THE MODEL WORLD AT YOUR FINGERTIPS

MECCANO MAGAZINE

THE MODEL WORLD AT YOUR FINGERTIPS

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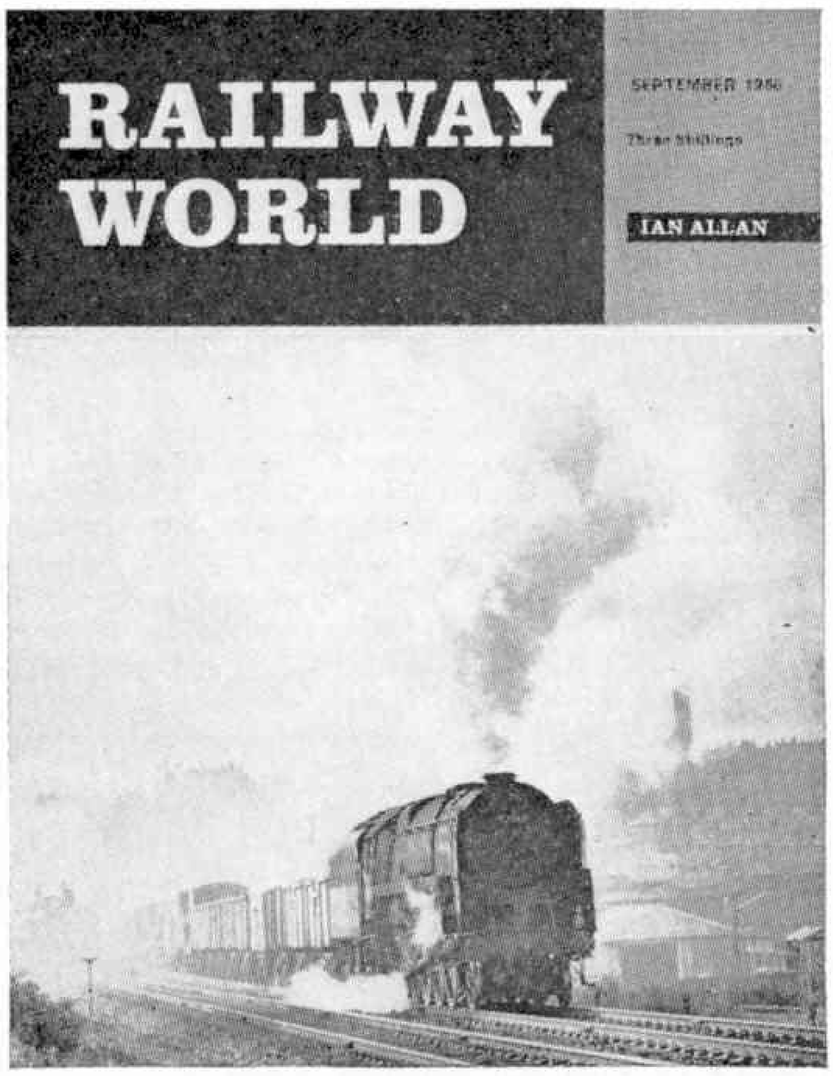

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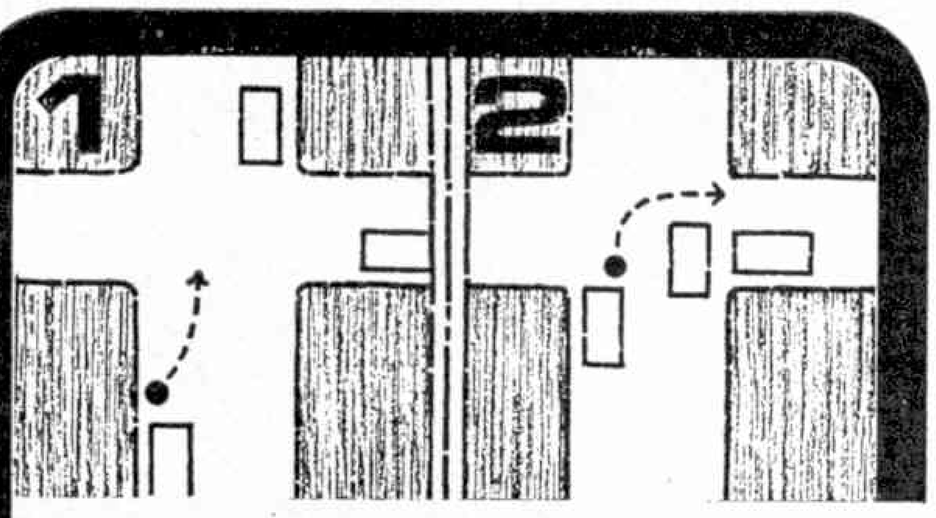

1 If you intend to turn right at a road junction, **prepare in advance!** When you are about 20 yards short of the turn, look behind you. If all is clear, signal your intention, and draw out to take up your position just to the left of the centre line.

2 Do not cut the corner. See that the road is clear to the right and left, wait until oncoming traffic has passed you, then take the corner in a wide arc. Gain the inside lane straight away, so as to let faster vehicles, which may be turning with you, overtake.

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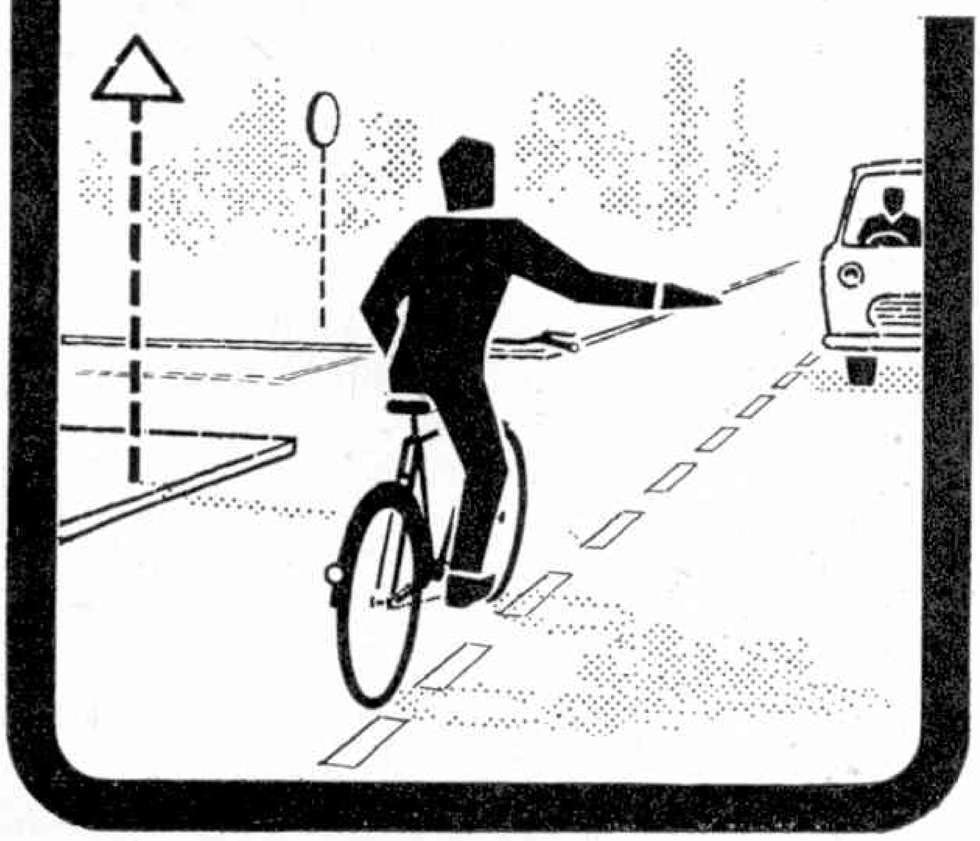

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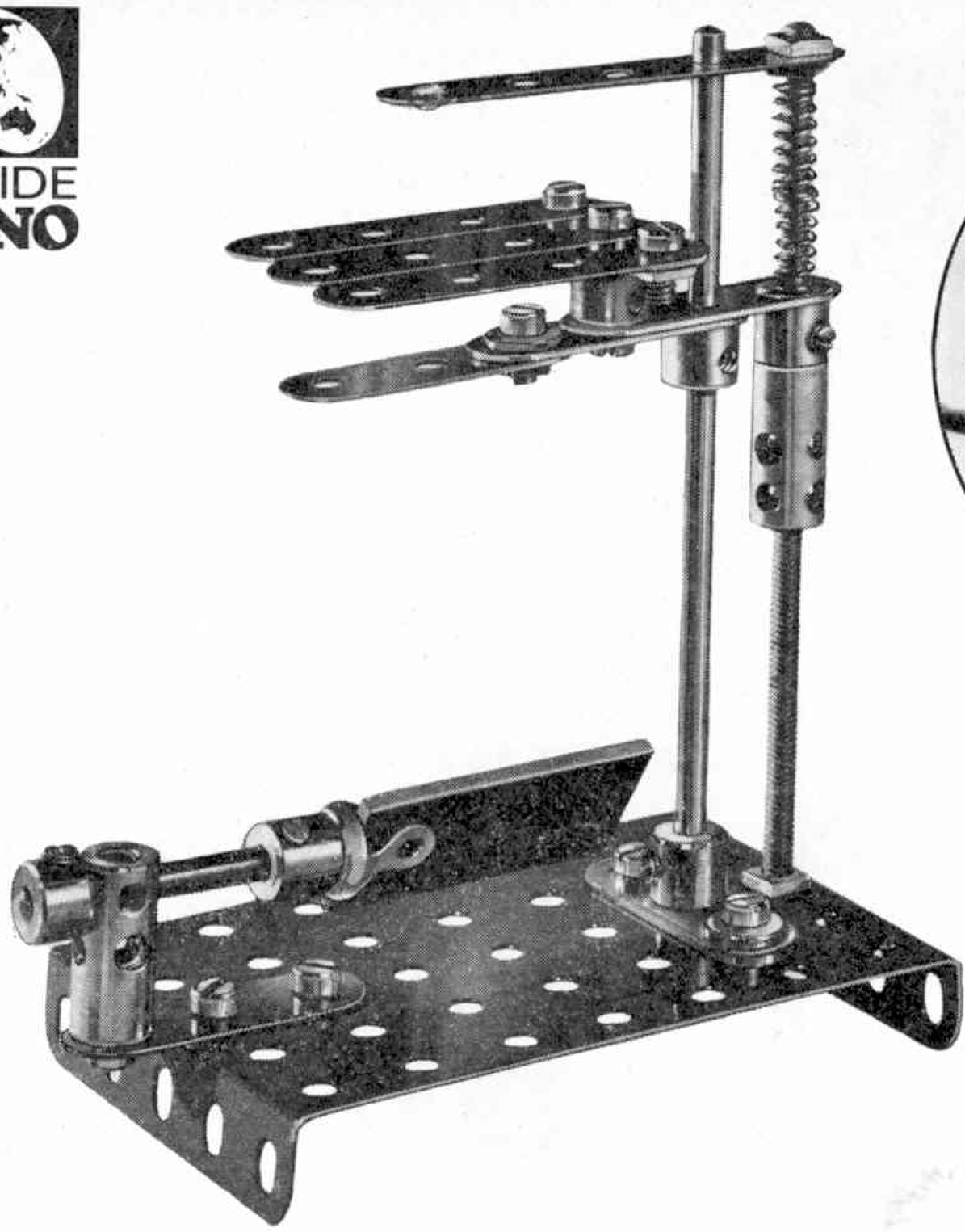

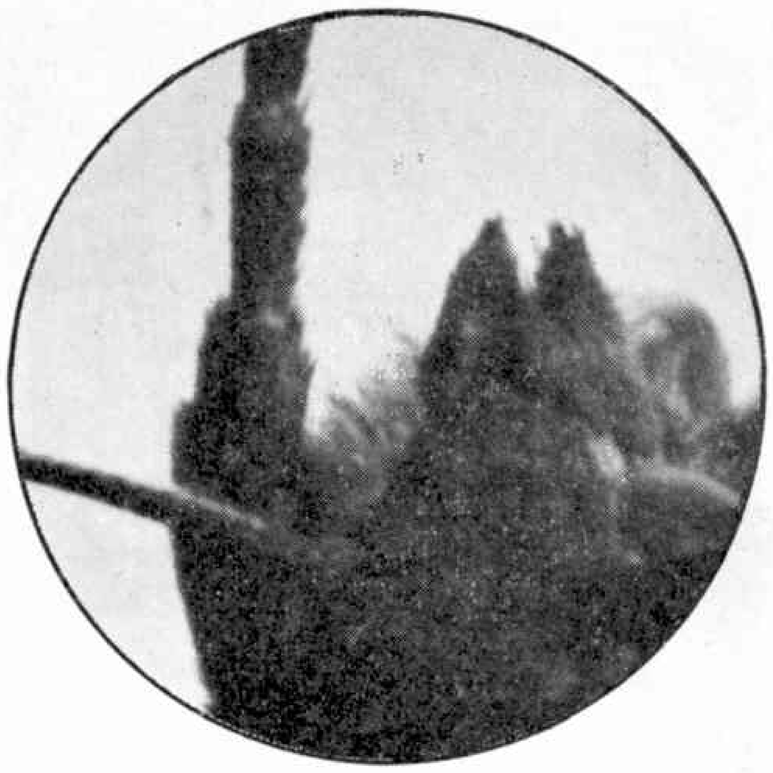

Above:
part of moth's head, enlarged
approximately 30 times

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We should like you to write about any models you've made which you think would be of interest to other Meccano enthusiasts round the world. Please send photographs and descriptions to Meccano Ltd., Binns Road, Liverpool 13.

THE WORLD'S GREATEST CONSTRUCTIONAL TOY

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meccano magazine

the model world at your fingertips

September 1966
Volume 51 · No. 9 · Monthly

On the cover: The remarkable photograph of an LTV A-7A Corsair II attack aircraft on the cover this month was taken from another aeroplane just after sunset. The two 'planes were high enough to be still in sunlight, even though the sun had sunk below the horizon for people on the ground below. It is this phenomenon that allows us to watch satellites passing overhead, like fast-moving stars, just before sunrise and just after dark.

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Next month: A very special issue, containing a big free Slot Racing Supplement with a complete run-down on the current scene, and a comprehensive history of this fast-expanding competitive hobby/sport.

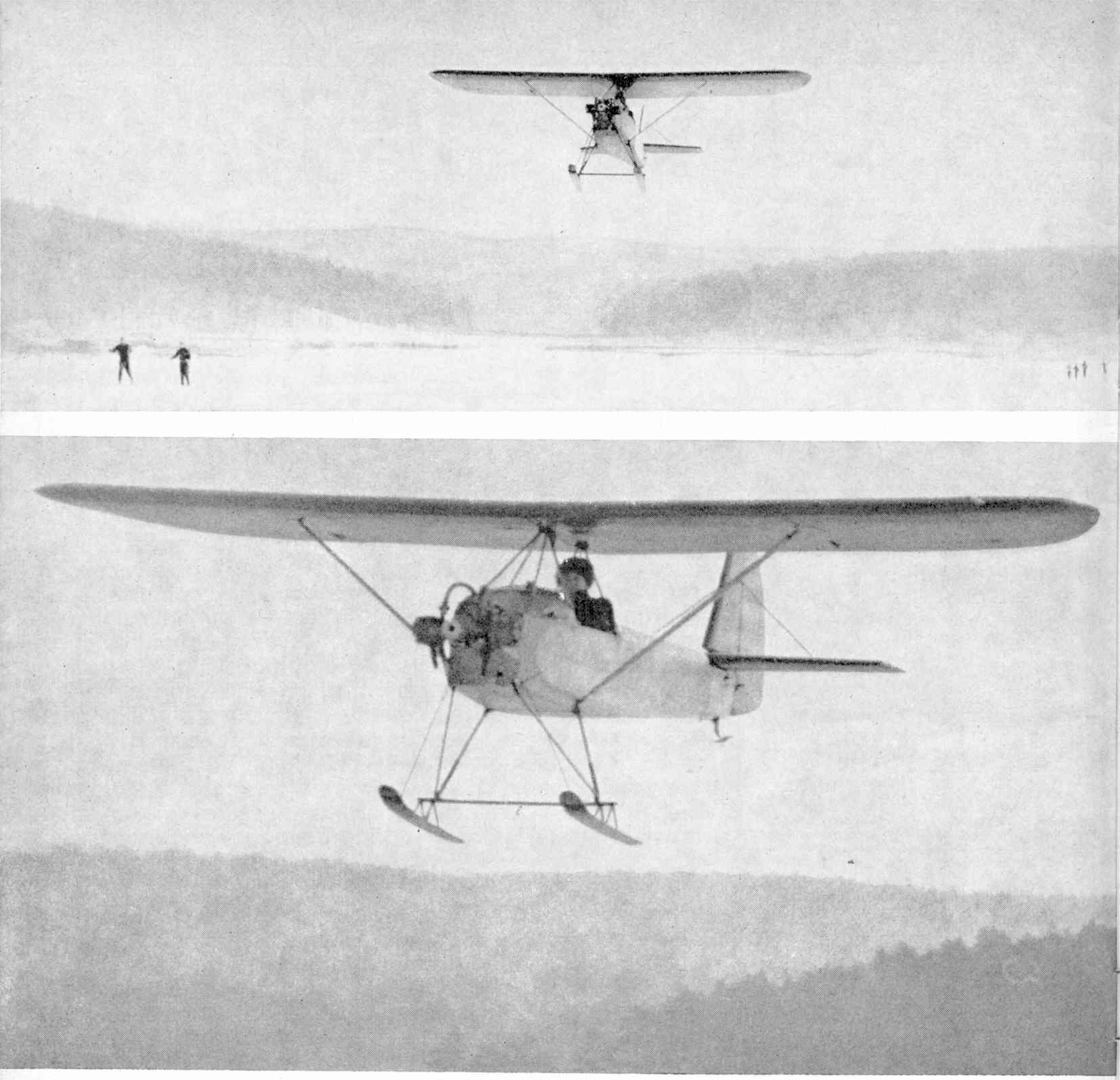
By the time this issue of M.M. goes to press, the holiday season will have started in earnest. The very word 'August' means something special to most people—to some it conjures up visions of lazy days in deckchairs, to others it spells the excitement of travelling or exploring the countryside. But to most M.M. readers and modellers everywhere, August means all this and something more—the opportunity to go and look at the subject they most enjoy modelling—the 'real thing,' in fact. And so, at this time of the year, when schools and offices all over the country empty for the holidays, enthusiasts can be found everywhere indulging in their favourite hobbies—some will be watching aircraft or flying their own models, others will be riding almost forgotten branch lines or wandering round museums in far-off towns. All these people, though their ages and interests may vary enormously, will have one thing in common—enthusiasm for their subject.

When you go off on your own explorations, do make a record of what you see. Carry a camera, if possible, and a notebook. The world is changing very rapidly and something that is here today may very well be gone tomorrow, whether it is a railway locomotive, aeroplane or even an interesting bridge or building. When the summer is over and the days get shorter, the pictures and data you have collected during your travels will prove invaluable for modelling and in years to come you will have a fascinating file on your subject. Remember that as a modeller, you are really a privileged person—you can make a model of anything that takes your fancy; it does not have to be 'a practical proposition' like the real thing, and will never become obsolete.

One word to new enthusiasts—don't be afraid to ask questions and talk to the 'old hands'. Pick their brains—they usually love to talk about their subject and, by doing so, often inspire a new generation of modellers. So keep your eyes open for the interesting and unusual, and don't forget to pack a camera.

Good holidays, and good hunting!

The Editor



THE LITTLE'UN FROM THE URALS

by John W R Taylor

MANY aeronautical surprises come through my letter-box, as Editor of *Jane's All the World's Aircraft*. There was, for example, one gentleman who had invented a not-very-convincing aeroplane which took off vertically by reversing gravity. He thought that if I published details in *Jane's*, some kind person might send him the money to build it. Unfortunately, this is not the object of *Jane's*, which includes details and pictures only of aircraft that have proved themselves able to fly or are being built by reputable constructors!

Even this leaves plenty of scope for the unexpected, as was proved when a large registered envelope arrived one day by air mail from Russia, proclaiming proudly that it came from the Palace of Pioneers at Zlatoust in the Urals. Inside were the photographs and three-view drawing reproduced on these pages, together with details of how the small aeroplane they depict was designed and built by twelve Soviet teenagers.

Between fifteen and seventeen years of age at the time, Victor Plotnikov, Victor Druzhinin, Victor Suzdaltzov, Victor Mamontov, Ivan Znakomestov, Viacheslav Riabinin, Alexander Mamontov, Vladimir Karmanov, Vladimir Tomilov, Arik Zhornitzkiy, Victor Strashnikov and Anatoliy Ibatulin decided they would use the experience they had gained as model-makers to produce a full-size aeroplane.

Fortunately, the head of the aeromodelling section of the Zlatoust Pioneers (the local branch of the national youth movement) is a trained aircraft engineer and pilot named Lev Alexandrovitch Komarov. Under his supervision, the schoolboys did all the calcu-

lations and design work, and built every part of the aircraft, including the engine. The result is a simple, sturdy single-seater, of such tiny proportions that its creators named it "Malish", or "Little-'n".

As one would expect, the design is very like that of a powered model aircraft, with a highly-practical parasol wing (my translator called it an umbrella-wing!) of Clark Y section, and an equally-practical ski undercarriage for operation from the snow-covered valleys of the Urals. The structure is entirely of wood, with plywood ribs and plywood covering on all leading-edges and on the fuselage around and forward of the cockpit.

A steel-tube cabane structure supports the wing centre-section, with a single streamline-section bracing strut on each side; and the tailplane is also braced by a single tie-rod from the fin on each side. The entire airframe is fabric-covered.

The engine is equally simple and straightforward, being a 700 cc. horizontally-opposed two-cylinder two-stroke with a compression ratio of 7:1. Running on standard motor-car petrol, mixed with 5 per cent lubricating oil, it develops 30 h.p. at 3,050 r.p.m. and drives a home-made propeller of 59 inches diameter. The cockpit instruments consist only of an air speed indicator, turn indicator, altimeter, rate-of-climb indicator and compass.

In his letter to me, Mr. Komarov says: "With regard to the cost of construction, it amounted to insignificant expenses for acquiring materials, plywood, fabric and aero-lacquer. The rest—unselfish hard work by the enthusiasts".

It is easy to guess how excited the twelve youngsters must have been when the time came for the first test flight of the Malish. It was a big day in more than one respect, for April 12, 1964, was also the annual "Day of Cosmonautics", when Soviet citizens pay tribute to their space-men. As none of the twelve had any flying experience, Mr. Komarov had to be the test pilot — which shows how much confidence he had in his pupils' ability and workmanship.

There must have been some anxious faces as he opened the throttle and the Malish began to trundle forward on its tiny skis over the uneven snow. Gaining speed rapidly, it left the ground in less than 100 yards and began climbing away at a steady 55 m.p.h. It did not take the pilot long to discover that the little machine was beautifully stable, with no unpleasant habits. Top speed proved to be about 80 m.p.h., and after an enjoyable potter around the neighbourhood of Zlatoust, he came in to land at a nice comfortable 31 m.p.h.

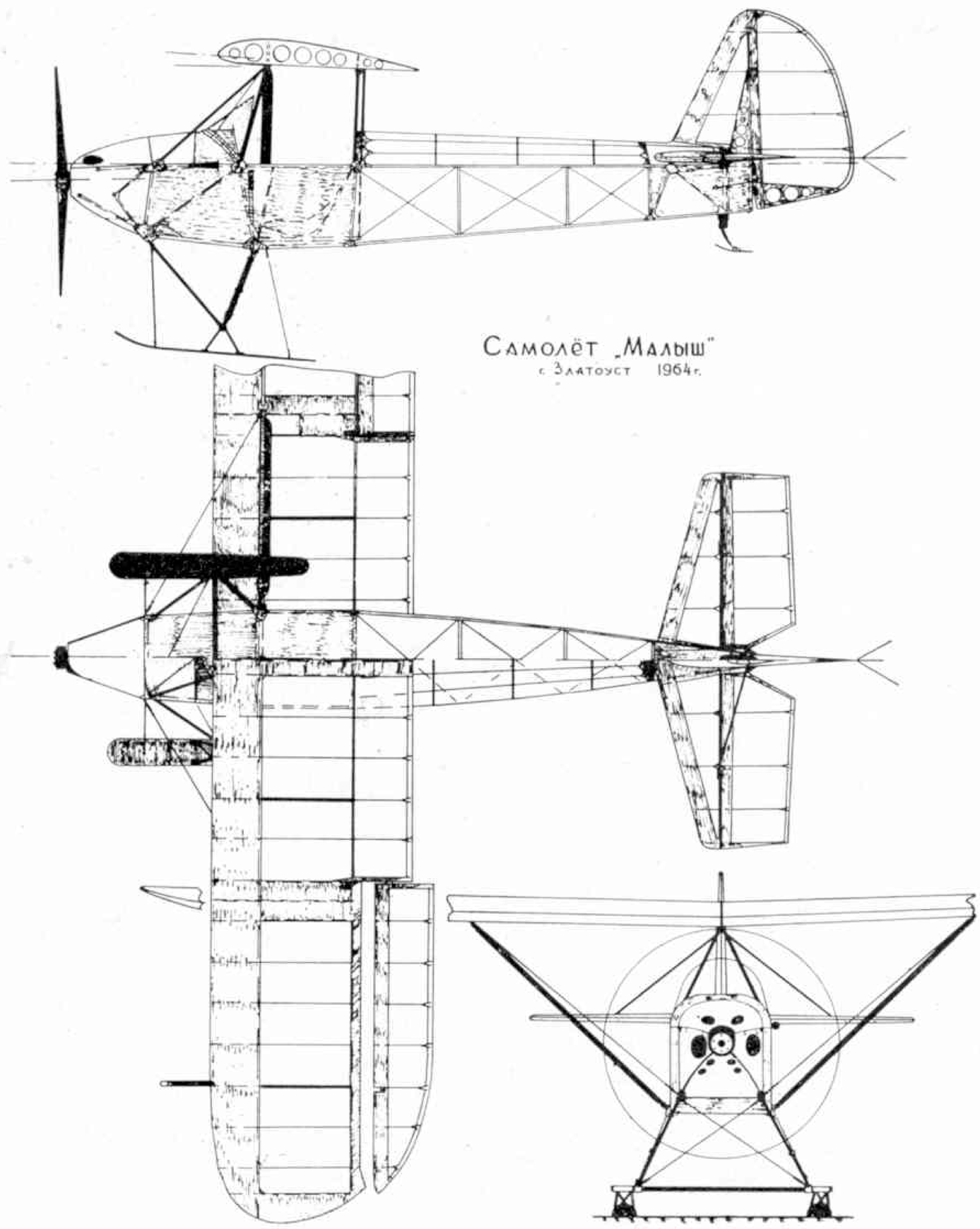
Malish was built for fun and to enable its young designers to learn something of how aeroplanes are constructed and how they fly. It is not regarded as an aircraft that other people will want to copy and plans are not available to would-be pilots. So we shall never see hundreds of Malishes flying, in the way that Smith Miniplanes and Baby Aces are being mass-produced at home by amateurs in America and elsewhere.

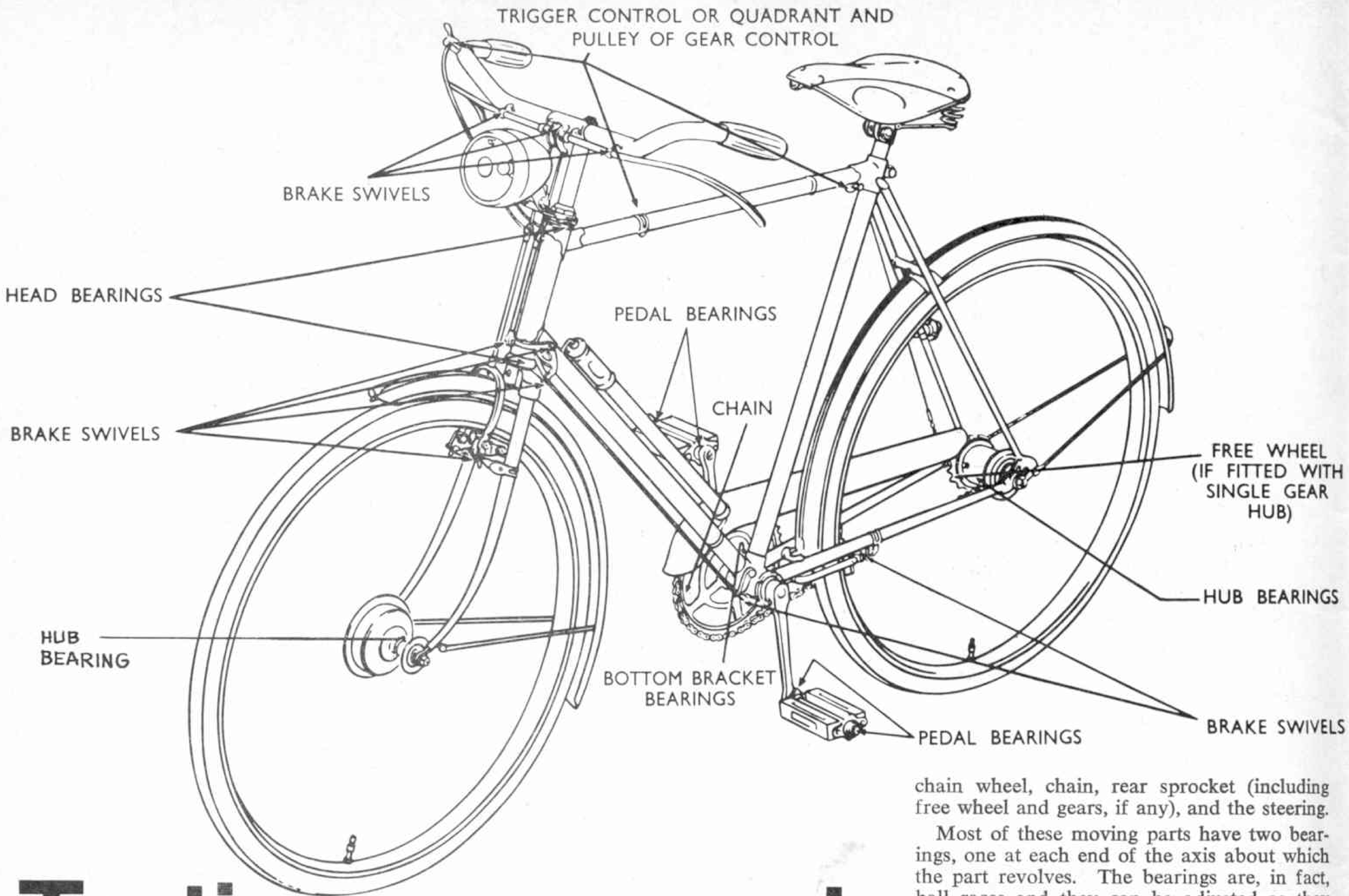
Nevertheless, this story of the "Little-'n from the Urals" may well inspire youngsters in Britain to have a shot at building their own aircraft. The technical data above — which have never been published in full—are of interest in that they apply to a teenager's aircraft which not only works but, in the words of Mr. Komarov: "could be flown without difficulty by any pilot with previous flying experience".

Data
Wing span 22 ft. 7¾ in
Length (flying position) 15 ft. 7 in.
Tailplane span 7 ft. 6½ in.
Wing chord 3 ft. 11¼ in.
Wing area 84 sq. ft.
Aileron area (total) 11·2 sq. ft.
Fin area 0·86 sq. ft.
Rudder area 5·81 sq. ft.
Elevator area 9·47 sq. ft.

Weights:
Engine and propeller 71 lb.
Fuselage, with fixed equipment 59·5 lb.
Undercarriage, with skis 23·2 lb.
Rudder 4 lb.
Tailplane and elevators 12·7 lb.
Wing, including ailerons 61·7 lb.
Wing struts and bracing wires 11 lb.
Weight of empty aircraft 243·2 lb.
Take-off weight, with pilot and fuel 440-485 lb.

