AT HOME. Containing all information necessary for the novice in Wireless Telegraphy and Telephony to fit up and get the best use out of his station; together with helpful hints for the receiving of broadcast Wireless News, Concerts, etc. Written in clear and understandable language. Illustrated. Price **6d.** net; post free **7d.**

HOW TO MAKE A SIMPLE WIRELESS SET. By A. V. BALLHATCHET. Gives complete instructions for making a successful Crystal Receiving Set with all accessories. 48 pages, 22 illustrations. Price **6d.**; post free **7d.**

JUNIOR MECHANICS AND ELECTRICITY. A Journal for Beginners of all Ages; deals with Tools and Tool Making, Lathes, etc., Aeroplanes, Model Boats, Electric Motors, Dynamos, Wireless Telegraphy, etc. Will interest all mechanically inclined. Monthly **3d.** net; annual subscription, post free, **4s.**

Send a Post Card for Complete Book List.

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Size, $4\frac{7}{8} \times 7\frac{1}{4}$ in. Nos. 1 to 4.

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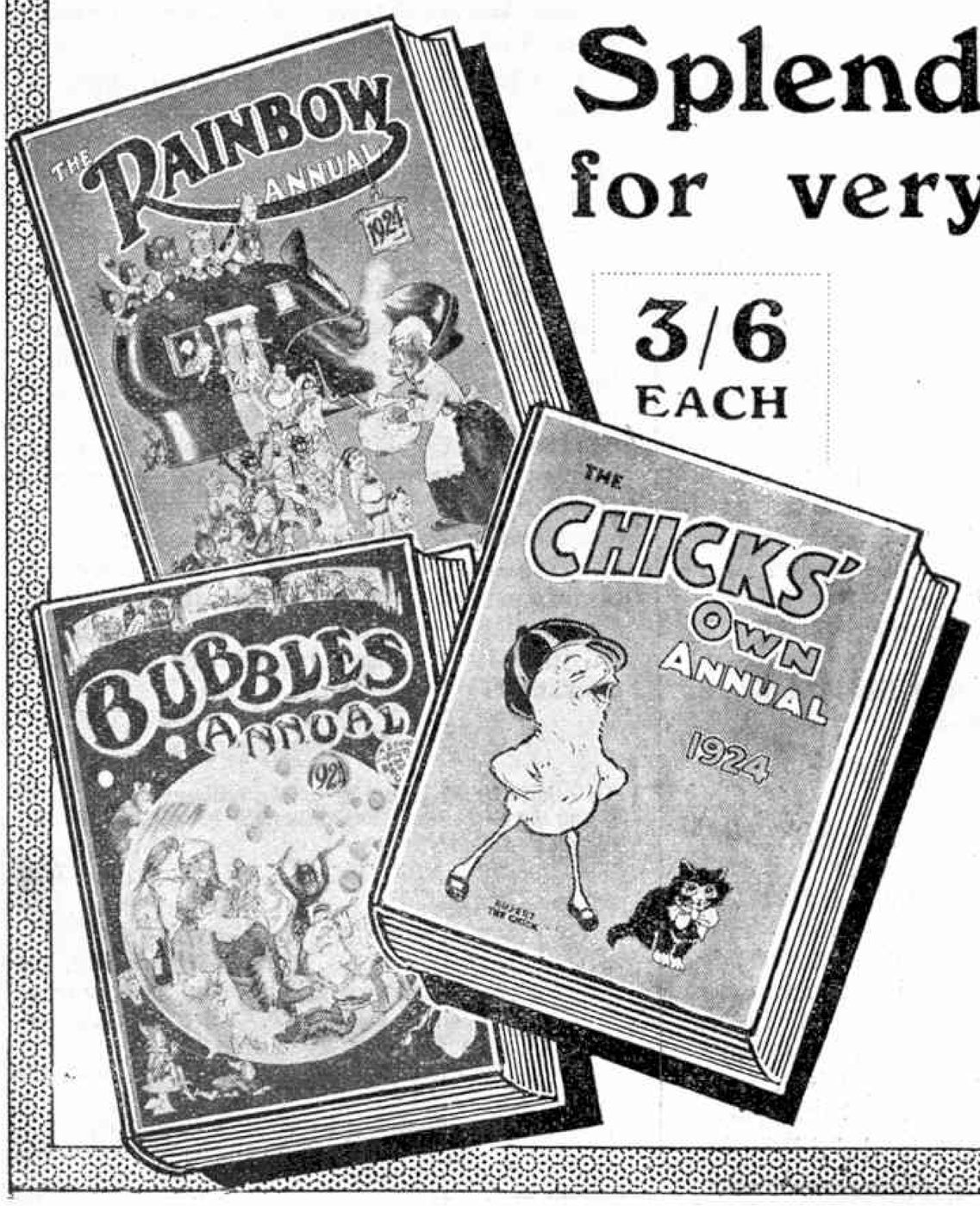

Splendid Gift Books for very little children

3/6 EACH

These three splendid gift books for little children are NEW this year. They are strongly bound in stout boards with brightly coloured glazed covers and packed with jolly pictures (many in full colour) and amusing stories.

RAINBOW ANNUAL deals very largely with the adventures of Tiger Tim and the famous Bruin Boys.

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NOW ON SALE

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Edited by ERIC WOOD

5/- net

A new series designed for boys who are keen about getting to know something useful and are more or less inclined to turn their hands to practical things, whether indoors or in the open air. Bound in Cloth, **5/-** net.

SOMETHING TO MAKE

Contains instructions and clear working diagrams for making a great variety of models and other apparatus, including Wireless Telegraphy and Telephony Sets.

HOBBIES

This volume covers a wide field: Collecting—Elementary Science and Simple Experiments—Pets—Outdoor Hobbies (from Cycling to Cliff Climbing, Woodcraft and Geology), and other miscellaneous hobbies; in fact, everything from Conchology to Kite-flying.

THE BOY'S WORKSHOP

Treats of the use of tools and materials under these suggestive headings: The Carpenter's Shop—The Laboratory—The Engineering Shop—The Electrician's Shop—The Metal Worker.

THE OUTDOOR BOY

A book to lead boys (and girls) out into the Great Out-of-doors, there to develop a love of Nature and to take a delight in the things that happen in the "Wilds." A most interesting book with a wide appeal.

Other Books will be added to this Series.

Cassell & Co. Ltd. La Belle Sauvage. E.C.4

Stamp Collecting is a Science

Those who despise stamp-collecting do not always realise that as a science it may be made as exact or as accommodating as the individual collector wishes. It is a science, too, that numbers amongst its practical uses the discovery of forgeries and the assistance of postal officials. Stamp-collecting widens one's outlook upon the world, and teaches exactitude, neatness, and observation, to say nothing of geography, history and art.

Amongst other details the stamp collector finds it necessary to study the currencies of nations; the different methods of printing, and the many varieties of paper. He learns much concerning different shades of colour, inks, and dyes. He studies postal history and postal methods, as well as many other subjects. To collect stamps is to acquire a liberal and varied education without knowing it.

Beginner and Specialist

Stamp-collecting exists to-day in many different forms. On the bottom rung of the ladder is the boy who sticks his stamps anywhere and anyhow in any book. Somewhere near the top of the ladder is the collector who makes his hobby the most scientific of sciences, and who possesses, or endeavours to possess, used and unused copies of every known variety of every known stamp, even to the smallest variation in shade and thickness of the paper upon which the stamp is printed!

It might seem that the first thing to do to become a stamp-collector is to obtain a quantity of stamps. Before doing so, however, you should decide what kind of stamps you intend to collect. There are at least six different classes of stamps, including (1) the ordinary stamps, used for prepaying the postage on letters, post cards, and parcels. (2) Official stamps, used for pre-paying the postage on matter posted by a Government department: (3) Registration stamps, used for prepaying postage on registered or insured packets. (4) Postage Due stamps, used to show how much postage is due to be paid by the receiver, when a packet has been insufficiently stamped. (5) Newspaper stamps. (6) Express Delivery stamps.

Limiting your Collection

You will probably decide to commence by collecting the ordinary postage stamps (class 1 above) first, and also collecting such of the other classes as may come into your possession, but, concentrating on increasing the size and interest of your main collection.

Dealing especially with ordinary postage stamps you may decide to collect postage stamps from all countries of the world, or you may prefer to limit your activities to stamps of the British Empire, to European stamps, to picture stamps, or only to stamps showing the head of King George V.

If you decide to limit your collection in some way, however, it is strongly recommended that you should be geographical. For example, if you decide to collect only "picture" stamps, collect certain stamps only of each country. You will then be collecting for the sake of the pictures, and not for the sake of showing the postal history of the country, which is the final aim of any real stamp collection.

It is perhaps best to start by collecting all stamps that come your way and then, as you go on—if you find it necessary—limit your collection to those countries the stamps of which interest you most. In any case you should endeavour to make your collection as complete as possible for those selected countries.

Used and Unused?

Another point to be decided is whether you will collect used stamps only or unused, or even one used and one unused specimen of each stamp. The usual solution, mainly because it is the cheapest, is to collect used stamps only, but when you come across unused specimens, to collect these as well! This also is the best from the philatelic point of view, for in a sense an unused stamp is only half a stamp. It has been made, but it has been of no use. A used stamp, on the other hand, has fulfilled its purpose by carrying a letter or parcel safely through the post—it is a true stamp, and no longer merely a scrap of printed paper!

NEXT MONTH.

BUYING PACKETS, ETC.

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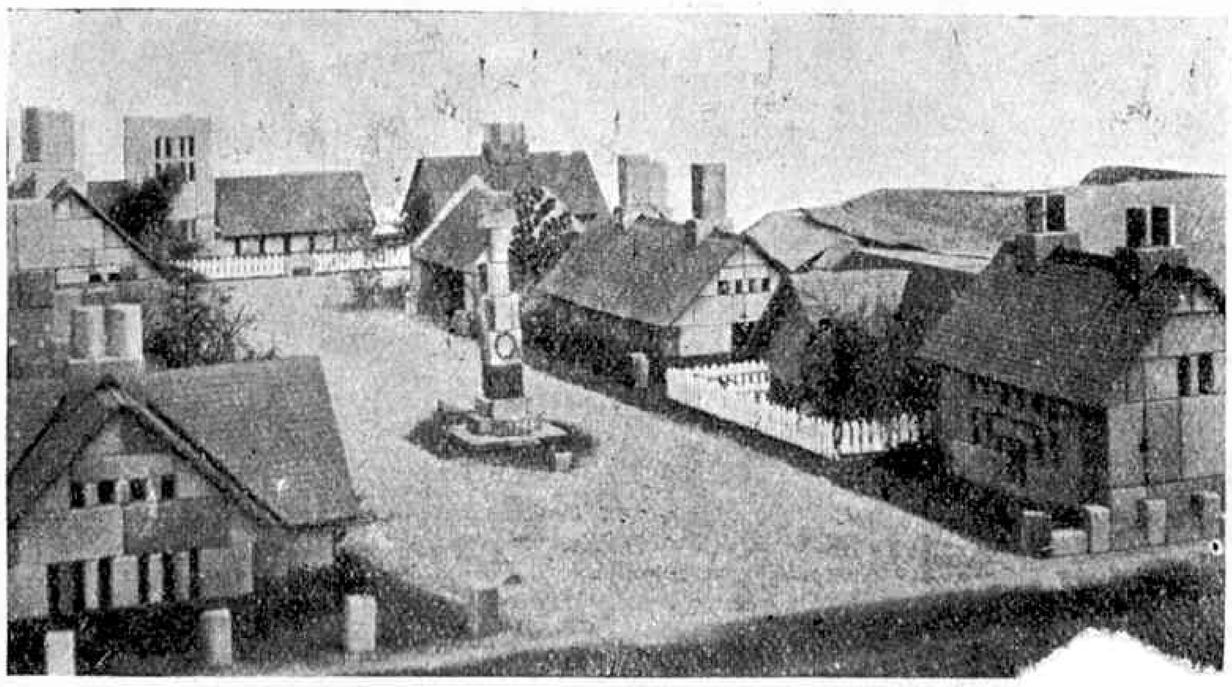


Chalets, Bungalows, Towers, Bridges, Houses, Cottages, Railway Stations, Workshops, Schools, etc.,

TUDOR BLOCKS

Box 1 6 Models, complete with Plans, Bricks and Roof... 3/3

SERIES "B," COMPOSITE SETS

Box A Complete with Plans, Bricks, Roof, Fences and Trees... 5/–

„ B „ „ „ „ 5/6

„ 1 „ „ „ „ 10/–
Plans for 18 Models enclosed.

„ 2 Complete with Plans, Bricks, Roof, Fences and Trees ... 10/6
Plans for 18 Models enclosed.

„ 3 Plans for 49 Models ... 17/6

Add a Garden City to your Model Railway

The above Village is built entirely from Plans contained in Boxes 1 and 2 Building Bricks are of Artificial Stone. Signal Boxes, Platforms, Goods can readily be constructed from the materials in the various sets.

Obtainable at all Leading Stores and Toy Emporiums throughout the Kingdom.

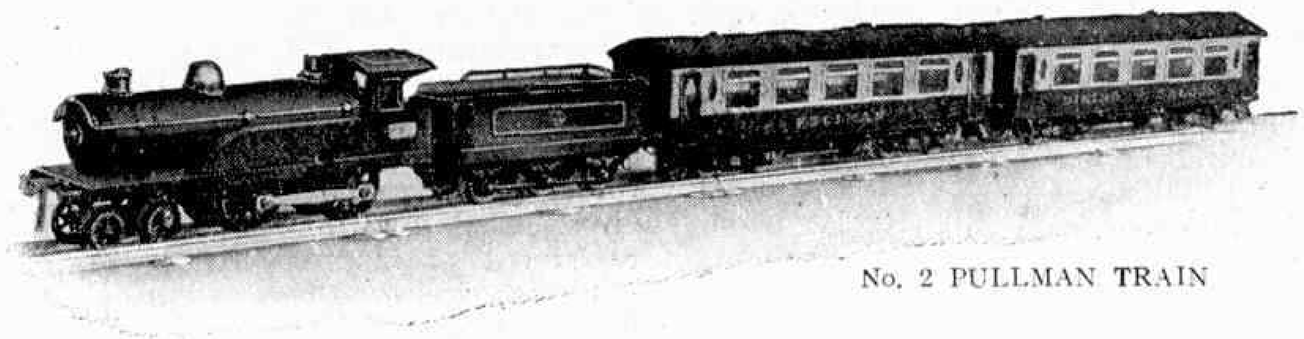
LOTT'S BRICKS I

Write for Illustrated List a

HORNBY CLOCK WORK TRAINS

THE TRAINS WITH THE GUARANTEE

A most valuable and remarkable feature of the Hornby Train is that it can be taken to pieces and rebuilt just like a Meccano model. All the parts are standardised, and there is as much fun taking Loco, Tender, Wagon, and Coaches to pieces and rebuilding them as there is in playing with them. Any lost or damaged parts may be replaced with new ones.



No. 2 PULLMAN TRAIN

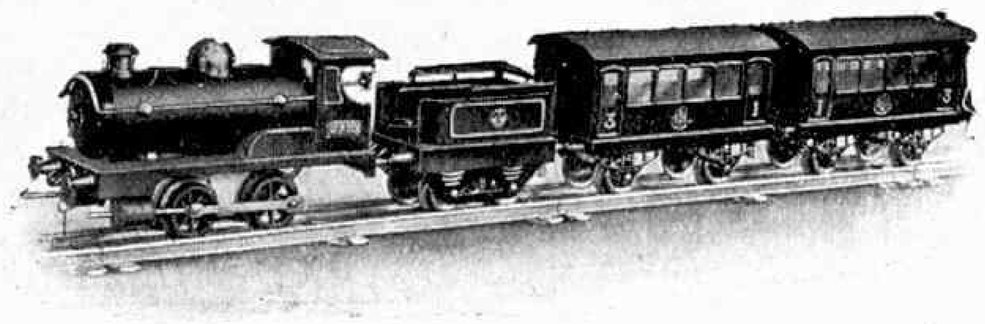
HORNBY TRAIN PRICES

No. 1

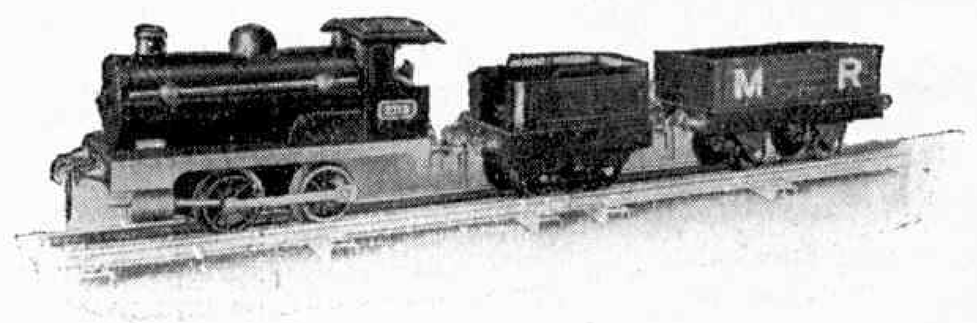
Goods Set	... ...	25/6	Wagons	each	3/9
Passenger Set	... ...	35/–	Tenders	,,	3/6
Locos	each	16/–	Passenger Coaches	,,	6/6

No. 2

Goods Set	... ...	45/–	Wagons	each	3/9
No. 2 Pullman Set	...	70/–	Tenders	,,	4/–
Locos	each	30/–	Pullman Cars ...	,,	16/–



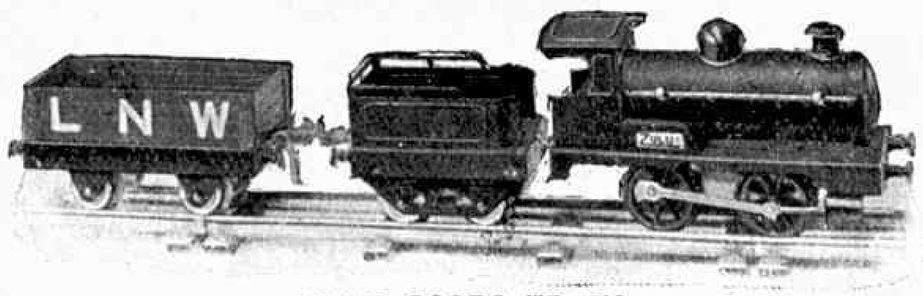
No. 1 PASSENGER TRAIN



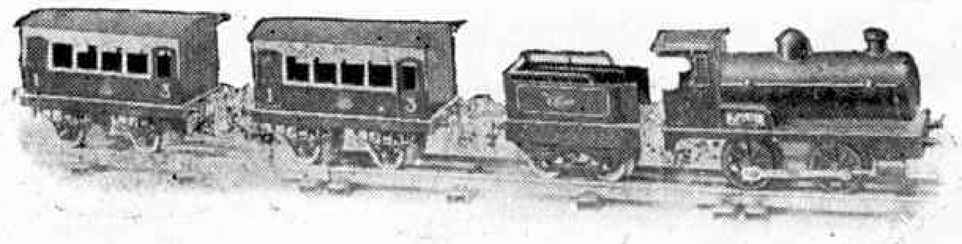
No. 1 GOODS TRAIN

ZULU CLOCK WORK TRAINS

The Zulu Clockwork Train is a cheaper type of mechanical train, the chief characteristics of which are fine and durable mechanism and immense strength of construction in all parts. The Zulu Loco is well designed and efficient, and will give long and excellent service. Richly enamelled and highly finished ; fitted with brake and governor ; non-reversing.



ZULU GOODS TRAIN



ZULU PASSENGER TRAIN

Zulu Train Prices

Goods Set	... ...		18/6
Locos ...	...	each	10/6
Passenger Set	... ...		25/–

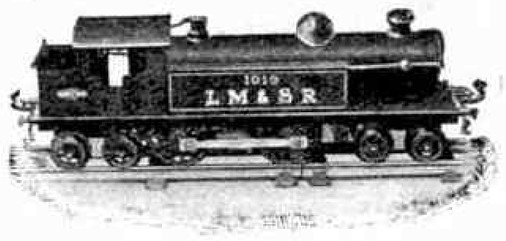
GUARANTEE

Hornby and Zulu Trains are tested, and their efficiency is guaranteed. A form of guarantee is furnished with each loco, and we undertake to repair, or replace, at our option any loco that fails to run satisfactorily from any cause other than misuse, within 60 days of purchase.

Zulu Train Prices

Tenders ...	...	each	2/6
Wagons ...	...	,,	3/–
Passenger Coaches		,,	5/–

TANK LOCOS



Hornby Tank Loco

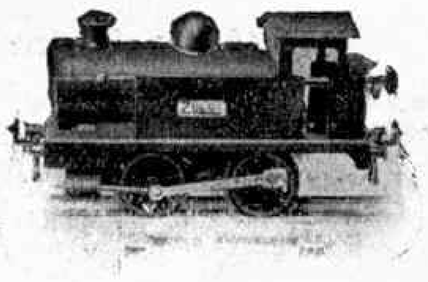
The Hornby Tank Loco is a powerful model embodying all the characteristics of the Hornby Train. It is 11½" in length and is fitted at both ends with a special bogey.

Price 32/6

Zulu Tank Loco

A strong and durable loco capable of any amount of hard work ; richly enamelled and highly finished ; fitted with reversing gear, brake and governor.

Gauge 0, in black only ... 12/6



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BRIGHT IDEAS

These columns are reserved for dealing with suggestions sent in by Meccano users for new parts, new models and new ways of making Meccano model-building attractive. We are always pleased to hear from any Meccano boy who has an idea which he considers will be useful in the Meccano system.

Ellson Dallaway (Pevensey).—A good representation of a motor car leaf-spring may be made from strips of graduated lengths slightly curved. See the illustration of this type of spring in our Chassis Leaflet.

H. Chesters (Crewe).—We greatly admired your sketch of the crane, illustrating the use of the suggested bent angle girder. Could you not use existing girders of the required length and make your connection by means of 2½" curved strips?

H. Coates (Notts.).—We have a tank engine already on the market, but this is not quite as elaborate as your suggestion.

F. Beeston (Cambridge).—We illustrate our 3" pulley fitted with a rubber ring in the Chassis Leaflet. Although the form is a little different, the effect is the same as your suggestion.

A. G. Cooke (West Kirby).—A "T" girder may be constructed from four angle girders bolted to a flat girder, a form of construction adopted in a model of the Quebec Bridge we made recently for the Canadian National Railways. The effect is the same as your suggestion except that it comes a little narrower between the parallel surfaces.

Bernard J. Hobden (Battle).—(1) Set-screws are adopted in all instances wherever possible. Grub screws have to be used in the smaller wheels on account of the interference with other gear wheels that set-screws would cause in sliding actions. (2) The dark colour of the grub screws is caused by the tempering process through which they are put. (3) We abolished the groove in the flanged wheel as it departed from the true type.

G. Hardy (Surbiton).—We should be interested to hear of any uses and advantages that you have found for the 2½" pulley, and for the combined bush and pulley you suggest.

M. Lemarchand (Boulogne).—(1) We list a train coupling (No. 121) which you will doubtless agree is superior to your suggested oval hook. (2) The present expansion spring may be employed as a compression spring by first of all extending it slightly.

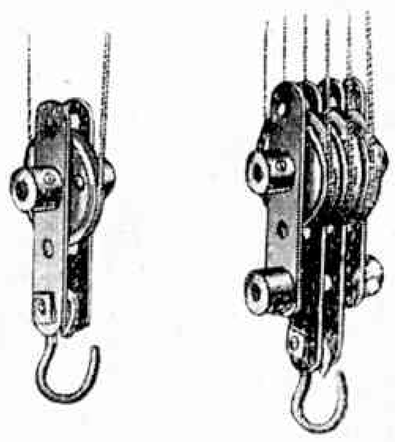
R. E. Gray (Forest Hill).—A flat sector plate would necessitate some means of fastening to the rest of the structure. The existing flange fills this requirement.

N. F. Keith (Geelong).—We shall give consideration to your suggested corner-angle plates.

E. C. Horsley (Malton).—The power of the clockwork motor would not allow of any type of friction speed controller.

Park Simpson (Northallerton).—At the moment we are experimenting with a Clockwork motor of a revised type.

B. Tucker (West Worthing).—Combination tools somewhat similar to those you suggest are stocked by most tool merchants.



J. Mears (Ashstead).—We illustrate above two methods of assembling pulley blocks. These, with two other examples, are shown in Model No. 442 in the new edition of our Complete Manual. (Price 2/10½ post free).

A. Fraines (Paris).—The most satisfactory braking action is that of a cord that runs loopwise over a pulley on the moving shaft. This method is universally employed where high braking power is required.

Into the Land of Fun—(*cont. from p.* 126)

This may also be used as a separate bolt and applied to other forms of pivots, such as a pivot for the boss of a crank, intermediate gear wheel, or loose pulley.

I always think the Drilling Machine (No. 312) is another interesting model. This is a simple model to build, but no less interesting than the Railway Breakdown Crane. It is an exact representation of the large machines used in engineering shops for drilling sheet iron and metal, and when I last went over the Meccano factory I noticed a large number of these drilling machines being used in the manufacture of Meccano parts. This model may be worked by the crank handle (part No. 19) included in the Outfit, or it may be worked from the electric or clockwork motor by running a belt over the flanged wheel on the right of the model. In either case the drill is revolved by means of a crossed belt drive over the upper pulleys.

The boy who is lucky enough to possess a No. 3 Outfit need not fear that he will be short of amusement during the dark winter evenings. There is no end of fun and real enjoyment to be obtained from the great number of models illustrating different mechanical principles. When constructed, each model means hours of pleasure, both in building and in play, and there is little wonder that to Meccano boys the winter months are the happiest of the year.

NEXT MONTH:

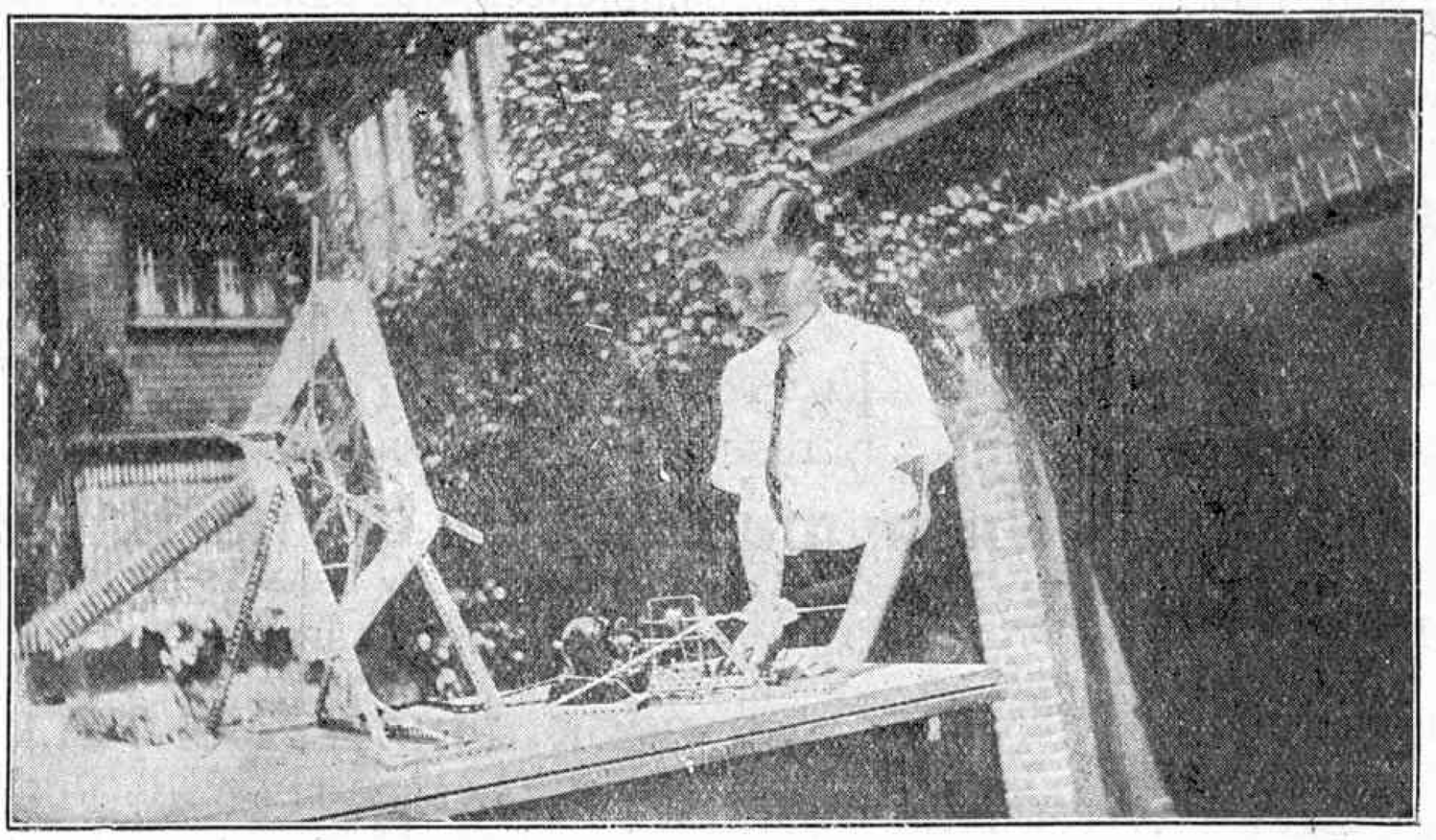
MORE No. 3 MODELS

Californian Boy Helps His Mother

by Inventing New Wool-winder

THE story of invention is always interesting reading. Every boy likes to read of the early electrical experiments of Benjamin Franklin, or of how young Watt, in watching the kettle boil, was led to think of the power of steam and the possibility of a steam engine. In inventing models many a Meccano boy does something that has never been done before, or improves on an existing idea. Boys who do either the one or the other are real inventors, as much so as Benjamin Franklin or James Watt.

Bartlett Stephens, who lives in San Francisco, is a boy of this type. This bright Meccano boy, who is just fourteen years of age, had often noticed the amount of labour and time expended by his mother in winding skeins of wool. With the true spirit of invention, he set about applying his knowledge of Meccano to constructing a mechanical method of winding. As a result, he evolved an appliance that does away with many tedious hours for members of the family, whose job it was to hold the skein whilst mother wound off the wool!



Master B. Stephens, of San Francisco, with the Meccano Wool-winder that he has invented

Our illustration shows Bartlett with his model, which consists of a collapsible frame, some twenty-six inches in height. This carries the skeins of wool, while a guider directs the worsted to a rod, supported in a frame and geared to an electric motor. On the motor being started up, the rod commences to wind the wool into a ball, pulling it off the skein which it is able to do because the frame rotates.

When wound the ball of wool is easily removed from the rod and a little care and manipulation during the process ensures the firm round ball, that our mothers insist on having.

What is the first principle of building construction?

IT does not matter how carefully a building is planned or how beautifully it is built; the skill of the finest craftsmen in the world may be lavished on it—all will be in vain unless the *foundations are sound.*

All over the world there are splendid buildings, which are cracking and collapsing because the foundations are giving way.

You yourself are rather like a building—it does not matter how clever you are with your brains or your hands. It does not matter how strongly you feel you will be able to do great things when you are grown up, unless your foundations are sound, unless you have *good health,* you will collapse.

Now the very foundation of good health is good teeth—you cannot be really fit and well unless you have sound teeth. Sound teeth are *clean* teeth.

It is a simple and pleasant matter to keep the teeth in perfect condition by the twice daily use of Gibbs Dentifrice. It cleans and brightens the teeth by removing the greasy food deposits and polishing the millions of tiny waves and facets into which the enamel of a normal tooth is divided.

It is these facets of the enamel (seen only through a powerful magnifying glass) which give the bright, sparkling appearance to clean teeth.

Gibbs Dentifrice is most convenient—a solid cake, protected by an aluminium case—it cannot spill or squeeze out.

Your chemist can supply you with Gibbs Dentifrice at the following prices: Large Size 1/-, De Luxe 1/6, Refills 11d., Popular Size 7½d.

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The Secretary's Notes

The first Winter Session has now commenced, and promises to be very busy and enjoyable, judging from the letters received from Club Leaders and Secretaries. Many Clubs are already preparing for Exhibitions to be held during the Session, with a view to augmenting Club funds. Programmes for the Winter Sessions are naturally very varied, for each Club Leader includes the subject in which his members are particularly interested. I am very pleased to find that the majority of our Clubs run either a Football Team or a Gymnasium during the Winter.

The First Winter Session

For the benefit of those readers who are not members of the Guild I would state that the Guild was first started at the request of Meccano boys, who had formed small Clubs amongst themselves. They felt that their Clubs should have an organising centre at Headquarters to which they could look for guidance. As many Meccano boys lived where no Clubs were established, however, it was decided to form a Guild for individual membership as well as for members of Clubs. Although there are now over 140 affiliated Clubs, there are yet many towns in which there are no Clubs. If there is not a Club near enough for you to join, you may become a "lone member" of the Guild, and if you wish to do so you may correspond with another member either in this country or abroad. There are over 30,000 Guild members in all parts of the world.

Join the Guild

The objects of the Meccano Guild are (1) To make every boy's life brighter and happier. (2) To foster clean-mindedness, truthfulness, ambition and initiative in boys. (3) To encourage boys in the pursuit of their studies and hobbies, and especially in the development of their knowledge of mechanical and engineering principles. A member of the Guild promises to promote these objects by his own example. He promises to be helpful to others; to be clean in thought and habit, and to be determined to make progress. He also promises to wear the Guild Badge on all possible occasions; to recognise and acknowledge all other members wearing the Guild Badge and to render them help in case of need. If you wish to become a member send up to Headquarters to-day for further particulars and address your communication to:—The Secretary, Meccano Guild Headquarters, Binns Road, Liverpool.

The Objects of the Guild

A Sturdy Eleven

I am pleased to be able to publish the accompanying photograph of the Claygate Meccano Club's Football Team, who will have the good wishes of all Guild members for a successful season.

The members of this enterprising Club are to be congratulated in having as their Leader, Mr. H. W. Haynes, who is seen on the left of the accompanying photograph. The Club was founded in 1919 and has been one of the most progressive Clubs in the Guild. By means of concerts and sports, sufficient funds have been raised to enable members to buy an ex-army hut, and here all meetings are now held. Mr. Haynes is an indefatigable worker and is always arranging some pleasant surprises for his members. To say that he is popular would be expressing the sentiments of his members very mildly!

Claygate Juvenile Club's Football Eleven

Owing to the large number of girl applicants for membership of the Club, Mr. Haynes decided last year to form a girls' section. This interesting innovation has been entirely successful, and there are now over 45 girl members. The example of the Claygate M.C. might well be followed by other Clubs, for we have ample evidence that Meccano is very popular with many Meccano boys' sisters!

Calcutta (India) M.C.—Has been closed for the Summer vacation, but activities have now recommenced, and an interesting programme has been drawn up. Although the Club is not large, the members are very keen and enthusiastic, and stamp-collecting is a popular hobby of members. The recently-opened library has proved to be a great success. *Secretary:* Master A. N. Roy Chowdbury, 35/2, Beadon Street, Calcutta.

Small Heath (Birmingham) M.C.—Session opened early in September with every prospect of success. A football team has been formed, and already a number of enjoyable matches have been played. *Secretary:* Master W. Edge, 131, Whitehall Road, Small Heath, Birmingham.

Luton M.C.—The programme for the Winter Session includes Lectures, Papers by the members, Model Building, Radio, and, finally, an Exhibition to be held at the close of the Session. *Secretary:* Master W. Humby, 11, Napier Road, Luton, Beds.

Liscard High School M.C.—The Club is to be divided into Scientific, Engineering and Miscellaneous sections. Each subject will be illustrated by means of models built by the members in the various sections. A Football Team has been organised, and several matches have already been won. *Secretary:* Master B. Warburton, 11, Brisbane Avenue, New Brighton.

Knutsford Lecture Hall M.C.—The Summer Session closed with an enjoyable outing to Ashley Mill. There is every indication that the coming Session will prove the most successful in the Club's history. *Secretary:* Master L. Shepherd, Grove Lodge, Knutsford.

Thornton Heath (London, S.E. 20).—The First Winter Session commenced towards the end of last month with an excellent attendance of members. The Concert Party, which was very successful last year, hopes to assist the "Holy Trinity M.C." with their Exhibition, particulars of which are given elsewhere on this page. *Secretary:* Master S. Sutton, 13, Campbell Road, Thornton Heath, S.E.20.

Triangle (Coventry) M.C.—The Club outing took place towards the end of the Summer Session, and although the weather was wet, the members managed to have an enjoyable time. The journey to Marton was made by motor car, and 90 members and 21 adults were present. Games were held indoors, and after tea four pilot balloons were sent up. An interesting programme for the Winter Sessions has been drawn up by the Club Leader. *Secretary:* Master R. Mayell, "Zola," Crescent Avenue, Stoke Coventry.

Parkstone Congregational M.C.—The last Summer Sessions proved very enjoyable and the programme included Tennis, Cricket, Bathing, Boating and Cycling. The Winter Sessions give promise of being equally enjoyable, and, in addition to Lectures and Model-building, Fretwork and Radio have been introduced. A Concert Party and a Football Team are also being organised. *Secretary:* Master F. Brumwell, "Strathyre," Fernside, Parkstone.

Mount Gould (Plymouth) M.C.—Winter activities commenced about the third week in September, and many new members have already joined. Excellent progress is being made by this Club. *Secretary* Master B. Hawkins, 25, Edith Avenue, Plymouth.

Club Recently Affiliated

Silchester M.C.—Meetings are held in the Silchester C. E. School, Reading, under the supervision of the Headmaster, Mr. F. H. Harris. The Secretary informs me that Mr. Harris intends taking the members camping during the holidays. *Secretary:* Master A. Toms, Pine View, Silchester, Nr. Reading, Berks.

Club not yet Affiliated

1st Malta M.C.—Established in April last under the direction of Mr. T. C. Parker, this Club is the first in Malta. It is hoped that this Club will soon become affiliated with the Guild. The Club Leader is at present on a short visit to England. *Secretary:* Master A. Grech, 173, Prince of Wales Road, Sliema, Malta.

Proposed Clubs

Leeds M.C.—A Club is being formed in Leeds and Guild members interested should communicate with Master W. C. Whitelow, c/o Mr. Jackson, 101, Albion Street, Leeds.

Newton (Hyde) M.C.—An effort is being made to form a Club in Newton, and any boy wishing to join should write for particulars to Master H. White, 15, Victoria Street, Newton, Hyde.

Llanelly (S. Wales) M.C.—Any Guild members living in or near Llanelly who wish to join a Club should communicate with Master G. J. Jones, 3, Bigyn Terrace, Llanelly, S. Wales.

Meccano Guild Exhibition

The 5th Annual Exhibition of Mechanical and Engineering Models is being held by the "Holy Trinity and Radio Meccano Club" on October 12th and 13th. The Exhibition will be of two days' duration, and the Mayor of Islington has kindly promised to open the function on the first day at 4 p.m. Several other London Meccano Clubs are co-operating with the Holy Trinity Club and each Club will have a separate table for display purposes. In addition to Model, Radio and Cinema Demonstrations, an attractive programme includes short concerts, sketches and competitions. The Exhibition is being held in the Holy Trinity Parish Hall, Richmond Road, Barnsbury, London, N.1, and I hope that all Guild members living near will endeavour to be present.

Small Advertisements

Small advertisements are inserted in these columns at 1/- per line (average seven words to the line), or 10/- per inch (average 12 lines to the inch). Cash with order. Letters to Advertisement Manager, "Meccano Magazine," Binns Road, Liverpool.

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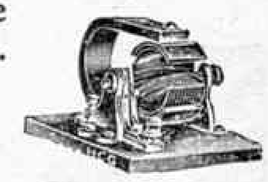

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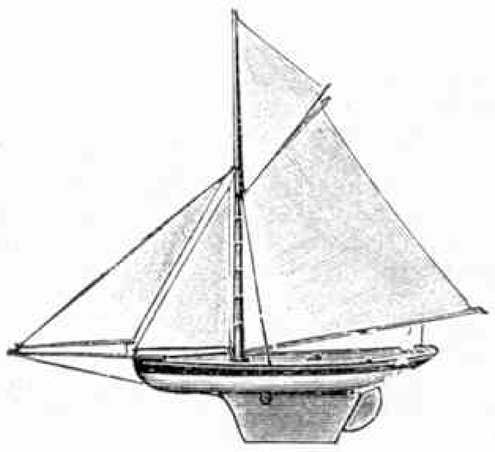

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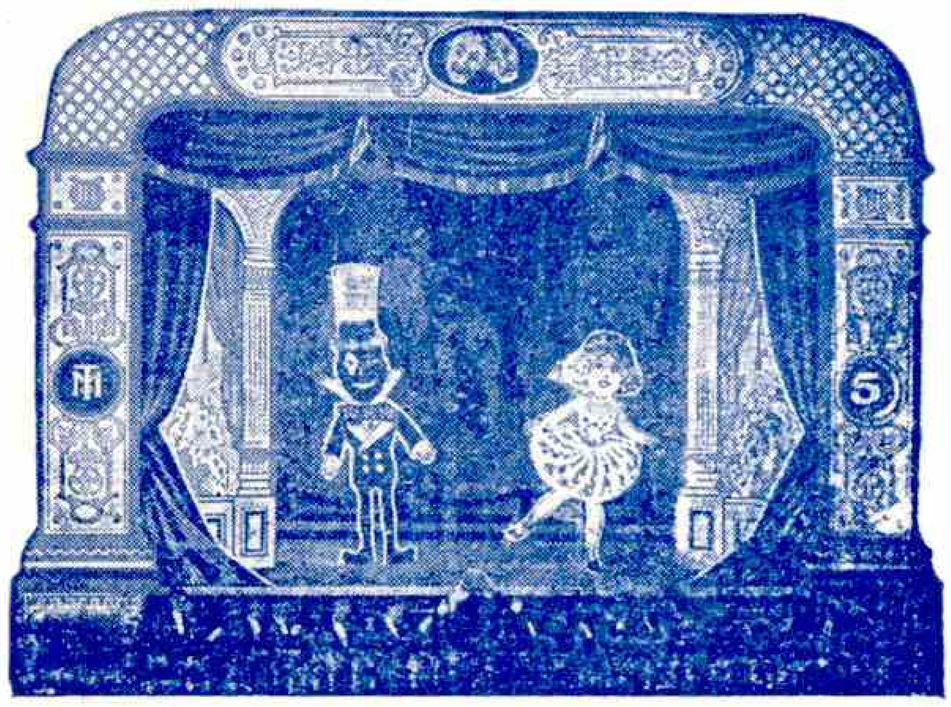

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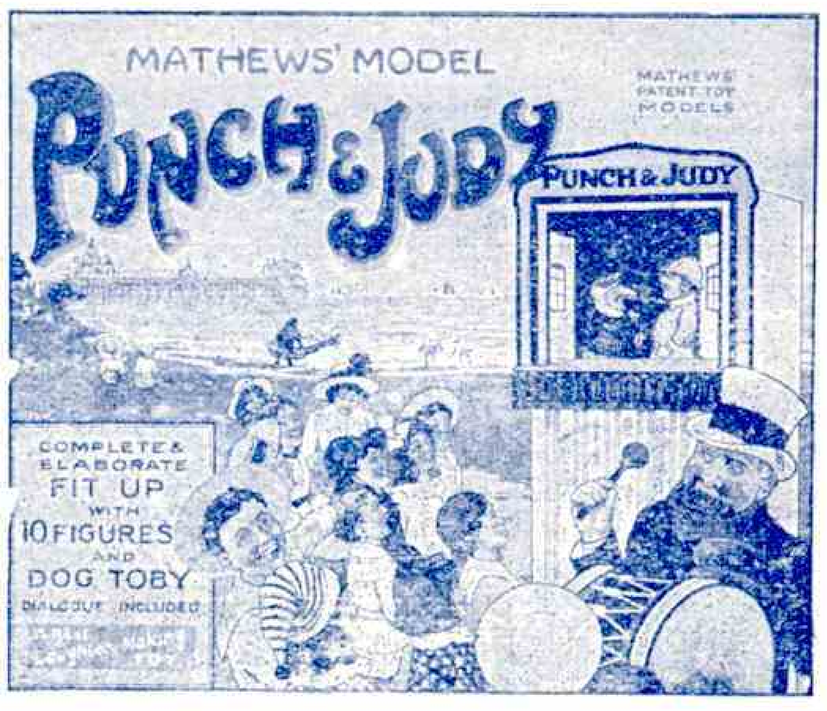

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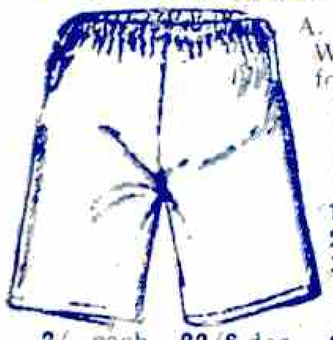

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Superior Tan Cape Gloves, Horsehair stuffed, bar grip, side pads, laced sheepskin palms, padded wrists.
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V. 629.
Vertical High-speed Engine, complete with Boiler, as illustration, double-action slide-valve Cylinder, Trunk Guide Steel Connecting Rod, and Crank Shaft. Disc Crank, fitted with bright Vertical Brass Boilers and Spirit Lamp, the whole mounted on Wooden Base.
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Type 4. 1" bore, 1" stroke ... **84/–**
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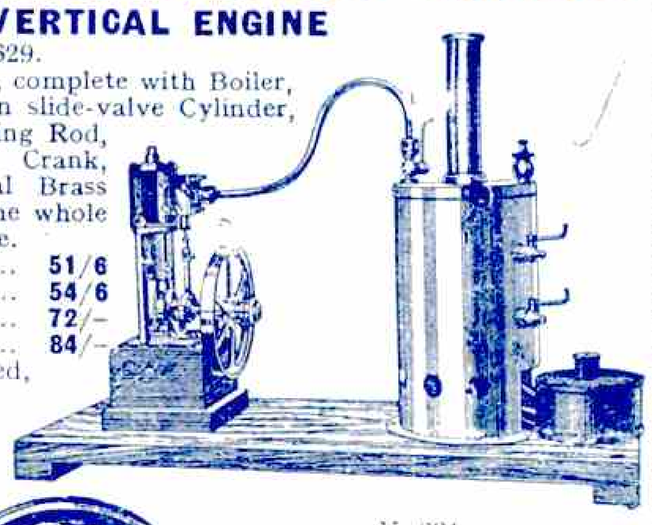
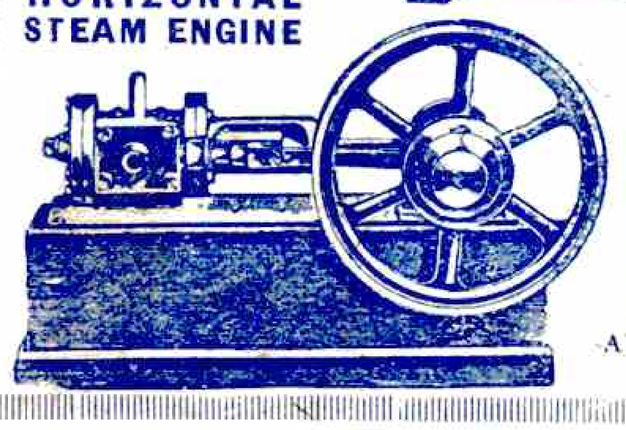


THE HOLBORN HORIZONTAL STEAM ENGINE



V. 631.
Horizontal double-action slide valve cylinder, trunk guide, steel connecting rod and crank shaft, disc crank, heavy flywheel, and 3-speed grooved driving pulley for round belt.
No. 1. ⅝" bore, ½" stroke **22/6**
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No. 4. 1" bore, 1" stroke **37/6**
Above finished Nickel-plated, 7/6 extra.

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P. 241. **JUVENILE MAGIC LANTERNS**

All metal bodies, objection fitted with good lenses, complete with oil lamp and glass and 3 slides. Packed in cardboard boxes.

Height with Chimney	Approximate dimensions: Size of Slides	Price	Extra Slides, per box of 1 doz.	18 Different Sets of 1 doz.
10"	1 × 4"	2/9	9d.	
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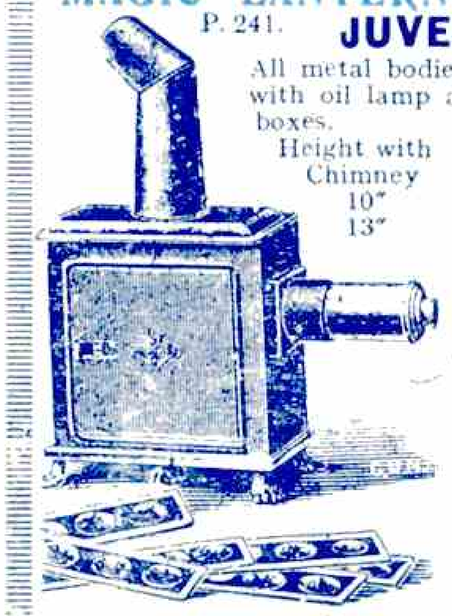

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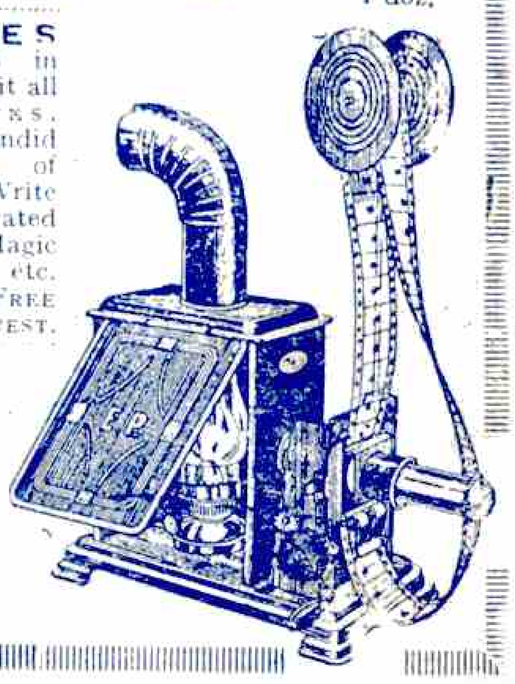

P. 423. **JUVENILE COMBINED CINEMATOGRAPH AND MAGIC LANTERN**

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Extra films, 36 ft. **1/–**; 72 ft. **2/–**, etc.
Endless films, **8d.** and **1/3** each.

GAMAGES, HOLBORN, LONDON, E.C. 1

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NOVEMBER 1923

MECCANO MAGAZINE

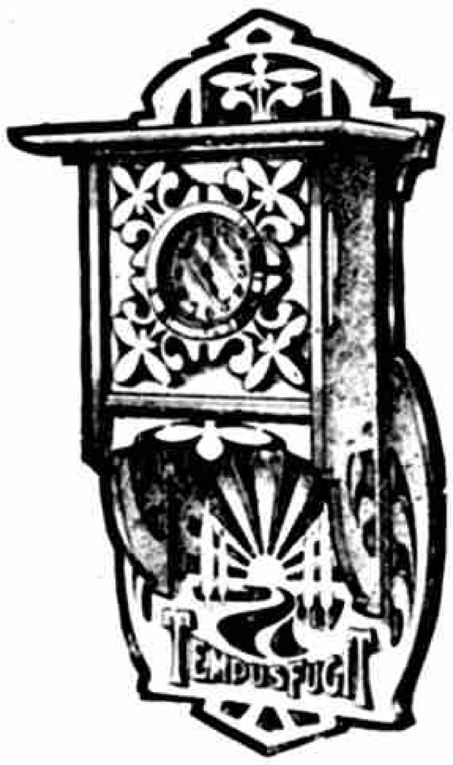
Published in the interests of Boys

PRICE 1D

VOL. VIII

No. 11

THIS CLOCK STANDS 6FT HIGH AND KEEPS PERFECT TIME



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„ 4½	„	12/	„	12 9
„ 5½	„	13 6	„	14 3
The A1	„	16 6	„	17 6
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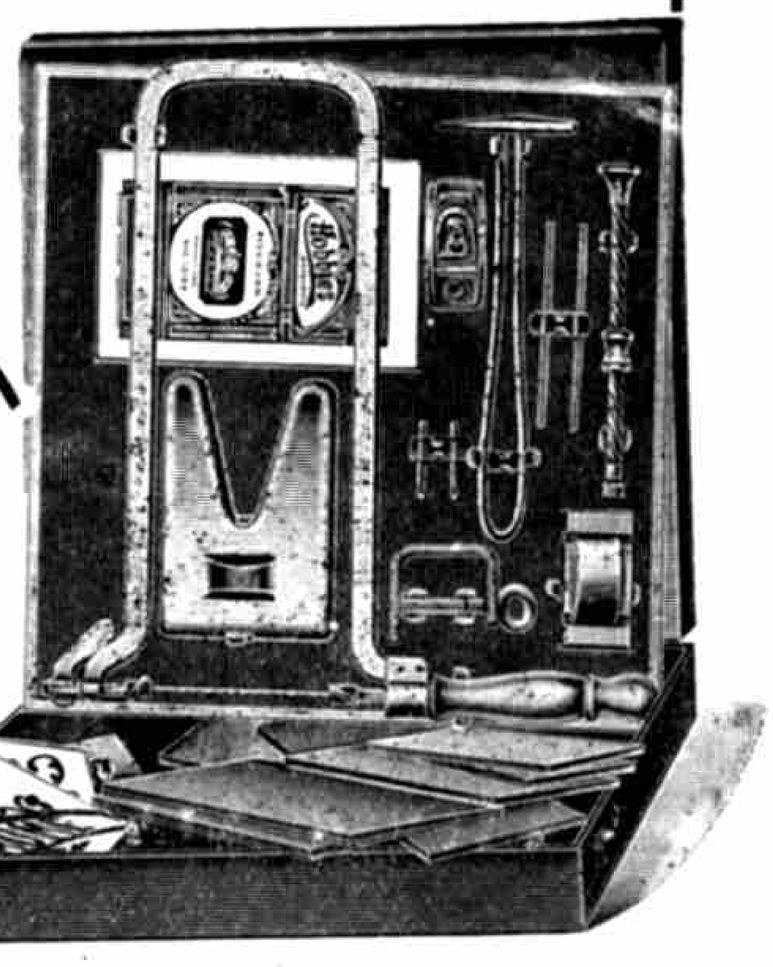


SPECIAL CHRISTMAS NUMBER OF THE "M.M." READY 15th DECEMBER. ORDER NOW!

EDITORIAL OFFICE
Binns Road,
LIVERPOOL

MECCANO MAGAZINE

PUBLISHED IN THE INTERESTS OF BOYS
on the
15th of each month

IT is a pleasure for me to acknowledge letters from hundreds of enthusiastic readers, with congratulations on the increased number of pages, and the improved appearance of the recent issues of the "*M.M.*" Some time ago I mentioned that it was my intention to make this the brightest and best paper for boys, and now scores of boys tell me that I have done that already. This does not mean that we have arrived at the end, however, for the "*M.M.*" will continue to improve with every issue.

The Growing "M.M."

For our future issues I have a number of good things and several surprises in store. At the moment I am not able to disclose the preparations that are being made for your interest in the forthcoming numbers. For many months past there have been two insistent demands from our readers. One has been that we add more literary pages and increase the price to 2d., and the other that we publish fortnightly, or even weekly! After careful consideration I have decided to adopt the former course—the latter demand will be further considered later. The increased price will come into operation next month, with a special large Xmas number.

Increase in Price

The "*M.M.*" is considerably heavier than it was in the old days, when we had only 12 pages, and the postage is now 1d. It will, therefore, be necessary to increase the subscription rates for Magazines mailed from Liverpool to 1/6 for six months or 3/- for twelve months. From the date of this notice the subscription for copies to be mailed direct will be at the above-mentioned rates, but we shall keep faith with our existing subscribers and execute all orders on our books at the old rates until the subscriptions expire. This remark does not apply to the Xmas number, for which each subscriber will be debited 3d. The "*M.M.*" is now included in Messrs. W. H. Smith & Son's wholesale list and is thus available to newsagents. It may be ordered from all regular Meccano dealers and also from any newsagent or bookstall, price 2d. Should any reader have difficulty in obtaining the "*M.M.*" from his Meccano dealer or newsagent, he should write to me, giving full particulars.

Increased Subscription Rates

And now just a word in connection with the special Christmas number that is being prepared. This will appeal to all my readers, both at home and abroad, and will have more pages than the "*M.M.*" has ever had before. It will contain a host of good things. There will be articles on Meccano Model Building, Radio, Stamps, Books, Presents to Buy, and some new features including a Puzzle and Joke Column that will appeal very strongly to Guild Members. New Competitions will be announced, and there will be a special splendid article on a proposed new structure that, when completed, will be one of the world's largest bridges. Be sure that you order your copy of the December "*M.M.*" in good time.

Special Xmas Number

In this issue I am announcing a new competition, the subject of which is "Drawing the Editor." During the past twelve months I have received thousands of requests from all over the world for copies of my photograph. Some of my readers imagine me with a long grey beard, and others have guessed that I have red hair! Many readers have asked whether the little sketch at the head of this column shows me as I really am. To tell the truth, I am not able to answer this conundrum, for I have never seen myself! My friends tell me that the sketch is not at all like me, and that I am not nearly so good-looking as the young gentleman depicted there! It has occurred to me that it would be rather interesting to ask those who enter our first drawing competition to send sketches of the Editor as they imagine him to be. I expect we shall have some very humorous entries, and I am looking forward with interest to seeing the efforts of those of my readers who are fond of sketching! Of course, the winning sketches will be printed in the "*M.M.*"! Full particulars on page 161.

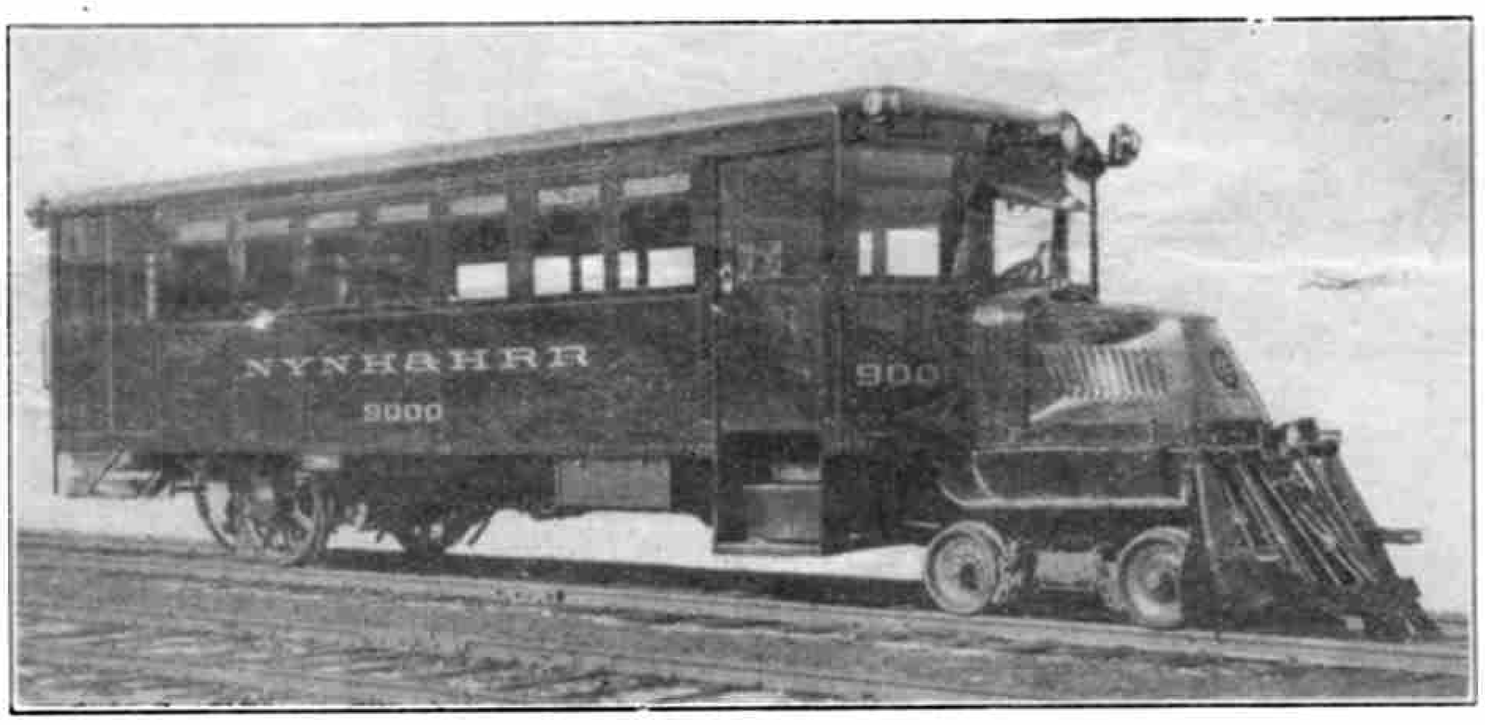
Do you Sketch?

Motor Cars to Run on Railways

THE New York, New Haven, and Hartford Railway has recently introduced a new type of vehicle, consisting of a kind of motor 'bus that runs on railway lines. The cars seat 35 passengers, carry 2,000 lbs. of luggage and travel at a speed of 45 miles per hour. A driver and a conductor constitute the crew.

The mechanical construction, which is practically the same as that of a motor car in use on roads, includes petrol-engine, clutch, gear-box, propeller shaft and bevel-gear rear-end drive. No differential is necessary, however, and reverse is obtained by a separate set of levers and gears, the cars having four speeds forward and four speeds reverse. They are worked much more severely than a road car, however, because their engines must operate at high speed, hour after hour

(*Continued on page* 168)



The New Railway Motor 'Bus

THE MECCANO CLOCK

Full Instructions for Building this Interesting Model

WE have pleasure in publishing the first instalment of the instructions for building a " grandfather's clock " with Meccano. This clock stands well over 6 ft. in height and keeps perfect time. With the exception of the 17 lb. weight, the wire by which it hangs, the cardboard-face and the light spring (80 Fig. B), the model is made entirely of Meccano. The clock keeps perfect time, and is the outcome of experiments conducted over the last twelve months in the Meccano model-building department. A large number of these clocks have been constructed, and have been tested out very thoroughly. With careful adjustment every clock has been made to keep perfect time. The construction of the clock is not difficult, and we hope that many of our readers will set to work and build this interesting and instructive model right away !

Constructing the Frame

Begin by making the frame to carry the gear trains. This frame (shown in Fig. A) consists of vertical 12½" angle girders (1), connected by 5½" angle girders (2) and 5½" strips (3). Bolt three 5½" × 2½" flat plates (4) to the 5½" strips (5) above and below, and two 2½" × 2½" flat plates (6) to the plates (4) but on the other sides of the lower strips (5) and overlapped two holes with the larger plates (4). Cranks (7) bolted to trunnions (8) on the top of the frame form the pivotal bearings for the pendulum. A 12" strip (9) is bolted vertically to one of the trunnions and to the 5½" strips (10) to form bearings for the main gear train. A double bent strip (11) is bolted on the left side of the frame to form a bearing for the winding handle (65 Fig. B). A second double bent strip (12) is provided, to form a bearing for the gear that disconnects the driving train from the gearing of the hands, when the clock is being wound up.

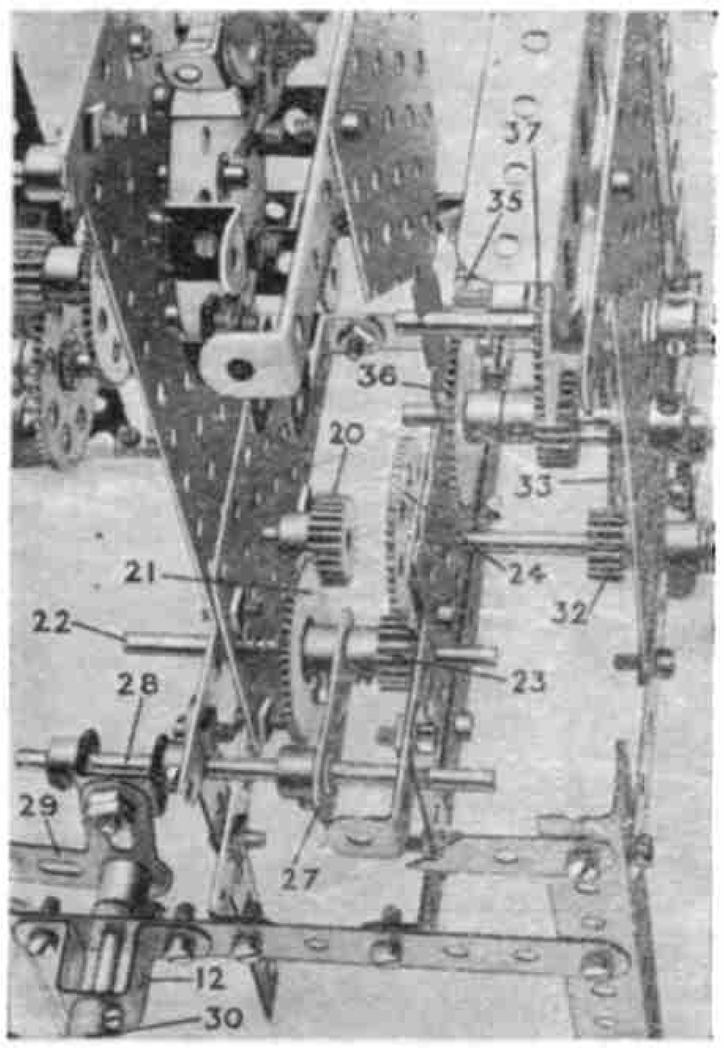


Fig. C

A flat trunnion (13 Fig. A) is bolted below the left perforated plate (6) to form a bearing for the lowest 3" rod of the clock train (18 Fig. B). The position of the other perforated strips will be easily seen from Fig. A.