Performance:
Maximum speed 81 m.p.h.
Best climbing speed 53-56 m.p.h.
Landing speed 31-34 m.p.h.
Time taken to climb to 1,000 ft. 2 minutes
Normal take-off run on skis 115-165 ft.
Range on 2¼ gallons of fuel 110-125 miles
Dihedral 1 degree
Incidence 3 degrees
Aileron movement 30 degrees up and down
Elevator movement 34 degrees up, 30 degrees down
Rudder movement 30 degrees each way
Tailplane incidence variable from +3 degrees to −2 degrees





Testing a second-hand bicycle

By Leslie B. Howard

Cycling is undoubtedly a cheap and efficient means of transport, and it can be fun, too. For those who are looking for a good second-hand machine, here are some tips on what to look for, and how to detect faulty parts.

THE purchase of a new machine can be a sizeable financial jolt for a young person who wants to cycle to work, or for parents who have to buy a bicycle so that a son or daughter may ride to a new grammar school.

A secondhand machine—and there are many bargains to be had—is often the answer.

The first step is to decide what class of machine best suits the purpose to which it will be put. (You will recall that the factors governing this decision were dealt with in the June issue.) The next step is to put a limit on the sum to be spent, and at this stage it is a good policy to look at the prices of new cycles so that one can better judge the value of secondhand offers.

When it comes to buying a secondhand machine the cyclist has an immediate advantage over the motorist, for he can make an on-the-spot assessment without the need for an engineer's report. There are no parts of a cycle which cannot be tested reasonably well at the kerbside. After all, it is a simple mechanism consisting of a few moving parts in a rigid frame.

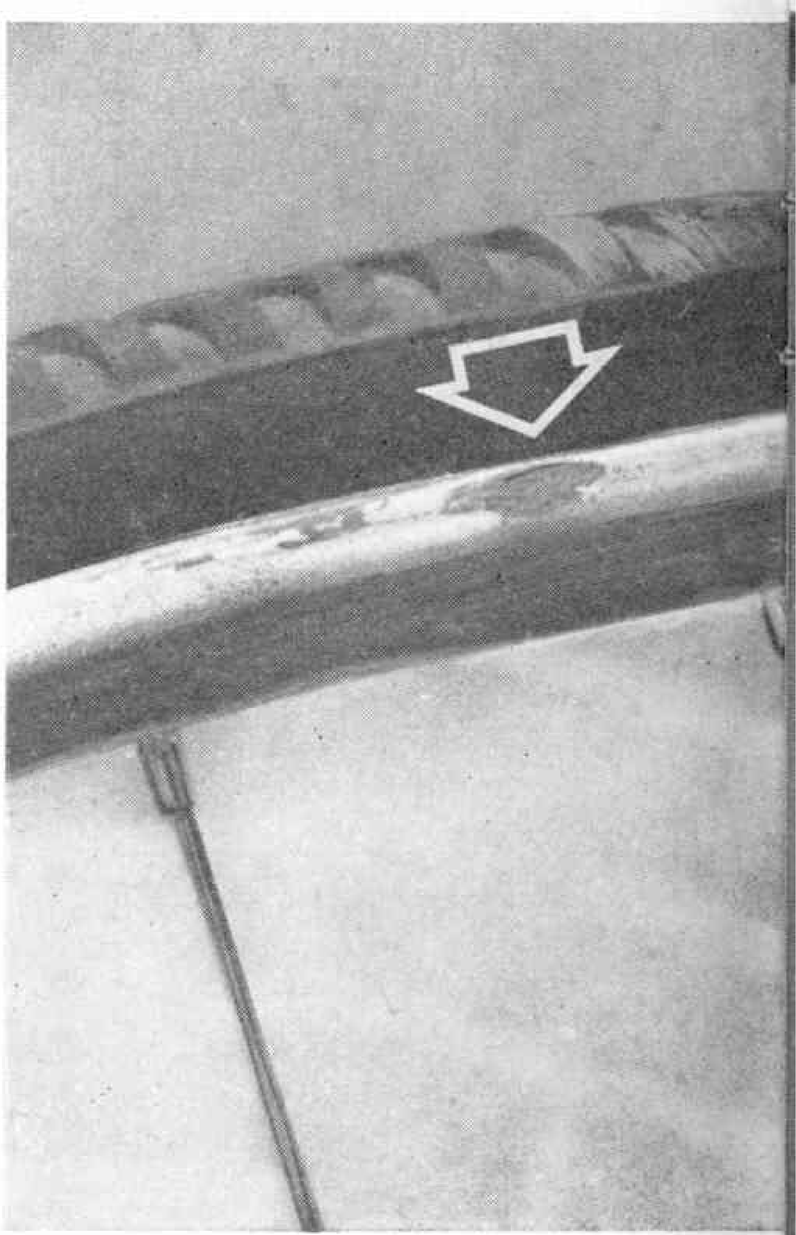
In a standard cycle there are eight parts which move—excluding brake mechanisms, which we can relegate to the 'don't move' category, and supplementary items like a dynamo or speedometer.

The eight parts are: two wheels, two pedals, chain wheel, chain, rear sprocket (including free wheel and gears, if any), and the steering.

Most of these moving parts have two bearings, one at each end of the axis about which the part revolves. The bearings are, in fact, ball races and they can be adjusted as they wear.

If there is any slackness or 'play' in a bearing, or if it is 'binding', then the moving part associated with it will not run truly, with two results. The control of the cycle will be affected and the part concerned will wear out rapidly.

1



So an important thing to ensure in buying a secondhand machine is that the bearings are in good order. Fortunately, there is a very simple roadside test which one can apply to all bearings and that is to rock their 'moving parts' sideways.

For example, to test the two bearings in a front or back axle, the wheel (the moving part) is first spun and afterwards rocked from side to side between the forks. I would perhaps be more accurate if I said you should *try* to rock the wheel, for there should be no rock at all in a perfect bearing. However, even with purists a tiny movement is acceptable, but if the wheel rim moves sideways more than $\frac{1}{32}$ in. then the bearing is slack. Of course, it may only need adjustment, and a vendor, when asked, should correct such a fault straight away. But if he should refuse on some pretext one can assume that the fault needs more than adjustment to put it right.

This gives the purchaser a bargaining argument for a reduction in price. In fact, the discovery of any fault, no matter how trivial, puts the purchaser into a bargaining position, because the honest vendor should make known the faults to the would-be buyer.

One does not expect a secondhand machine to be perfect, but then one is not paying a 'new' price. So if the vendor does not disclose the existence of defects to the purchaser he has only himself to blame if the purchaser finds a few and asks for a reduction in the advertised price.

To continue with the testing. Each pedal and the chain wheel can be checked by similarly rocking them from side to side—at right-angles to the plane of rotation. And, like all other moving parts, they should be spun to see they are not binding.

But where are the bearings for the steering? The drawing shows their position—and again, you will notice, there are two ball races, one at each end of the steering 'axle'.

The easiest way of testing these two is to pick up in one hand the front end of the bicycle by the crossbar and with the other hand try to shake the steering assembly. There should be no looseness at all.

An alternative method—but not such a trustworthy one because other factors are involved—is to put the front brake on hard and rock the front of the machine back and forth. A bad fault in the head bearings will be observable by the amount which the handlebar moves backward and forward over the stationary front wheel.

The chain, you will recall, was listed among the moving parts and when examining a secondhand machine with a view to purchase it calls for special attention.

One fault to look for is 'stretch', and it is usually discernible by a slight twist. A good chain should hang level like the links on the famous Menai Suspension Bridge and it should resist any attempt to twist it or pull it sideways. More than $\frac{1}{4}$ in. or $\frac{3}{8}$ in. sideways play—measured in the centre of the top half—means the chain is beginning to wear.

The general condition and cleanliness of the chain and cog wheel tells a purchaser a lot about the machine. A clean, well-oiled, flexible chain is a sign of care. And bright, clear-cut cogs on chain wheel and sprocket tell the same story.

Wheel spokes can be checked by letting them strike the fingers as the wheel revolves. Loose, broken or missing ones are easily detected. Not so easy to detect are replacement spokes of the wrong gauge wire, though this is not necessarily a serious fault.

While a wheel is revolving is an opportunity to check its truth. The best spot to watch is where the rim passes the brake blocks. A tiny wobble is instantly discernible here. Remember that a wheel can be out of true in two planes—diametrically (up and down wobble) and axially (side to side wobble).

I would hesitate to buy a machine with a wheel wobbling more than $\frac{1}{16}$ in. unless the vendor was prepared to drop the price to cover the cost of having it trued. To ride a bicycle with a wobbling wheel is to take greater risks than climbing the Matterhorn. You never know when it might lock. A front wheel lock will toss the cyclist into the road, a back wheel will deposit him on his behind, a sitting duck to oncoming traffic.

Cotter pins are important locking devices which keep the cranks fixed to the crank axle, to which the chain wheel is attached. Occasionally a pin may work loose, a fact which can be discovered by grasping a pedal in each hand and trying to move the cranks forward together and backward together.

They should not move at all because the torque of one is opposing the torque of the other, but if a cotter pin is slack one crank will move slightly.

A lot can be learnt from the general condition of the machine. Are the hubs shiny? Is there rust on the chromium? Can you see grime in the less accessible places? Is the saddle slack? Does the pump work? Are the hand grips and pedal rubbers shabby? Are the brake blocks worn? How much adjustment is left on the brake cables? Do the lights work? Is the frame bent? Are mudguards broken? Or their stays bent?

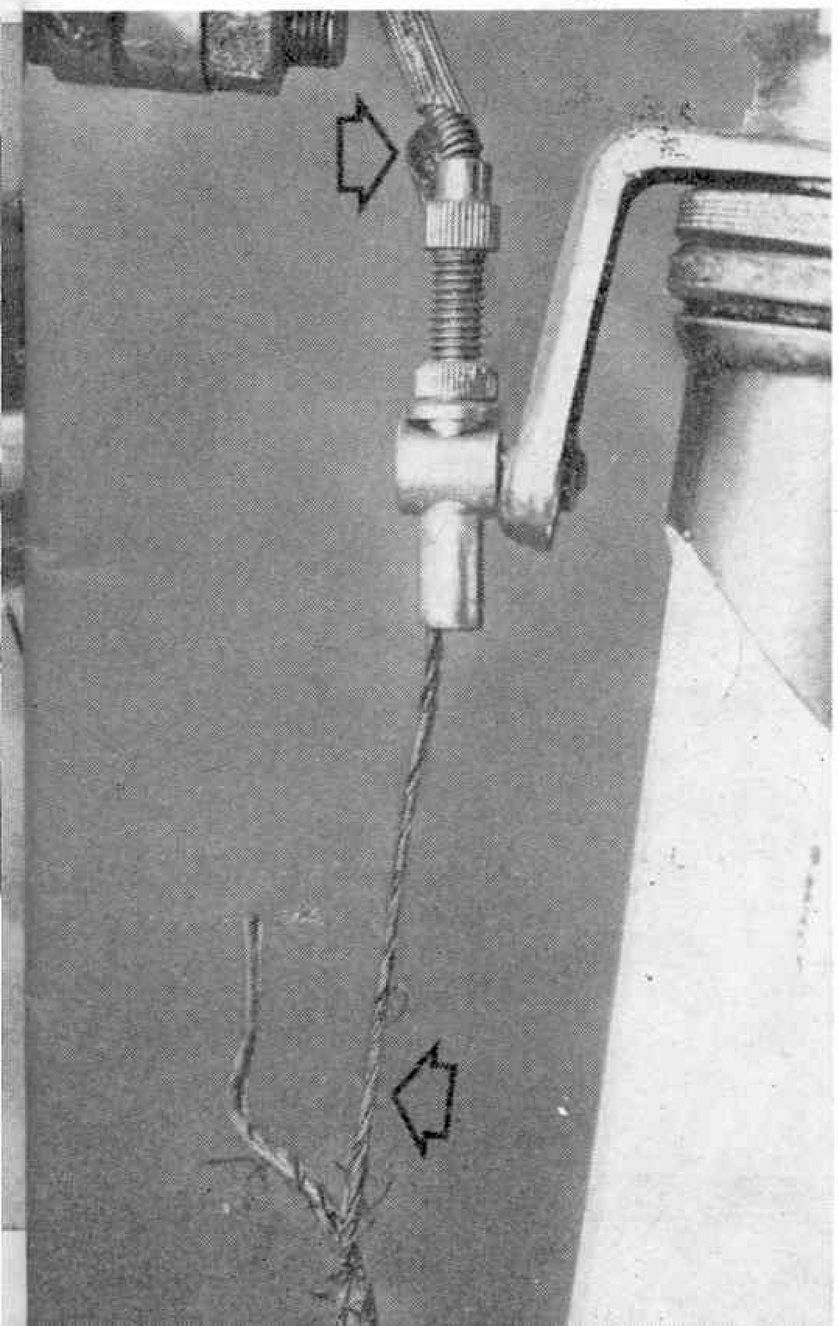
Let us briefly examine some of these checking points.

A quick check of the brakes can be made in the following manner. Stand on the left of the machine. Place the hands on the handlebar and apply the front brake with the right hand. Push the cycle and if the brake is effective the front wheel will lock and the rear one rise.

Now place the right-hand on the saddle and press down hard. Apply the rear brake with the left hand and again push. This time the rear wheel will lock and skid if the brake is working properly. In non - standard machines, where the brakes are reversed, stand on the right, and to test the rear brake place the left hand on the saddle.

So much then for testing principal moving parts on a cycle, but there are still important items, such as brakes, frame and gears, which need examination, and these I will write about next time.

2



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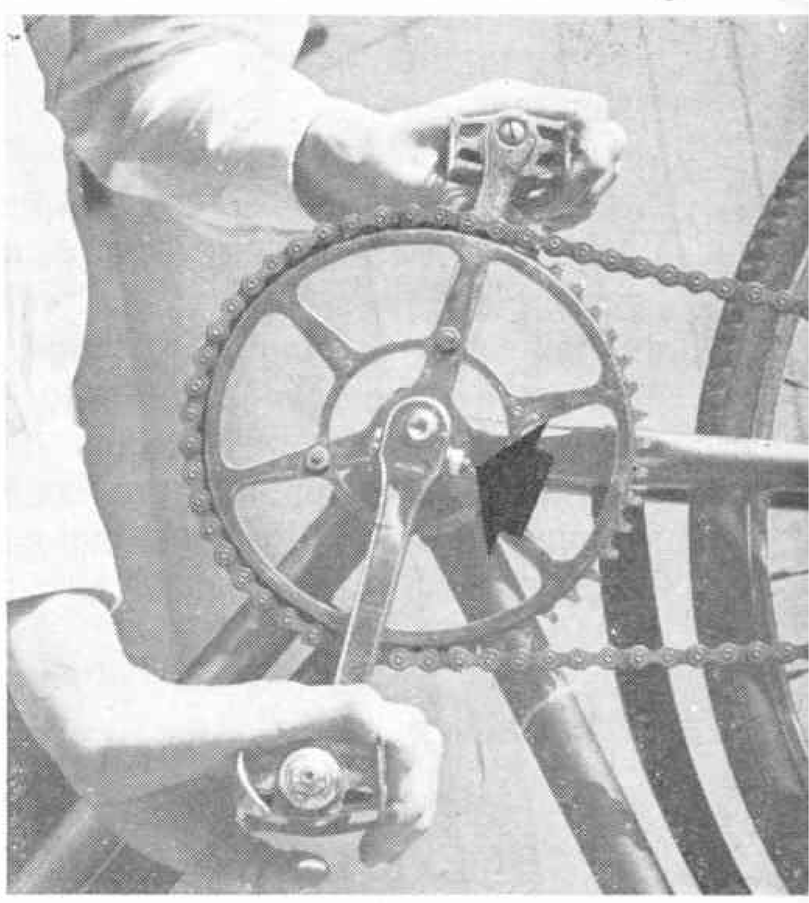
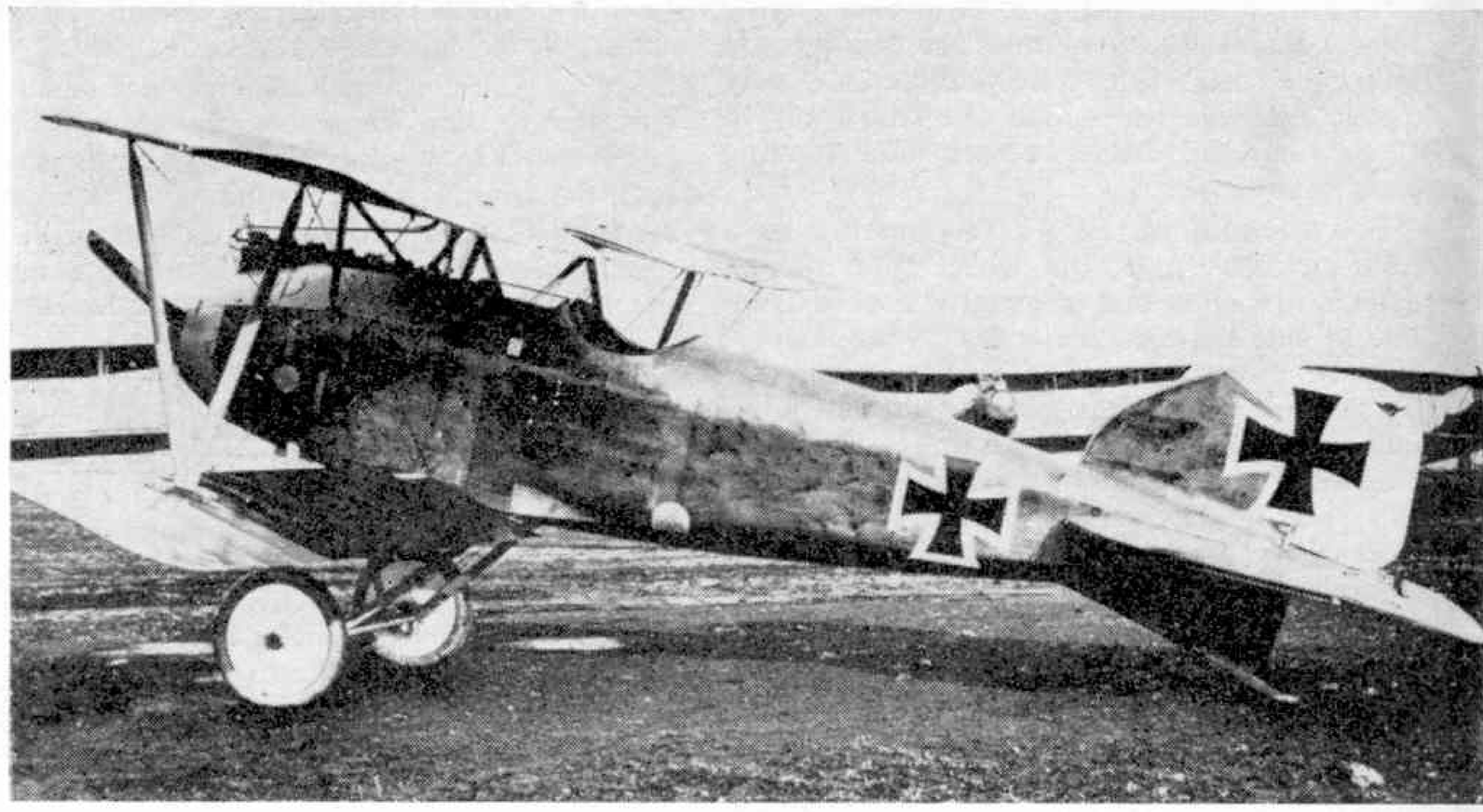


1. Damaged rim shows that the cycle has probably been in a head-on collision.
2. This cable needs replacing. It is frayed, and the weatherproofing sleeve (arrowed top) is broken.
3. Broken mudguard and bent stay detract from appearance, but are not costly to replace.
4. Test for a loose cotter pin (arrowed) is to turn cranks in opposite directions. Any looseness means the pin is not tight.

The Shapely Albatros



The Albatros D.III was a progressive development of the D.I and D.II which had regained aerial supremacy for the Germans during the latter half of 1916.

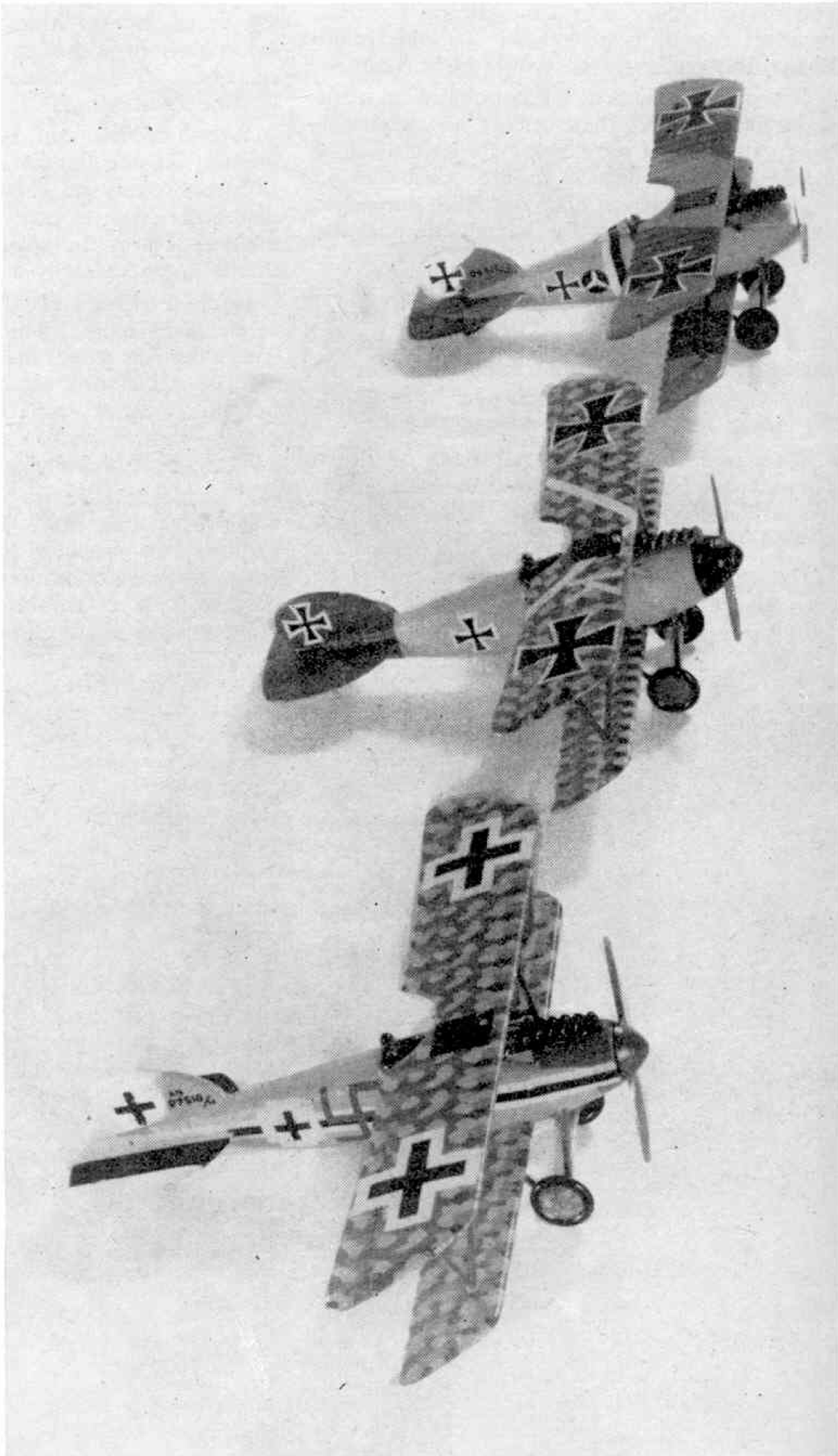
The shapely plywood covered fuselage was almost identical with the earlier machines but in place of their equal chord wings, the D.III had a lower wing of much narrower chord. It is generally believed that the Neiuports, which had always impressed the German authorities, influenced the choice of this arrangement. However, if the D.III acquired the Neiuport's virtues, it also inherited its defects, for the wings proved to be the weak point on both machines. A number of pilots were killed by the collapse of the lower wing and von Richthofen himself had a narrow escape with a cracked wing but managed to land safely.

In spite of this defect, the D.III was most successful, and during 1917 it was extensively used on the Western Front, in Macedonia and Palestine. It was also built in Austria by the Oeffag company. These machines differed in having fully cowled engines with stub exhausts and the guns fitted inside the fuselage, firing through extension tubes on each side of the engine. The Oeffag 253 series had a rounded snub nose and no spinner.

Standard factory colour scheme

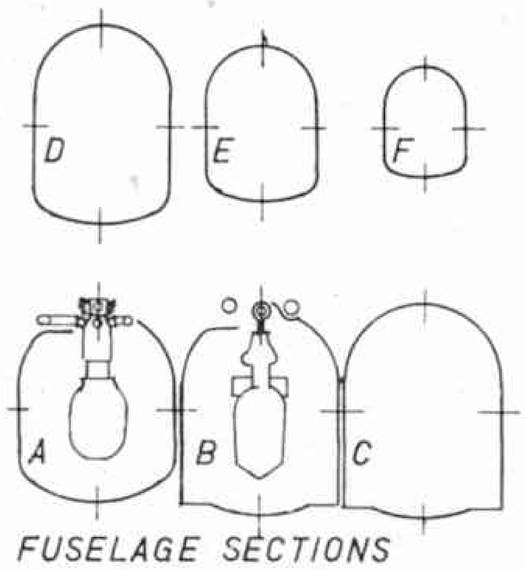
Fuselage and fin—varnished birch plywood. Wings and tailplane—undersides light blue, top surfaces—dark green and purple camouflage. (Some later aircraft had the standard irregular hexagonal camouflage consisting of green, cobalt, terra cotta and pink 'lozenges'.) Spinner and engine cowling —light grey. Struts and undercarriage—light grey or dark green.

In service the machines were often painted in bright colours.

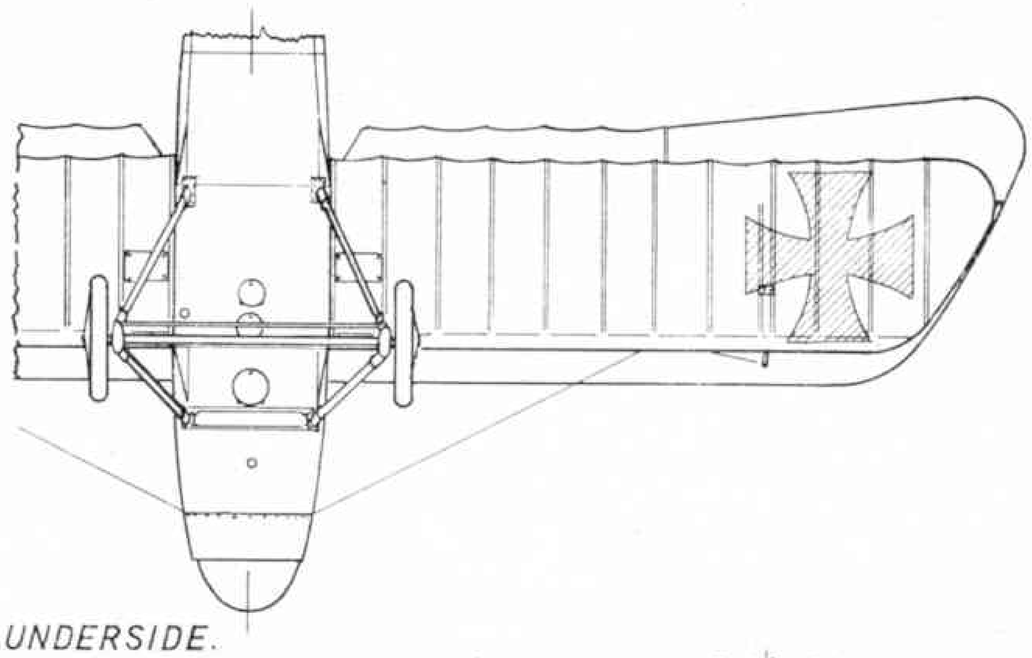


Here are three Albatros D.V. models built from the Airfix kit. The D.V. differed from the D.III mainly in respect of the more rounded fuselage section and rudder outline. However, the fuselage of the Airfix kit is not quite as 'full' as it should be and can quite easily pass for the earlier model. The wing colouring of the far model is the simplest to reproduce—irregular green and purple bands as described in the text, whilst the two other models are painted to represent the printed fabric more widely used. The pattern of this fabric consisted of a regularly repeated 'lozenge' design of variously coloured irregular hexagonal shapes. This type of covering is one of the interesting features of the German aircraft seen in the new 20th Century Fox Cinemascope film 'The Blue Max' and, although the hues are not all accurate, this is a really fine film that all aviation enthusiasts will rave over; the air combat scenes are certainly the finest ever filmed.

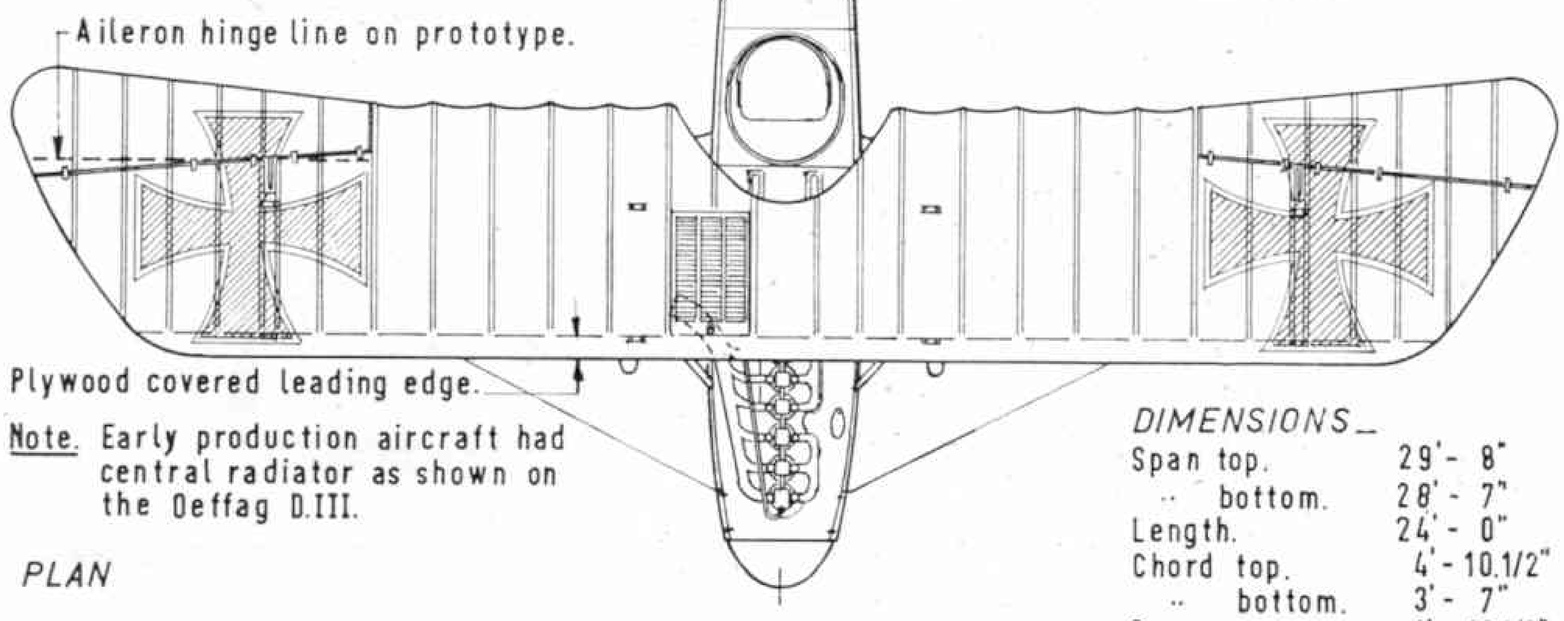
There is also a 1/72nd 'Revell' kit for the Albatros D.III at 2s 6d and 'Aurora' will shortly re-introduce their 1/48th scale version at 10s 6d.



FUSELAGE SECTIONS



UNDERSIDE.

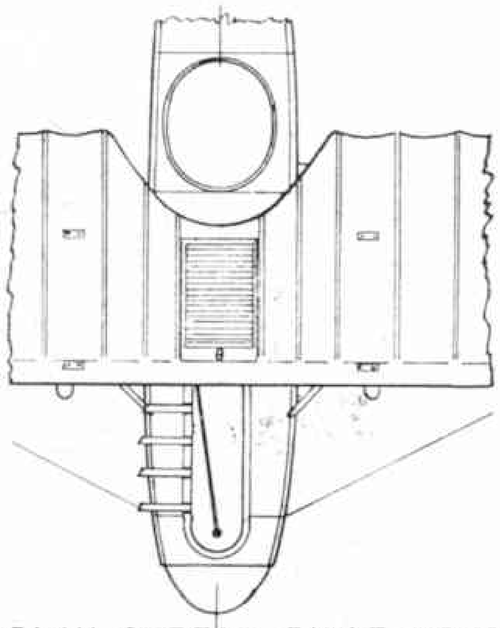


Note. Early production aircraft had central radiator as shown on the Oeffag D.III.

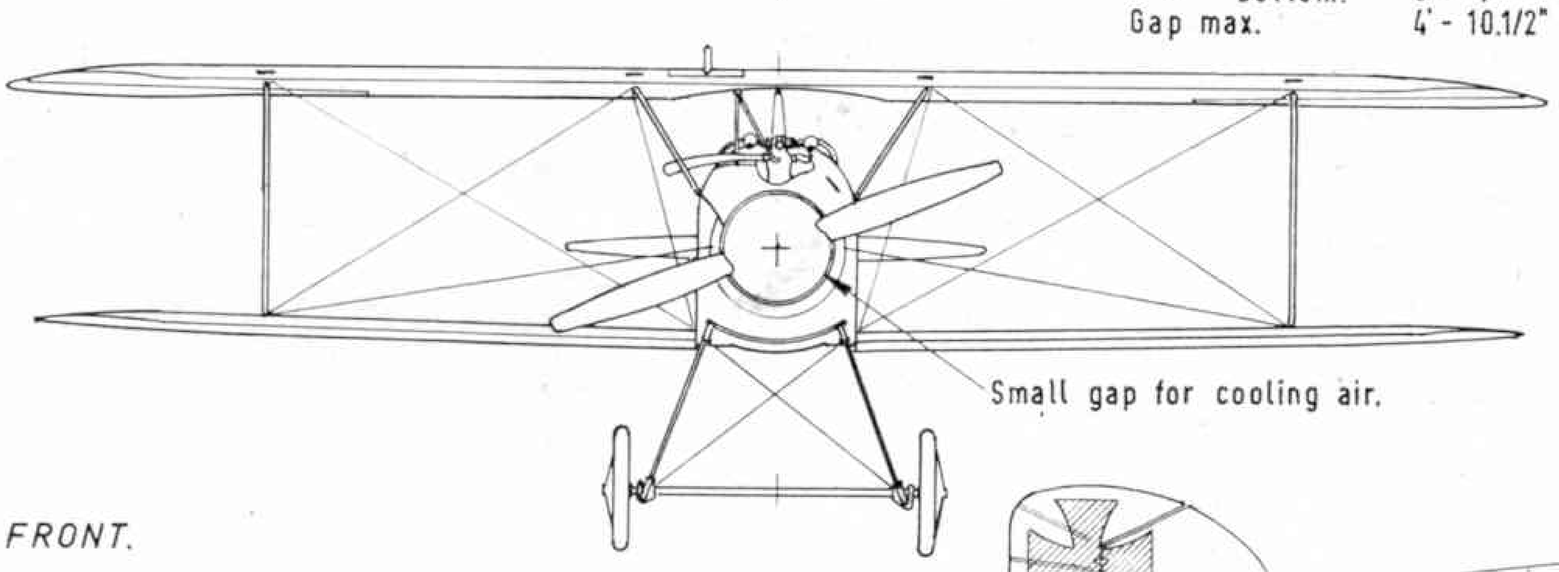
PLAN

DIMENSIONS_

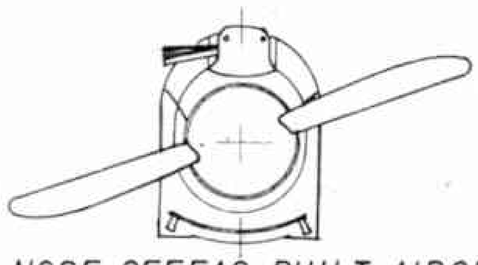
Span top.	29'- 8"
" bottom.	28'- 7"
Length.	24'- 0"
Chord top.	4'- 10.1/2"
" bottom.	3'- 7"
Gap max.	4'- 10.1/2"



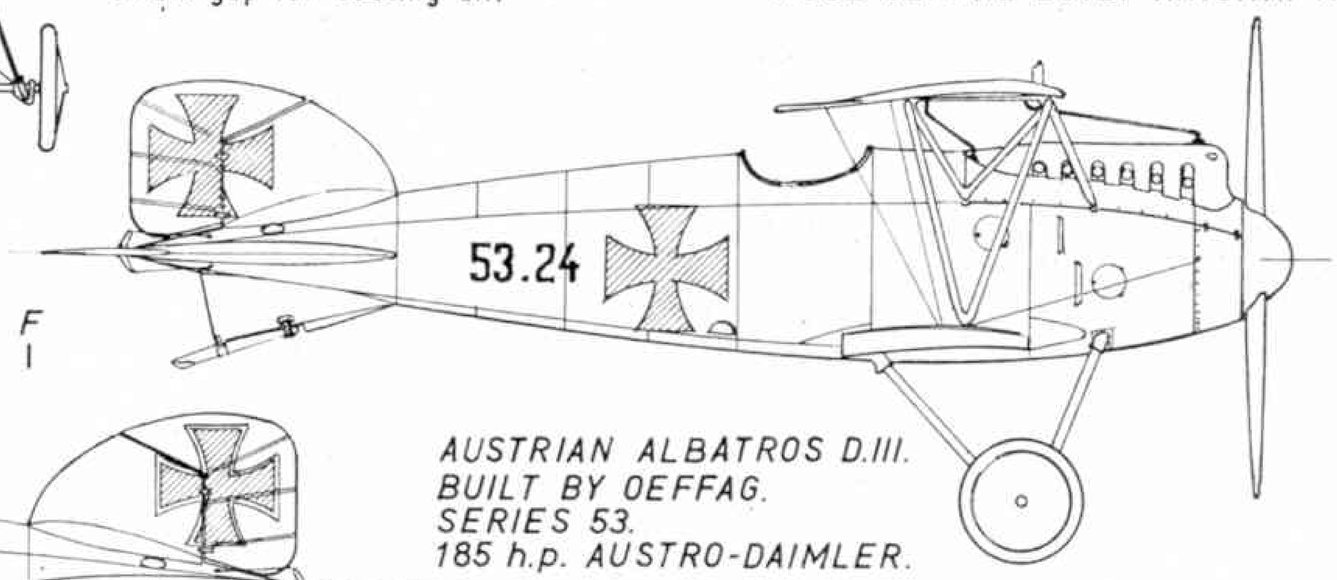
PLAN OEFFAG BUILT AIRCRAFT.



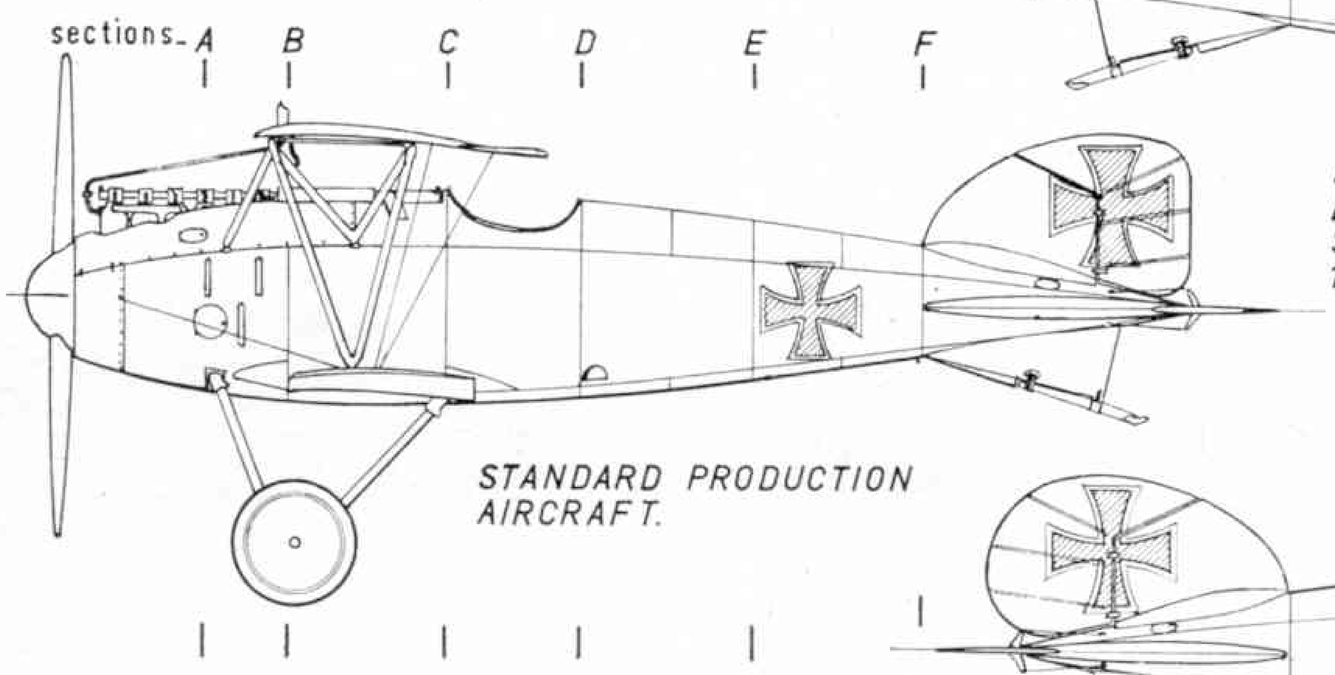
FRONT.



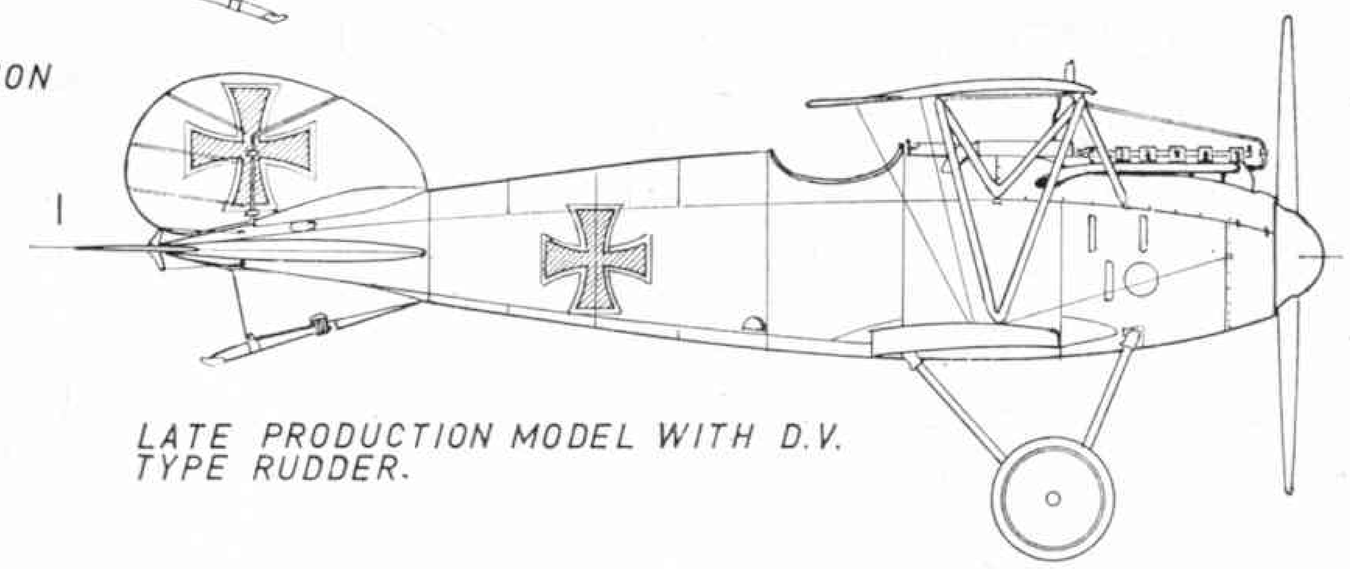
NOSE OEFFAG BUILT AIRCRAFT.



AUSTRIAN ALBATROS D.III.
BUILT BY OEFFAG.
SERIES 53.
185 h.p. AUSTRO-DAIMLER.



STANDARD PRODUCTION AIRCRAFT.



LATE PRODUCTION MODEL WITH D.V. TYPE RUDDER.

ALBATROS D.III. 1917
160h.p Mercedes.

Drawn by Ian R. Stair.

Scale, 12" 0 5' 10'

RAILWAY NOTES

New service on the CN A new afternoon and overnight passenger service is now in force between Ottawa and Toronto on the Canadian National Railway.

Provided with a snack bar service, a morning train leaves Ottawa daily at 9.40 a.m. transferring passengers at Brockville at 11.43 a.m. to the Lakeshore, to the Montreal-Toronto train, which arrives Toronto at 3.45 p.m.

The new afternoon train to Toronto from Ottawa, leaves daily at 4.55 p.m. and joins the Montreal-Toronto 'Bonaventure' at Brockville to arrive Toronto at 10.40 p.m. Passengers to Ottawa from Toronto board special coaches on the Montreal-bound 'Bonaventure' leaving at 4.50 p.m. On reaching Brockville this train splits into Montreal and Ottawa sections and the Ottawa section arrives 10.15 p.m.

The new overnight service, with coach and sleeping cars, will operate daily except Saturday. From Toronto it will leave at 11.40 p.m. and arrive Ottawa at 6.15 a.m. To Toronto, it will depart Ottawa at 11.0 p.m. and arrive at 6.15 a.m.

North Eastern Contracts Contracts for the new locomotive and wagon servicing depot, now being built at Knottingley, have been awarded by the North Eastern Region of British Railways, to J. Dixon (Doncaster) Ltd., who will build the framework for a staff amenities block, and to Herbert Morris Ltd., Loughborough, who are to supply and erect a 15 cwt. electric overhead travelling crane.

The 15 ton electric overhead travelling crane at Hull Central Freight Depot is to be increased to 18 tons capacity by the manufacturers, Patterson Hughes Engineering Co. Ltd., Glasgow, and W. S. Westin Ltd., of Huddersfield, have been given a contract for the installation of electrical lifting equipment at Holbeck (Leeds) Motive Power Depot.

Liverpool — Southport diesel trains An increased service of diesel trains commenced running between Southport and Liverpool Lime St. on Monday, June 6, 1966. From Southport to Lime St., six trains leave on weekdays at 06.45, 09.25, 11.30, 13.25, 15.25 and 17.10 hrs., connecting with fast electric expresses to London. On Saturdays five trains leave Southport at 07.25, 09.25, 13.25, 15.25, and 17.10 hrs. These trains will also connect with fast electric expresses to London, Euston. In the reverse direction, on Mondays to Fridays diesel trains will leave Liverpool Lime St. at 10.35, 11.35, 13.50, 18.05, 19.55, 21.00 and 21.25, providing connections from the 07.45, 08.30, 11.00, 15.00, 17.00, 18.10 (Pullman) and 18.30 trains from Euston. On Saturdays, the trains leave Lime St. Station at 11.35, 13.50, 18.05, 19.55 and 21.25 arriving in Southport at 12.24, 14.39, 18.57, 20.45 and 22.17 respectively.

'The Cheshire Regiment' At a ceremony in Chester (General) Station on Sunday, June 12, Lt.-Gen. Sir Charles Harrington, K.C.B., C.B.E., D.S.O., M.C., Colonel of 'The Cheshire Regiment' and Deputy Chief of the General Staff, named a London Midland Region Type 4 Diesel Electric Locomotive No. 137 'The Cheshire Regiment' in the presence of Mr. John Pollard, Line Manager, Crewe, British Rail, together with representatives of the Regiment and other distinguished guests.

This is the second occasion that a railway locomotive has held the name 'The Cheshire Regiment', the first being L.M.S. 'Royal Scot' No. 6134 which was named on the same spot on April 15, 1947.

£800,000 export order An export order worth about £800,000 for ten 1,350 h.p. diesel-electric locomotives has been placed with The English Electric Company Limited by East African Railways and Harbours, who ordered the locomotives to extend diesel working to branch and subsidiary main-line services. The locomotives will have a new designation—the '91' Class. East African Railways and Harbours is already operating 24 English Electric locomotives of the more powerful '90' Class (2,205 h.p.) which have proved so successful that a third repeat order for a further twelve was placed last September with deliveries beginning later this year. When completed, the latest order will bring to 46 the number of English Electric diesel-electric locomotives of the two classes in service in East Africa.

Similar in general appearance to the '90' Class with which they will be able to work in multiple, the new locomotives of the '91' Class are powered by English Electric Type 8CSVT 8-cylinder turbo-charged and intercooled diesel engines. The locomotives have a 1-Bo-Bo-1 wheel arrangement, weigh 69 tons and can develop a tractive effort of 40,000 lb. They are 40 ft. long over buffer beams and will be built at English Electric's Newton-le-Willows Works in Lancashire.

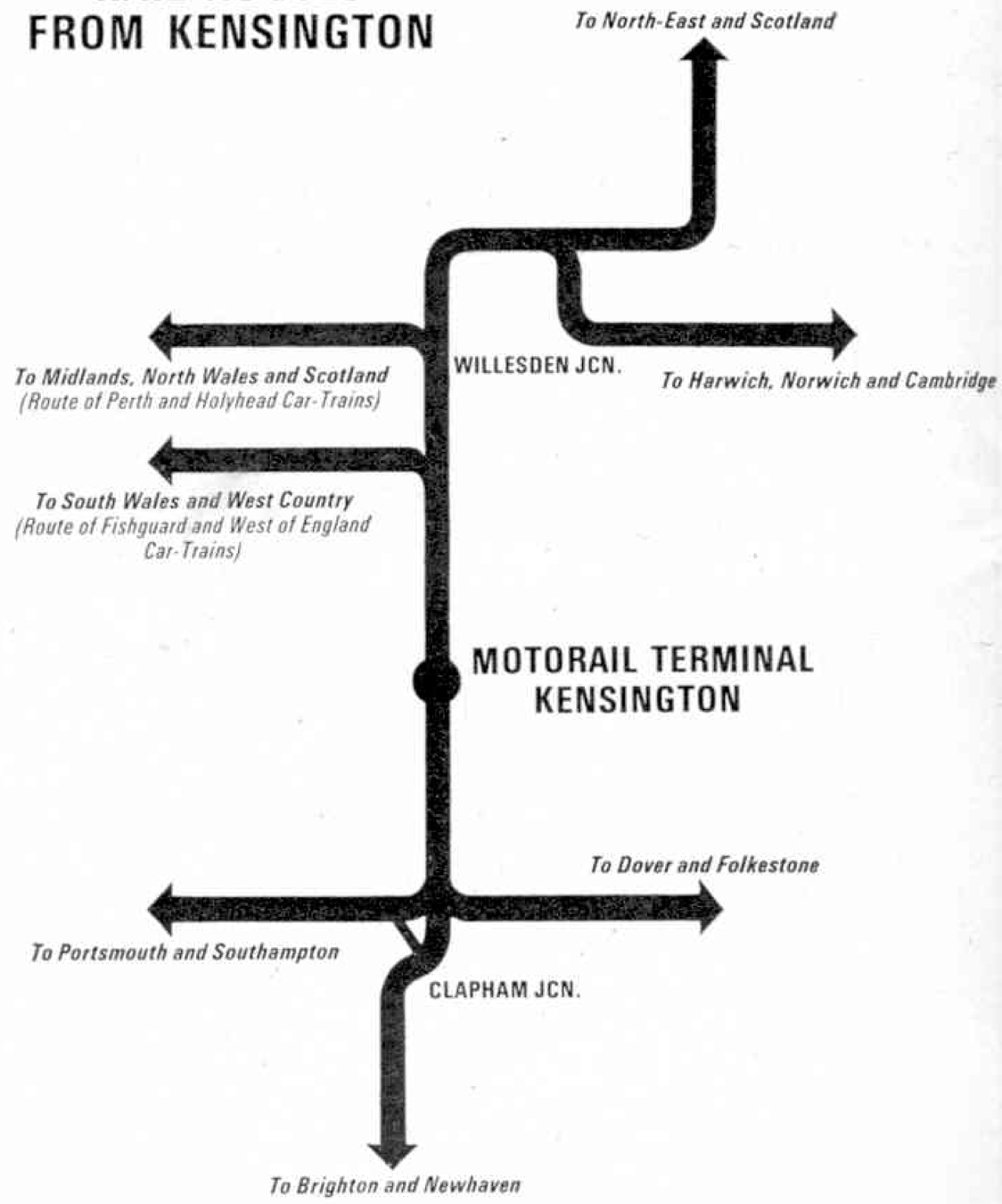
Highland line tokenless block Two sections of single-track line—between Montrose and Usan, and between Crianlarich Upper and Rannoch—have been selected for a fascinating signalling experiment which may ultimately be extended to all single lines in the Highlands. Although perfectly safe, the existing token system is, by modern standards, inefficient in many ways. To pass two trains at a crossing place always means a long wait for at least one of the trains, while the tokens are 'put through' the instruments and the points and signals altered for each train. The 'Tokenless Block' will give a flexible signalling system because, as its name implies, no tokens will be used and token exchanging will disappear. Signalboxes can be switched in and out when required, with trains passing through when they are closed. The time-wasting collection and delivery of tokens when trains cross, will disappear and indeed, this feature has allowed signalboxes in some cases to be spaced further apart than would otherwise have been required.

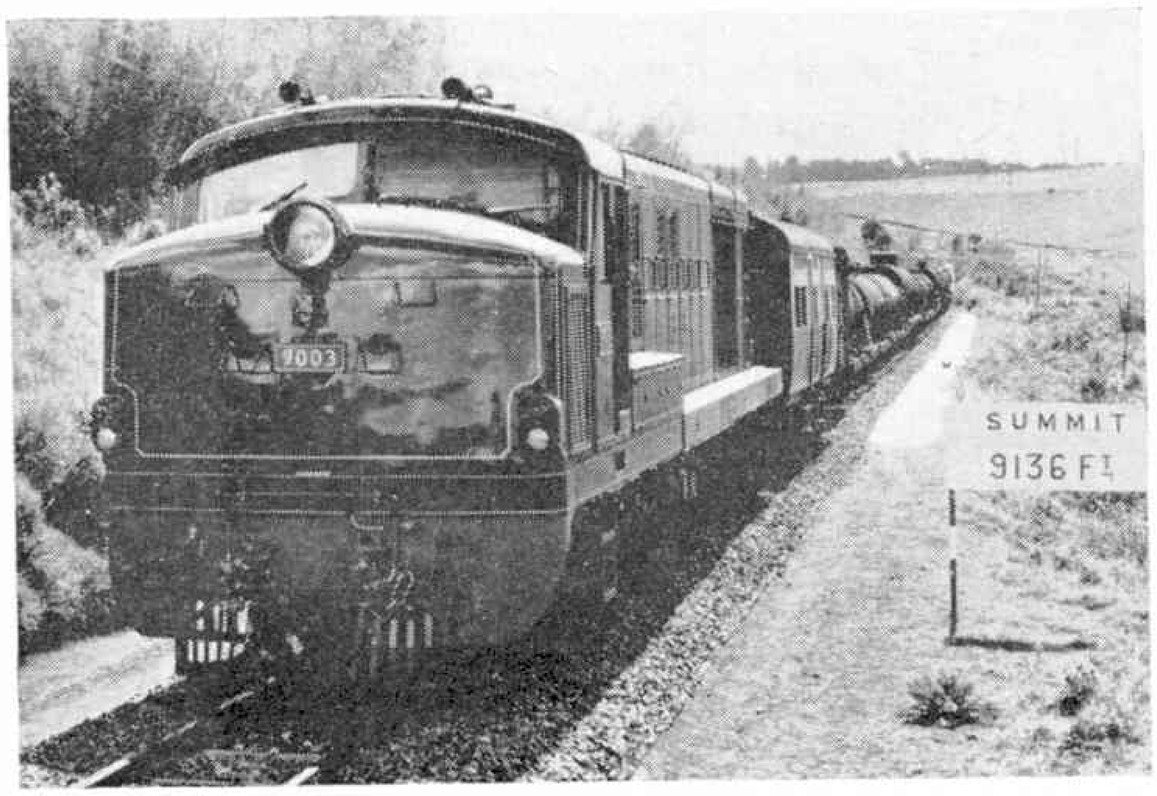
As trains can now run at speed past signalboxes where they are not required to stop, crossing loops will be designed, where circumstances permit, to have one straight through fast loop signalled in both directions so that the only speed restrictions will be the line limit, whether the signalbox is open or closed.

Car-train terminal British Rail's first car-train terminal—the first of its kind in the world—is now officially open. Adjoining Olympia station, a focal point in London's road and rail networks, with connecting rail routes to all parts of Britain, the new terminal is to be the 'home' of all London based 'Motorail' services.

With a spacious passenger lounge and toilets where passengers can freshen up before and after their journeys, the terminal can handle up to four car trains at a time. It is fully equipped for loading both single-deck and two-tier car carriers, and its four loading bays, platforms, and parking area are entirely under cover. By the peak of the coming holiday season, the terminal will be handling up to eight trains and between 250 and 300 cars daily. The trains will link London with Perth for the Scottish Highlands; with Fishguard and Holyhead for West and North Wales, with car ferries to Ireland; and with Totnes and St. Austell for the West Country.

RAIL ROUTES FROM KENSINGTON





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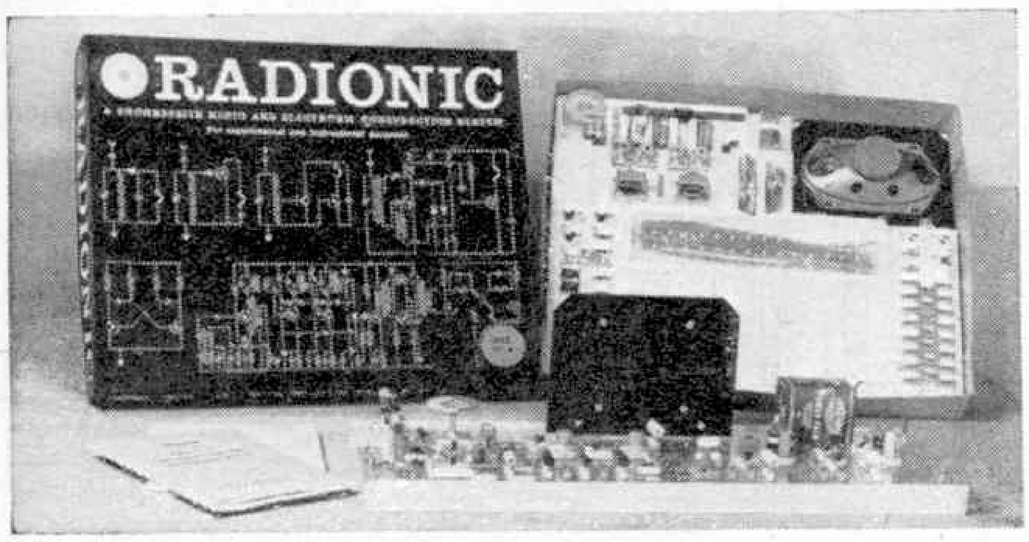

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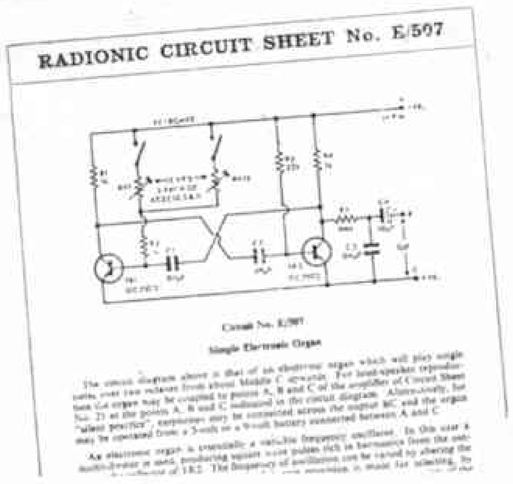
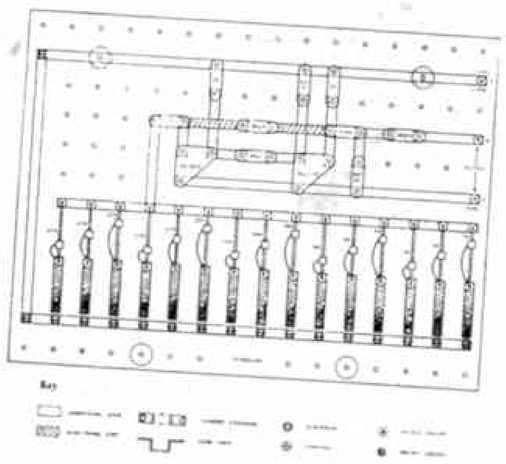


Theoretical Circuit



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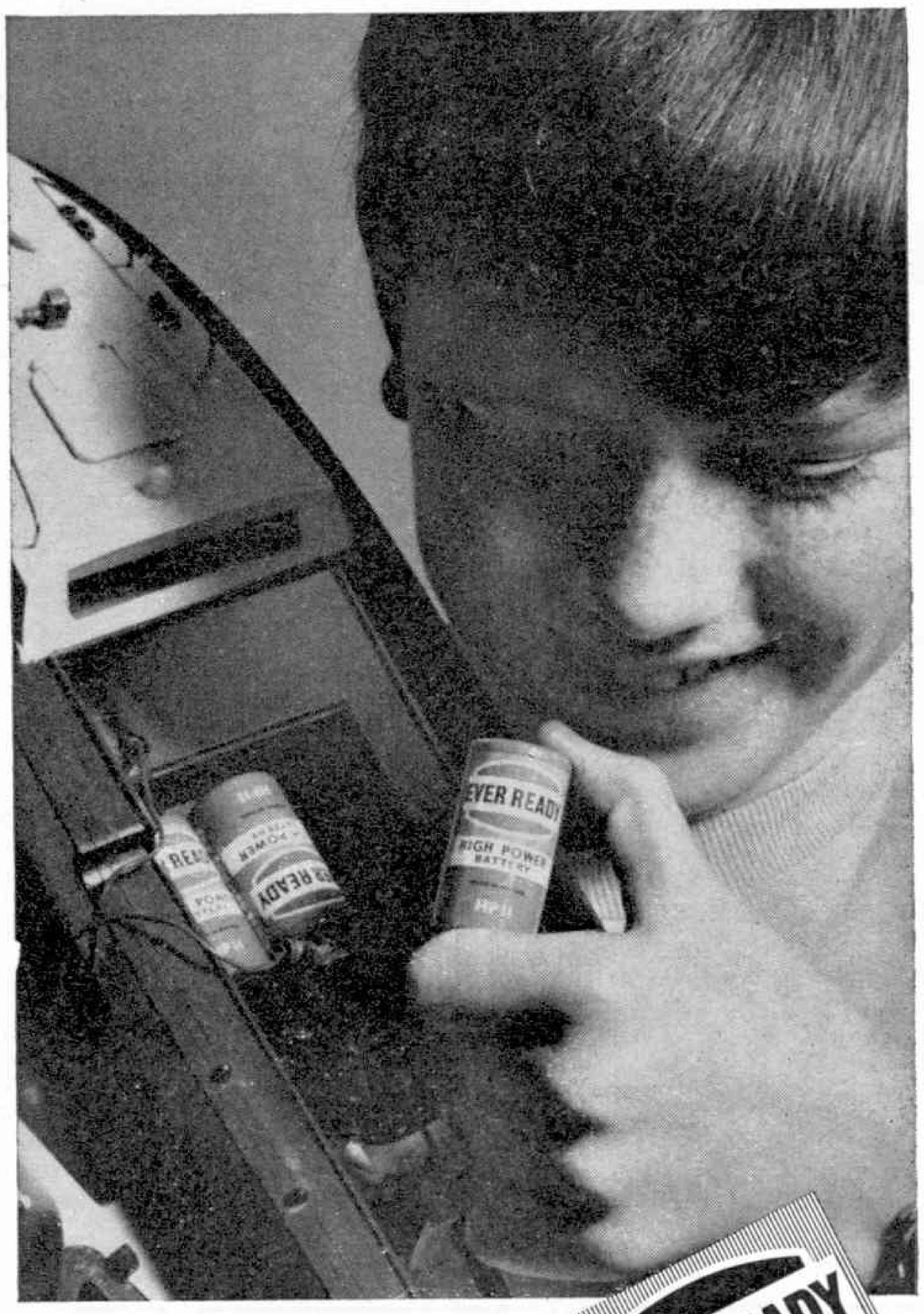