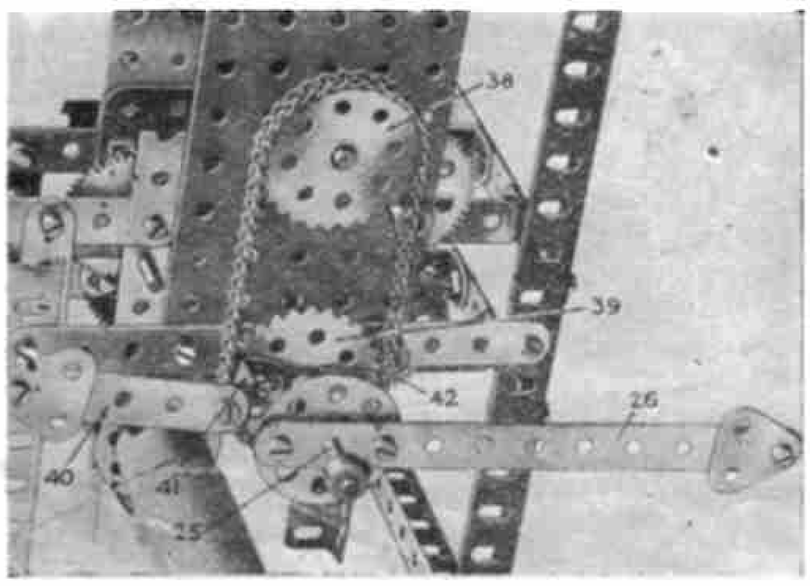


Fig. D

The Main Gear Train

When the frame has been constructed, proceed to build the main driving gear train, as shown in Fig. B. This consists of three ½" pinions (14) connected with 57-toothed gear wheels (16) and three ¾" pinions (16) connected with 50-toothed gear wheels (17). These are secured on the rods 18, the top rod being 3½" long and the remainder 3" long. They pass through holes in the left-hand plates (4 and 6) and the strip 9, collars (102) being fitted on each rod on each side of the strip 9. No collars are necessary at the other ends of the rods.

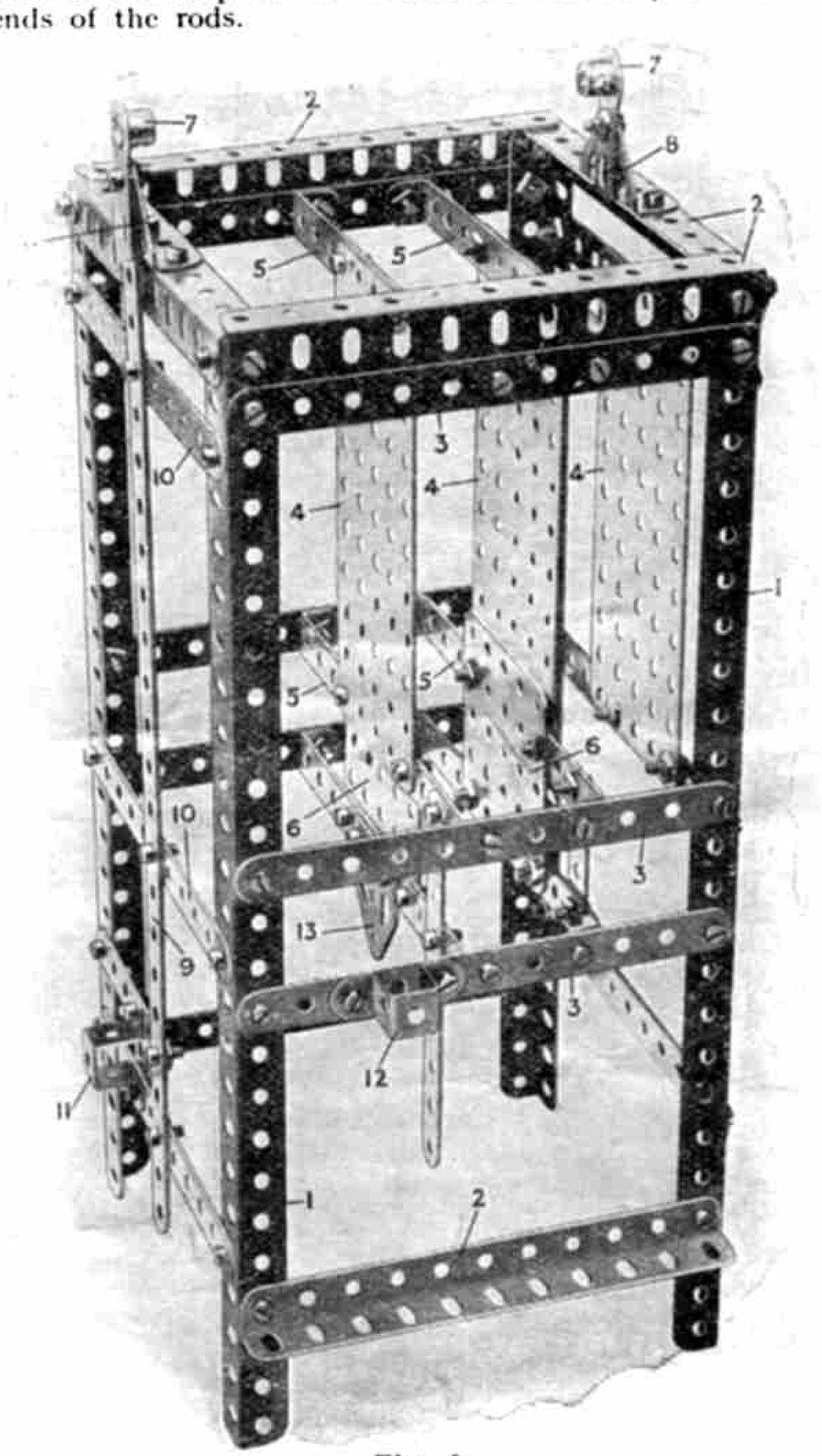


Fig. A

On the end of the 3½" rod (19) is a ¾" pinion (20), which is seen more clearly in Fig. C. This pinion gears with a 50-toothed gear wheel (21) fixed on a 2" rod (22) which is able to slide in the plates (6). On this rod also is a ½" pinion (23) geared with a 57-toothed wheel (24) on a 4½" rod (25) carrying the minute hand (26 Fig. B). The web of a crank (27 Fig. C) engages the 2" rod (22), the crank being bolted to a 3½" rod (28) carrying

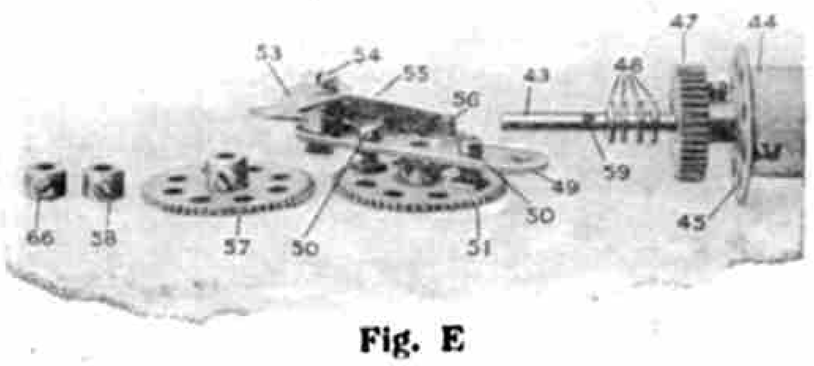


Fig. E

a double bracket bolted to a bell crank (29) and pivoted on a rod (30) in the double bent strip (12).

Adjusting the Hands

A cord (31) is connected to the bell crank (29), and by pulling on this cord, the rod (28) is caused to slide and move the gear (21) in or out of engagement with the pinion (20). This releases the driving train from the clock hands and enables the hands to be freely adjusted.

In order to drive the hour hand from the minute hand rod (25), a ½" pinion (32) on this rod drives a 57-toothed gear (33) mounted on a 2" rod. This engages a second 57-toothed gear (34 Fig. B), the ¾" pinion (35) on the same 2" rod driving a 50-toothed gear (36). Another ¾" pinion (see Fig. B) on this rod drives a 50-toothed gear (37). On the 2½" rod of this last wheel is a 1½" sprocket wheel (38 Fig. B and Fig. D) which is coupled to a similar sprocket (39) loose on the rod 25. The hour hand (40 Fig. D), consists of a 2½" strip and is connected by a ½" reversed angle bracket (41) to a 1½" strip (42). This is bolted to the sprocket wheel (39) and spaced by two washers to give clearance for the sprocket chain. The reversed angle bracket (41) is necessary to enable the hour hand 40 to be brought clear of the dial plate.

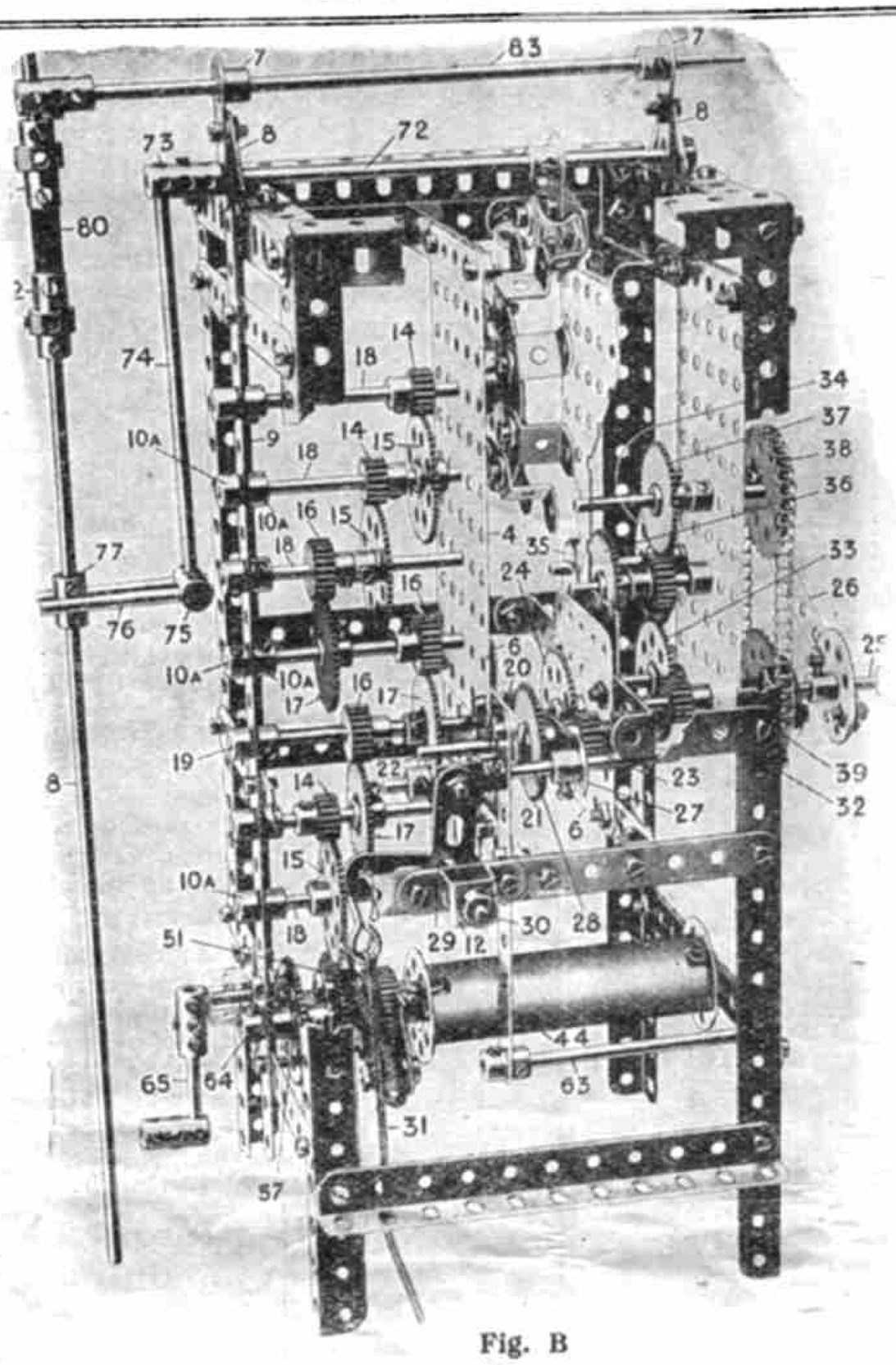


Fig. B

Two 2½" strips (49) are bolted by ¾" bolts (50) to a 57-toothed gear wheel (51), lock-nuts (52 Fig. F) being fitted on the bolts on each side of the gear wheel (51) and also beneath the strips (49). A pawl (53) is pivoted at (54) in the end hole of the strips (49) and a spring (55) is connected to the pawl boss by a screw, and also to a ¾" bolt (56) on the gear wheel (51) and lock-nutted. The element so built up is passed over the rod (43), being loose thereon, and the pawl engaged with the gear wheel (47) (see Fig. F).

(To be continued)

Ratchet Winding Mechanism

The ratchet mechanism permitting the winding of the weight is built up as shown in Figs. E, F and G. As will be seen from the two first-mentioned, the complete ratchet element is made by passing a 6" rod (43) through a wood roller (44), the ends of which are clamped between two bush wheels (45) secured on the rod. The bosses of the bush wheels are entered into the ends of the wood roller and the bolts (46) engage in the end notches of the wood roller to key the roller to the bush wheel (45).

A 1" gear wheel (47) is then bolted on the rod (43) with its boss close against the end bush wheel (45). Four washers (48) are then threaded on the rod.

The element shown in the centre of Fig. E is next passed over the rod. This element is made as follows:—

NEXT MONTH:

We shall print the Final Instalment of this article on the Meccano Clock.

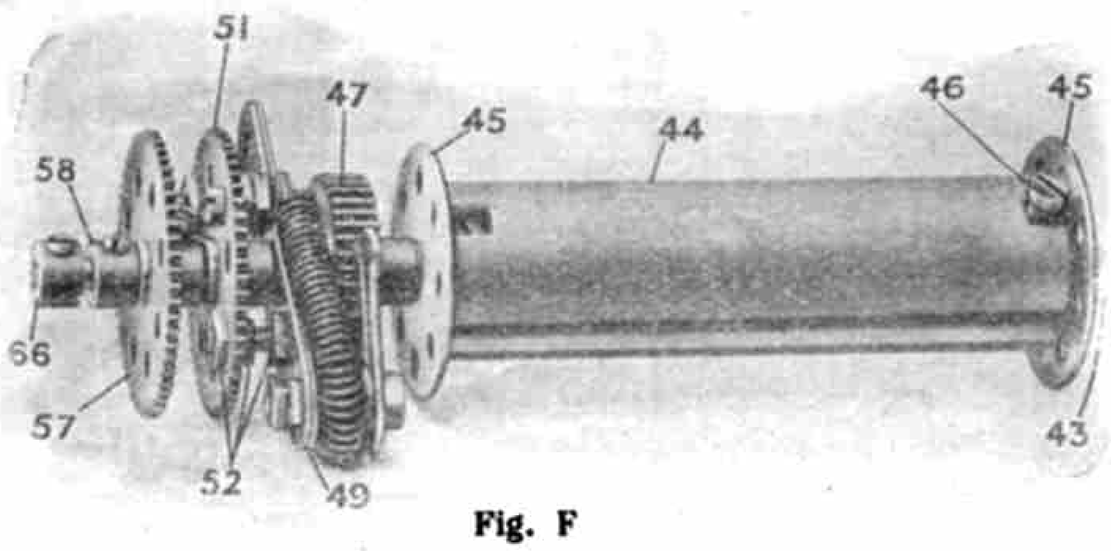


Fig. F

OUR MAIL BAG

In this column the Editor replies to letters from his readers, from whom he is always pleased to hear. He receives hundreds of letters each day, but only those that deal with matters of general interest can be dealt with here.

Correspondents will help the Editor if they will write neatly in ink and on one side of the paper only.

Ian MacDonald (?).—We have received your letter enclosing 1/8 subscription for the "*M.M.*" You have not sent us your address, however, and we shall be glad if you will kindly do so in order to enable us to trace.

H. Dewhurst (Nelson).—You are indeed fortunate in having secured a Club Leader who has given his members the use of his Art Gallery, Library, Billiard Table and Lathe. No wonder you enjoy the club nights so much. Your club magazine is very creditable.

M. J. Rowlands (Trawsfynydd).—"*M*eccano *E*n courages *C*oncentration, *C*arefulness, *A*lertness, *N*eatness, *O*riginality." Very neatly put and quite true.

W. G. Ford (West Croydon).—"Your articles are always so ripping that it makes us emulate Oliver Twist." It is through having so many Oliver Twists amongst our readers that we have been compelled to increase the size of the "*M.M.*" so many times. We think our Christmas Number will satisfy even your own voracious appetite.

L. C. Denis (London).—Your solution to J. Miller's puzzle in the October Magazine is quite correct; "J. Miller first had 7 strips and his chum had 5. The chum divided his strips with his brother and then they all had 4 each." We were interested to hear that you solved the problem by Algebra. We have happy (!) memories of trying to make x=y.

S. Whitehead (King's Heath).—You also have solved the puzzle. We see that we shall have to think o fsomething really difficult for our new Puzzle Column !

D. O. Boyd (Callestick).—A Competition for the best photograph of the nest and eggs of a British bird would, we fear, scarcely bring sufficient entries. We are, however, always glad to receive and pay for any such photographs that are suitable for reproduction.

L. B. Perkins (Bradford).—We appreciate your praise for the "*M.M.*" Sorry we said "Photographic." Our printers try to explain it by saying that the compositor had the hump when he set the word.

W. Tomsett (Saundersfoot).—If you order the "*M.M.*" from Messrs. W. H. Smith & Sons they will supply it to you regularly. We shall reprint "Dick's visit to Meccanoland" later, possibly in the "*M.M.*"

H. E. Huisle (Paddington).—"A fine way of keeping the muscles strong is to get on all-fours so that the soles and heels of your boots touch a wall. Now, walk up it by moving the hands towards the wall and the feet up it." Excellent for light-weights, Herbert, but not for the poor Editor. He must just jog along with flabby muscles !

A. J. Lewis (Wynberg, S.A.).—Your letters are always welcome, and we are particularly pleased to hear of your early promotion. We hope the Wynberg Meccano Club and its fifty members will have a successful winter.

E R. Whiting (Claremont, W.A.)—Your cryptogram "*How I snaeco 2 todemansirig,*" is ingenious, but we fear it is a little too difficult for most people. Don't waste too much time on perpetual motion. Mr. Hornby once tried it, but he failed, just as everyone must. We hope you will write to us often.

A. Neilson (Buenos Aires).—We are very glad to hear of your safe arrival home, and to know that you retain such pleasant memories of your visit to the Meccano factory and of your talk with Mr. Hornby. We hope to deal with your suggestions in a later issue.

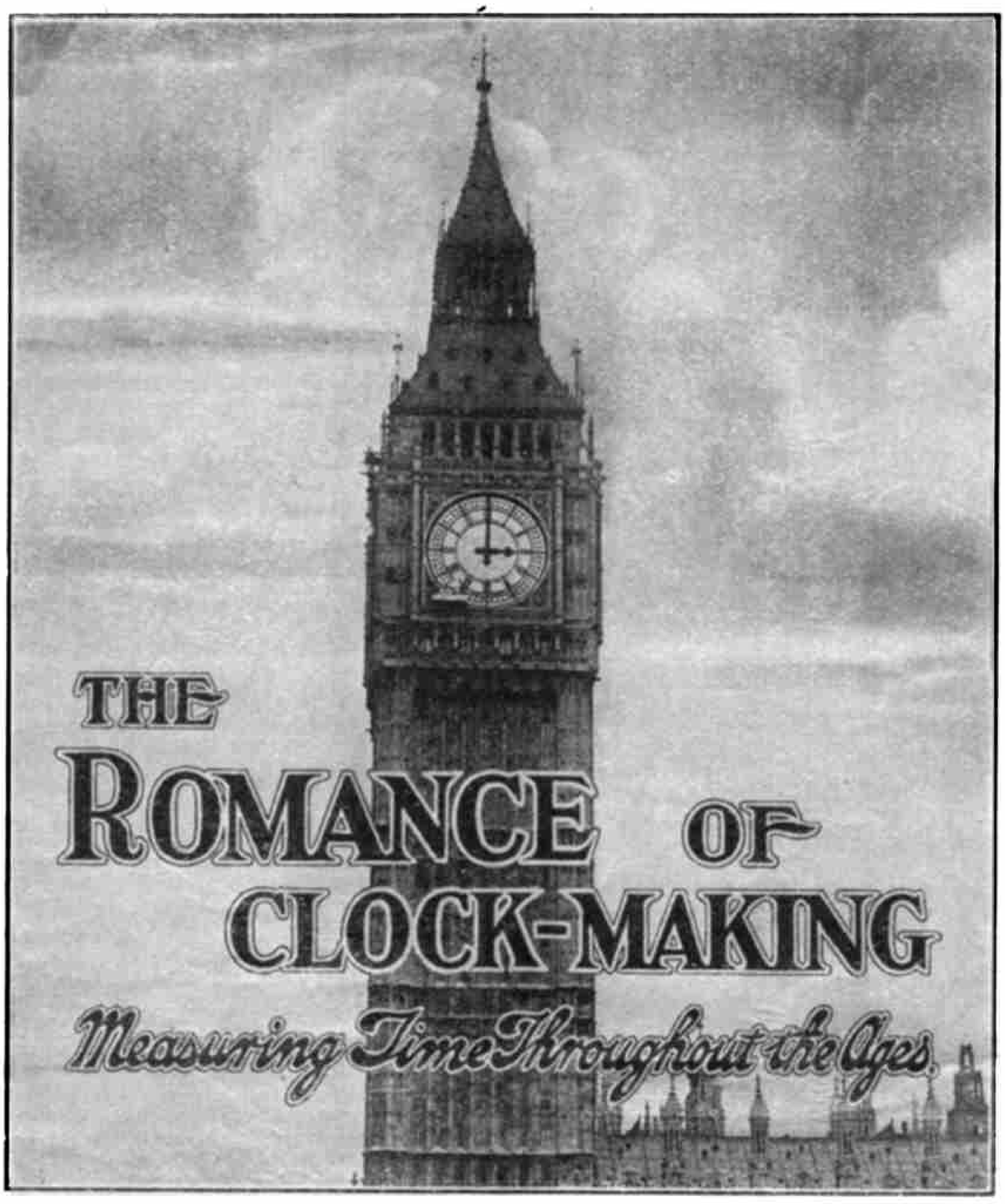
E. Shipley (Walsall).—"W2Ii Ni S4imv6 e slev qs2 ko21h5i2 3m h163mt qs1q s4imy6 qi13mh 2cx20 100 4qseih." Mr. Hornby thanks you for the message in your cryptogram, and for all the good things you say in your letter.

W. S. Lee (Clinton, B.C.)—We are sorry your club broke up on account of counter attractions. Now is the time to start it again By all means send us particulars of the radio set that is giving such good results. We are pleased Meccano helped you so much

S. Johnson (Bedford).—

"The poor benighted Hindoo,
He does the best he kindoo,
From first to last
He keeps his caste,
And for clothes he makes his skindoo."

You have a well-developed sense of humour, Sidney, and we are sorry we are only able to find room for one of your little poems. If you ever write similar life stories of other native tribes we will try to make room for them



HOW few of us realise the tremendous amount of thought and work that has been necessary to bring to perfection the mechanism of a clock. In these days clocks and watches are so numerous, and may be purchased for so little, that we forget the wonderful story that lies behind the measuring of time throughout the ages.

How many of us realise, for instance, that the accuracy of our time depends upon an astronomer's observations at Greenwich Observatory? Although it is very interesting to learn about the canals of Mars; about the wonderful clouds of Jupiter; or about the mountains of the Moon, a study of these objects does not fall within the duties of the astronomers at Greenwich. They are more concerned in checking and keeping correct their master clocks that give the time to all the clocks in the country.

Astronomers Keep Our Clocks Right

Every night the astronomers watch with a large telescope for the passing of a star across a particular part of the sky, which passage denotes the correct time. The diagram on this page illustrates what the astronomers see when they are checking the time. In the telescope are several vertical lines, which are actually portions of a spider's web placed in the eye-piece of the instrument. It is possible to calculate the exact instant when a star should pass each of these lines, and the observer watches for this to take place. The star enters the field of view from the left and passes each of the lines in turn. In the accompanying figure the star lettered A has passed the second line and is approaching the centre of the field. The star B is exactly on the second line. When the observer sees that the star is on a vertical line he presses a key, which completes an electric circuit and the exact instant is marked on the cylinder of a recording machine.

The work of the astronomers enables us all to get up punctually; school to start to the minute; and express trains to depart "on the tick." Imagine the chaos that would result if the astronomers set the nation's clocks half-an-hour late! We should all be up late; schools would be late; trains would be all wrong and everyone would be in a bad temper as a result!

Even greater confusion would result at sea, however, for a sailor cannot find the exact position of his ship unless he is provided with the correct time. He obtains this information by wireless, time signals being sent out at stated periods by the Eiffel Tower and other large stations. It is the astronomer who ensures that the radio signals are broadcast at the correct instant. In the case of the Eiffel Tower, for instance, transmissions are actually sent out by a master clock at Paris Observatory, the time of which is checked with the passage of different stars several times during the night.

Primitive Measuring Devices

Have any of you boys ever wondered how the people of old were able to tell the time, long before watches and clocks were invented? They did so either by the Sun or the Moon, noting their position in the heavens by day or night. In those days time was not measured by hours, minutes, or seconds as it is to-day. Instead, it was divided into "years," according to the apparent motion of the Sun among the stars; into "months" by the revolution of the Moon around the earth (the word "month" indicates this); and into "days" by the alternate light and darkness, caused by the rising and setting of the Sun.

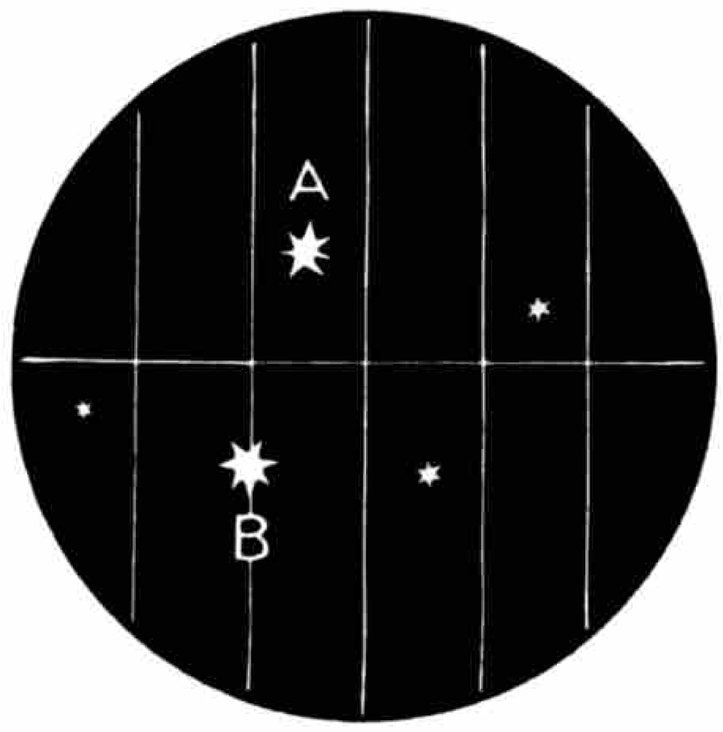
Later, the day was divided into several equal portions by watching the movement of a shadow; for as the Sun moves through the sky the position of a shadow continually changes. The different positions were marked by means of pieces of wood or stone, placed on the ground. By these means the ancients were able to measure the passage of time, principally with a view to obtaining a more accurate idea as to when to expect darkness to descend upon the land.

A development of this early device was the sun-dial, examples of which are to be seen to-day outside some old churches or in old-world gardens. The earliest record of a sun-dial is found in the Bible, where in the II Book of Kings, chap. xx., v. 11, we read of "the dial of Ahaz." The Sun does not always shine, however, and when it is cloudy sun-dials are useless.

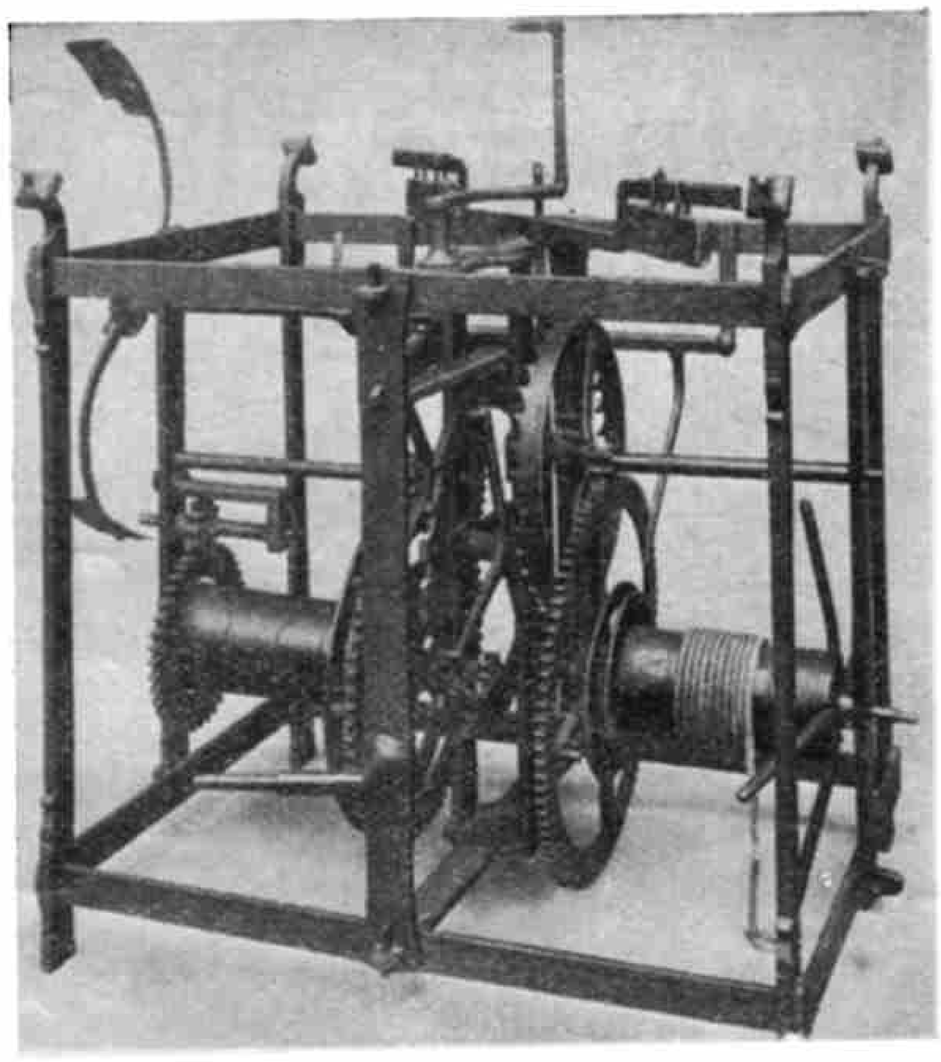
The Water-Clock

As civilisation spread, and the lives of people become more ordered and regular, there was an increasing demand for some other device for measuring time. This resulted in the introduction of the *Clepsydra* or Water-Clock, which is of great antiquity. From old models discovered, and from references in ancient documents, we know that water-clocks were used by the Greeks and also by the Indian tribes of America. Julius Cæsar, when he invaded Britain in B.C. 55 found water-clocks in use among the natives, and with these clocks is said to have observed that the summer nights in Britain were shorter than those in Italy.

In its original form the water-clock consisted of a vessel filled with water, which was allowed to escape through a



What the astronomer sees when he looks through the transit instrument—a telescope with lines marked in the eye-piece.



The Famous Dover Castle Clock

small hole. By noting how far the level of the water had fallen, it was not difficult to determine the interval of time that had passed since the vessel was filled.

Water-clocks—which could, of course, be used by day or by night—were subsequently improved, and in a later form the water dripped into a second vessel, in which a wooden figure was placed. As the level of the water rose in the second vessel the wooden figure floated higher and higher, and the intervals of time were thus more easily noticed.

Soon afterwards hour symbols were painted on the inside of the vessel and a figure with an outstretched arm was used as a float. As the figure rose, the outstretched arm pointed to the hour on the inner side of the vessel, ultimately resulting in the hour-hand of our present day clocks.

How the Clock-Face Originated

In another type of water-clock a dial similar to a clock-face was placed over the vessel containing the water. On the water floated a piece of wood attached to which was a string running over a wheel connected to the hands on the dial. The water was allowed to drip from the vessel so that it took exactly a day to empty. As the floating wood sank lower and lower, the string pulled the hand around the dial. In this form of water-clock the face had twenty-four figures. The device could only record the hours, however, because it had only one hand.

A considerable amount of skill was exercised in the construction of these water-clocks, as is evident from models to be seen in many of our museums. Some of these models are of very beautiful design and clever craftsmanship. One famous example, in brass, was sent in the year 800 by the King of Persia to the Emperor Charlemagne. In this clock twelve figures of horsemen marched out of twelve windows one by one, according to the hour. When twelve hours had passed the figures returned again, closing the windows after them as they marched back!

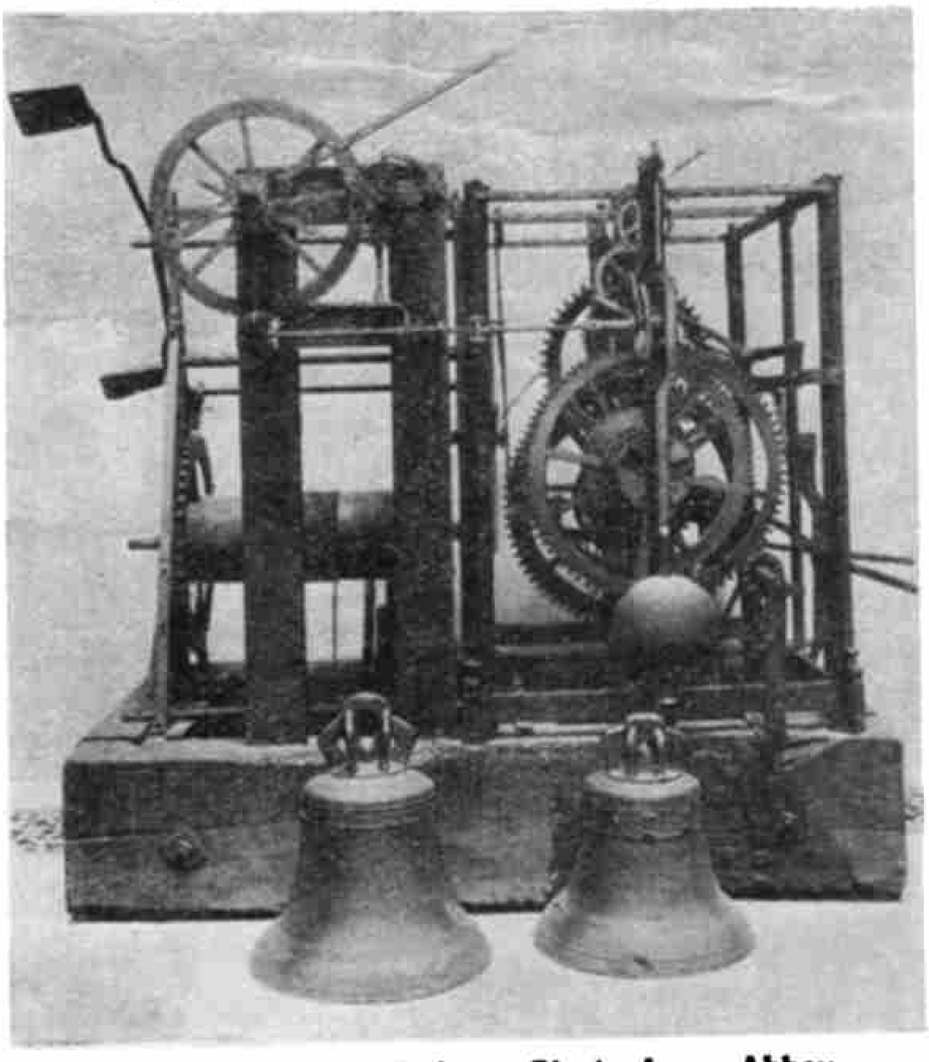
Measuring Time with Sand

About the year 330 A.D. sand-glasses were introduced. These were glass vessels shaped something like a figure 8, the narrow waist of which only allowed the sand placed in the top half of the glass to run through grain by grain. It required an hour for the sand to pass from the top to the lower half of the glass, after which the glass had to be turned upside down again so that the next hour could be measured by the sand running back again. Although it was not difficult to roughly ascertain how much of the hour had gone by the quantity of sand that had fallen, the great disadvantage of sand-glasses was that people often forgot to turn them back after the hour was run, and so lost the correct time. Then again, unless they were continually attended to during the night, the time was lost and the hours could only be counted from the time at which the owner of the glass awakened and started off the sand-glass! Because of these disadvantages it is not surprising to learn that sand-glasses were not in use for very long.

Candle-Clocks

Another early method of measuring time was by burning long candles, made to burn for a certain number of hours. These candles had divisions down their sides, each mark showing when an hour had passed. Candle clocks were very unreliable, however, for the slightest draught would alter the rate at which the candles burned, causing them to incorrectly measure time.

(To be continued)



The Ancient Clock from Glastonbury Abbey

BRIGHT IDEAS

These columns are reserved for dealing with suggestions sent in by Meccano users for new parts, new models and new ways of making Meccano model-building attractive. We are always pleased to hear from any Meccano boy who has an idea which he considers will be useful in the Meccano system.

Leonard Powell (Crewe).—A crank on the lines of your suggestion may be constructed from two crank pieces, spaced by a coupling mounted on a 1½" rod at the flat ends, and secured on the outsides by collars. The centre grub-screws may then be removed and the screwed rod inserted in this hole.

Lance Kramer (Cheltenham).—Wire wheels would be expensive to make, and in our opinion would not be any more useful than the existing large pulley. In our Chassis Leaflet we illustrate these wheels fitted with a thick rubber ring to represent tyres. We do not stock the rubber rings on account of their perishable nature.

H. Leslie Brook (Cranlie Cottage).—(1) We shall consider carefully the matter of your suggested double crank. (2) What is the object of your suggestion to remove the groove in the 1" pulley? (3) The present 3" pulley serves the purpose of your suggestion. (4) We already list a 1" reversed bracket (No. 124).

B. C. Curby (Wooden Ferries).—We already have the matter of curved girders under consideration.

E. C. Robinson (Leeds).—Forked couplings have a very wide range. Several combinations suggest themselves and we shall go carefully into their adaptability and cost of manufacture.

L. Burstert (Marseilles).—Grooves in our rod are not practical on account of the smallness of the diameter. We are examining a method for giving a sliding action.

Harold Green.—(1) Your suggested sprocket wheel is not possible on account of the width of the boss being more than ¼". (2) We have not yet found any mechanical combination requiring a cone sprocket, and we should be interested to hear whether you have.

A. Despeyroux (Mezin, Nord).—(1) We do not stock rubber rings on account of their highly perishable nature. (2) We do not as yet contemplate manufacturing steam models, but probably we shall go into the matter at some future date.

A. de Vaucleroy (Moulton).—(1) Sectional pieces for constructing ships' hulls are scarcely practical. Efficient sealing of the joints would be a difficulty, and a further disadvantage is that such sectional pieces do not lend themselves to general model construction. (2) The reason we brass our nuts and screws is to give a more pleasing contrast to the nickel strips. (3) We shall probably increase the range of bevel gears shortly. We do not employ bevel gears in our differential and suggest you send for a copy of the Chassis Leaflet.

Robert A. Harvey (London, S.W.).—There may be possibilities in a ratchet wheel, and we shall go into he matter.

C. Manclair (Fretegency).—(1) Secured to the face plate our present flanged disc gives a flanged wheel. (2) We do not see any general use for your suggested thin steel strips for centrifugal governors.

G. A. Liardet (Bradford).—(1) We have already considered a groove in our rod for a sliding action, but it was found to be impracticable on account of the smallness of the diameter. (2) Will you give us instances where your suggested threaded wheels could be employed?

F. Harper (Wakefield).—With a constructional motor there is always the possibility of the standard of efficiency not being attained. For this reason we refrain from issuing the Meccano Motor in constructional form.

S. Gough (Smethwick).—We are interested in your special nut, and would like to have further details of its employment in any of the models you mention.

A. Dakin (Bradford).—We shall go into the matter of a suitable mounting for models.

H. P. Croom-Johnson (Blaby).—We are constantly increasing our range of train accessories, and shall no doubt include such a carriage as you suggest, and also signals.

E. Thomson (Crieff).—We have in mind the question of flat angle strips on the lines of your suggestion.

E. C. Corps (Northampton).—A double angle strip, with flanges such as you suggest, may be constructed from a 1½", or any strip of the desired length, secured to reversed angle brackets.

H. R. Stafford (Sutton).—As far as we can make out from your sketch your suggested piston rod appears to be more on the lines of a crank shaft, similar to accessory part No. 134.

Leslie K. Thompson (S. Petherton).—Various types of combination points and crossings will be added to our list in due course.

James Stevens (Kingston Hill, Surrey).—We have in mind new types of rolling stock for Hornby Trains, which it is our intention to make as comprehensive a system as possible.

New Rolling Stock and Accessories

THERE are new Wagons, Signals, Lamps, Stations, Turntables this year, all built in correct proportion to the size, gauge, method of coupling, etc., of the Hornby Trains. Most important of all they have the uniformly beautiful finish which is the great feature of the Hornby system. To use cheap-looking rolling stock or a foreign-looking station with a Hornby Train completely spoils the effect.

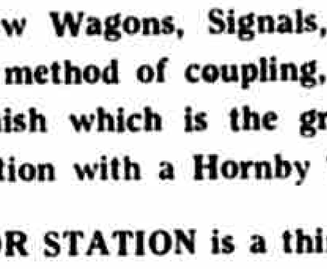
THE WINDSOR STATION is a thing of beauty—the only really British station obtainable. Its bright colouring and realistic appearance will bring joy to the heart of every boy who sees it.

BRAKE VANS
Finished in colour.
Each **4/6**

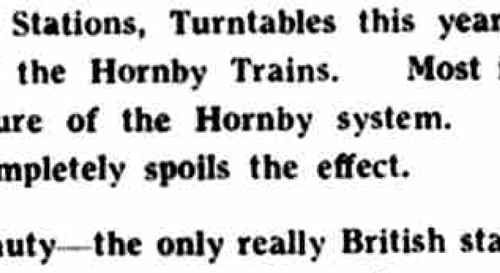
WINDSOR STATIONS
Excellent models, beautifully designed and finished.
Dimensions: Length 2 ft. 9 in., breadth 6 in., height 7 in. Each **12/6**

No. 1 LUGGAGE VANS
Letter M.R. Representative colours.
Each **4/6**

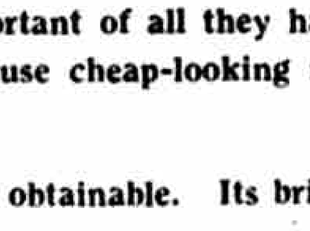
REFRIGERATOR VANS
Enamelled in white, lettered black. Each **4/6**



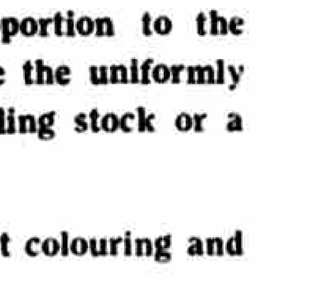
MILK TRAFFIC VANS
Fitted with sliding door, complete with milk cans. Each **5/-**



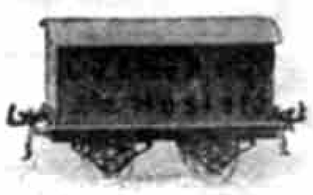
No. 2 LUGGAGE VANS
Finished in colour. Fitted with double doors. Suitable for 2 ft. radius rails only. Each **7/-**



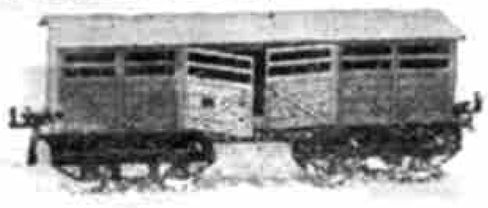
GUNPOWDER VANS
Finished in red.
Each **4/6**



No. 1 CATTLE TRUCKS
Fitted with sliding door, Very realistic design.
Each **4/6**

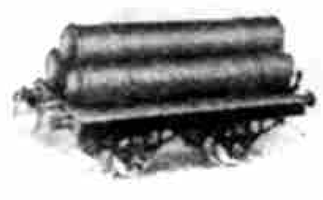


COLMAN'S MUSTARD VANS
Finished in colour.
Each **4/6**

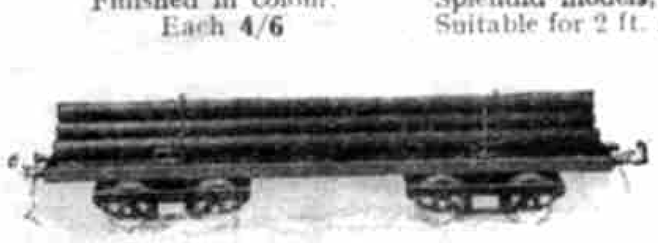


No. 2 CATTLE TRUCKS
Splendid models, fitted with double doors.
Suitable for 2 ft. radius rails only. Each **7/-**

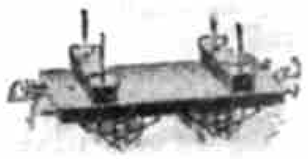
TROLLEY WAGONS. Finished in colour.
Suitable for 2 ft. radius rails only. Each **6/6**



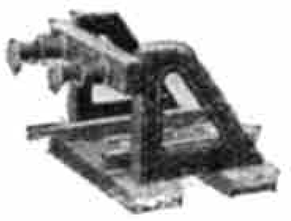
GAS CYLINDER WAGONS
Finished in red, lettered gold.
Each **4/-**



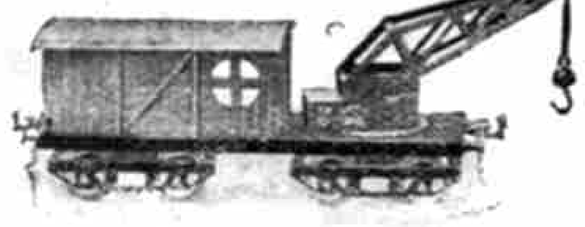
No. 2 LUMBER WAGONS
Fitted with bolsters and stanchions for log transport.
Suitable for 2 ft. radius rails only. Each **5/6**



No. 1 LUMBER WAGONS
Fitted with bolsters and stanchions for log transport. Each **2/6**

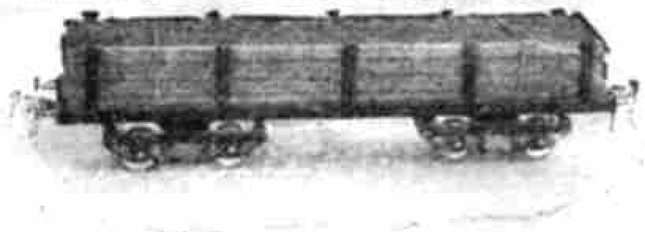


SPRING BUFFER STOPS. Each **2/-**

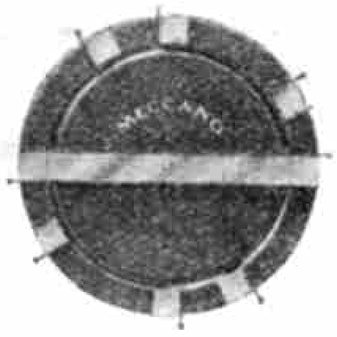


BREAKDOWN VANS AND CRANES
Excellent finish. Beautifully coloured.
Suitable for 2 ft. radius rails only. Each **7/-**

No. 1 TIMBER WAGONS
Beautifully enamelled in colour and stoved. Each **2/-**



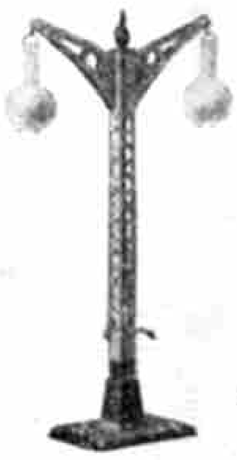
No. 2 TIMBER WAGONS
Beautifully enamelled in colour and stoved. Suitable for 2 ft. radius rails only. Each **5/6**



TURNTABLES. Each **4/6**

ROTARY TIPPING WAGONS
Finished in colour.
Each **3/6**

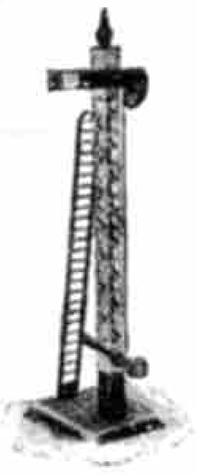
SINGLE LAMP STANDARDS
A four-volt bulb may be fitted into the globe.
Each **3/-**



DOUBLE LAMP STANDARDS
Four-volt bulbs may be fitted into the globes.
Each **4/-**

TELEGRAPH POLES
Each 3

LOADING GAUGES
Each **1/9**



SIGNALS
Each **2/6**

MECCANO LIMITED BINNS ROAD LIVERPOOL

Into the Land of Fun

by

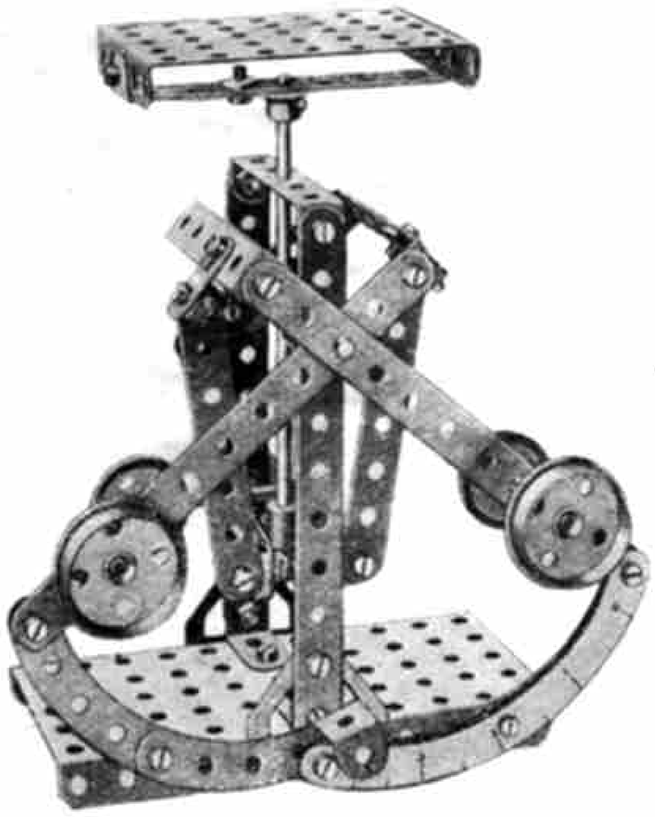
"SPANNER."

IT seems strange to me that any boy should be content to build only those models that are shown in the Meccano Manuals. Yet I meet many such boys in my travels, and I always think that they are missing more than half the fun of Meccano. I sometimes wish I could take these boys over to Liverpool, and show them the wonderful model-building room at the Meccano factory. I'll warrant that my young friends would be so inspired that they would return home and build a new model every day for the remainder of their lives!

I mentioned this matter to Mr. Hornby on the last occasion that I was over at Liverpool. His reply was so interesting that I made a note of it.

"Yes," he said, "it is as you say many boys do not realise the wonderful possibilities of the Meccano system. We illustrate in our Manuals only a small number of the models that may be constructed with each Outfit. We show representative types, as it were, and leave it to the Meccano boy to build others. Come with me!" saying which he led the way to the model-room.

"Here," he said, indicating hundreds of models, "are some of the experimental models we have built during the past twelve months. From them we have selected a number of representative types for inclusion in our new Complete Manual. Every one is a splendid model, and we should like to include them all, but what can we do? Our Complete Manual



Model 306. Letter Balance

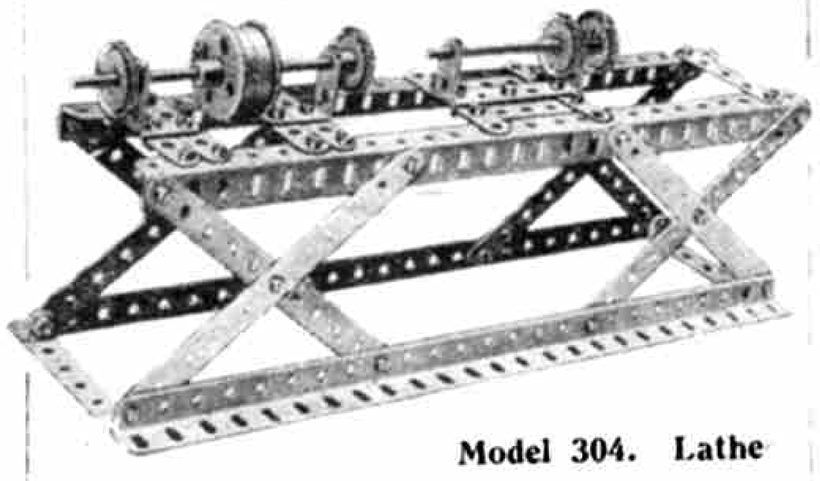
already illustrates nearly 400 models, and it is really quite impossible to include any others on account of the lack of space. If we were to show all the models that can be built with Meccano we should require a manual with 10,000 pages!"

I quite agreed with Mr. Hornby, but I could not help feeling sorry that all Meccano boys could not see the rows and rows of splendid models that stood before me—Cranes, Bridges, Derricks, Dredgers, Guns, Motors, Engines, and a host of others too numerous to mention. "Tell your Meccano boys," concluded Mr. Hornby, "that if they use their brains they can build hundreds of models not shown in any of our Manuals, and from them they will obtain any amount of pleasure."

It struck me after leaving the factory that the prize-winners in the £250 Model-Building Competitions were the boys who had used their brains in the manner Mr. Hornby suggested, and I pictured to myself what wonderful fun these prize-winning Meccano boys must have had thinking out the new models—models which in many cases differ entirely from any of those shown in the Meccano Manuals.

I think that one of the greatest charms of the Meccano system lies in its never ending variety. There is no need to build the same things over again, and to the Meccano boy of ability and intelligence—the boy who wishes to "get on" in the world—there is nothing so pleasurable as inventing some new model or improving an existing model. There is so much scope for such a boy, for he has "the whole world to go at," as the saying is. Of course, in the more complicated models a greater number of parts are required, but these may be added to existing Outfits from time to time, or an Accessory Outfit may be purchased, converting the original Outfit into the next higher and so making possible a large number of new models.

Perhaps one of the finest examples of the cleverness and resource of a Meccano boy is shown in the Oscillating Steam Engine (Model No. 307). The original of this model was built by a boy a fortnight after converting his No. 2 Outfit with the addition of a No. 2a. The model is composed of ninety-nine



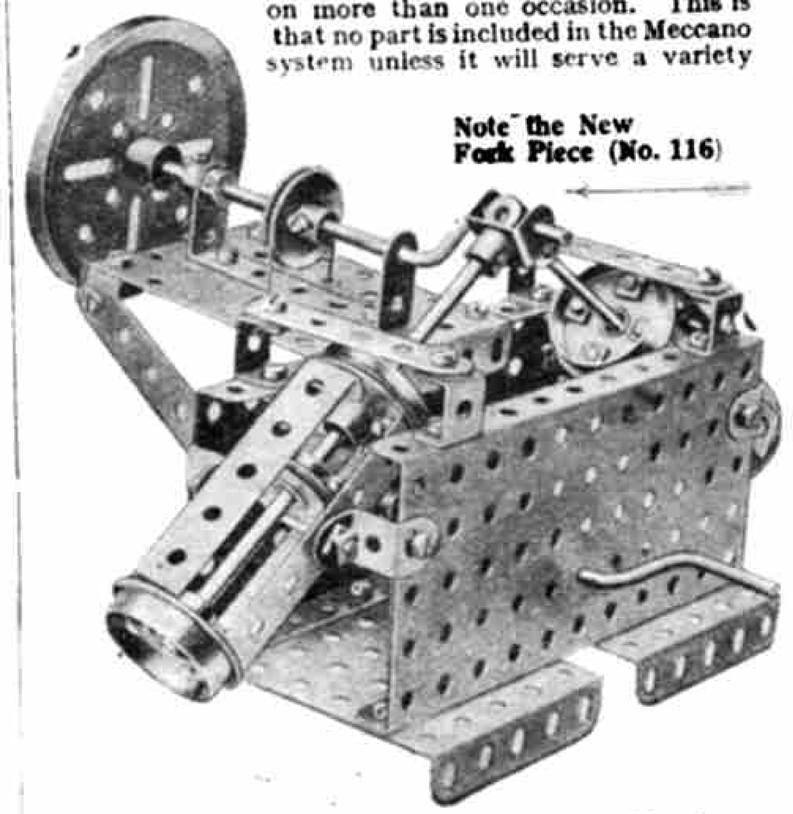
Model 304. Lathe

parts and is an accurate copy of this type of engine. When the oscillating steam engine is made to work, by turning the crank handle, the piston rods drive up and down in the cylinders in a very realistic manner. I have been told that before being published in the Manual, the original model was only slightly improved by the model-building staff at the Meccano factory. For instance, advantage was taken of a new part, the Fork Piece (No. 116), which came in very conveniently for use in the piston heads, where they join the crank-shaft.

Another model that is both interesting and useful to those possessing a No. 3 Outfit is the Letter Balance (Model No. 306). In the illustration the arms of the Balance have been fixed wide apart to show the construction of the model. In practice, however, the two flanged wheels should be touching until a weight is placed on the balance, when the curved strips open out and the double bracket piece shows the weight registered.

In the construction of this model a new and much-needed part will be found useful. This is the 3½" × 2½" perforated flange plate (No. 53) that forms the top of the balance. This part is first met with in the 2a Outfit.

It is often surprising to me to find how the addition of only one or two extra parts to an Outfit immensely widens its building scope. This is chiefly due to a principle that Mr. Hornby has discussed on more than one occasion. This is that no part is included in the Meccano system unless it will serve a variety



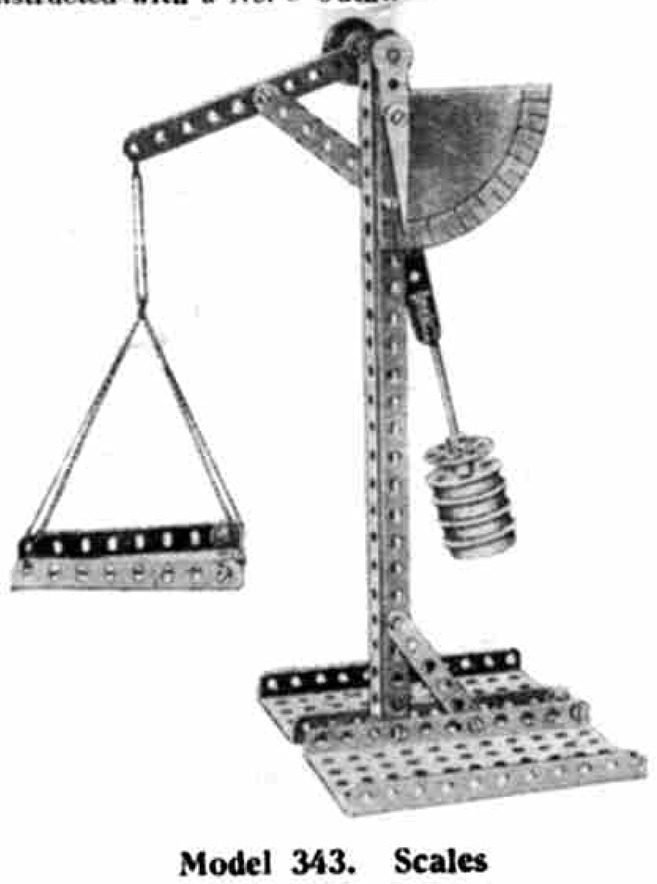
Model 307. Oscillating Steam Engine

of purposes and is applicable to several different models. Thus the Worm Wheel (No. 32), the Double Angle Strips (Nos. 46 and 48b), and the 1½" Pulley Wheel (No. 21) included in the 2a Outfit will, later on, be found indispensable in building many of the more advanced models.

Another type of balance (Scales, Model No. 343) may also be made with a No. 3 Outfit, and is an interesting model, if only because an entirely different principle is employed to that of the Letter Balance. The Scales are very simple to construct and the counterpoise weights, for which flanged wheels are used, are screwed on to a 5" axle rod (No. 15). Incidentally, it is very interesting to notice the great variety of purposes for which the flanged wheels may be used. For instance, in the four models illustrated on this page they are used respectively as weights, lathe-pulleys and cylinder heads. There are, in fact, very few models in which these handy wheels may not be employed in one capacity or another.

A model that gives a very good idea of the general working principles of a lathe is Model No. 304. This is an example of a simple form of lathe, such as is used in big engineering shops for turning metal, screw-cutting, boring and a number of other purposes.

Each of these four models, and the four described last month, are only a few of the very many illustrated in the new Complete Manual, a special section of which has been devoted to models that may be constructed with a No. 3 Outfit.



Model 343. Scales

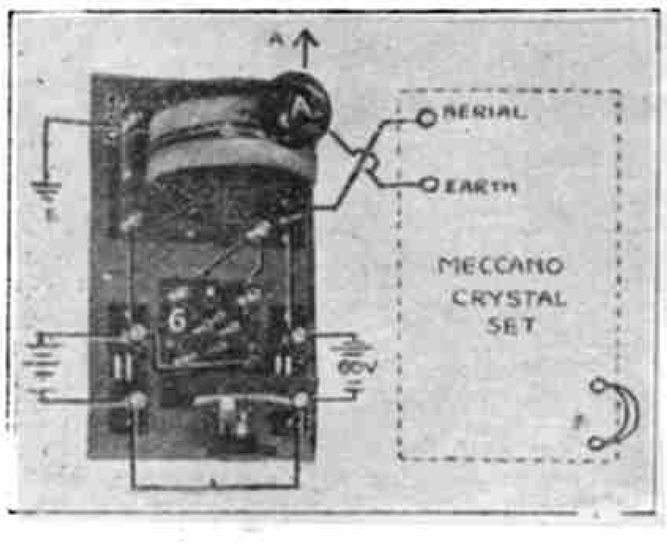
Incidentally, I should like to take this opportunity of congratulating those responsible for the system of numbering followed in the new Manuals. All models that may be made with a No. 2 Outfit, for instance, fall between the numbers 200 and 299. Models for a No. 3 Outfit are numbered 300 etc., No. 4, 400 etc., and so on. Thus it may be seen at a glance what Outfit is required to build any given model, by simply noting the first figure in its number. This saves a great deal of labour looking up the models, as was necessary under the old arrangement.

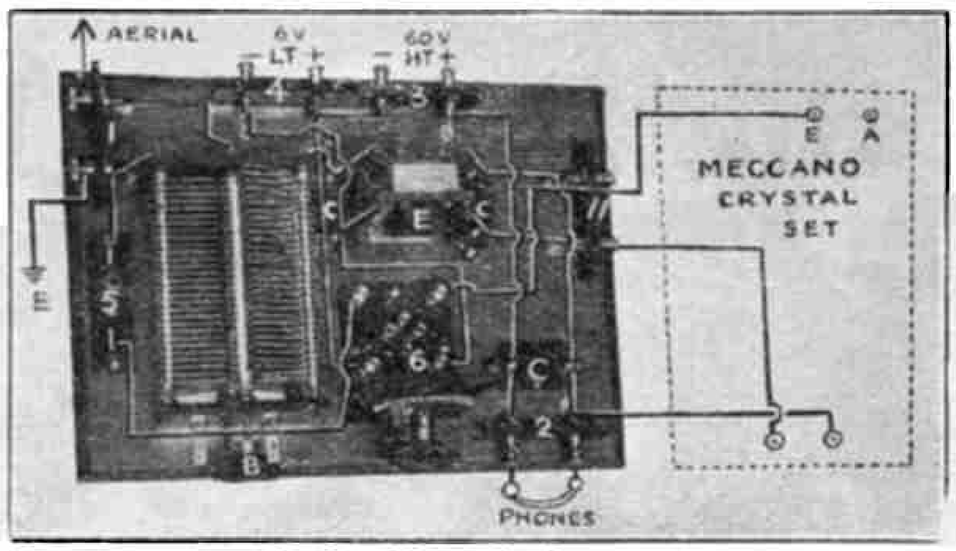
May I also take this opportunity of saying that I very much prefer the new type of illustrations in these Manuals, adopted for the first time last year. I believe these illustrations are printed by what printers technically describe as the "half-tone process." At any rate, the new method clearly shows all the component parts of the models and makes model-building very much easier. As I remarked last month, the Manual should be in the hands of every Meccano boy.