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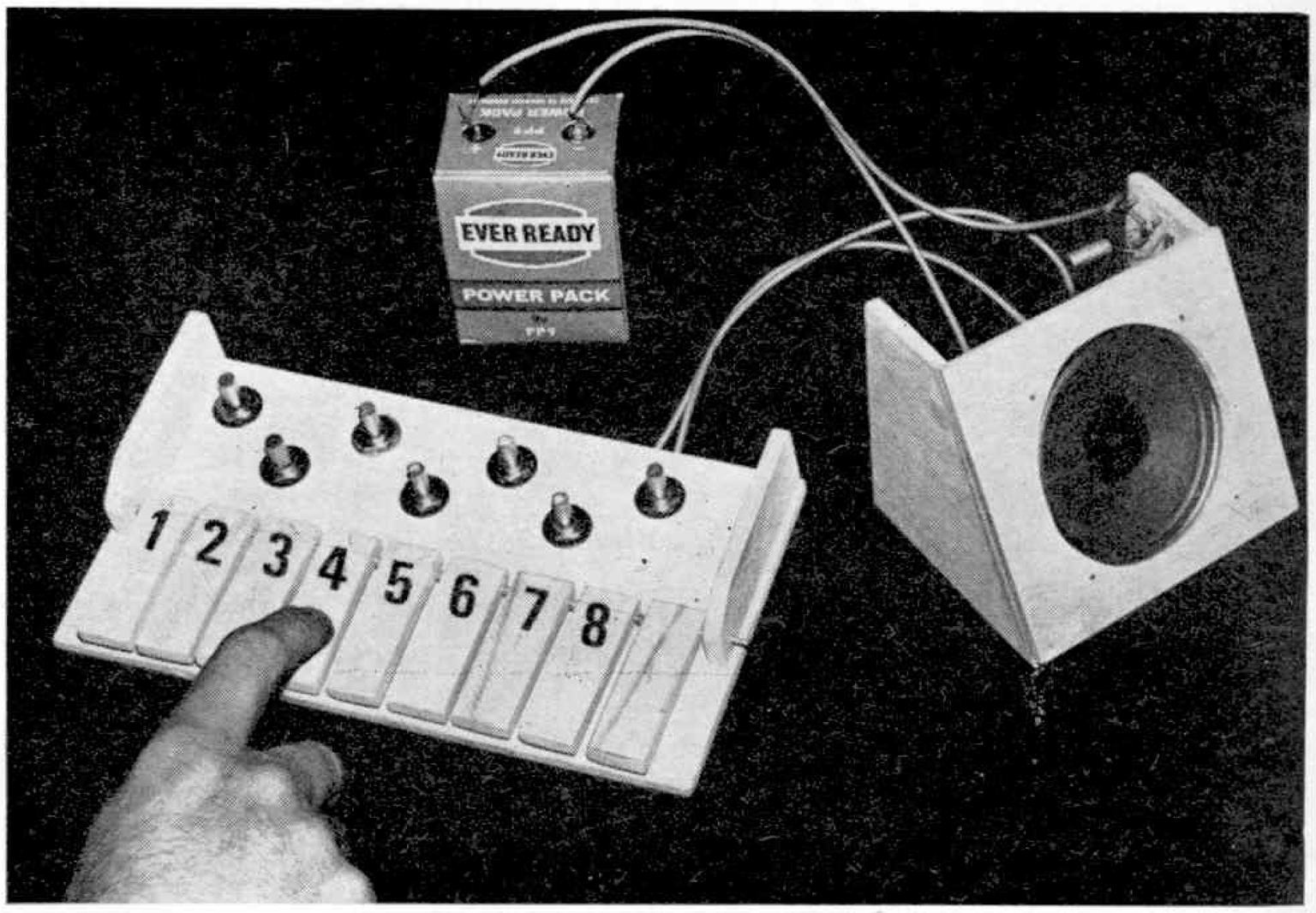
M.M. ELECTRONIC ORGAN



Part 3. Now Play It!

Having built the keyboard and amplifier in the July and August issues of MM, our organ is now playable, so we decided to give you some tunes to play instead of describing the tremulo as originally planned

LAST month, we completed the note generator and amplifier section of the organ, and heard it 'play' for the first time. After the initial satisfaction of depressing the keys and making the organ 'speak', the next step is to play a tune! This will present no difficulty to M.M. readers who can already play a musical instrument, of course, but for those who have no special musical ability, the following hints and ideas may be helpful.

First, a word about tuning. As you know, the keyboard consists of eight keys (the ninth is reserved for the tremulo, which will be described next month). There are no 'semitones', which are represented by the black notes on a piano, and consequently our organ is tuned 'doh, ray, me, fah, soh, lah, tee, doh'. These eight notes provide a complete scale, or octave, and the eighth note is the same is the first, but an octave higher. Pianists will know that a complete octave can be played on a piano without semitones, in the key of 'C'. If you are not sure that you can tune your organ properly, ask a friend who has a good ear for music to do it for you, but remember to tell him to tune from the high notes downwards—if tuned the other way round, each note affects the tuning of its predecessor. Now for some music!

Because there are no semitones provided on our keyboard, and we have only one octave, the number of tunes that can be played is naturally somewhat restricted. Those who have built the base keyboard as well will have greater scope in their choice of music, as they have two complete octaves instead of only one. However, after a little thought and experiment, it will be found that a great variety of tunes can be played using the treble keyboard only. The traditional 'beginners piece' is 'Three Blind Mice'. Imagine that the keys are numbered 1-8 from right to left, or pencil the numbers lightly on the keys themselves, and try playing it from the 'music' below:

'Three Blind Mice'
3 2 1, 3 2 1, 5 4 4 3, 5 4 4 3,
5 8 8 7 6 7 8 5 5, 5 8 8 7 6 7 8 5 5,
4 3 2 1.

It isn't difficult, is it?

Below are four more tunes you will probably know; 'Half a pound of Twopenny Rice'; the old sea shanty 'Shenandoah'; 'The First Noel', and the German folk song 'Muss i' denn'. These are all only suggestions, of course, and with a little practice you will be able to add many other tunes to your list. If you choose a tune that can't be played, the reason is either that it requires semitones or a wider compass of notes than just one octave—or both! Traditional songs, carols, etc. are usually the best to try.

The commas in the 'music' below denote pauses, but we have not given any other instructions for 'expression' such as would be found in 'proper' music—if you know the tune, this will come instinctively. Don't laugh all you musicians—this is for beginners only!

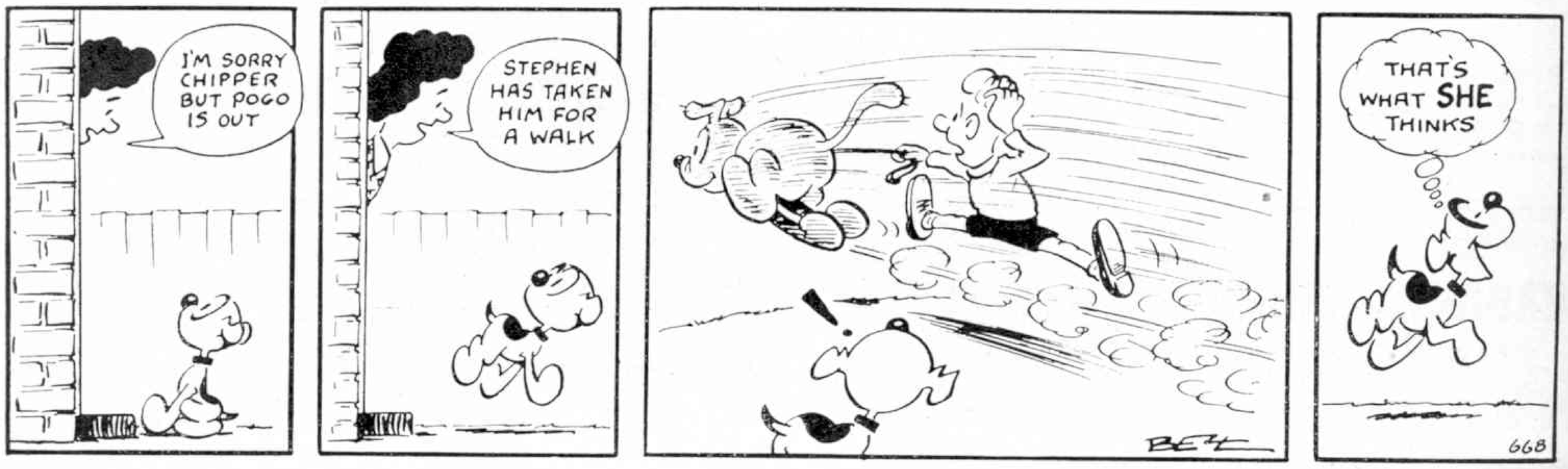
'Half a pound of Twopenny Rice'
1 3 2 4 3 5 3 1, 1 3 2 4 3 1,
1 3 2 4 3 5 3 1, 6, 2 4 3 1.

'Shenandoah'
1 1 1, 2 3 4 6 5, 8 7 6, 5 6 5 3 5,
5 6 6 6, 3 5 3 2 1, 2 3 1 3 6 5,
1 2 3, 1 2 1.

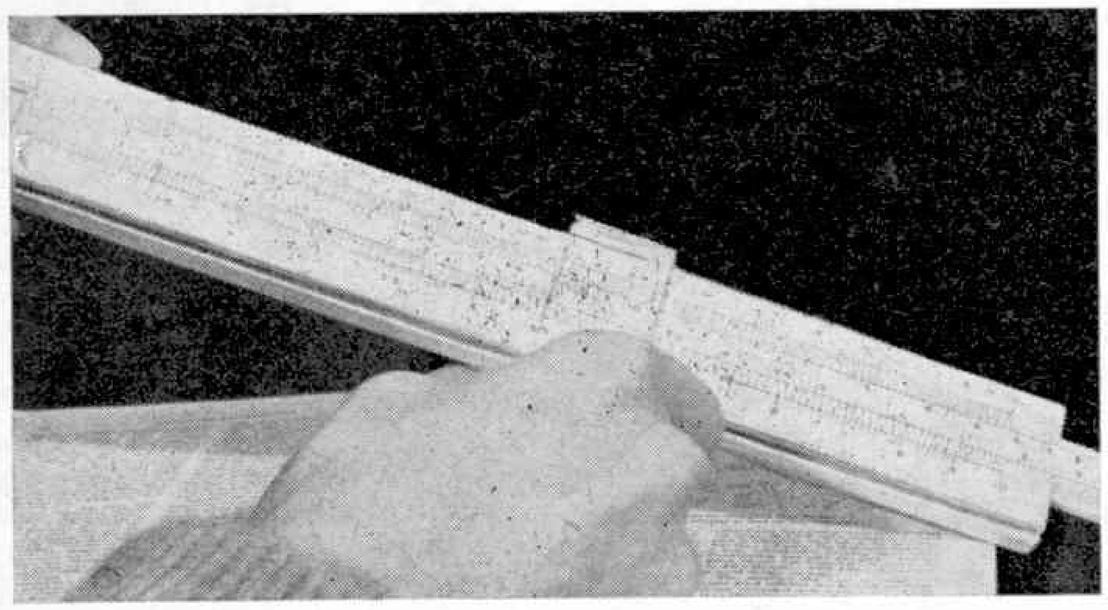
'The First Noel'
3 2 1, 2 3 4 5, 6 7 8, 7 6 5,
6 7 8, 7 6 5, 6 7 8, 5 4 3,
3 2 1, 2 3 4 5, 8 7 6, 6 5,
8 7 6 5 6 7 8 5 4 3.

'Muss i' denn'
1 2 3, 3 5 4,
4 6 5, 6 5 4 3, 5 6 5 4 3,
3 5 4, 4 3 2, 5 3,
3 5 2, 3 4 2, 3 4 5,
5 6 6 8 7 6 5,
1 2 3, 3 5 4,
4 6 5, 6 5 4 3, 5 6 5 4 3,
3 5 4, 4 3 2, 5 1.

CHIPPER

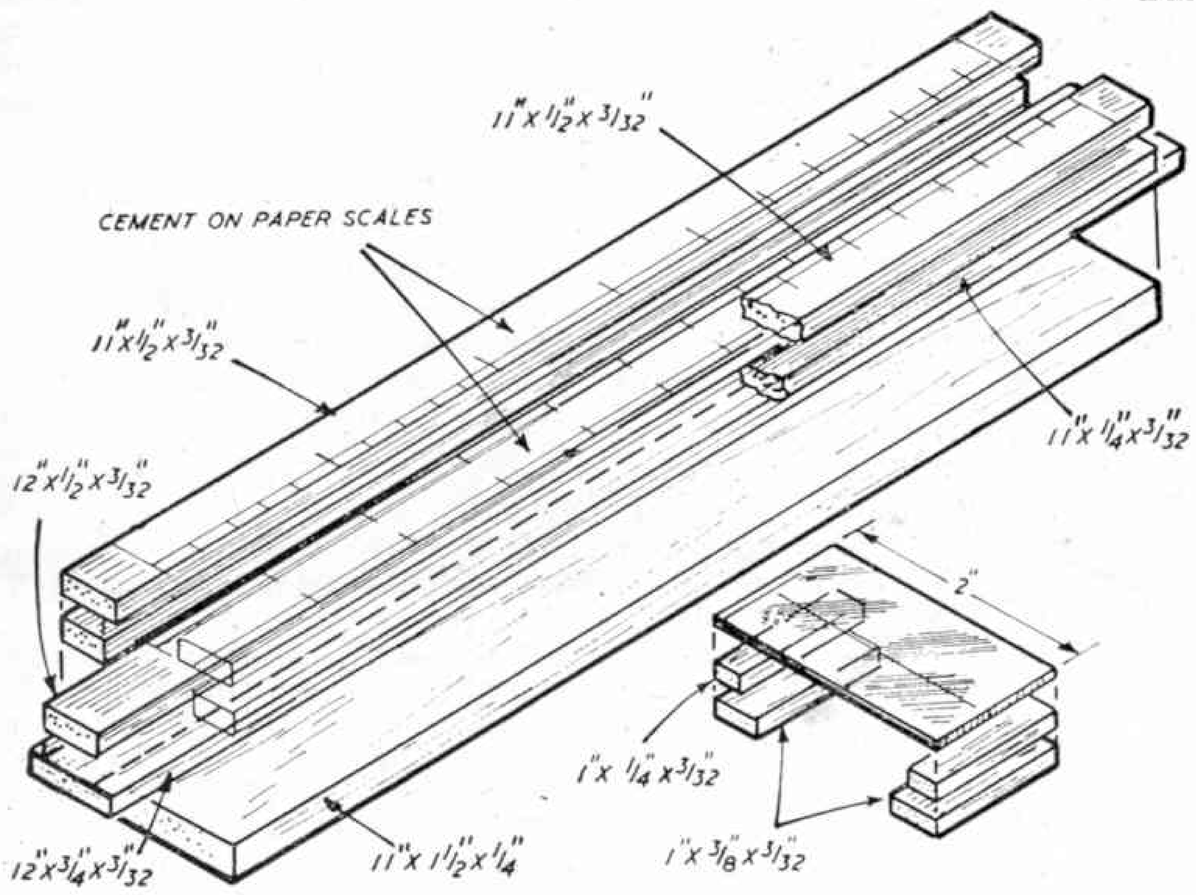


MAKE A SLIDE RULE FOR A SHILLING



Here's a precision instrument you can make for a shilling or less, using balsawood and the printed scales reproduced alongside. And construction time is only a matter of an hour or so!

As a special offer you can also obtain a set of printed balsa scales by arrangement with Solarbo Ltd (see their advertisement on page 22). These printed balsa scales should be ordered direct from Solarbo Ltd, Commercial Way, Lancing, Sussex. Enclose a 6d Postal Order and ask for a set of scales for the Balsa Slide Rule



CUTTING LIST

The slide rule body and slide parts are cut from $\frac{3}{32}''$ thick balsa sheet, plus a piece of $\frac{1}{4}''$ balsa sheet for the base.
From the $\frac{3}{32}''$ sheet cut:-
one piece $12'' \times \frac{3}{4}''$
one piece $12'' \times \frac{1}{2}''$*
two pieces $11'' \times \frac{1}{4}''$
two pieces $11'' \times \frac{1}{2}''$*
two pieces $1'' \times \frac{1}{4}''$
two pieces $1'' \times \frac{3}{8}''$
From the $\frac{1}{4}''$ sheet cut:-
one piece $11'' \times 1\frac{1}{2}''$.
*Note: if making the slide rule from the PRINTED BALSA SCALES available from Solarbo Ltd, these pieces are *not* required.

ASSEMBLY

The correct stages in assembly are shown in the diagrams below. First make the slide by cementing the $12'' \times \frac{1}{2}'' \times \frac{3}{32}''$ piece to the centre of the $12'' \times \frac{3}{4}'' \times \frac{3}{32}''$ piece.

Lay the slide on the $11'' \times 1\frac{1}{2}''1\frac{1}{4}''$ base piece and cement the two $11'' \times \frac{1}{4}'' \times \frac{3}{32}''$ strips each side. Hold temporarily with pins and check that these permit easy movement of the slide. Remove the slide so that it cannot stick and leave to set.

Replace the slide in position and use it as a guide to cement the two top strips in place on the body. When you are satisfied that you have got a snug but easy fit, hold with pins and withdraw the slide completely. Leave until set.

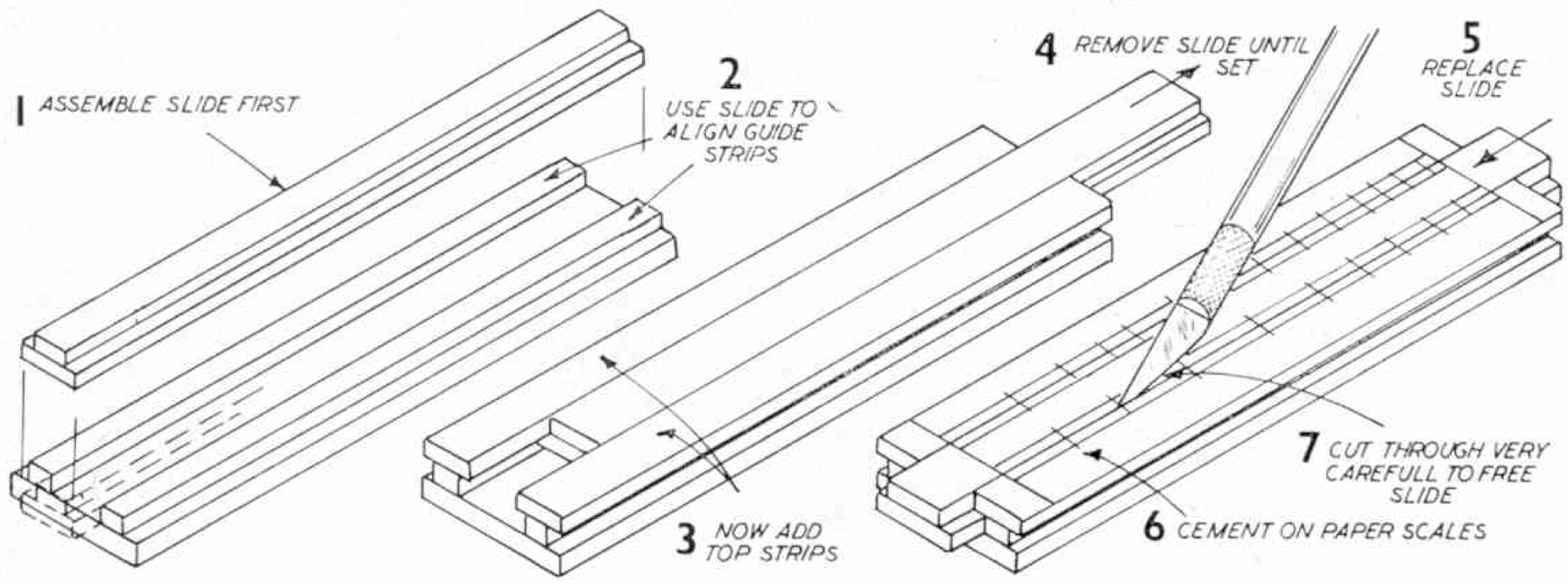
Replace the slide once more and position it centrally in the body—i.e. overlapping $\frac{1}{2}''$ at each end. Cut out the paper scales and cement to the top of the body and slide. Leave for a few minutes to set and then separate carefully along the thicker lines to free the slide, using a very sharp modelling knife or razor blade.

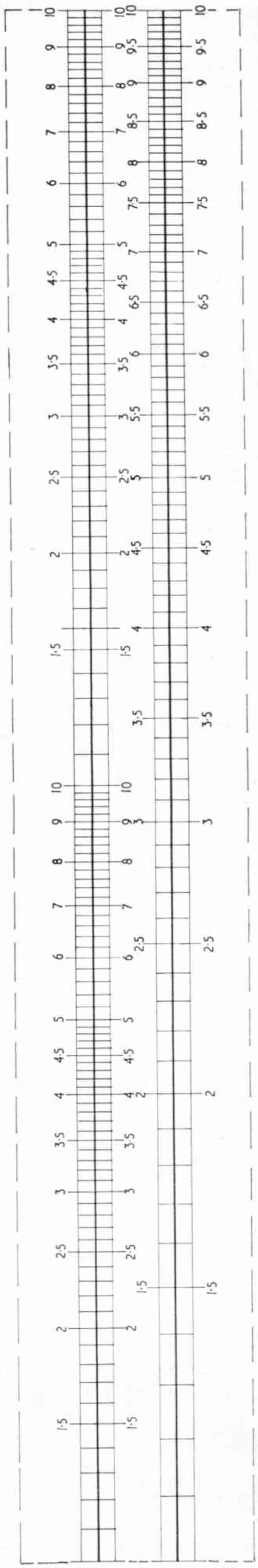
It is advisable to use a metal straightedge to guide the blade when making these two cuts.

In order to use the slide rule, a sliding cursor is needed. This consists of a piece of $2'' \times 1''$ heavy celluloid or acetate sheet cemented to the balsa slide pieces as shown in the exploded view. A line is scribed on the celluloid at exactly right angles to the direction of travel. The cursor should be an 'easy' sliding fit, with as little side play as possible.

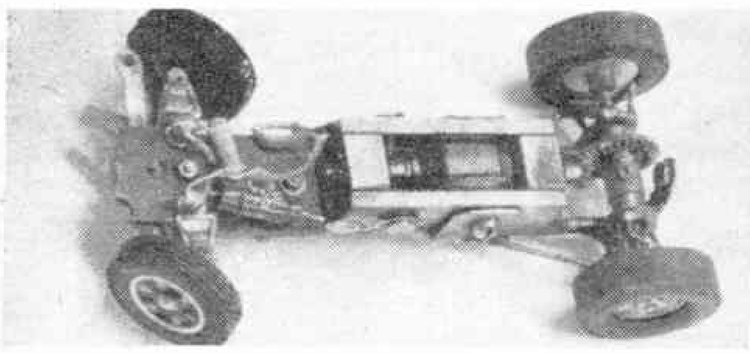
That completes the slide rule, ready for use. To make the slide move easily it is recommended that it is rubbed lightly with the end of a candle along the edges which locate in the body. The paper scales can be protected if desired, by covering with clear cellulose tape or a coating of clear paper varnish.

Note: when using the printed balsa scales, assembly follows the same procedure except that the slide top and the two top strips for the body are cut from the printed balsa panel. Stages 6 and 7 are not required since the scales are already printed in position.

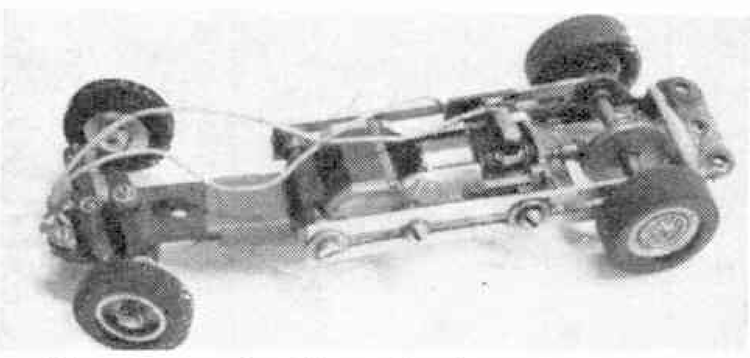




SCRATCH BUILDING by GODFREY ARNOLD



This chassis, for a Jaguar Mk. X, has a Pittman DC-66 motor mounted in a Revell rear end with M.R.R.C. steering, fitted with Supershells wheels and a Revell slot guide. Rear tyres are S.C.D. Dublicks.



I have been using this car for about three years now with no breakages. The motor is a K's Mk. 1 and it is mounted in a jig-built brass tubular chassis, complete with detailed rear suspension. The steering unit is Airfix, modified with plastic curtain rail.

This is one car that will win races straight out of the box, although the tyres may well have to be changed to suit the track surface. It is the M.R.R.C. Indi-Novi-Ferguson.

This Mercedes, belonging to a member of our slot racing club, has a hand-built wooden body and no chassis, the working parts being fitted directly onto the underside of the body.

A NEWCOMER to slot racing may well wonder why anyone should bother to build models from scratch, considering the wide range of kits and ready built cars available. In last month's article, on modifying commercial cars, I gave the main reasons for this, these being that cost and toughness usually have to take precedence over ultimate performance with factory produced models. There are a few cars that will acquit themselves very well with little modification and even a couple that are capable of winning races straight out of the box but, as a general rule, a good home-built car will win every time.

I am not at all sure that just putting a different body on a production chassis would constitute scratch building, but this is often the first step taken by a beginner, the V.I.P. chassis being commonly used. My first scratch-built car, however, was an Airfix Lotus 24 fitted with a Scalextric motor and rear axle. This combination won many races a few years ago, and would not be disgraced today. The rear axle was installed by cutting out the triangular bush locations of the Airfix lower half to accept the brass bushes of the Scalextric unit, retaining these with an impact adhesive, and then locating the motor by pieces of plastic and balsa wood. It was with this car that I learnt the lesson of fixing things securely for, to start with, I had a lot of trouble with the motor 'missing' or cutting out when full power was applied, this being due to the motor twisting due to torque reaction and pushing the ends of the brushes against the body, so lifting the carbon off the commutator. Since then I have always mounted motors securely!

The most common method of scratch building is to take the products of one or more makers, and make them up into a chassis which is completely independent of the body fitted to it.

The first problem with such a chassis is fitting all the bits together in such a way that they will stay together under the roughest conditions, but at the same time can be dismantled easily for maintenance and repair.

Before making a chassis it is essential, if the model is to be used in club racing, to know the track and wheelbase of the original and scale down from this. Assuming that $\frac{1}{32}$ scale is used, it makes scaling down easier if you remember that 8 ft. becomes 3 in.; 4 ft., $1\frac{1}{2}$ in.; 1 ft., $\frac{3}{8}$ in.; and 1 in. $\frac{1}{32}$ in. Both the track and wheelbase must be correct within $\frac{1}{16}$ in. which, when one considers it, is quite a wide tolerance!

When choosing a motor for your model, be sure that you have a hand controller to match it. The motors in the type of cars used in club racing draw a heavy current and consequently, a controller with a lower electrical resistance is needed if the car is to be at all manageable, but a 15 ohm controller will suffice for most of the power units on the market at present. Choice of a motor is not so easy, for there are at least fifty different ones available but, if you are scratch building for the first time, it is advisable to choose one with an integral rear axle bracket, which narrows the choice quite considerably and will make for easier construction.

The motor and rear axle constitute half the chassis, so that a 'front end' is the next thing to be decided upon, and here the choice lies between steering and non-steering. Non-steering cars tend to be tougher and more reliable, but steering seems to have the edge when used on the normal type of club circuit which has relatively tight corners. Both types handle quite differently, and the choice is a matter of personal preference. There are several commercial 'front-ends' of both sorts available, some of these being a complete chassis for motors with no mounting brackets, but ensure before buying one that provision is made for the track and wheelbase to be adjusted to suit your requirements.

Once you have joined the two ends of your chassis, the car can be wired up and a tip worth remembering is that, whenever possible, flex should never be soldered where it is going to bend a lot and this, of course, is the case at the slot-guide, fixing at this end being, usually, either by screws or by pushing the flex through the braid. Suppressors should be fitted at this stage, either one 1 amp TV choke in each lead or one choke in one lead and a 470 pF capacitor between the leads. Soldering is perfectly satisfactory at the motor end and, if you want your car to run in the correct direction on a track wired to the standards of the Electric Car Racing Association (as most club tracks are) then, with the wheels turning in the right direction, the positive lead should be the one on the left-hand side of the guide, looking in the direction of travel. It is as well to note that this is the opposite direction to Scalextric and Airfix cars as one buys them.

Having got the chassis in running order the next, and often difficult, stage is to mount the body. Assuming that the body is a proprietary one and your chassis is to scale, as long as tyres are not too large, little trouble should be encountered with their fouling the wheel arches but, if this does happen, a little trimming of the arches should cure it. Once the body will fit easily over the chassis it is necessary to keep it securely in position so that nothing touches any moving parts. My favourite method is to glue a block of wood to the underside of the body to correspond with the rear of the 'front end' and to solder a couple of dummy exhaust pipes onto the rear motor bracket, so locating the body in a downwards direction, and a couple of slots can be filed in the tail of the body to give sideways location at the rear. I then drill right through the front end of the chassis and into the wood block, open out the hole in the block and glue (with an epoxy resin such as Araldite) an 8 B.A. bolt into this hole, making sure that none of the adhesive gets on to the projecting threads. Once the glue has set, the chassis can be put into position and held firmly by a single nut which can be locked in position, to stop it vibrating loose, by plastic cement but can be easily undone to give access to the working parts.

One could write several books on the subject of building model cars and still not cover all the aspects of it but in my next 'Slot Racing Page' (in the November issue) I will show you how to build a car which, if well driven, can hold its own with almost any car in club racing.

We are 'missing next month' because, as you will have read on page 5, the October issue is to be a really bumper number with a special Slot Racing Supplement surveying the current model racing scene in great detail — see you in two months' time!

THIS month, as promised, I'm describing in detail the six sports tourers produced by Meccano Ltd., just prior to World War II.

These six models were issued with catalogue numbers, as Dinky Toys are today, but they differed from current numbering in that each number had a small letter attached. This was common—as will be seen—with all pre-war and early post-war Dinkys.

If you read last month's Meccano Magazine you will remember how I came to find those Frazer Nash's. I must emphasise here that this was virtually a miracle. Luck like that just doesn't happen anymore. So *don't* turn up at Hamley's with this month's Meccano Magazine and ask their long suffering assistants for an 'F.N.'! Also, it would be a waste of time writing to Meccano at Binns Road; they just don't have an old model in the place, not even for their own records.

Now to the models! There's been, in the past, a great deal of writing and controversy between serious collectors about one of the series. The No. 38e Triumph Dolomite sports coupé. This, scheduled with the rest for June 1939, *never* appeared, I can state this quite definitely. It may have passed the drawing boards as a mock-up model but it never reached the shop counters. Three of this series were eventually issued in August/September, 1939, in small quantities until the war stopped production. We then had to wait until mid-1946 to buy these and the rest of the series.

The first three were as follows: 83a Frazer-Nash B.M.W.—this is a model of the type 328 'F.N.' B.M.W., which had a six-cylinder engine and was capable of a maximum speed of 100 m.p.h. Ratings then weren't in c.c.s but in horse power—the B.M.W. was rated at 16 h.p. The model was issued mainly in dark blue with grey seats and wheels, and grey with red upholstery and wheels.

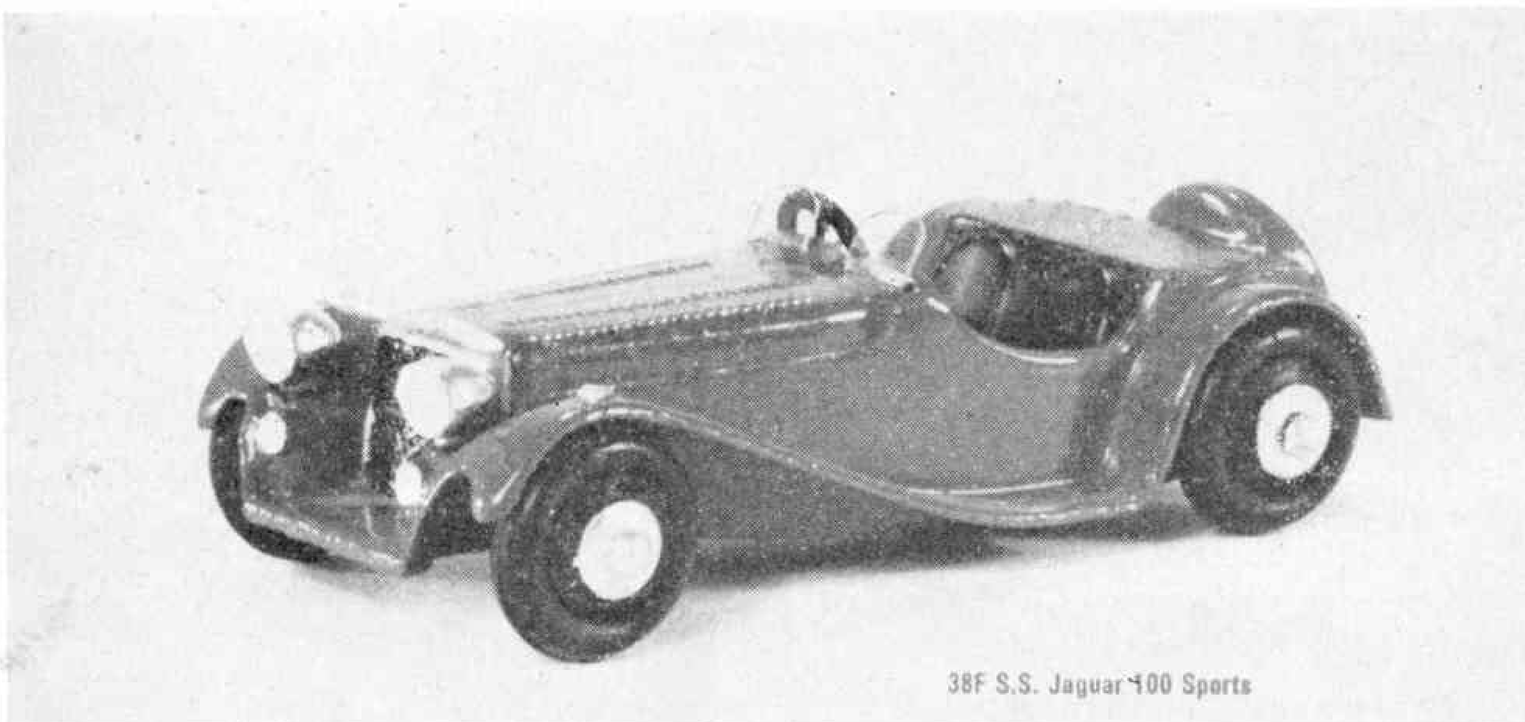
Next to be issued, No. 38b Sunbeam Talbot was usually in Pillar Box Red with Maroon seats, etc., or yellow. This was a three-litre sports car with a six-cylinder side valve engine and was 20 h.p.

No. 38d Alvis Sports Tourer—the last pre-war job—was issued in various colours—mine's in bright green with dark green interior. This again had six cylinders, but was really fast, being capable of speeds in excess of 100 m.p.h.

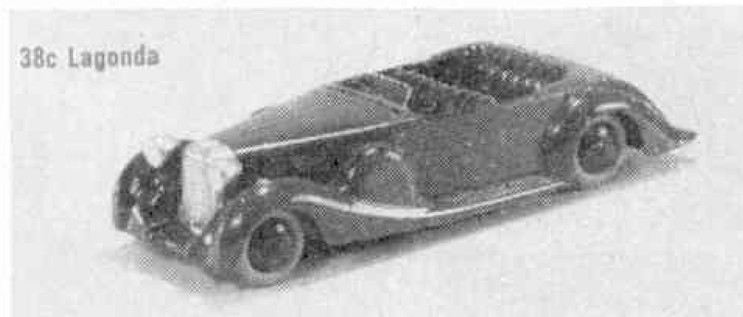
The last three of this series appeared, as I've said, in 1946 and were as follows: No. 38c Lagonda 3½ litre sports was issued first, followed closely by 38f S.S. Jaguar 100 Sports and No. 38e Armstrong Siddeley Coupé, which was modelled on the then current Armstrong Siddeley Hurricane. Not a very popular car. This 38e Armstrong replaced the intended but non-existent Triumph Dolomite.

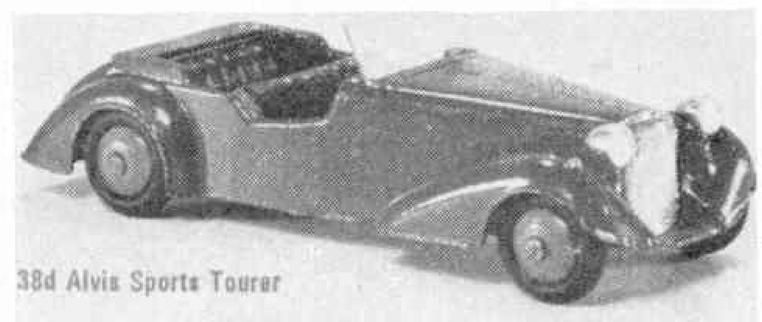
The Lagonda has been issued in various colours, such as putty, grey, dark grey, green, maroon, etc. The one shown is in green, like the Alvis. I have three Jaguars in red, silver and green. It was also issued in pale and dark blue and I think, yellow. The Armstrong Siddeley was in light grey, dark grey (rare in this colour) light green—horrible—and blue.

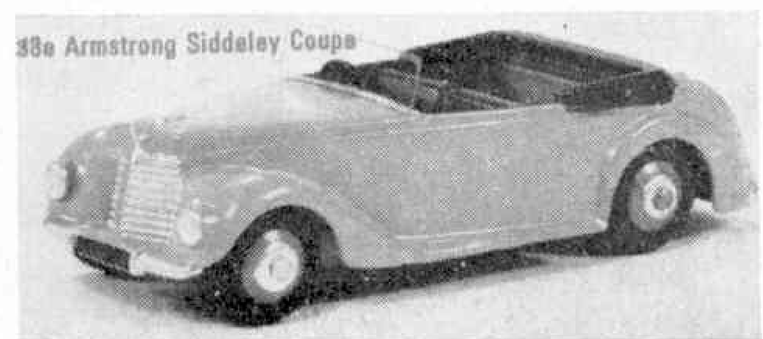
For some unknown reason, Meccano produced all six cars without any outside door detail. I'll admit they could get away with this on the Frazer Nash and S.S. Jaguar—these don't look too bad at all—but the rest of the series are spoiled considerably by this lack of foresight, perhaps on the part of the draughtsman. They also (apart from the Armstrong) lack bumpers. This leaves them somewhat lacking in authenticity, but nevertheless, I think you'll agree that these are six models of six famous cars and well worth having and so, worth searching for. As will be seen from the photographs, each model was fitted with clear celluloid, or some form of acetate, windscreens which, on the earlier issues, had a thin band of paint around to represent a frame. The bottom of this windscreen slotted through a slit in the baseplate.


38F S.S. Jaguar 100 Sports

38b Sunbeam Talbot Sports


38c Lagonda

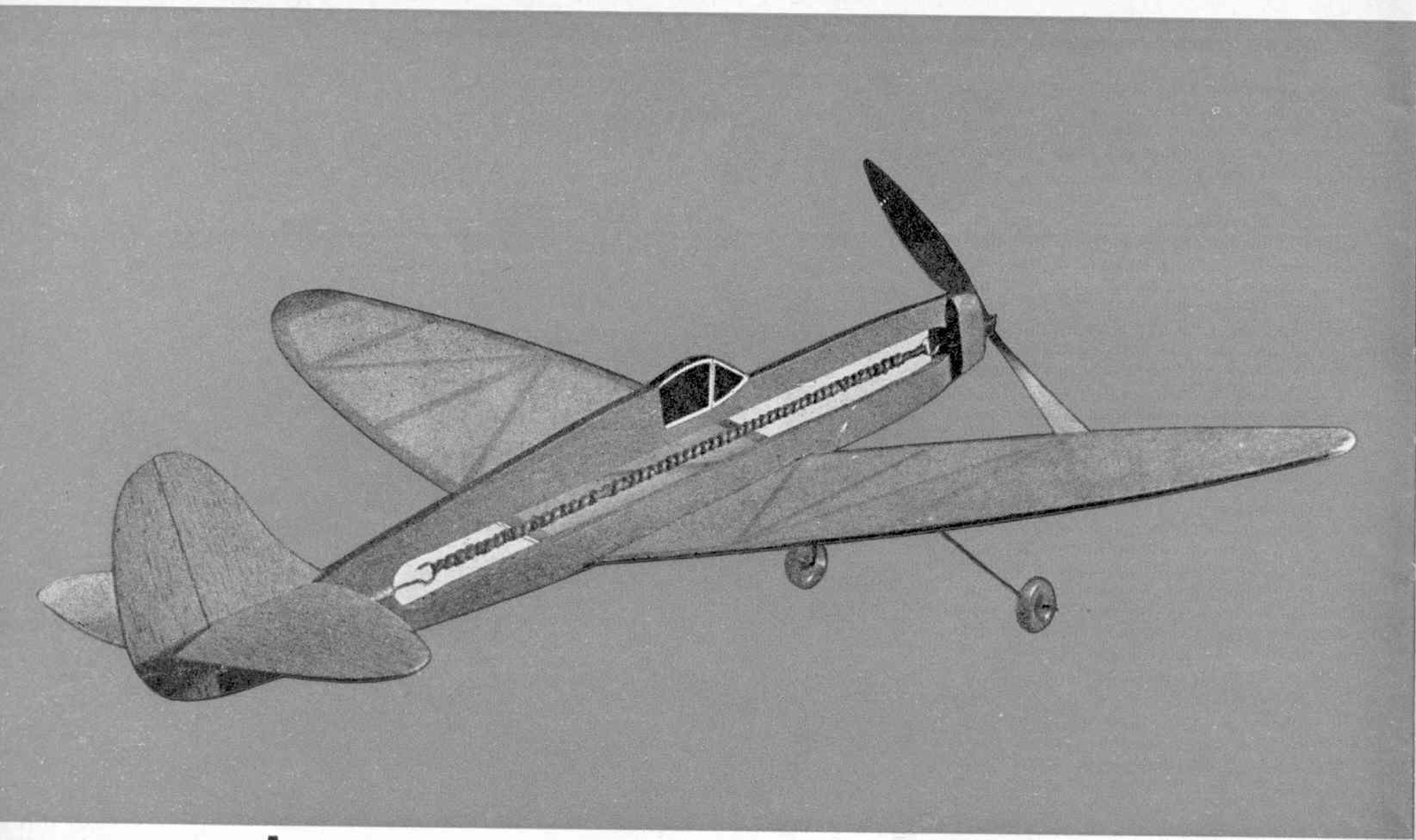

38d Alvis Sports Tourer


38e Armstrong Siddeley Coupe

The headlights of the Lagonda, S.S. Jaguar, Alvis and Sunbeam, were fitted through slits in the headlamp stem or base. The baseplates were fixed as they are today, with a rivet fore and aft and, due to the plate narrowing very sharply at the front, there's a lot of unrealistic wheel wobble when the model is held in the hand, but this is righted when the cars are on the road. The wheels, fitted with smooth rubber tyres (white before the war, black after), are, as you can see, just plain hubs—later supplied with an inner ring—usually painted black. Incidentally, this hub type, which first saw life in 1935 (the first Dinkys had either a good copy or original Tootsietoy hubs), remained until recently, when it was replaced with the metal finished recessed hub—as on the E-type Jaguar.

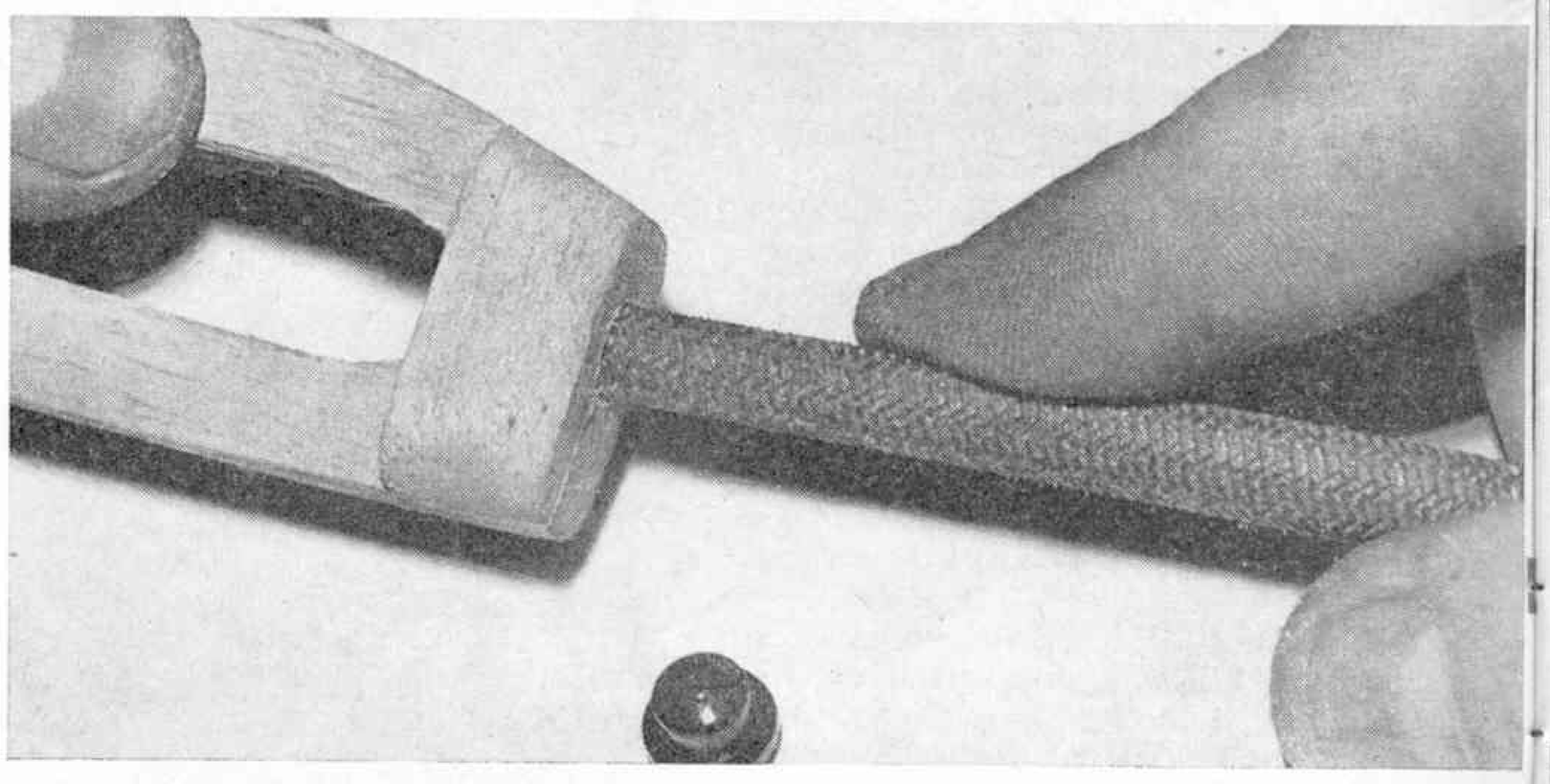
Well, those are the 38 series set. Despite their shortcomings—re. lack of door detail, etc.—I often 'browse' through them and feel glad to have 'em, so, start searching fellers!

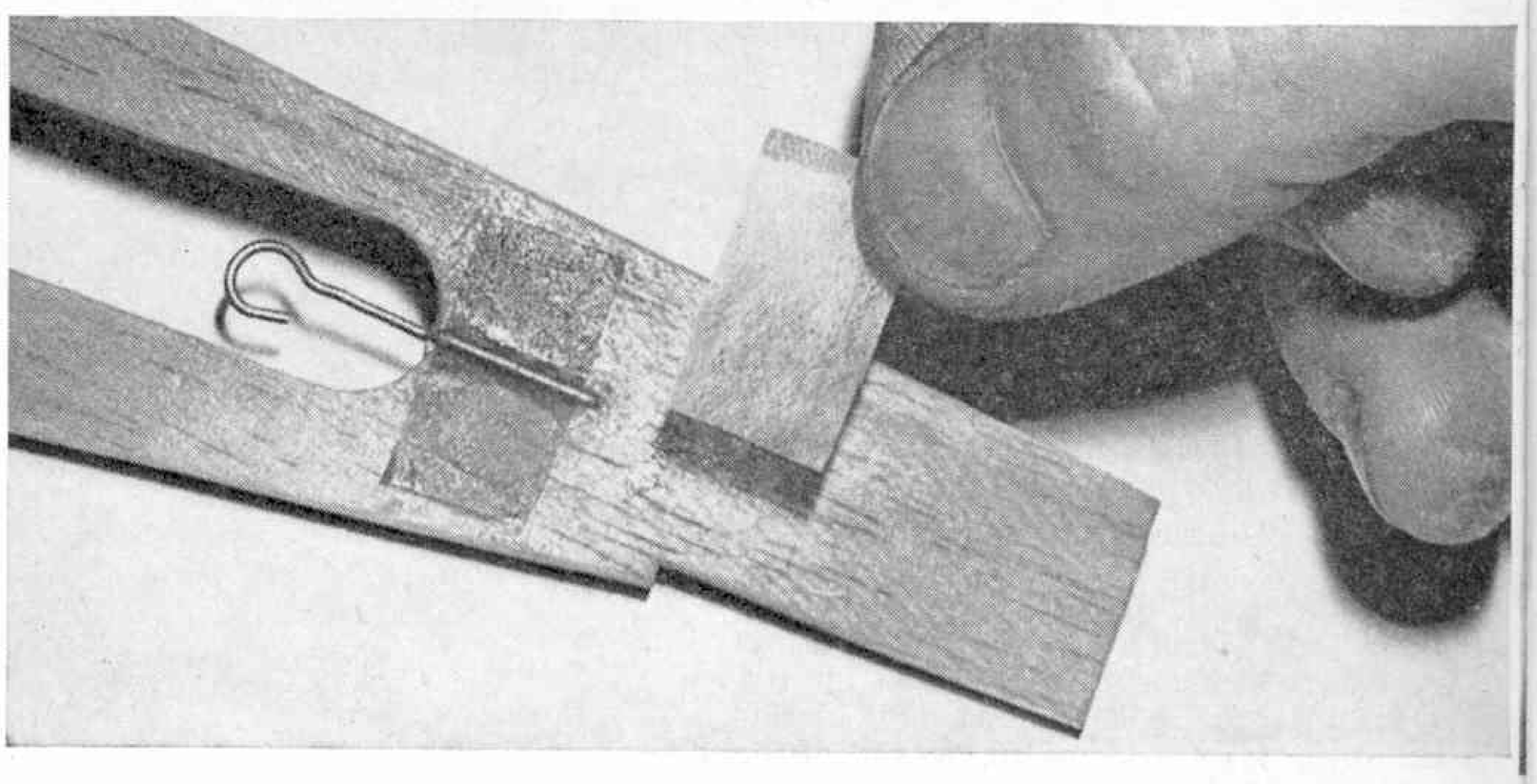
Next month we're taking a look at a few French made Dinky Toys.

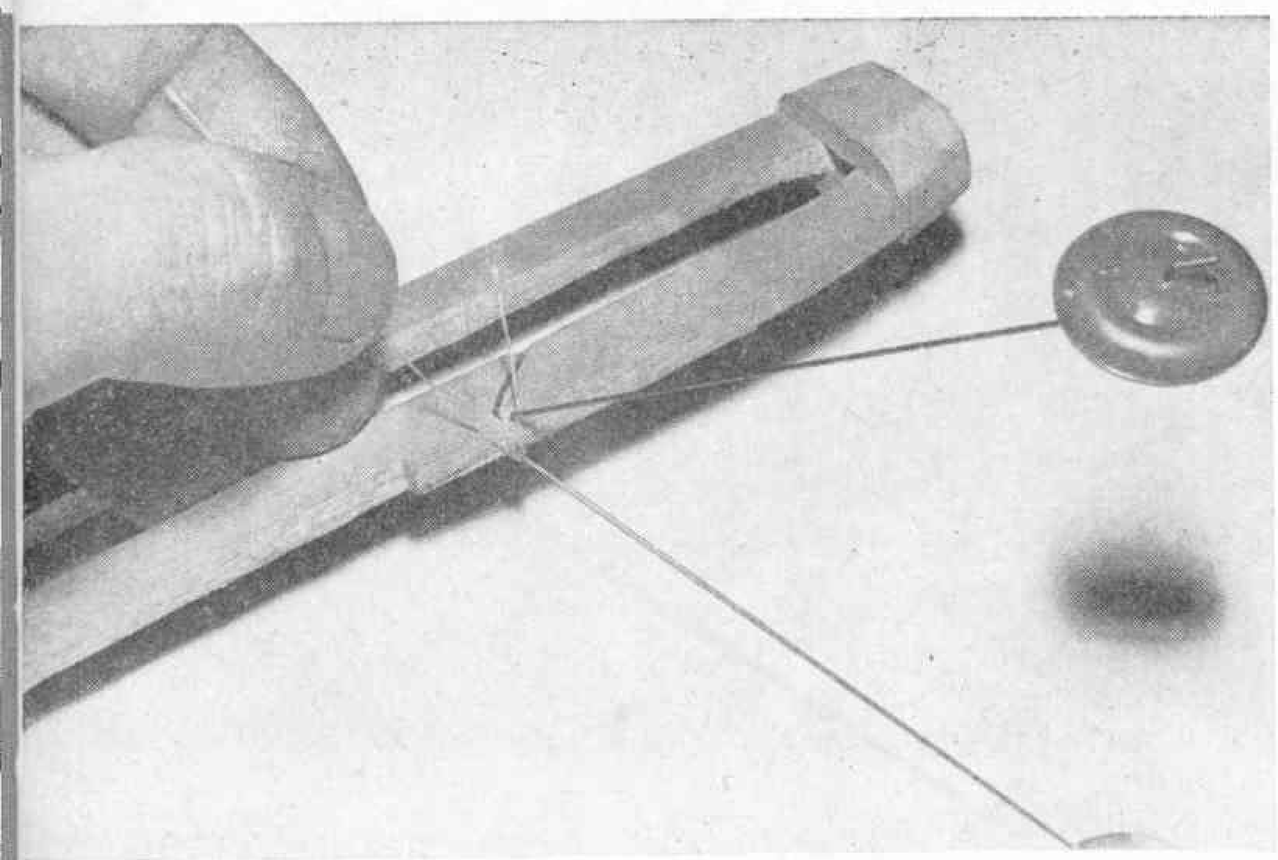


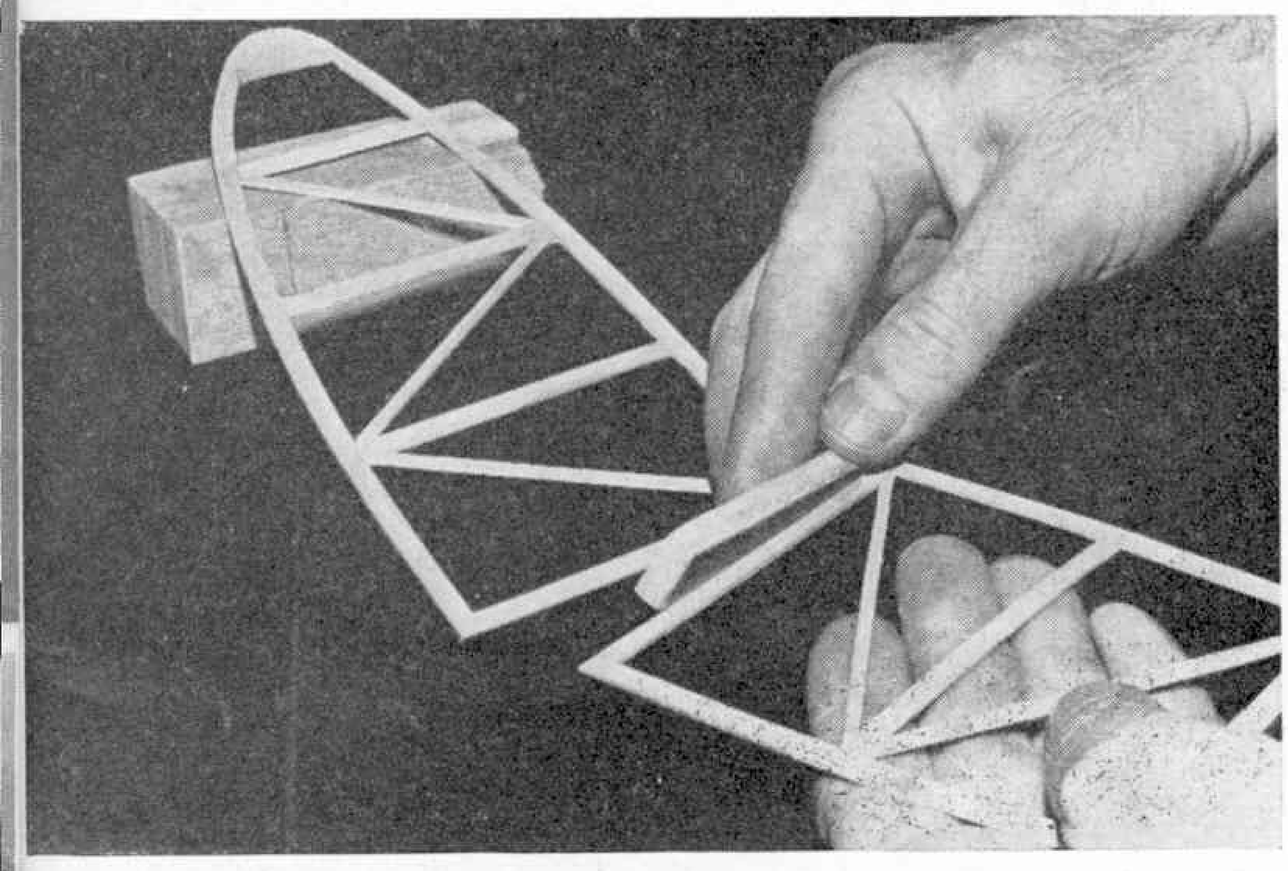
A PLEASANT EVENING'S WORK IS ALL THAT'S REQUIRED TO COMPLETE ONE OF THE NEW HALES FROG FLITE MODELS SO BUILD IT TONIGHT AND