NEXT MONTH

Some Interesting No. 4 Models.

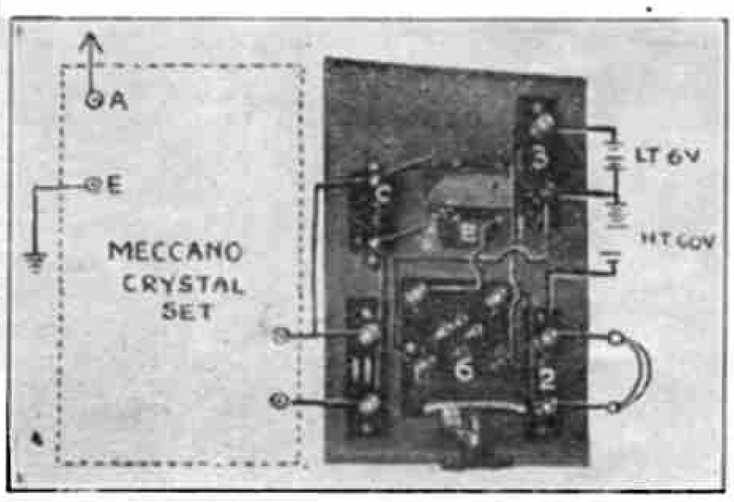
Unit No. 1 (*complete*)





Unit No. 2 (*complete*)

Unit No. 3 (*complete*)



If you have a MECCANO CRYSTAL SET here are three ways of improving it

TO INCREASE ITS RANGE

(*See Unit* 1).

As you know, boys, the Crystal Set is not much good for long distance work, although for use within 20 miles from a Broadcasting Station it gives splendid results. But there is a way to increase the range of the excellent Meccano Set to as much as 70 or 100 miles—even more under favourable circumstances—and that is by using a Valve in front of it.

Look at the illustration above, and note how easily with only four components you can build up Unit No. 1 and increase the range of your Set at least three times.

TO MAKE IT LOUDER

(*See Unit* 3)

No Crystal Set gives sufficiently loud speech to work a Loud Speaker, and as most of you at some time or another will want to entertain your friends in this way, we show you in Unit No. 3 how you can add to your Meccano Set an Amplifier which will give you speech five times as loud. For this Unit you only require components No. 2, 3, 7, 11, C, E, nothing could be easier.

PRICES AND KEY TO PHOTOS

1.	A and E terminal strip	10d.
2.	TEL terminal strip	9d.
3.	HT terminal strip	8d.
4.	LT terminal strip	8d.
5.	Single coil holder	1/3
6.	Socostat (combined valve holder and filament resistance)	7/6
11.	Output terminal strip	9d.
A.	Variometer ...	7/3
B.	.001 Variable condenser (assembled)	9/-
C.	.001 fixed condensers	1/6
E.	Max-Amp. Transformer ...	18/6
	Rubber-covered connecting wire	2½d. per yd.
H.	Fixing Brackets	1½d. each

TO INCREASE ITS RANGE AND MAKE IT LOUDER AT THE SAME TIME

(*See Unit* 2)

This method is a combination of Units No. 1 and 3, but only one Valve is used. The Circuit used in this set is known as a Dual Amplification Circuit, and is very similar to the famous "P.W." Circuit which you have no doubt read quite a lot about in "Popular Wireless."

Here again, you will be able to see by the illustration, exactly what components you need, but if you have any doubt, write to us and we will be pleased to tell you more.

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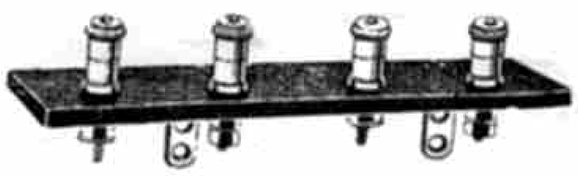

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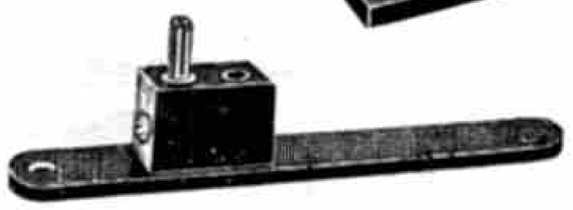
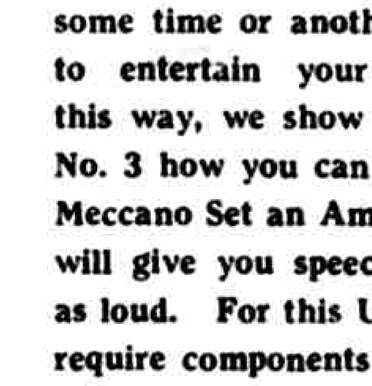
Sold in strips of 2 or 4. Engraved + HT—, +LT—, 'PHONES, price 8d. per pair of terminals. Ditto, but with telephone terminals throughout, 9d. per pair. Large ditto, engraved Aerial and Earth, Per pair 10d.



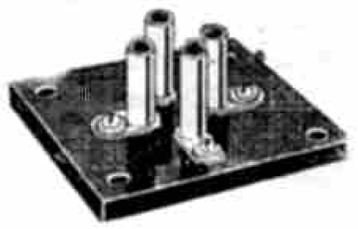
SWINGING COIL HOLDER

Enables coil to be moved through an angle to give coupling effects 2/3



COILS

No.	Wavelength	
1	290–390 mtrs.	2/-
2	340–470 „	2/6
3	420–650 „	3/-
4	570/900 „	3/6
5	780–1140 „	4/-



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Can be used also for carrying transformers, solid ebonite ... 1/3

VALVE RESISTANCES

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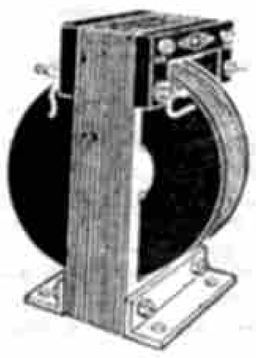

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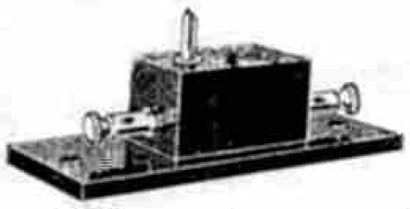

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Very economical method of carrying any type of coil ... 1/9

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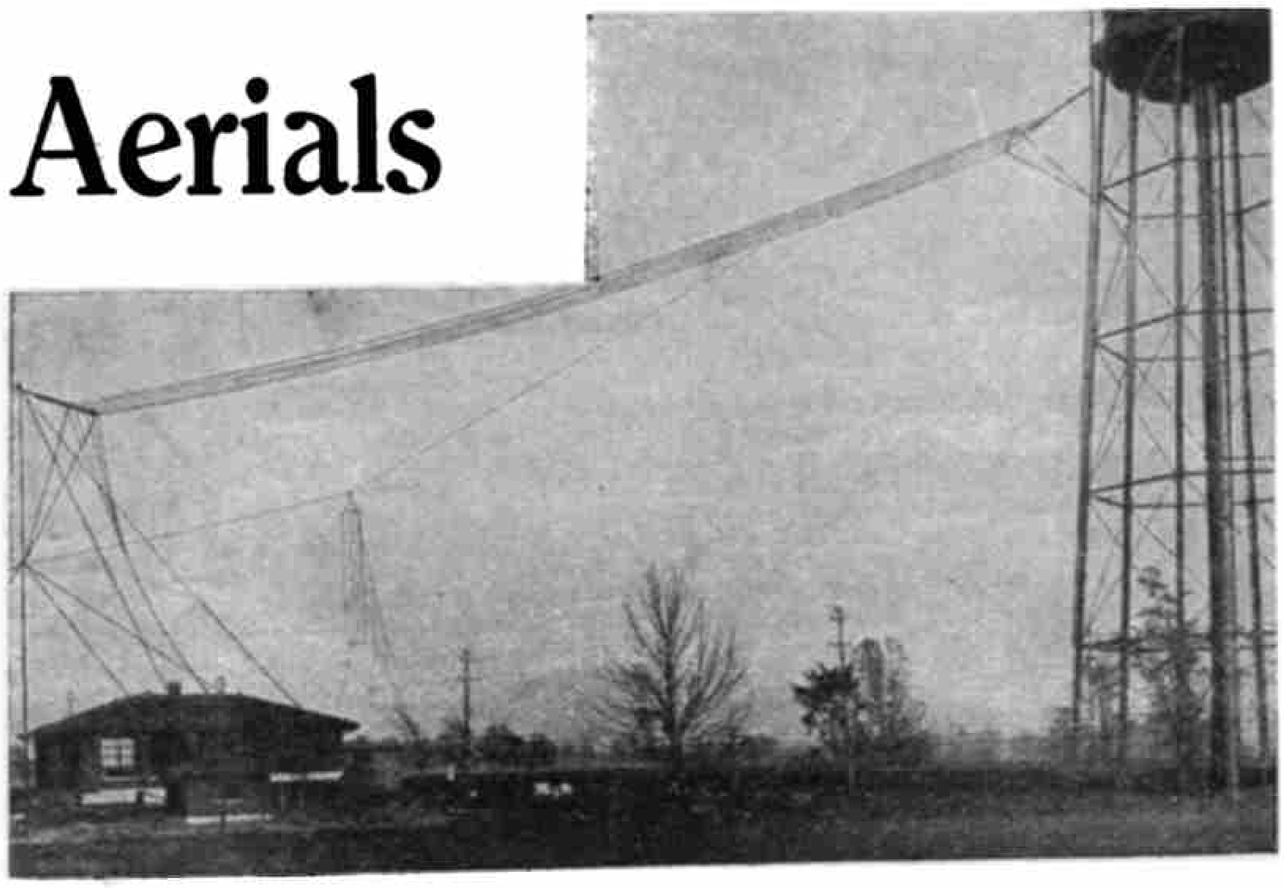
A Talk about Aerials

BY THE RADIO EDITOR

These articles describe the best type of aerial to erect and give suggestions for the erection of different aerials. When you have put up your aerial and connected to it your receiver you will be able to listen all night long to all manner of good things from the nearest broadcasting station. There need be no more dull evenings, and you will be able to entertain your friends by allowing them to listen-in.



Our illustration shows a very efficient aerial for both transmitting and receiving. The amateur to whom it belongs is fortunate in having been able to take advantage of a high water-tower near his house. The aerial is of the inverted "L" type

I.

THE aerial is, perhaps, the most important part of a crystal receiving set, for unless it is absolutely efficient, signals will either not be received at all, or if they are received they may be so faint as to be almost unrecognisable. To be efficient, an aerial must be perfectly insulated, as high up as possible, and of as great a length as the regulations permit. Whether the type of aerial employed is T-shaped or L-shaped is a secondary consideration, height and length being of the greatest importance.

We all know that there are many difficulties in erecting an aerial. First of all there is a plan to be made, and this is, perhaps, the least difficult part of the business. Those boys who cannot have a straight span of, say, 40 ft. between two supports have to think out some alternative scheme whereby the necessary length and height may be obtained.

Next comes the question of erecting the poles that are necessary in the majority of cases. Permission has to be obtained from father or mother—or sometimes from both! If the poles are to be attached to the brick-work of the house, permission may have to be obtained also from the landlord.

Having obtained these permits and the poles, the next thing is to secure the latter in position. Here more difficulties

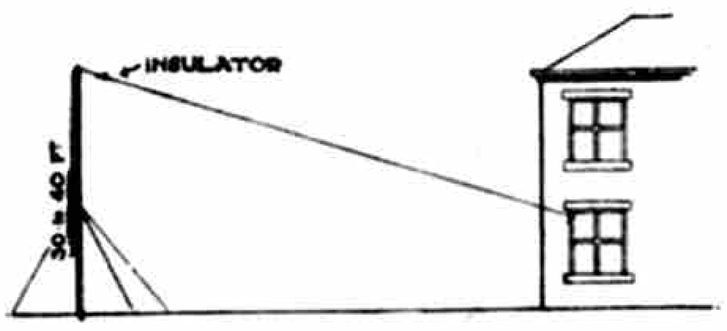


Fig. 1

may be encountered, especially if you get stuck on the roof with a 20 ft. pole in one hand and a hammer and staples in the other—then you really do begin to wonder who invented wireless, and why! Generally it is best to have the poles fixed by some local firm of builders, or by some "handy-man." In some towns there are now firms who specialise in the erection of aerials, and their charges are generally quite reasonable.

Difficulties were made to be overcome. The ingenious boy will not be prevented from participating in the joys of Radio because of any difficulty in erecting his aerial.

II.

Although almost any kind of wire will enable signals to be received, a wire made of an alloy of copper—such as phosphor-bronze—is more susceptible to radio impulses than other metals. Even better is an all-copper wire. The wire

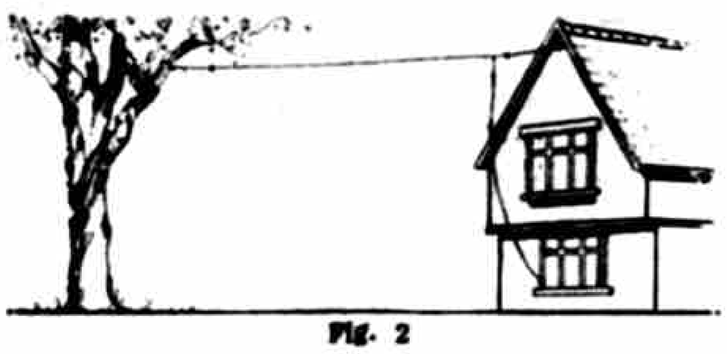


Fig. 2

should be fairly thick—gauge 14, 16 or 18, for single wire, or if the greatest efficiency is desired, a stranded copper wire should be used. (7/72's is perhaps the best of all). The wire may be bare or covered with insulation, which does not affect the impulses in any way. The Postmaster General allows an aerial length of up to 100 ft., including the height of the leading-in wire measured vertically from the leading-in point. In other words the combined height and length of the aerial must not exceed 100 ft. Any number of wires may be used in the aerial.

The "antenna," as the aerial wire is called, whether composed of bare or covered wire, must itself be insulated from the earth. Poles, house-walls, rope and such substances all conduct electric currents more or less completely, especially when wet. The antenna must not touch anything that is capable of conducting

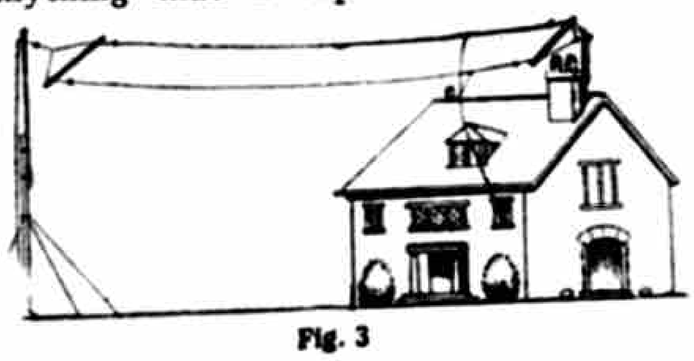


Fig. 3

an electric current, or the impulses will be led to earth instead of to the receiving apparatus.

The best way of insulating the antenna is to fasten it to porcelain insulators, themselves suspended from the two points of suspension by rope or string. If the distance between the two points of suspension exceeds the desired length, the space may be bridged by suspending the insulators with a longer rope at either or both ends.

III.

Nearly every mail brings me letters from the readers of the "*M.M.*" asking "Which is the best type of aerial to erect?" This is a question that opens up a large subject. In the first place nearly every aerial that is erected is different to other aerials, because the situation of nearly every "listener-in" varies. One boy may be very fortunate and have a 30—40 ft. flag-pole at the bottom of his garden. He then has no difficulty in erecting his aerial by attaching one end to the pole and taking the other end directly into the house (Fig. 1). He is able to obtain a straight run of

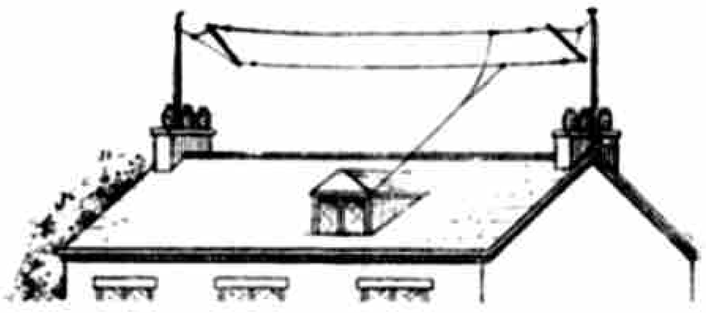


Fig. 4

say 60 ft. across the lawn, and so he uses only a single wire.

Another boy has no flag-pole, but there is a tall tree in the garden, and this he uses to support one end of the aerial.* He is more anxious than boy

(*Continued on page* 155)

*NOTE.—When fastening the aerial to a branch of a tree, it is a good plan to introduce a light spring between the insulator and the branch. This allows for slight movements of the tree in the wind.

Have you a Wireless Set?

Mr. E. J. BARNARD, Welling, Kent, writes :
"I think I ought to tell you how much I value '**The Amateur Mechanic.**' It has proved of great assistance in a variety of jobs, and especially as to the article on WIRELESS TELEGRAPHY. I constructed an instrument entirely according to the instructions, and was rewarded with success on the first trial. Considering that my aerial is only 42 feet long and 18 feet high, I think these are grounds for self-congratulation. **I may add that until I became interested in the article in your 'Amateur Mechanic' I had not the slightest elementary knowledge of Wireless Telegraphy.**"

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There is no waiting to study or learn. The moment "**The Amateur Mechanic**" arrives you can start in to do one of 400 money-saving jobs about your home and garden.

How to build your own sheds, outhouses, poultry houses, etc.—How to cure damp walls, leaky roofs, and smoky chimneys—How to make garden frames, garden furniture, and garden paths—How to mend windows, and to make, mend, and strengthen locks and bolts—To clean, overhaul, and repair motors and motor-cycles—To instal electric light, etc.—To work in every kind of metal—To etch on brass—To write on glass—To make hectographs—To build a boat, a canoe, a canvas canoe, etc.—To paint and paper a room—To sole and heel and patch boots and shoes—To make a pair of hand-sewn boots—To restore colour to old brown shoes—To make household furniture—To re-seat chairs—To upholster sofas, etc.—To instal a speaking tube—To clean a stove—To repair bicycles—To work in metal—To colour metals—To repair water taps—To varnish a violin—To remedy damp walls—To repair the piano—To make a padded chair from an old cask—To stuff animals—To dress furs—To stuff and mount birds—Wood inlaying—To prepare working drawings—To renovate a grandfather's clock—To make garden arbours, arches, seats, summerhouses, etc.—To use metal drilling tools—To renovate mirrors—To mend china—To do fretwork—To limewhite poultry houses—To do gold-plating and silver-plating—To clean a watch—To mend keyless watches and ordinary watches—To distemper ceilings and walls—To make picture-frames and frame pictures—Curtain fitting—Metal castings—To clean paint off glass—To clean boilers—To fix an anthracite stove—To re-gild and restore picture frames—How to use spanners—To make doors and windows draught-proof—To paint walls—To do nickel-plating—To cure noises in hot-water pipes—India and glue varnishes—To make plaster casts, etc., etc.

"Parents would be wise in buying these works for their boys. How you can turn out these books at the price beats me."—Mr. WALTER JOYCE, St. Philip's Place, Leeds.

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The Men Who Gave Us Radio:

VI. HUGHES, HERTZ, ONESTI, and BRANLEY.

In previous instalments of this article we have described the work of those scientists, who, in the nineteenth century and previously, contributed to the discovery of the principles of wireless telegraphy.

As will be seen from these articles, the invention of wireless telegraphy was not solely due to Marconi, although he was the first to put into operation a practical system. Many boys are surprised to find that Radio is the result of researches that extend over the past century. Progress may be traced by studying the lives of those men who devoted themselves to the science. The manner in which they overcame difficulties and step by step gained the desired end, is a splendid object lesson for every Meccano boy. In this series of articles we are outlining the development of Radio by briefly describing the researches of those scientists who, before Marconi's time, laid the foundation of communication without wires.

Hughes

UNTIL the end of the nineteenth century two methods had been used to transmit messages from one place to another without wires. These were (1) Conduction, or the use of the conductive properties of the earth and of water for conveying the electric force, and (2) Induction by which the electric impulse is transferred from one circuit to another, without there being connection between the two circuits.

Towards the end of the century, however, these two methods were superseded by the discovery that electro-magnetic waves may be *radiated* through space, and it is upon this fact that present-day Radio depends. Credit for this discovery is generally accorded to a German named Hertz, but—although Hertz certainly was the first to publicly make known the existence of these waves—we now know that they were first discovered by a British scientist, Professor D. E. Hughes.

Hughes, who was the inventor of the microphone and of the printing telegraph, had been engaged in a study of wireless telegraphy from 1879 to 1886. He discovered that when a current passing through a coil of wire was interrupted it caused such intense currents at the exact instant of interruption in a second coil near by that the atmosphere was momentarily disturbed. Solid objects did not seem to present any obstacle to these disturbances, which seemed to be able even to pass through walls with ease.

Using this discovery, Hughes devised a means of transmitting signals to a considerable distance, and several leading scientists witnessed his demonstrations. In 1892 Sir William Crookes wrote that: "Even now, telegraphing without wires is possible within a restricted radius of a few hundred yards. Messages may be transmitted from one part of a house to another, without intervening wires."

Professor Hughes believed his success was made possible by electric waves. He did not announce his results, however, because three eminent scientists expressed the opinion that his achievement did not involve any new discovery. They stated that the results could all be explained by known electro-magnetic induction effects, and that therefore Professor Hughes's view, that there existed unknown electric waves, could not be accepted. In the face of this discouraging report, Hughes did not devote further time to the matter and the great opportunity passed him.

Hertz

Although the secret of wireless communication had not yet been solved, the triumph of science was rapidly drawing near, for a new era was to commence with the notable discoveries of Heinrich Hertz, of Munich. Hertz greatly advanced the science of electricity, taking up the subject at the point to which it had been advanced by Faraday and Clerke-Maxwell.

Hertz studied at Berlin, where in 1880 he became assistant to Helmholtz, a notable physicist. He was particularly attracted by Clerke-Maxwell's theory regarding light and electro-magnetic waves in the ether, and (in 1888) commenced to investigate the subject at the suggestion of Helmholtz. His object was to establish the existence of the waves by actual experiment, and at last, after considerable work and study, he succeeded in doing so.

In these experiments Hertz used an apparatus, called an "oscillator," consisting of two metal discs each mounted at the end of a rod. Metal knobs were fixed at the opposite end of these rods and when these were connected to an induction coil they became charged. This caused a spark to jump across the small gap that separated the two balls. When this occurred, electric waves were radiated from the apparatus, each oscillation causing, as it were, a ripple in the ether.

Hertz next bent a wire into a circular shape, cut it and placed a small metal knob at the end of each wire. This part of the apparatus, called the "resonator," was placed a short distance away from the oscillator. When the latter was set in action, sparks were seen to jump across the gap in the resonator, although the latter was not connected in any way with the oscillator.

Hertz showed that the waves in the ether caused by the oscillation closely resemble waves of light. He showed also that they might be reflected, refracted and even polarised, just as may light. He thus brilliantly demonstrated beyond doubt Clerke-Maxwell's theory that light and electricity are identical in their essential details.

Onesti

Before wireless telegraphy could become possible, some more delicate apparatus than a resonator spark-gap was necessary for the detection of the Hertzian waves. In 1885 Professor Galzecchi Onesti, an Italian, introduced a more sensitive detector. He used a small quantity of iron filings, enclosed in a glass tube, between two corks. Through each cork there

(*Continued on page* 168)

HERTZ

Heinrich Rudolph Hertz was born at Hamburg on 22nd February, 1857. He determined to enter the Engineering profession, but devoted his attention to Physical Science. He studied successively at Munich, Berlin, and Keil, where he commenced his investigations on Clerke-Maxwell's Electro-Magnetic theory. He died at Bonn on 1st January, 1894.

BRANLEY

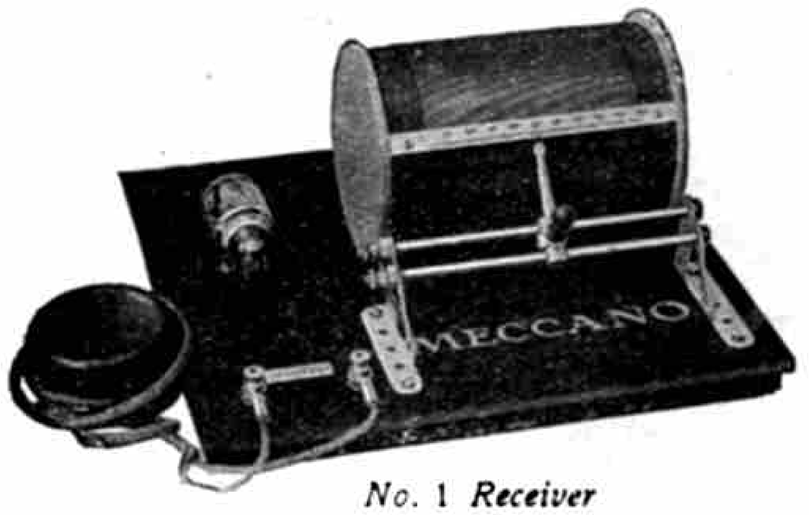
Edouard Branley was born at Amiens in 1846 and was educated at St. Quentin College and Henry IV. College, Paris. He is a Professor of Physics at the Catholic Institute. Paris, and a Member of the Institute of France. His discovery of the coherer in 1890 marked a distinct stepping-stone in the history of Radio.

Listen-in with a Meccano Receiver

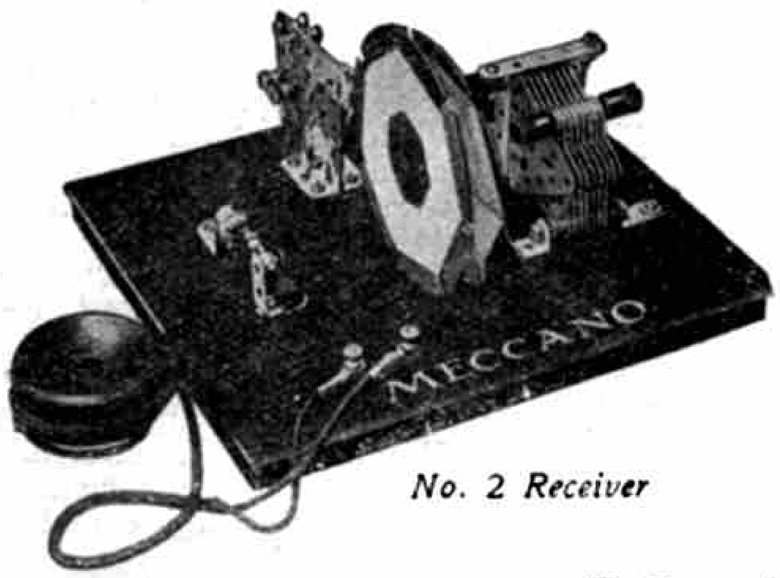
No. 1 Meccano Crystal Receiver

With a good aerial this set will receive telephony up to about 25 miles from a broadcasting station, and Morse signals up to, and exceeding, 100 miles. The set, which may be used with a broadcasting licence obtainable from any Post Office at a cost of 10/-, will receive on wave lengths from zero to approximately 1,000 metres.

R.S. 1—Receiving Set complete, tested and guaranteed, price **29/-**
Compulsory Broadcasting Fee **1/-**
Price **30/-**



No. 1 Receiver



No. 2 Receiver

No. 2 Meccano Crystal Receiver

This set is of the constructional type and is specially adapted to the requirements of those who wish to carry out simple experiments. Its range is the same as that of No. 1 set described above, and it receives on wave lengths of approximately 300-500 metres. It may only be used with a constructor's licence, which costs 15/-, and is obtainable from any Post Office.

R.S. 2—Complete Set of Parts, in strong carton, including single telephone 2,000 ohms resistance, price **25/-**
R.S. 2a—Complete Set of Parts, in strong carton, without telephone, price **15/-**

MECCANO AERIAL OUTFIT

The Meccano **Aerial Outfit contains everything for the erection of a regulation** aerial with the exception of poles. **The contents are as follows: Antenna 65 ft. 16 Gauge Bare Copper Wire. Lead-in (soldered to Antenna) 29 ft. 16 Gauge Bare Copper Wire coupled to 6 ft. of insulated 16 Gauge Bare Copper Wire. Earth Wire 30 ft. 18 Gauge** Bare Copper Wire. Insulators (egg-shaped) 2. **Pulleys** (porcelain) 2. Price **12/6**

MECCANO LIMITED **BINNS ROAD** **LIVERPOOL**

R. Griffiths (Doncaster).—The No. 2 Crystal Receiver is constructed of Meccano parts. These parts are particularly suitable for carrying out experiments.

C. Andrews (Maidenhead).—(1) As you are approximately 26 miles from London you should have no difficulty in receiving broadcast from 2 L.O. with a Meccano Crystal Receiver, provided your aerial is erected as high as possible and carefully insulated. (2) Although it is possible to use two crystals on a set it would not materially affect its power of reception, and I would advise you to use one crystal only. (3) Marconi House is the nearest broadcasting station to Maidenhead.

P. Scott (Stratford-on-Avon).—The Meccano Crystal Set No. 1 may be used with a broadcasting licence. The Meccano Crystal Set No. 2 may only be used with a constructor's licence (15/-). Either is obtainable from any Post Office.

J. E. Savidge (Southborough).—It is generally recognised that a Crystal Receiver is capable of receiving telephony up to a distance of 15-20 miles, but much depends upon local conditions, and sometimes this distance is increased to 25-35 miles.

R. S. Sanderson (Edinburgh).—The size of the former disc is 3¼" diameter. (2) 120 turns of 22 G. enamelled copper wire. (3) Yes, you may purchase the scale separately.

A. J. Riley (London, E. 11).—I trust that you have had satisfactory results from your set using the revised circuit I sent you. Your suggestion for a new Meccano part was duly passed to the Editor of the Bright Ideas column.

H. Critchley (Southport) and **R. Carman** (Chester.)—(1) 28 turns of 23 G.SSC wire. (2) 32 turns of 36 G.SSC wire.

A. Illingworth (Bradford).—It will be impossible to receive telephone broadcast from Manchester with a Crystal Receiver, owing to the screening effect of the Pennine Range.

L. Hart (Liverpool).—It is immaterial if there are any joins in the wire of a tuning coil, providing they are soldered and insulated.

H. J. Bowers (Surbiton).—The Postmaster General limits the length of an aerial to 100 feet, including lead-in wire.

Rowland Hill (Kettering).—(1) The Meccano Receivers may be supplemented with a high frequency amplifying valve, which would increase the distance of reception. (2) I have never heard of steel plates being treated in the way you mention.

D. Parker (Newport).—An extra inductance disc may be added to the No. 2 Meccano Receiver by bolting an extra hinge on the fibre plate.

R. Kirkwood (Holt).—To carry out your suggested programme you will require to obtain a 5-valve receiving set!

A specially-equipped radio station has been installed at the Vollot Observatory, on the peak of Mont Blanc. Climbing parties in the Alps are now warned to carry radio apparatus with them so that help may be called from the Observatory in case of emergency.

• • •

To a great extent this innovation eliminates the splendid rescue work hitherto carried out by the St. Bernard dogs of the Alpine Monasteries.

• • •

Beyond the cost of a licence, amounting to one dollar, radio amateurs in Canada have no restrictions whatever to contend with.

• • •

A man who has been deaf for thirty years has recently heard a wireless concert.

• • •

The desolate reef of Cabras Island, Porto Rico's leper colony, has been considerably brightened by the installation of a radio set. This enables the unfortunate exiles to enjoy concerts and orchestral recitals broadcast from New York and Chicago.

Whilst on a voyage to Australia, the Aberdeen liner "*Themistocles*"—fitted with the latest Marconi Radio apparatus—was constantly in communication with land stations in Great Britain. During the voyage no less than 65,000 words of news were received.

• • •

The record for Canadian long-distance broadcasting is held by an enthusiast living in Darlington, England. On September 23rd, he heard a service broadcast from the Grace Presbyterian Church in Calgary, a distance of over 6,000 miles.

• • •

Recent changes in wave lengths have been announced by the British Broadcasting Company for the following stations:—Aberdeen, 495 metres; Bournemouth, 385 metres; London, 363 metres; Manchester, 370 metres. The wave lengths of other stations remain unchanged.

• • •

To decide whether it was possible for radio waves to penetrate thick walls an interesting experiment was carried out in America. Three Bank officials were locked inside the four-foot walls of a burglar-proof vault and clearly heard a radio concert broadcasted from New York, 60 miles distant. The aerial used was of the loop type, and, with the rest of the apparatus, was inside the vault.

• • •

King Christian has opened the new wireless telephone system between Copenhagen and the island of Bornholm, in the Baltic, a distance of about 100 miles. The wireless is linked up at each end with the ordinary telephone system, and the ceremony demonstrated the ease with which communication can be carried on.

• • •

The installation of a relay station on the outskirts of the city, enables owners of crystal sets in Sheffield to hear broadcast from Manchester, and other distant stations. A special land-line has been laid to the station from Manchester, so that the whole programme may be re-transmitted from the Sheffield station. To prevent any distortion of the sound, amplifiers are used at each end of the line and the signals are then sent out on a wave length of 350 metres. The relay station also transmits local talent once a week in response to repeated requests from listeners.

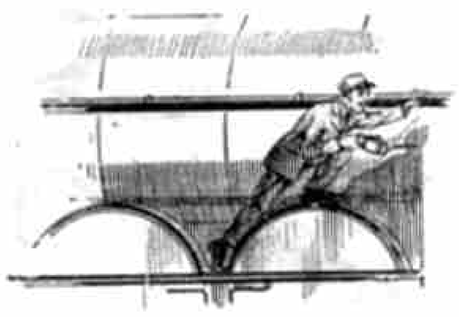
The Sheffield relay station is the first of eleven that are to be erected all over the country. The scheme includes stations for Plymouth, Liverpool, Leeds, Bristol, Hull, Bradford, Wokingham, Portsmouth, Stoke-on-Trent, Leicester and Edinburgh.

BELOW a RIVER on an EXPRESS ENGINE

A Run Through the Severn Tunnel

By **Master Harold Simpson**

THE safety valve was lifting gently and the Westinghouse pump clicking softly, as I swung myself on to the footplate of the huge express engine. The driver, an old grizzled veteran of the iron road, welcomed me with a smile and a nod, and advised me to hold on to my hat when we started. Meanwhile the stoker was scrambling, Tarzan fashion, over the wheel-guards towards the cab. He carried an oil-can in his hand and had been oiling a slide-valve.



Just then the signal fell with a crash, and the driver immediately crossed over to the other side of the cab and, leaning out, looked down the platform for the guard's "Right-away!" The slamming of doors denoted that all the passengers were aboard. The stoker scrambled in, the guard's whistle blew. Giving a warning blast on the whistle, the driver moved the regulator, and with a tightening of couplings, we were off on our long journey.

Chattering and lurching over the points and crossings we soon joined the main track, and with the engine purring contentedly we quickly left the smoky city behind us. With a glance at the steam-gauge, the driver "let her rip," as he laughingly described it. Signal-boxes, telegraph posts, bridges, deep and narrow cuttings, wayside stations—all flashed past so swiftly that I was bewildered. Not until we approached Severn Valley Junction did the driver check the pace. Speeding again, we crashed over points, and past a long goods train, laden with red-stone and drawn by a fussy tank engine. Then we reached another clear stretch. A signalman waved his hand as we passed his box, shouting some unintelligible words. "Speed, speed" was our only cry, as we thundered over an iron bridge spanning a canal.

Suddenly the driver applied the steam brake and shouted to me to hold tight. Far off I could see what looked like a tiny dot upon the red cliff ahead.

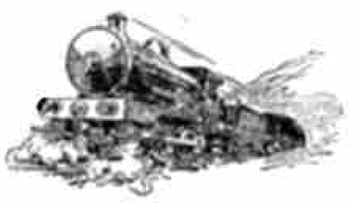
"That's the Severn Tunnel," shouted the driver, above the noise and clatter, "it's over four miles long."

We were now tearing down the long incline at over sixty miles an hour. A prolonged shriek of the whistle, then daylight was gone! The darkness seemed full of flying shadows, and the driver and stoker looked like dim, shadowy outlines. Sparks rising in front of us from the now invisible funnel, flew backwards like fire-flies.

In the middle of the tunnel I noticed what seemed like a group of pin-points of light in the distance. These swiftly grew larger and larger, and I saw the blurred outline of another train approaching. It passed us as a long stream of light, which lit up our eager faces. The roar and rattle it raised was deafening, yet shrill above it rose the scream of our whistle.

Once the stoker threw open the furnace door, and I was startled by the sudden, unexpected glare and heat. I had a view of the sooty and dripping walls of the tunnel above, with the shadow of the stoker assuming gigantic proportions. The carriages behind looked an enormous size, as they rushed along under the rounded roof. Only for a second or two did the glimpse remain, however, and with the shutting of the furnace door we swept again into the darksome cavern. It seemed wonderful to think that on the broad river above there were huge ships steaming or lying at anchor.

We were ascending the upgrade now and ahead I saw a spot of light, which slowly took a rounded shape. Then came a sort of green faintness of light which increased in power, until at last we burst through again into the brilliant daylight. The engine, puffing like a worn-out beast, yet strong enough to haul the train for many miles more, went speeding on its way and seemed almost to rejoice at being in the bright sunshine once again.



Interesting Paragraphs

A tree-doctor in America is said to earn £200,000 a year by curing the various ills to which all trees are subject. When this man, whose name is John Davey, was 27 years of age, he went to America as a farm labourer and bought books on trees. Later he became a prosperous farmer, and wrote a book called "*The Tree Doctor*" which made him famous. He has now earned for himself the title of "*The Father of Tree Surgery*," and is the head of the Davey Institute.

* * * *

The Big Wheel at Paris has now been dismantled, and all that remains of the massive structure are the two pylons which supported the 36-ton axle.

In a new twisting machine recently invented for the textile industry, the bobbins rotate simultaneously with the spools that receive the spun thread. This causes both ends to twist and gives great firmness and strength to the thread. It is claimed that the new machine twists seven times as fast as machines of the present type.

* * * *

The contract for the construction of a new reservoir and dam for the Belfast Water Commissioners has been secured by a London firm, Messrs. S. Pearson & Sons Ltd., who estimate the work will cost £1,035,000. The reservoir will be built in the Mourne Mountains area, County Down, and will supply 10,000,000 gallons of water a day. Its construction is expected to take several years.

Our Special

Xmas Number

A special double number, combining the December and January issues of the "*M.M.*" will be ready on or before the 15th December. Price 2d. from any Meccano dealer or newsagent or bookstall. (3d. post free from this office).

Order your copy *now*, as only sufficient magazines will be printed to fill actual orders.

***Meccano Magazine*,**
Binns Road, Liverpool.

Two New Books *by the Editor*

of the *Meccano Magazine*

Engineering for Boys. 6/- net.

By ELLISON HAWKS, Editor of the *Meccano Magazine*.

This book has been specially written in response to the many appeals that Mr. Hawks receives every year from boys who are keen on engineering, asking him to tell them of a book that describes engineering subjects in which they are particularly interested. As Editor of the *Meccano Magazine* Mr. Hawks is in a position to speak with authority.

Nearly 400 pages are packed with just that kind of information that Meccano boys want, while there are over 100 pictures from unique photographs of marine engines, liners warships, docks, lighthouses, locomotives, bridges, dams, canals, engineering shops and machinery, generating stations, etc., beautifully printed on plate paper, besides many text cuts. Boys who wish to become engineers will be specially interested in the chapter "The Making of an Engineer," which will enable them to decide which branch of engineering they will take up.

The Romance and Reality of Radio. 3/6 net.

By ELLISON HAWKS, Editor of the *Meccano Magazine*.

This book is intended for those who wish to obtain, as briefly and as clearly as possible, a comprehensive knowledge of Radio.

It brings together, in one cover, a brief account of the History, Theory and Practice of the highly-important and rapidly-growing science of Radio, from the early experiments of Morse to the wonderful trans-oceanic Radio communication of to-day.

No mathematical symbols, forbidding-looking formulæ, or other technicalities find place in the pages of this book, which will show the beginner that Radio is one of the most fascinating of sciences, and as a hobby, a pleasant and instructive pastime. Fully illustrated with plates and text cuts.

All About Our British Railways. 6/- net.

By G. GIBBARD JACKSON.

All boys of a mechanical turn of mind know the fascination of railways, and this book will satisfy their curiosity and scientific leanings. The author has had the help of the chief mechanical engineers and superintendents of the line of the great railway companies. Nearly 120 pictures from photographs on plate paper, together with numerous cuts, illustrate the interesting text.

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Readers frequently write to me asking if I can recommend books that are both of interest and of use. In this column I hope to review books that I consider specially appeal to Meccano boys. I do not actually supply these books, which may be obtained either through any bookseller or direct from the publishers.

THE last three months of the year are the best for book lovers, because there are then so many new books to read, and one is able to enjoy them in comfort at the fireside during the dark, cold nights.

Surely boys get the best books these days, because there are such wonderful stories written for their entertainment. Since such masters as R. L. Stevenson, Mark Twain, Rudyard Kipling, and J. M. Barrie established the fashion, our best writers have not disdained to set their hands and brains to the writing of boys' books, to the permanent eclipse, one hopes, of the futile "blood-and thunder" and "penny-dreadful."

"Carpentry and Bench Work"

(*Pub. by "B.O.P." Office. Price* 1/6 *net*).

This is a wonderfully handy little book, belonging to the "*How to Make*" series. The 200 pages are packed with useful information on all kinds of wood-working. A very wide field is covered, dealing with the making of a simple tool box; a variety of book cases and picture-frames; rustic garden seats and arches, and fancy occasional tables; beehives; steam and water turbines, etc. Written in a simple manner, and clearly illustrated, this book also contains warning hints regarding many common errors. The articles on chip-carving and the making of one's own tools alone make the book worthy of a place on the practical boy's bookshelf. Any Meccano boy who is handy with his tools, and interested in model yachts and boats, is advised to add this volume to his bookshelf.

"The Romance and Reality of Radio"

by Ellison Hawks

(*Pub. by T. C. & E. C. Jack. Price* 3/6).

This book tells the story of wireless telegraphy and telephony in a clear and simple style that compels the interest of the reader. It is the only book published containing historical, theoretical, and practical information regarding Radio. Radio is not an easy subject, and we should be grateful to the author for explaining the principles of this new science in a manner which the non-technical mind can easily follow. In addition to describing the work of the pioneers—the "Men who gave us Radio"—their disappointments and their triumphs, the book also deals with the construction of receiving sets, types of aerials, and other useful information. There are many plates and figures in the text to help to make everything plain. Altogether this is a well-written and well-illustrated book.

The Last Secrets

by John Buchan

(*Pub. by Nelson. Price* 5/- *net*).

It is the privilege of the reader of this thrilling book to accompany some of the world's bravest men on wonderful journeys of endurance and exploration. Among other adventures the author lays bare the mysteries of the impregnable fortress of Lhassa, that stronghold of worshippers of a strange religion. The Mountains of the Moon, situated in equatorial Africa yet covered in snow all the year round, are discovered and climbed. The holy Cities of Islam, the virgin forests of New Guinea, and the mighty splendour of Mount Everest deliver up their age-old secrets to the courageous explorer. Last but not least is the memorable dash across snow and ice to plant Peary's victorious standard at the North Pole, and the account of Scott's daring expedition, with references to Capt. Oates, "a very gallant gentleman."

Jack Without a Roof

by Major Charles Gibson

(*Pub. by "B.O.P." Office. Price* 4/6 *net*).

This is a tale of the French Revolution, and the author has well preserved the atmosphere and spirit of this period. A boy of three, the son of my Lord Marquis de Savenay, escapes one day from his nurse and is lost in the woods. He is found by a dwarf, who takes this "cub of an aristocrat" to his own home. Under his new name of Jacques Sansabri he is reared in squalor and misery until he is eighteen, when he takes part in the storming of the Bastille. Unknowingly he saves the life of his father, and the two come together later under tragic circumstances. The story of the reunion of father and son is vividly told.

The Empire Annual for Boys

(*Pub. by "B.O.P." Office. Price* 6/- *net*).

This volume, which makes a welcome reappearance, contains splendid school stories and tales of adventure in India, North America, Greenland, Central Africa and Mexico. It concludes with a diverting ghost story from New Zealand. Thirty stories in all by well-known writers. A handsome volume well illustrated.

A Scout of '45

by E. Charles Vivian

(*Pub. by "B.O.P." Office. Price* 3/6).

Amongst the many good books published this month I have read this one with interest. It is a tale of the Jacobite Rising in which Arthur Wyland, heir to Sonsett, leaves his guardian's roof and sets out to make his fortune. He encounters Gay Harry, a "knight of the road," and the two join in the pursuit and rescue of Mistress Dorothy Trafford, who has been carried off by the Jacobites and held as hostage for her father. It is a stirring tale of the road, of nightly encounters with desperate men and a final clash of arms on the bridge at dawn. Illustrations by Gordon Browne, R.I.

Model of Wireless Receiver.

(*Pub. by Geo. Philip & Sons Ltd. Price* 2/6).

This is an excellent cardboard model of a two-valve receiving set, which, by means of a very ingenious device, shows exactly how the valves function. Seven different positions are obtainable, and in each, the changes in the circuit are shown by recognised symbols which automatically become visible.

BOOKS RECEIVED

We have received copies of the undermentioned books during the past month, and these will be reviewed in this column in a future issue.

"ENGINEERING FOR BOYS" *by* Ellison Hawks (T. C. & E. C. Jack), 6/-

"TODDY SCORES AGAIN" *by* Alfred Judd (Nelson), 5/-

"BETWEEN TWO SCHOOLS" *by* Harold Avery (Nelson), 5/-

"JACK O' LANGSETT" *by* R. A. H. Goodyear (Nelson), 5/-

"MORE ABOUT P.J., THE SECRET SERVICE BOY" *by* Hamilton (Nelson), 5/-

"THE BOY ELECTRICIAN" *by* A. P. Morgan (Harrap & Co. Ltd.), 7/6

"THE SCHOOLBOY'S ANNUAL" ("Boy's Own Paper" Publishers), 3/6 net.

Catalogues Received

We have received the following catalogues this month. Should any of our readers write to the firms concerned, they will assist us by mentioning the "Meccano Magazine."

• • • •

The Nelson Lists (issued by Messrs. T. Nelson & Sons Ltd., 35/6, Paternoster Row, E.C.), come to us with their dainty covers and capital illustrations of tempting books. It is much easier and more satisfactory to select from lists such as these, than to spend long hours in book-shops. Free on application.

• • • •

The Peto-Scott Co. Ltd. (64, High Holborn, W.C. 1), send us a very complete list of Wireless Components. The wireless accessories supplied by this firm have a high reputation and their Unit System is reliable and efficient. The catalogue is exceptionally well illustrated and costs 3d.

• • • •

The Games Dept. of Messrs. D. & W. Gibbs Ltd. ("Cold Cream Soap Works," London, E.1), add a joy to Christmas by publishing "*Games for Children.*" If you are giving a party this book will help you wonderfully. The "Ivory Castles" books are good fairy stories. Each book costs 6d., but Messrs. Gibbs Ltd. will tell you how to get them free on receipt of a postcard.

• • • •

From where do Dean & Son Ltd. (29, King St., W.C.2), get all their ideas for children's toy books? The "*Youngster's Modeller*" series of four books, are fine fun, and the new "*Stencil Books*" compel you to paint like a true artist. The Dean catalogue "*What Every Youngster Wants*" describes scores of dainty and pleasing painting and drawing books, plays for young actors, etc. Free on application.

• • • •

From Lott's Bricks Ltd. (Watford, Herts.), we receive a list of their "Building Blocks" Outfits, 2/- to 35/-, and a further series containing Trees, Fences, Shrubs, Palings, etc. There are illustrations of villages, churches, skyscrapers, colleges, etc., which look astonishingly real. A well-designed building block system. Lists free on application.

A Talk About Aerials—(*cont. from page* 149)

No. 1 to obtain the very best results possible. Instead of taking the second end of the aerial directly to a room on the ground floor, he makes a bid for greater efficiency by fixing it to the gable-end of the roof. (Fig. 2).

A third boy has a flag-pole in the garden, but much nearer the house than the first boy's pole. Instead of using a single wire, therefore, he erects an aerial with a double antennæ, attaching the other end to a short pole, fixed to the chimney (Fig. 3).

Boy No. 4 has neither flag-pole nor tree, but he is able to obtain parents' and landlord's permission to fix two poles to the house chimneys, and with a span of 30 to 40 ft., finds his double aerial very efficient (Fig. 4).

We thus see that, in the first place, local conditions determine, to a large extent, the details of aerial erected.

NEXT MONTH.

"T" and "L" AERIALS. DIRECTIVE AERIALS. AERIALS WITHOUT POLES

To-day the world relies on Ingersolls for Time

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INGERSOLL RADIOLITE SHOWS TIME DAY AND NIGHT

The Hands and Figures glow brightly in the dark, a valuable feature for almost everyone, and particularly for boys—in the dark room and under the pillow at night.

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GUARANTEED WATCHES AND CLOCKS

BUY YOUR INGERSOLL WHERE YOU SEE THESE SIGNS

FOR ALL RADIO ENTHUSIASTS

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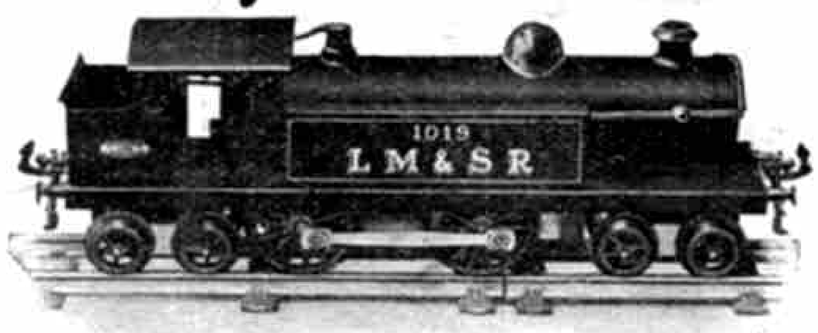
A concise and reliable guide—helpful to the experienced and essential to the amateur. It explains how to choose the correct Aerial, how to make both Crystal and Valve Sets, how to use a Valve Combination with a Crystal, and expounds many knotty Wireless problems.

On sale everywhere, or post free, 3/9, from the Publishers,
GEORGE NEWNES LTD., 8-11, Southampton Street, Strand, W.C.2.

The Hornby Tank Loco



We have pleasure in announcing that we have added a Heavy Tank Loco to the Hornby Clockwork Train system. A glance at the above illustration will show how beautifully this Loco is designed. It is thoroughly representative of the latest type of its class. Measuring 11½ in. in length, it embodies all the characteristics of the Hornby Trains.

Beautifully finished in colours; lettered L.M.S. and L.N.E.R. Fitted with reversing gear, brake and governor.

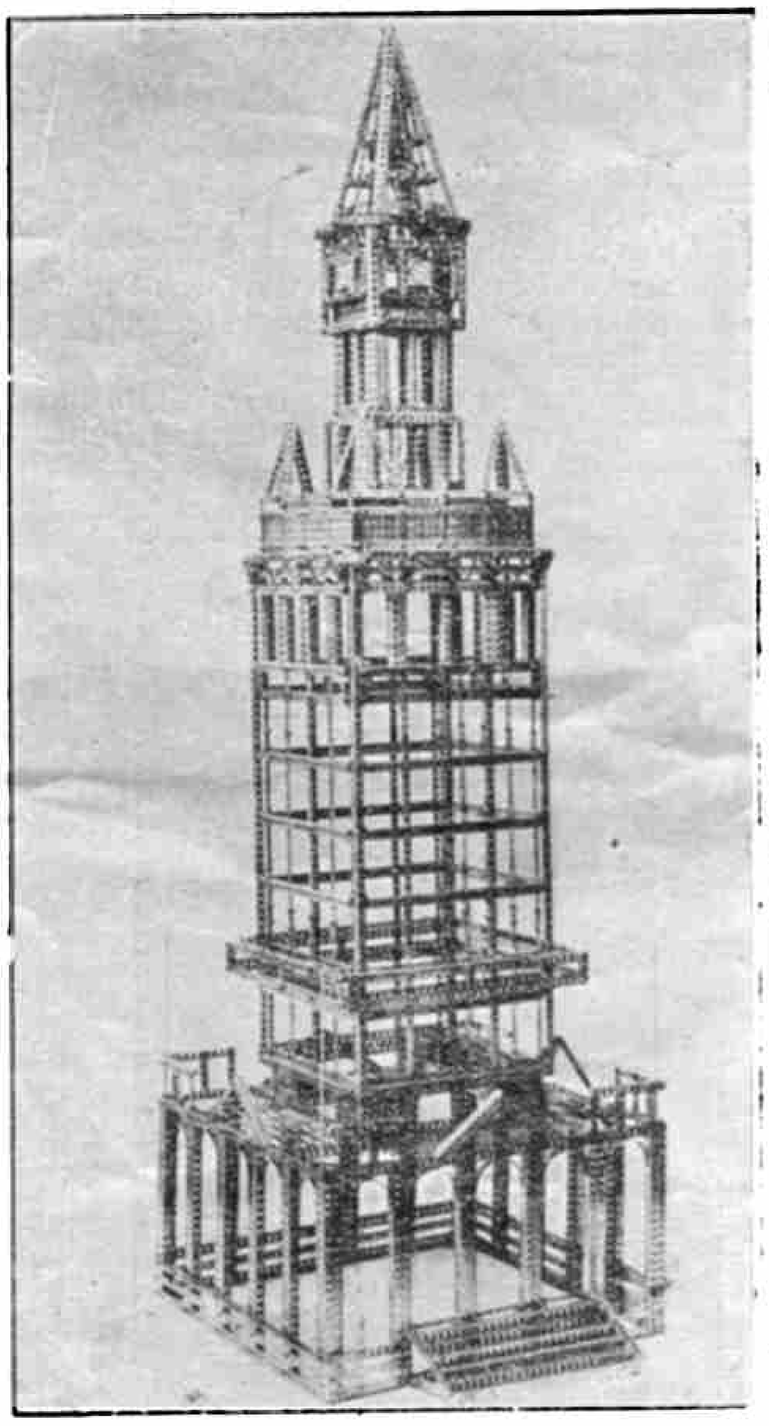
Price each **32/6**

MECCANO LTD.,
BINNS ROAD LIVERPOOL

Government Sky-Scraper

in Meccano

WHEN completed, the new Custom House at Boston, U.S.A., will be one of the finest buildings in Boston and will form an impressive landmark from the harbour. From a constructional point of view the building is interesting because it is being built on top of the existing Custom House!



The model illustrated is the new Custom House at Boston, U.S.A., described in the accompanying article.

The original building, which dates from 1847, was surrounded by tall granite columns and surmounted by a low dome. The interior is of beautiful design and contains marble columns, supposed to have been copies from the monument of Lysicrates at Athens.

Boston is an important port, and its traffic has increased considerably every year. In 1908 it became evident that it was impossible to carry out the increased work from so small a building, but as the Government refused to purchase land to accommodate a new building, matters were at a standstill. At last, however, it was suggested that a building of several stories built on the existing colonnade, would not only accommodate the increased staff but would also result in preserving the splendid architecture of the old building.

This idea was officially sanctioned, and it was decided that the new building should take the form of a tower, above the central part of the old Custom House. The tower is to be 504 ft. in height, 65 ft. in width and 70 ft. in breadth. In order to provide a firm foundation for the great weight, massive concrete caissons have been sunk a hundred feet below the street level.

One of the most prominent features of the building will be an immense clock with a 21 ft. dial and an 11½ ft. minute-hand. The clock-face will be of reinforced concrete, marble, and bronze. The numerals and minute-dots are to be formed by slits in the concrete, opening into a room lined with white-enamelled bricks. From this room light will be reflected through the openings.

In the building, now in the course of erection, there will be approximately three times as much office space as in the old Custom House, and the new building will be fireproof throughout and equipped with all the latest modern appliances.

It is not surprising to find that the new Custom House suggested itself as the subject of a Meccano model to a smart American boy. We are able to illustrate his model, and a comparison of the two illustrations accompanying this article shows that the model is a very creditable reproduction of the original.

Educate the Kiddies to love good Furniture—

Period

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British made

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What better Christmas Presents could you give them than sets of this beautifully-made furniture for the Doll's House? The expense is negligible when you consider the hours of innocent amusement it will give them—and it will keep them out of mischief, too! Each Set packed carefully in a strong box 11 in. × 11 in. × 2½ in.

9/6 per set. There are four different sets.

If unobtainable locally, furniture will be sent direct, and necessary arrangements made with nearest dealer.

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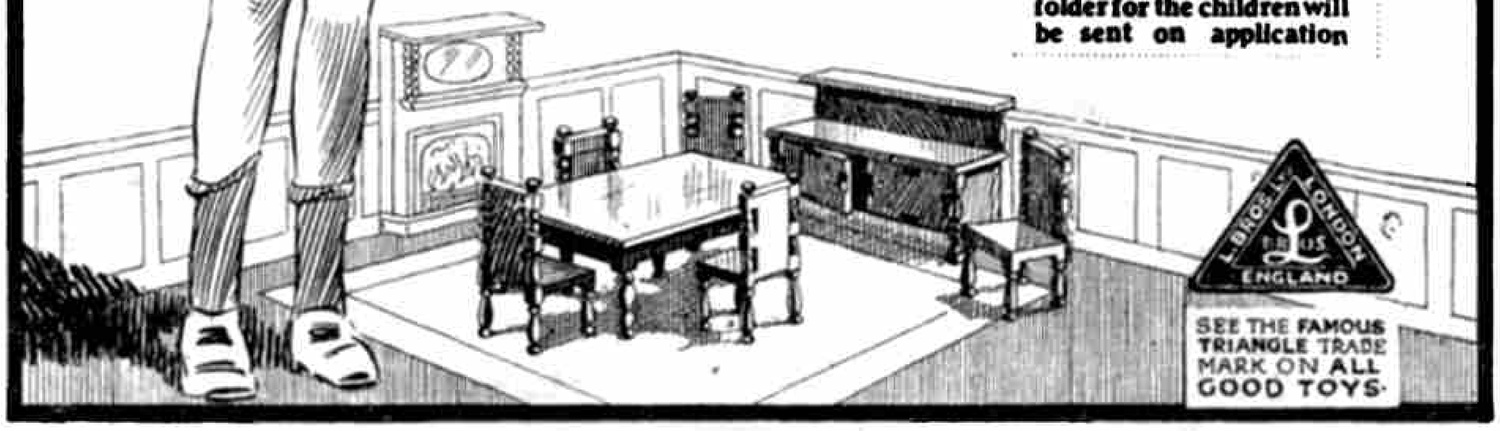


L. BROS. LONDON ENGLAND

SEE THE FAMOUS TRIANGLE TRADE MARK ON ALL GOOD TOYS

THE MECCANO GUILD

The Secretary's Notes

From time to time I receive letters from Secretaries asking for advice in connection with the raising of Club funds. There is no better method of raising funds than by organising Exhibitions and Concerts, which always prove a popular means of raising comparatively substantial amounts. In many cases Exhibitions and Concerts have been combined, and in this form also very successful appeals have been made. Exhibitions are best held towards the end of the Sessions, so that the members may work on their models for exhibition during the Session. Each member should undertake to provide at least one model for the Exhibition. Side shows may be organised and guessing competitions have proved both remunerative and interesting. For instance, a prize is offered for the best guess as to the number of parts employed in some particular model, or the number of Meccano nuts and bolts contained in a glass jug. With a little thought many other similar competitions may be arranged. It is customary for one or two prizes to be offered for the best model exhibited, and this leads to healthy rivalry and provides the members with some object for which to work. Parents and friends of members may be invited to these Exhibitions, being admitted at a moderate charge.

Club Funds

In addition to augmenting Club funds, functions of this nature arouse the interest of the general public in the work of the Club. When Concerts are given in conjunction with the Exhibition, it is best to run them under the supervision of the Club Leader, or one of his friends who is, perhaps, specially interested in such functions. Of course, where a Club runs a Concert Party or Minstrel Troupe in connection with the Club work, no difficulty is experienced in arranging a Concert at the shortest notice. In addition to raising funds for their own Club, many Clubs have loaned their exhibition models to bazaars, sales of work, etc., and Minstrel Troupes and Concert Parties have given entertainments in connection with local charities.

Successful Concerts

The Club Membership Cards for the Winter Sessions 1923-4 are now in my possession, and I shall be pleased to send copies to all Club Leaders who have not already had their regular supplies. The cards are tastefully printed in green, and include the rules of the Guild with space for the insertion of the programme of Club meetings for the two Winter Sessions. Each affiliated Club is provided with a card for every member of the Club.

Club Membership Cards

I am pleased to notice the increased activities in connection with the Correspondence Club. Guild members have long felt that they belonged to a great brotherhood of boys, each having the same thoughts, sharing the same pleasures, and thrilled by the same ambitions. They often think of other Guild members in far corners of the earth, and wish that they might learn something of what they are doing in those far off countries. The Guild Correspondence Club makes this possible, and already many lasting friendships have been formed through its medium. Those members who are interested, and wish to take advantage of this opportunity of exchanging letters with other Guild members, should write to the Guild Secretary for further particulars.

Correspondence between Members

I have several times had occasion to warn Guild members against begging letters received from abroad, and as the practice seems to be on the increase I am again mentioning the matter. The letters come principally from native boys on the West Coast of Africa who see the names and addresses of Meccano boys in the *Meccano Magazine*. either as prize-winners or in connection with the Guild. Sooner or later they ask for presents of fountain pens, silk handkerchiefs, etc., and offer to exchange native baskets and monkey-skins. I advise all Meccano boys to ignore communications of this type.

A Warning

Overseas Meccano Harriers

Meccano Guild Minstrels, Football and Cricket Teams have all been illustrated in these pages, and now I have pleasure in reproducing an interesting photograph of a pack of Meccano Harriers. These jolly-looking athletes are members of the Malvern (Johannesburg) Meccano Club, and a few weeks ago they held their first Annual Cross-Country Run.

Competitors in the 9-Mile Run

Altogether there were 15 entries, and the first man got away exactly at 4 p.m., the remainder leaving at equal intervals up to 4.14. After a keenly-contested race Master H. Mumford began to draw ahead and finally arrived home first at 5.15. His time was 1 hour and 4 minutes with a start of 5 minutes. Master E. Sykes, who started from scratch, gained second place, with the excellent time of 1 hour and 2 minutes.

After the run the Club entertained to supper the members of the Jeppe Boys' Club, and finally a very successful meeting was closed by three hearty cheers for the Meccano Guild.

Meccano Club Leaders

No. 7. Mr. L. LEWIS

Mr. L. Lewis is the Leader of the "Dudley (Wolverhampton) M.C." This Club, inaugurated in October 1920, was affiliated with the Guild in February 1921, when Mr. Lewis accepted the Leadership. At present there are twenty-four members on the roll. The Club possesses a Wireless Outfit, and Mr. Lewis hopes to organise a Concert Party in connection with the Club next Winter. We have no doubt that, under his splendid leadership, this new departure will be a great success.

CLUB NOTES

Leckhampton M.C.—Winter activities have now commenced, and as all the members are thorough sportsmen, a Football Team has been organised. The Club programme includes Lectures, Debates and Model-building. *Secretary:* Master B. Rhodes, Cotswold View, Charlton Lane, Leckhampton, Cheltenham.

Ormskirk Wolf Cub M.C.—The Summer Session included Cricket, walks, etc., and recently the members made a trip to Chester. Several models, including the High-Speed Ship Coaler and the Electric Loco, have been exhibited in a local dealer's window with gratifying results. The Club is in a sound financial position with a balance of over £6 and Meccano Sets and parts to the value of over £20. *Secretary:* Senior Rover Master Chas. Walsh, 111, Wigan Road, Ormskirk.

St. Luke's (London, W. 10) M.C.—During the Summer months the members were in camp for a couple of weeks at Beadenham, near High Wycombe, and the holiday proved a great success. An interesting programme is being arranged for the Winter Sessions. *Leader and Secretary:* Mr. J. P. Betts, 178, Wornington Road, N. Kensington, London, 10.

Herne Bay M.C.—Some enjoyable picnics were held by this Club during the Summer months, and a monthly meeting for model-building was well attended. Winter activities started on September 17th, and with every sign of a successful Session. *Secretary:* Master C. W. Russell, 4, Clifton Villas, South Road, Herne Bay.

St. John the Baptist's (Liverpool) M.C.—The Winter Sessions commenced early this month, and meetings are held every Saturday evening from 7 p.m. until 9 p.m. in the Wellington Road Schools, Toxteth. Any boy who wishes to become a member should write to the Leader for further particulars. *Club Leader:* Mr. J. S. Lewis, 46, Durning Road, Liverpool.

Cobham M.C.—First Winter Session commenced with a membership of twenty. The programme includes Model Building, Swedish Drill, Games, Tournaments and Lectures. A Social Evening is being arranged for the close of the Session. *Secretary:* Master A. Phillips, The Fox and Hounds, Cobham, Surrey.

Barnetby (St. Barnabas) M.C.—Winter activities have now commenced, and as a means of increasing the membership, each member has been asked to bring a friend to the next club meeting. A stamp collecting section is proving a popular addition to the club's activities. *Secretary:* Master R. H. Ward, Laurel Villas, Victoria Road, Barnetby, Lincs.

Woodville (Thornton Heath) M.C.—During the Summer months a Cricket Club was organised, but now Winter activities have again commenced. As all the members are keen on Radio, this subject is being included in the club programme. *Secretary:* Master D. Morley, 12, Liverpool Road, Thornton Heath, Surrey.

Wynberg (S. Africa) M.C.—This Club was re-opened early in September, and since then many interesting meetings have been held, including a visit to the General Post Office, Capetown. Reports received from the Secretary show that the Club is well organised, and it should continue to make rapid progress. *Secretary:* Mr. A. J. Lewis, Tea Rooms, The Park, Wynberg, near Cape Town, S. Africa.

Davenport (Stockport) M.C.—Mr. Main has unfortunately resigned from the Leadership, but another local gentleman, Mr. Massey, has accepted office. The members hope to perform the Meccano play "*Nonsense Nana*" at the close of the Winter Session, and rehearsals have already commenced. A Football Team has been organised, and is proving very popular. *Secretary:* Master A. D. Stoker, 124, Bramhall Lane, Stockport, Cheshire.

King Edward's (Birmingham) M.C.—An interesting programme is being drawn up, and Meccano outfits are being carefully overhauled. A new Secretary has recently been elected, and it is intended to issue a Club Magazine very shortly. *Secretary:* Master A. Tims, Albert House, 23, Key Hill, Birmingham.

West View (Nottingham) M.C.—The Leader informs me that the prospects for the Winter Sessions are very good, and that the members are as enthusiastic as ever. Special features this year are being made of Model Building, Games and Lectures. *Leader:* Mr. H. W. R. Cousens, 494, Mansfield Road, Sherwood, Nottingham.

Dudley M.C.—Good progress has already been made by this Club, and great interest is being shown in a Competition for the simplest and most efficient Wireless Set. All the members are keen and enthusiastic. *Secretary:* Master C Whitworth 19 Smith Street, Dudley.

Meccano Photographers "Get Busy"

Results of

FOURTH PHOTOGRAPHIC COMPETITION

A CONSIDERABLE increase in the number of entrants and in the quality of the work rendered difficult the task of judging our Fourth Photographic Competition. On the whole the subjects were well chosen and correctly focussed and exposed, and altogether the standard of work surpassed that of any previous competition.

The winner of class A is Gerald Rennison of East View, Seaton Delaval, with the happy snap "Crossing Ships." This is an exceptionally clear photograph considering the view chosen; for moving water is at the best of times very difficult to photograph successfully. Generally it comes out blurred or foggy, but in the winning photograph every ripple is clearly seen.

In Class B Master J. E. Baker, of 24, Haddock's Hill, Sidley, takes the prize. His photograph entitled "The Foster Mother" is certainly a very interesting piece of work. The subject is one of which we often read, where the mother sheep has died and the young lamb has to be reared with a bottle. In this snap the lamb is evidently quite at ease with its new "parent" and seems to be thoroughly enjoying the liquid refreshment so strangely administered.

Photo by] **"The Foster Mother"** *[J. E. Baker*

Photo by] **"Crossing Ships"** *[Master G. Rennison*

The prizes in each case were Hawk-Eye Cameras, made by the Kodak Company. Next month we hope to publish in the "*M.M.*" the photographs that secured the second prize in each section.

Those competitors who entered photographs in the competition but who were not fortunate enough to secure prizes should not be discouraged, but should enter our Fifth Photographic Competition, particulars of which are announced on page 161.

Entries are particularly invited from our Overseas readers for these Competitions, and a specially late date has been arranged for the Overseas sections.

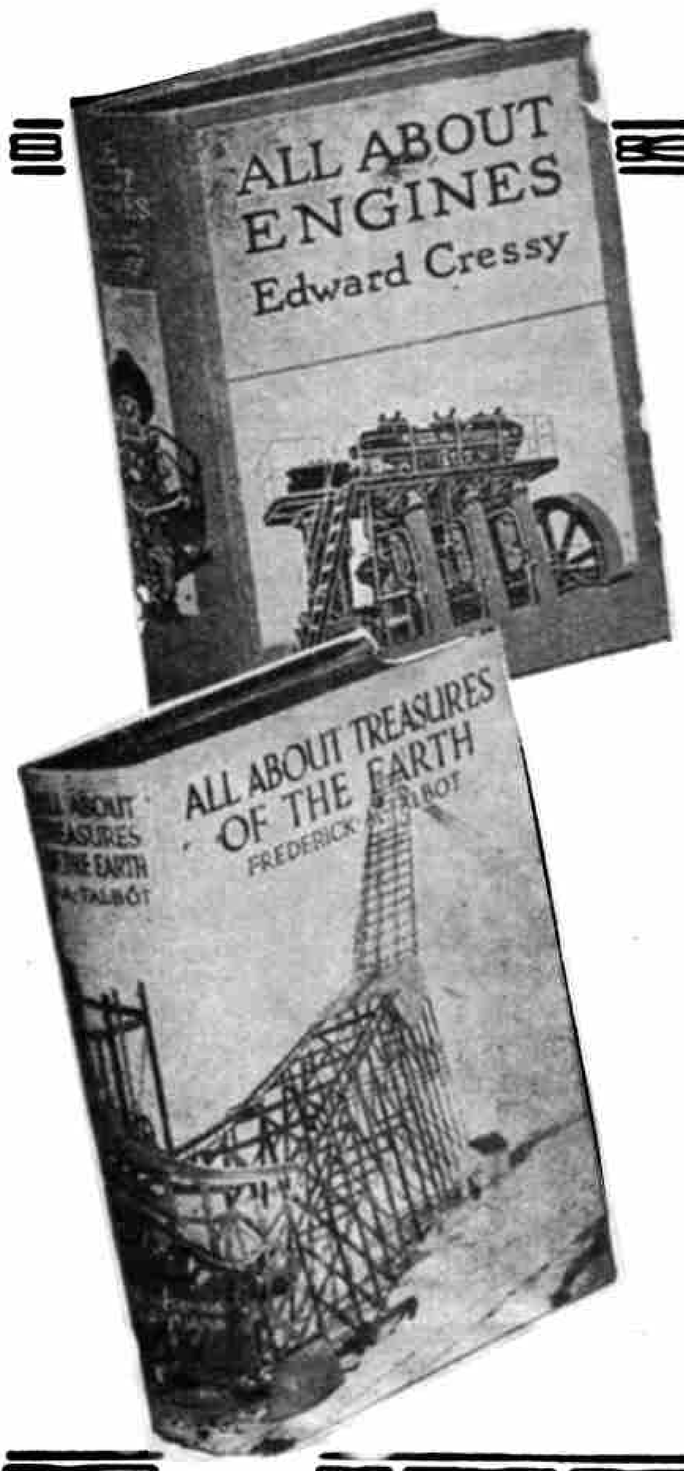
Buckfastleigh M.C.—The indoor Sessions recently commenced, and the club room has been brightened up by decorating the walls with Meccano coloured posters. It is hoped to make this a record Session. *Secretary:* Master H. Parsons, Bell Cottage, Buckfastleigh, S. Devon.

Club Recently Affiliated

Ethersall (Nelson) M.C.—This Club has already made good progress, and the first Club Exhibition was held on October 16th. The members are very proud of the fact that in a recent Swimming Gala at the Nelson Schools, Master Fred North, a member of the Club, came in second in the final for the neatest breast-stroke. The Dramatic Section of the Club recently produced "The Death of Mark Antony." *Secretary:* Master H. Dewhurst, 145, Waids House Road Nelson Lincs.

A Forthcoming Exhibition

An interesting Exhibition of Mechanical and Engineering Meccano Models is to be held by the St. Mary (Newington) Meccano Club on November 21/22 commencing at 3 p.m. All Guild members living in London should make a note of this date and visit the feast of good fun and enjoyment that is being prepared. There will be stalls showing Meccano models, Hornby train sets with the latest rolling stock, and a full size model of the wonderful Grandfather's Clock illustrated in this number. The address is St. Mary's Parochial Hall, Kennington Park Road, S.E.11, and can easily be reached by 'bus, tram or Underground railway.



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Competition Corner

Competitions have always been a strong feature of the "*M.M.*," and several new contests of interest will be announced in our future issues. Elsewhere on this page particulars are given of the £250 Championship Contest for the best models, which every reader of the "*M.M.*" should enter.

New Essay Competition

I am able to announce a new Essay competition the subject of which is :—

"WHAT I INTEND TO BE, AND WHY."

Everyone of our readers has his ambitions, and no doubt the majority already have decided what they intend to be. Many wish to be Engineers or Electricians. Some have a taste for farming or wish to go abroad as Planters or Ranchers. Others wish to be Soldiers or Sailors, or to enter one of the professions and become Doctors, Lawyers, Accountants, etc.

Every boy has his place to fill in the great scheme of life, and I feel sure it will be of interest to learn what Meccano boys intend to be, and also to know why they are choosing that particular walk of life.

Essays, to be written on one side of the paper only, should not exceed 1000 words. A prize of Meccano goods to the value of £1/1/- (to be chosen from our current list) will be awarded for the best essay, and three Hawk-Eye cameras (taking pictures 3¼" × 2¼") made by Kodak Ltd., to the next best. The winning essay will be published in the "*M.M.*"

Closing date, 31st January, 1924 (Overseas 31st March).

Fifth Photographic Competition

This competition closes on 30th November (Overseas : 29th February, 1924), and is divided into two sections (A) 14 years of age and under, and (B) over 14 years of age. The subjects are (1) A Family Group, (2) An Animal Study, (3) Miscellaneous Section. The First Prize in each section is a Hawk-Eye Camera (taking pictures 3¼" × 2¼") made by the Kodak Co.

Puzzle Column

We shall commence a Puzzle column, particularly appealing to Guild Members, in our next issue. Prizes will be offered each month for the best puzzles submitted.

Tom Sawyer Result

Three contests closed on 30th October. The entries for two of these, the Holiday Essay and Photo Essay competition, are now being classified, and the results will be announced in our Xmas number.

The winner of the "Tom Sawyer" competition is Master Albert E. Bebb, of Redditch, whose sensible comment reads :—

"I should say that the chief point of the Tom Sawyer story is that Tom used his brains and turned what would otherwise have been work, into pleasure.

"It shows us also that to do our duty brings its own reward, as although Tom did his duty reluctantly, he was amply repaid.

"Another point is that we always desire most that which we cannot have. The boys would not have wanted to whitewash the fence unless Tom had made them think that it was a pleasure to him."

A No. 1 Meccano Radio Receiving Set has been despatched to the winner, and I hope he will spend many happy hours listening-in to broadcast from the Birmingham station. A second prize of Meccano goods to the value of 5/- has been awarded to Miss Dickie Jones, of Gloucester, who also sent a very sensible comment.

Are You an Artist ?

In response to numerous requests received from Meccano boys, I have pleasure in announcing a Drawing Competition. As mentioned in this month's Editorial on page 141, the subject of this competition is to be : "*The Editor of the 'M.M.' as I imagine him to be.*"

In this competition the drawings may be of any size and the subject may be treated in any manner desired, *i.e.*, it may be either in black and white, pencil, crayon or wash.

There are no restrictions, except that the drawing must, of course, be the unaided work of the competitor. The competition will be divided into two sections :—

(A) Boys under 12 years of age.
(B) Boys of 12 years of age and over.

A prize of a Hawk-Eye camera, manufactured by the Kodak Company, will be awarded in each section. The closing date is 31st January, 1924, in the United Kingdom, and for entries Overseas, 31st March, 1924. I hope to receive a large number of entries for this, our first drawing competition, which, if well supported, will be followed by other similar competitions. The winning drawings will be published in the March "*M.M.*"

MECCANO £250
CHAMPIONSHIP CONTEST
21 Cups and 460 Medals

In the 1923–4 Model-Building Contest **21 Championship Cups, 110 Silver and 350 Bronze Medals** will be awarded, together with a number of Special Certificates of Merit. The total value of the prizes will amount to £250. The various countries have been divided into seven groups, and these, again, are divided into sections according to the age of the entrants.

The awards will be made for the best models submitted—particularly for those models that embody ingenious and original features. The winner of each cup will hold the title of "Meccano Champion" for his particular group and section for twelve months. The cups, which have been designed for us by a well-known firm, are of superb quality, and very handsome in appearance. Each cup will be engraved with the name of its winner, and provided with a suitable pedestal.

Meccano Gold Medallist.

The competitor who submits the best model in the entire competition will be awarded a specially-designed Solid Gold Medal. He will be the "Meccano Gold Medallist" for a year, and his name will be engraved on the medal, which will, of course, remain his property. Full particulars and entry form may be obtained from any Meccano dealer, or will be mailed (post free) on request to the Editor.

Model Building Competitions

In last month's Magazine we printed a list of dealers who are arranging Meccano Model-Building Competitions for boys living in their districts. Below we give a further list. Full particulars, together with an entry form, will be supplied by any of the dealers on application.

ASHTON-UNDER-LYNE
S. Harrison Ltd., 43/5, Market Street.
BATH—Barley & Sons, Centre of Corridor.
BURNLEY—W. H. Frost, 179, Colne Road.
BURY—Sam Taylor, 16, Silver Street.
CHELTENHAM—Pantoys Ltd., 7, Promenade.
EDINBURGH—Thornton & Co., 78/9, Princes Street.
KINGSTON-ON-THAMES—
Stirling Ltd., 17, Clarence Street.
LEEDS—J. S. Savile & Co., 12, Otley Road.
LEIGH—H. M. Morris, 10, Market Street.
LONGTON—Hughes & Harber Ltd., The Royal Press.
MORECAMBE—A. Edmondson, 35/7, Queen Street.
NELSON—Robinson, 8, Market Street.
NORWICH—R. E. Pilch, Brigg Street.
ROTHERHAM—Wallace Heaton Ltd., High Street.
SITTINGBOURNE—Cleaver, 53/59, West Street.
WIGAN—J. J. Broughton, 76, Market Street.

Competition Closing Dates

1923	30 Nov.	Fifth Photographic.
1924	31 Jan.	Essay.
	,,	Drawing.
	15 April	£250 Championship.

Overseas Closing Dates

1923	30 Dec.	Holiday Essay.
	,,	Photo Essay.
1924	29 Feb.	Fifth Photographic.
	31 Mar.	Essay.
	,,	Drawing.
	30 May	£250 Championship.

CHOOSE YOUR OWN CHRISTMAS PRESENT

It is a wonderful sensation to sit down and study illustrations and descriptions, and select your own Christmas present. Try it! The Christmas Double Number of the "*M.M.*" will contain advertisers' announcements of all kinds of splendid toys, books, and all manner of articles for giving pleasure to boys at Christmas. We are going to make at least one boy happy by giving him just the very thing he wants, from amongst the articles advertised in our columns.

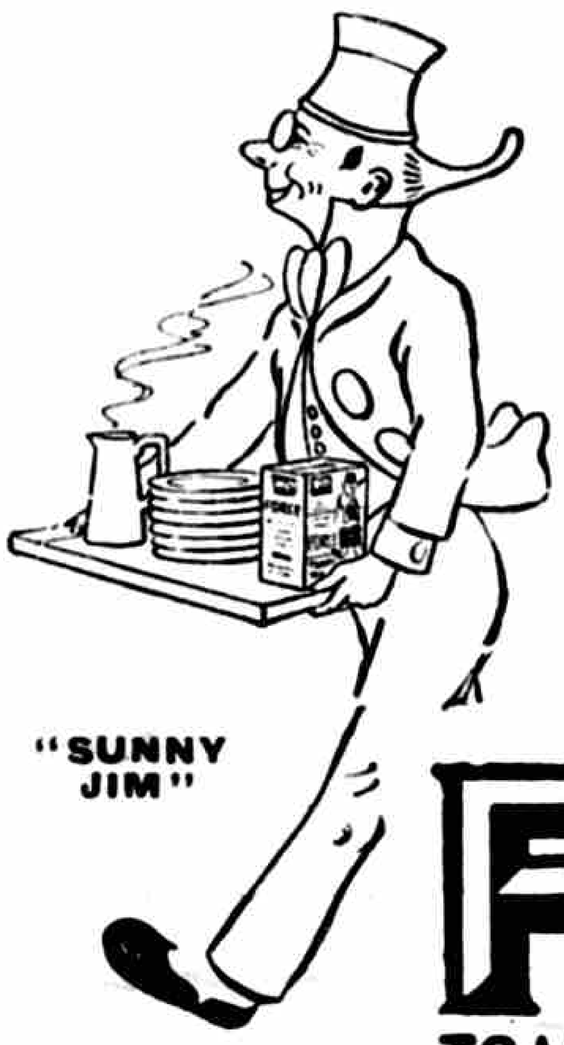
Let us know what you want—
On a Postcard

Obtain a copy of the Christmas number of the *Meccano Magazine*, which will be ready on December 15th, look at *all* the articles advertised and then decide which you would like the postman to hand to you on Christmas morning. Write the name of it on the top of your postcard, marking it No. 1. Then write the name of the article that you would like second best and mark it No. 2. Do this with six articles altogether, write your own name and address at the bottom in very plain letters, and send the postcard to "Christmas Presents, *Meccano Magazine*, Binns Road, Liverpool."

To the boy whose list corresponds most nearly in order of merit with the total voting we will post the article that heads his list, to reach him on Christmas morning.

"Christmas Presents" postcards must reach us not later than December 20th.

Who are the lucky ones?



To whom is "SUNNY JIM" taking this jolly breakfast? Count the plates. There are seven of them. Seven lucky boys and girls are going to breakfast off "FORCE" and hot milk. To think of it is to smell the fragrant aroma of the malted whole wheat as it rises up from the steaming plates. *What* a breakfast!—or lunch—or supper! They might even have it with fruit! *You* might have had some, too, if you had persuaded mother to get it for you. Tell her it's *wholesome whole wheat*—she can't refuse you then, because it is so good for you. All grocers sell "FORCE." If you've never tasted it, send for the free sample.

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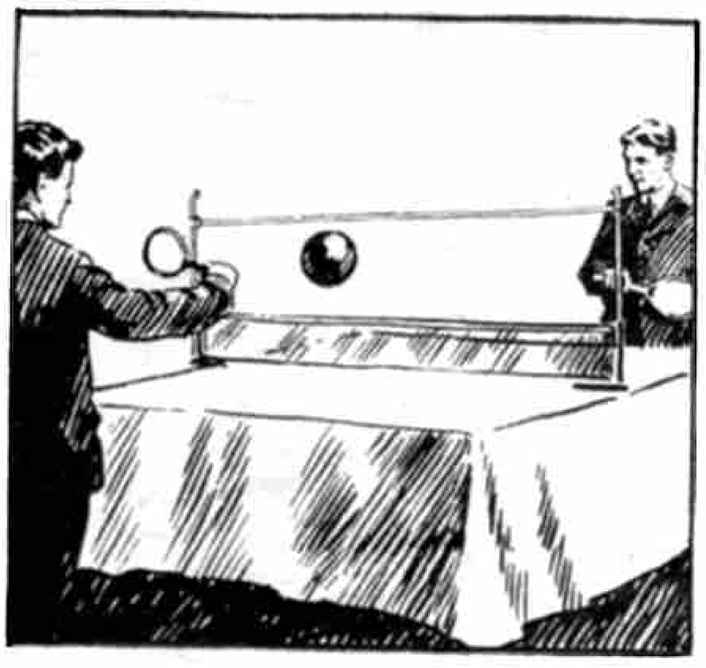

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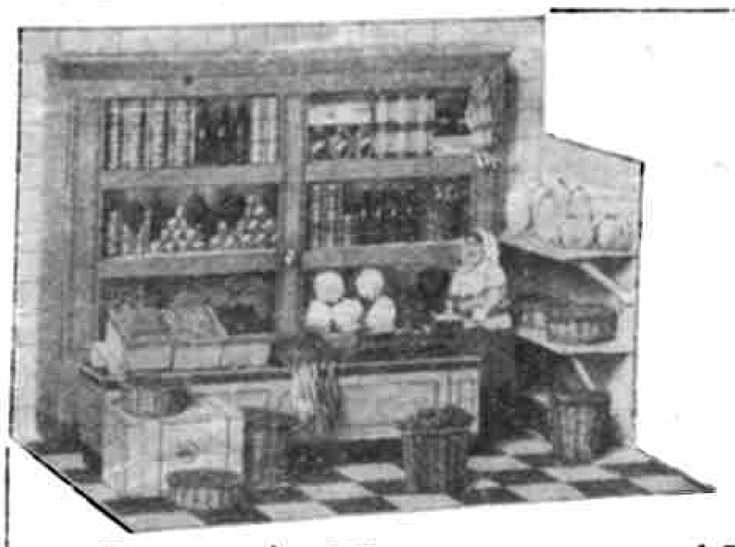

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(*For Advertising Rates see page* 168)

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30 DIFFERENT STAMPS FREE, including sets 7 Japanese, 6 Denmark and 2 German Air Post to approval applicants. Hook Bros., 26, Vale Road, London N.4.

Buying Packets

IN our last issue we discussed what kind of postage stamps to collect in view of the fact that there are so many kinds other than those used for sending letters or packages through the post. We decided that perhaps the best plan is for the young collector to give his first attention to ordinary postage stamps, while collecting also any specimens of the less usual stamps that may come his way. The best way to begin a collection is to buy the largest packet you can afford. You may buy packets of stamps of the kind you want at anything from 1d. to £1,000 or over, so that prices may be truly said to suit all purses! Do not buy a 2/6 packet this week, however, and another 2/6 packet next week. If you do, there are certain to be many duplicates, or second copies, in the second packet. It is better to buy no stamps this week and a 5/- packet next week, so that you will obtain only stamps that may be put in your collection.

Tongue Twisters !

In regard to increasing the size of your collection and the best method of mounting your stamps, we shall have more to say later. At present the main thing is for you to start your collection. Meanwhile, having purchased your packet, do not be in a hurry to buy an album and stick the stamps in. Devote your energies to trying to arrange your stamps into their respective countries by studying them. Read all the inscriptions. Most stamps have the name of the country on them somewhere, even if it is not in English spelling. If the name looks peculiar, try pronouncing it aloud, for you can often find out the name of the country to which a stamp belongs by doing this, and at the same time afford considerable amusement to yourself and friends by trying to pronounce some names such as Djibouti, Cesko-Slovenska, Azerbaijan, Chimborazo, and Kiautschou!

Identifying Names

Not all stamps bear the name of their place of origin in English spelling or even in English letters. With few exceptions, however, all the countries of the British Empire are named in English or in a form almost as easy to read.

Sometimes the name of the country differs on various issues, such as Rhodesia. On the earlier Rhodesian stamps the name appears as "British South Africa Company," a fact very likely to confuse collectors who are unable to find that name in their catalogue. In the album, however, both kinds of stamps are mounted under "Rhodesia."

"*Oranje Vrij Staat*" is easy to identify if you follow the hint to try pronouncing the name of the country aloud. Miss out the "*j*" of "*Vrij*" and you hear yourself say "Orange Free State!" Another puzzling South African colony is the Transvaal, which appears on its earlier stamps as "*Zuid Afrikaansche Republiek*," or, abbreviated, "*Z. Afr. Republiek.*" This is the Dutch for "South African Republic."

Four Chief Groups

It will be found that the stamps of foreign countries may be divided into four main groups: (1) those on which the name of the country is in English spelling or nearly so, (2) those on which although the name is not n English it is in letters of the English alphabet, (3) those on which the name is in a foreign alphabet, and (4) those bearing no name of country.

The first group should offer no difficulty. It is easy to see that "*Brasil*" stands for Brazil, "*Island*" for Iceland, "*Nederland*" for the Netherlands (Holland), "*Romania*" for Roumania, and so on. Here, again, pronouncing the name aloud is a great help.

Sometimes the origina name of the country is changed by an overprint. When this is the case the overprinted name is the latest, and therefore the one under which the stamp is to be classified. The term "overprint" denotes some inscription that alters the usage of the stamp, *but not its value*. On the other hand, a "surcharge" is an overprint that alters or confirms the *value* of a stamp.

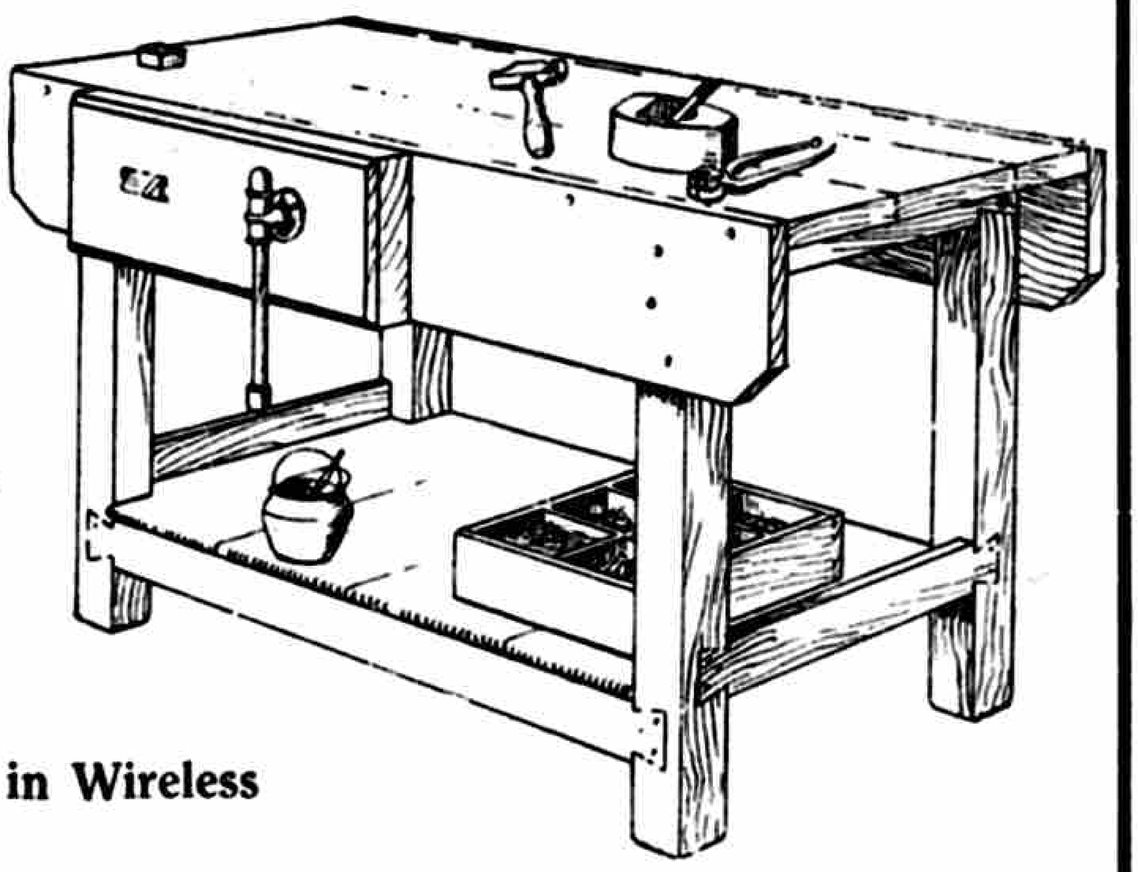
The word "*Francaise*" or "*Francais*" appears on nearly all French colonial stamps. Do not be too hasty, however, in calling these stamps French, but look for other names. If the name of another country appears, that is the one to which the stamp belongs. If there is no other name, then the stamp is French. Bear in mind, also, that "*Franc*" is the name of a coin as well as an abbreviation of "*Francais.*"

An overprinted stamp to be classed under Togoland. The original stamp belonged to Dahomey, but also had the word "*Francaise*" on it.

The South American state of Bolivar, now a part of the Republic of Colombia, at one time issued postage stamps of its own. The country was called Bolivar in honour of a hero of that name, whose portrait and name often appear on stamps of other countries. Accordingly, whenever you come across a stamp bearing this name, see if there is another name as well; if so, this latter is the heading under which the stamp is to be classified and "Bolivar" is here used as the name of a person only.

NEXT MONTH:
STAMPS with "UN-ENGLISH" NAMES

A Handy WORK BENCH



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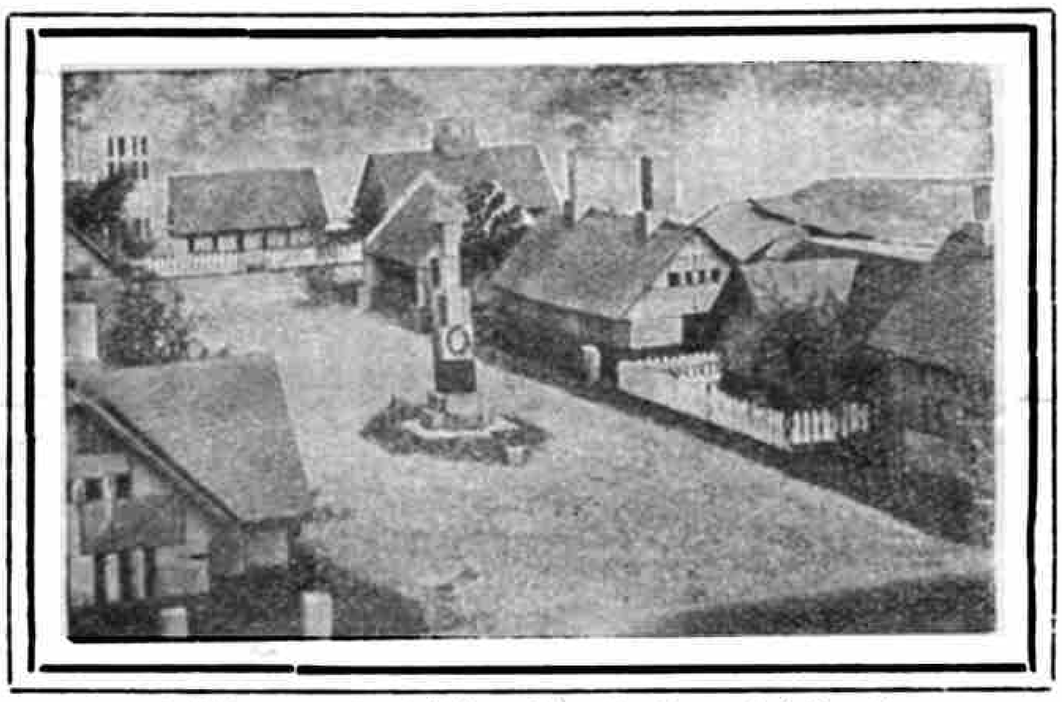
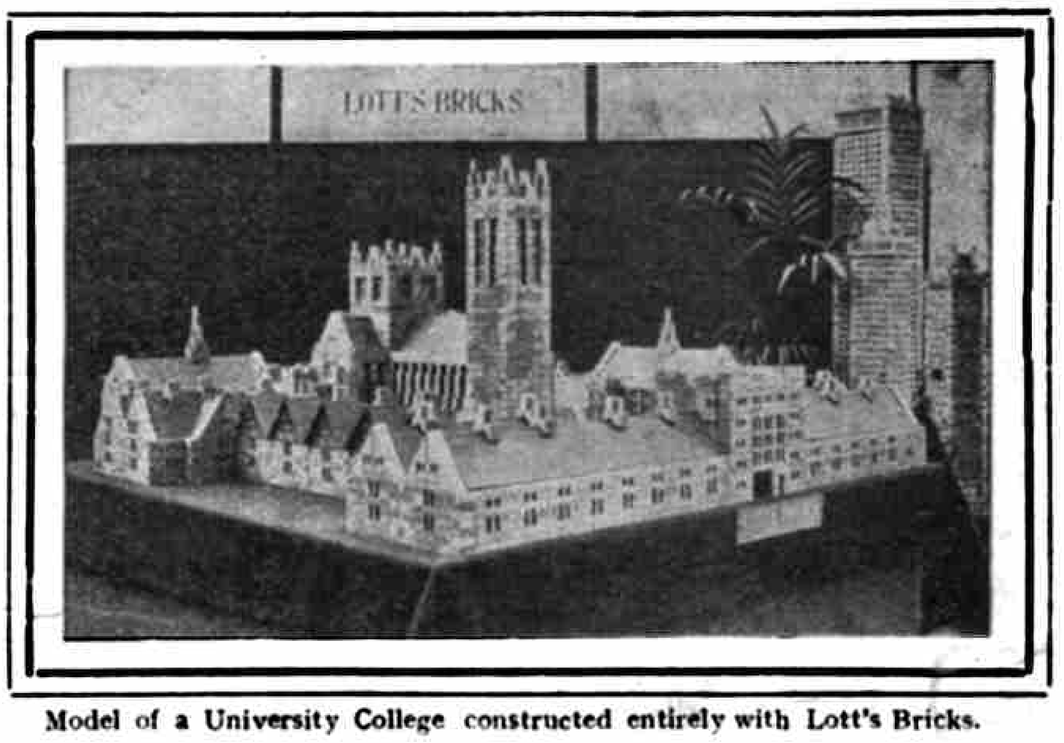


A Village constructed from Plans in Boxes 1 & 2 or 3.



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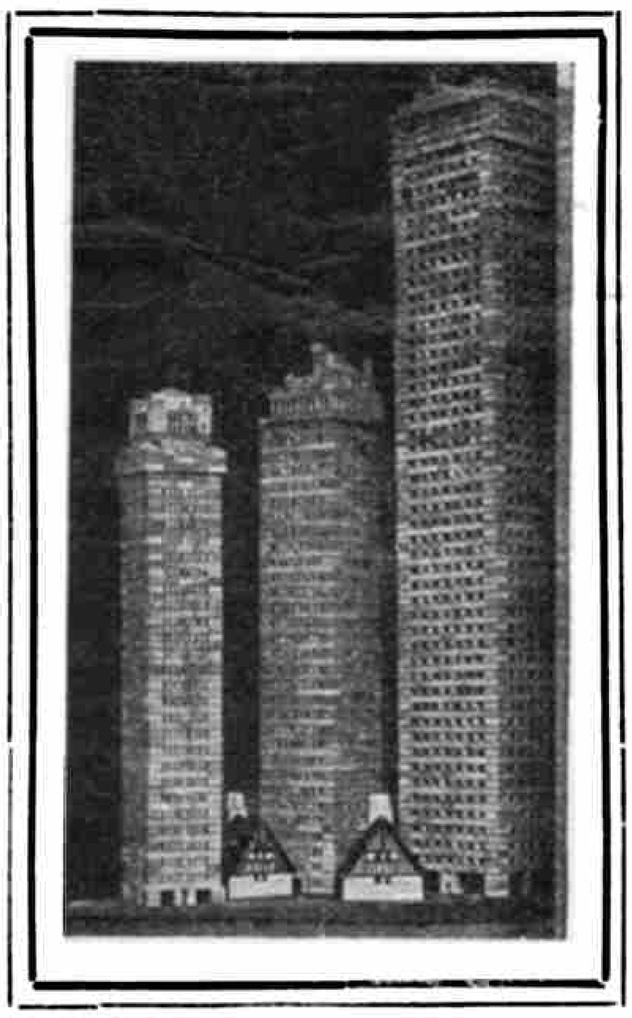

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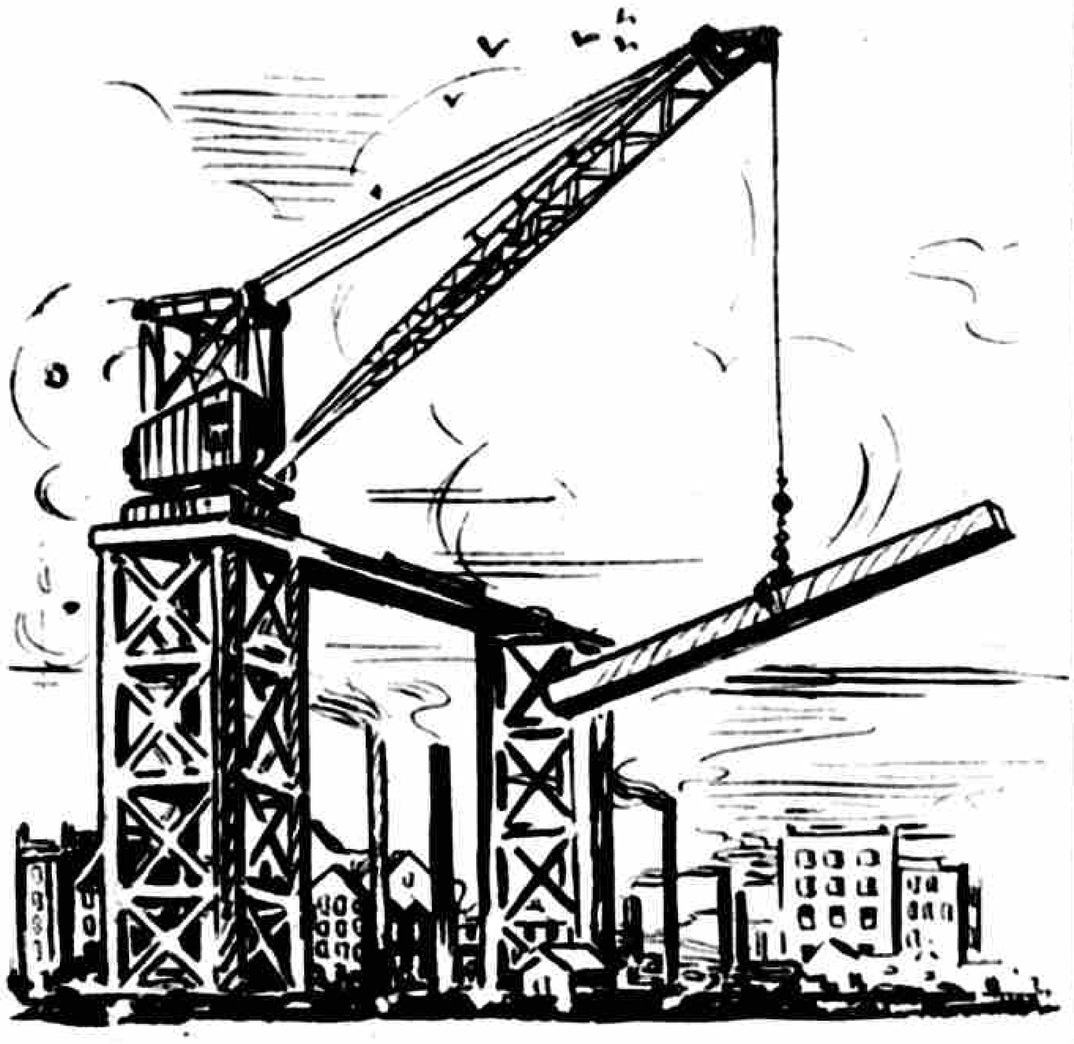

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Tons of steel, tons of solid stone and masonry are carried and slung by huge cranes over the heads of the public in every-day building operations.

One weak link in the chain—a few broken strands in the ropes—a flaw in the metal-work construction—might lead to disaster. Great builders and engineers realise the vital importance of testing every little part in the construction of their cranes and other building apparatus.

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Your chemist can supply you with Gibbs Dentifrice at the following prices: Large size 1/-, De Luxe 1/6, Refills 11d., Popular size 7½d.

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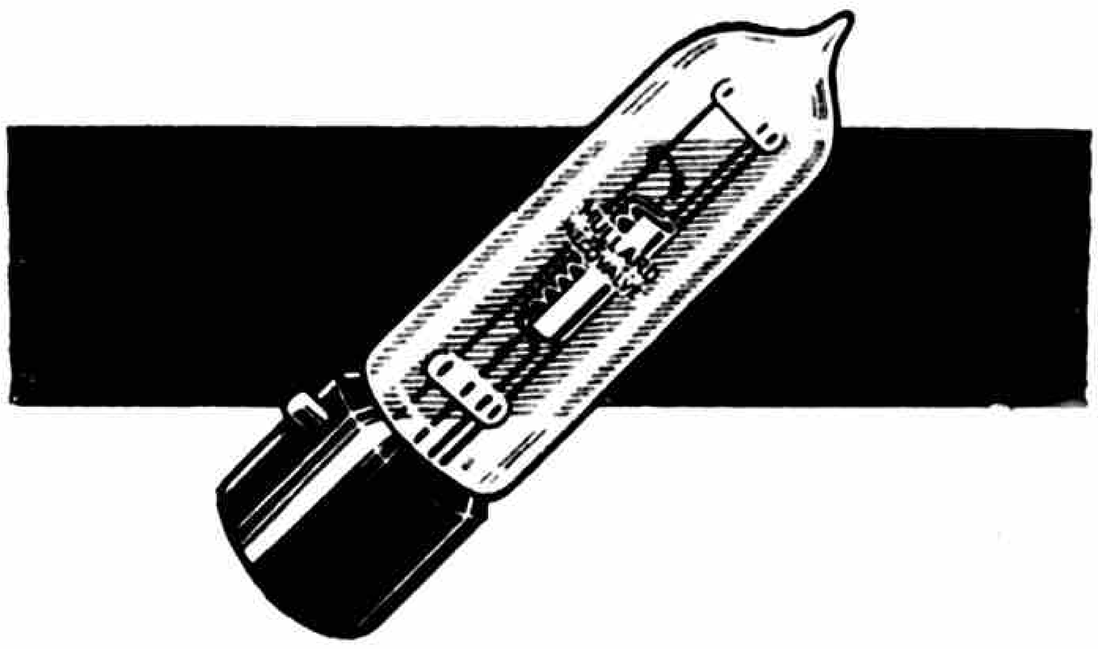

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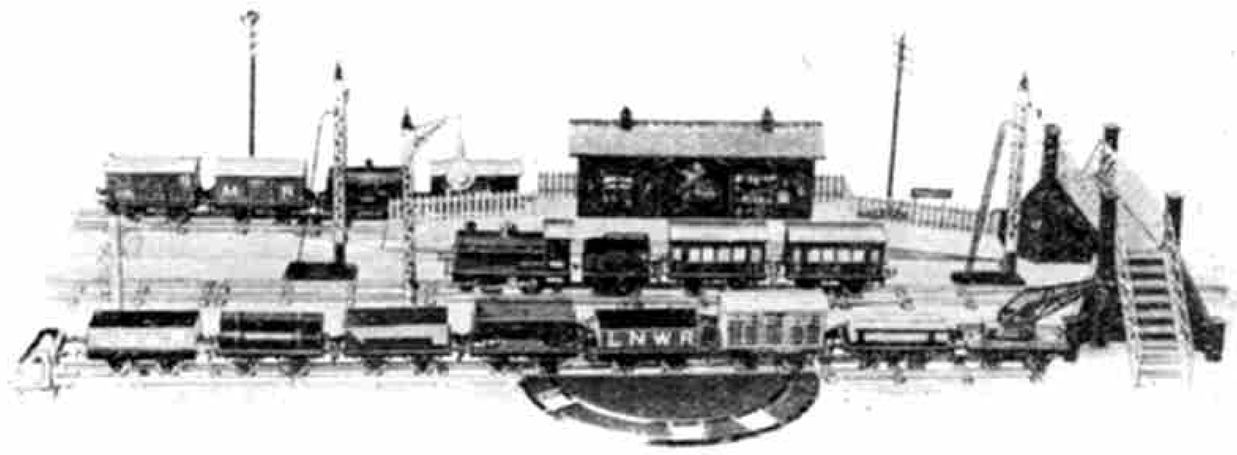

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Cars on Railways (*cont. from page* 141)

without rest. Some of the cars cover nearly 150 miles every day.

The engine develops 60 h.p., and ignition is by both high tension magneto and battery. The petrol consumption is approximately 5 –7 miles to the gallon. The engine also drives a small generator for the lighting. In winter the car is heated by passing the exhaust gases through pipes laid along the sides of the car near the floor. The brakes are applied by compressed air from a small compressor, similar to those used in some motor garages for pumping up car tyres.

These rail-cars are used on branch lines where there is little traffic, because in these circumstances they are more economical than steam locomotives and coaches. It is expected that in the near future larger rail cars will be built. These will have double-swivel trucks, more powerful engines and double-end control.

The Men Who Gave Us Radio—(*cont. from page* 151)

passed a wire, projecting into the space occupied by the filings, but not touching each other. To ordinary electric currents, these filings were a bad conductor, but when subjected to high frequency currents, such as the spark from an induction coil, they instantly became a good conductor. By connecting them in the circuit of a battery and a Morse recorder it was thus possible to make them record signals from a distance.

Branley

Working on this principle Professor Branley, of Paris, invented (in 1890) his "coherer" which, as we shall shortly learn, was the detector subsequently improved and adopted by Marconi.

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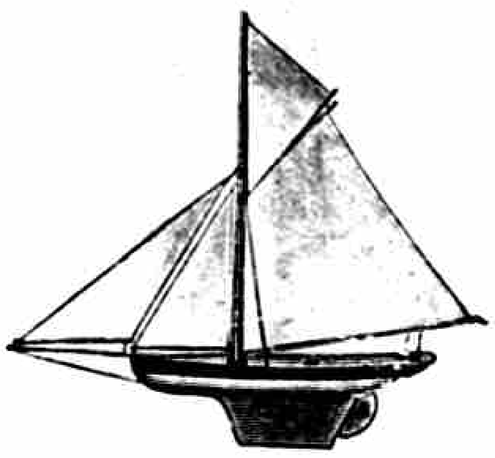

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Secretaries, see that your Club members do not get overcharged by local dealers. Please enclose ½d. stamp and state name of Club.

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Ask your mother and sister to try this special bargain offer. Postal Orders to :—

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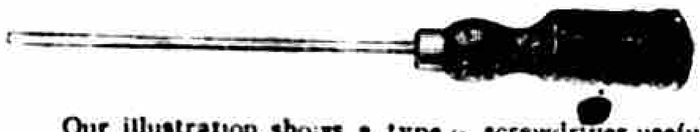

Our illustration shows a type of screwdriver useful for reaching bolts in inaccessible places on models. We are disposing of these screwdrivers, whilst our stock lasts, at the special price of 10d. each, post free.
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The Worlds Best Toys REGD.

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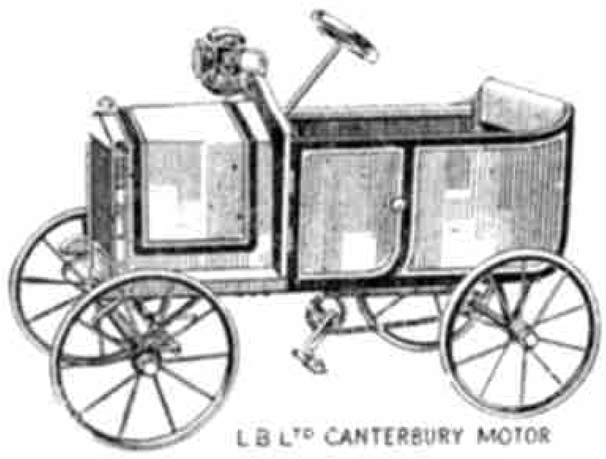
Here are a few examples of the beautifully finished British toys made by Lines Bros. They represent the highest value, make excellent Christmas presents, and can be relied upon to give splendid service throughout the year, for they are made to withstand rough treatment.

ASK FOR THEM AT YOUR TOYSHOP.



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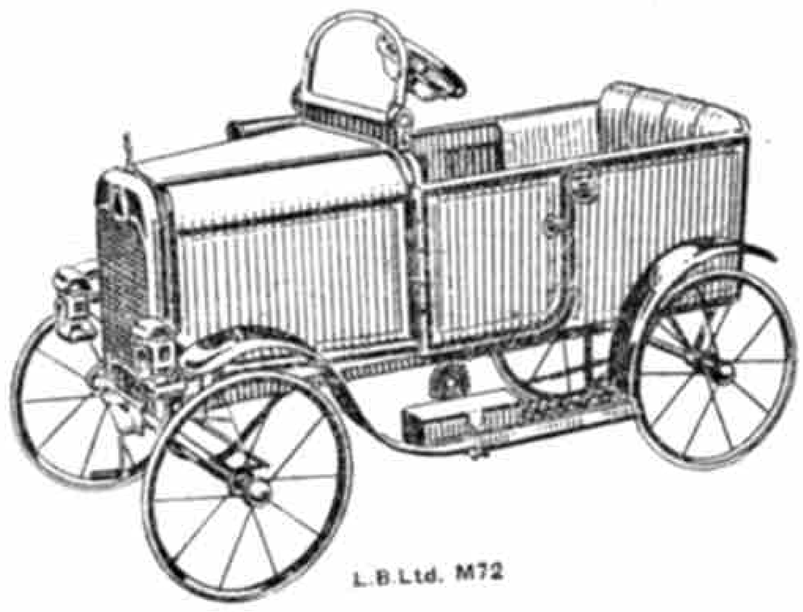
For children, 3-8 years, with pedalling gear, upholstered seat, side door to open, Rolls Royce pattern radiator and lamp **65/3**



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For children 3–9 years, complete with pedalling gear, lamps, mascot, tool box, licence card carrier, horn, windscreen and opening door **115/6**

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For boys and girls. Strongly made on cycle principles of solid drawn steel tubing. Aluminium footboard, 12 in. wheels with ½ in. wired-on tyres. Plated handlebar. Outlasts several ordinary scooters ... **27/-**

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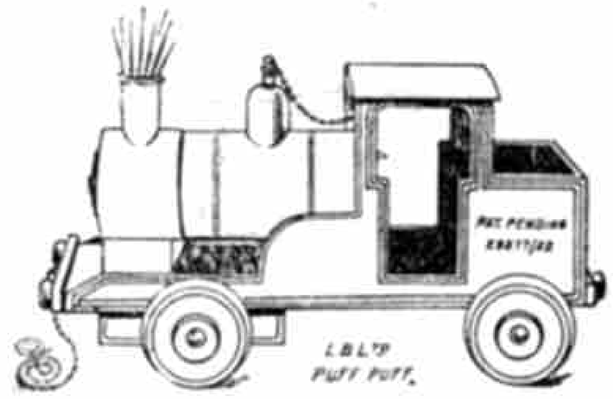

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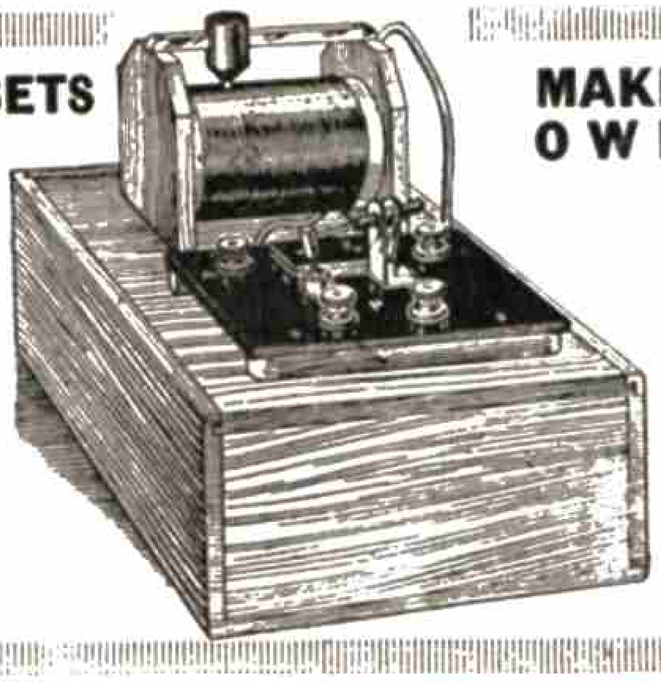

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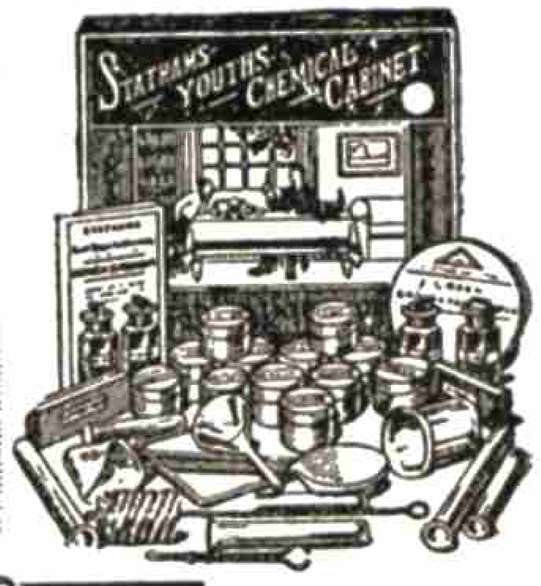

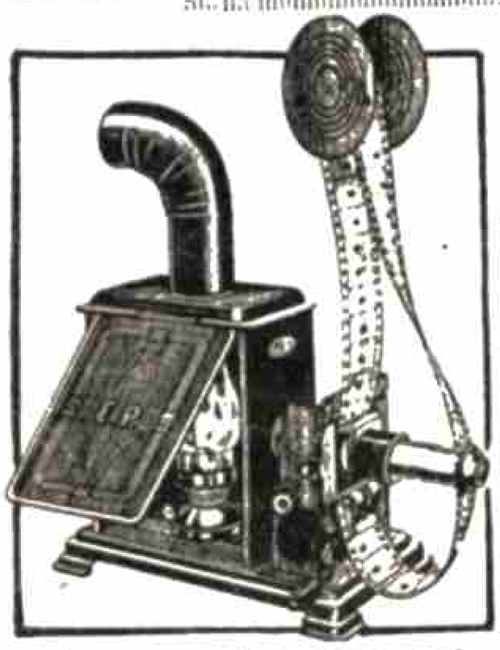

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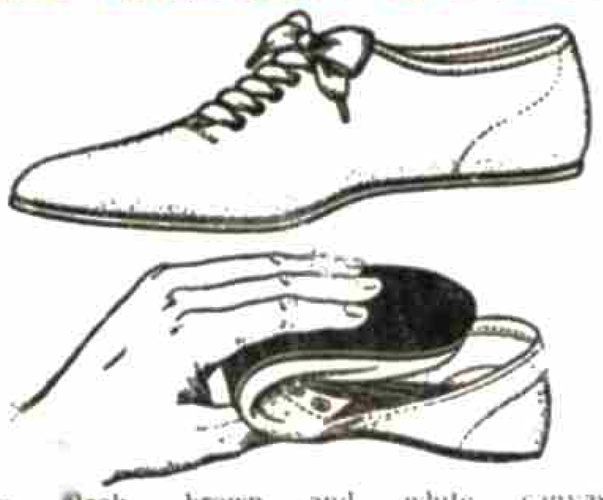

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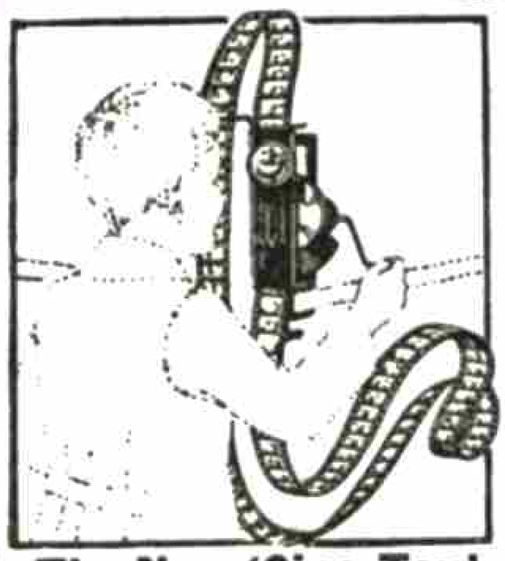

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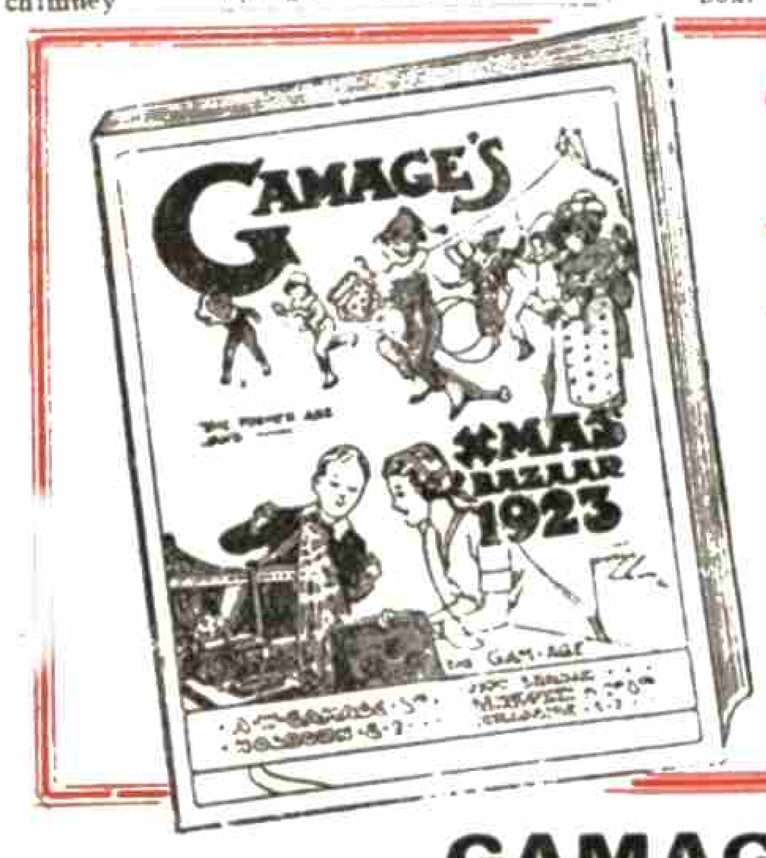

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DECEMBER 1923

MECCANO MAGAZINE

PRICE 2D

VOL. VIII

No. 12

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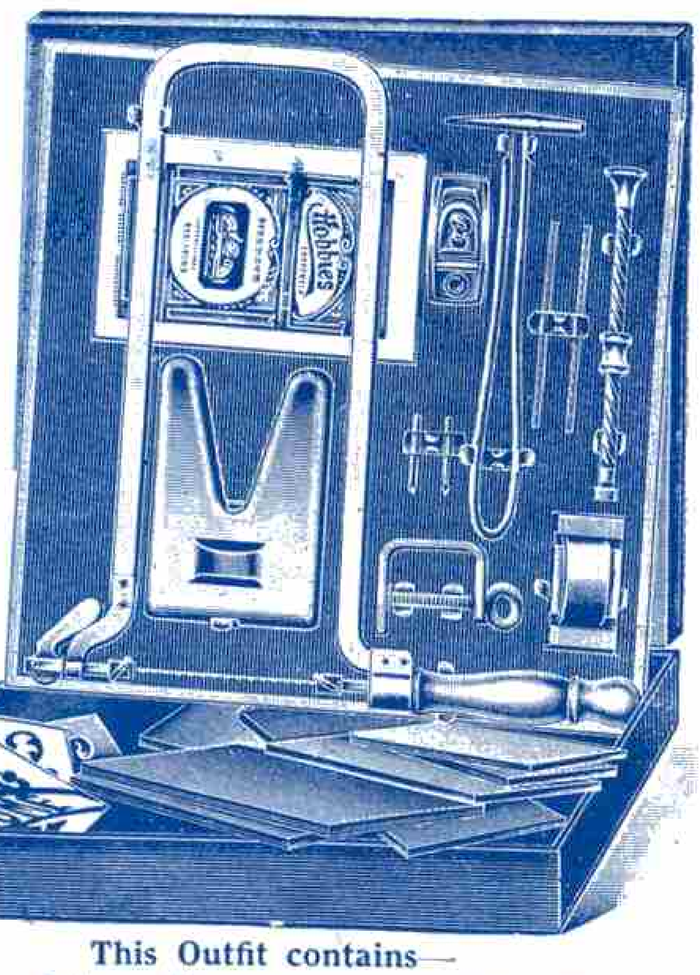

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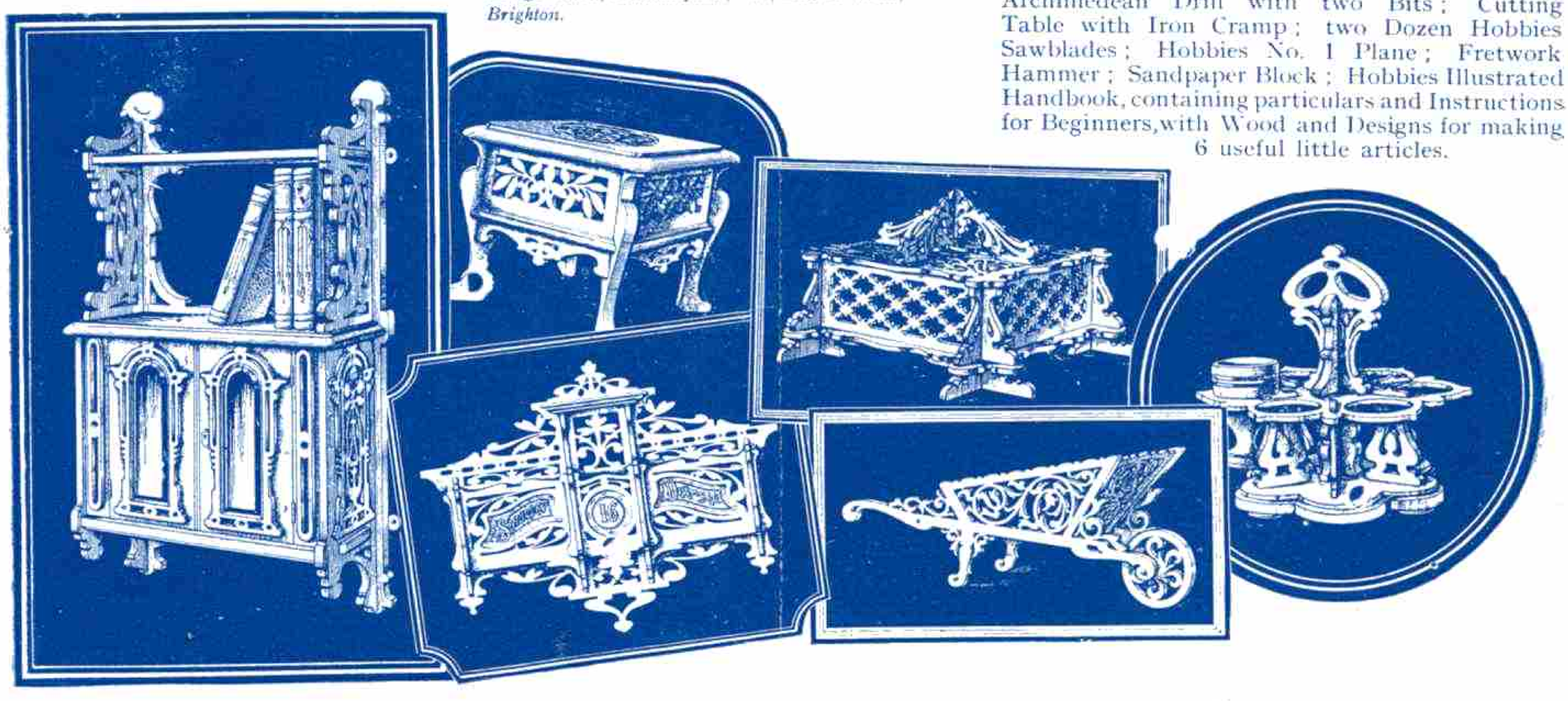

ORDER YOUR NEXT NUMBER OF THE "M.M." NOW! PUBLISHED 10th JANUARY. PRICE 2d

EDITORIAL OFFICE
Binns Road,
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MECCANO MAGAZINE

PUBLISHED
IN THE INTERESTS
OF BOYS

Keep the Money in Great Britain

Buy British Goods

IN a grave and earnest speech, one of our Cabinet Ministers recently stated that the only thing that matters in home politics at the present time is unemployment. No one who takes any interest in the conditions in his own town, or in the general conditions throughout the whole country, entertains any doubt whatever that this is a serious and deplorable truth. It is estimated that there are not less than 1,500,000 unemployed in Great Britain. Have you ever seen a crowd of 50,000 persons? Probably some of you have seen something approaching this number of spectators at a big football match. It is an awesome sight. Well! there are thirty crowds of this size walking the streets of the country with nothing to do and earning no money, because no employer is able to find work for them! The causes of this deplorable state of affairs are concerned with rates of exchange, diminution of exports, National Debt and an impoverished Europe.

Neither the causes nor the final remedies can be adequately dealt with in the pages of the "*Meccano Magazine.*" A question which, no doubt, every reader of the "*M.M.*" is asking himself, however, is "What can *I* do to help the situation?" The plain answer to this question is:—"*Buy British-made Goods!*"

No self-respecting person can do otherwise than buy British goods this Christmas. We have no word to say against foreign-made goods, but our nation is sick and we must apply a remedy. If you spend 20/– on a foreign-made present this Christmas, at least 10/– of that sum will go abroad to be paid to foreign workpeople. If you spend the same sum on a British-made toy, the whole of the 20/– remains in this country. That is surely plain enough.