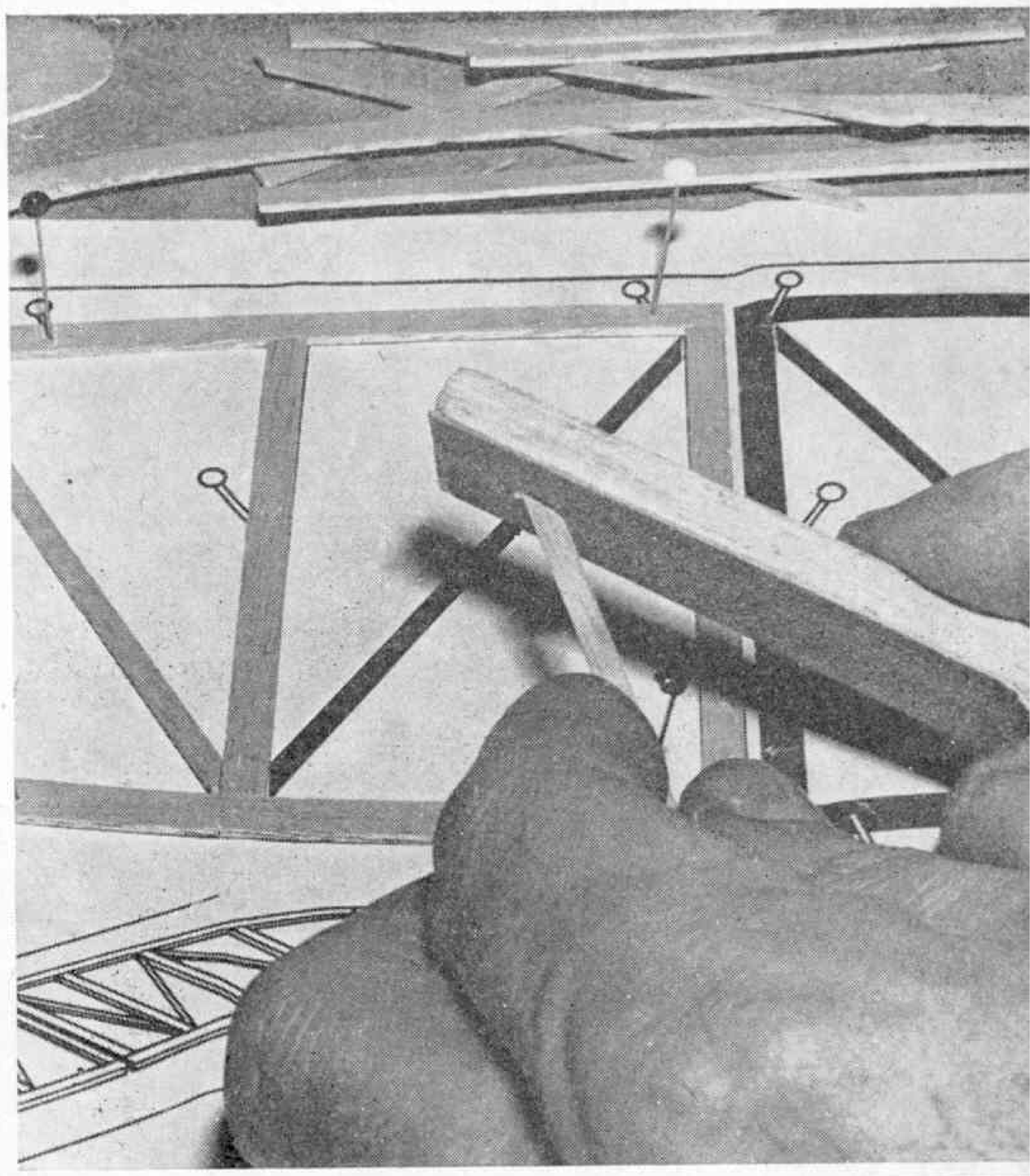
FLY IT TOMORROW

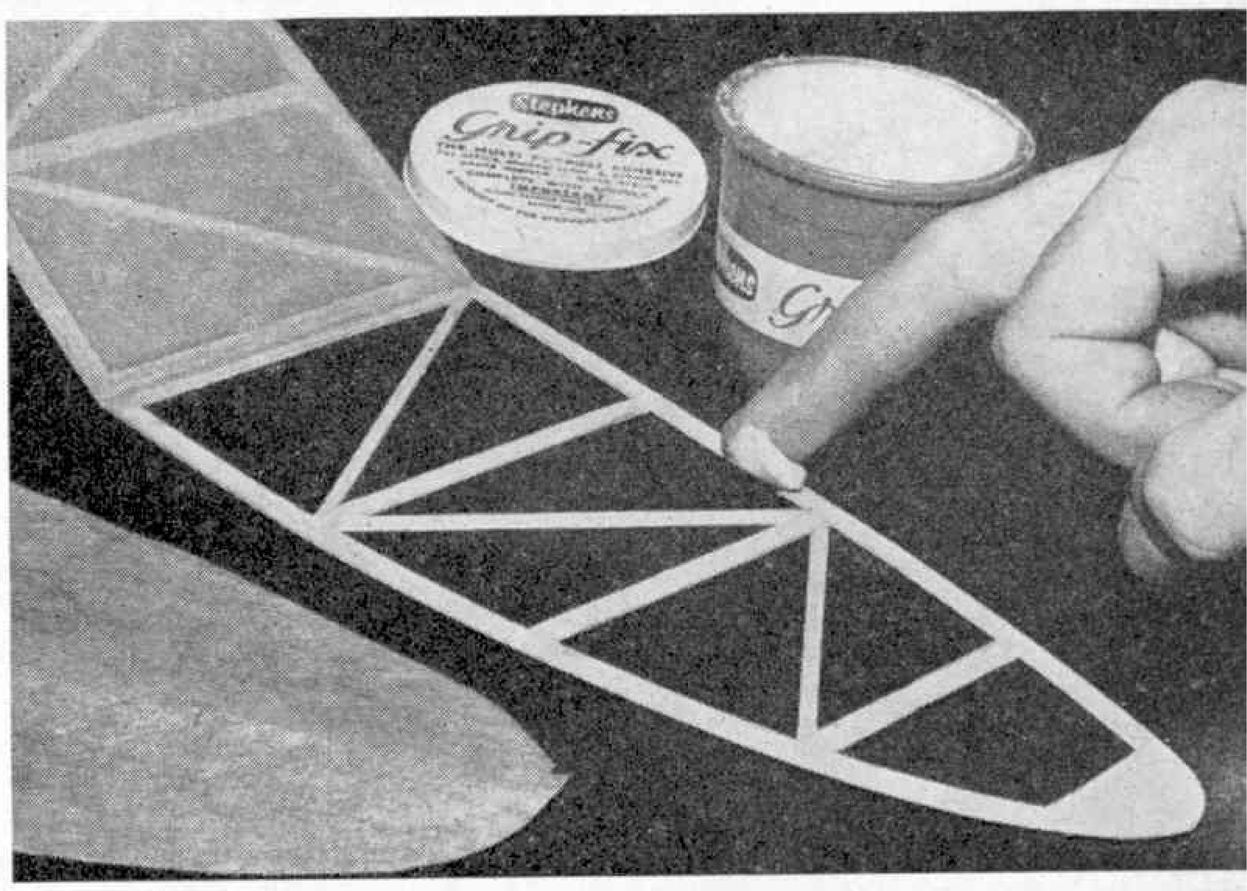












Opposite page: open out the hole in the nose with a round file or a piece of sandpaper 'rolled-up'. The nose button should be a fairly tight push-fit. Small pieces of tissue cemented over the rear hook wire attachment will strengthen it

Top left: strength of the undercarriage attachment can be increased by binding the legs together with thread, then coating the joint with cement

Top right: all the parts ready shaped, but a little sandpapering will ensure a really good fit. Glass headed pins hold the wing parts in place until the cement dries

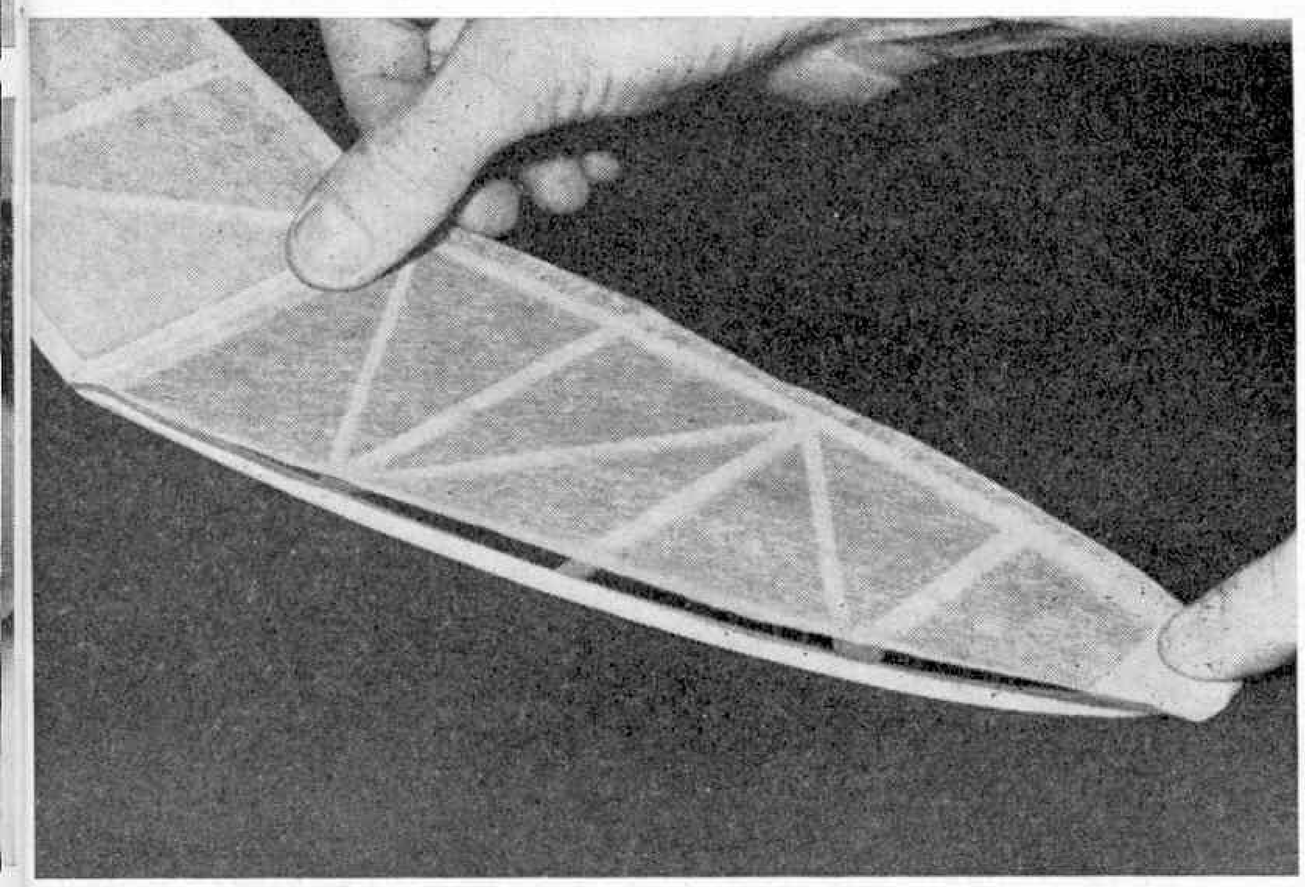
Centre left: sand the inner ends of the wing panels to correct angle, so that the edges of the centre ribs are parallel when the tips are raised to the correct dihedral

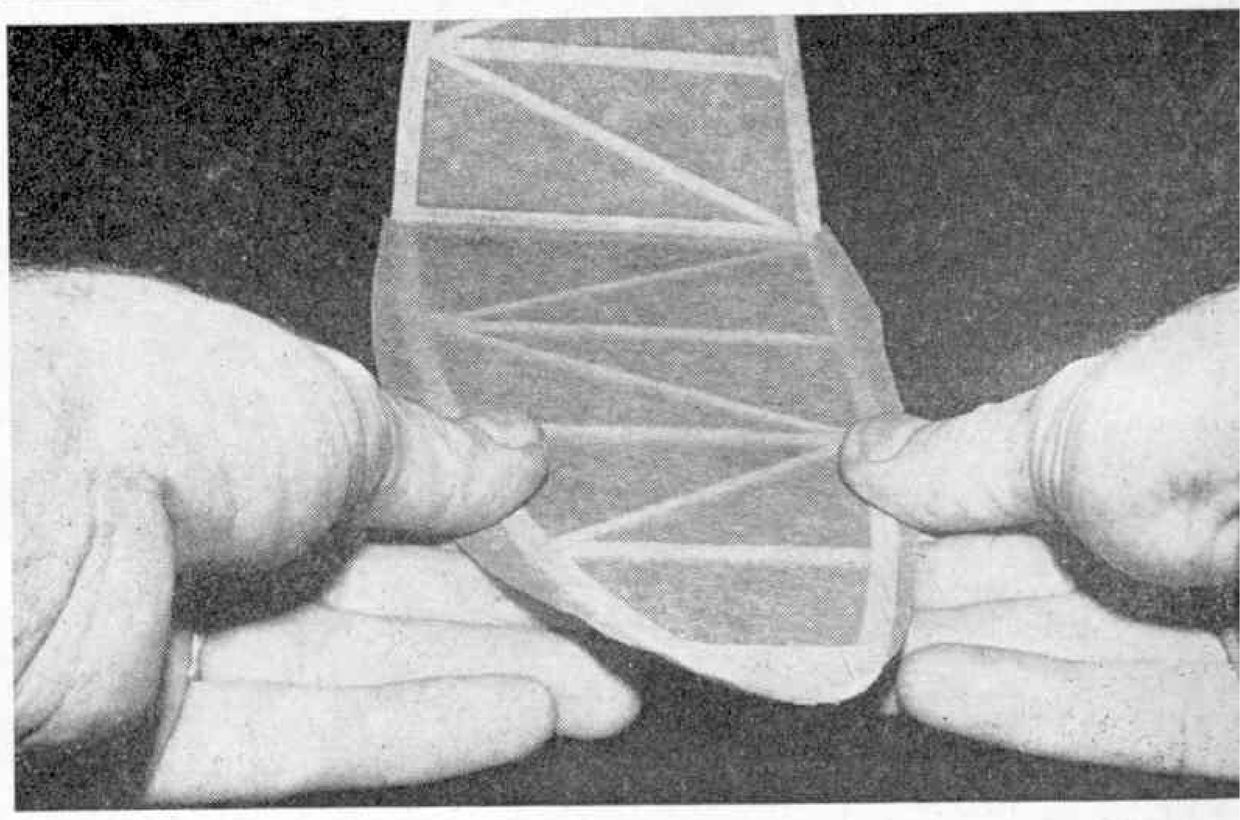
Centre right: cut the tissue to shape, allowing a little overlap, sand any rough spots off the assembled wing and then smear paste around the outer parts of the wing only

Bottom left: stick the tissue first to the wing tip, then to the wing root (centre line of wing)

Bottom right: working along the wing from one end, press the tissue to the wing edges, at the same time easing it tight with an outward sliding movement of the thumbs

Other models in this Hales Frog Flite 3s. 6d. range include the Hurricane, Bird Dog, Mustang, Auster and Piper Cub





creating atmosphere

Accurate detail is often not enough to capture the atmosphere of the prototype, and real locomotives are seldom as clean as a model.
Mike Rickett describes how to give your motive power a genuine operational appearance.

THOSE of you that own a Tri-ang Hornby locomotive will certainly remember the time when it was first bought and taken out of its box, to be placed on the layout ready for its first train. You will remember its sparkling 'new' appearance, its pristine superstructure and bright driving wheels and motion. Although this is undoubtedly how we would expect a new model to look, how often have you seen a real steam engine looking quite as clean, except when it has just emerged from the works?

Tri-ang Hornby locomotives in nearly every way, are scale models of their counterparts on British Railways. Fine detail is crisp and clear and considerable trouble is taken by the manufacturers to see that the locomotive in all essentials looks like the real thing and operates smoothly and reliably. If, however, you are one of those enthusiasts who strive to make your layout as authentic as possible, you will know that detail itself is often not enough to make a realistic model, and that it is therefore worth giving your models extra attention to make them blend with the rest of the layout.

That elusive 'atmosphere' that some layouts have, is in no small measure due to the careful positioning of models, but more important, time and care spent on each individual model. Instances that come readily to mind are: buildings with gaps under their walls where they have not been properly fixed to the baseboard, signals and other structures that lean crazily, and scenery that does not look convincing. Shiny locomotives and stock are also a little unconvincing because they are very rarely seen in real life, except on preserved railways and in museums. Only locomotives that have just emerged from the works have this sparkling appearance and even this wears off extremely quickly during the course of day-to-day running. Creating 'atmosphere' by the correct painting of your locomotive is therefore worth while.

Take a look at that factory-fresh Tri-ang Hornby locomotive you have just bought. Its coupling rods and motion are bright, its superstructure beautifully finished in a uniform matt colour and the lining and letters strikingly clean. Now go to your nearest railway station and look at a real steam locomotive. It will probably be a dirty grey or brown. The lining will probably be non-existent or very faint, the coupling rods covered in dirty oil and streaks of red showing at various places on the superstructure where there is rusty water. It may also have faint streaks of white near the chimney or dome due to priming—a sure sign of hard work. This can all be reproduced on your model with a little time and care, although, I admit, a certain courage is needed to set about a brand new locomotive you have just bought.

Go to your nearest art supply shop and ask for students' oil colours. These are sold in tubes and you will require a tube of Flake White, Ivory Black, Cobalt Blue, Cadmium Yellow, Chinese Vermillion, and a bottle of turpentine, used in the same way as water for water colour paints. You will also need an old rag, large and small water colour paint brushes, P.V.A. glue (such as Casco) or Seccotine and a candle.

Before you set to work, try a little experiment. Mix these various primary colours using plenty of turpentine, just to get the feel of them. A piece of glass or enamel makes an excellent palette and roughly speaking, you will find that blue and yellow makes green; blue and red, purple; red and yellow, orange; and red, yellow, black and white will give brown in various shades according to the quantities of each primary mixed.

When you have got the hang of it, mix a brownish grey from black, white, yellow and red, with a little blue. The resulting colour should be slightly more grey than brown and when you are quite satisfied that you have the correct shade, dilute it with turpentine and give the locomotive superstructure a wash using the larger brush. Before it has dried, dab off most of the paint with a rag, leaving deposits in corners and round fine detail such as rivet heads. On the tank or cab sides use a light smearing motion until a little of the lining disappears and the surface has lost its uniform matt colour. Do not wipe all the paint off, but leave thin deposits over the wider areas and a thicker layer round the edges of cab sides and roof, edges of boiler bands, chimney top, splashers, and at the base of the fire box. Anywhere, in fact, where you would expect to see deposits of grime and dirt.

The paint will at first appear to be glossy, but providing that it was mixed with turpentine, it will dry quite matt. With a slightly stronger mix of the brownish grey paint, pick out all the parts of the locomotive below the footplate, including the wheels and spokes, valance rail, steps, and the chassis sides. Be careful, however, not to paint the wheel treads or the current collector strips behind the wheels. The buffer beams and buffers should also be treated in this way to tone them down a little. You can, if you wish, use a little more orange in the mixture for the firebox, since on the real thing, it often is this colour after a long period of work. Do be careful not to add too much orange however. Only a suggestion is needed to give the required effect.

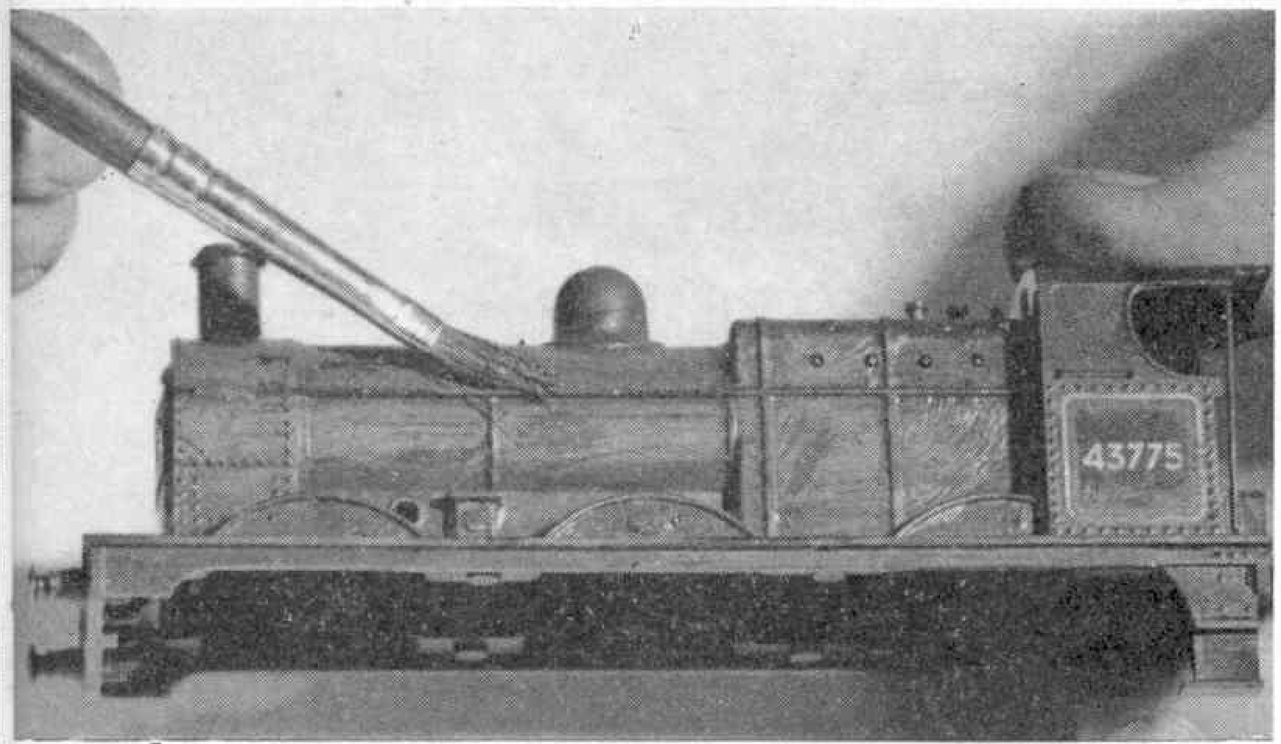
If you take a look at the real locomotive again, you will see orange red stains in a number of positions on the locomotive, where there is either rusty water, or where the metal itself is corroded. This, on your model, can be represented with a mixture of red orange, slightly subdued with the brown you were using before. Use the small brush for applying this and have the large brush, clean and loaded with pure turpentine, ready to hand.

Place a spot of colour at the base of the safety valves and immediately dab it with the large brush, pressing out the turpentine so that it runs down the firebox sides. Do the same at the base of the dome and on the tank tops —in the case of tank engines. Allow the rusty water colour to trickle down the tank sides and place spots of colour near steps and other places where it would be likely to be seen on the real thing.

Clean both brushes and mix white with turpentine. As before, place a drop of colour either side of the locomotive chimney top, using the larger brush to dab on turpentine so that streaks of white run down the chimney and firebox, giving the locomotive the appearance of having been primed. Clean your brushes again and mix yellow with black to get a dirty oil colour, which you can use to paint the connecting and coupling rods, as well as other parts of the locomotive that would normally be oily.

Your locomotive should by now be looking a little more like the real thing and only a few more things remain to be done. Paint the cab roof a dirty grey colour and run the top of the engine over a candle flame. Do not, however, allow the flame to remain in one spot because this might result in parts of the superstructure melting. The locomotive bunker or tender can also be treated by applying a coat of glue over the existing coal and placing small lumps of real coal into the glue. This gives a much more realistic finish and if a P.V.A. glue is used, as I suggested at the beginning of the article, you will find that it will dry quite transparent and matt.

When you have finished painting and are quite satisfied with the engine's appearance, allow it to dry before touching it. You can then give it a coat of matt varnish to prevent the paint rubbing off as you handle it.



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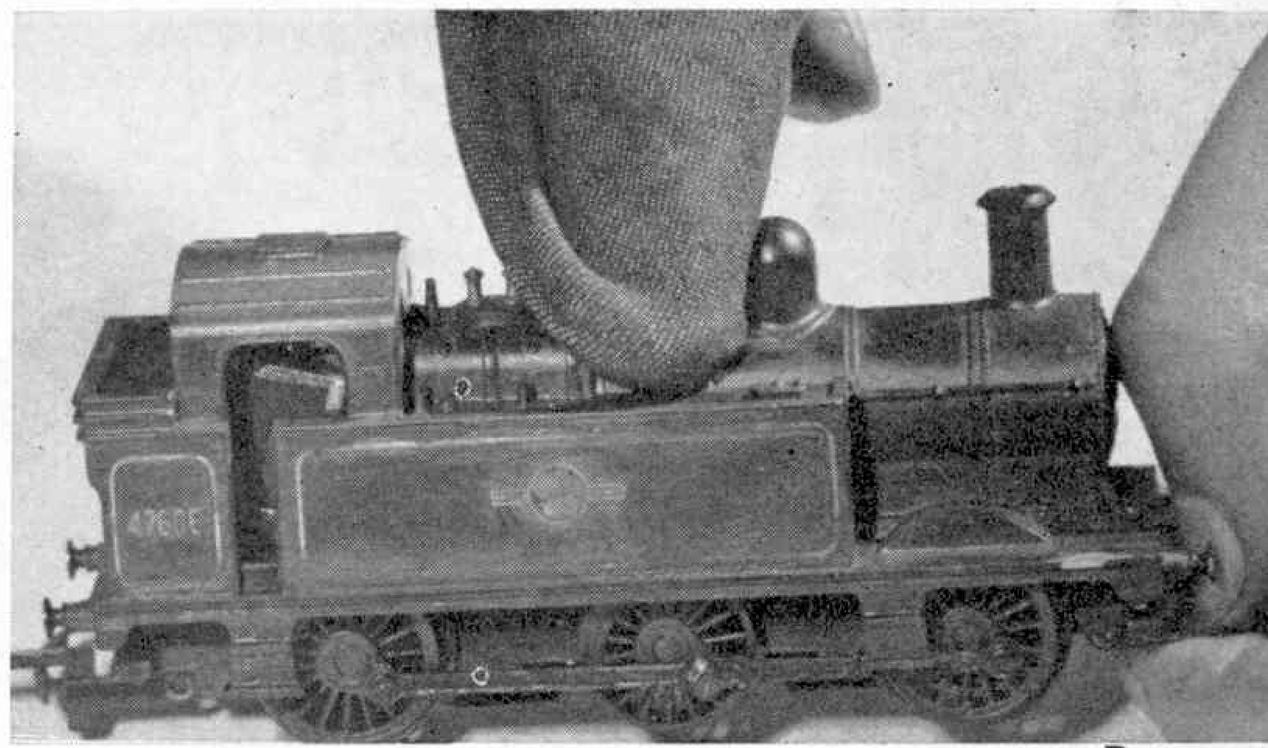

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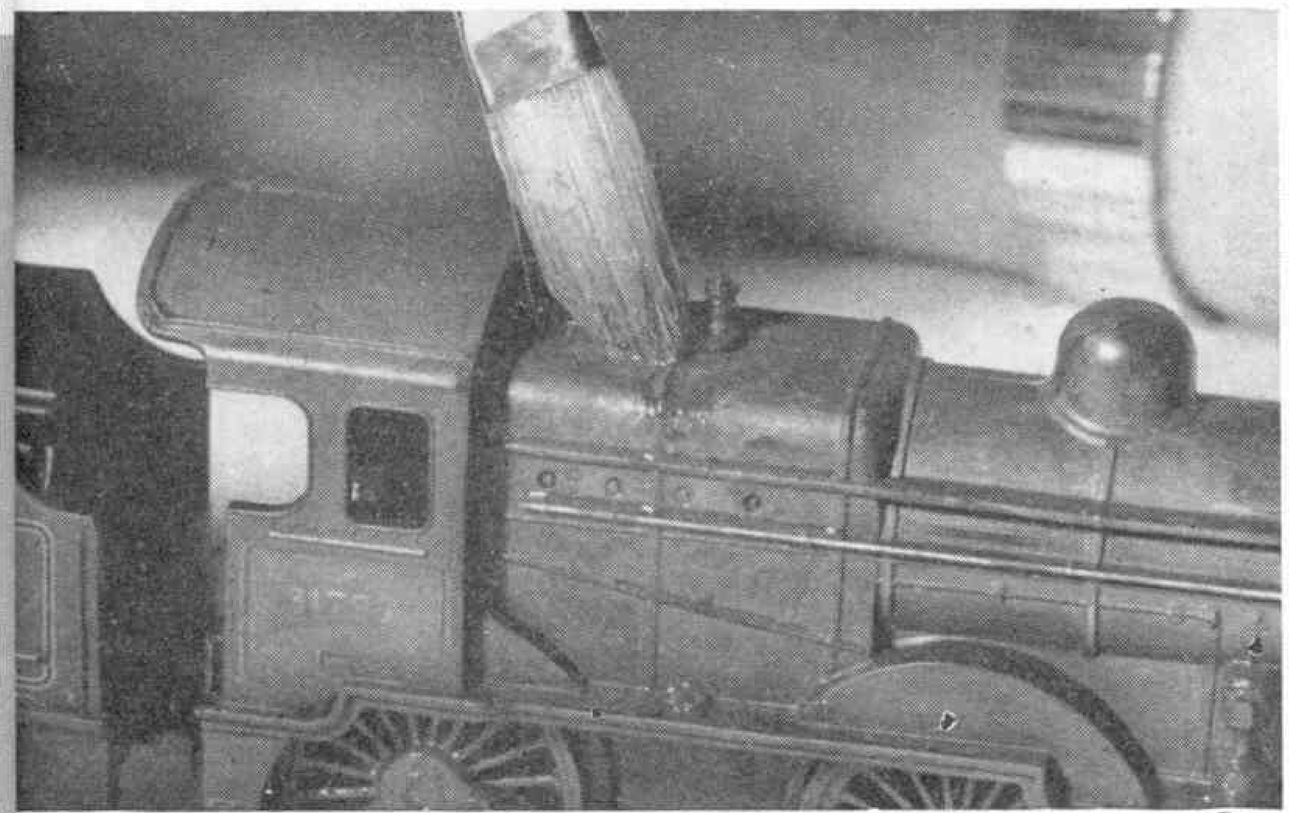

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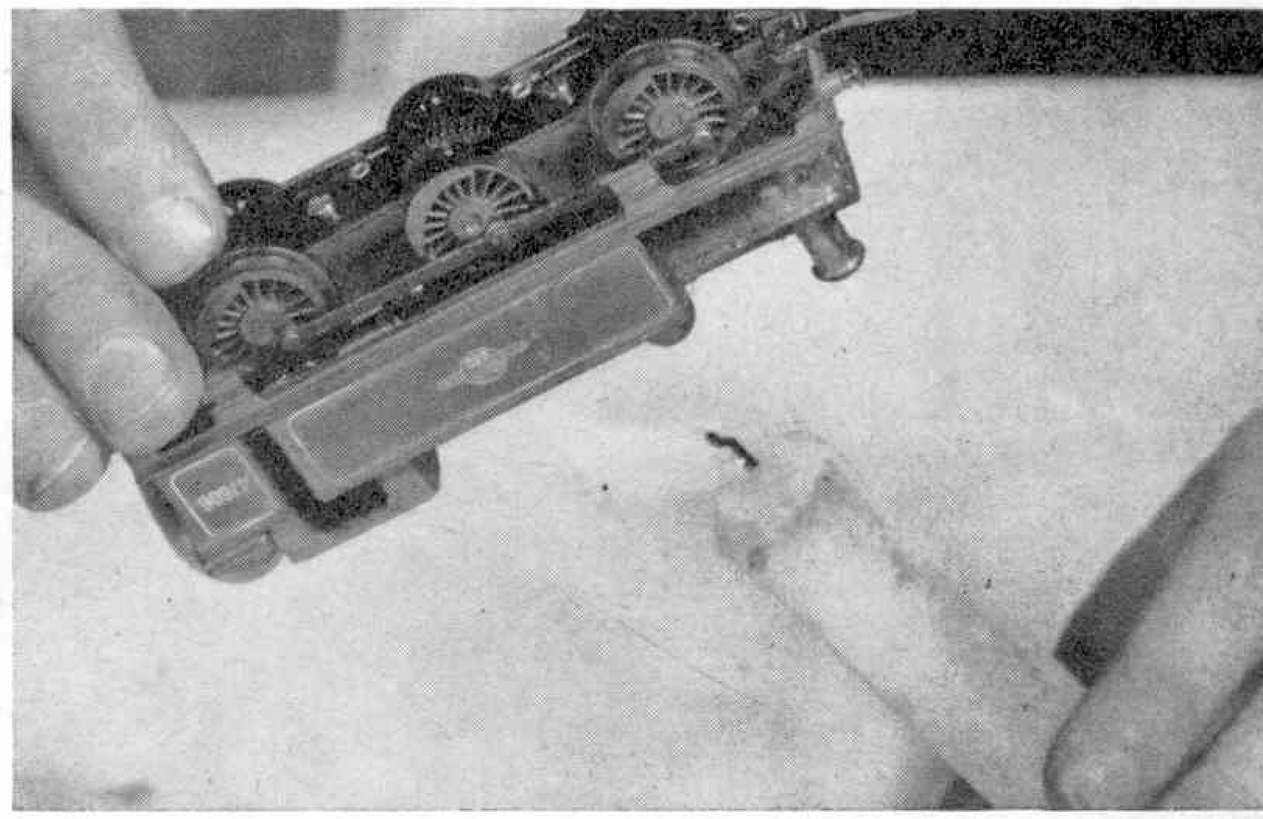


D

A The first step in the dirtying process is to give the locomotive a wash of grey brown paint.