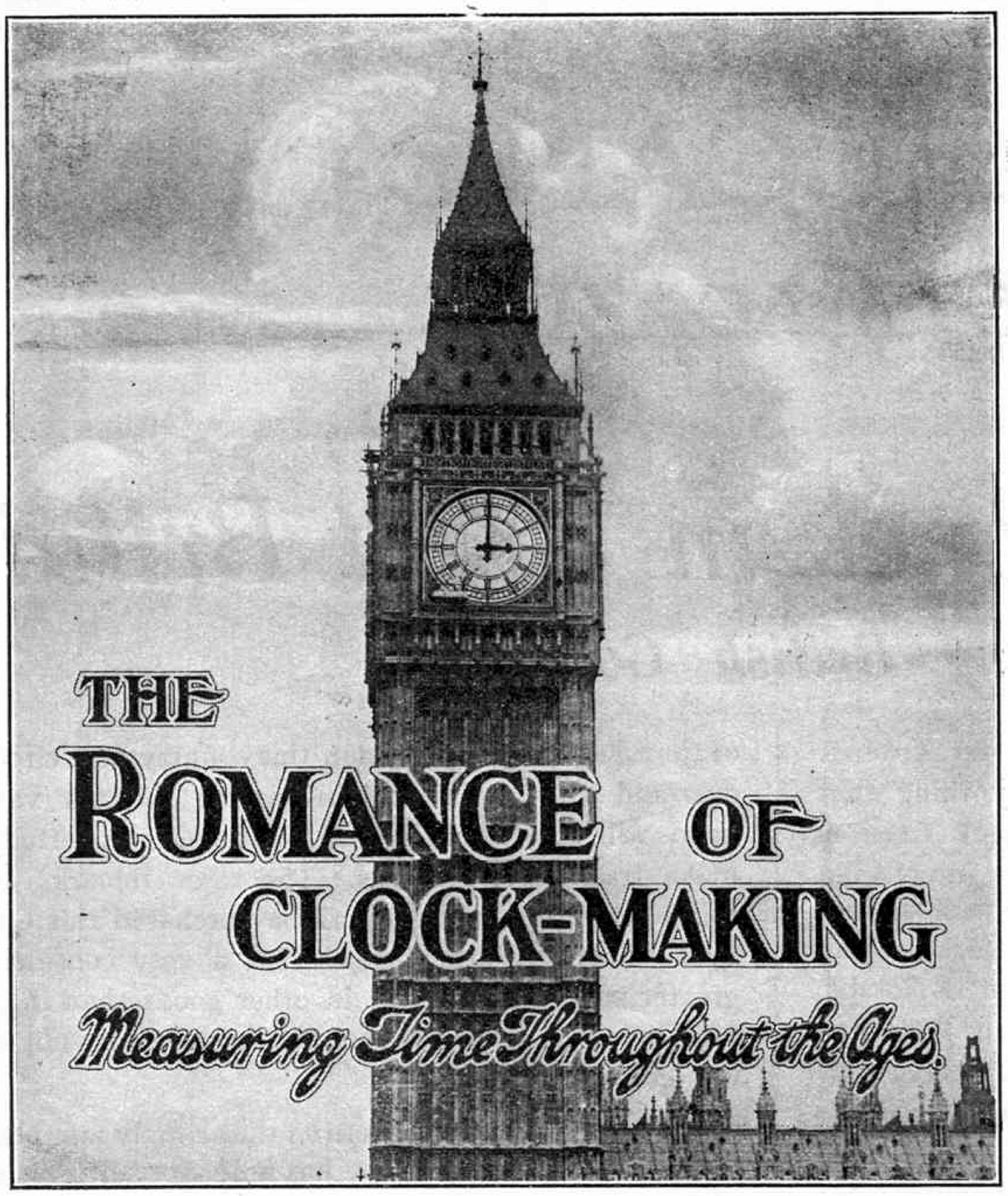
At least £500,000 will be spent on toys this Christmas in Great Britain, and if foreign-made toys are purchased we shall send out of the country £250,000 in good English money to assist other nations to get on their feet. If British-made toys are purchased the whole of the £500,000 will remain in this country, will circulate over and over again, and in passing through various hands will provide employment and help wonderfully to make trade better for us. The same remarks apply to all other presents that will be purchased this Christmas. The only difference is that a very considerably greater sum will be spent in other goods than in toys. It is up to us all to see that this money does not leave our country.

We have set out the situation thus simply and plainly, feeling that the British boy has only to realise the state of affairs to act definitely and as a patriot.

There need be no fear that in buying British-made goods there will be any sacrifice as regards quality, ingenuity or cleverness. Many British toys are better—most of them every whit as good—as the best foreign-made articles. We could name off-hand half-a-dozen British firms who produce toys that are better than anything ever imported from abroad. British toys are well-designed, well-constructed and they are good value.

One of the difficulties confronting purchasers is to know for certain what goods really are British. In this matter we can be of some assistance. Every toy advertised in this issue of the "*M.M.*" is made in this country and may be purchased with complete confidence. Every book and every other present advertised in our columns is the product of British labour. For quality and value they cannot be surpassed by any imported goods.

If you buy any of the splendid presents advertised in the "*M.M.*" you will be doing a wise thing, a patriotic thing, and, incidentally, a service to the "*M.M.*" If you purchase something else, then it is the patriotic thing to ask if it is British made. See that the money that you spend is retained in this country and devoted to softening the hard lot of the million and a half British citizens who are suffering through no fault of their own.



PART II.

OUR readers will remember that in the first instalment of this article, which appeared in our last issue, we dealt with the several ancient methods of measuring time. These included the sun-dial, water-clock and sand-glass. Another method of measuring time, before clocks were invented, was by means of long candles, which were made to burn for a certain number of hours.

These candle clocks were in use at the time of Alfred the Great, and whilst the King was a fugitive in his own country he vowed that if ever he were restored to his kingdom he would devote a third of his time to the service of God. Later, when he achieved his desire, he ordered a number of candles to be made so that he might divide his time in accordance with his vow. The candles burned for exactly four hours and were lighted one after another by one of Alfred's chaplains, who also gave the King due warning of the passing of the hours.

A New Type of Clock

Neither sun-dials, water-clocks, sand-glasses nor candles solved the problem of accurately measuring time. This did not become an accomplished fact until the invention of the weight-driven wheel clock. It is impossible to say exactly when this type of clock commenced to supersede the ancient time measures. Many vague allusions to wheel clocks occur at a very early period, but whether these were some form of water-clock or whether they were actually wheel and weight clocks seems doubtful. To a certain extent, wheel clocks were a development of water-clocks, in the later models of which a paddle-wheel took the place of the empty vessel and its floating figure. The water dropped on to the paddles of the wheel, driving it around; every time the wheel made a complete circuit a gong was struck.

It is believed that the Greeks introduced mechanical movements to take the place of the gong, and also that they connected the wheel with a series of cogs, moving an indicator on a dial. Later a falling weight took the place of the dripping water, and in this way the weight-driven clock came into existence. Some believe that credit for its invention is due to Archimedes, the famous mathematician, who lived in the third century B.C., but whether or not he really did invent the type we do not know.

The First Wheel Clocks

Although there is no record earlier than 1120 A.D. in which a weight-driven clock is definitely described, there seems to be little doubt that weight-clocks were used in the monasteries of Europe in the 11th century. Probably these clocks had no dial or hands, but only struck a bell at certain hours to call the monks to prayer. This was an improvement on the previous methods, however, for until then it was necessary for one of the monks to watch the stars in order to know when it was time to awaken his brethren for early morning prayers.

The wheel-clock was perfected by a German named Henry de Wyck. A rope with a weight attached was wound round a cylinder or barrel, which resembled the roller of a household mangle. As the weight dropped, the barrel revolved, moving the clock hand through a train of gear wheels.

In his early models, de Wyck found that as the weight dropped the speed at which the wheels revolved became faster and faster. When the end of the rope was reached the barrel revolved so rapidly that the hour hand was actually thrown off its spindle! De Wyck persevered in his experiments to overcome the difficulty, however, and did so by fitting a series of spikes to a small wheel, which then resembled a pawl and ratchet and checked the revolutions of the barrel. The King of France, Charles V., heard about de Wyck's wonderful clock, and asked for one to be made for his palace. Thus it was that the first mechanical clock to be made in France was made by a German citizen.

Discovery of the Pendulum

Shortly after De Wyck's success the whole principle of clock-making was revolutionised by the discovery of the pendulum by the famous Italian, Galileo Galilei, then a youth of 18 years of age. One day in the Cathedral at Pisa, he noticed the regular movements of a hanging lamp that had been set moving when being lighted. No doubt many people had seen a lamp swinging to and fro before, but had thought no more about it. Galileo was struck by the fact that the motion of the lamp never seemed to vary, however, and he decided to test its accuracy. Watches were unknown then, so holding his pulse and feeling his own heart-beats, he counted the time required for one swing of the lamp. To his amazement he found that the lamp required always the same amount of time to complete one swing, although the swings were becoming gradually of less extent each moment. Again and again he repeated the experiment, and each time the result was the same.

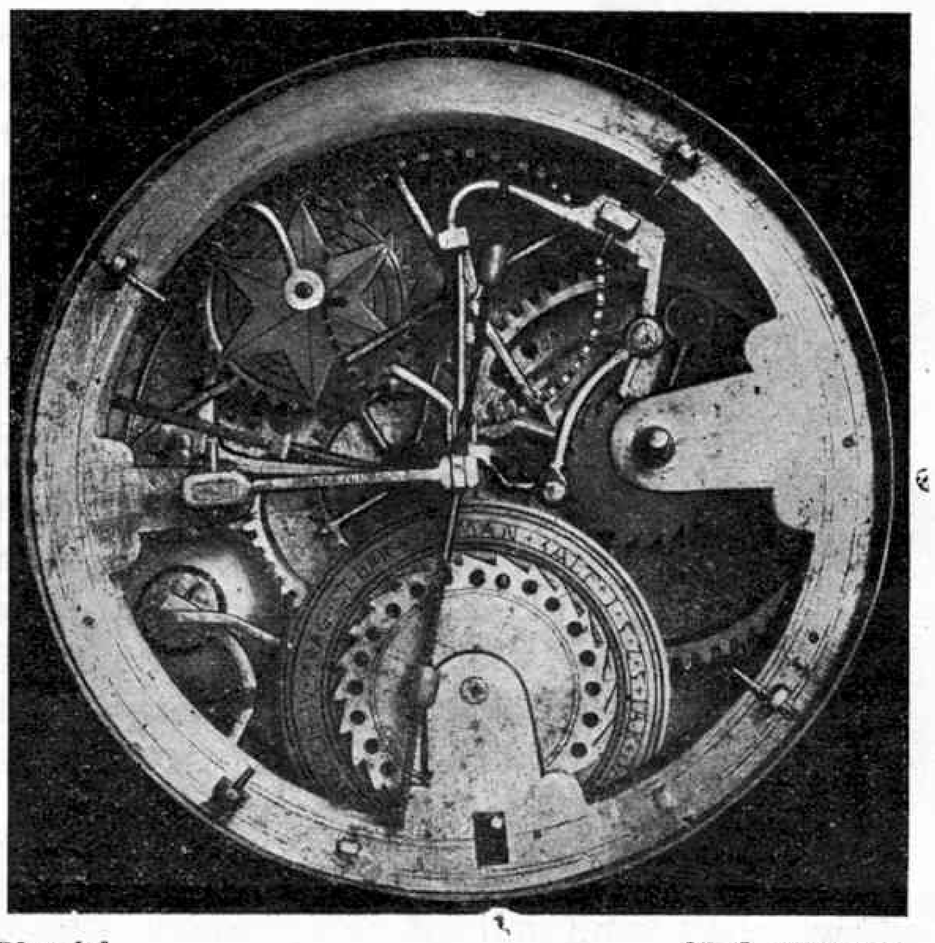


Photo by [*R. S. Antiquities*

The First Portable Clock made by Zech

Convinced of the value of his discovery, Galileo soon completed a model of the lamp by fixing a weight to the end of a long bar of metal, and it was not long before he had adapted this pendulum to work an astronomical clock.

Solving a Mystery

Once the principle had been established, pendulum clocks became common, and at last the world had a fairly accurate means of measuring time. The next step was to improve the clocks so that they were even more accurate.

In this connection there was one particular trouble to be overcome, which was to understand why the clocks always went faster in winter than in summer. In those days very little was known about the various properties and peculiarities of metal, and it was a long time before the mystery was solved. Popular opinion had it that in some unknown manner the sun affected the clocks in the summer. In the main this idea was quite correct, of course, for the difference in the clock's speed was actually due to the expansion or contraction of the metal of which it was constructed. In the hot days of summer the metal expanded, the pendulum-rod became longer, and the pendulum required longer to make its beat. In the winter the reverse was the case, and then the clocks always ran a little fast.

When more knowledge was obtained about metals, and when their different rates of expansion and contraction were discovered, the mystery was solved.

An Ingenious Device

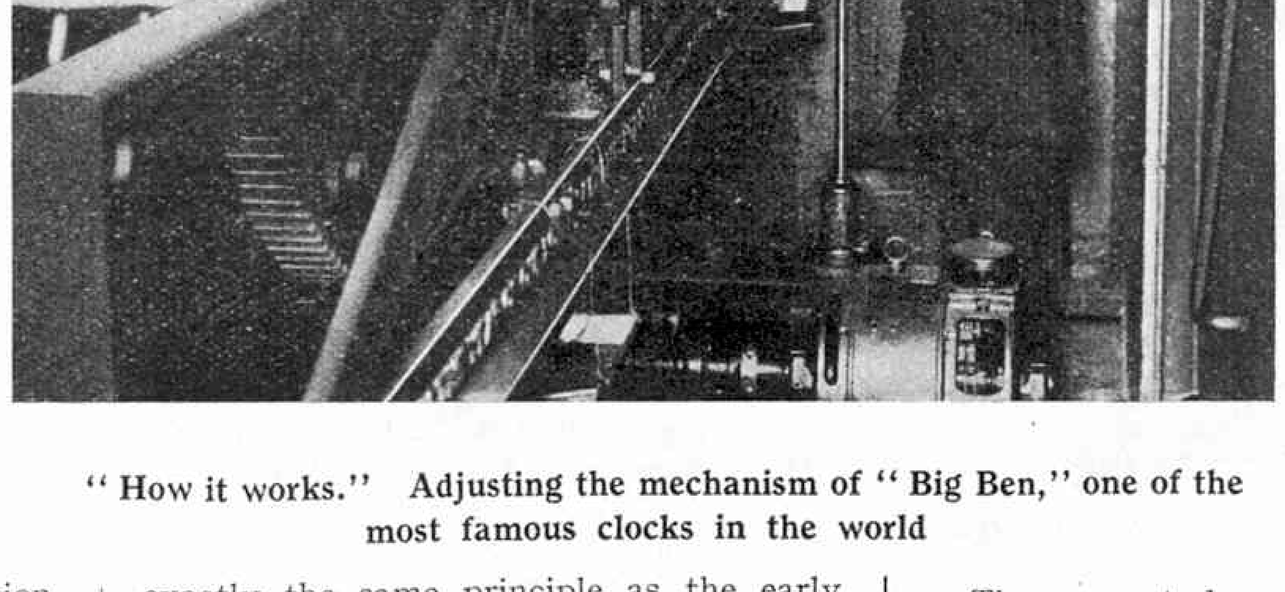
The difficulty was overcome in a very ingenious manner. The heavy metal weight of the pendulum was replaced with a vessel filled with mercury. Although the pendulum-rod continued to expand and lengthen during the summer, the mercury in the jar also expanded, rising higher in its containing vessel. This rising of the mercury had exactly the same effect as raising the weight further up the pendulum rod, a procedure that—as everyone knows—causes the pendulum to beat more quickly. The mercury therefore automatically compensated for the alteration in the length of the pendulum-rod, and the clock was able to keep perfect time without attention at any season of the year.

So accurate is this method of compensation by mercury that it is still used at the present time in astronomical clocks. It may also be sometimes seen in the clocks that register Greenwich time at large watch-makers and jewellers' shops. By the invention of the mercury compensating device, pendulum clocks were more or less perfected, though several minor improvements were afterwards made in the gearing and the method of indicating the hour.

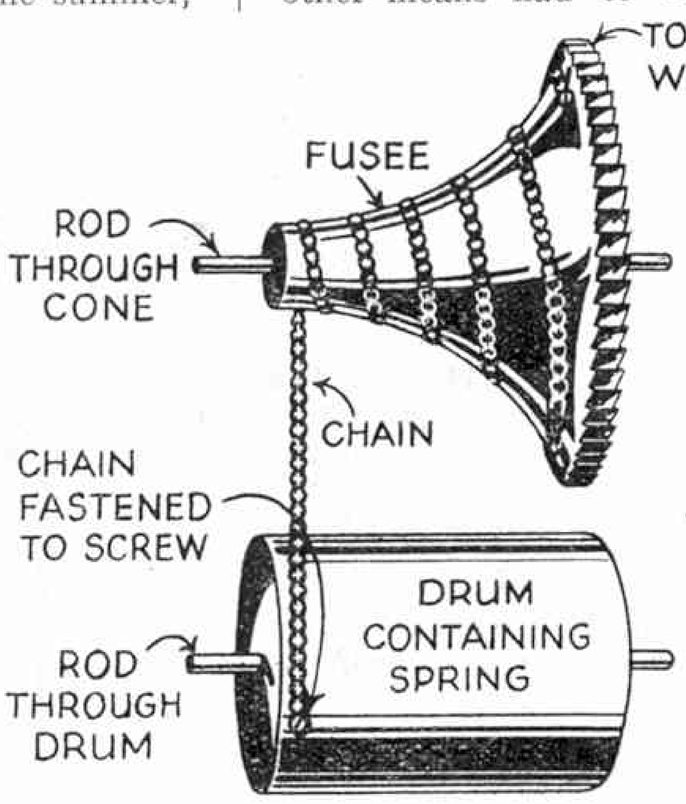
Portable Clocks

The first pendulum clocks were of the "grandfather" type. It is interesting to know that the Meccano Clock and other present-day clocks are constructed on exactly the same principle as the early clocks. After "grandfather" clocks had been in use for some time, clockmakers turned their attention to the construction of smaller clocks. These were called "portable clocks," and it is from them that our watches originated.

As it is obviously impossible to use a pendulum in a small portable clock, some other means had to be used for driving the mechanism.



"How it works." Adjusting the mechanism of "Big Ben," one of the most famous clocks in the world



The Fusee, the wonderful device that overcame a difficulty in clock and watch mechanism

About 1500 Peter Hele of Nuremberg found that a coiled spring might be used instead of a weight, for both store up energy of a similar nature.

Trouble was soon met with, however, for it was found that as the spring unwound itself and lost its tension, the speed of the wheels became slower and slower, and the clock would not keep accurate time. It was apparent that to overcome this difficulty the mechanism must be made easier to drive when the action of the spring became weaker.

A Wonderful Invention

Here was a problem, indeed! Watchmakers were not dismayed, however, and in 1525 Jacob Zech, of Prague, brought forward a solution. In his device the mainspring was contained in a drum, which revolved as the spring uncoiled. To the drum was attached one end of a tiny chain, or a string of cat-gut, which was wound on to a kind of conical roller called the "fusee." When the spring was fully wound, the chain lay at the small end of the fusee, where it had very little leverage on the clock mechanism. As the mainspring unwound, and its force became less, the chain came off a larger radius of the fusee, and thus a greater leverage was obtained by the spring, accurately compensating for the loss of energy due to its uncoiling.

There must have been hundreds of disappointments before the difficulty was solved, and although many years of patient study and careful work must have been expended over this problem, we are able to dismiss it in a few lines of print! Yet we may profitably pause to admire the ingenuity of the device, which made portable clocks and watches practicable, for in millions of watches made every year, the barrel and fusee are incorporated.

The Compensating Balance

In the earliest watches a small wheel was used in place of a pendulum. Its regular motion allows the mainspring to unwind a little at equal intervals in exactly the same manner as the pendulum allows the weight to fall a little at each swing in the heavier types of clocks. The difficulties of differences in temperature were overcome by Thomas Earnshaw, who invented the compensating balance. This uses the unequal expansion of different metals in an ingenious manner so as to keep the leverage of the rim of the wheel constant.

Zech's first clock is now in the possession of the Society of Antiquaries of England. It is inscribed in Bohemian "Made in Prague by Jacob Zech in 1525," has a spring as motive power with barrel and fusee, and is the oldest portable clock in existence.

Clocks and clock-making is indeed a romantic subject, and one that provides a very profitable field for ingenuity and inventiveness. Unfortunately, considerations of space forbid our describing any of the many famous clocks in this issue, but I hope in one of our future issues to briefly describe Big Ben and one or two other famous clocks.

(THE END).

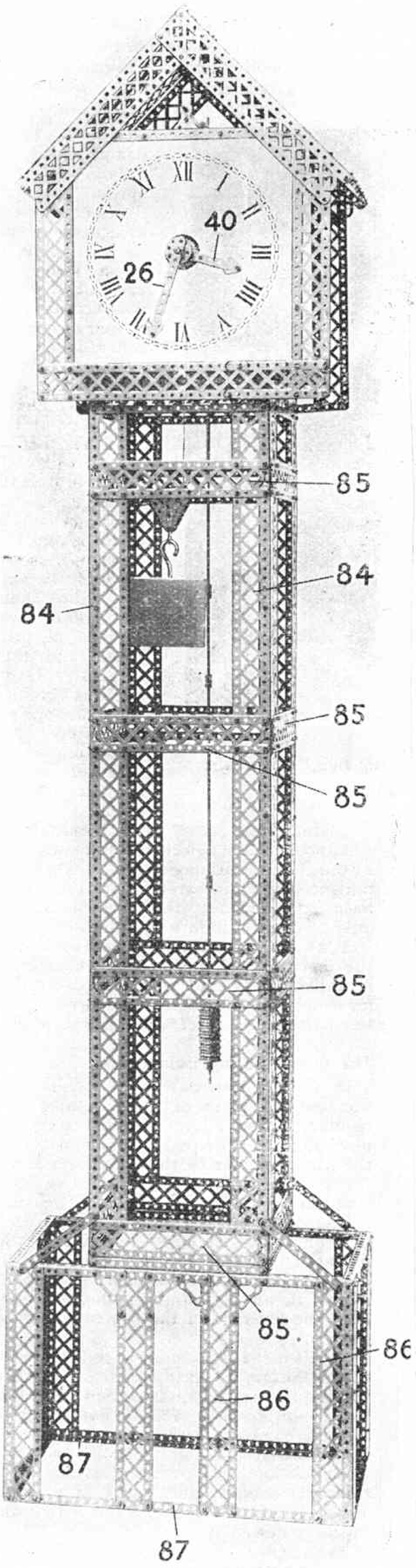


Fig. G. The Meccano Clock

Full Instructions for Building the

MECCANO CLOCK

PART II.

IN the first instalment of this article, which appeared in our November issue, instructions were given for the assembly of the Frame, Main Gear-Train, etc. The following details complete the instructions for building this remarkable model, which stands well over 6 ft. in height and keeps perfect time.

The Meccano clock is a triumph of model building, and with the exception of the 17 lb. weight, the wire by which it hangs (60 Fig. M), the cardboard face, and the light spring (80 Fig. B), it is made entirely from Meccano.

Non-Slipping Device

Having assembled the Ratchet-Winding Mechanism and the element shown in Fig. F*, a 57-toothed gear wheel (57 Fig. M) is passed over the rod and bolted thereon, and a collar (58) is bolted outside the gear wheel (57). In order that the gear wheel (57) may not slip on the rod (43) when taking the whole of the strain in winding the heavy clock weight, a flat (59 Fig. E*) is filed on the rod in the correct position for being engaged by the screw of the gear wheel (57). This gives the wheel a secure grip on the rod.

Winding the Clock

A stranded wire cord (60) is wound on the wood roller (44) and passes round a pulley (61) in the pulley block (62). This is made up of two $2\frac{1}{2}''$ triangular plates bolted together with double brackets, and carries the $1\frac{1}{2}''$ pulley wheel (61). The other end of the cord (60) is hooked (at 64) over the rod (63).

After the wood roller (44) has been inserted in place, another collar (66) is secured on the extreme end of rod (43). The clock is wound by a crank handle (65) provided with a $\frac{1}{2}''$ pinion (not visible in the photograph), which engages the gear wheel (57). The roller (44) drives the main gear train, by reason of its gear wheel (51) engaging the first gear (15) of the train.

The Escapement Wheel and Pallet

Next, proceed to construct the escapement, which consists of an escapement wheel and a pallet mechanism. The former (Fig. H) consists of a face plate (66a) to which are attached eight reversed angle brackets (67). In order that these shall not move, they are pressed hard against the circular edge of the plate, and then bolted in position with washers (68) beneath the bolt-heads.

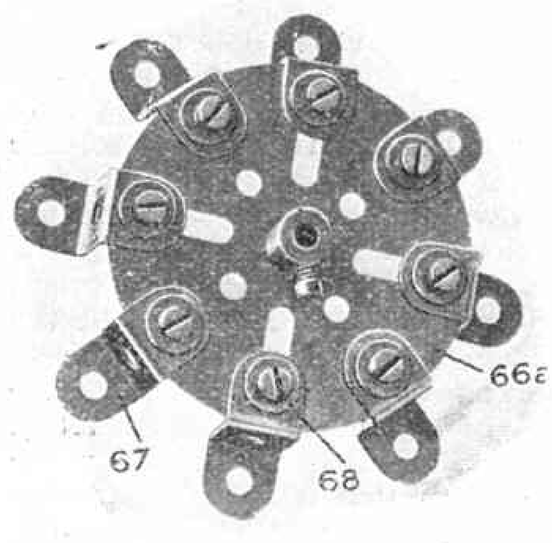


Fig. H. Escapement Wheel

The pallet mechanism (Fig. J) consists of two $2\frac{1}{2}''$ reversed curved strips (69) with the web of a crank (70) bolted between. Angle brackets (71) are bolted in the end holes of the curved strips which form the pallets. The crank (70) is bolted on a 6″ rod (72, see Fig. B*) and a 5″ rod (74) is secured to a coupling (73) on the end of the rod (72). At the lower end of this is a coupling (75) carrying two 2″ rods (76) which engage on each side of a bush (77) on the pendulum rod (78).

The Pendulum

As shown in Fig. K, the pendulum consists of four $1\frac{1}{2}''$ (78, 78a, 78c, and 78d) and a 5″ rod (78b) connected by couplings. As also shown in Fig. K, the pendulum is connected to the lower end of the $1\frac{1}{2}''$ rod (78) (see Fig. B).

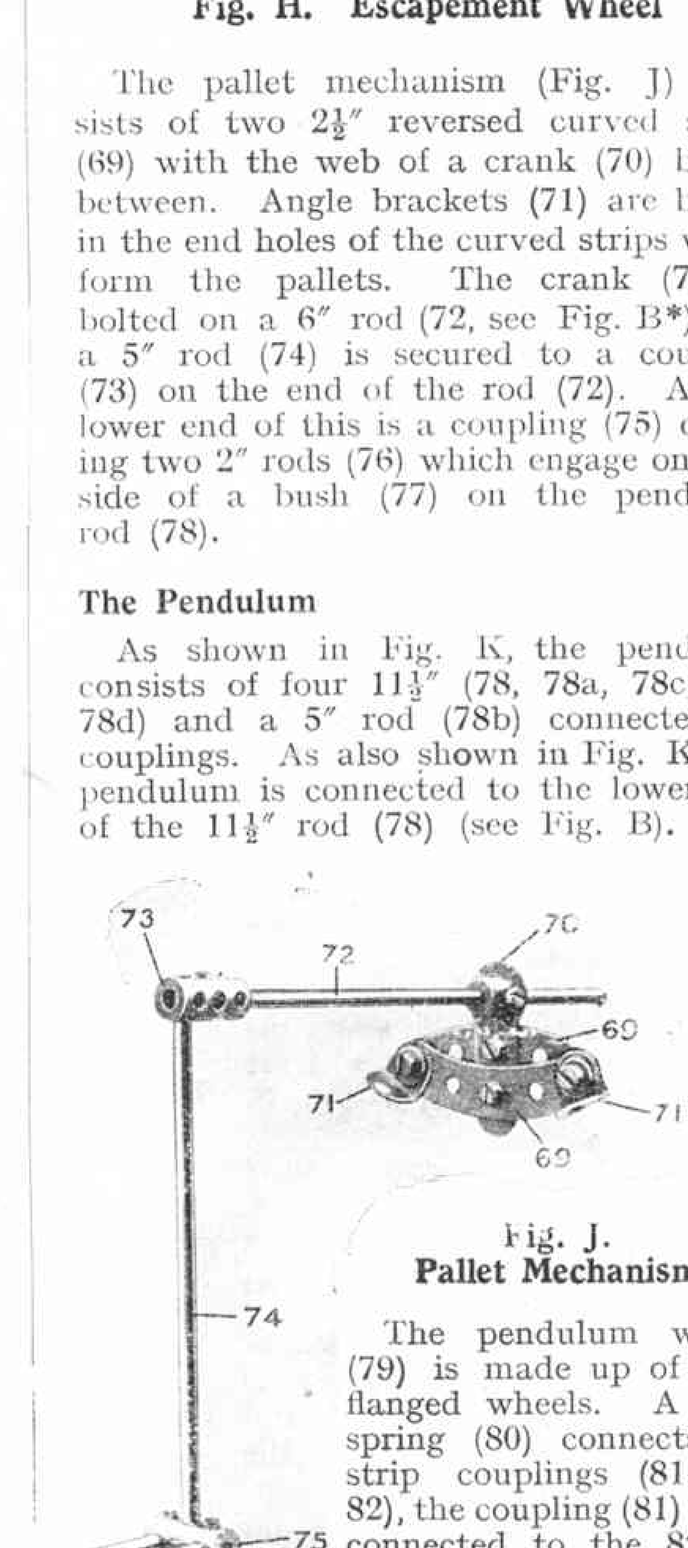


Fig. J.
Pallet Mechanism

The pendulum weight (79) is made up of eight flanged wheels. A light spring (80) connects the strip couplings (81 and 82), the coupling (81) being connected to the 8″ rod (83) which is pivoted in the bosses of the cranks (7). The spring (80) is

* Illustrated last month.

78a

78b

78c

78d

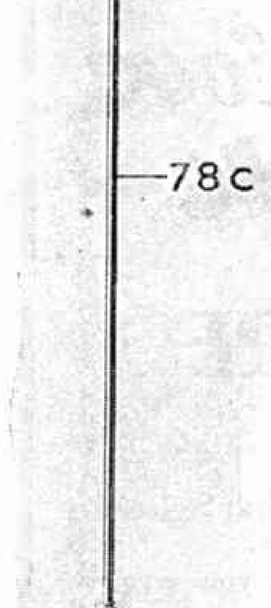


Fig. K. Pendulum

necessary in order to provide for an easy escapement movement of the pendulum.

Constructing the Main Frame

The main frame may now be built. This consists of two 24½″ angle girders at each vertical corner, overlapped three holes. To these are secured 12½″ braced girders (84) connected by 9½″ horizontal braced girders (85). The base consists of 12½″ vertical braced girders (86) and horizontal 18½″ angle girders (87), at the front and back.

The construction of the head of the clock will be clearly seen from Fig. L. It is built up of 12½″ angle girders (88) front and back, while 9½″ angle girders (89) connect the front and back girders. The feet of the vertical angle girders (Fig. A*) of the works casing are bolted by the bolts (91) to the 12½″ angle girders (90). These rest on the top of the side angle girders of the main frame (Fig. A*).

The dial should be attached and then the works casing placed in position from the rear. The hour and minute hands are then secured in place at the front of the dial and the model is complete.

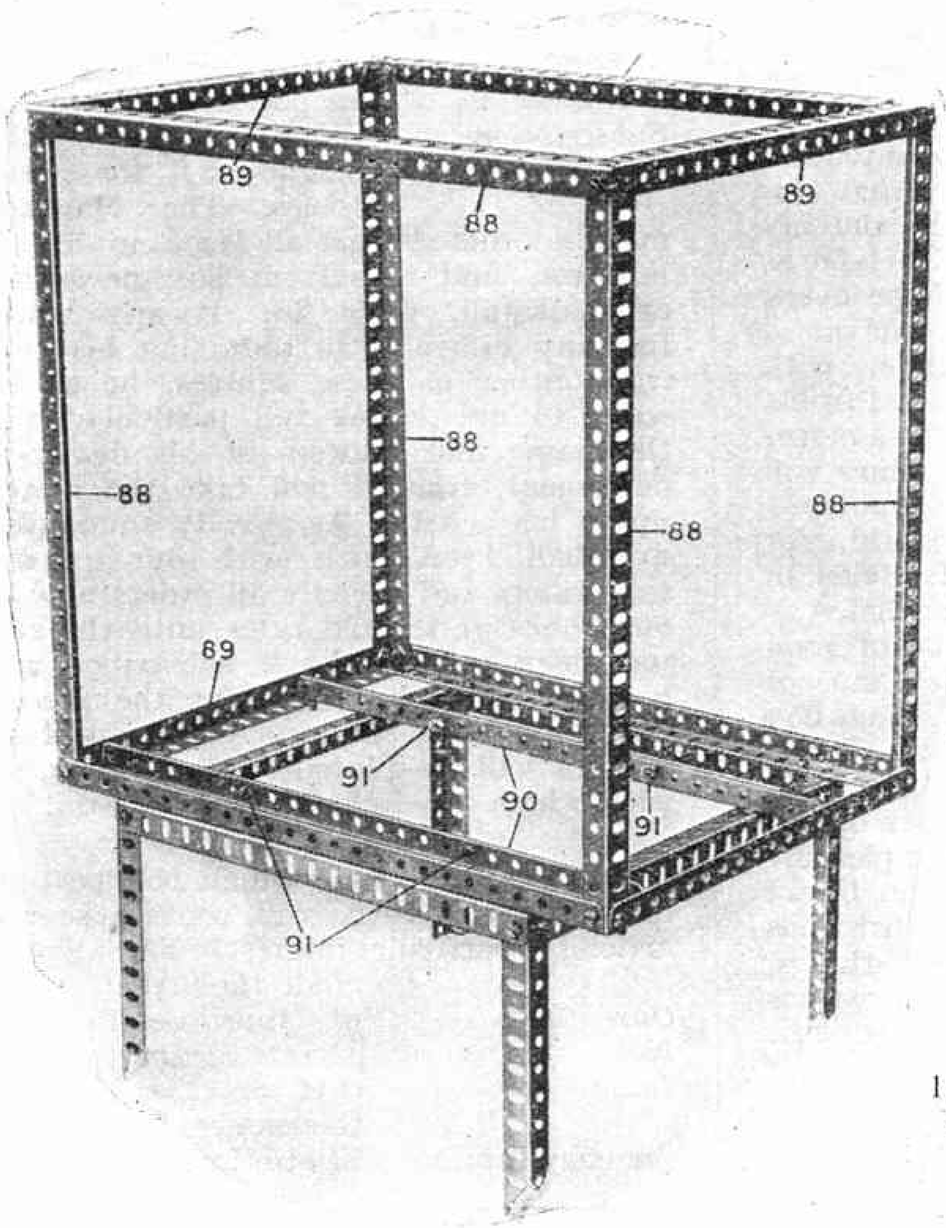


Fig. L. Clock Head

The Complete Instructions

The Meccano clock is a very interesting model to build and one that will always command admiration. During the past twelve months a large number of these clocks have been constructed in the Meccano model-building department and have been tested-out very thoroughly. With careful adjustment every clock has been made to keep perfect time. The construction of the clock is not difficult, and we hope that our readers will set to work and build this instructive model right away.

Complete instructions are being prepared in the form of a beautifully-printed and fully-illustrated leaflet, full particulars of which will be announced in the "*M.M.*" when ready. In the meantime if any readers wish a copy of this leaflet to be sent them, they should send their names and addresses, together with 4d. in stamps. Their names will be placed on a waiting list, and they will receive copies of the leaflet immediately it is ready, which we anticipate will be in about two months' time.

THE END.

* Illustrated last month.

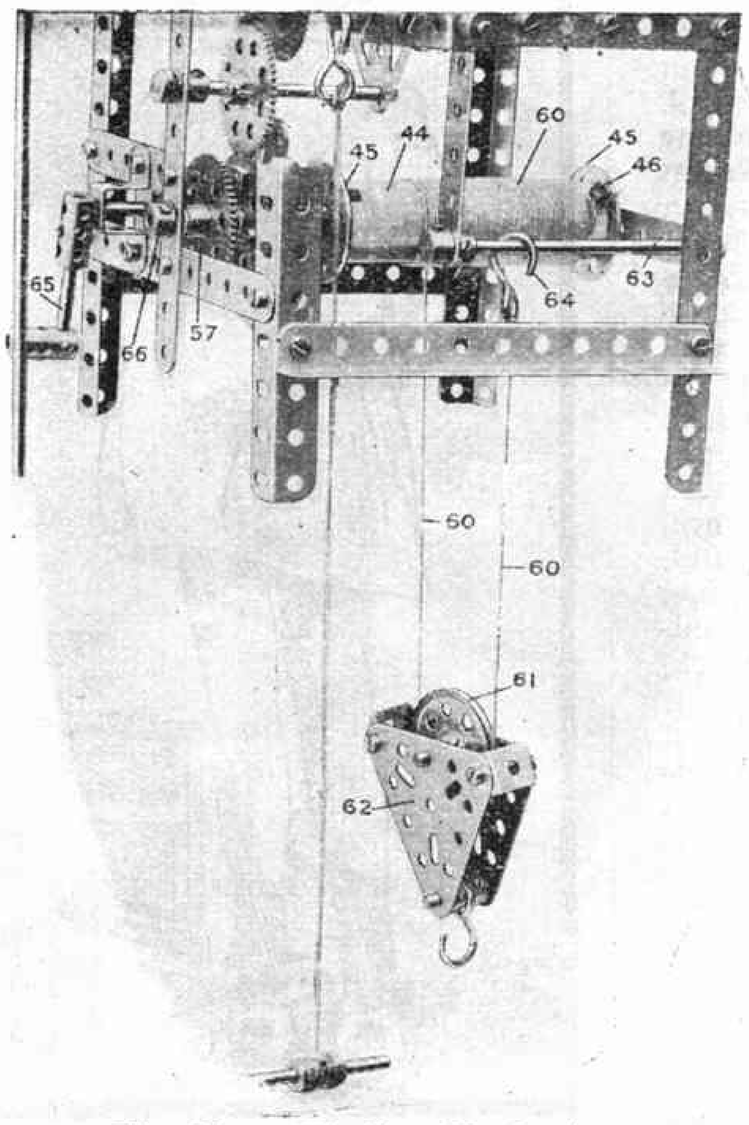


Fig. M. Winding Mechanism

Parts required for Clockwork Movement

1	Perf. Strip,	12½″
14	,, ,,	5½″
1	,, ,,	4½″
2	,, ,,	3″
1	,, ,,	2½″
1	,, ,,	2″
2	,, ,,	1½″
4	Angle Girders,	12½″
6	,, ,,	5½″
3	Double Brackets	
2	Angle ,,	
4	Axle Rods,	11½″
1	,, ,,	8″
2	,, ,,	6″
3	,, ,,	4½″
9	,, ,,	3½″
1	,, ,,	3″
1	,, ,,	2½″
8	,, ,,	2″
2	,, ,,	1½″
2	,, ,,	1″
10	Flanged Wheels	
1	Pulley Wheel,	1½″
3	Bush Wheels	
5	Pinion Wheels,	¾″
6	,, ,,	½″
8	Gear Wheels,	57 Teeth
5	,, ,,	50 ,,
1	,, ,,	38 ,,
1	Pawl	
106	Nuts and Bolts	
20	Washers	
1	Spring	
2	Double Bent Strips	
3	Hooks	
35	Collars	
6	Double Angle Strips	5½″ × ½″
4	Cranks	
9	Couplings	
2	Strip Couplings	
3	Flat Plates,	5½″ × 2½″
2	,, ,,	2½″ × 2½″
2	Triangular Plates,	2½″
2	,, ,,	1″
2	Curved Strips,	2½″
10″	Sprocket Chain	
2	Sprocket Wheels,	1½″
1	Wood Roller	
1	Face Plate	
2	Bolts,	¾″
9	Reversed Angle Brackets,	½″ × ½″
2	Trunnions	
1	Flat Trunnion	
1	Boss Bell Crank	
10 ft.	Flexible Steel Wire	
1	Face	

Parts required for Clock Case and Frame

51	Braced Girders,	12½″
24	,, ,,	9½″
8	,, ,,	3½″
8	Angle Girders,	24½″
4	,, ,,	18½″
14	,, ,,	12½″
14	,, ,,	9½″
4	Perforated Strips,	5½″
2	,, ,,	3½″
4	Architraves	
329	Nuts and Bolts	
8	Washers	
10	Angle Brackets	
1	17lb. Weight	

EDITORIAL

A VERY merry Christmas to all readers of the "*M.M.!*" I feel that this must be my first thought and my first words in this special Christmas number. I hope every reader will have a real jolly time, with plenty of fun and frolic. I shall think of you all on Christmas morning, and shall imagine the good times you are having in all parts of the country—indeed, in all parts of the world, for Christmas is one of the few festivals in which the world partakes as a whole.

Good Wishes

Christmas is not only a season of good times, but it makes tens of thousands of new friends for Meccano boys. Each boy who receives a Meccano Outfit as a Christmas present, joins our great brotherhood of boys; each becomes a member of our world-wide movement. What vast pleasure is in store for these new Meccano boys! What jolly times ahead! And on Christmas Day we shall all think of these things, and wish we might have a great Christmas gathering of all Meccano boys, with Mr. Hornby as Chairman, supported by the Guild Secretary and myself. Such a gathering is impossible, of course. We could not find any building in the world large enough to hold us all! Instead we must content ourselves with knowing that every Meccano boy this Christmas is, in thought, broadcasting to every other Meccano boy a message of good-will and friendship.

I hope you all like the special Christmas cover in which this number of the "*M.M.*" comes to you. The idea, which the artist has so beautifully carried out, occurred to me one day a few weeks ago when passing through our Shipping Department here in Liverpool. All around me were hundreds of packing cases of Meccano and Hornby Trains labelled and addressed, waiting for our motor lorries to take them to the docks for shipment to their destinations. Consignments of goods were being despatched to all parts of the world, and I felt so certain that readers of the "*M.M.*" would be interested to hear of the countries to which Meccano was being sent, that I made a list of the destinations on the crates I saw around me. Here it is:—France, Chili, India, Norway, Italy, Holland, U.S.A., Spain, East Africa, Argentine, New Zealand, Australia, Switzerland, Demerara, Bolivia, Smyrna, Denmark, Sweden, Canada, Belgium, Asia Minor, Morocco, Malta, Egypt, South Africa, China, Japan. Even this list of countries does not exhaust the countries in which Meccano is sold, of course, and it is a wonderful tribute to Meccano to find that boys all over the world want it. Some day I hope to tell in greater detail of the manner in which Meccano is shipped. How we have to look well ahead and in some cases ship orders for Christmas goods even during the Summer months, in order that they may reach their far-off destinations in time for the festive season! These and many other facts in connection with this important Department of our factory, will make interesting reading some day.

Sending Meccano World-wide

As mentioned in our last issue, in view of the increased size of the "*M.M.*," the price will be 2d. in future. Subscription rates for Magazines mailed direct from this office will be 1/6 for six and 3/– for twelve issues. The Magazine may be ordered from all Meccano dealers, however, and also from any newsagent or bookstall, price 2d. If any reader has any difficulty in obtaining his copy from either of these sources, he should write to me, giving full particulars and the name and address of his dealer or newsagent, when I will take the matter up on his behalf. As already announced, we shall keep faith with our existing subscribers and execute all orders now on our books at the old rates until the subscriptions expire. Each subscriber will, however, be debited 3d. for the present Christmas number, including postage. A note will be placed in each magazine with which any subscription runs out.

Increased Subscription Rates

Our January issue, which will be published on the 10th, will contain several articles of particular interest. These will include the first of a series of four dealing with Giant Steam Shovels that do the work of thousands of men. The January number will also include the first instalment of "*A Remarkable Engineering Feat*," Puzzles, Competitions, and many other good things. We print only sufficient magazines to fill the orders on our books, and for the last three months there have been many disappointments, owing to our being "sold out." If you have not already done so, place a regular order for the "*M.M.*" to-day, either with this office, or from your Meccano dealer or local newsagent.

Our Next Issue

Many outside firms are now using the pages of the "*M.M.*" for their advertising. I hope that every reader of the "*M.M.*" will patronise those firms who advertise in our pages, and whenever possible will make his purchases from them. When ordering goods or requesting catalogues it will help considerably if readers will mention to the firms concerned that they saw their advertisement in the *Meccano Magazine*. That will encourage our advertisers to continue to use our pages, and this in turn will enable me to enlarge the "*M.M.*" even further.

Support our Advertisers

IMPORTANT NOTICE

We are constantly asked to supply back numbers of the "*M.M.*" We print only sufficient copies to fill our regular orders, and back numbers cannot therefore be supplied. In order to prevent disappointment our readers are advised to place a regular order, with a Meccano dealer, a newsagent, or direct with us.

Educate the Kiddies to love good Furniture—

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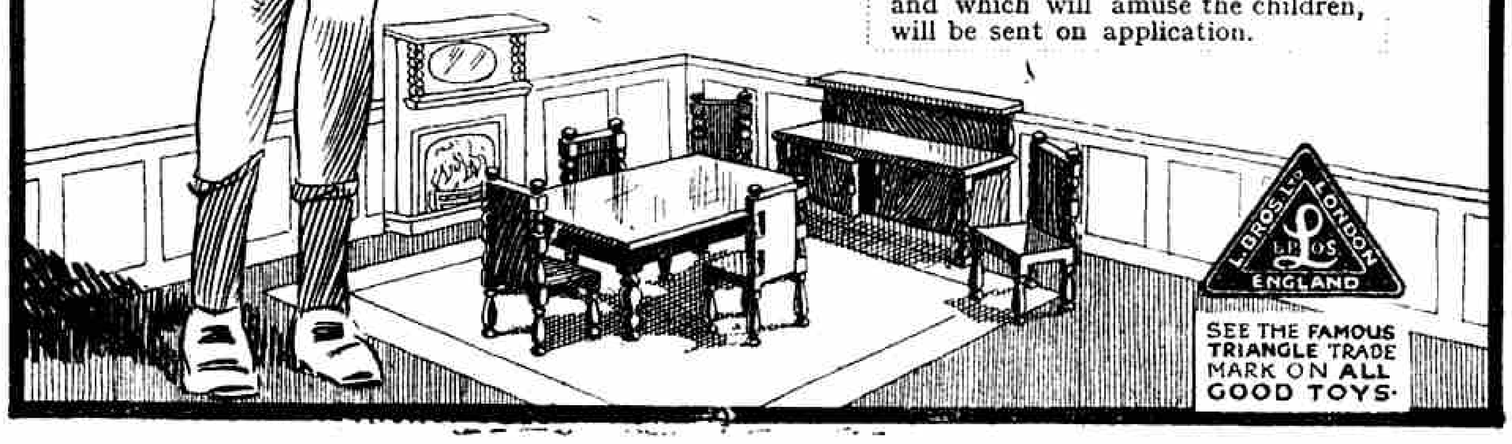

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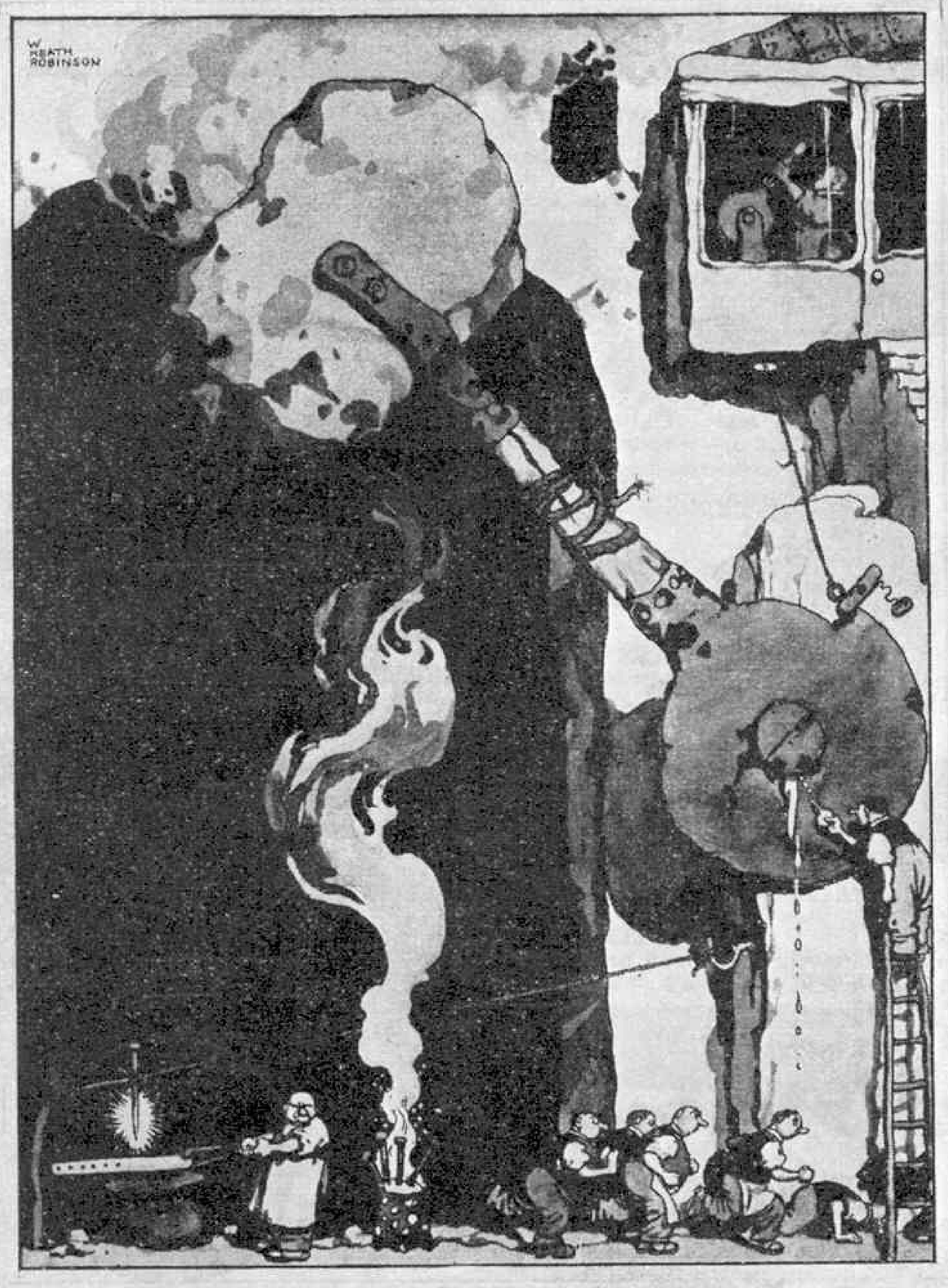
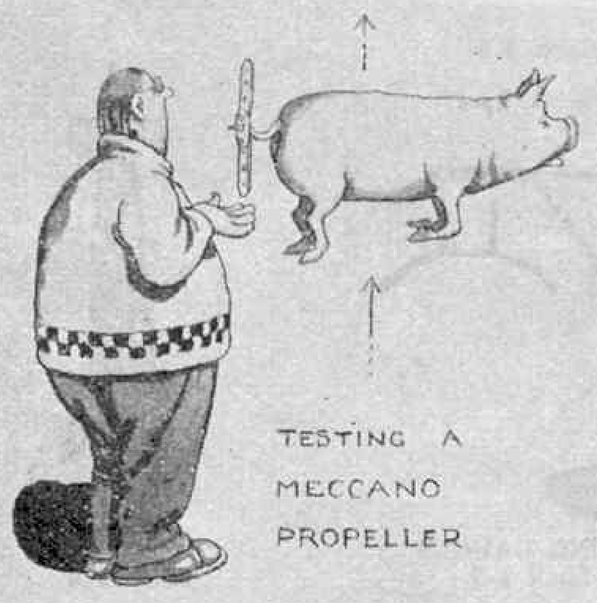


THE ARDUOUS WORK OF THE MECCANO HOLE COUNTER

MECCANO TRUCK TESTING



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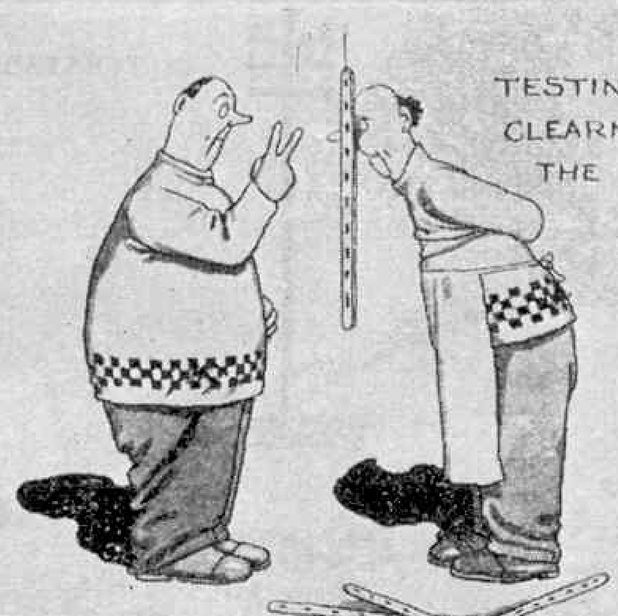

TESTING THE CLEARNESS OF THE HOLES

Mr. Heath Robinson's idea of how Meccano is made and tested.

New Rolling Stock and Accessories

THERE are new Wagons, Signals, Lamps, Stations, Turntables this year, all built in correct proportion to the size, gauge, method of coupling, etc., of the Hornby Trains. Most important of all they have the uniformly beautiful finish which is the great feature of the Hornby system. To use cheap-looking rolling stock or a foreign-looking station with a Hornby Train completely spoils the effect.

THE WINDSOR STATION is a thing of beauty—the only really British station obtainable. Its bright colouring and realistic appearance will bring joy to the heart of every boy who sees it.

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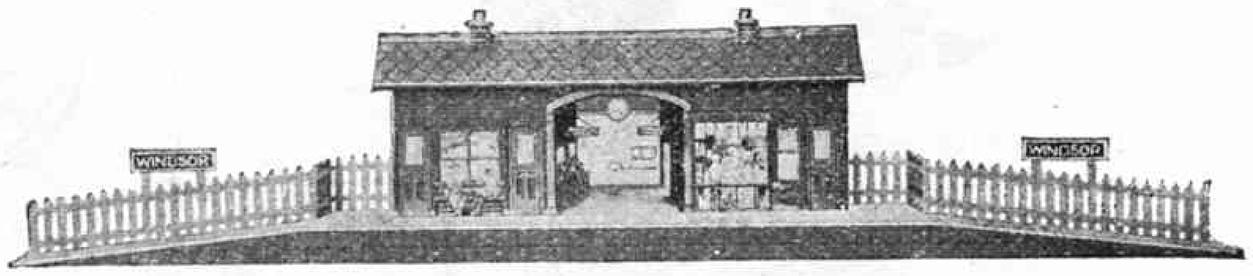

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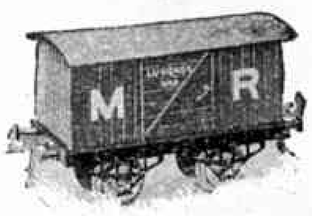

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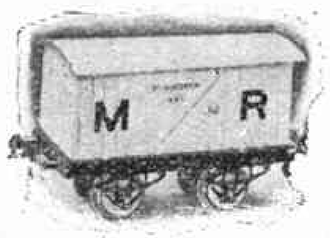

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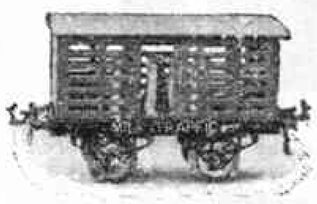
Enamelled in white, lettered black. Each **4/6**



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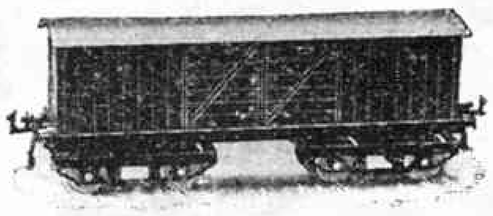
Fitted with sliding door, complete with milk cans. Each **5/–**



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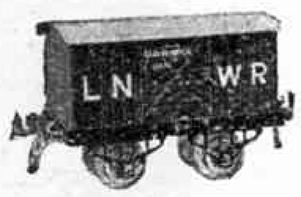
Suitable for 2 ft. radius rails only. Each **7/–**



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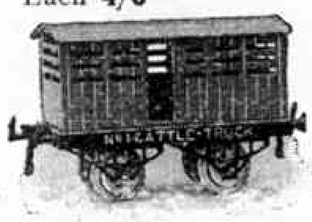

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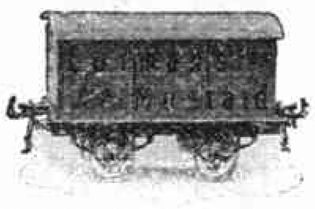

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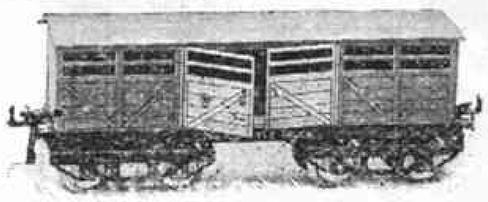

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Splendid models, fitted with double doors.
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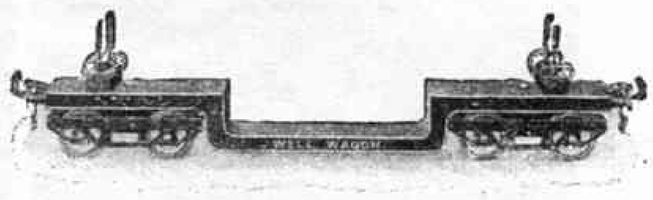

TROLLEY WAGONS. Finished in colour.
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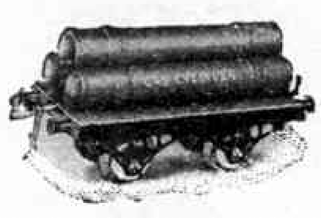

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Finished in red, lettered gold.
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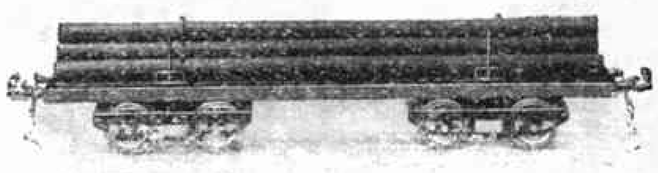

No. 2 LUMBER WAGONS
Fitted with bolsters and stanchions for log transport.
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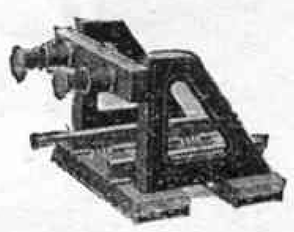

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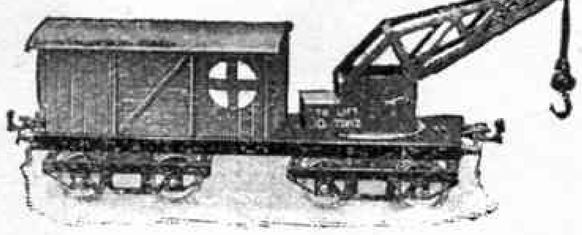

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Excellent finish. Beautifully coloured.
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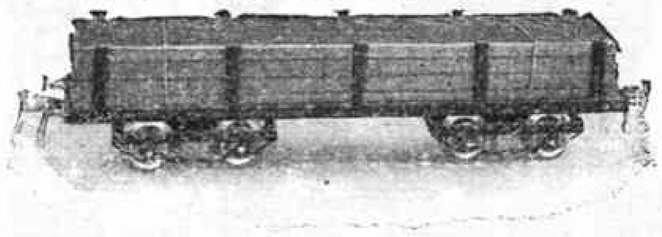
Beautifully enamelled in colour and stoved. Each **2/–**



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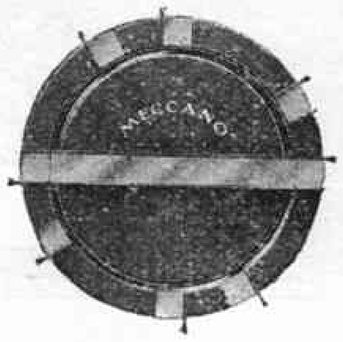
Beautifully enamelled in colour and stoved. Suitable for 2 ft. radius rails only. Each **5/6**



TURNTABLES. Each **4/6**

ROTARY TIPPING WAGONS
Finished in colour.
Each **3/6**

SINGLE LAMP STANDARDS
A four-volt bulb may be fitted into the globe.
Each **3/–**

DOUBLE LAMP STANDARDS
Four-volt bulbs may be fitted into the globes.
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TELEGRAPH POLES
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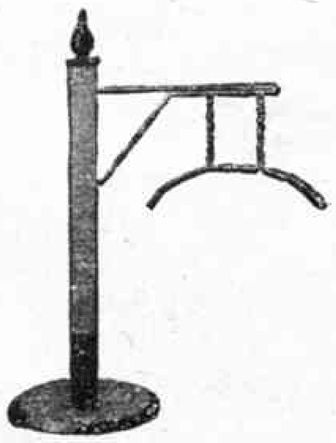
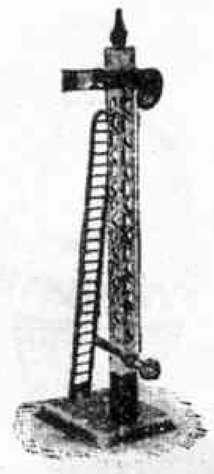


LOADING GAUGES
Each **1/9**



SIGNALS
Each **2/6**

MECCANO LIMITED BINNS ROAD LIVERPOOL

Into the Land of Fun

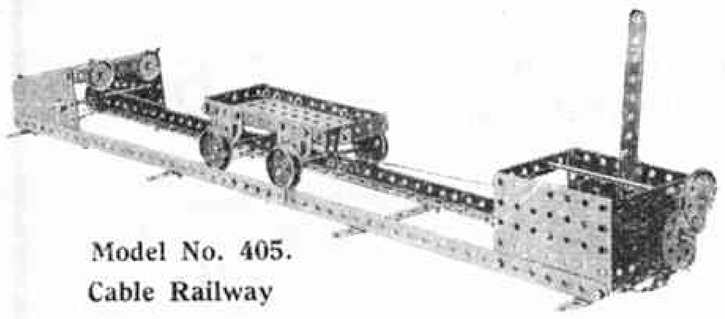
by

"SPANNER."

THERE are over a million boys to-day who regard Meccano as being the most fascinating hobby in the world. During my travels I have met many thousands of these boys, and I have been compelled to notice how full of enthusiasm and praise they are for everything that comes from Meccanotown.

Often during these dark December nights as I sit by the fire I like to think of these boys in all parts of the country. I think of them bringing out their well-worn boxes of Meccano and having real jolly evenings with their Outfits. They don't care whether it is raining or snowing, for their minds are away in the wonderful realms of engineering, planning wonderful structures or intricate mechanisms of iron and steel.

The boys I know never seem to come to the end of their Meccano fun, for somehow or other, no matter how many models they build, there always seem to be others ahead. One of them told me the other day that he thinks there are enough models illustrated in the Meccano Manuals to keep any boy busy for a couple of years! I quite agreed with him, but even when all these models have been constructed there are hundreds more to be thought out. Then, too, there are numbers of fascinating experiments to be made, improvements in existing models to be effected, or new ideas to be tried out.

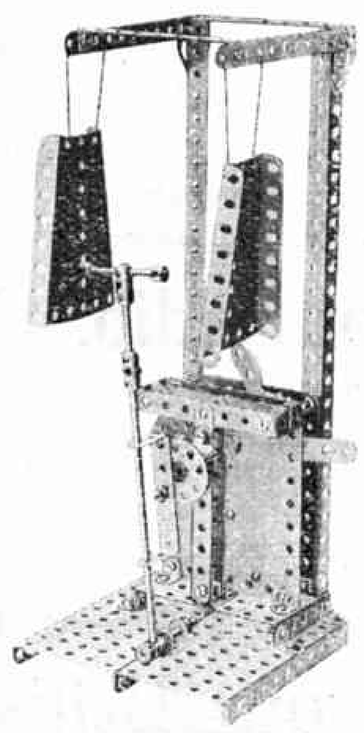


Model No. 405.
Cable Railway

I do not believe that there are many boys who build the same models more than once, because they always wish to "go one better," and having built a model they pass on to more complicated models. And when the models within the range of their Outfit have all been built it is a simple matter to add an Accessory Outfit, and the building power of the Outfit becomes enormously increased at once.

Some years ago I used a No. 4 Outfit and I have many pleasant memories of the good times I had with this Outfit. Though I used it every day, I never seemed to come to the end of the different models I could build with it. Looking through the pages of the new Complete Manual, I feel that I should have had even more enjoyable times if that Manual had been published then! In its pages all manner of new mechanical devices are shown, and the models have been so improved that some of them are quite unlike their predecessors in the former manuals, although bearing the same names.

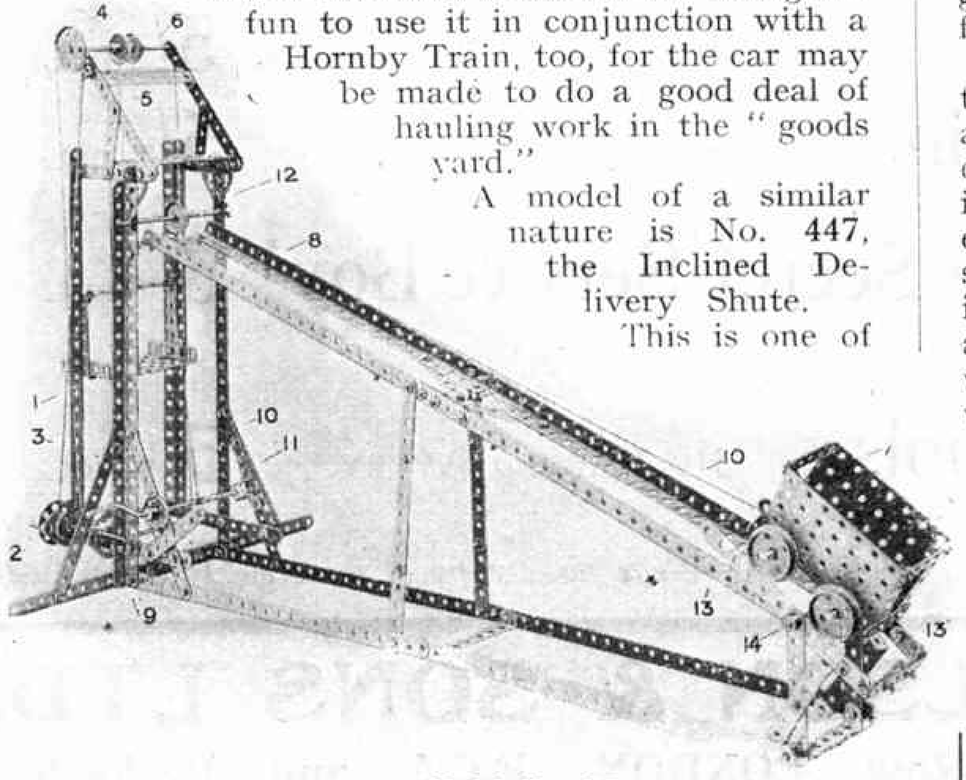
I like those models that continue to amuse after they have been built—the working models, I mean.



Model No. 413.
Automatic Gong

One, which a No. 4 Outfit builds, is No. 405, the Cable Railway, with which I have amused myself for hours on end. Unfortunately it is not possible to do justice to this model in a small illustration, but you may take it from me it is one of the most entertaining models in the book. Only one section of rails is shown in the illustration, but these may be extended to any length desired. The model may be worked by a Meccano electric or clockwork motor, through a belt, which is passed around the $1\frac{1}{2}$" pulley. This drives through a clutch mechanism and pinion and gear wheels to the lower spindle on which the driving pulley is fixed. The driving cord passes over this pulley and over the second pulley at the other end of the railway, as shown in the illustration. A point to be remembered is that in fixing the lever for operating the clutch mechanism, the nuts should be locked to prevent the screw from working out. Hours of fun may be spent with this model, hauling goods from one side of the room to the other. It is great fun to use it in conjunction with a Hornby Train, too, for the car may be made to do a good deal of hauling work in the "goods yard."

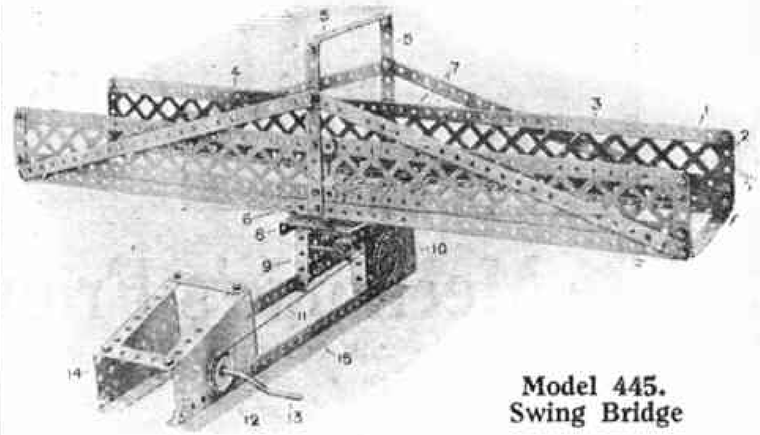
A model of a similar nature is No. 447, the Inclined Delivery Shute. This is one of the many models that have been greatly improved in the new Manual. The model works by gravity, the wagon running on an inclined plane. A hand wheel (on the left of the illustration) raises the cage and a crank handle enables the wagon to be drawn up the incline. When the truck reaches the top, the load is transferred from the cage to the truck, which then runs down the incline, its speed being controlled by a hand brake. When the end of the rails is reached the truck runs on to two pivoted $5\frac{1}{2}$" strips, which are depressed by the weight and the truck thus automatically tips its load.



Model No. 447.
Inclined Delivery Shute

Model 413, Automatic Gong, will be useful for calling the family to Christmas dinner and other meals. It makes quite a respectable noise and may be operated by a string attached to the clockwork starting lever.

Bridges are always interesting to all Meccano builders, and Model No. 445, Swing Bridge, illustrated here, is a very clever example and one that won a prize in one of the recent competitions. This type of bridge is to be seen all over the country and is particularly common in Holland, where it is usually placed over the canals. When barges or ships wish to pass, the bridge is swung round on to the land, leaving the canal clear. The sides of this model are made of braced girders secured to upright strips and reinforced by inner



Model 445.
Swing Bridge

strips. Diagonal strips brace the side girders to the top structure, thus forming a stay for the sides. The swing base of the bridge is composed of a 3" pulley wheel, bolted to two cross $5\frac{1}{2}$" strips, which in turn are secured to the main base side girders. The bridge swings on the perforated plate on a short rod.

Those who own a Hornby Train will find this model very interesting, for it may be arranged to take the track across a "valley" or "river." Of course it adds to the fun if the bridge is worked by a clockwork or electric motor. In my own model railway system I had one of these bridges working in this way. It took one line of rails across another track, and I arranged it to operate with a Meccano electric motor. This was worked from a distant signal box, by switching on the current, and many times my Hornby Express only narrowly escaped disaster by the bridge not being opened in time! Those were exciting days indeed! Once my kitten nearly got electrocuted by becoming entangled in the wires—but that is another story!

NEXT MONTH

More No. 4 Models.

NELSON BOOKS for BOYS

Engineering for Boys. 6/- net.

By ELLISON HAWKS, Editor of the *Meccano Magazine.*

Nearly 400 pages are packed with just that kind of information that Meccano boys want, while there are over 100 pictures from unique photographs of marine engines, liners, warships, docks, lighthouses, locomotives, bridges, dams, canals, engineering shops and machinery, generating stations, etc., beautifully printed on plate paper, besides many text cuts. Boys who wish to become engineers will be specially interested in the chapter "The Making of an Engineer," which will enable them to decide which branch of engineering they will take up.

"A mine of information for the boy who intends to become an engineer."—*Yorkshire Observer.*

"The many photographs and drawings are admirable."—*Evening Dispatch.*

The Romance and Reality of Radio. 3/6 net.

By ELLISON HAWKS, Editor of the *Meccano Magazine.*

This book brings together, in one cover, a brief account of the History, Theory and Practice of Wireless Telegraphy and Telephony from the early experiments of Morse to the wonderful trans-oceanic Radio communication of to-day.

It shows the beginner that Radio is one of the most fascinating of sciences, and as a hobby, a pleasant and instructive pastime. Fully illustrated with plates and text cuts.

"Lucid . . . helpful and practical information . . . distinctly to be recommended."—*Birmingham Post.*

All About our British Railways. 6/- net.

By G. GIBBARD JACKSON.

Every boy is tremendously interested in railways, and this book is so full of information, so clearly written, so plentifully illustrated, that it is assured of a widespread welcome. The author knows his subject from A to Z and has had the help of the chief mechanical engineers and superintendents of the line of the great railway companies. Nearly 120 pictures from photographs on plate paper, besides many text cuts.

"A book that any normal boy will gloat over; but father, I fear, will insist on reading it first."—*Edinburgh Evening Dispatch.*

"Most fascinating . . . tells the average boy just what he wants to know about railways."—*Court Journal.*

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By JOHN BUCHAN. With Illustrations and Maps.

"A record of great deeds . . . fascinating reading for boys of seven to seventy."—*Glasgow Citizen.*

NEW STORY BOOKS.

Jack O' Langsett. A School Story. By R. A. H. GOODYEAR. 5/- net.

Toddy Scores Again. By ALFRED JUDD. 5/- net.

The school adventures of no ordinary boy.

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By LORD FREDERIC HAMILTON.

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Between Two Schools. By HAROLD AVERY. 5/- net.

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Readers frequently write to me asking if I can recommend books that are both of interest and of use. In this column I review books that I consider specially appeal to Meccano boys. I do not actually supply these books, which may be obtained either through any bookseller or direct from the publishers.

EVERY year hundreds of new books are published, dealing with almost every subject under the sun. A hundred years ago it was difficult to obtain any books, other than those dealing with certain subjects, and often these subjects were " as dry as dust " and of no interest to anyone but the writers of the books themselves. To-day, however, all this is changed, and it would be difficult to find any subject on which some book has not been written. In this respect we are fortunate in living in an enlightened age. No matter of what we may wish to read—whether it be of ancient nations, of our work, hobbies, or even of our dreams—there are dozens of books that will give us information on the subject desired. We read for our living; and we read for our pleasure. It is impossible for us to imagine a world without books.

The Editor knows that readers of the " *M.M.*" are particularly fond of books. He also knows that it is impossible for anyone to read more than a fraction of the books that have been published. Much time may be wasted in reading books that do not matter, and we strongly urge every reader of the " *M.M.*" to choose very carefully the books that he reads. If you like fiction, read only good, clean stories of adventure or of school life. Do not read trashy stories of the " blood-and-thunder " type. They may be exciting but they do no good, and to read a book from which we learn nothing is a waste of time.

In this monthly column we describe only the best type of books, and no reviews will be found of books unsuitable for readers of the " *M.M.*" You may with safety choose any of the books mentioned here, or in our advertisement pages. Any book that does not conform to the high standard we have laid down, finds no space in these pages.

Robinson Crusoe
by Daniel Defoe
(*Pub. by Religious Tract Society, London. Price* 6/-).

This is a new edition of Defoe's masterpiece, the hero of which needs no introduction. Robinson Crusoe and his adventures are immortal and appeal to every generation of boys. The present edition is printed from new type and completely re-illustrated by Stanley L. Wood, who, as a result of careful study, has dealt with the subject in a distinctive manner. It is interesting to find that the edition includes part two, so often omitted in recent issues, and many of the illustrations depict scenes very seldom pictorially treated.

Engineering for Boys
by Ellison Hawks
(*Pub. by T. C. & E. C. Jack. Price* 6/-).

In his preface the author of this book writes :—" Every year I receive thousands of letters from boys, nearly all of whom are interested in Engineering . . . above all, every boy wishes to know how to become an engineer. . ." Such a book was wanted—and here it is. As Editor of the " *Meccano Magazine* " Mr. Ellison Hawks has greater opportunities for studying the mind of the boy than any other writer. Moreover, he knows how to allay the thirst for interesting knowledge possessed by every boy, wisely and to useful ends.

Ancient Engineering, Power, the Invention of the Steam Engine, Turbines, Railways, Breakwaters, Docks and Harbours, Lighthouses, Tunnels, Ships, Canals, Roadmaking, Bridge-building and Famous Bridges, are written of with a sure touch. All that is fascinating and informative in them is revealed in a striking manner, and every one of the 389 pages is packed with reading that will specially appeal to Meccano boys. Sixty-three half-tone illustrations, beautifully printed on art-paper, and 140 figures in the text, make everything clear. This book should be added to the private library of every Meccano boy. A.M.D.

The Boy's Own Annual
(*Pub. by The Religious Tract Society. Price* 12/6 *net.*)

Somehow or other Christmas would not seem complete without a copy of our old friend " The Boy's Own Annual." This year's volume is even bigger and better than its predecessors, and is full of real " live " stories of pirates, hidden treasures, school life and adventures. The stamp collector, naturalist, and model builder are not forgotten, and there are numerous excellent articles on these engrossing topics, all written by men with an expert knowledge.

The long stories are by such well-known and popular authors as Major Charles Gibson, Harold Avery, Charles Vivian, and there is not a dull page in this well-bound and profusely-illustrated volume.

Jack O' Langsett
by R. A. H. Goodyear.
(*Pub. by Nelson. Price* 5/- *net*).

This convincing school story of Blue Springs College and its pupils holds our interest from the time Jack is chosen to play for his second eleven until he finally becomes Captain of the School. When the Head decides to abolish all " caning and swishing," dire results are prophesied by the Blues, but they do not reckon with Mr. Smethwick, the new sports Master, who always manages to have the last word, which usually takes the form of " impots," There are many exciting incidents in the tale, chief of which are the Great Fire in Canvas City, and the wonderful game in which Jack saves Blue Springs College from defeat and gains his cricket colours.

Careers for Our Sons
by D. W. Hughes
(*Pub. by A. & C. Black Price* 5/-).

" What shall I be ? " " How can I become a success ? " " What is an Engineer's work ? " These and a thousand other questions are answered in this book. Everything you want to know about a life at sea, abroad, at home or in the air, is clearly and interestingly told. The training necessary for any particular career, the examinations to be passed, and the pay and prospects, are all contained in this mine of information.

(*Continued foot of next col.*)

" How to Identify " Series.

The price of these books is 1/6 each, and not 1/9 as stated in this column in our October issue.

BOOKS RECEIVED

We have received copies of the undermentioned books during the past month, and these will be reviewed in this column in a future issue.

" CHILDREN'S COMPANION ANNUAL " (" Boy's Own Paper " Publishers), 4/6 net.
" THE MOTOR CYCLING MANUAL " (Temple Press), 2/- net.
" HANDICRAFTS FOR HANDY PEOPLE " (Educational Co. of Ireland Ltd.), 3/-
" LOST ON DU CORRIG " *by* S. O'Grady (T. Fisher Unwin), 5/- net.
" THE RADIO AMATEUR'S HANDBOOK " *by* A. F. Collins (Harrap & Co. Ltd.), 7/6
" THE BOY'S BOOK OF MODEL AEROPLANES " *by* Collins (Parsons & Co.), 8/6
" SOLDIER AND COWBOY " *by* Capt. G. Ash (Dranes), 3/6
" SHIPS OF THE ROYAL NAVY " *by* O. Parkes (Sampson, Lowe & Co. Ltd.), 2/6

Catalogues Received

We have received the following catalogues this month. Should any of our readers write to the firms concerned, they will assist us by mentioning the " Meccano Magazine."

Messrs. Lott's Bricks (Watford, Herts.) are issuing a sheet of prize-winning plans for building with their bricks—bricks that embody far more than the old-fashioned wooden blocks and pillars. This sheet contains instructions for building forts, villas, cottages, and a mill, giving ground plans, north and south elevation, etc., and full architect's plans in miniature. This sheet, price 1/-, is a wonderful help in a truly fascinating hobby. Other lists free on application.

* * * *

We have received Messrs. Gamage's (Holborn, London) Christmas Catalogue—and what a catalogue it is ! For variety and interest it excels all previous years' lists. It contains page after page of suggestions for Christmas gifts and is a production to delight the heart of any boy. No matter what are our requirements, they are met in these pages. 168 pages of delight. Post free on request.

* * * *

Radio enthusiasts will find something new in the " Polar-Blok " catalogue (Radio Communication Co. Ltd., 34-35, Norfolk Street, Strand, London, W.C.2.) This system makes it possible to add valves to a crystal detector and to alter the circuit exactly as desired, and yet allows the set to maintain a smart and a finished appearance. This clearly-written book will be sent to any Meccano boy, price 3d. post free.

* * * *

Messrs. Nelson & Sons, of 35–6, Paternoster Row, London, E.C., publish an exceptionally attractive list this year. The range of new books is excellent, covering everything from fairy stories to popular science. The list is illustrated and conveniently arranged in sections. A sure guide to good literature and acceptable Christmas presents. Messrs. Nelson will be pleased to mail their catalogue free upon request.

* * * *

We have received interesting leaflets from the New Auto Scooter Co. (Chestergate, Stockport), giving details of six different models that will appeal to our younger readers. This enterprising Company are organising a special Essay Competition for Meccano boys, full particulars of which appear in our advertising pages.

* * * *

McCaw, Stevenson & Orr Ltd. (Linenhall Works, Belfast), send us a descriptive leaflet of Seccotine which we really don't need to read, because we know all about it ! It sticks everything to everything and holds it there for ever ! " Firmas " is another form of Seccotine for repairing articles that will afterwards be subjected to heat or are required to hold hot or cold water.

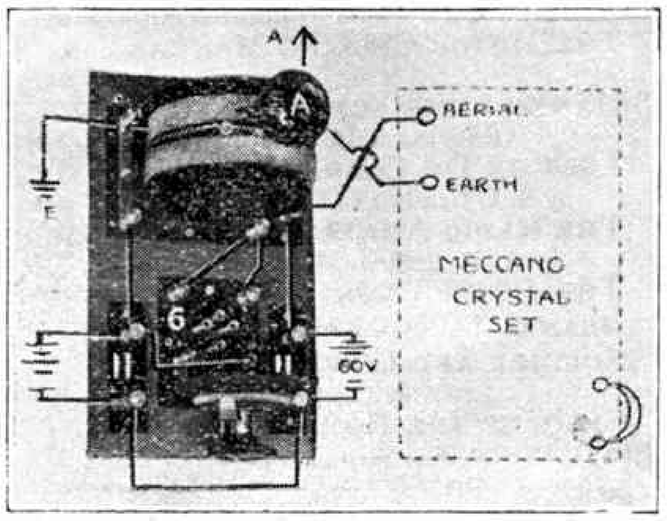
* * * *

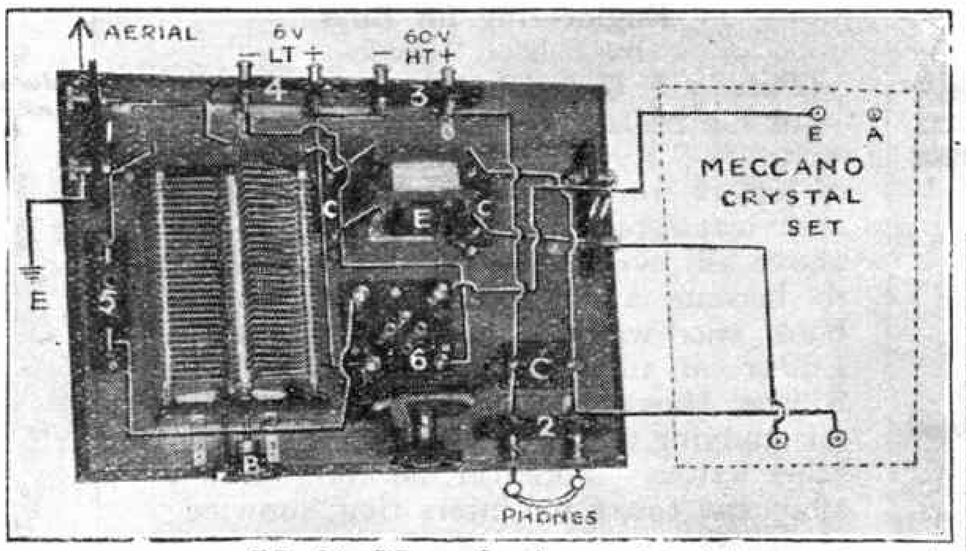
The Religious Tract Society (4, Bouverie St., E.C.), send us their booklet " *Books for Gifts.*" Most of the books listed are illustrated and shortly described, making it an easy matter to select a suitable volume for a present. Free on application.

* * * *

The Mullard Radio Valve Co. Ltd. (45, Nightingale Lane, Balham, S.W.12), send us lists of their well-known Valves and other Radio Accessories. The O.R.A. valve is, of course, known to all Radio users, and the firm is now introducing " Wecovalve," which requires no accumulators—just a dry cell. Double the life, and a fraction of the running cost of the older valves. For detecting, H. or L. frequency amplifying, this valve promises to be as successful here as in U.S.A. Lists free on application.

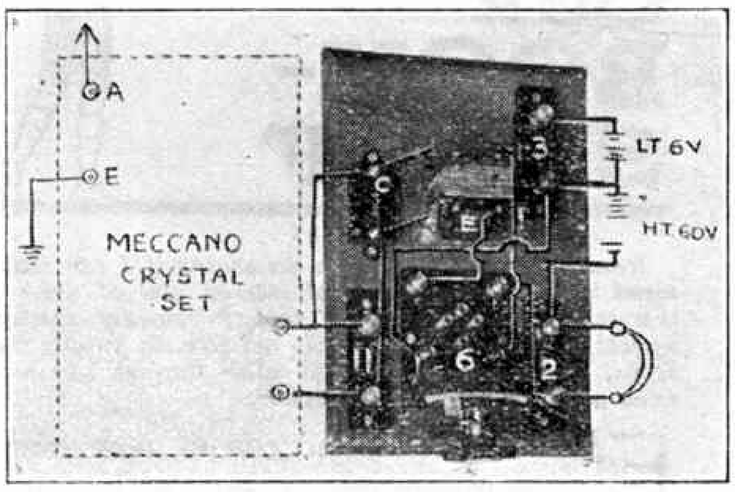
Unit No. 1 *(complete)*





Unit No. 2 *(complete)*

Unit No. 3 *(complete)*



If you have a MECCANO CRYSTAL SET here are three ways of improving it

TO INCREASE ITS RANGE

(See Unit 1)

As you know, boys, the Crystal Set is not much good for long distance work, although for use within 20 miles from a Broadcasting Station it gives splendid results. But there is a way to increase the range of the excellent Meccano Set to as much as 70 or 100 miles—even more under favourable circumstances—and that is by using a Valve in front of it.

Look at the illustration above, and note how easily with only four components you can build up Unit No. 1 and increase the range of your Set at least three times.

TO MAKE IT LOUDER

(See Unit 3)

No Crystal Set gives sufficiently loud speech to work a Loud Speaker, and as most of you at some time or another will want to entertain your friends in this way, we show you in Unit No. 3 how you can add to your Meccano Set an Amplifier which will give you speech five times as loud. For this Unit you only require components No. 2, 3, 7, 11, C, E, nothing could be easier.

PRICES AND KEY TO PHOTOS

1. A and E terminal strip ... ...10d.
2. TEL terminal strip 9d.
3. HT terminal strip ... 8d.
4. LT terminal strip ... 8d.
5. Single coil holder ... 1/3
6. Socostat (combined valve holder and filament resistance) 7/6
11. Output terminal strip 9d.

A. Variometer 7/3
B. .001 Variable condenser (assembled) 9/–
C. .001 fixed condensers 1/6
E. Max-Amp. Transformer 18/6

Rubber-covered connecting wire 2½d. per yd.

H. Fixing Brackets 1½d. each

TO INCREASE ITS RANGE AND MAKE IT LOUDER AT THE SAME TIME

(See Unit 2)

This method is a combination of Units No. 1 and 3, but only one Valve is used. The Circuit used in this set is known as a Dual Amplification Circuit, and is very similar to the famous "P.W." Circuit which you have no doubt read quite a lot about in "Popular Wireless."

Here again, you will be able to see by the illustration, exactly what components you need, but if you have any doubt, write to us and we will be pleased to tell you more.

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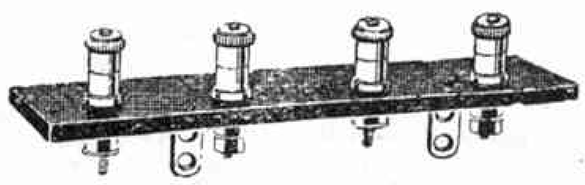

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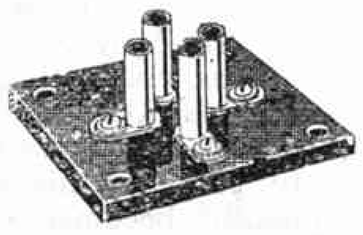
Sold in strips of 2 or 4. Engraved + HT—, + LT—, 'PHONES, price 8d. per pair of terminals. Ditto, but with telephone terminals throughout, 9d. per pair. Large ditto, engraved Aerial and Earth, Per pair 10d.

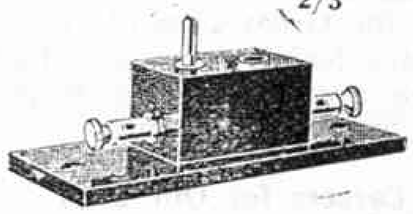
COILS

No.	Wavelength.	
1	290–390 mtrs.	2/–
2	340–470 ,,	2/6
3	420–650 ,,	3/–
4	570–900 ,,	3/6
5	780–1140 ,,	4/–



SWINGING COIL HOLDER

Enables coil to be moved through an angle to give coupling effects 2/3



COIL HOLDER

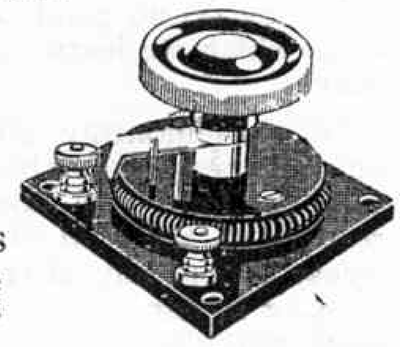
Very economical method of carrying any type of coil ... 1/9

VALVE HOLDERS

Can be used also for carrying transformers, solid ebonite ... 1/3

VALVE RESISTANCES

Made in solid ebonite for mounting on board 4/–



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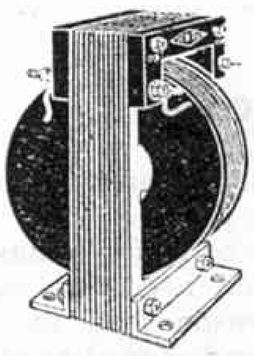

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The Men Who Gave Us Radio:

VII. LODGE, POPOFF, RIGHI, and MARCONI

This is the last of a series of articles giving an outline of the lives of the men who contributed to the invention of Radio as we know it to-day. Our articles have followed the progress of the wonderful science of Radio, dealing with the work of the various scientists who engaged themselves in the quest of a means of wireless transmission. This final instalment briefly outlines the work of Sir Oliver Lodge, Augusto Righi, and Senator Marconi. After reading these articles, Meccano boys will have a better realisation of the fact that the Radio of to-day is not the work of one man alone, but of many men, each of whom extended the field of research in turn.

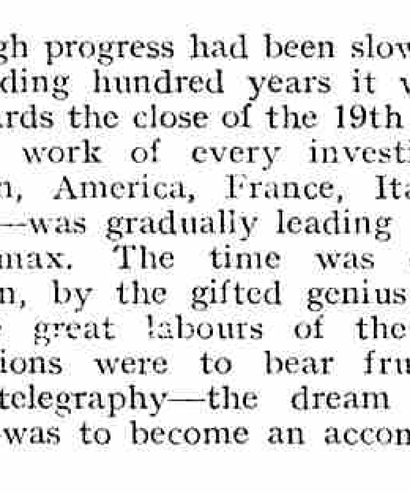
Lodge

IN 1894, Sir Oliver Lodge, lecturing in London, repeated Hertz's experiments. He demonstrated the efficiency of the new Branley "coherer" as a detector of Hertzian waves generated some 150 yards distant. It is remarkable to find that although wireless telegraphy was at this time well within Sir Oliver's grasp, it did not seem to occur to him that the coherer and Hertz's oscillator might be adapted to long distance telegraphy without wires. "Stupidly enough," he wrote later, "no attempt was then made to apply any but the feeblest power, so as to test how far the disturbance could really be detected."

Popoff

In 1895, Popoff, a Russian physicist, introduced the automatic "tapper." This was necessary to restore the metallic dust used in the coherer to its normal condition after the passage of an electric wave.

Although progress had been slow during the preceding hundred years it was evident towards the close of the 19th century that the work of every investigator—in Britain, America, France, Italy and Germany—was gradually leading up to a great climax. The time was drawing near when, by the gifted genius of one man, the great labours of the earlier investigations were to bear fruit, and wireless telegraphy—the dream of the century—was to become an accomplished fact.



Augusto Righi, celebrated Italian physicist, carried out many experiments in electricity and magnetism. He was born at Bologna on 27 August 1850, and died there on 8 June 1920.

Sir Oliver Joseph Lodge, born at Penkhull, Staffs., in June, 1851, was educated at University College, London. He was Professor of Physics at Liverpool University from 1871 until 1900, when he went to Birmingham as Principal of the University. He was knighted in 1902.

Righi

In the meantime Righi, a Professor at Bologna University, was investigating the Hertzian waves from an optical point of view. Righi was an enthusiastic disciple of Hertz, and he effected a considerable improvement in the latter's "exciter." He used two metal balls in place of knobs, and by placing them in an ebonite frame and filling the spark-gap with oil, he made its action more regular, and also improved the apparatus in other details.

One of Righi's pupils was a bright boy named Marconi, who was particularly interested in his tutor's experiments. There can be little doubt but that Righi's enthusiasm had a marked influence on young Marconi, causing him to turn his attention to applying the Hertzian waves to wireless telegraphy.

Marconi

Guglielmo Marconi experimented on a small scale in 1895 at his father's farm. His first trials proved successful, and he came to England during the following year. He obtained an introduction to Sir William Preece, who (as we have already seen) himself had carried out experiments in wireless telegraphy and telephony. Sir William, in his official capacity, greatly aided Marconi in the development of his invention.

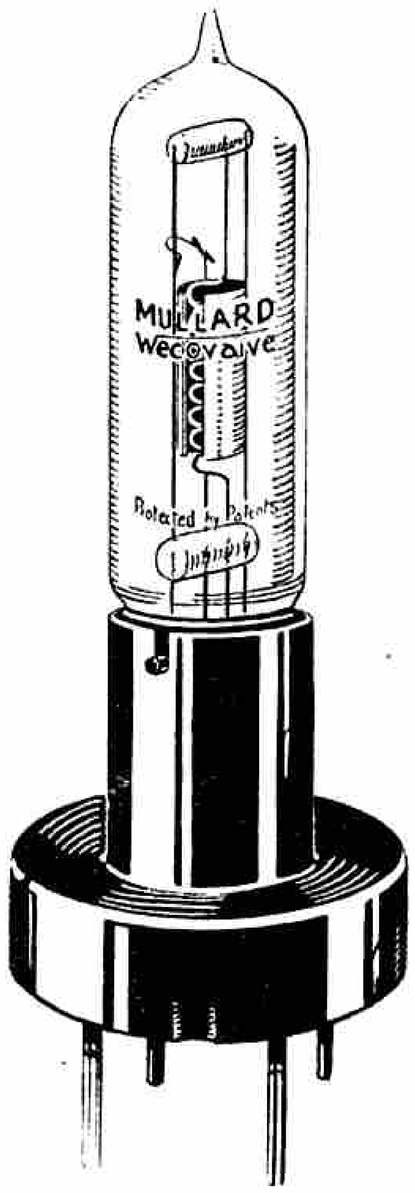
Marconi's system embodied the inventions of several previous workers. These inventions were improved in detail and so adapted that, collectively, they formed a practical working system. The "wave-exciter" of his original apparatus, consisting of brass balls or spheres separated by a short gap, closely resembled Righi's "three-spark exciter." The receiver consisted of a coherer similar to that used by Branley and Sir Oliver Lodge, but made much more sensitive by Marconi. The filings of this coherer were returned to their normal position, after cohesion, by a "tapper," exactly similar in principle to that invented by Popoff, but again improved in detail.

In combining these individual inventions Marconi showed himself to be possessed of far-seeing initiative. He was sufficiently alert and practical to bring into operation an apparatus that worked, whereas other scientists—who might have forestalled him, but did not—were still endeavouring to "make sure." Righi himself had said that Marconi "carried into the domain of practical reality that which had only floated indistinctly before the minds of others or had served them for modest experiments."

Great credit is due to Marconi for achieving a victory over innumerable practical difficulties. His success depended entirely on what were apparently but trivial matters of minor importance. It was only by unremitting study, perseverance and attention to detail, however, that the imperfections were finally eliminated, enabling the completed scheme as a whole to become a success.

THE END

Guglielmo Marconi, born at Bologna (Italy), 23rd September, 1875, and educated at Leghorn, evolved the first practical system of wireless telegraphy. He communicated across the English Channel in 1899, and two years later he succeeded in communicating across the Atlantic.



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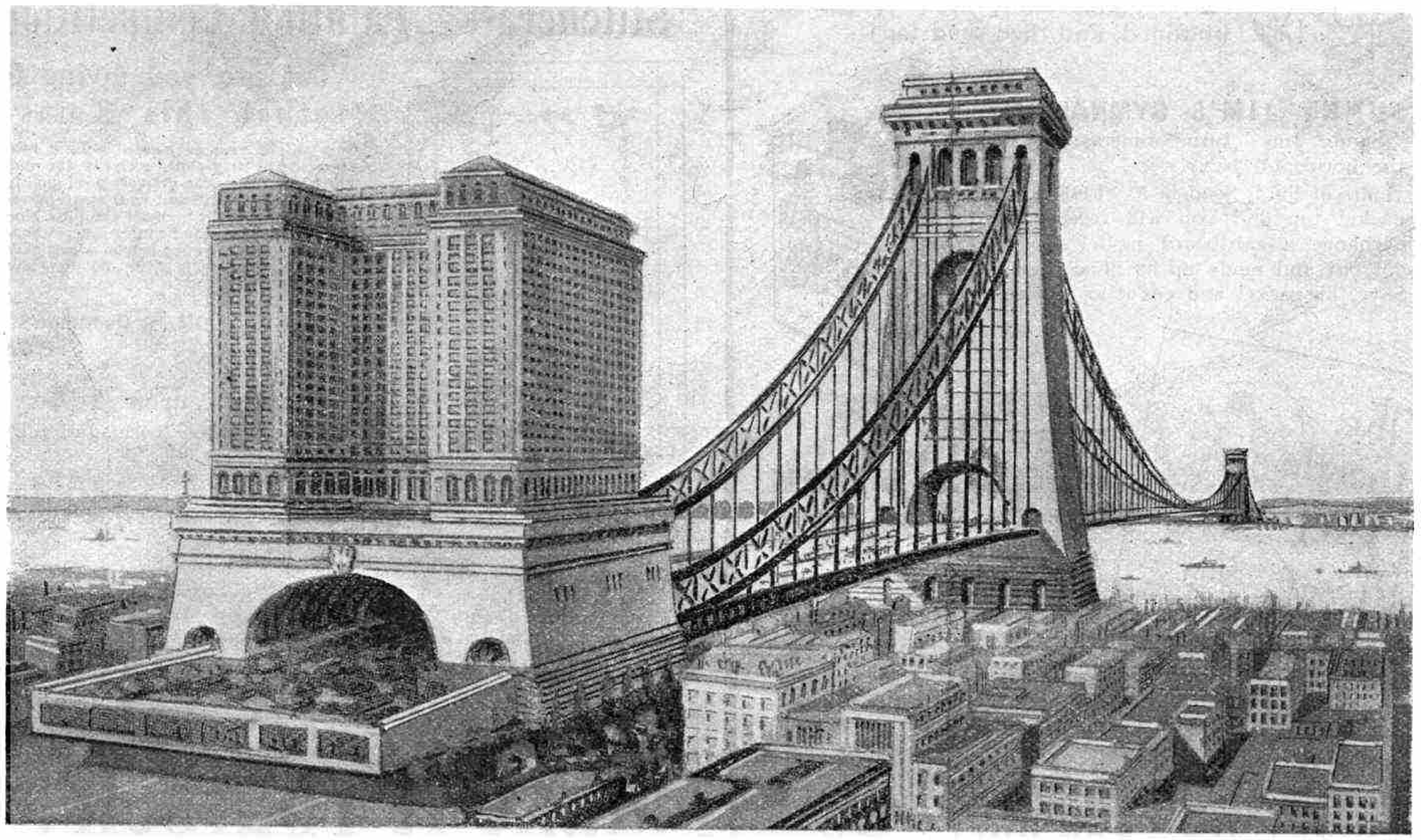
Famous Bridges II.

A Monster Bridge:

Two Tramways, Two Railways and a Road Wider than Kingsway



The above drawing, which is reproduced by the courtesy of the "*Architect's Journal*" and "*Everyday Science*," gives a vivid representation of the completed appearance of the proposed new bridge at New York

ALTHOUGH the business section of the city of New York is located on the island of Manhattan, nearly everyone lives on the mainland, where the suburbs are situated. These residential districts are separated from the city by the East River and the Hudson River, the latter being almost a mile in width.

First Bridge at New York

It is not so very long since there were no bridges at New York, and city workers had to cross the East River and the Hudson River, morning and evening, by ferry steamers. As the numbers of workers in New York continued to increase, however, the accommodation provided by these ferry steamers became very much overcrowded. It was in the desire to ease the situation, created by the changed conditions, that the first suspension bridge across the East River was built. This bridge was rapidly followed by other bridges, until at length the great American city became famous for having more large bridges than any other city in the world.

In the meantime every year has brought more workers and more traffic. Now, even the present numerous bridges already existing are not sufficient to accommodate the increasing flow of pedestrians and vehicles from one shore to the other.

Largest Bridge in the World

Plans are therefore being made for the building of a new bridge, and this, although not the longest, will certainly be the largest bridge in the world. It may possibly be the last massive iron bridge to be built, for the cost of such heavy metal structures is now rapidly becoming prohibitive.

According to the present arrangements the bridge will be 6,600 ft. in length. It will be divided into two shore spans, each 1,710 ft. in length, and a central span of 3,240 ft. The distance between the anchorage on Manhattan Island and the anchorage on the mainland will be 7,460 ft.

Bridge Road Wider than Kingsway

The new bridge will not only accommodate vehicles and pedestrians, but will also carry trams and trains. It will have two decks, each 220 ft. in width. The upper deck will be divided into two roadways, one for motors and the other for vehicles. This roadway will be 155 ft. in width, and our London readers will be able to realise what this will look like when it is mentioned that it will be wider than Kingsway.

On each side of this roadway will be a tramway track, beyond which will be two footpaths 17 ft. in breadth. Access to the upper deck of the bridge will be gained by a central lofty arch, with two smaller side arches to admit the traffic to the bridge approach. The lower deck of the bridge will be used only by trains, and it will carry ten lines of railway track.

The bridge will be of the suspension type, the two decks being suspended from four steel cables, two on either side. These cables will consist of 80 lines of eye-bars, arranged in three banks and enclosed in tubular bronze casings 15 ft. in diameter.

Massive Towers

In order to obtain sufficient height to give the suspension cables the requisite curvature, it will be necessary for the suspending towers to be 840 ft. in height. Each tower will measure 400 ft. in breadth at the ground level, tapering to 200 ft.

(*Continued on page* 211)

SUNNY JIM'S CHRISTMAS STOCKING

Choose whatever you like from this list, read carefully how it can be obtained, and then send for it.

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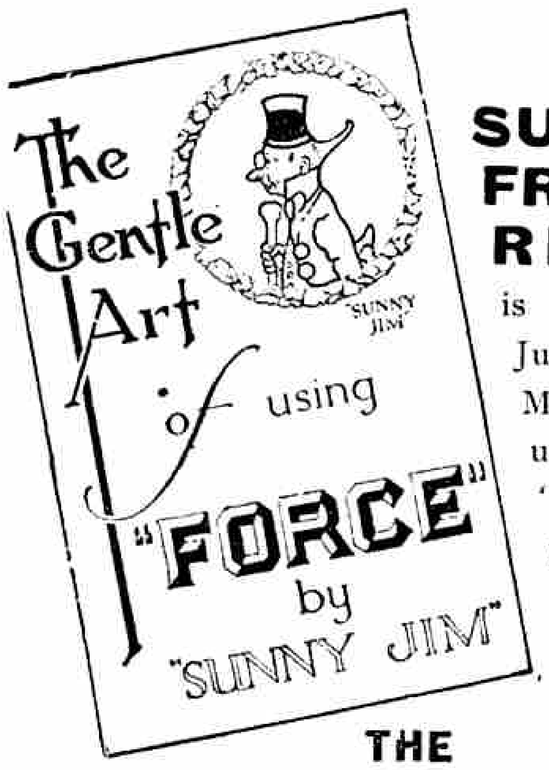

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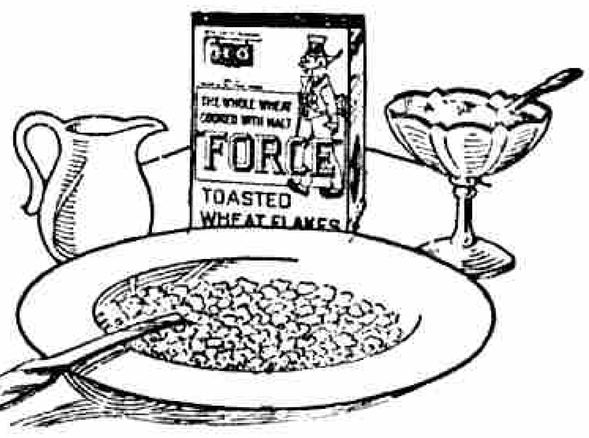
Two "FORCE" packet tops and 6d. P.O. bring you the doll unstuffed. Two "FORCE" packet tops and 2d. in stamps bring you the **rag pattern** ready for making up.

Tell mother that "FORCE" is a fine food for all who want a food that is at once tasty, nourishing and easy to serve.



"FORCE" is delicious toated malted wheat flakes, the **whole** of the **wheat,** served in an instant by adding hot milk.

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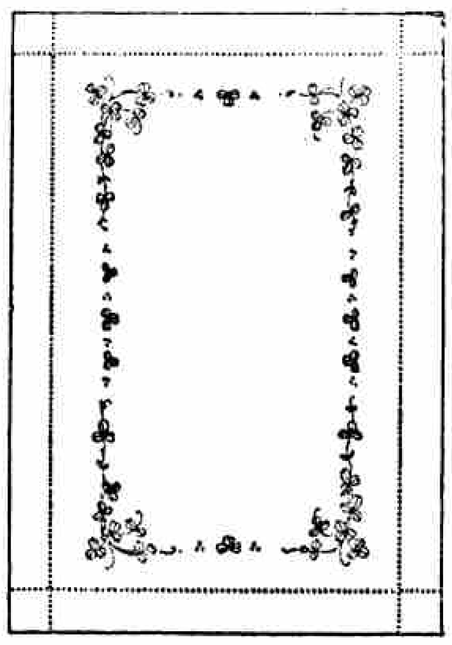

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A Talk About Aerials

BY THE RADIO EDITOR

This is the second instalment of a series of articles describing the best types of aerials to erect, according to local circumstances. In the last number of the "M.M." we described a simple aerial from a pole in the garden to the house, and from a tree to the house. On this page we deal with two types of aerials that are most often used, the "inverted-L" and the "T."

IV.

ONE of two types of aerial is usually employed by amateurs. One known as the inverted L-type (Fig. 5) and the other the T-type (Fig. 6). These aerials are so called because of their resemblance to the letters L ("upside-down") and T.

It has been found that the "orientation," or the direction of the compass in which an aerial runs, affects the strength of reception. To obtain the maximum strength the end of the aerial should be "end-on" to the transmitting station from which signals are being received.

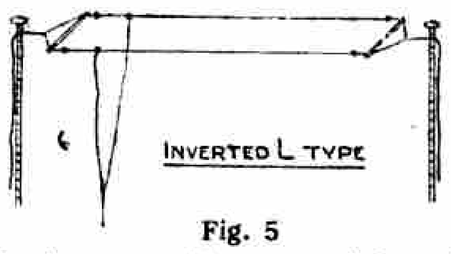


Fig. 5

That is to say, if an aerial points due north and south it will be most efficient in receiving from transmitting stations in the north and in the south, rather than from stations in the east and west. Such an aerial is called "directive," because it is most sensitive to signals from a particular direction.

Greater signal-strength is obtained by taking the lead-in wire from the end of the aerial that is nearest to the transmitting station. Thus, if you are due north of London, and wish to receive broadcast at the greatest possible strength from London, your aerial should be oriented north and south and your lead-in wire taken from the south end of the aerial. In this case, therefore, the aerial used will be of the inverted L-type (Fig. 7).

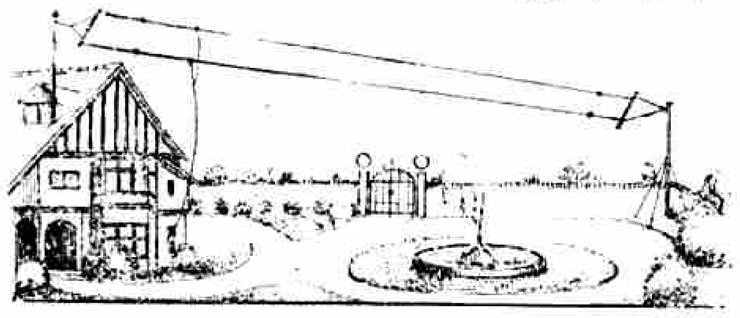


Fig. 7

Should you be situated midway between two broadcasting stations, and wish to receive signals of equal strength from each, the lead-in wire should be taken from the centre of the aerial. Such an aerial will be of the T-type (Fig. 8).

We thus see that the aerial is firstly governed by the circumstances in which you are situated—long garden, flag-pole, or house chimneys. Secondly, where the greatest efficiency is desired, the aerial is governed by the orientation, depending on the direction of the broadcasting station from which it is desired to receive the loudest signals.

V.

The fact that an aerial is directed towards one particular broadcasting station does not mean that signals will not be received from other stations. Much depends on the local surroundings, but it may be said that, as a general rule, a directive aerial will enable signals that would otherwise only be faintly heard, to be heard clearly or even loudly. At the same time,

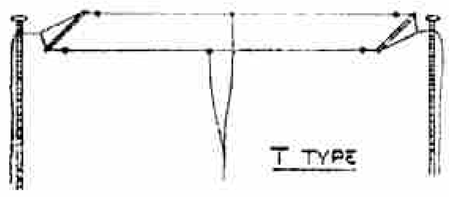


Fig. 6

the orientation of the aerial for this purpose may have no detrimental effect at all upon the loudness of signals from another broadcasting station that is situated at a shorter distance.

The following example will, perhaps, help to make clear my meaning. I have an inverted L aerial, of 60 ft. in length and 20 ft. in height, and situated at Liverpool. It points directly towards the Glasgow station and the lead-in wires are taken from the north end. Thus, everything is in favour of receiving good signals from Glasgow, and these signals do, in fact, come in very loudly (on a four-valve set). At the same time, I get almost equally loud signals from London, although my lead-in is at the wrong end for the *greatest* efficiency from London.

By altering my aerial to a T-aerial I get signals a shade louder from London, but less loud from Glasgow. But with either the L or the T-type, signals from Manchester (25 miles distant) are equal in volume, although in each case my aerial is "broadside-on" to Manchester. By altering the orientation of the aerial so that it points directly to Manchester, with the lead-in wires nearest to Manchester I get Manchester a little more loudly, but both London and Glasgow are very much fainter.

Thus, in my case it is best to have an inverted L-type aerial oriented on Glasgow, because I get both Glasgow and London satisfactorily with this type. It is better to have my lead-in wires from the north end, because I can afford to lose a little of the volume from London in order to gain more from Glasgow, which seems to transmit with slightly less power than London.

VI.

So far we have dealt with aerials of the standard types generally necessary with a crystal set, at distances over about 15 miles from a broadcasting station. It is not every boy who can erect such an aerial as these, however, and those who find none of the above aerials possible, and who live not more than 15 miles from a broadcasting station, may employ a more simple form of aerial. They are advised to experiment with an aerial

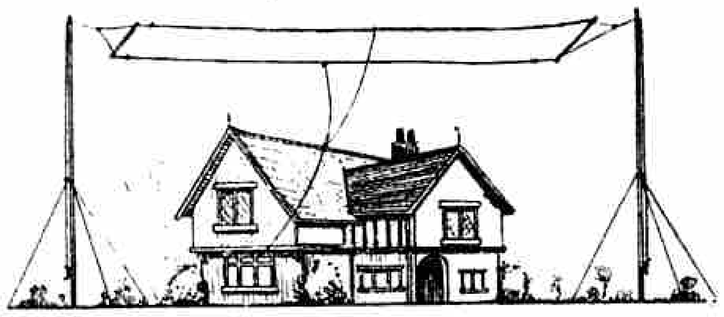
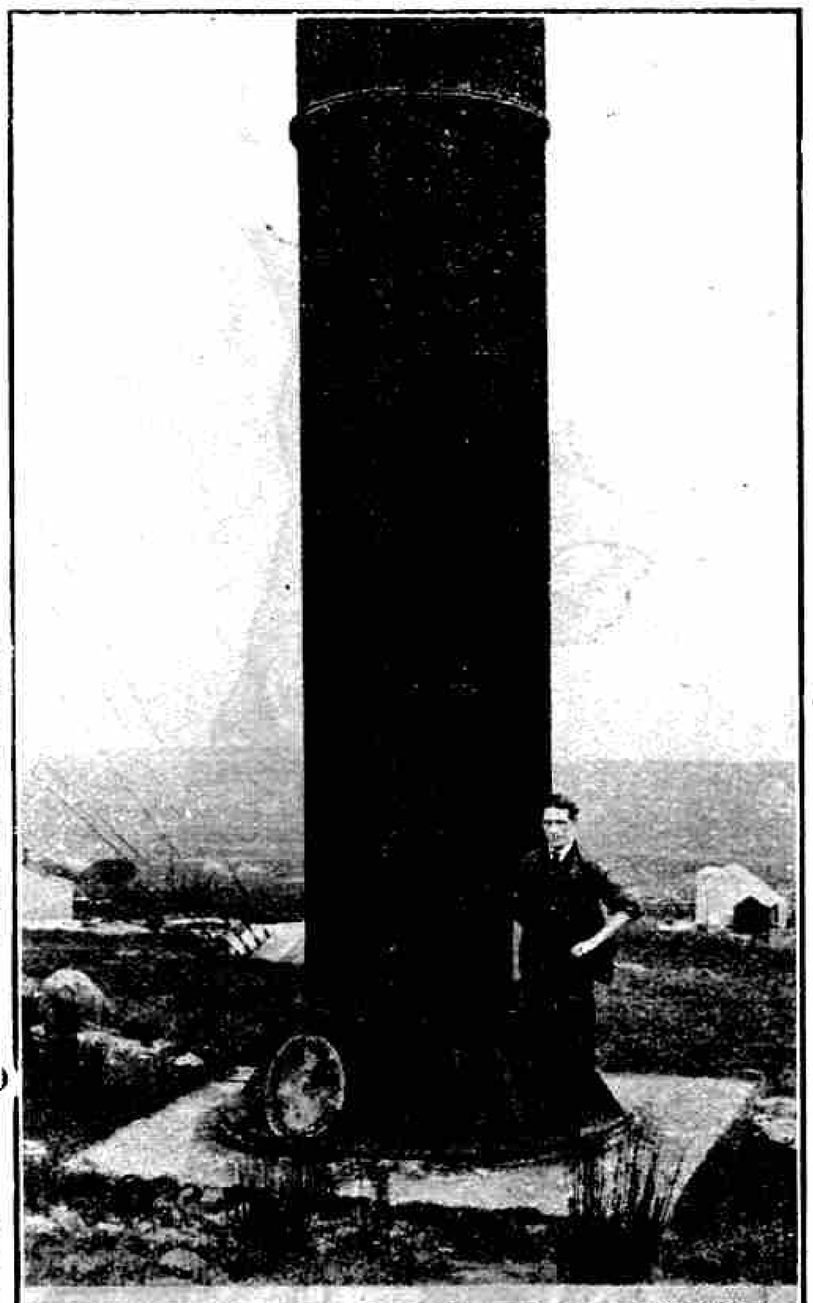


Fig. 8

suspended between two chimney stacks—either on their own house or from their house to that of a neighbour. If the full length of 100 ft. (less the height) cannot be obtained for a single wire, a shorter wire may be used, or, as an alternative a double antennæ wire may be erected. This consists of two lengths of wire, say 30 ft. each, or whatever other length is convenient. Each length is separated by a spreader formed by a light piece of wood or bamboo not less than 5 or 6 ft. in length. A treble antennæ may be employed if desired, although, except in special circumstances, it will probably be found that three wires are little better than two wires.

(To be continued



CARNARVON— MAST, FIRST SECTION.

"Some" Mast

Our illustration, published by the courtesy of the Marconi Company, shows the base of one of the huge aerial masts at the Radio Station at Carnarvon. The tubular steel masts rise to a height of 400 ft. These are arranged in four rows, and form a very impressive feature of the landscape. The aerial used is of the inverted-L type.

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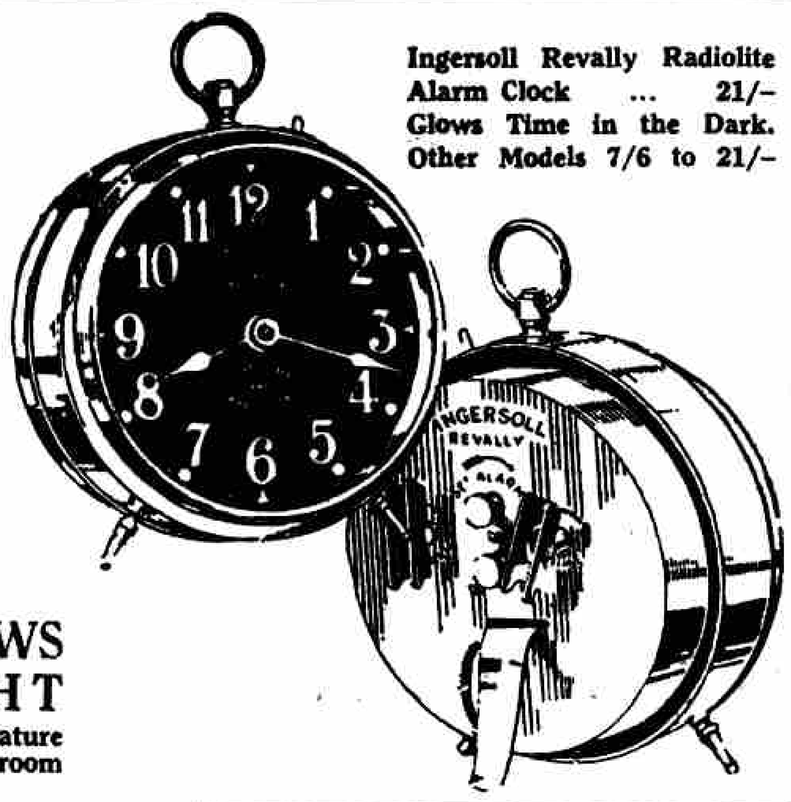

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A Message from The Rt. Hon. G. H. Barnes, P.C.

MECCANO is not only a toy for boys but it affords food for reflection on the part of grown men. I myself derive a good deal of pleasure from Meccano in watching my grandson building bridges and cranes and other models. He does not copy all these from the book of Instructions, but invents many new models himself. We keep a Meccano Outfit for him here and they are duly dragged out on his frequent advent among us. Our Dick is a firm believer in ocular demonstration, and always occupies a good deal of floor space!

Rt. Hon. G. H. Barnes, P.C.

Meccano is unquestionably the greatest thing for boys, and it will have its effect upon the youngsters as they grow into men. It is a true saying that "the boy is father to the man," for as the mind of the boy is moulded, so will that of the man be set. And, at least as regards mechanics, the moulding is helped by Meccano better than by mere oral teaching or flat board demonstration. I speak as one with some knowledge, because I spent a good deal of my early life in plying the rule and compass.

I am sure that Meccano is giving boys a taste for construction which could not be otherwise given. It prepares the ground for education in building or machine construction. It gives an insight into the interdependence of parts, which apprentices are denied because they are often kept for long spells on one part of a design without any opportunity of finding out its relation to other parts in the scheme of things.

This knowledge is essential if we are to maintain our position in the world of work. Our workmen are the best in the world when given a job to do, but the world is ever changing and they must be alert to change with it. New ways of doing things are always being brought out, as the result of knowledge of mechanism that the mere use of tools cannot give. This is where we are being "caught out" by France and America in some forms of specialised industries in which Britain was at one time supreme. What is needed now, is a quickened intelligence and a renewed interest in work for work's sake and both these requirements are stimulated by Meccano.

But there is another and a more immediate quality possessed by Meccano. It is distinctly British. It is produced by British labour and produced in such quantity as to have become quite a British industry. This should appeal to those who, like myself, are concerned about British unemployment. The sale of Meccano in place of foreign productions provides and perhaps increases employment for British labour.

Meccano has more than held its own in quality, in suggestiveness and attractiveness, as compared with the best of similar productions from abroad. I regard this feature with special satisfaction, because I am old enough to remember the displacement of some of our high class productions by American competitors. We cannot afford to lose industries because we cannot afford to lose employment. There never was a time when it was so important to retain our industries and, indeed, to add to them. Meccano is an industry we should stick to, encourage, and add to.

For these and other reasons I commend Meccano and wish it the best of good luck among the boys and those who cater for the boys. Those who would combine the genial atmosphere of Father Christmas with a useful stimulant to both youthful ingenuity and British industries cannot do better at the coming festive season than place a Meccano Outfit in the hands of British boys.

G. H. BARNES.

A Message from The British Broadcasting Co.

THE readers of the *Meccano Magazine* live in a happy age. There are few greater pleasures than that of constructing things for ourselves. Young and old alike seem to find a good deal of enjoyment in the construction of home-made wireless sets, and in the use of them afterwards.

It has sometimes struck me that the boys of the present day know so much, that they may lose the sense of wonder. This would be a great loss, and one which, I hope, they may never experience. I know one of our greatest scientists who never uses a telephone without feeling what a marvellous thing it is. Although I spend all my days thinking about Broadcasting, it still seems to me a marvellous thing that a person may speak from our studios in London, or from any of our stations throughout the country, and be heard by over a million people, from Land's End to John o' Groats. Every day and every evening, there is speech and music in your home. All that is necessary to hear it is an aerial and a receiving apparatus, which many of you will no doubt be making for yourselves, or buying complete.

The British Broadcasting Company has all along been anxious to cater for those who wish to make their own wireless sets, and at last a licence has been provided for this purpose. I do not like to intrude upon the columns of a Christmas number by talking about pains and penalties, but I expect you know that nobody may use a wireless receiving set without a licence. Without a licence they are disobeying the law, and such a course is not wise. Apart from this, they are avoiding payment towards the heavy costs of maintaining the broadcasting service.

Another point I wish to make clear to you is that the Constructors' Licence is issued to those who will use only British parts. When you go to your dealer to ask for parts, it would be better to say to him "Are you sure that these are British parts?"

There are a great many people out of employment just now, but we are already finding work for many of them in the wireless industry. If everybody who constructs a set will loyally observe the condition of the licence (that only British parts are used) there will be a great deal more employment for British labour. I am sure that you will realise this and will do your best to help. The pleasure of constructing your own set will be all the greater if you know you have helped to keep in employment someone belonging to your country.

There are a number of items already included in our programmes that are of special interest to readers of the "*M.M.*" If there are items not at present provided, which a number of you would like, perhaps you will let your editor know. If he will pass the suggestions on to us we will see what we can do about it. Your interest in wireless should not end when your set is complete, for we wish you to realise that when you have a really good British set, you are in touch with one of the greatest services that the world has ever known.

J. C. W. REITH,
General Manager B.B.C.

Note. I shall be very pleased to hear from readers of the "M.M.", with suggestions or new items to be broadcast. Write neatly on a postcard and address to "Broadcasting," Meccano Magazine Liverpool.—EDITOR.

Birthday Gifts for Meccano Users

When is your birthday?

In every Meccano Outfit or Hornby Train Set purchased this Christmas there will be found a special entry form on which full particulars of Mr. Hornby's birthday scheme are set out. A handsome pocket wallet will be presented to those boys whose birthday falls on the same day as Mr. Hornby's. This wallet is strong and durable, of excellent quality, and should wear for many years. All that is necessary to qualify for this gift is that the purchaser of a Meccano Set or Hornby Train should fill in the form and post it to Meccano Limited. The date of Mr. Hornby's birthday will be announced in the *Meccano Magazine* for May next.

A. & C. BLACK'S LIST

THE CAPTAIN AND THE KINGS. A School Story by R. A. H. GOODYEAR With 8 illustrations by Savile Lumley and a picture jacket in colour. Large crown 8vo, cloth. Price **5s.** net.

THE BIBLE STORY. A Connected Narrative retold from Holy Scripture. By the Rev. J. BAIKIE, F.R.A.S. With 50 full-page illustrations in colour by J. H. HARTLEY. Super-royal 8vo, cloth. Price **15s.** net.

MOTHER GOOSE'S NURSERY TALES. Selected and edited by L. EDNA WALTER, M.B.E., B.Sc., A.C.G.I. With 16 full-page illustrations in colour by CHARLES FOLKARD, also decorative title, border, etc. Small crown 4to, cloth. Price **7s. 6d.** net.

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MY OWN CHURCH. By E. S. NEWMAN. With attractive line illustrations and texts for colouring. Small crown 4to. Price **1s. 6d.** net.

PEEPS AT THE WORLD'S DOLLS. By H. W. CANNING-WRIGHT. With 12 illustrations, 4 of them in colour. Large crown 8vo, cloth. Price **3s.** net.

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A. & C. BLACK LTD., Soho Square, London, W.1.

OUR BUSY INVENTORS

RECENT INTERESTING PATENTS

Every day new inventions and ingenious labour-saving devices are being brought into existence. From time to time the more interesting of these will be described and illustrated in these columns. The Editor of the "*M.M.*" will be pleased to hear your opinion of this new feature. Readers are invited to send us particulars (accompanied, if possible, with photos, sketches or cuttings) of any interesting inventions or devices that may come to their notice.

IT has sometimes been said that there is nothing new under the sun. If our readers could see the flood of inventions that is daily being poured into the Patent Office at Somerset House, however, they would feel justified in casting some doubt on the statement. Not only are hundreds of new ideas—some good, but many "no good"—received, indexed and filed every week at Somerset House alone, but the same remarks apply to every patent office in the world. During the war, of course, there was a distinct lull in all patent offices, except for inventions relating to devices for the prosecution of the war. An examination of the current patent offices records, however, abundantly proves that the world's inventors are getting well into their stride again!

The study of inventions and patents is very fascinating. It shows that there is always something new to puzzle our brains over, or some new method of doing things that appeals to our imagination. It must be especially fascinating to Meccano boys, who are born inventors—as anyone may see when watching their ingenuity and originality in making their models. What a pity it is that so many lose this habit of invention when they grow older. It is a most valuable and stimulating gift that should be developed and encouraged wherever possible.

It is most interesting to watch the stream of inventions as they flow through the patent office, and to endeavour to pick out those that are likely to prove successful and profitable. Nine-tenths of them are probably never heard of again, and of the remaining tenth, very few will ultimately prove of lasting value to mankind.

Wonderful Discovery of an Engineer

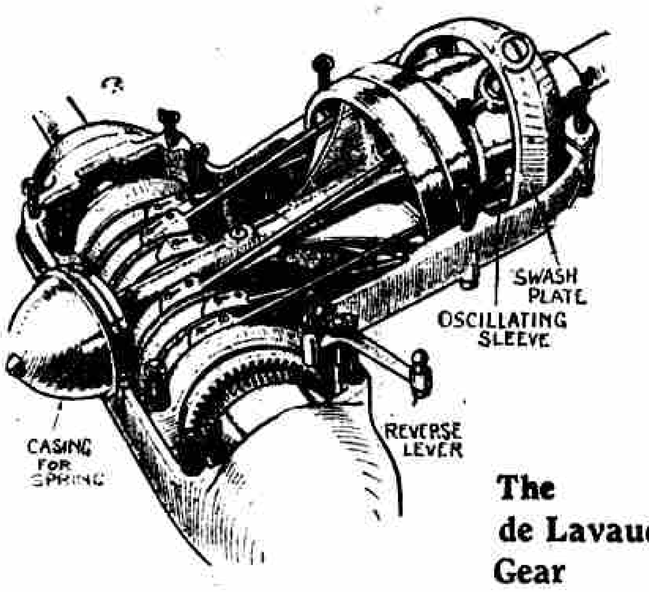
During the last few months some startling discoveries have been made by engineers investigating the possibilities of new forms of transmission. One in particular has recently created world-wide interest and promises to revolutionise motor transport as known at the present time. This is the "Torque" Converter, invented by Mr. George Constantinesco. As a result of this invention it is possible to have motor cars without clutches or gears. One result of this will be that motor cars of the future will run as silently as a falling leaf! Hills will be climbed without loss of speed, and there will be much less wear and tear because the engine will always be running at the correct speed for its particular load and gradient.