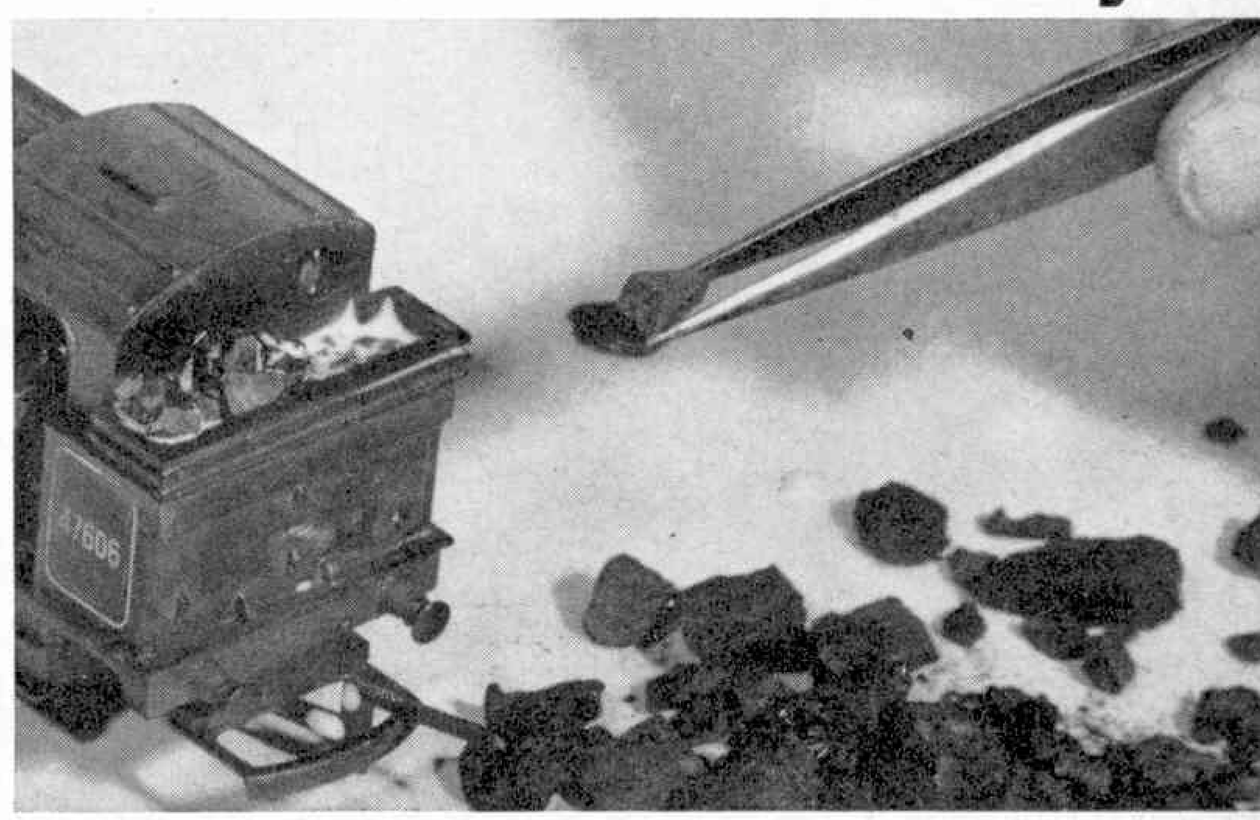
B As seen here, this is later rubbed or smeared with a rag to remove most of the paint, leaving patches of 'dirt' in corners and around detail.

C Paint representing rust is then dabbed on and a brush loaded with turpentine pressed on top to allow the paint to trickle down the sides of the locomotive.

D A candle can be used to give a sooty effect to the top of the locomotive.

E Real coal, glued on top of the existing plastic coal, is used on the tender or bunker of the locomotive to give the final touch.

F 'Before and after'.



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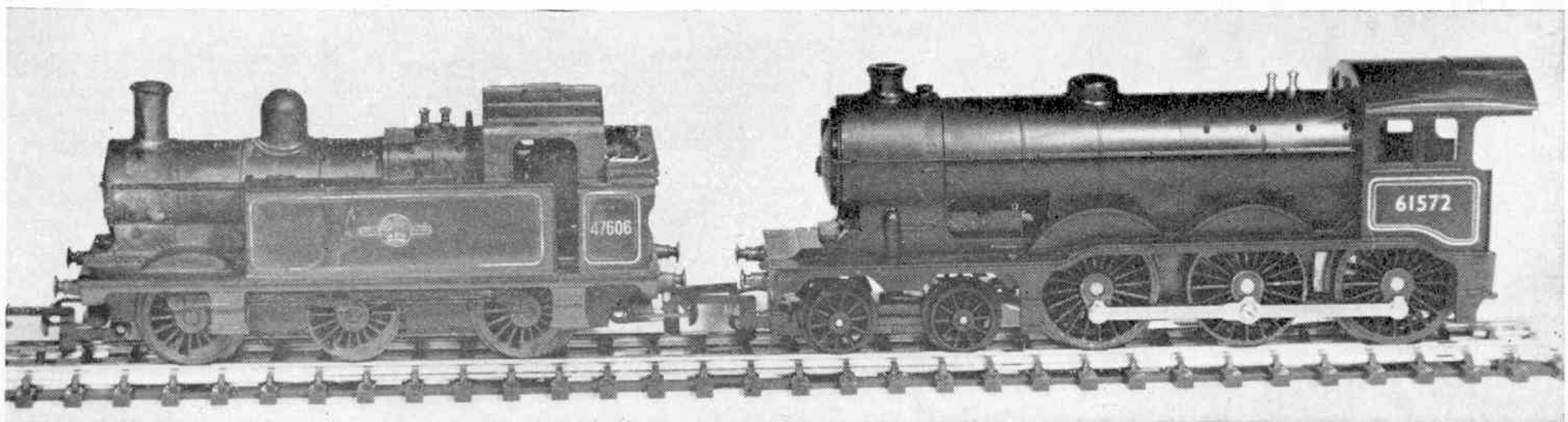

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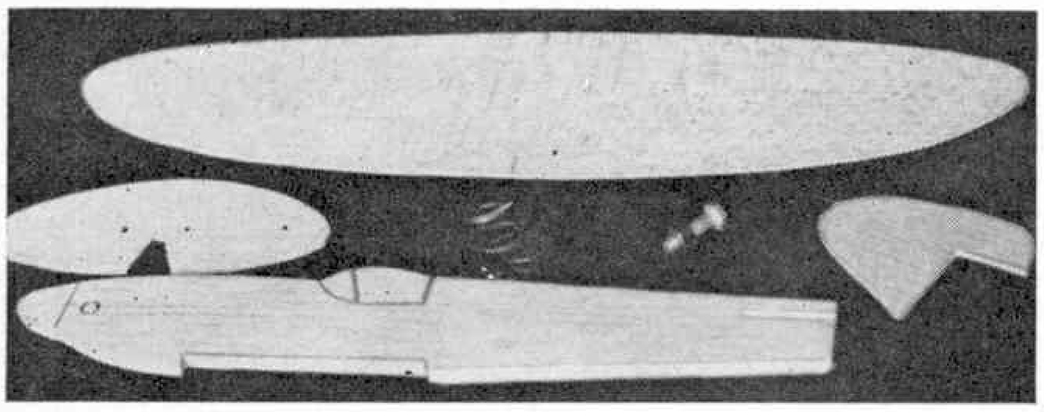

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WORKING TIPS . . .

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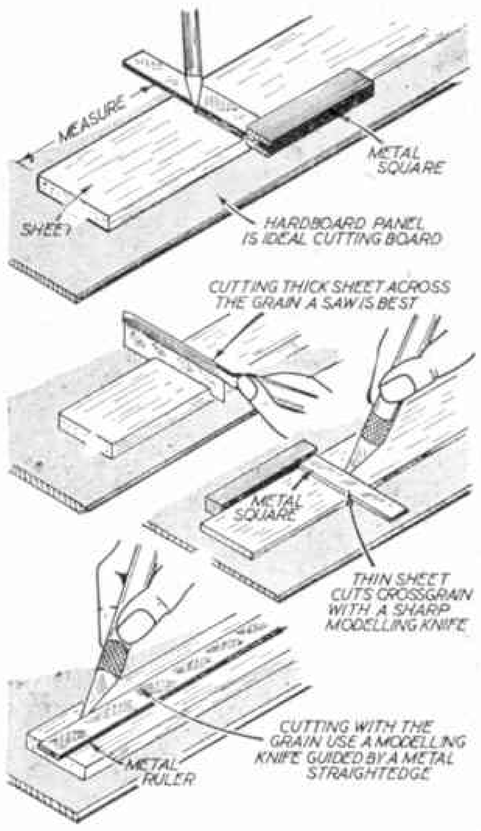

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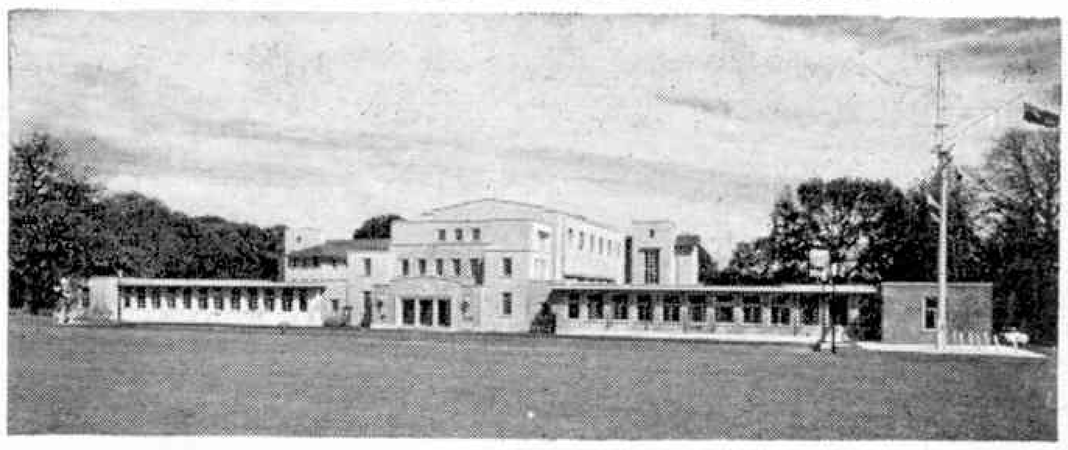

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SOLDERING EXPLAINED

MIKE RICKETT

SOLDERING, for some strange reason, is considered by many people to be something quite beyond their capabilities and worth avoiding at all costs. This is rather unfortunate because soldering is one of the most useful of techniques associated with modelling and is also one of the easiest to learn. Of all the hobbies where soldering finds an application, railway modelling is perhaps the one to make the greatest use of it and any newcomer will find, as his interest in the hobby develops, the need to solder occurs more and more frequently.

A successful soldered joint depends entirely on the conducting of heat from the iron to the work and for this reason, it is most important for the items to be joined to be brought to the same temperature. If one is cooler than the other, solder will not flow evenly, resulting in either no joint at all or what is known as a 'dry' joint, where the solder is ragged and easily removed. It is, therefore, important for the soldering iron to be in contact with both pieces to be joined so that heat can be conducted to both surfaces, allowing the solder to flow evenly to give a smooth glossy joint that is not easily broken. Use a piece of glass to solder on so that heat will not be dissipated.

Cleanliness is also very important where soldering is concerned and both the iron and the work should be as clean as you can get them. Dirt on the iron resists the transfer of heat from it to the work, and also prevents the solder from flowing. Dirt on the work has the same effect and may also result in a dry joint., Always clean both the work and the iron wherever possible with emery cloth, and always use a flux.

Although a paste flux is undoubtedly the best for wiring, where sheet metal is concerned, this leaves a rather unpleasant deposit which is very difficult to clean off and an acid base flux such as Zinc Chloride (Baker's Soldering Fluid) or Phosphoric Acid is much better for metal construction such as the locomotive kit illustrated. The acid base flux has the added advantage of overcoming any fine deposit of dirt on the metal and also makes the solder flow more evenly. Do remember, however, to wash your hands and the metal parts most thoroughly afterwards, because fluxes of this type are slightly corrosive and will eat away metal after a time unless it is washed thoroughly after each session. Phosphoric Acid is perhaps the less corrosive of the two and your chemist will no doubt be able to obtain it for you.

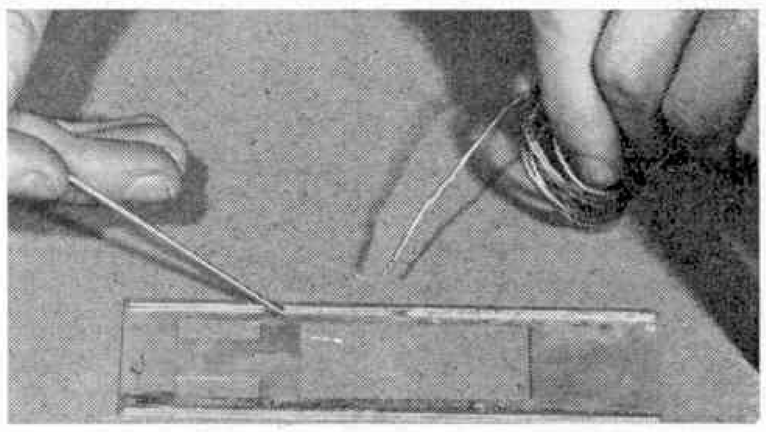
For most work, including locomotive construction, I have found that cored solder is admirable. It has the added advantage of being easily obtainable and is also small enough in section to allow it to be used for fillet joints. Tinmans solder is also useful, but cannot be used for wiring without a paste flux. For the average soldered joint, clean your iron with fine emery cloth and 'tin' the tip with a coat of solder. Apply flux on the surfaces to be joined and then tin them. Hold the iron on the joint until the tinning of both surfaces melts and unites.

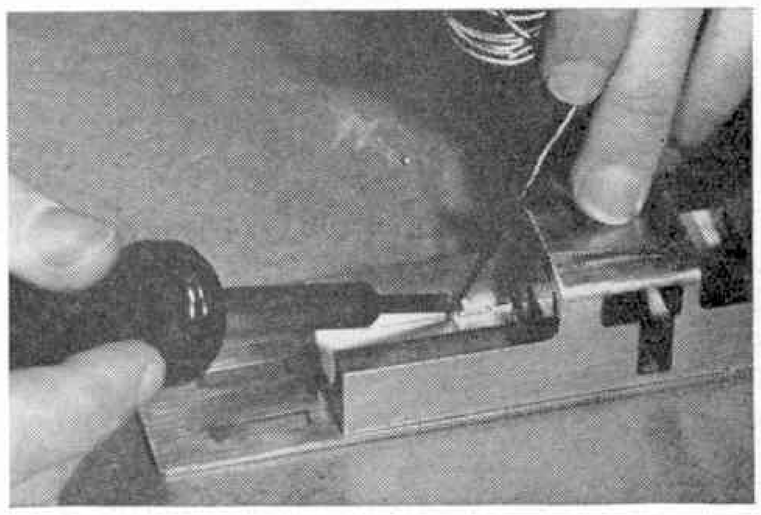
To solder a seam, run a fillet of flux along the join and then, with the cored solder in one hand, place the iron on the work and introduce the solder. When it begins to flow onto both surfaces, move the iron slowly along, taking the solder away at intervals to avoid having too much metal on the iron bit. For some inaccessible places, apply flux as before, and melt solder onto the iron, placing this on the joint until the solder flows. It might not be possible to tin the joint in circumstances such as these, and it will be necessary to rely on good fluxing and a well loaded iron.

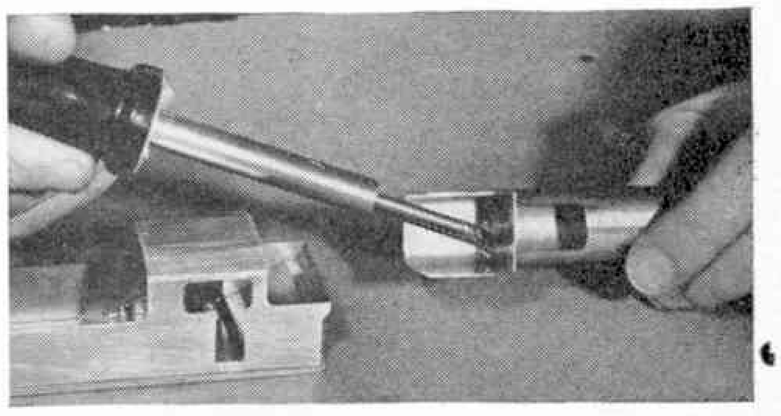
Always solder from the inside of a joint wherever possible because this gives a neater appearance and leaves less cleaning up to do. It may also be necessary to use solder as a filler, blocking up gaps in the metal where parts do not quite fit. The best way of dealing with this of course, is to file the part up beforehand, but if it should have escaped your attention, flux both surfaces and load the tip of your iron with a good blob of solder. Slowly fill the gap with solder from the inside until the gap or hole is filled. Depending on the size of gap, this will need plenty of solder, and do not be afraid of really loading your iron.

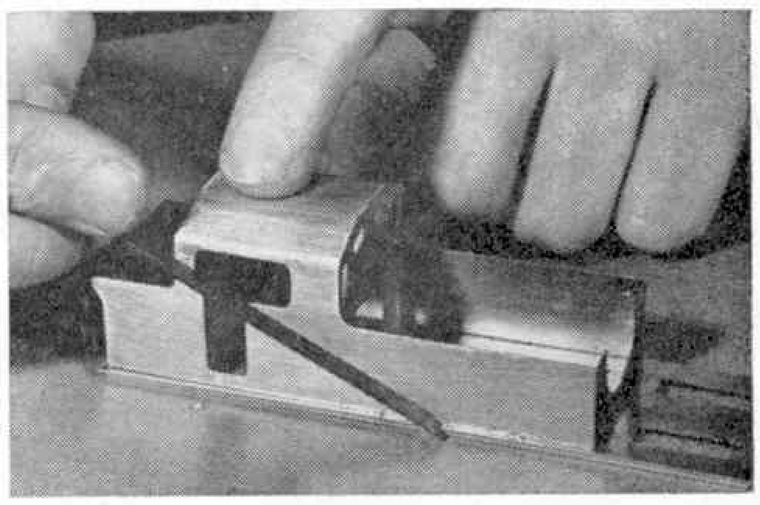
Fine parts are soldered more easily in a jig where they can be tinned with a thin coating of solder. Remove any surplus from your iron and then press the two surfaces with the iron until the solder melts. Try to avoid as much cleaning up as possible on small parts and on no account touch or hold the parts while soldering.

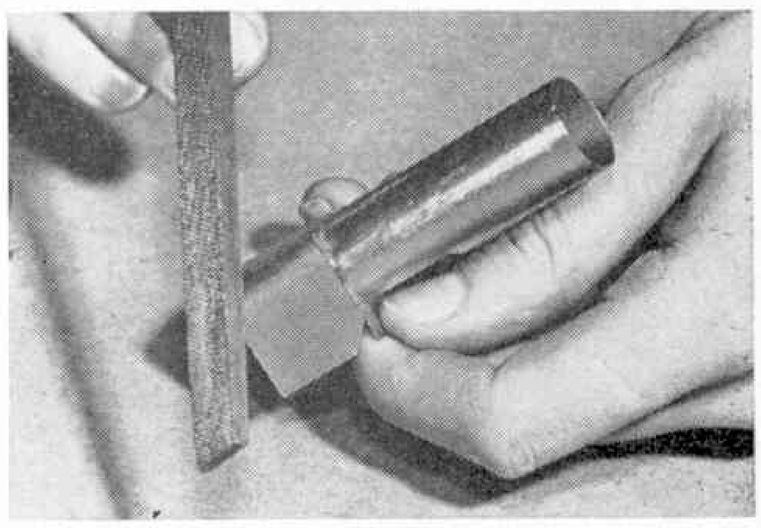
Cleaning is almost as important as the soldering itself, for it is this that gives a good or bad finish. A wash in cold water after every soldering session is essential to remove all traces of the flux, which might corrode the metal if left. All solder should be filed off from the outside of the metal with a needle file kept specially for the purpose. A ground down file made into a scraper is also very useful for removing solder and with these two items, the outside of work can be cleaned up. It may also be necessary to file away metal to the correct contour after it has been soldered, as in the firebox front in the locomotive kit. When you are quite satisfied with the final appearance of the work, give it a final rub down with fine emery cloth.

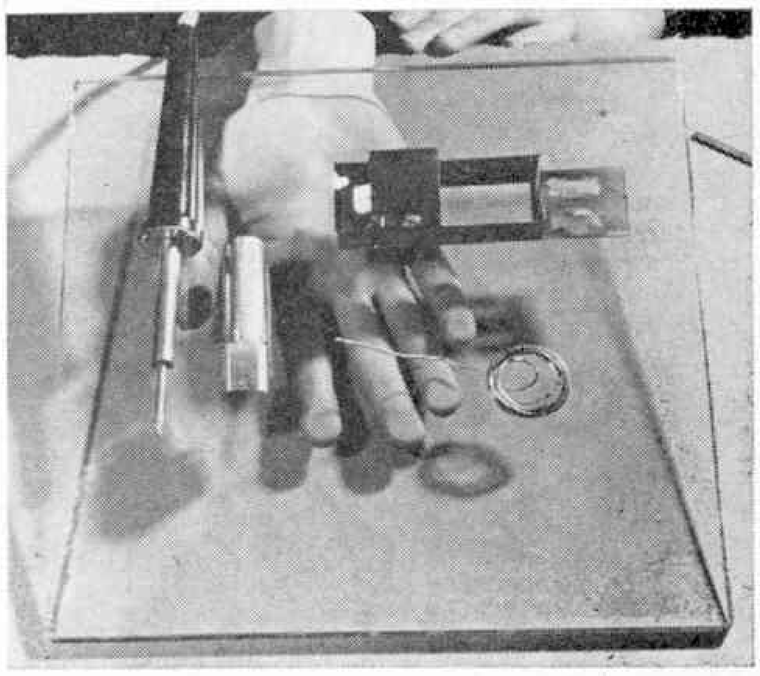












Top to Bottom:
A fillet of flux should always be run along a joint before it is soldered, as seen here on the underside of the locomotive footplate
Soldering a seam inside the locomotive side tanks. Always solder from the inside wherever possible to minimise cleaning up afterwards
Soldering another seam, but this time by melting the solder on to the bit of the iron beforehand, fluxing the join and then melting the solder with the iron
Cleaning up solder with a needle file specially ground down to the shape of a scraper
A coarse file poised ready for filing the firebox front to the correct contour. It frequently simplifies the shaping of parts such as this if they are first soldered into position
A sheet of thick plate glass makes a good soldering surface. It is flat and has the added advantage of not conducting heat

Euston's yesterday

THE greatest work of railway modernisation ever to have taken place in this country resulted, on April 18 of this year, in new high speed express trains linking up Manchester and Liverpool with Euston, London. The modernisation scheme, costing a total of £175 million, included the installation of an overhead catenary system on the 25 kV 60 cycle frequency, and also the rebuilding on a vast scale, of bridges, track and other civil engineering features, and the modernising of many station buildings along the route. In this sphere, the largest single work was undoubtedly the rebuilding of Euston Station itself, first undertaken in 1961 as part of the British Railways modernisation plan.

The new high speed express trains between Euston and Manchester will run at basically 2 hr. intervals, and the fastest will take only 2 hr. 35 min., for the 188¾ miles, which, of course, compares very favourably with the former time of 3 hr. 10 min. Similarly, the fastest train along the 193 miles between Euston and Lime Street will also be 2 hr. 35 min., as compared to 3 hr 4 min. previously.

There is no doubt that the new Euston will be more in keeping with the highly modern railway system served by it, although it is pleasant to recall the Euston that is no more, which stood for over one and a quarter centuries, through three successive railway

administrations. Almost a landmark in itself, Euston was famous for its Doric Arch, and also for its Great Hall, second only in size to that at Buckingham Palace.

The rebuilding of Euston became necessary when the station became in need of repair—although the main line electrification programme would, in any event, have called for vast reconstruction work. The opportunity was therefore taken to begin the rebuilding of the station, which meant among other things, the disappearance from the scene of both the Great Hall and Doric Arch.

The early history of the station is of special interest because of its associations with the London and Birmingham Railway—one of the ancestors of the mighty London and North-Western Railway, subsequently part of the London, Midland and Scottish Railway. The architectural splendour that was lavished on Euston would, perhaps, have been more befitting of a building positioned in the centre of London, and it may appear strange that a building of the importance of Euston was sited in what were, during the early nineteenth century, the outskirts of the city. This, however, was due, in no small measure to the great ignorance and prejudices that early railway promoters had to contend with when acquiring land for their projects.

As originally planned and authorised by Parliament, the London and Birmingham Railway had its terminus at Chalk Farm, near the south end of Primrose Hill Tunnel. While the line was under construction, the directors of the railway company obtained permission to build an extension—a short branch to Euston Grove. The station as first erected was of modest dimensions and occupied only two acres of ground, but by 1870 it had increased in size to such an extent that it occupied an area of 50,000 sq. yd. It was decided in that year to widen the station on the Seymour Street side to provide additional lines and platforms. The station roof was also extended and a new approach was made through the gardens in Euston Square.

Twelve years later, the Cardington Street side of the station had to be diverted for further additions, which transpired to be so

Right: the Great Hall of Euston, now demolished. It was designed by Philip Charles Hardwick, and built in 1846-7.

extensive as to constitute an almost completely new station in itself with separate booking office and waiting rooms. These extensions were later altered because of the confusion caused, and it was eventually decided to merge the two stations to form one complete building. These alterations were started in 1887 and completed in 1894, the station then occupying an area of eighteen acres.

Because of its then isolated situation and the fact that it was not approached by a main road, the Euston of the early nineteenth century was for the most part devoid of any other rail or bus connections, although in the 1830s three omnibus routes served the station, conveying passengers for sixpence. The buses started from Gracechurch Street, Cheapside and Charing Cross. Also, the bus journeys were considered part and parcel of the railway trip.

The construction of the Euston branch from the original terminus at Chalk Farm was fraught with difficulties, and engineering works of a colossal nature were undertaken. On the main line, gradients as steep as 1 in 62 were required and tunnels at Primrose Hill and Kilsby had to be cut. Deep cuttings at

Tring, Blisworth and Roade were hewn out. So immense were the works along the route in fact that several contractors were ruined. Trains ascending the steep gradient of 1 in 62 at Primrose Hill were worked by stationary steam engines and a cable system.

Euston Station itself was designed by Robert Stephenson and had, when first opened, only two platforms—now numbered 3 and 6. Philip Hardwick designed the roof —the cast iron roof supports were still in position in 1961 before rebuilding began—and also the Doric Portico, which was built in 1846-7. Both these structures were truly outstanding pieces of railway architecture, although the Portico has been both praised and reviled during its long history. A once popular name for it was 'The Gateway to the North' and, in fact, it was built from Yorkshire stone, at a cost of £35,000. Its columns were 27 ft. 6 in. high and 8 ft. 6 in. in diameter, and the height of the arch was 72 ft. Before the arch was demolished, the original coat-of-arms of the London and Birmingham Railway could be seen on the wrought iron gates at the entrance to the station.

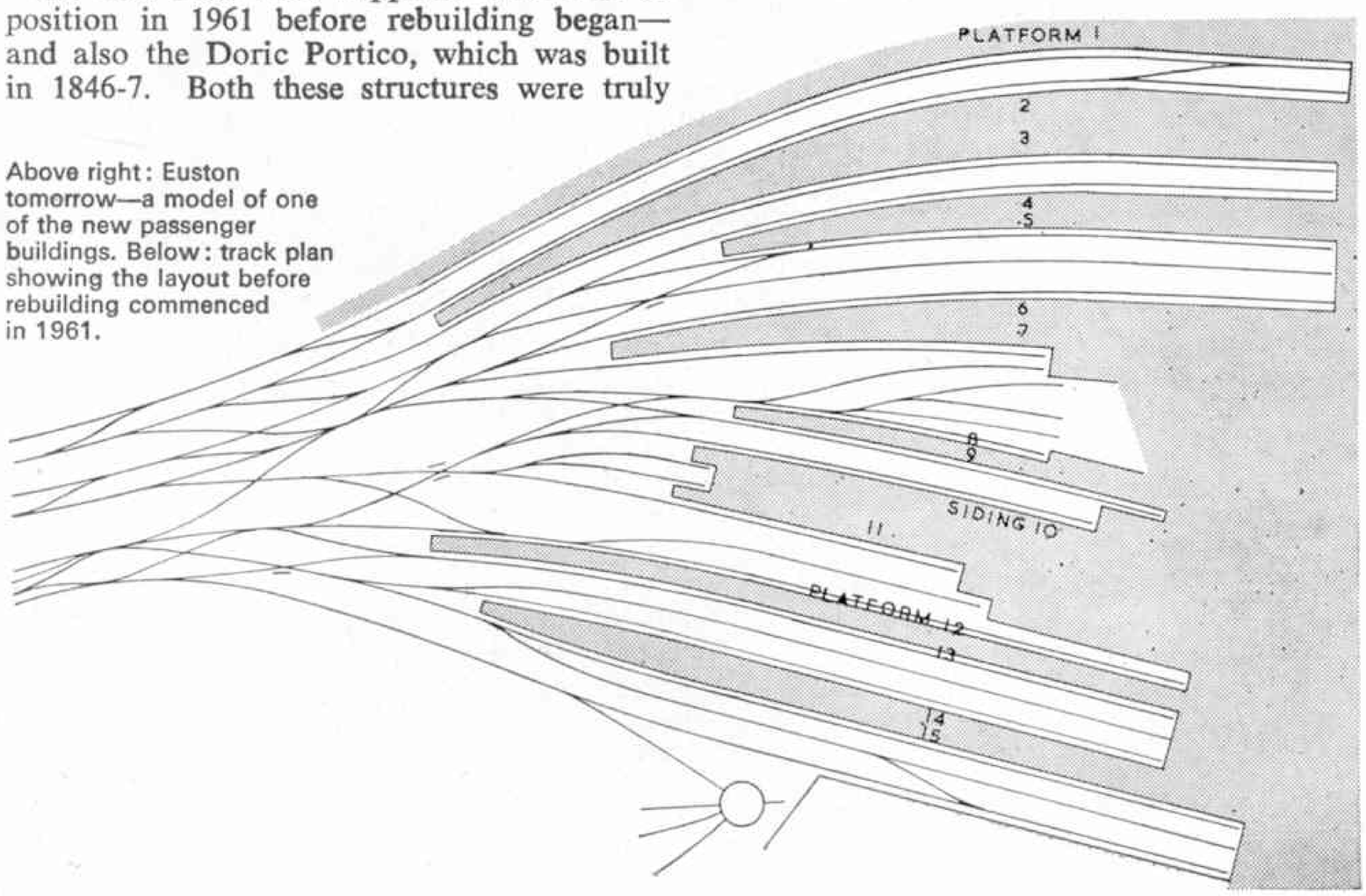
The Great Hall was another masterpiece of early Victorian genius and was 128 ft. long, 62 ft. wide and 64 ft. high with a great ornamental ceiling with no supporting columns. At the foot of the staircase leading to the boardroom and railway offices was a statue of George Stephenson, erected in 1854.

Many reminders of the early Euston still existed before the station was demolished. Platform 9 was, for instance, nicknamed 'The York'—a definite link with the early days, before King's Cross Station was built, and when the York traffic from London was routed via Rugby and Derby. No. 9 platform was used principally by local and semi-fast trains and also by several long-distance parcels trains and relief expresses.

The nickname of No. 6 platform — 'The Departure' — referred to early London and Birmingham Railway days when it was the Birmingham departure platform, and was used latterly by only few expresses, although the 11.30 a.m. to Birmingham, and the Sunday morning expresses to Scotland were regular users of the platform for a number of years. No. 9 platform was used for official exhibitions and also by Royal trains departing for Ballater.

Although the origins of a number of Euston nicknames are unknown, many still live on in everyday use. 'The Kensington Bay' is such a one and refers to No. 7 platform. Many other nicknames were born at times of crisis and it is not therefore surprising to find that the carriage sheds bore the names of 'Port Arthur' and 'Mukden', 'Khyber' and 'Suez'. Topical nicknames were also given to the down carriage sidings.