Interview with Inventor

Immediately the new discovery was announced we wrote to the inventor, Mr. Constantinesco, and told him that Meccano boys would be delighted to hear full details of this marvellous mechanism. For this purpose we placed the columns of the "*M.M.*" at his disposal. "Come and see me," said the busy inventor, in reply. Our readers may be sure that we lost no time in responding to this kind invitation and a representative of the "*M.M.*" waited upon Mr. Constantinesco at the earliest opportunity. A full account of the interview will appear in our next issue and I can promise our readers that they will be intensely interested in it. Mr. Constantinesco is the inventor of many amazing devices, not the least important of which is a death-dealing trench mortar and the device that enables a machine gun to fire through the revolving propeller of an aeroplane.

A New French Gear

Another and somewhat similar invention is also announced by a French engineer, M. de Lavaud. This is known as the de Lavaud gear, which, when fitted in the rear axle of a car, takes the place of three portions of the ordinary chassis. It does



The de Lavaud Gear

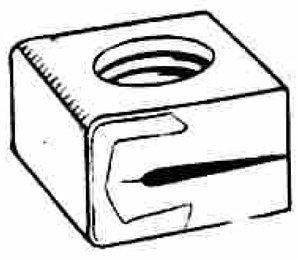
the work of the gear box, differential and the back-axle drive, only the clutch being retained. The gear box and differential are replaced by an infinitely variable range of gears. This device automatically adjusts its gear ratio to the gradient on which the car is travelling, the ratio being increased on the level and lowered on a gradient, without any attention whatever from the driver.

Our Busy Inventors—(*cont.*)

We hope to have more to say on this subject in one of our future issues.

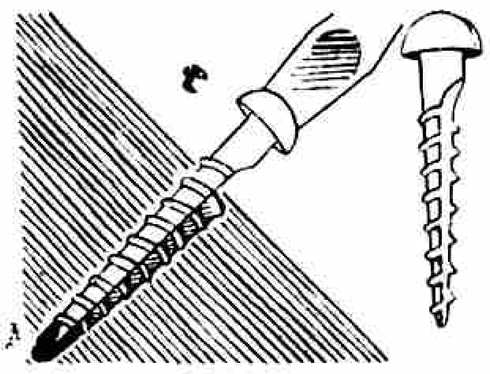
A Non-slip Nut

Nuts often come adrift from their bolts and sometimes this leads to disastrous results. To prevent such accidents a nut has been designed that locks itself on to its bolt. The nut is slotted, as shown in the accompanying illustration, and the two halves exert a pull on each other, binding themselves securely to the threads. The new nut does not require a washer and also effects an economy in material, for shorter bolts may be used. It is to be manufactured in many different sizes and will be specially useful in automobiles and machinery construction, as it is not affected in any way by excessive vibration.



For Carpenters and Handymen

Wood often cracks when screws are being driven into it, even though a hole is drilled for the screw. To overcome the difficulty a new type of screw has been invented. As may be seen from the illustration the screw has been ground down to cut a good thread, allowing the following screw to be easily driven in and providing a good grip so that the screw will not pull out.



Minor Inventions

Among numerous other small inventions that are worthy of note, this month, we notice the following :—

An automatic music-sheet turner for all sizes of pages. The sheets are engaged by clips of fine wire and turned when pressure is applied by the player to a foot pedal.

* * * *

A clock that will prove useful to those Meccano boys who find themselves unable to save money. This clock requires winding every 24 hours, but it cannot be wound until a coin is put in the slot to release the spring. This invention comes from America, where it has been introduced to encourage thrift.

* * * *

A new self-feeding tack-hammer should save many a bruised finger. An endless fabric belt to which 70 tacks are glued, runs inside the handle from the butt of the hammer to the head. The tacks are projected one at a time, point outward, at the butt end of the handle. The user, striking the butt on the spot where he wishes to drive the tack, starts the tack in the wood. Loosening it from the belt, it is driven home in the usual way.

* * * *

To the dozens of existing devices for sharpening pencils another has been added. This one comes from San Francisco, and commences to sharpen a pencil the moment it is inserted. Either a fine or a chisel point (such as draughtsmen prefer) may be given to the pencil as required. To make the invention quite complete, an emery cloth puts a fine finish to the lead, whilst automatic cutters clear away the wood !

How to Obtain the "*M.M.*"

The "*Meccano Magazine*" may be ordered from your Meccano dealer, or from any newsagent or bookseller, price 2d. If you are not able to obtain the "*M.M.*" from these sources it may be obtained direct from this office, post free, six issues 1/6, 12 issues 3/–.

The next number of the "*M.M.*" will be ready on 10th January. As we print only sufficient copies to supply orders received, you should place a regular order with your dealer or newsagent, or direct with this office, to avoid disappointment.

"*Meccano Magazine*"
Binns Road, Liverpool.

BRIGHT IDEAS

These columns are reserved for dealing with suggestions sent in by Meccano users for new parts, new models and new ways of making Meccano model-building attractive. We are always pleased to hear from any Meccano boy who has an idea which he considers will be useful in the Meccano system.

H. Oddie (Carranballac, Victoria).—(1) Regret, but we are not able to follow your suggestion for a cup with a boss and cone plate. (2) Circular sections are having our attention.

Stanley and Philip Love (Bristol).—We shall go into the matter of the method of securing the signal to the track. We intend to introduce more elaborate railway signals in the near future.

C. J. Salt (Lincoln).—(1) Triangular corner plates have already been brought to our notice and we consider they might prove quite useful. (2) The ¾" pinion in mesh with the 50-toothed gear wheel gives a ratio of 2 to 1, and the ½" pinion, meshed with a 1½" wheel, gives a ratio of 2¾ to 1. Do you consider the ratio suggested between these two would have any practical application? (3) The question of circular plates is already exercising our attention.

Bernard J. Hobden (Battle).—(1) We are considering the advisability of introducing three lengths of perforated holes on the face of the sector plate. (2) If the mechanical parts of a model are properly adjusted to give free and easy action, the roughing of the groove in the pulley wheels to give extra grip should not be necessary.

John Candler (Tulse Hill).—Further information regarding your suggested new part would be helpful, as we cannot quite place it from your sketch.

H. Bradby (Reigate).—(1) Large-size reversed angle strips are of doubtful value, but we shall go carefully into the matter. (2) The necessity for large wheels has not yet presented itself, but we shall keep the matter in mind. (3) Helical or twisted gears are already under consideration.

G. Corby (Cheadle).—(1) See our reply above to H. Bradby re large wheels. (2) Can you give any instances where hollow shafts are used? (3) The introduction of a groove in our rod to give a sliding action is not practical on account of the smallness of the diameter.

Frank Ellis (Bradford).—(1) In making suggestions for new parts it helps us considerably if an instance of their application is cited. What do you consider are the uses for a complete circular strip? (2) We shall keep in mind your second suggestion for a circular plate.

Ralph Brown (West Bromwich).—(1 and 2) The instances where strips or rods longer than 12½" are used are so infrequent that they are not justified. A comparison between long strips and long girders cannot be made. Consecutive numerical tabulation of the accessory parts would not be practicable. The system of subsidiary lettering enables new additions, which are constantly being made, to be kept under the main heading number.

N. Herald (Manchester).—A flexible rod would be costly to manufacture and we cannot see that it could have any real practical use.

OUR MAIL BAG

In this column the Editor replies to letters from his readers, from whom he is always pleased to hear. He receives hundreds of letters each day, but only those that deal with matters of general interest can be dealt with here.

Correspondents will help the Editor if they will write neatly in ink and on one side of the paper only.

Oscar Newman (Tongoa, New Hebrides).—It will be remembered that in our February issue we printed a letter received from Oscar Newman in which he told us that he was the only white boy on the island in the New Hebrides, where he lived. Oscar now writes us again to say that since we published his letter he has received friendly letters from hundreds o :Meccano boys and he asks us to thank them most sincerely for their kindness. He will try to reply to them all, and he hopes to keep up a regular correspondence with a few boys in Great Britain. Loneliness is a terrible thing, and it was fine that these hundreds of Meccano boys should spontaneously desire to let Oscar know that he is one of us, even though he is so far away and we shall probably never see him.

W. Summarsell (Brighton).—In a very short time now we shall commence to illustrate new models of a simple type, for those who do not own big Outfits. We quite appreciate your arguments, and shall certainly not confine ourselves to big models, however attractive they may be.

W. Clarke (Hyde).—We like your letters and we like the spirit in which you enter our competitions. Nothing would please us better than to see you win one of the beautiful championship cups which are to be offered in the next Model Building Contest. A boy, who, like yourself, has had Meccano for his hobby for ten years, has always a warm corner in our hearts.

W. F. Coates (Streatham Hill).—

There was a young lady of Harwich,
Who once wrote an essay on marwich,
She said " All you do
Is to swear to be true
And then you drive home in a carwich."

This is the only one of your limericks for which we can find space. If we start a puzzle and rhyming column a little later, as we may, your undoubted talent in this direction should make you a useful contributor.

E. G. Powell (Burton-on-Trent).—" Why is a horse with its head hanging down like the "*M.M.*" on the 8th of the month? *Answer:* Because its neck's weak." If we get much more of this we shall certainly have to start a riddle column.

E. Draper (Southampton).—Without the advertisements we should probably not be able to put the "*M.M.*" into these beautiful coloured covers which we are now using. They also enable us to enlarge the "*M.M.*" and give more articles on engineering and other interesting subjects. Watch the "*M.M.*" grow, Edward.

G. Kay (Pinner).—No ! that is not really us at the top of our Editorial column. Our brow is a little more wrinkled than that, but it unwrinkles beautifully when we receive such nice friendly letters as your's, and then we are not really bad looking at all.

H. Piggott (C.-on-M., Manchester).—" How about enlarging the '*M.M.*' and charging 2d. for it. I know boys who pay 4d. for a blood, and the cheapest is 2d. now-a-days. The '*M.M.*' is the finest in the world." We intend to keep the price as low as possible, but we shall most certainly continue to improve it, Harry.

R. Peet (Nottingham).—Most boys commence a diary at some time, but very few get beyond the first few days. You might try it, Ronald, and let us hear from you about a month after you have commenced it.

E. Bonnici (Sliema, Malta).—Many thousands of our readers at home listen-in to splendid concerts every night, and we are sorry that you are deprived of this pleasure. You must induce your father to transmit a little music from his own set for the benefit of the boys in Malta. We are mailing you full particulars of the Correspondence Club.

G. Irlam (Salford).—Our articles on Railways have always been popular, and we shall commence a new series very shortly. We have so much to print, and our space is very limited, that these must wait their turn.

D. Ayes (Darjeeling, India).—Thanks for your endeavours to make Meccano better known in India. Your photos are interesting and we shall be glad to see more. You have our best wishes for your success in the A.M.I.M.E. Exam.

V. G. Govett (London).—Thanks for your suggestion that we issue Guild brooches and pendants for those who prefer them to the regular Guild Badges. This has been suggested several times, and we should like to have the views of other readers.

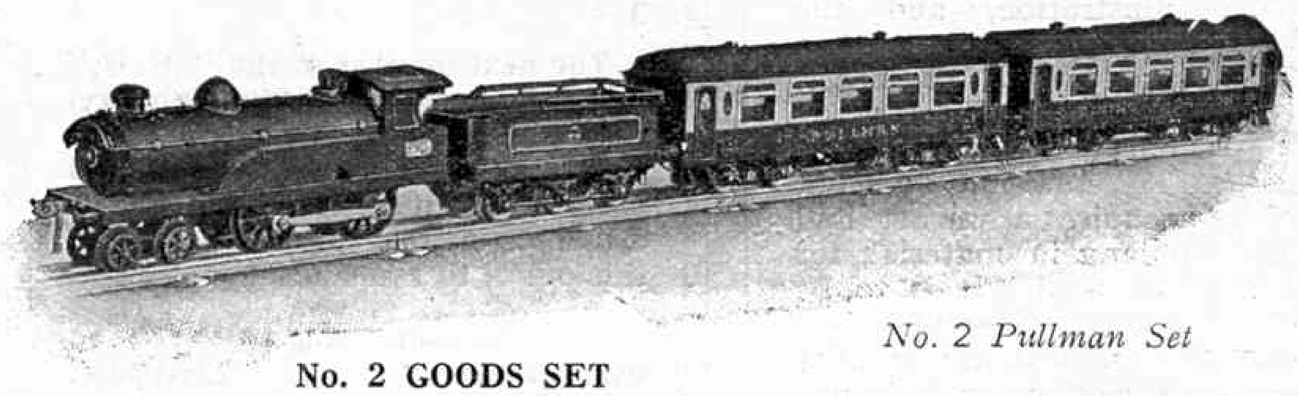
HORNBY CLOCK WORK TRAINS

THE TRAINS WITH THE GUARANTEE

A most valuable and remarkable feature of the Hornby Trains is that they may be taken to pieces and rebuilt, just like Meccano models. All the parts are standardised, and any lost or damaged sections may be replaced with new ones.

No. 2 PULLMAN SET

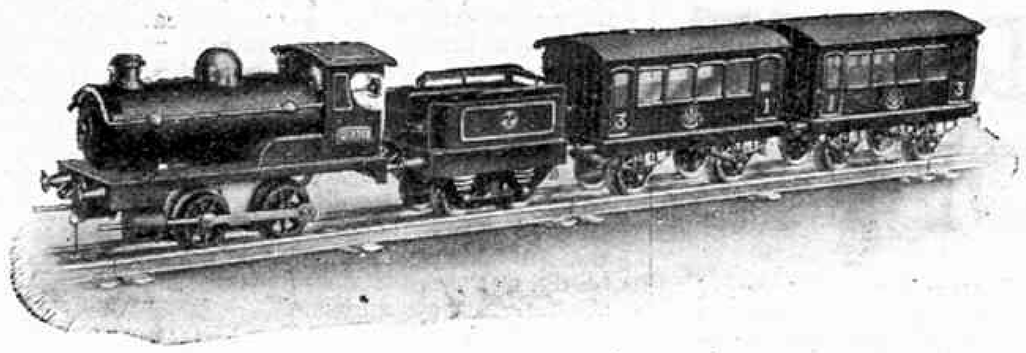
The No. 2 Pullman Set is a beautiful production. The Loco and Tender measures 17″ in length. It is built of standardised parts, enamelled in colours and beautifully finished. Fitted with reversing gear, brake and governor. Complete set in brown leather-finished gold-embossed box 70/–



No. 2 Pullman Set

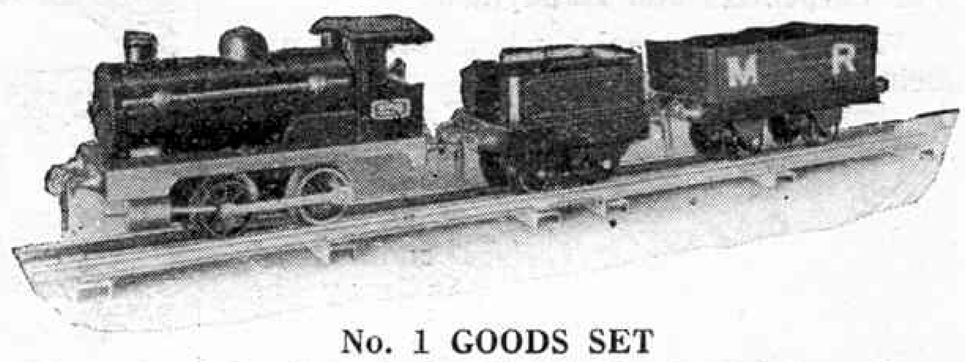
No. 2 GOODS SET

This Set contains Loco, Tender and Rails (as in the No. 2 Pullman Set), and two Goods Wagons. Superbly finished. Gauge 0, in colours to represent L.M.S. and L. & N.E.R. Co.'s rolling stock. Complete set in brown leather-finished gold-embossed box 45/–



No. 1 PASSENGER SET

This set contains Loco, Tender, two Passenger Coaches and Rails. Gauge 0, in colours to represent the principal British Railway Companies' rolling stock.
Complete in brown leather-finished, gold-embossed box, price 35/–



No. 1 GOODS SET

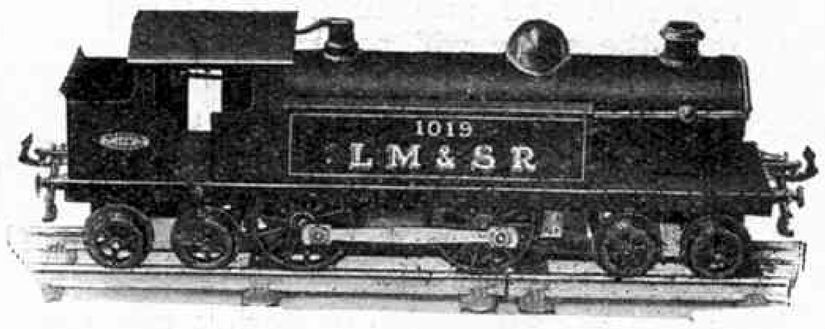
The Loco and Tender of the No. 1 Goods Set are the same as No. 1 Passenger Set. A Goods Wagon is supplied in place of the Passenger Coaches. Each Loco is fitted with reversing gear, brake and governor. Gauge 0. Complete in brown leather-finished gold-embossed box, price 25/6

Guarantee

Hornby and Zulu Trains are tested and their efficiency is guaranteed. A form of guarantee is furnished with each Loco. We undertake to repair or replace, at our option, any Loco that fails to run satisfactorily from any cause other than mis-use, within 60 days of date of purchase.

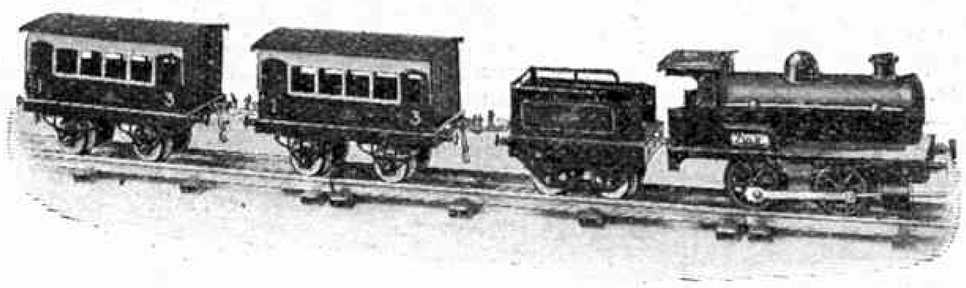
HORNBY TANK LOCO

The Hornby Tank Loco is a powerful model, embodying all the characteristics of the Hornby Train. It is 11½″ in length and is fitted at both ends with a special bogey. Beautifully enamelled and finished, Lettered L.M.S. and L. & N.E.R. Fitted with reversing gear, brake and governor. Gauge 0. Price 32/6

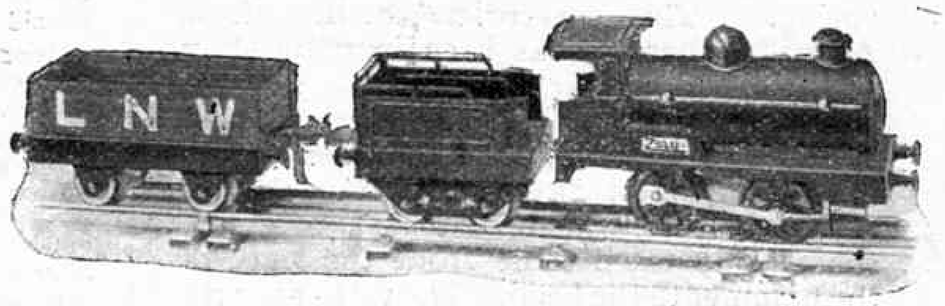


ZULU CLOCK WORK TRAINS

Fine and durable mechanism, and strength of construction in all parts are the main characteristics of Zulu Clockwork Trains.



The Locos are well designed and efficient, and will give long and excellent service.

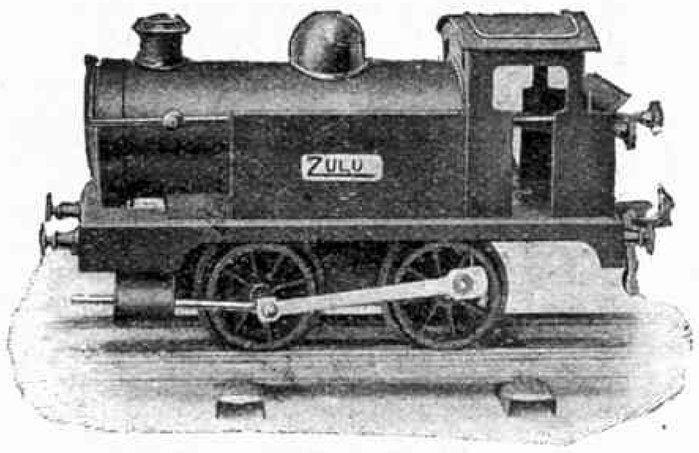


ZULU PASSENGER SET

This Set contains Loco, Tender, two Passenger Coaches and Rails. Gauge 0, in black only. Packed in strong cardboard box, price 25/–

ZULU GOODS SET

Contains Loco, Tender and Wagon and Rails. Gauge 0, n black only. Packed in strong cardboard box, price 18/6



ZULU TANK LOCO

A strong and durable Loco capable of any amount of hard work ; richly enamelled and highly finished; fitted with reversing gear, brake and governor. Gauge 0, in black only ... ... each 12/6

Full details of all Hornby and Zulu trains appear in the Meccano Products Booklet illustrated on opposite page. Read the conditions under which a copy of this splendid booklet will be sent you.
Illustrations and particulars of Train Accessories appear on page 176 of this issue.

For
MAS

MECCANO

ENGINEERING FOR BOYS

THE reason why you can build such wonderful models with Meccano is that every part is a real engineering piece—pulleys, gears, strips, girders, rods, couplings and cranks, each perfectly designed and accurately made. Every part is standardised and interchangeable.

WHEN TO START

Anywhere between 5 and 70 is the correct age to start Meccano. The youngest boy may begin the moment he gets his Outfit home. A screw-driver and spanner are the only tools necessary, and even these are supplied. Every Outfit is complete—there is nothing further to buy.

HOW TO BEGIN

For convenience Meccano parts are sold in nine Outfits of varying size, numbered 00 to 7. The quality and finish of the parts are of the same high standard throughout the series, but as the Outfits increase in size they contain larger quantities and greater varieties of parts. Each Outfit may be converted into the one next higher by the purchase of an Accessory Outfit. Thus if a No. 2 is the first Outfit bought, it may be converted into a No. 3 by adding to it a No. 2a. A No. 3a would then convert it into a No. 4, and so on up to No. 7. In this way, no matter with what Outfit you commence, you may build it up by degrees to a No. 7 and so be able to make all of the many hundreds of models shown in the Books of Instructions. No study is needed.

Free to "*M.M.*" Readers

This splendidly-illustrated book tells of all the good things that come from Meccano-land, where the best toys are manufactured. It includes illustrations of all the Meccano Outfits from No. 00 to No. 7, and also shows all the Hornby and Zulu Train Sets, new Rolling Stock and Train Accessories. Full details of Rails, Points and Crossings are also given, and a complete list of Meccano Parts. Twenty pages of splendid Meccano Products!

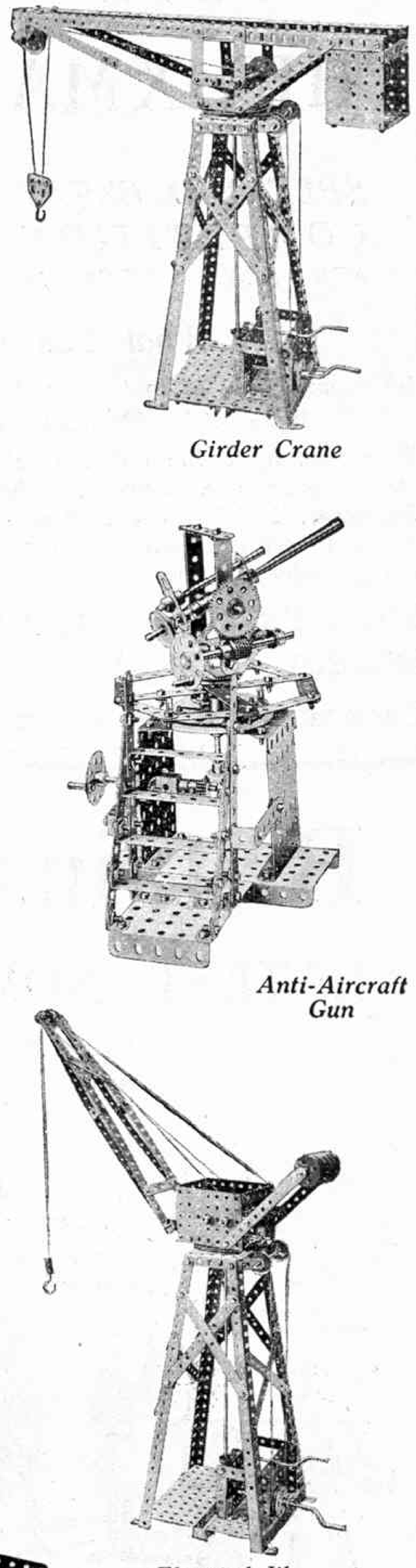
HOW TO GET A FREE COPY

Just show this advertisement to three boys who do not take the "*M.M.*," and send us their names and addresses with your own. Address your letter to "Booklet" Department.

MECCANO PRICES

No.			No.		
00	Outfit ...	3/6	4	Outfit ...	40/–
0	,, ...	5/–	5	,, (carton)	55/–
1	,, ...	8/6	5	,, (wood)	85/–
2	,, ...	15/–	6	,, (carton)	105/–
3	,, ...	22/6	6	,, (wood)	140/–
			No. 7 Outfit	(wood)	370/–

These are a few of the hundreds of models that may be built with a No. 4 Outfit.



Girder Crane

Anti-Aircraft Gun

Elevated Jib Crane

Tip-Wagon

BUY BRITISH TOYS THIS XMAS

SPLENDID ESSAY COMPETITION
FOR BOYS UNDER 14

This is the FIRST PRIZE in our SPLENDID ESSAY COMPETITION
(See below)

Model-de-Luxe Scooter

What You Have to Do

Write an Essay of not more than 500 words on "WHY WE SHOULD BUY BRITISH TOYS."

Then send it to the Editor of the "Meccano Magazine." State clearly your age, name and full address. Closing date 31st December, 1923. The Editor of the "M.M." has kindly consented to act as judge, and for the two best Essays we will give the following :—

FIRST PRIZE—Our Model-de-Luxe Scooter as Illustrated.
SECOND PRIZE—Our Popular Model with Solid Tyres.

The Auto-Scooter is The Sporty Toy for The Sporty Boy

Prices to suit all Pockets

MADE BY

The New Auto-Scooter Company

CHESTERGATE,
STOCKPORT,

and Stocked by all Leading Toyshops

Send for Lists of 6 Different Models

Britains Limited, Toy Soldier Makers, Lambton Road, LONDON, N. 19

LATEST NOVELTY The Model Home Farm Series. Perfect Models, strictly to scale. Make and finish exactly similar to our celebrated Metal Toy Soldiers.

Specialities :

Railway Station Sets

Complete as Illustrated.

CATALOGUE—POST FREE.

Prices to suit all Pockets.

MANUFACTURED BY W. Britain IN LONDON ENGLAND.
TRADE MARK

Ask your Dealer for them.

WHEN BUYING BRITAINS SOLDIERS SEE THAT THEY ARE BRITAINS.

Competition Corner

Essay Competition

This Competition, which was announced last month, is for the best essay on the subject :—

"What I Intend to Be, and Why."

Everyone of our readers has his ambitions, and no doubt the majority already have decided what they intend to be. Many wish to be Engineers or Electricians. Some have a taste for farming or wish to go abroad as Planters or Ranchers. Others wish to be Soldiers or Sailors, or to enter one of the professions and become Doctors, Lawyers, Accountants, etc.

Every boy has his place to fill in the great scheme of life, and I feel sure it will be of interest to learn what Meccano boys intend to be, and also to know why they are choosing that particular walk of life.

Essays, to be written on one side of the paper only, should not exceed 1000 words. A prize of Meccano goods to the value of £1/1/– (to be chosen from our current list) will be awarded for the best essay, and three Hawk-Eye cameras (taking pictures 3¼" × 2¼") made by Kodak Ltd., to the next best. The winning essay will be published in the "*M.M.*"

Closing date, 31st January, 1924 (Overseas 31st March).

ESSAY COMPETITION for "M.M." Stamp Collectors

This competition is open to all readers of the "*M.M.*" who are also stamp collectors. The subject is "WHY I COLLECT STAMPS." Limit your essay to 500 words; write neatly on one side of the paper only, with name, address and age on back of each sheet. First prize: Packet of Stamps value 10/6 to be chosen by the winner, from any firm advertising in the pages of the "*M.M.*" Make your choice when you send in your essay and give the necessary information, so that the stamps may be sent to you if you are the lucky winner. Closing date, 31st January next. (Overseas 31st May, 1924). Mark your envelope "Stamp Essay."

Are You an Artist?

IN response to numerous requests received from Meccano boys, I have pleasure in announcing a Drawing Competition. As mentioned in last month's Editorial on page 141, the subject of this competition is to be: "*The Editor of the "M.M." as I imagine him to be.*" In this competition the drawings may be of any size and the subject may be treated in any manner desired, i.e., it may be either in black and white, pencil, crayon or wash.

There are no restrictions, except that the drawing must, of course, be the unaided work of the competitor. The competition will be divided into two sections :—

(A) Boys under 12 years of age.

(B) Boys of 12 years of age and over.

A prize of a Hawk-Eye camera, manufactured by the Kodak Company, will be awarded in each section. The closing date is 29th February, 1924, in the United Kingdom, and for entries Overseas, 30th April, 1924. I hope to receive a large number of entries for this, our first drawing competition, which, if well supported, will be followed by other similar competitions. The winning drawings will be published in the April or May "*M.M.*"

Sixth Photographic Competition for Guild Members

Prizes will be awarded for the best indoor photograph of a Guild member or members, building a Meccano model. There will be two classes, (A) for members of 14 years of age and under, and (B) for members over 14 years of age. Closing date 29th February next. Prizes in each section, Meccano goods to the value of 10/6, to be chosen by the winners from the Meccano catalogue.

There is no Overseas section in this competition. The attention of Overseas readers is drawn to the Fifth Overseas Photo Competition, announced on this page.

Competition Closing Dates

1923	20	Dec.	Christmas Present
1924	31	Jan.	Essay.
		,,	Stamp Essay.
	29	Feb.	Drawing.
		,,	Sixth Photographic.
	15	April	£250 Championship.

Overseas Closing Dates

1923	30	Dec.	Holiday Essay.
		,,	Photo Essay.
1924	29	Feb.	Fifth Photographic.
	31	Mar.	Essay.
	30	April	Drawing.
	30	May	£250 Championship.

CHOOSE YOUR OWN CHRISTMAS PRESENT

CLOSING DATE, 20th DECEMBER.

It is a wonderful sensation to sit down and study illustrations and descriptions, and select your own Christmas presents. I want you to try it! I am going to make at least one boy happy by giving him just the very thing he wants, from amongst the articles advertised in the pages of this Special Christmas number of the "*M.M.*"

What You Have to Do

In order to experience the sensation of choosing your own presents you must look at *all* the articles advertised in these pages and decide which article you would like the postman to hand to you on Christmas morning. Write the name of it on the top of a postcard, marking it No. 1. Then write the name of the article that you would like second best and mark it No. 2. Do this with six articles altogether, write your own name and address at the bottom in very plain letters, and send the postcard to "Christmas Presents," *Meccano Magazine*, Binns Road, Liverpool.

To the boy whose list corresponds most nearly in order of merit with the total voting we will post the article that heads his list, to reach him on Christmas morning.

"Christmas Presents" postcards must reach us not later than December 20th.

MECCANO £250 CHAMPIONSHIP CONTEST

21 Cups and 460 Medals

In the 1923–4 Model Building Contest **21 Championship Cups, 110 Silver and 350 Bronze Medals** will be awarded, together with a number of Special Certificates of Merit. The total value of the prizes will amount to £250. The various countries have been divided into seven groups, and these, again, are divided into sections according to the age of the entrants.

The awards will be made for the best models submitted—particularly for those models that embody ingenious and original features. The winner of each cup will hold the title of "Meccano Champion" for his particular group and section for twelve months. The cups, which have been designed for us by a well-known firm, are of superb quality, and very handsome in appearance. Each cup will be engraved with the name of its winner, and provided with a suitable pedestal.

Meccano Gold Medallist

The competitor who submits the best model in the entire competition will be awarded a specially-designed Solid Gold Medal. He will be the "Meccano Gold Medallist" for a year, and his name will be engraved on the medal, which will, of course, remain his property. Full particulars and entry form may be obtained from any Meccano dealer, or will be mailed (post free) on request to the Editor.

OVERSEAS SECTION

"SHARP EYES"

The two best entries in the Overseas section were submitted by Master Alick Young, of 14, Trollope Street, Grahamstown, South Africa, and Master E. L. Thompson, of Russell Avenue, Lindfield, N.S.W., Australia, respectively, each of whom found over 100 mistakes. Mr. "X" has sent a Meccano Clockwork Motor to each of these boys and congratulates Masters Young and Thompson on their keen powers of observation and the wonderful patience they have shown in listing the errors.

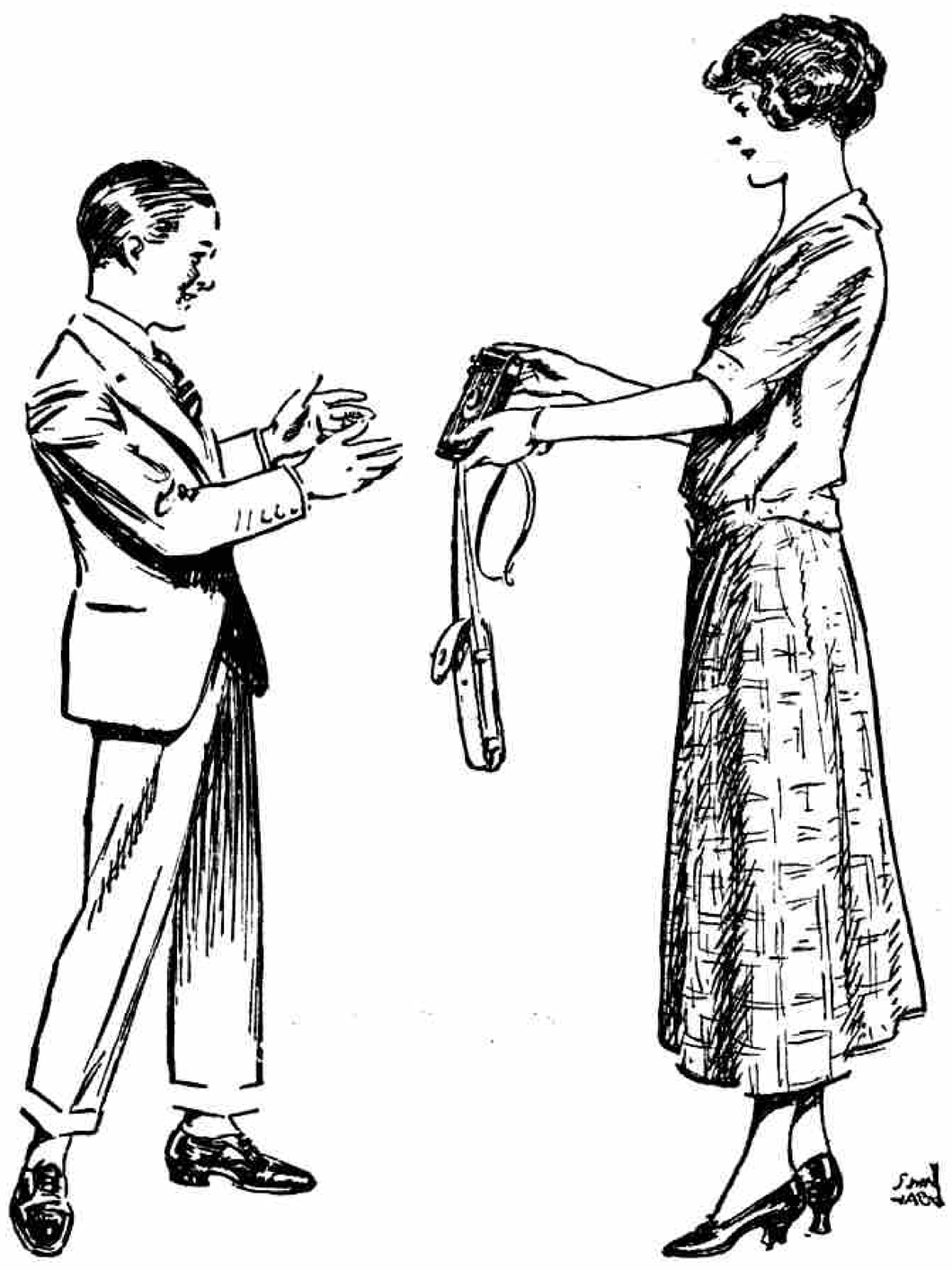
Overseas Fifth Photographic Competition

This competition closes on 29th February, 1924, and is divided into two sections, (A) 14 years of age and under, and (B) over 14 years of age. The subjects are (1) A Family Group, (2) An Animal Study, (3) Miscellaneous Section. The First Prize in each section is a Hawk-Eye Camera (taking pictures 3¼" × 2¼") made by the Kodak Co.

Improving the "*M.M.*"

Overseas Section

I have been overwhelmed with entries for this competition from almost every country in the world. Every entry has been carefully considered, and the best suggestions are those from Master J. A. Sadler, of Adelaide, S. Australia, to whom the first prize of a Hornby Train has been despatched. The second prize of a Zulu Tank Loco has been awarded to Master F. Whitney, Ficksburg, South Africa, and I congratulate these two competitors on their well-merited success. This has been one of our most successful competitions, and I wish to thank the hundreds of readers who wrote to me for the helpful spirit they showed.



Now boys! altogether for a

"Kodak"

Tell Dad you *must* have a 'Kodak' at Christmas. You can then make your own pictures of your own particular pastime; you can save forever the models you make; you can keep a picture record of your models in the course of construction; you can enter your very own pictures in your own magazine competitions. Ask Dad to take you to the nearest Kodak dealer. There are Brownies from 10/6 upwards —and you can learn to use any 'Kodak' or Brownie in half-an-hour.

Brownies from	10/6
Folding Autographic Brownies from	45/-
Vest Pocket Autographic Kodaks from	35/-
Autographic Kodaks Junior from ..	60/-

Kodak Ltd., Kingsway, London, W.C.2

Stamps with "Un-English" Names

In our last issue we mentioned that, broadly speaking, the stamps of all foreign countries may be divided into four main groups: (1) those on which the name of the country is in English spelling or nearly so, (2) those on which although the name is not in English it is in letters of the English alphabet, (3) those on which the name is in a foreign alphabet, and (4) those bearing no name of country.

We have already explained the classification of the first group and deal in this article with the remaining groups.

In group 2, where the word is entirely different from the English for the same place, but where the alphabet is still English, a little difficulty may be found at first. Below is a list of such names as you are likely to come across, with a key to the country under which they are classified. Those names that sound the same as the English when pronounced, or beginning the same, have been omitted.

Name on Stamp	Country
Bayern	Bavaria
Belgie, Belgique ...	Belgium.
Bosnien-Herzegowina	Bosnia and Herzgovina.
Ceskoslovenska ...	Czecho-Slovakia.
C.X.C.	Jugo-Slavia.
Danmark	Denmark.
Deutesche-Reichspost Deutsches Reich ...	Germany.
Deutsch	German (on German colonials as in "Deutsch Neu Guinea").
Eesti	Esthonia.
Éire, Éireann, Éireann	Irish Free State.
Emp. Ottomane ...	Turkey.
Espana	Spain.
Ethiopie	Abyssinia.
Haute	Upper (on French colonials, as in "Haute-Volta").
Helvetia	Switzerland.
K. Wurtt.	Wurtemburg.
Latvija	Lettland=Latvia.
Lietuva	Lithuania.
Magyar	Hungary.
Norge	Norway.
Oesterr, Oesterreich	Austria, or Austrian Levant, or Austrian Crete.
Polska, Poczta ...	Poland.
Sverige	Sweden.
Toga	Tonga (not the same as Togo).

This guide to the name of countries on stamps should prove of considerable use to beginners and to those a little more advanced who wish to revise their collections. The lists are not complete, however, as countries the stamps of which are rare, have been omitted.

Foreign Alphabets

Stamps that carry inscriptions in letters that are not the same as those of the English alphabet may only be identified by the use of a Key and by experience. Below is a Key that will be useful, and as it includes all the countries that readers of the "*M.M.*" are likely to come across it will enable stamps to be identified in almost every case.

The chief countries concerned are Greece, Crete. Bulgaria, Montenegro, Servia, Russia and Finland. Here are specimens of lettering on stamps of these countries.

Greece:	ΕΛΛΑΣ
Crete:	ΚΡΗΤΗ
Bulgaria:	БЪЛГАРСКА, ПОЩА, СТОТ, ФЕРДИНА, or БZЛГЛРИЯ
Montenegro:	БИЂЕГА ДОШТЕ ЦР. ГОРЕ
Servia:	ПОШТА, СРПСКА СРБИЈА
Russia or Finland, according to details of design of stamp:	ПОЧТОВАЯ МАРКА

Stamps having some portion of their design composed of what appears to be a daisy, belong to Japan. It is often said that the centre represents the Sun and the petals its rays. In reality, however, it represents a chrysanthemum, the national emblem of Japan.

In Group 4 there are no common stamps excepting those issued by Great Britain (which may be recognised by the portraits) and the Indian Native States.

Classifying in Sets

When the stamps have been identified and sorted into their respective countries, we may proceed to classify them according to their particular "sets." When this has been done we shall be ready to arrange them correctly in the album. As everyone knows, a set is a group of stamps issued about the same date. They may all be of similar design, although of differing colours and values, or they may be of varied design. For instance, the set now in use in Great Britain bears the portrait of King George V, and consists of fifteen different values between ½d. and 10/–. The long reign of Queen Victoria was marked by several sets, distinguished by differences in the portrait or in the frame of the stamps.

To classify the stamps of each country into their respective sets is difficult without the guidance to be obtained from a catalogue. Without a catalogue the collector is as much at sea as a tourist without a guide-book or map, or a sailor without a compass. It is better to spend a little money on a catalogue than to buy more stamps or even a larger album. A stamp catalogue is really a dealer's price list. It contains details and illustrations of all postage stamps known to have been issued to the date of publication. The stamps of each country are placed in their order of issue under the heading of the country to which they belong, with dates of issue and prices in unused and used condition. There are many useful catalogues, but readers of the "*M.M.*" will probably find the "Standard Catalogue of Postage Stamps"* to be most suitable, as it does not deal with the intricate details of stamps required by the advanced collector.

Next month we shall describe the preparation of the stamps for the album and their arrangement therein. We shall endeavour to assist the beginner in the choice of an album. In the meantime it may be found convenient to store the loose stamps in envelopes marked with the names of the respective countries, and arranged in alphabetical order for ready reference.

* Published by Messrs. Whitfield King & Co., Ipswich, price 6/6 post free.

SPECIAL ARTICLES I.

The King of Spain

as Baby, Boy and Man

Alphonso XII, King of Spain, died in 1886, a few months before his son was born. Accordingly his son, the present King, bearing the title of Alfonso XIII, commenced to reign at the date of his birth (17 May, 1886).

1889-1900

In 1889, when the young King was three years old, a series of postage stamps was issued, showing his baby portrait. In 1900, when he was fourteen, a new set was issued, showing him as a boy, and nine years later still another set was issued showing His Majesty as a man. This is, perhaps, the only case in which one person appears on stamps first as a baby, then as a boy, and lastly as a man.

1900-1909

The stamps of the last two sets are all numbered on the back in blue, except the 15c. of the 1909 issue, which sometimes has the number in blue and at other times in red. Every stamp on the same sheet has the same number, but every sheet has a different number. Postal officials are thus able to tell at once when a stamp was printed by looking at this number on the back. Sometimes, however, mistakes were made in the printing and so very occasionally different numbers are found on the same sheet. These errors are more valuable but, of course, they are not to be found in single stamps.

1909-1923

R.K.G.

Stamp Enquiries

F. Graham (Nottingham).—We hope to explain the different kinds of water-marks in one of our future issues. We shall also deal with the differences in perforations.

Geo. Williamson (Chester).—You will be interested to know that we are contemplating an article on engineering wonders of the world as depicted on stamps. We think this subject will be of great interest to Meccano boys who are stamp collectors.

G. Chapman (Luton).—Plate numbers in the English penny red stamps are to be found on the sides of the stamp in the column of tracery. We shall illustrate plate numbers and give interesting details in one of our future issues.

F. Johnson (Birmingham).—The article on this page will help you in the identification of your Greek stamp.

A. E. Lea (Cardiff).—We hope to deal with interesting new issues from time to time in this column. There are so many new issues, especially from the European countries, however, that to "give illustrations of every new issue each month" would require a very large number of pages. We shall select only the more interesting for description.

E. Partington (Leeds).—You are quite correct in supposing that "printing that has been put on a stamp wrong way up" increases its value. The technical description of this is an "inverted surcharge."

For Stamp Collectors

The attention of stamp collectors is drawn to the Special Essay Competition announced on page 193 of this issue.

FREE *MECCANO OUTFITS.*

YOU *MUST* enter the simple and fascinating Competition in this week's "*Scout.*" Besides Meccano Outfits there are many other Splendid Prizes, including

CHRISTMAS CARD AND CALENDAR *also given free inside every copy of THE*

TUCK HAMPERS,
FRETWORK OUTFITS,
CONJURING OUTFITS,
FOUNTAIN PENS,
FOOTBALLS, Etc., Etc.

Don't miss the first instalment of our new thrilling Serial "THE RIVER RIDERS."

SCOUT *XMAS No. just out--2d.*

FREE SAMPLE OF FELS-NAPTHA

Send for it!

Send a post card, giving your name and address, to A. C. Fincken & Co., Sole Consignees (Dept. 90A), 197, Gt. Portland Street, London, W.1.

Now Boys! what do you know about SOAP?

Who said "nothing"? Take no notice of him. He himself is probably ignorant of the fact that even the greatest scientists do not know *all* there is to know about soap, in spite of the fact that they use it every day of their lives! However, any boy can find out enough about soap to be able to tell mother if she is using a good one or not. All dirt is held to fabrics by a thin film of invisible oil. Ordinary soap breaks up this film and allows the water to get at the dirt and swill it away. But it won't come away without boiling and rubbing the clothes first. That's why mother so dislikes washdays. They mean such hard work. FELS-NAPTHA Soap is different. It has real naptha in it. Naptha *dissolves* grease. The clothes just have to be soaped with it and soaked in warm water. The stubborn oil film is gently dissolved away and the soapy water loosens the dirt. Then a rinse swills the dirt away, and the washing is done, quickly, easily, safely. Which method is the easier? The second, undoubtedly. Give mother a surprise! Send for a free sample of FELS-NAPTHA, explain to her how to use it (the directions are inside the wrapper) and never more will she have to endure the old-fashioned wash-day. *Won't* mother be pleased! Send to-day.

FELS-NAPTHA SOAP

FELS-NAPTHA COSTS **5½d.** A BAR, AND WASHES WITHOUT BOILING WATER.

Fireside Fun

THERE is a curious sentence that many of us were asked to say when we first went to school. Here it is:—"Of all the saws that ever I saw I never saw a saw that saws like this saw saws." That is not difficult to say, but there are many sentences with the same word, syllable or sound that *are* difficult, especially when we try to repeat them several times in quick succession. These sentences are called tongue-twisters. "Truly rural" and "A pound of mixed biscuits" seem quite simple expressions, and yet there are very few people who can say either of them quickly, several times running, without twisting them into something that sounds like "toorelooral" and "missed bixis."

A well-known tongue-twister, a favourite even in our grandfathers' times, is the verse:

Peter Piper picked a peck of pepper;
Did Peter Piper pick a peck of pepper?
If Peter Piper picked a peck of pepper,
Where's the peck of pepper Peter Piper picked?

Here is another similar form of tongue-twister in the verse:

Oliver Oglethorpe ogled an owl and oyster;
Did Oliver Oglethorpe ogle an owl and oyster?
If Oliver Oglethorpe ogled an owl and oyster,
Where are the owl and oyster Oliver Oglethorpe ogled?

These verses should be repeated half-a-dozen times, as quickly as possible. Anyone who does this without a slip may spend Christmas with a clear conscience!

Perhaps even more difficult to repeat than either of these is a verse in which the letter q occurs in almost every word.

Quixote Quicksight quizzed a queerish quid-box.
Did Quixote Quicksight quiz a queerish quid-box.
If Quixote Quicksight quizzed a queerish quid-box,
Where's the queerish quid-box Quixote Quicksight quizzed?

* * *

Sandy (receiving doctor's bill)—"But the bill is not right, Doctor. You've chairged me for seven days insteed o' six. Dinna ye mind I was dileerious one day, and was not aweer of your presence?"

* * *

A little boy complained that his shoes hurt him. His mother looked at them and saw that in his hurry to get dressed he had put the right shoe on the left foot, and the left shoe on the right foot.

"You've put your shoes on the wrong feet, dear," she explained.

The little boy looked up in wonder. "No, I haven't, mummy," he said, "*They're on my feet.*"

Adam and Eve Ate Lots of Apples

The vicar said he felt sure they only ate 1.

The curate said he didn't think that could be right because Eve 81 and Adam 812. Total 893.

The warden said that both were quite mistaken, because Eve 814 herself and Adam 8124 himself. Total 8938.

The sexton thought they were all wrong. He said that Eve 8142 know how it tasted, and Adam 28142 know what it was like. Total 36284.

Is anyone able to improve on this?

We are offering a prize of 5/- for the best puzzle submitted each month, and prizes of 2/6 each for any other puzzles printed.

Puzzles should be expressed as clearly as possible and the answers should be given in each case. Diagrams should be clearly drawn and letters should be addressed "Puzzles," Meccano Magazine, Binns Road, Liverpool.

We hope to announce next month a special Puzzle Competition for Guild Members.

A lady, who was engaging a new maid, showed the girl a valuable Persian rug, of which she was very proud. Pointing to the rug she said "When you clean the parlour, Mary, be very careful of this beautiful rug. It is very old!" "I can see it is, ma'am" replied the maid sympathetically, "but I dare say we can make it last the winter if we're careful!"

* * *

"Did you ever ride a horse before?" shouted the sergeant. "Never" replied the recruit. "Ah!" returned the sergeant with a sour smile, "Here's just the animal for you! He's never been ridden before. You can start out together!"

* * *

Officer (angrily): "Button up your coat."

Married recruit (absent-mindedly): "Yes, my dear!"

* * *

A young man while fishing on the Wye landed a wallet containing twenty-two £1 Treasury notes. A correspondent writing from North of the Tweed enquires what bait the fellow was using.

Try this on Father!

Tell him to think of the number of the month of his birth, counting January as 1 etc. Multiply it by 2; add 5; multiply it by 50; tell him then to add his age; then subtract 365; then add 115. The month of his birth will then be indicated by the first figure and the age by the last two figures.

* * *

Can you do this in an Hour?

ENIZAGAMONOMAGAZINE
NIZAGAMONANOMAGAZIN
IZAGAMONACANOMAGAZI
ZAGAMONACCCANOMAGAZ
AGAMONACCECCANOMAGA
GAMONACCEMECCANOMAG
AMONACCEMEMECCANOMA
MONACCEMEHEMECCANOM
ONACCEMEHTHEMECCANO
MONACCEMEHEMECCANOM
AMONACCEMEMECCANOMA
GAMONACCEMECCANOMAG
AGAMONACCECCANOMAGA
ZAGAMONACCCANOMAGAZ
IZAGAMONACANOMAGAZI
NIZAGAMONANOMAGAZIN
ENIZAGAMONOMAGAZINE

Starting with the T in the middle of the above parallelogram of letters, how many times can you find the words, "*The Meccano Magazine?*" You must always read in a straight line, but you are allowed to turn at right angles as often as you please.

By permission of] ["*The Captain*"

Pat, with the aid of the Meccano Outfit Aunt Maria gave him, "remodels" her precious Binks (who is getting rather fat) as a 2-4-2 Tank locomotive!

BUILD A HOUSE

SPECIAL OFFER to Meccano Boys

WE have a limited number of model house sets which we have decided to offer at special prices to all readers of the "Meccano Magazine."

These model houses are beautifully printed on stout card, and the material for each model is contained in a special envelope, on the outside of which is shown a picture of the model when made up.

All that is necessary to make a house is to cut and score the card as shown in the clear instructions given with each set. The parts are then built up by affixing them with a little SECCOTINE. When the model is complete, additions such as red roofs, plaster walls, gardens, etc., can be made as desired by the modeller, and much ingenuity can be exercised in the making of these additions. We give three suggestions :—

1. Grass can be indicated by smearing the base card with a thin solution of SECCOTINE, and then imitation or real moss attached. This is very effective, especially as footpaths can be shown by leaving the moss and Seccotine off where desired.
2. Plaster walls can easily be made by smearing the sides of the house with Seccotine, and then ordinary sand sprinkled over.
3. Windows can be made by sticking small pieces of glass or clear gelatine into the spaces allowed for the panes.

These models can be used in many attractive ways in conjunction with Hornby Trains and rail sets.

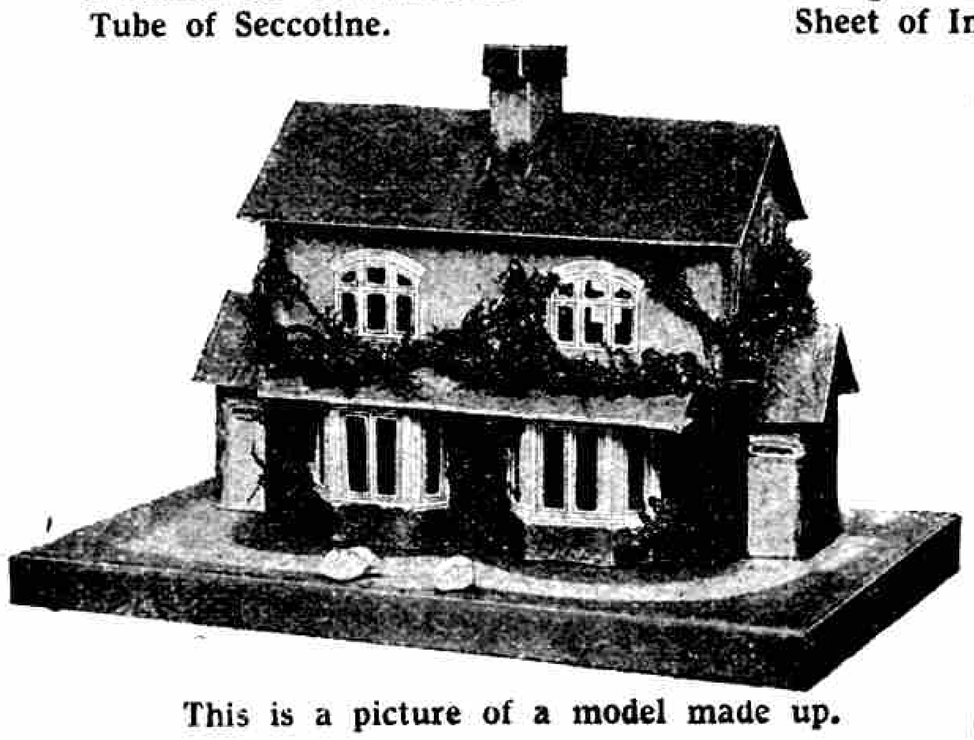
The list of models available is :—

Model No. 1—Two Semi-Detached Villas
,, ,, 2—Detached House, to stand in its own grounds
,, ,, 3— ,, ,, ,,
,, ,, 4—(a) Village School, (b) Two Semi-Detached Villas, (c) Villa
,, ,, 5—(a) Church, (b) Blacksmith's Forge, (c) Village Shop
,, ,, 6—(a) Villa, (b) Cottage, (c) Village Inn
,, ,, 7—(a) Row of Cottages, (b) Detached House, (c) Monument

Any Box for 1/6 Postage Paid

EACH BOX CONTAINS

Material for Construction.
Tube of Seccotine.
Straight Edge.
Sheet of Instructions.



This is a picture of a model made up.

Fill in the attached Coupon and send it to us with a Post Office Order covering the boxes required, and by return you will have the sets ready for working on

COUPON

To be cut out and forwarded with Postal Order for number of boxes required.

Please send

..... Box ..... Model House No. 1
..... ,, ,, ,, ,, 2
..... ,, ,, ,, ,, 3
..... ,, ,, ,, ,, 4
..... ,, ,, ,, ,, 5
..... ,, ,, ,, ,, 6
..... ,, ,, ,, ,, 7

at 1/6 per box post paid.

Name .....

Full Address .....

.....

McCAW, STEVENSON & ORR LTD.

The Linenhall Works, BELFAST

SOLE MAKERS OF **SECCOTINE** Which Sticks Everything

The Secretary's Notes

I wish you boys, members of this great Meccano brotherhood, could spend a day at my elbow. I wish you could share my pleasures in seeing how the scope of the Guild is increasing every day. I wish you could see how new members are joining us by the hundred every week, how numerous new Clubs are being formed every month, and what great promise these new Clubs hold for future development. Many of these new Clubs are being founded at the suggestion of local gentlemen, who realise what splendid work may be done through the medium of a real live Club.

Progress of the Guild

The Guild movement, the largest brotherhood of boys in the world, has been a great success ever since its inception some four years ago. I am not content to rest with the success that has been achieved, however, and I want to make the Guild an even greater success. In the first place I want to be sure that every member is getting the best out of the Guild. To make this possible, it is important that all individual members should support the Club in their district. Clubs have now been formed in nearly all large towns in this country, as well as in many countries Overseas, and if any of you who read these lines have not joined a Club you are missing heaps of fun. I hope that you will support your local Club, and shall be glad to send you full particulars of the nearest Club on request. Should there not be any Club established in your neighbourhood you should have a talk with your chums and see if you cannot form one together. I am always ready to give all the information and advice possible and to help in any way in my power, not only by assisting in starting new Clubs, but also in making them a success once they have been opened.

Join a Club

Many boys have written to ask me how to start a Club, and I think that a few words in this column will be of interest to new Guild members. The first step in starting a Club is to obtain a copy of the booklet "*Suggestions for Club Secretaries.*" This will be mailed, post free, on request. It tells you just how to set to work and shows that the essentials of a successful Club are a proper Club room and an adult Leader. These sometimes present difficulties, but my experience is that both are absolutely necessary to the successful working of a new Club. The difficulties are not so great as they may appear at first sight, however, and it is surprising to find how people will help if they know just what you want.

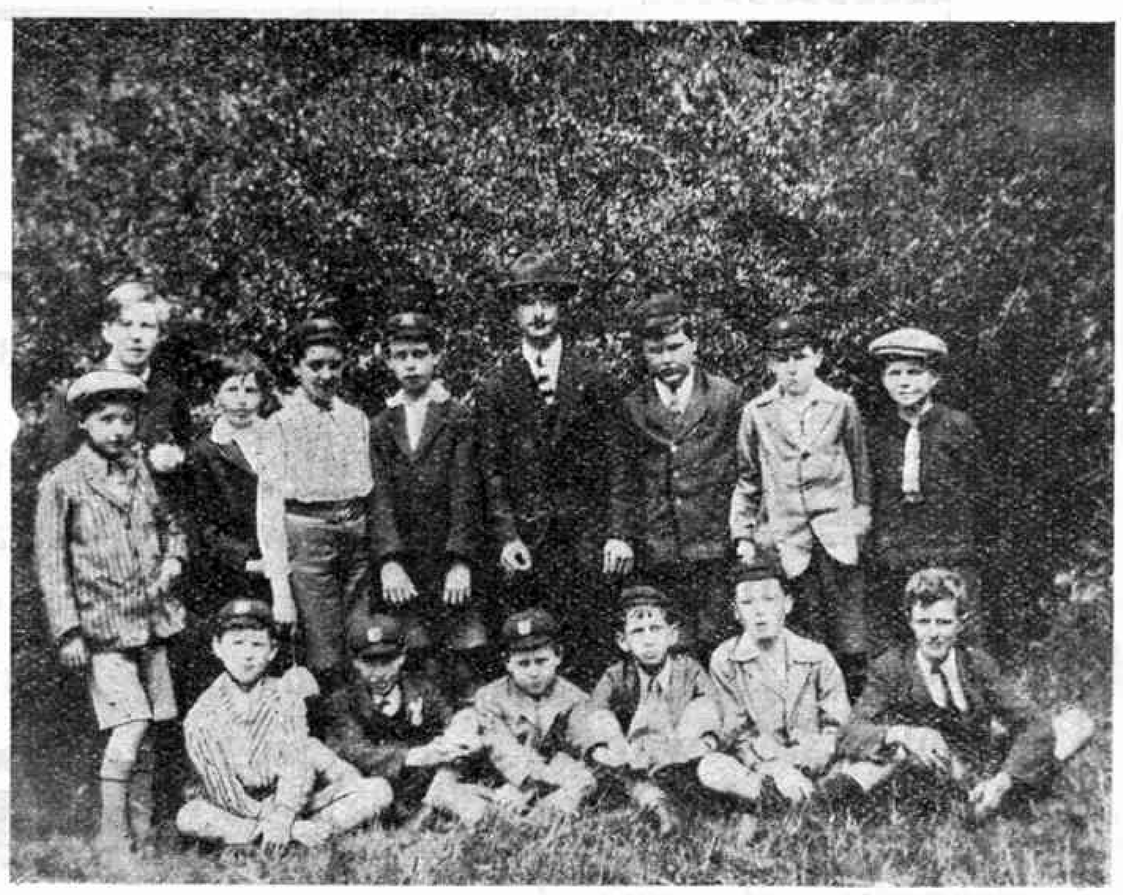
Starting a Club

In regard to obtaining a Leader, my advice is that you should approach your schoolmaster, Sunday-school teacher, or local Y.M.C.A. Secretary on the subject. Any of these gentlemen will be willing to help you, if they are able to do so. Should you experience any difficulty, however, I am always pleased to endeavour to obtain Leaders. Similarly, in the obtaining of a Club room I offer to write to local authorities on the subject and to interest local gentlemen in the work of the Club.

I want you to realise, however, that you must only appeal to me as a last resource. The successful working of a Club depends upon the Guild members on the spot. Unless they are prepared to work hard, both in the formation of the Club and afterwards, no Club will be successful. "What is worth doing at all, is worth doing well" is an old saying which still holds good in regard to many things, but in regard to forming a Meccano Club in particular. If the members are keen and enthusiastic they will often be able to arrange for both a Club Leader and a Club room without having to seek my assistance.

(*Continued in third column*

Club's Happy Outing



Pleasant memories of summer days and country rambles are recalled by this photograph of the Leader and members of the Southall Meccano Club. The photo was taken on the occasion of the Club's outing to Burnham Beeches, some very beautiful woods just outside London. We are well able to imagine that these happy-looking Guild members had a very jolly time out in the open. The Leader of the Southall M.C., Mr. G. Carpenter, who is seen in the centre of the group, has recently succeeded in obtaining a new and larger Club room to accommodate the steadily increasing membership of this enthusiastic Club.

Meccano Club Leaders

No. 8. Mr. H. W. R. COUSENS.

Mr. H. W. R. Cousens, the Leader of the "Westview (Nottingham) Meccano Club" took over the Leadership of this Club a little over a year ago. Since then

rapid progress has been made in every direction of the Club's activities, which are not confined to model-building, but include other hobbies introduced from the Leader's versatile store. The social side of the Club is not neglected and Mr. Cousens tells me that he derives great pleasure on Club nights in seeing the boys turn up with smiling faces in anticipation of a good time. I feel sure they are not disappointed and they are fortunate in having a leader who is so well able to cater for their many interests.

(*Continued from first column*)

In the October "*M.M.*" the Editor mentioned that the 1923 Meccano Model-building Competition is the biggest thing in Competitions of its kind ever held. He mentioned that his particular interest would be in the destination of the gold medal and the title "Meccano Gold Medallist." I should like to say that I also am particularly interested in this award, and I sincerely hope that the coveted title will be won by a member of our Guild. The Meccano Guild members have always been to the front in the list of prize-winners in this great annual Competition, and it will indeed be pleasing—not only to myself but also to the 30,000 members of the Guild—if one of our number carries off the supreme award in the Competition now running. Full particulars of the Competition are given elsewhere in these pages and I want all Guild members to "put their thinking caps on" and to devise a model that will do them justice.

Meccano Championship Competition

Remember that the award will be given for the best model in the whole Competition and that models are judged from the point of view of originality and ingenuity displayed. The boy who enters a model that is copied from some model in the Meccano Manuals cannot expect to win a prize. He has not exercised his brains or his inventive powers, the very thing that the Competition has been organised to bring about. It is not necessary to have a No. 7 Outfit to win a prize, but it is important that the models entered are built with skill and that the subjects selected are reproduced correctly and carefully. No boy who enters this Competition with a model that shows faulty construction or is badly built, can expect to win a prize. The title of "Meccano Gold Medallist" is one that thousands of boys covet, and the builder of the winning model will fully deserve the honour that the title conveys.

In some recent notes I announced that a number of Guild members in Canada were anxious to correspond with English boys. These Canadian members have now all been fixed up with correspondents in this country and they are enjoying exchanging letters with one another.

Correspondence Club

I have this last week received a number of names from the local Secretary of the French Meccano Guild. These French boys wish to correspond with English boys and they desire to write to their correspondents in English and to receive letters from them in French. This will be excellent practice for any Guild members who wish to improve their French, especially as there are no black marks or other penalties for any mistakes made! Any Guild member who wishes to open up correspondence with a French boy should send to me for full particulars of the Correspondence Club and enrolment form. Next month I hope to give a full list of boys abroad who desire me to find them correspondents in England.

Club Notes on Page 201

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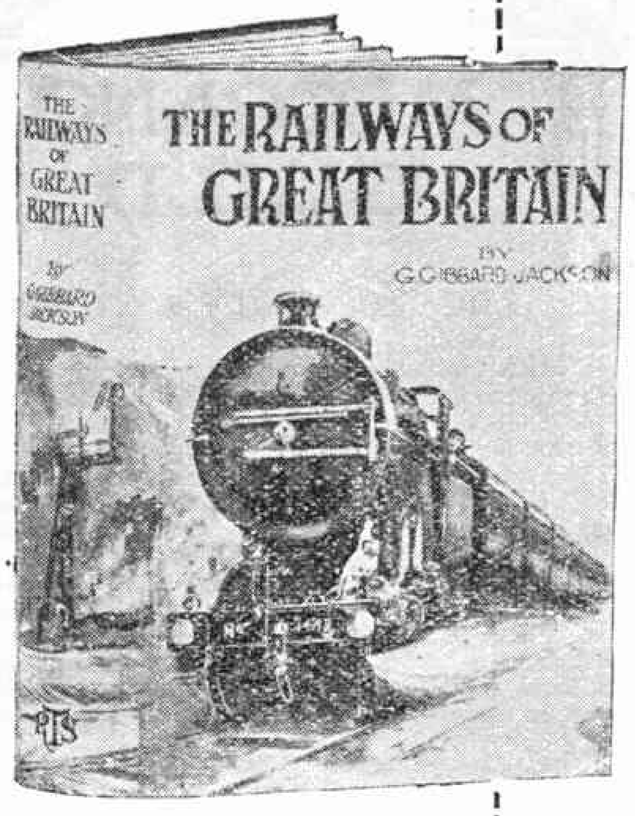

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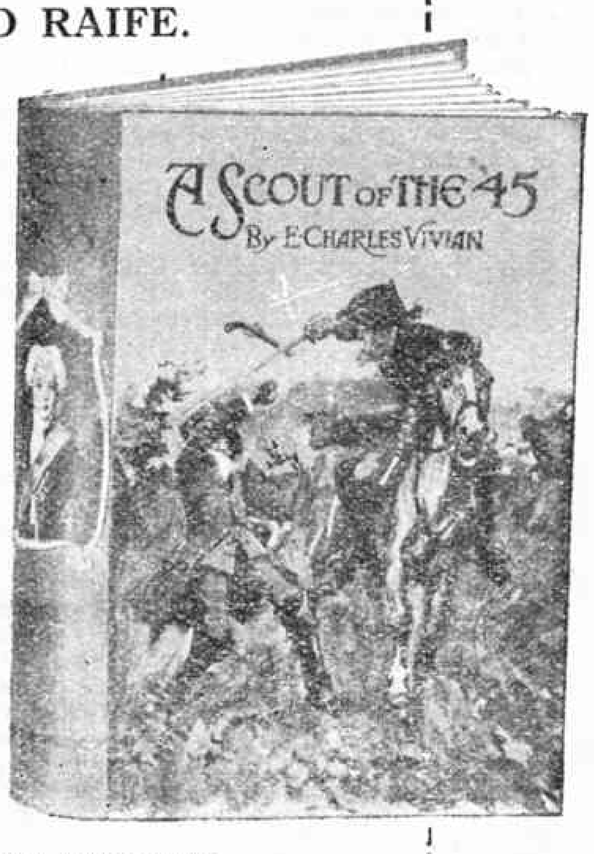

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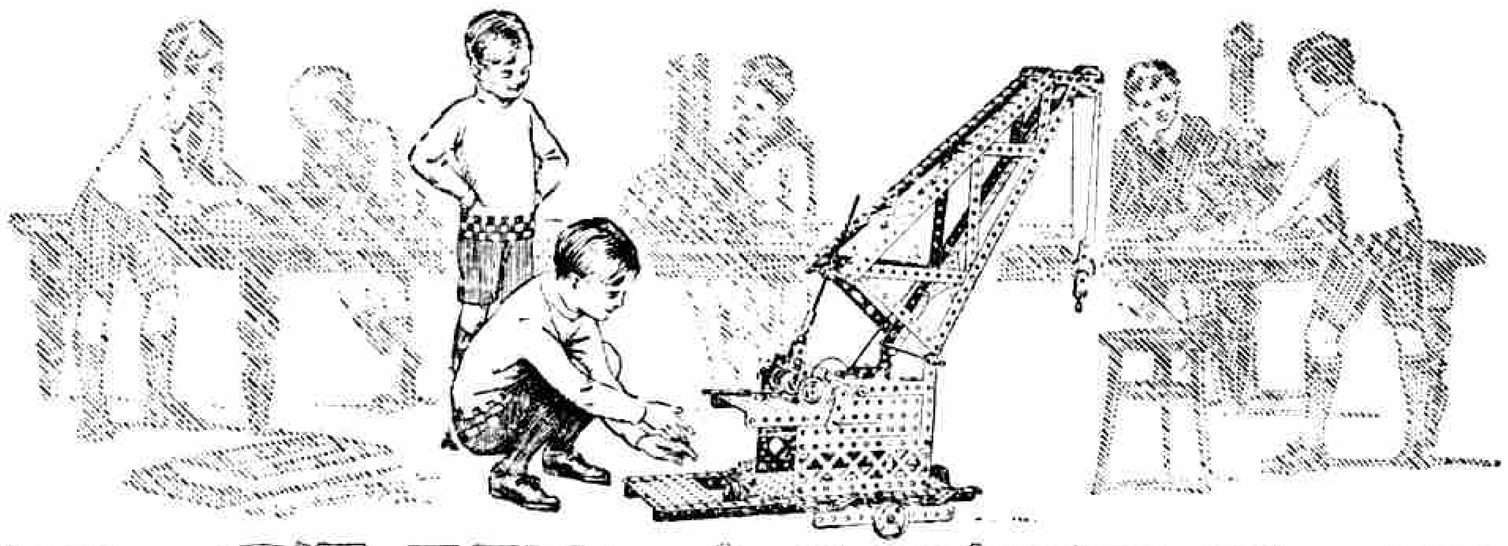

CLUB NOTES

Luton M.C.—The first Winter Session is proving very successful. A Radio evening proved so popular that the Club Leader has decided to give a series of short lectures on the "Elementary Principles of Wireless." *Secretary:* Master W. Humby, 11, Napier Road, Luton, Beds.

Southall M.C.—This Club has recently succeeded in obtaining a new club room, so there is now more room for model building and entertainments. The room was obtained chiefly through the efforts of Mr. Haigh, the Vice-President, who is a good friend of long standing. *Secretary:* Master G. Gray, 26, St. John's Road, Southall.

Barnetby (St. Barnabas) M.C.—Club meetings are being held regularly, and Part 2 of the Meccano Lecture entitled "*The Story of our Ships*" was greatly enjoyed on a recent club night. The Club's football team promises to be a great asset. *Secretary:* Master R. H. Ward, Laurel Villas, Victoria Road, Barnetby, Lincs.

Leamington M.C.—Several new features have been included in the programme for the present Session. One of these is Boxing, in which the members are to be trained by a qualified instructor. Competitions are being arranged with other clubs in the town and I take this opportunity of wishing the Club every success. Club work is not neglected, and interesting lectures on all branches of engineering are delivered to the members from time to time, while other evenings are devoted to Club Competitions and model building. I hope to pay a visit to this Club in the near future. *Secretary:* Mr. G. Hare, 36, Willes Road, Leamington.

Wisbech M.C.—Owing to the rapidly-increasing membership of this Club, a Joint Leader, Mr. A. Beck, has recently been appointed, and his assistance will be greatly appreciated. The first anniversary of the Club was celebrated by a Social, which was voted a great success. *Secretary:* Master S. Ketteringham, 99, Norwich Road, New Walsoken, Wisbech.

Glevum (Gloucester) M.C.—In August last a camp was organised at Brimscombe, nr. Stroud, and many of the Club's members spent an enjoyable time on the Cotswolds, some 500 ft. above sea-level. Winter activities are now in full swing and the Club intend to install a wireless set, which will enable the members to listen to broadcast while building their models. The members attend a gymnasium every week. A concert party has been organised and toys are being made for the Children's Hospital for Christmas. *Club Leader*: Mr. L. C. Hobbs, 32, Vicarage Road, Gloucester.

House (Guernsey) M.C.—Winter activities have again commenced and many new members have joined. It is the Club's endeavour to make this a record Session, and there is certainly no lack of enthusiasm. *Secretary:* Master H. Griffith, Elizabeth College, Guernsey, C.I.

Bloemfontein (South Africa) M.C.—Interesting visits have been arranged to the local railway shops and printing works in addition to the ordinary Club programme. The Club members recently passed a vote of thanks to the Editor of the "*M.M.*" and unanimously decided that it was "just fine." *Secretary*: Master F. H. Lupton, 4, Loop Street, Bloemfontein, South Africa.

Sparkbrook M.C.—The programme for the present Session includes Lectures, Debates, Model Building, Speed Tests, Competitions, Games, Riddles, etc., and a Grand Social will be held later. An interesting evening will also be held on 3rd January, when members will each describe "How I Spent Christmas." *Secretary:* Master Francis Hubball, 71, Turner Street, Sparkbrook, Birmingham.

Ethersall Nelson M.C.—This newly-affiliated Club recently held an Exhibition, which was highly successful, both from a financial and general point of view. Many ingenious models have been constructed at the regular meetings, and last month an enjoyable visit was paid to the Printing Works of Messrs. H. W. Bateson & Son, of Barrowford, through the kindness of Master L. Horsfield, one of the members. After a tour through the works the boys listened to a Radio Concert from Manchester. The Secretary was recently awarded a Gold Medal for his achievements in the cricket field and I am sure that all the Guild members will join in congratulating him. *Secretary*: Master H. Dewhurst, 145, Waide House Road, Nelson, Lancs.

Clubs Recently Affiliated

Adelaide (South Australia) M.C.—This Meccano Club was formed a short time ago, and as excellent progress has already been made, affiliation with the Guild has now been granted. Some interesting meetings have been held, with Demonstrations, Lectures and Model Building. An interesting Lantern Lecture on "*Merrie England*" was very well received. *Secretary:* Master R. E. W. Cornish, Walkerville Terrace, Walkerville, Adelaide, South Australia.

Silchester M.C.—Established under the supervision of Mr. F. C. Harris, the Headmaster of the Silchester C. E. School, this Club has already made excellent progress. *Secretary:* Master A. Toms, Pine View, Silchester, near Reading, Berks.

Westcliff & District M.C.—Was established early last May, and affiliation with the Guild was granted towards the end of August. The members are keen and enthusiastic, and there is every prospect of a successful future. *Secretary:* Master D. S. Cecil, 22, Valkyrie Road, Westcliff-on-Sea.

Footscray (Australia) M.C.—This is the fifth Club in this country to become affiliated with the Guild, and, at the present rate of progress will soon become one of the leading Clubs in Australia. *Secretary:* Mr. H. L. Roach, 48, Stirling Street, Footscray, Victoria, Australia.

Clubs not yet Affiliated

Claughton (Birkenhead) M.C.—It is hoped to establish a Meccano Club in Birkenhead in the near future. All Guild Members who live near the Secretary should communicate with him without delay. *Secretary:* Master E. R. Hudson, 7, Upper Brassey Street, Birkenhead.

St. Helens Y.M.C.A. M.C.—A successful Club has been organised in St. Helens, and as soon as this comes under the supervision of an adult Club Leader it will be affiliated. Any St. Helens boys who are interested should call at the Junior Department of the Y.M.C.A. between the hours of 7 p.m. and 9 p.m. on Wednesdays or Fridays. *Secretary:* Master W. Mousdell, 14, Tennis Street, St. Helens, Lancs.

Albion Field (London, S.E. 13) M.C.—This Club has every prospect of being affiliated with the Guild at an early date, for already an adult Leader and Club room have been obtained. Meetings are held every Friday evening at 7 p.m., and any boy desirous of joining should communicate with the Secretary. *Secretary:* Master L. Jones, 39, Wellmeadow Road, Lewisham, S.E. 13.

Red Triangle (Halifax) M.C.—Every effort is being made to increase the membership of this promising Club. Any Guild boy living in Halifax will receive a cordial welcome. Full particulars of the Club may be obtained from the Secretary or from the Red Triangle Hut in Commercial Street. Club Meetings are held every Thursday evening. *Secretary:* Master E. Littlefair, 4, Clare Street, Halifax.

Lahore (India) M.C.—Has been in existence for some time, and when an Adult Club Leader is found will be affiliated with the Guild. One of the Club's most enthusiastic members died recently, and I feel sure that all Guild members will extend their sympathies to the Club in its sad loss. *Secretary:* Master H. C. Manchanda, 39, Ramour Mozang Road, Lahore, India.

Clubs Print Magazines

The Holy Trinity (Barnsbury, London, N.) is the first Meccano Club to issue a printed Magazine. The St. Mary (Newington) Meccano Club has not been far behind, however, for a copy of their Magazine reached me only a few weeks after the Magazine from the first-named Club. Both Magazines are similar in design, and both are printed by the Holy Trinity Meccano and Radio Club Press. The subscription is 1/- per annum or 1/6 (post free).

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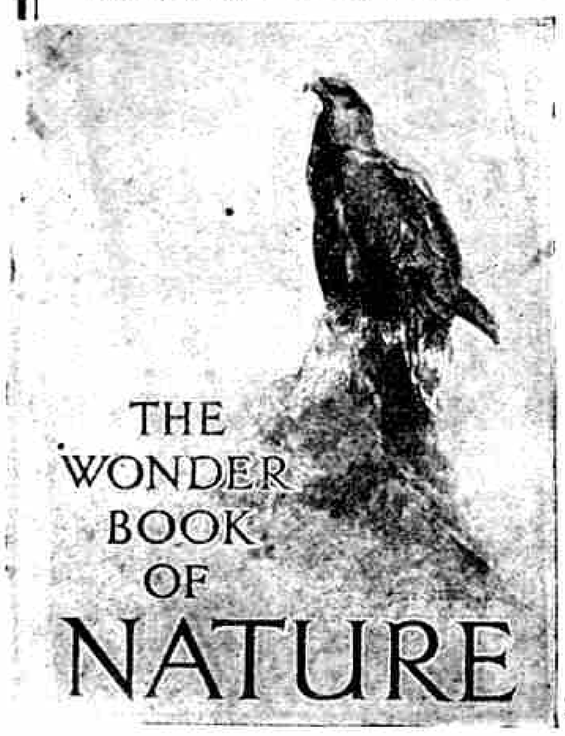

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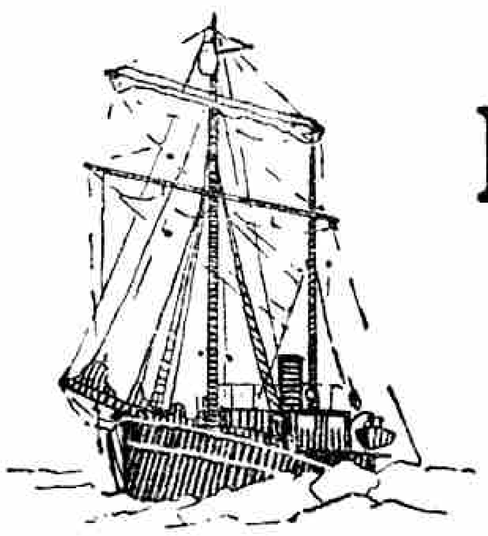

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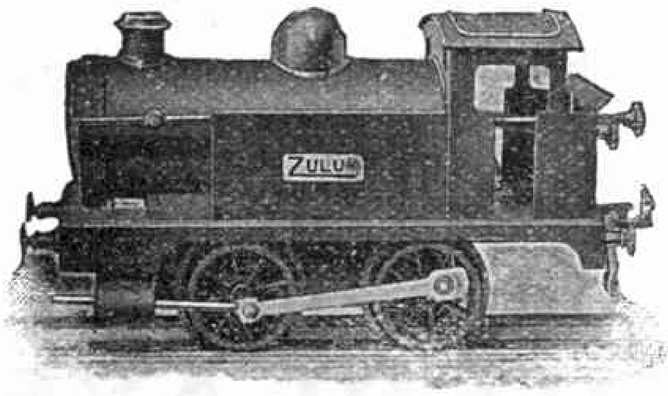

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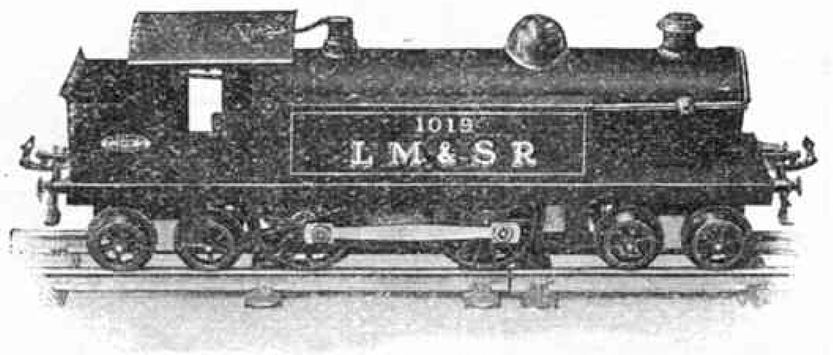

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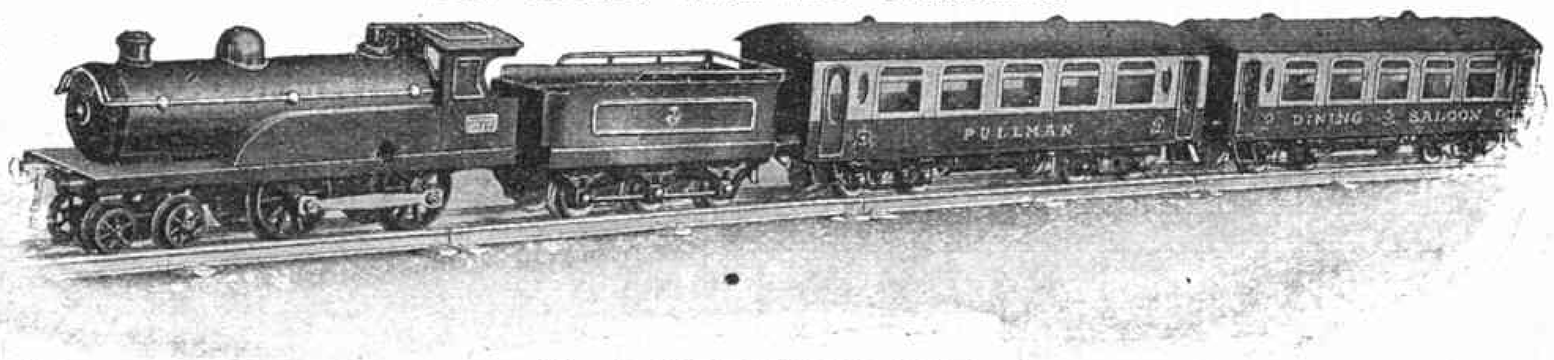

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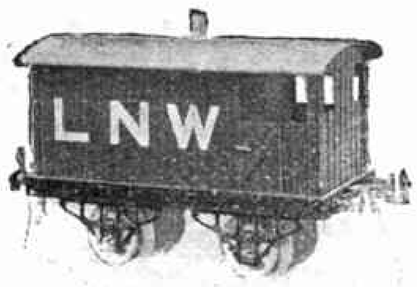

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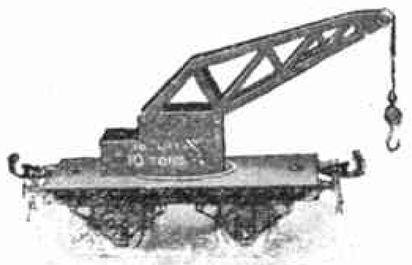

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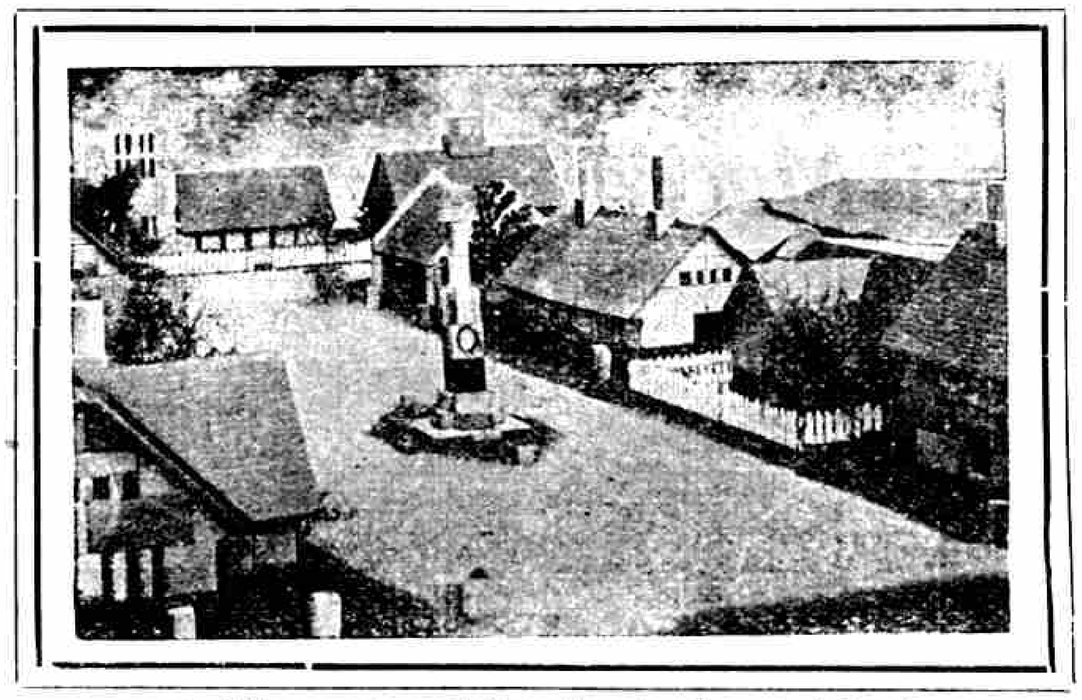

A Village constructed from Plans in Boxes 1 & 2 or 3.

All boys like building Models. Lott's Bricks is an ideal medium, and affords the widest scope for the construction of Houses, Towers, Bungalows, Bridges, Churches, Municipal Buildings, Railway Stations and Termini, Etc., Etc.

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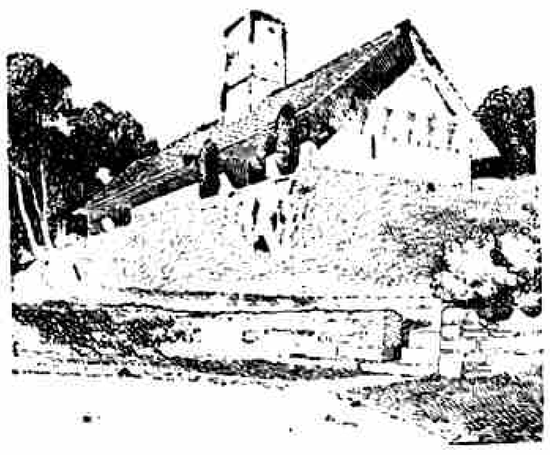

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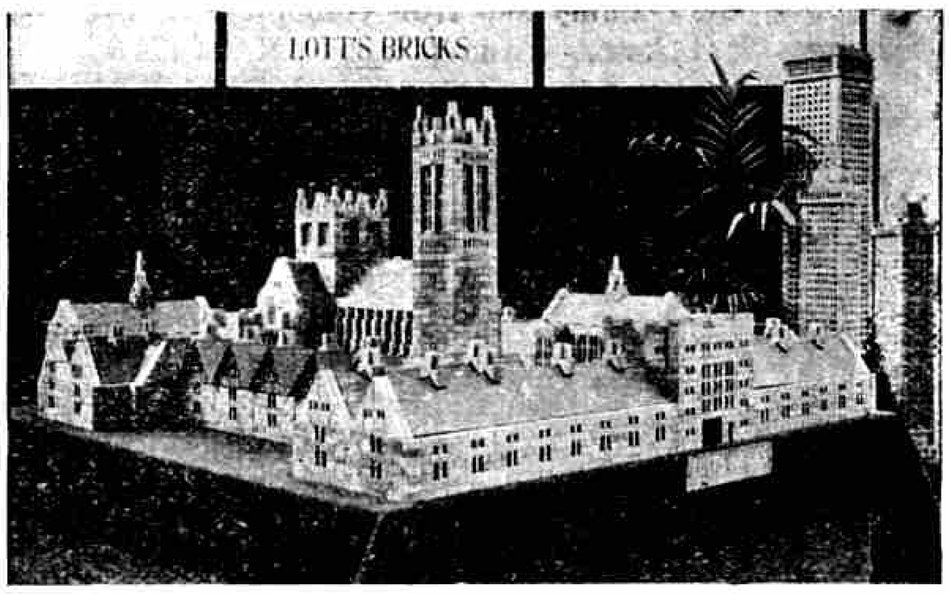

Model of a University College constructed entirely with Lott's Bricks.

The Plans enclosed in each Set are only samples of what can be accomplished with Lott's Bricks. There is no limit to their possibilities, and no end to the variety of structure of which they are capable. The method of construction is both unique and simple, all Plans are shown in Elevation, with a Ground Plan. There are only Thirteen Varieties of Bricks, each Brick being distinguished by a letter.

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COMPLETE WITH PLANS, BRICKS, ROOFS, FENCES TREES, Etc.

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Ready shortly

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Small Size ... 4/- Larger Size ... 6/-

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2/- and 5/- per box.

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For the Best Designs using Tudor Blocks and Series "B" Bricks in combination.

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The Competition closes on March 31st, 1924.

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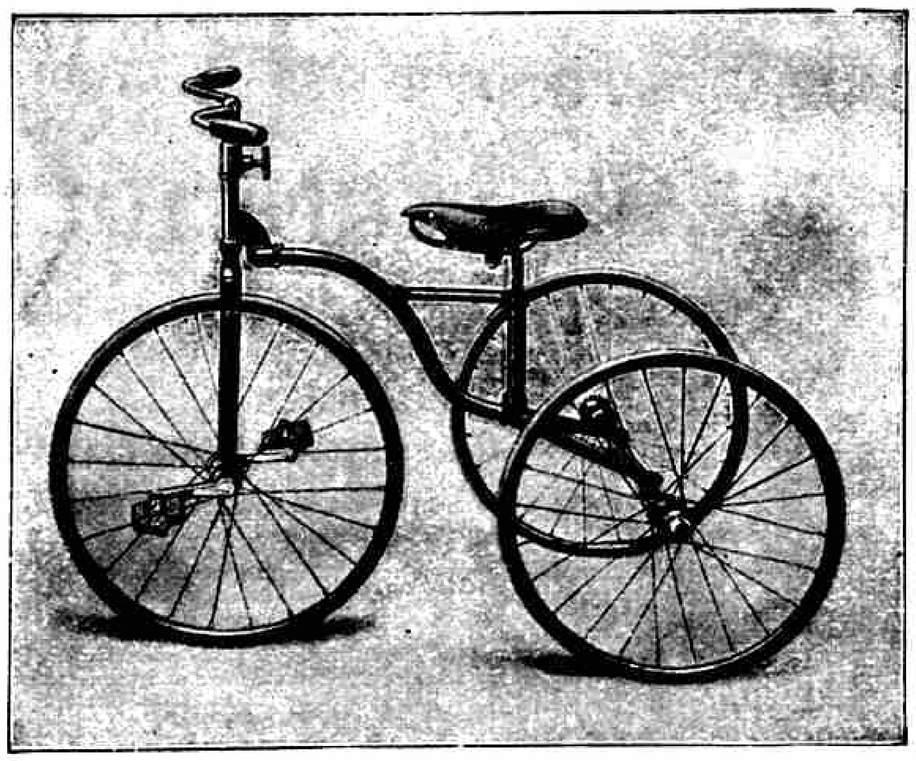

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They are absolutely of British Manufacture throughout. Don't leave it too late. Place your orders early.

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STRONGLY MADE OF WOOD AND METAL

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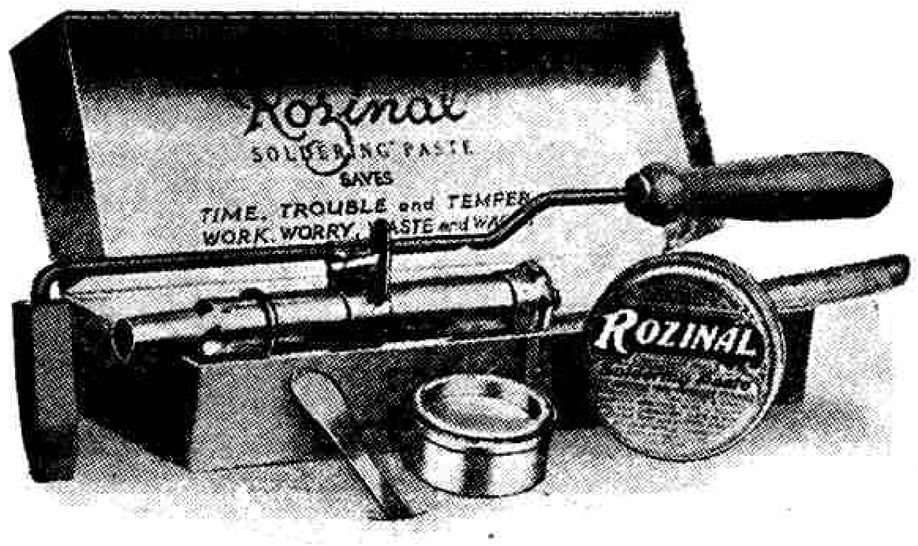

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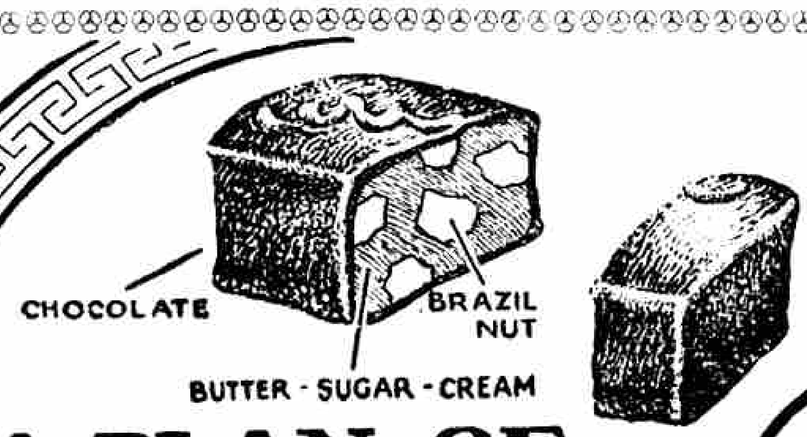

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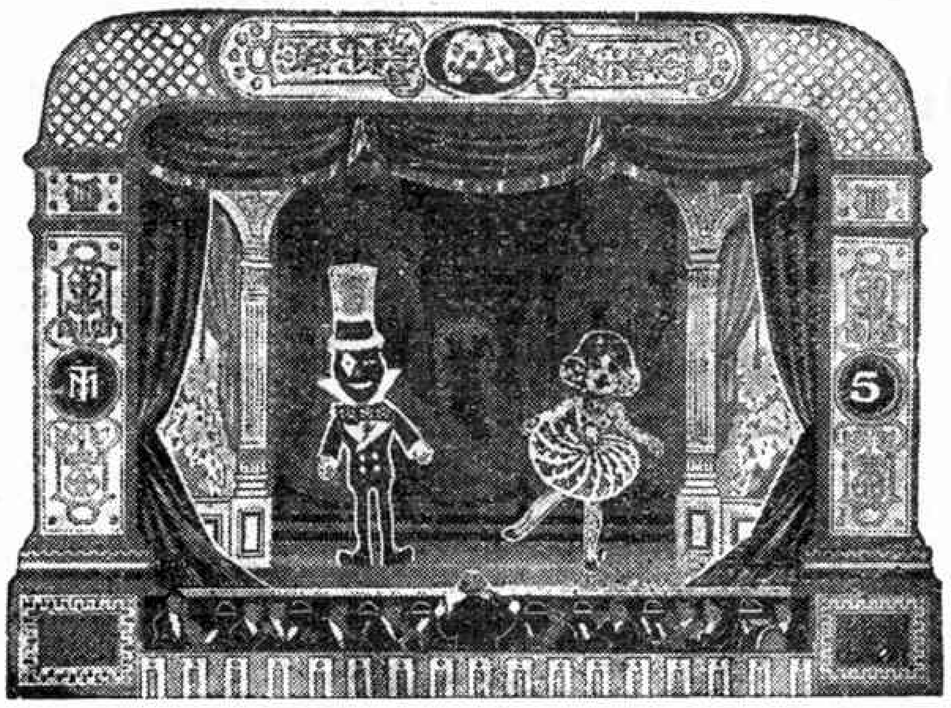

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These Twin Dollies are extremely pretty and will please all little folk. You can dress them in the latest fashion, and according to the weather.

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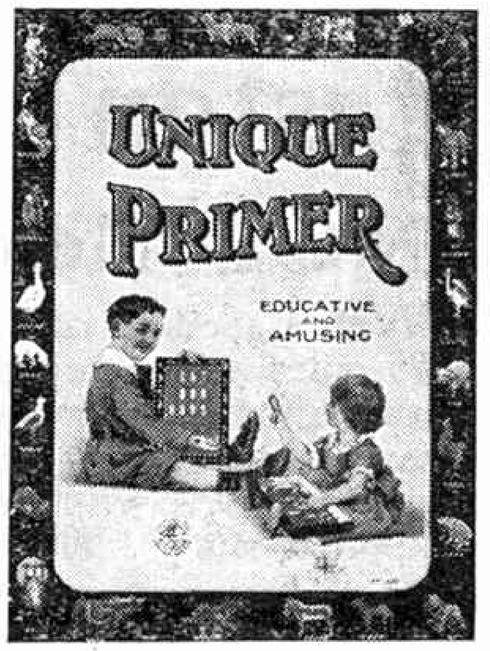

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SET OF FOUR

YOUTHS' SIZES

6/9	9/6	10/9 Pair
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Postage and packing 6d. extra.

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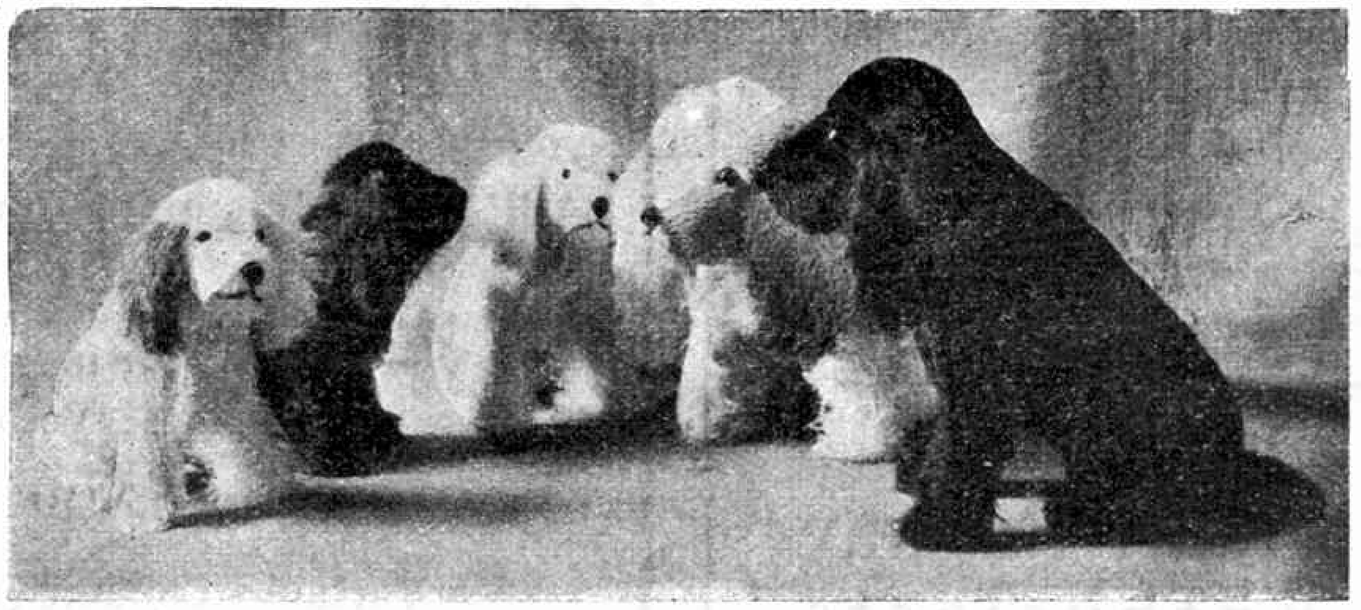

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Listen with a Meccano Receiver

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R.S. 1—Receiving Set complete, tested and guaranteed, price **29/-**
Compulsory Broadcasting Fee **1/-**
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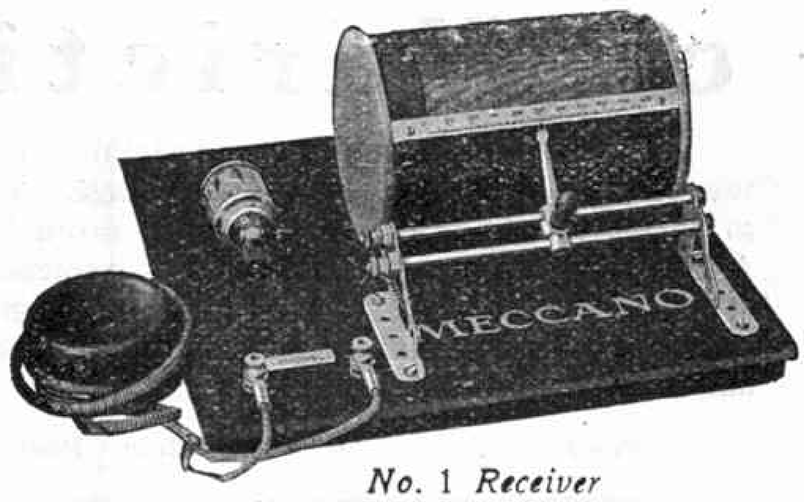
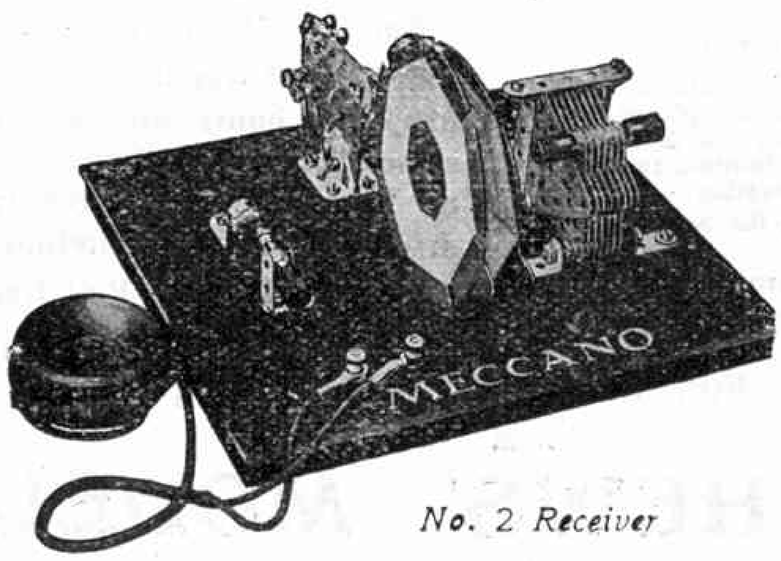


No. 1 Receiver



No. 2 Receiver

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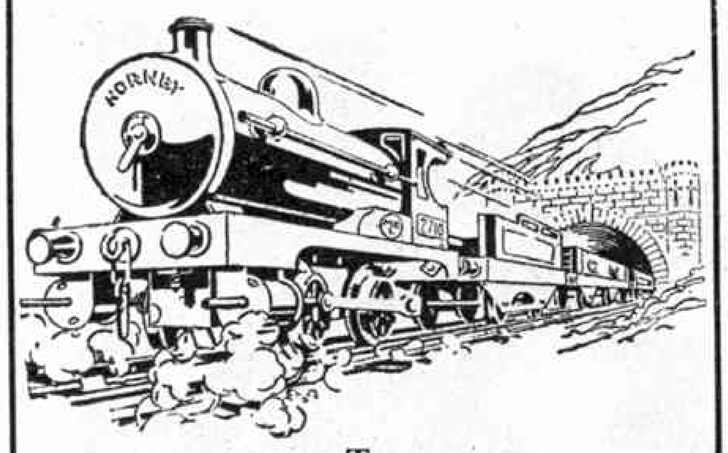

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THE SAME SET ON LEG SUPPORTS

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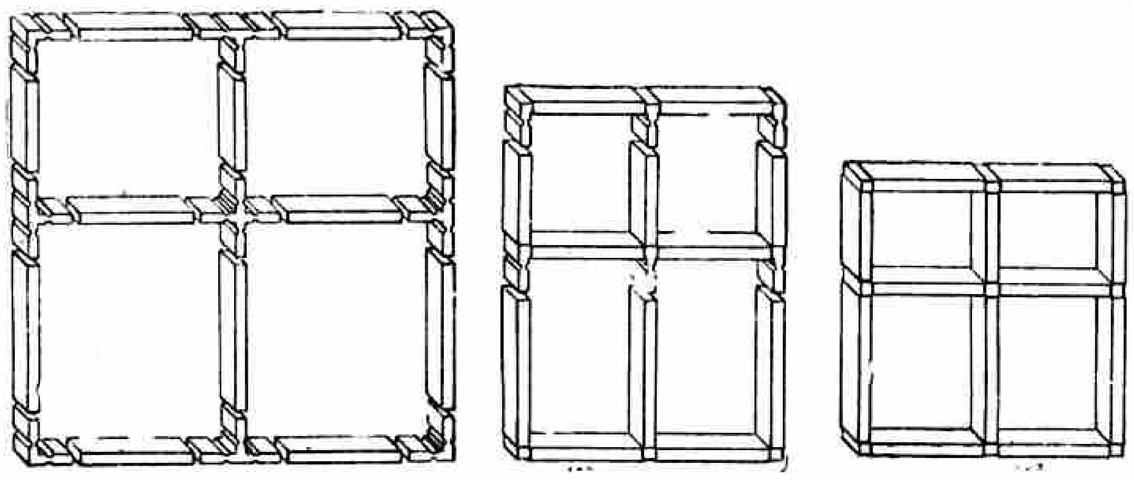

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"DIAMOND" PACKETS are most acceptable presents. They are guaranteed to contain **1,000 UNSORTED STAMPS** (from Convents abroad) **1/3.** Every packet may contain **RARE SPECIMENS.** 2 packets, 2/5; 3 packets, 3/6; 4 packets, 4/6; 5 packets, 5/6. All post free. (Abroad 3d. per packet).
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This **Grand Packet** containing Set of **Unused Austrian,** Set of **Unused Leichnenstein** and single stamps of **Bulgaria** (Palace), **Venezuela,** etc., sent **FREE** to all genuine applicants for my **Bargain Approvals.** Just send a **Postcard** (abroad 6d.)
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DON'T MISS THIS! HALF PRICE!
Special Xmas Packet contains 50 different including Zanzibar (Sultan), Guatemala (view of Cathedral), Dominican Republic (Arms), Indore Native State, Mauritius, Panama Rep., set of five Venezuela, etc. Splendid value, post free 1/– or 6d. only if you ask to see approvals.
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150 Germany, all different, 2/6;
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CHRISTMAS SURPRISE PACKET
of 50 different Stamps. Unique Value.
To applicants asking to see my famous Approval Selection.
250 unused stamps, 1/3; 1000 different stamps, 4/3; 2000 different stamps, 15/–.
FLEMING, Queen's Park, CHESTER.

A Monster Bridge — (*cont. from p.* 183).

at the top, and will contain 35,000 tons of steel.

Although the towers will be constructed of steel, they will be faced with granite, and will thus appear to be columns of solid masonry. The bridge will be required to carry an immense weight, and therefore every part will be of very massive construction.

Heavy Anchorages

In order to counteract the tremendous pull of the cables, which it is calculated will amount to 25,000 tons, gigantic anchorages will be required. They will consist of huge masses of masonry, measuring 400 ft. in breadth at the base and tapering gracefully to the top, 200 ft. above ground level.

On each anchorage it is proposed to erect rectangular buildings, 250 ft. in breadth and 70 ft. in width, with a space of 100 ft. between their inner faces. The ground floor will be 200 ft. and the roof 500 ft. above road level. The accommodation provided by these new buildings will help to replace the property that it will be necessary to demolish to make room for the approaches, and their rents will furnish a source of revenue for the maintenance and repair of the bridge.

WANTED. Articles and photographs of general interest, suitable for publication in the "*Meccano Magazine*." Accepted contributions will be paid for at our usual rates and will be returned if unaccepted, if stamped addressed envelope is enclosed. Although every care will be taken of same, no responsibility can be accepted for lost or mislaid manuscripts. THE EDITOR, "*Meccano Magazine*," BINNS ROAD, LIVERPOOL.

MYSTERY STAMP FREE

All genuine applicants sending a postcard asking to see approvals will receive the following absolutely free and post paid.

ONE STAMP	**catalogued**	**7s. 6d.**
Set 13 old German	**,,**	**6s. 0d.**
Set 13 Ukraine Pictorials	**,,**	**1s. 9d.**
SCARCE TEMESVAR	**,,**	**9d.**
Total catalogue value		**16s. 0d.**

We won't tell you what the 7/6 stamp is, and it will remain a mystery until you get it, but it will be a pleasant surprise.

Have You got a Temesvar Stamp?

These were used by the Hungarians when they captured the town from Roumania, and now the Roumanians have got it back. Only a limited number were issued, and we have been able to get a few. This enormous free gift is only to increase our list of Stamp Collectors and we reserve the right to refuse applications we consider unsatisfactory. This advertisement will never be repeated—don't delay—send a p.c. at once. Applications in rotation.

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1,000 Mixed Stamps, 1/- 4,000 for 3/9
Stamp Mounts, like glass, 1,000 for 5d.
All different Stamps, 500 for 4/-, 1,000 for 10/-
1,000 Mixed Unused Stamps for 4/6, 500 for 3/-
500 Different Unused Stamps from all parts of the World, 10/-

R. WILKINSON,
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Printed in 11 Colours.
Size of each 20 × 12 ins.

Full Particulars of Dimensions.

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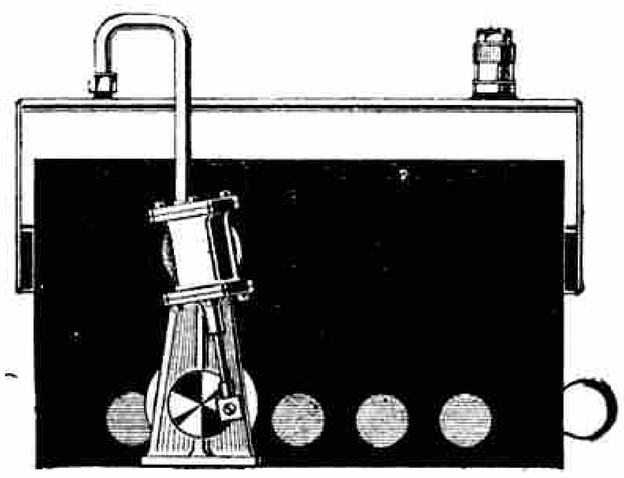

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WE HAVE IT !

THE THORNTON TABLE GAME

Provides
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Special Christmas Offer
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Carr. 15/- Paid

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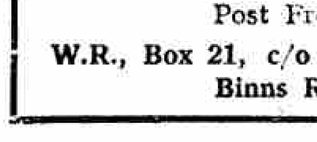

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Splendid Smooth Writing Pens.

Give your father or your chum one for Xmas. Complete with filler, packed in strong box, regulation size.

Marked on box 10/6 Our price 1/9

Post Free any address.

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Stamps for Sale

(*see also pages* 210 *and* 211).

Fine Postage Stamps! Low Prices!!

Splendid Sets—8 Malta, 5d.; 6 China, 1d.; 6 Cyprus, 4d.; 6 Gibraltar, 4d.; 12 Phillipines, 8d.; 12 Portugal, 4d.; 12 Persia, 6d.; 20 Siam, 9d.; 20 Sweden, 6d.; 12 Denmark, 4d.; 12 Roumania, 4d.; etc., etc. Postage Free. Ask to see my new books of ½d. stamps, 2/6 per 100; or a superior class at 1d. each, 6/- per 100. Address:

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Your difficulties will be solved if you choose some of our marvellous **Sixpenny** Packets for yourself or give them to your friends.

6d. each or 12 for 5/-, 25 for 10/-, 50 for £1 (with 1,000 mounts free). Send for list, which includes: 20 British Colonials, 2 Liberia Triangles, 23 Czecho-Slovakia, 25 North America, 4 Ingermannland, 10 Venezuela, 40 Germany (all Mint), 50 Bavaria.

Any one of the above **free** if you enclose postage and ask to see Approval Sheets.

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Price **10/6** post free.

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100 Austria	... 1/-	**40** Argentine	... 1/-
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Fine selection of Postage or Revenue ready.

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The "Bazaar" says: "An opportunity not to be missed."

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15 Pictorial Oedenburg. Surprise Pkt. of 100 Diff.
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Become a Multi-Millionaire to-day and write to

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100 All Different Stamps Free

Many unused. Send postcard only.
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Complete set of finished parts, **6/-.**
Variometers with knob, **4/6.**
Contact Studs, ¼" × ¼", per doz., **6d.**
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List of accessories, ½d. stamp.

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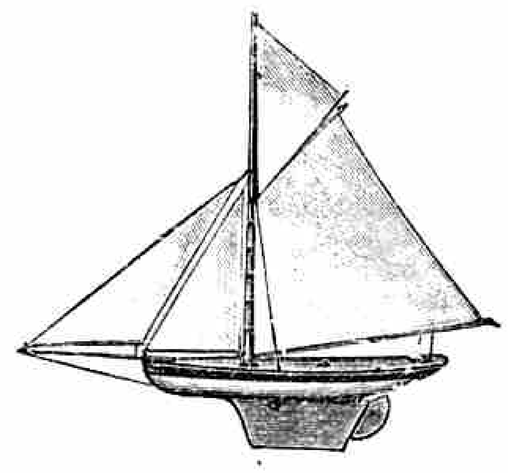

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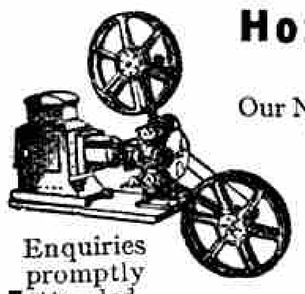

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Enquiries promptly attended to.

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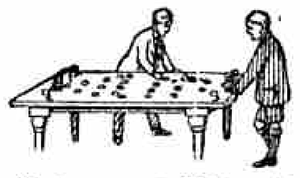

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Ask your Dealer for them, or write direct to
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5/- Every "Meccano" reader who is interested in Electricity or who one day wants to be an Electrical Engineer should get one of these wonderful Dynamos and learn how Electricity is made. They are easy to work. Will

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5/-

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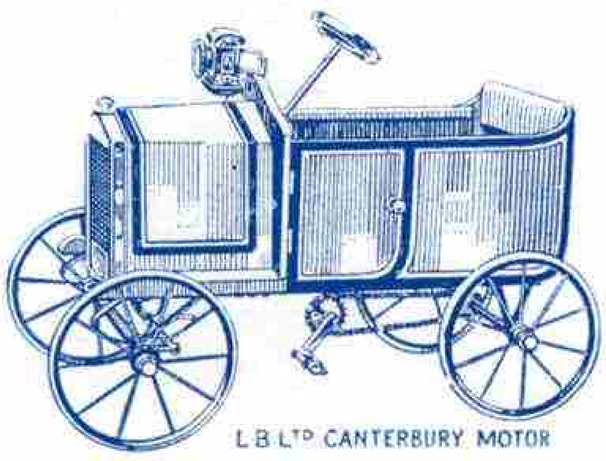
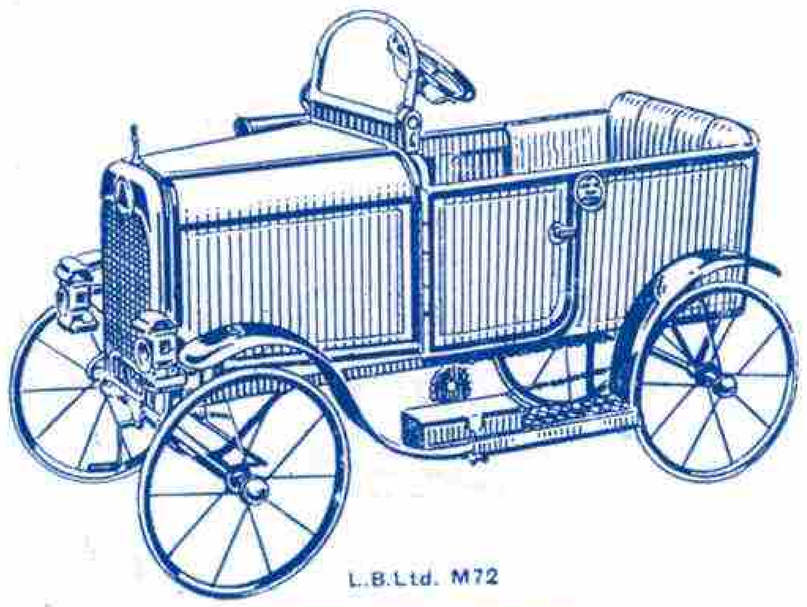
ASK FOR THEM AT YOUR TOYSHOP



CANTERBURY MOTOR
For children 3-8 years, with pedalling gear, upholstered seat, side door to open, Rolls Royce pattern radiator and lamp **65/3**



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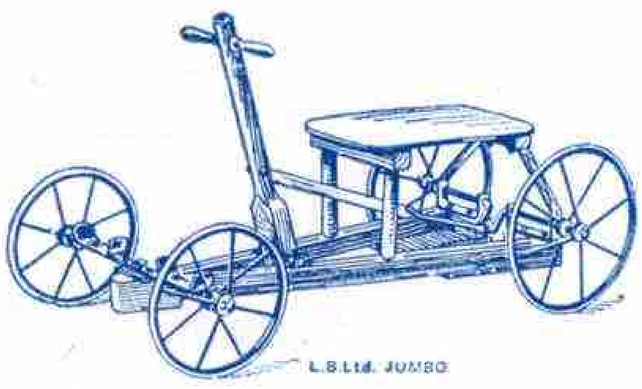
For children 3–9 years, complete with pedalling gear, lamps, mascot, tool box, licence card carrier, horn, windscreen and opening door **115/6**

THE FAIRYSCOOT
For boys and girls. Strongly made on cycle principles of solid drawn steel tubing. Aluminium footboard, 12 in. wheels with ½ in. wired-on tyres. Plated handlebar. Outlasts several ordinary scooters ... **27/-**



THE JUMBO RACER
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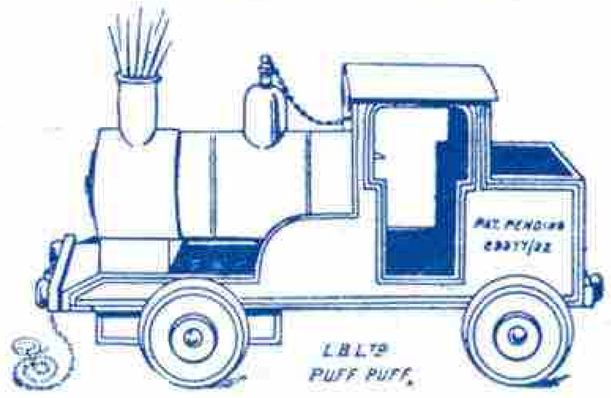
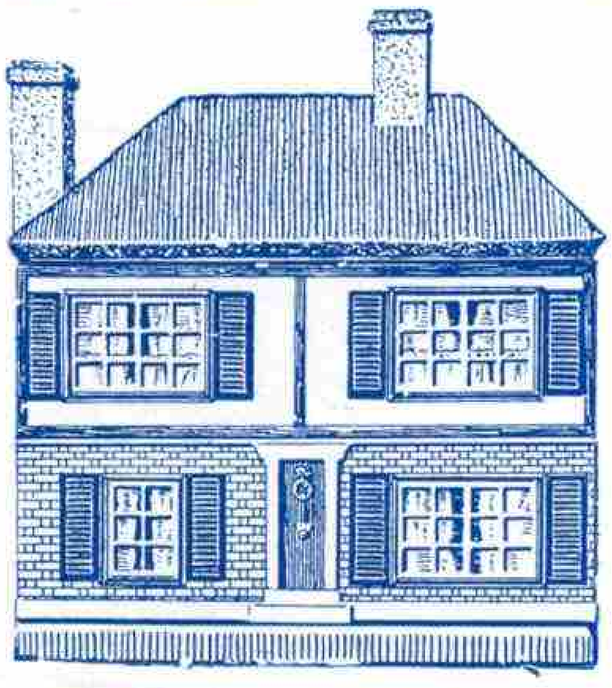


PUFF PUFF ENGINE
Puffs like a real engine when drawn along. Fitted with a whistle. Splendidly painted, lined and varnished. 21½ in. long **15/-**



No. 9 PERIOD DOLL'S HOUSE
Four rooms, hall, staircase, fireplaces, rough cast half timbered and red brick exterior, curtains, sun shutters, brass knocker and letter plate. 27 in. wide, 31 in. high, 16½ in. deep. **60/-**

THE FAIRYCYCLE
(Regd. Trade Mark).
Built like a bike—but safer. Adjustable saddle and bars, mudguards, free wheel, brake, ball bearing rubber pedals, 12 in. wheels with ⅝ in. wired-on tyres. Look for the triangle trade mark on the frame. **59/6**. Or with Pneumatic Tyres and Ball-Bearing Tangent Spoke Wheels, **89/6**. None genuine without the Fairycycle Trade Mark.

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Look for the famous Triangle Trade Mark on all good Toys.

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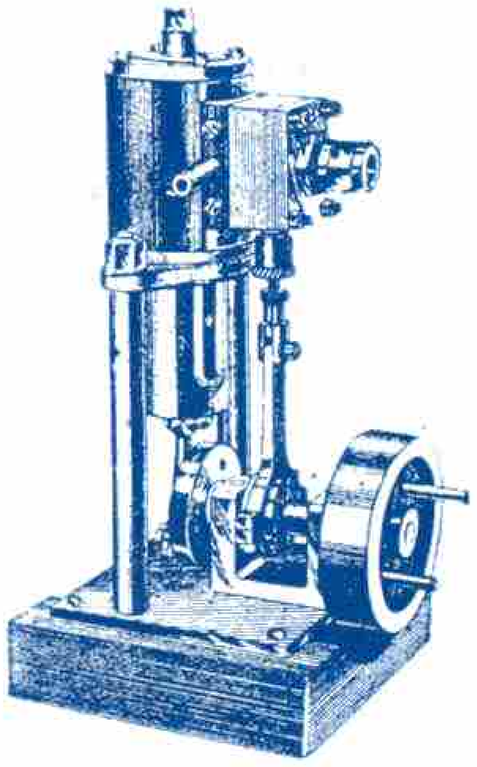

V 630.

SPECIAL VALUE LAUNCH ENGINE

With double action slide valve cylinder, ⅜ in. bore, ½ in. stroke, trunk guide, steel connecting rod and crank shaft, disc crank, heavy flywheel with coupling. All working parts arranged for lubrication. Mounted on brass foundation plate, with stern tube and stuffing box, 3 blade propeller and shaft, with coupling complete.

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Above finished Nickel-plated, 7/6 extra.

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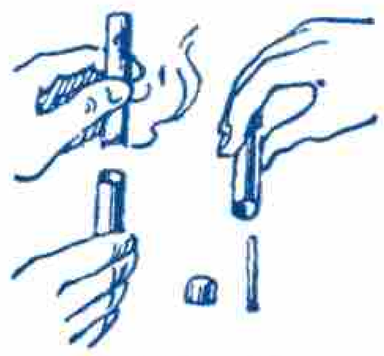

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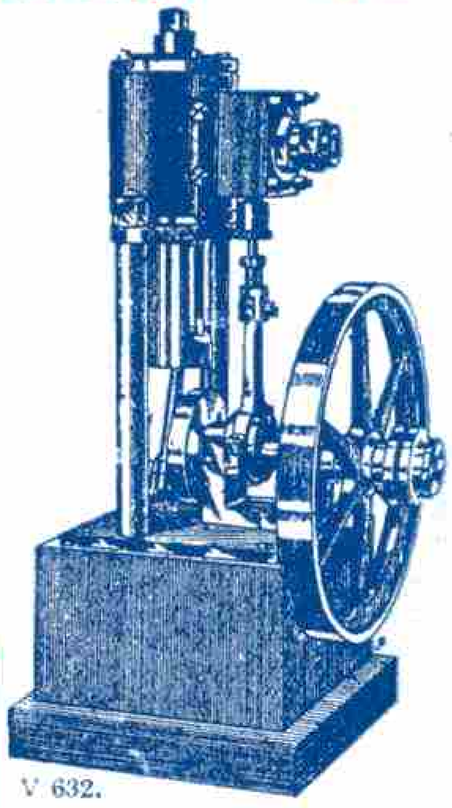

V 632.

VERTICAL HIGH-SPEED ENGINE

As illustration. Fitted with double-action slide valve cylinder, trunk guide, steel connecting rod and crank shaft, disc crank and very massive flywheel, 3-speed pulley for round belt. All parts arranged for lubrication. The bed-plate is of solid brass and extra heavy, and is mounted on a stout wooden block.

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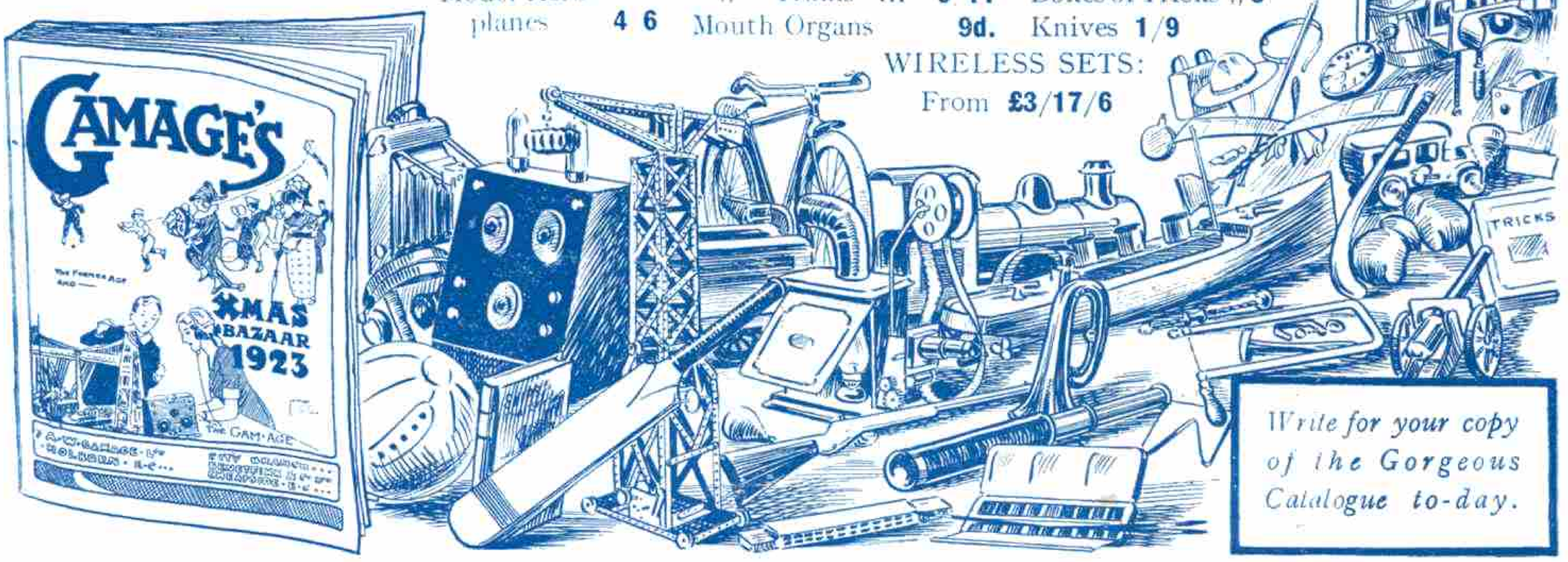

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