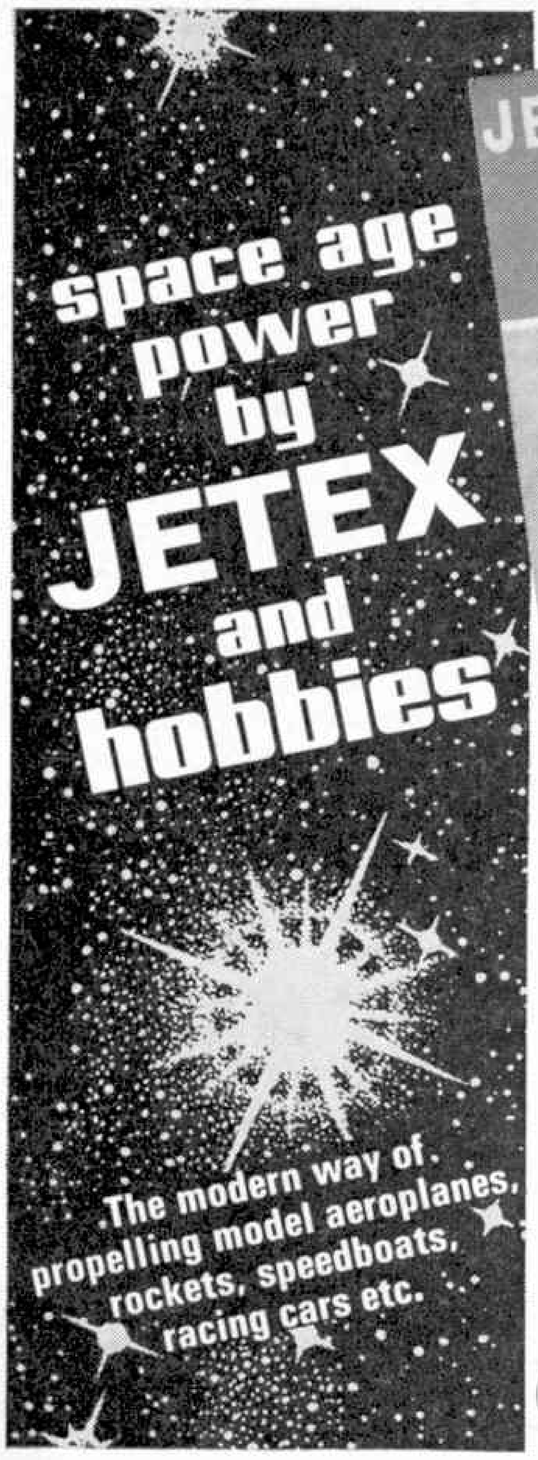
In August, 1848, Euston saw the first departure of a train that was to become world famous — the 'Irish Mail' which has run between Euston and Holyhead ever since. The first through train between Euston, Glasgow and Edinburgh left Euston at 10 a.m. on February 15, 1848, and has also run at the same time every day since then. It is now known as 'The Royal Scot'. The forerunner of the modern travelling post office made its first journey in 1838 and in 1885 it became known as the 'West Coast Postal', which travelled to Aberdeen, picking up and dropping the mails along the journey.



Above right: Euston tomorrow—a model of one of the new passenger buildings. Below: track plan showing the layout before rebuilding commenced in 1961.

During the 1850s, it was the practice to pilot all trains out of Euston to the top of Camden Bank. When the train reached the top of the bank, the fireman of the pilot engine would climb to the back of the tender and uncouple his engine from the second locomotive and its train. The pilot engine would then move speedily over a set of points into a siding where the points would be changed just before the train itself was about to pass! Needless to say, such dangerous practices were later discontinued on the introduction of more powerful locomotives and modern signalling.

Mike Rickett



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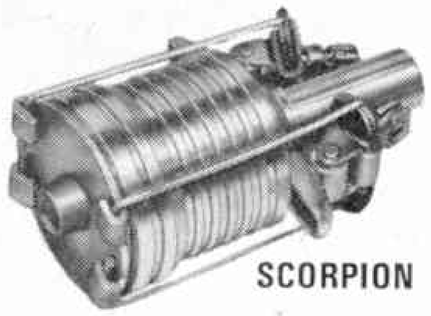
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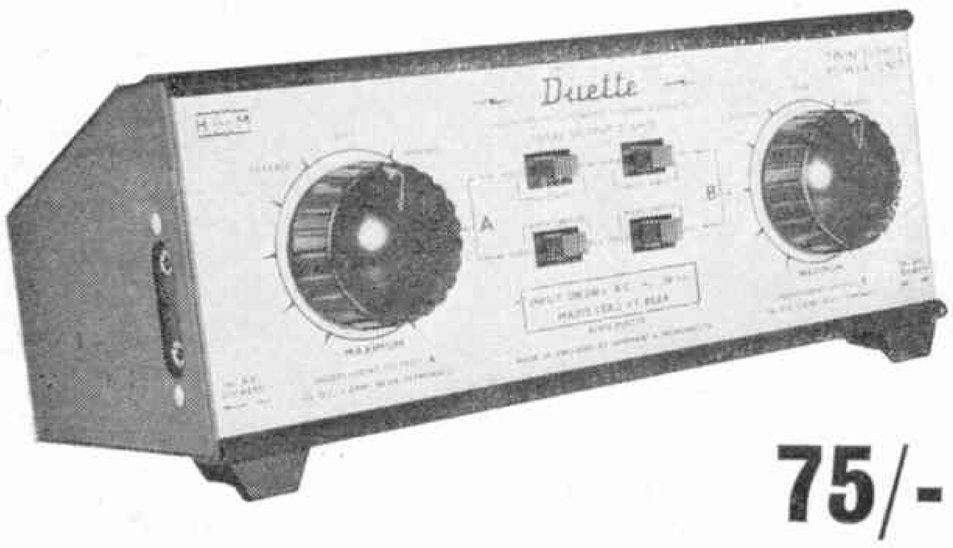

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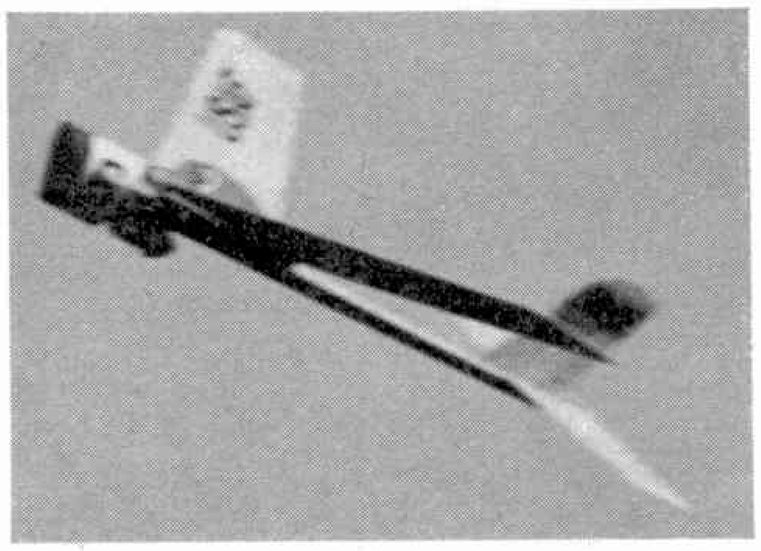
'JETRIDA'



It's easy to be a Jet Set Leader with this sparkling new Malmström creation. Your wing men will soon provide the rest of the squadron when they have seen your 'Jetrida' in high speed action.

MOST of today's modern war planes are powered by jet engines, and the model we are presenting this month—'Jetrida'—not only has the sleek swept-wing layout of an up-to-the-minute fighter, but it is also jet powered. The power unit for this really easy-to-build model is the famous Jetex 50 C motor. This little motor has three main advantages over the other means of model aircraft propulsion. It is easy to operate, gives the same thrust for each flight, and in these days of the noise nuisance it is *silent* in operation. If you have never flown a Jetex-powered model before, then get in on the exciting jet age with 'Jetrida'. If you are already a Jetex fan, then you will need no encouragement to get started right away on this super little jet-job.

Construction is so easy that we are going to leave the 'easi-build' sketches and photographs to take care of the building session. Build your model step-by-step, as shown in the sketches, and your 'Jetrida' will be ready for action in a very short time. So straight on to a word or two on Jetex operation and the trimming and flying of 'Jetrida'.

It is very important to carefully balance a Jetex model. Do this as shown in the sketches. With the wing in the position indicated on the plan, you may need a very small amount of nose or tailweight to get your model to hang level with the ground. Now look at the model from the front view. If one wing hangs down lower than the other, a tiny piece of lead, or a paper clip can be neatly Sellotaped to the undersurface of the lighter wing panel (somewhere near the tip) until the model balances perfectly. Glide tests are the same as for any other type of model (see the August issue of Meccano Magazine). Be sure the Jetex 50 C motor is in position in the clip, but is *not* loaded. Launch gently into any breeze that may be blowing, but *never* throw the model. 'Jetrida' should leave your hand, and glide straight ahead, landing some 25-30 feet in front of you. You can adjust the rear edge of the fin to correct any slight turning tendency. Bend it gently to the left to correct a right turn, and to the right to correct a left turn (model viewed from the rear). Adjust only about $\frac{1}{16}$ in. at a time. Having obtained a straight glide, you can load your Jetex motor with *one* charge. The Jetex 50 C Kit includes full instructions for loading, firing, and maintaining your motor. *Please* read them!—they will save you a lot of time and trouble. When you are ready for your first power flight, ignite the wick with a piece of smouldering balsa wood or thick string: do NOT use a match. Wait for the Jetex motor to really get going and build up full thrust (you'll hear a steady hissing sound when this occurs), and then launch the model steadily as you did for the glide tests. Never launch the model before the wick has ignited the charge, otherwise your model will just glide to the ground and the charge will be wasted. For some reason or other even experienced Jetex fans find it difficult to wait for the motor to develop full thrust (about 2 seconds only) before launching—so please be patient, and wait for the thrust! Under jet-power your model will climb to a fair height, probably turning a little, and then as the Jetex motor cuts, it will settle into a long shallow glide back to land. If this happens, all is well, and you can try two charges for your next flight. Remember to always clean out the motor carefully after each flight, and clean the jet hole with the wire provided. If your 'Jetrida' stalls (climbs steeply, falls back on its tail, and then dives in), move the wing back a little, or add a wee spot more nose weight. If it dives, move the wing forward a little (about $\frac{1}{4}$ in.) or reduce the nose weight. Incidentally, your model, like our own original 'Jetrida' may balance perfectly, and not need any additional nose or tail weight at all. Violent turns (ending in spinning-in) under power, usually indicate that your Jetex 50 C motor is not lined up correctly down the centre line of the fuselage. So if you have really had turning trouble (unlikely

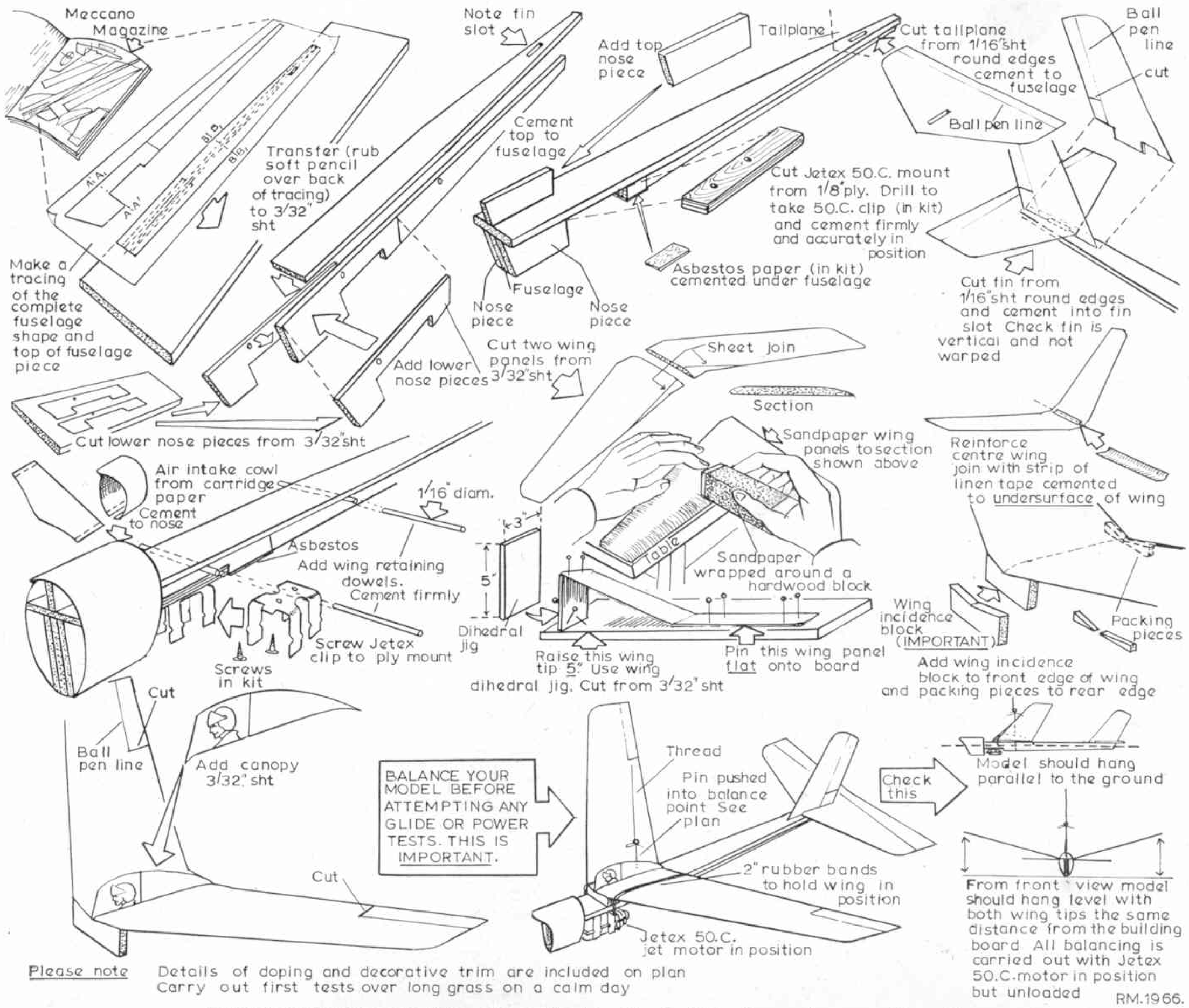
Down again, and ready for another display to thrill the crowd—proud expression needs no words!

if you've built and balanced 'Jetrida' correctly) then check the alignment of your motor, and see it is not pointing to left or right in its clip. Bending the clip slightly will usually true-up your motor if it is only a little off centre. If it is badly off, you will have to re-drill the holes holding the clip to the plywood mount.

On two charges, 'Jetrida' will really get upstairs—so fly in a field with plenty of space. If you are restricted in your flying space, stick to one charge. 'Jetrida' will still give you lots of flying fun! Gentle turns can be achieved by bending the tabs on the trailing edges of the wing tips. For a right-hand bank, bend the left tab down about $\frac{1}{16}$ in. But be careful; trimming by wing tabs (ailerons) can be fun but it is rather tricky. Your 'Jetrida' should fly perfectly without your ever having to touch the wing tabs. Now you are all ready to join the 'jet-set'. So good luck and 'jet-going'!

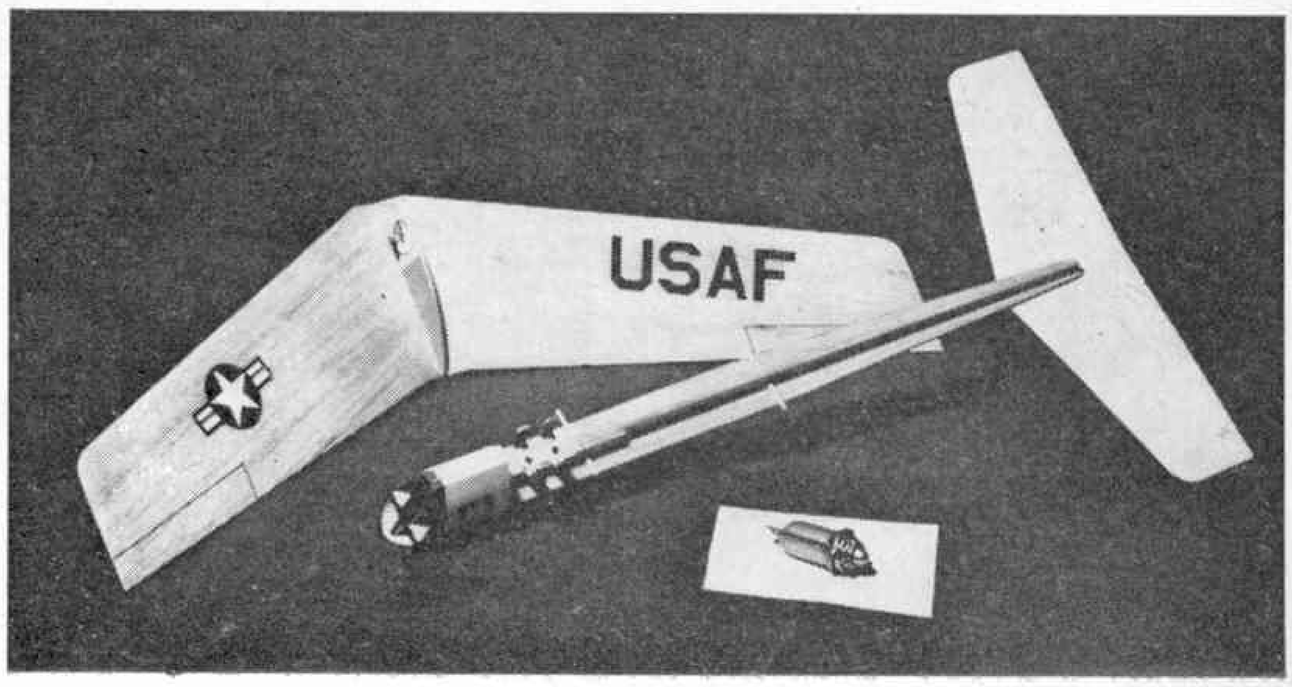
Materials List

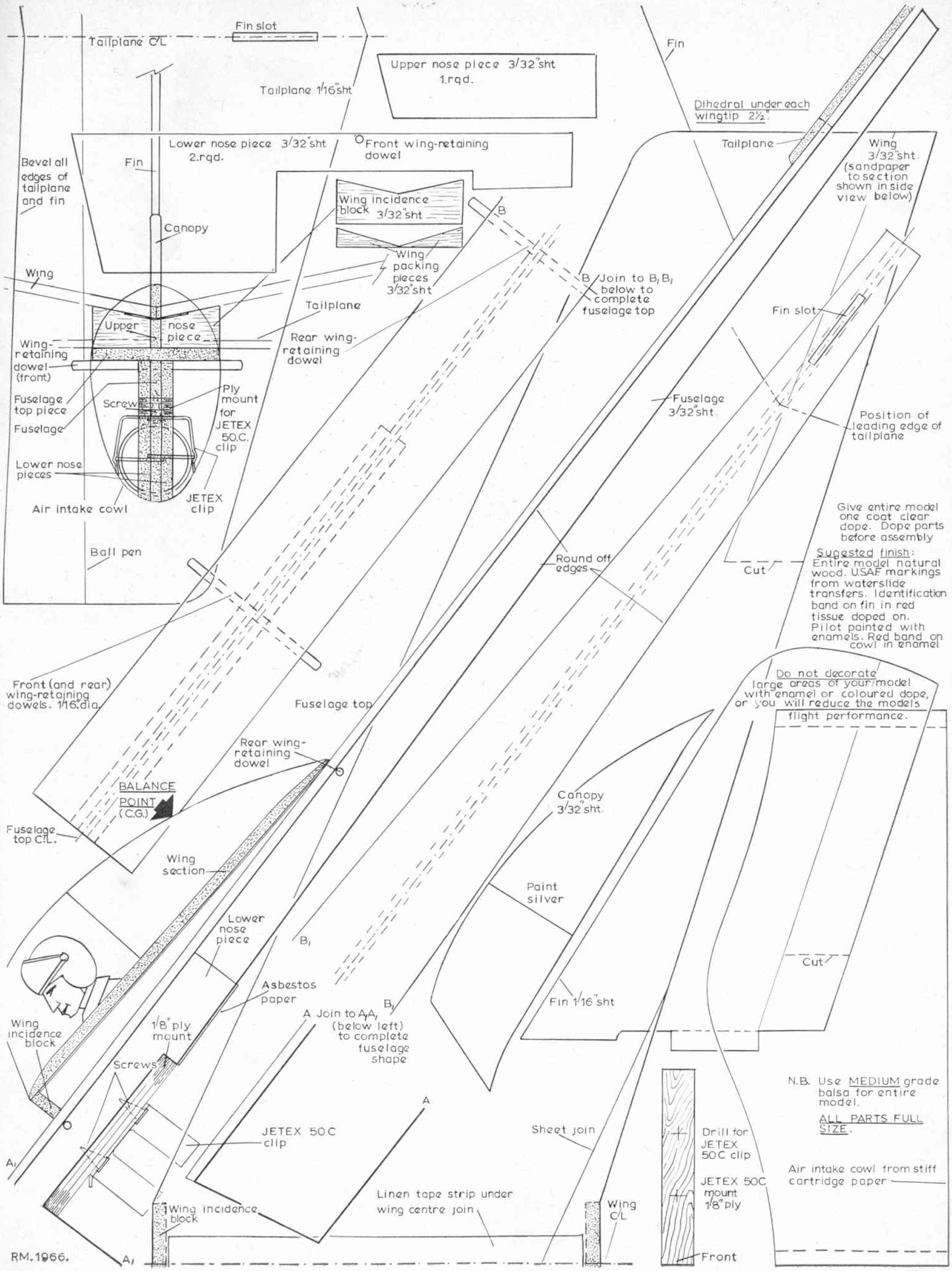
2 sheets $\frac{3}{32}$ in. by 3 in. by 36 in. medium grade balsawood
1 sheet $\frac{1}{16}$ in. by 3 in. by 18 in. medium grade balsawood
1 piece $\frac{1}{8}$ in. plywood 2 in. by $\frac{1}{4}$ in.
1 piece of stiff cartridge paper 3 in. by 6 in.
1 length of dowel rod $\frac{1}{16}$ in. diameter by 3 in.
2, 2 in. rubber bands
Sheet of waterslide transfers (national markings to own choice)
Small piece of red tissue
Small quantity of coloured dope or enamel for colour trim (optional)
1 tube (medium size) balsa cement
1 small bottle clear dope
1 Jetex 50 C. motor kit (price 5s. 11d.)
(Extra boxes of Jetex igniter wick, 9d. per box)
(Extra boxes of 20 Jetex 50 C. charges 20 for 1s. 11d.)



Please note Details of doping and decorative trim are included on plan
Carry out first tests over long grass on a calm day

These photos show the parts of the model and the Jetex 50 unit with its clip mounting screwed in position




Fin slot
Tailplane C/L
Upper nose piece 3/32"sht 1.rqd.
Tailplane 1/16"sht
Fin
Dihedral under each wingtip 2½".
Lower nose piece 3/32"sht 2.rqd.
Front wing-retaining dowel
Tailplane
Wing 3/32"sht. (sandpaper to section shown in side view below)
Bevel all edges of tailplane and fin
Fin
Wing incidence block 3/32"sht
B
Canopy
Wing packing pieces 3/32"sht
Wing
B
Join to B1 B1 below to complete fuselage top
Tailplane
Fin slot
Upper nose piece
Rear wing-retaining dowel
Wing-retaining dowel (front)
Fuselage top piece
Screw
Ply mount for JETEX 50.C. clip
Fuselage
Fuselage 3/32"sht.
Position of leading edge of tailplane
Lower nose pieces
JETEX clip
Air intake cowl
Give entire model one coat clear dope. Dope parts before assembly
Ball pen
Round off edges
Cut
Suggested finish: Entire model natural wood. U.S.A.F. markings from waterslide transfers. Identification band on fin in red tissue doped on. Pilot painted with enamels. Red band on cowl in enamel
Front (and rear) wing-retaining dowels. 1/16" dia.
Fuselage top
Do not decorate large areas of your model with enamel or coloured dope, or you will reduce the models flight performance.
Rear wing-retaining dowel
BALANCE POINT (C.G.)
Canopy 3/32" sht.
Fuselage top C.L.
Wing section
Paint silver
Lower nose piece
B1
Cut
Asbestos paper
Fin 1/16"sht
A Join to A1A1 (below left) to complete fuselage shape
Wing incidence block
1/8" ply mount
Screws
A
JETEX 50C clip
Sheet join
Drill for JETEX 50C clip
N.B. Use MEDIUM grade balsa for entire model.
ALL PARTS FULL SIZE.
A1
JETEX 50C mount 1/8" ply
Air intake cowl from stiff cartridge paper
Linen tape strip under wing centre join
Wing incidence block
Wing C/L
RM.1966.
A1
Front

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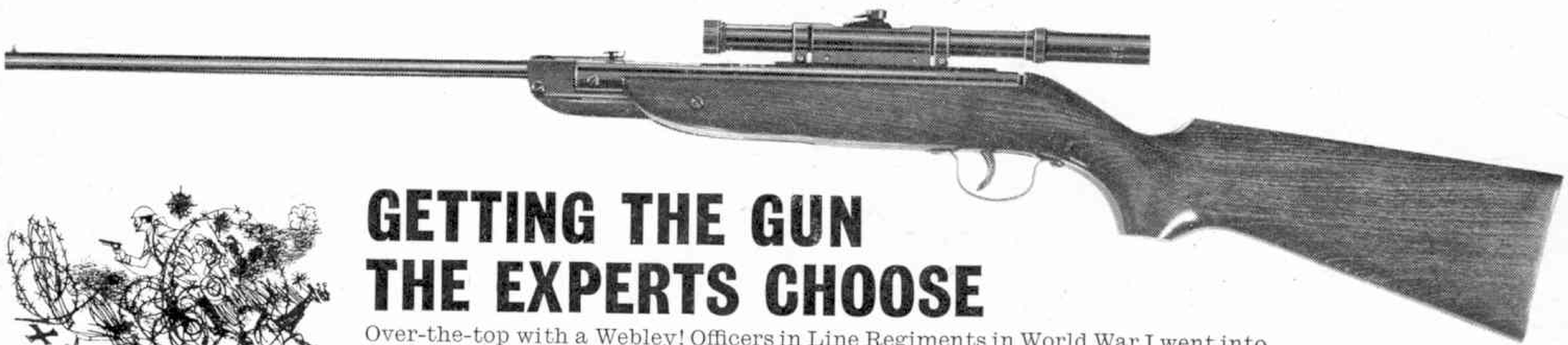
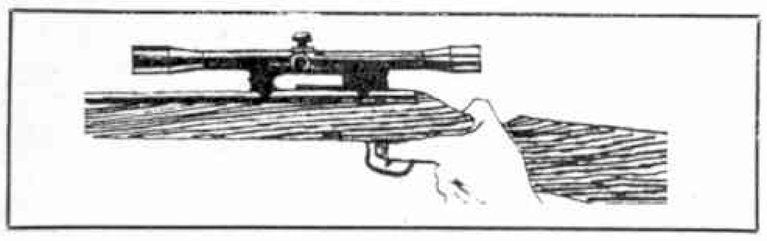


GETTING THE GUN THE EXPERTS CHOOSE

Over-the-top with a Webley! Officers in Line Regiments in World War I went into action with Webley Mk VI .455 revolvers. Today, modern Webleys are used, too, by armies and by police all over the world.

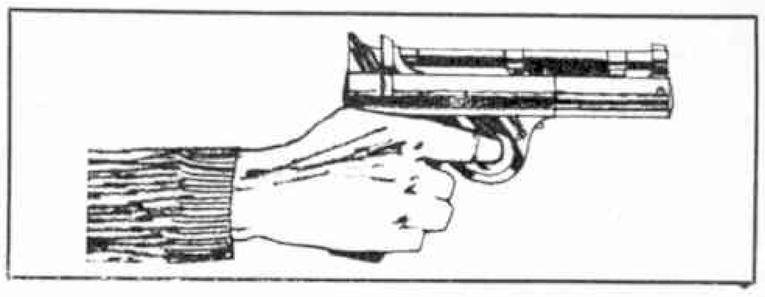
The Webley Ranger (above) is a target rifle for the shot who is on the way to getting his marksman's badge. Length 39". Weight 3 lb. 14 oz. .177, £7.17.6. Other Webley rifles: MK III .22 or .177 £21. Falcon, £11.15.0. Jaguar, £6.17.6. The telescopic sight on the Ranger you can buy separately (£3). It's a 4X magnification expert's sight, fits all Webley air rifles. Always use Webley specially-gauged pellets (3/9 for 500) and darts (2/3 for 12), and send four coupons from Webley pellet-tins with 3/- P.O. for the Webley Marksman's badge.

WHAT DO YOU KNOW ABOUT GUNS? What is (1) grouping? (2) bore? (3) choke? Reverse the page to check your answers.



For the man who prefers to shoot air pistols, Webleys are extremely fast and accurate. Webley Premier .177 or .22, 10 gns. Junior model £7.0.0. *Handle* these, and the rifles at your authorised Webley shop.

(1) the accuracy with which you can group a series of shots close together on a target (2) the measure of the centrally bored hole which runs the full length of the barrel. (3) choke in a gun barrel is where the bore is reduced at the muzzle to control the area of the eventual shot pattern.

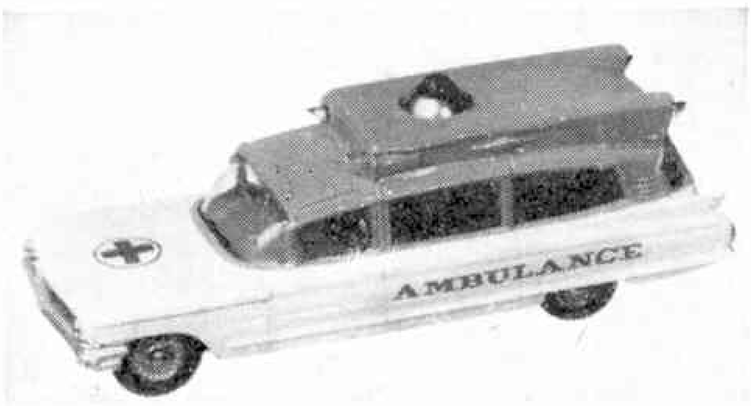


Shoot with safety. Never point a gun, unloaded or not, at anyone. Never handle a gun before checking that it's unloaded. Always carry it so that the muzzle is fully under your control. Never leave it where people younger or less responsible than you can meddle with it. Never leave a loaded gun unattended. Always make sure no-one is behind your target before opening fire.

GET A WEBLEY WEBLEY *BRITAIN'S BEST GUN*

from your Webley shop. Or write for a list, sending 4d stamp, from: Webley & Scott Ltd. (Dept. 130) inc. W.W. Greener Ltd., Park Lane, Handsworth, Birmingham 21.

HAVE YOU SEEN ?



Latest Corgi model of the popular Cadillac Superior Ambulance has no fewer than *five* flashing lights, all lit by a special flashing bulb which operates whether the model is moving or not. A battery concealed in the chassis supplies the power, and spare bulbs and batteries are available from Corgi stockists. The ambulance retails at **8s 9d**

One of the attractive features of the Japanese 'LS' 1/24th scale Ford GT kit is the useful plastic container in which it is packed. This is fitted with a handle and is intended as a transporter for the completed model which can be neatly accommodated inside. In fact the case will take TWO cars side-by-side!

Unfortunately, all the instructions for assembling the model are provided in Japanese! An English version, even if only in an abbreviated form, would prove an asset. Consequently, a first glance at the instruction sheet supplied could well discourage many would-be constructors. However, if a more careful scrutiny is made, the series of excellent, clearly defined and detailed diagrams should enable anyone who has had previous experience in assembling plastic kits, to follow the required procedure with little difficulty. Mainly due to the lack of assembly instructions in English this otherwise fine kit is not recommended for the beginner.

The finish of the plastic components is exceptionally good, and the character of the prototype has been captured admirably in the shape and details incorporated in the body shell.

In line with the majority of plastic kits now available, the model is non-steering. The slot-guide, with attached braided pick-ups, being of the 'drop' type. Holes in each of the robust brass chassis side frames are positioned to accept the arms of a simple wire loop forming part of the drop-guide assembly.

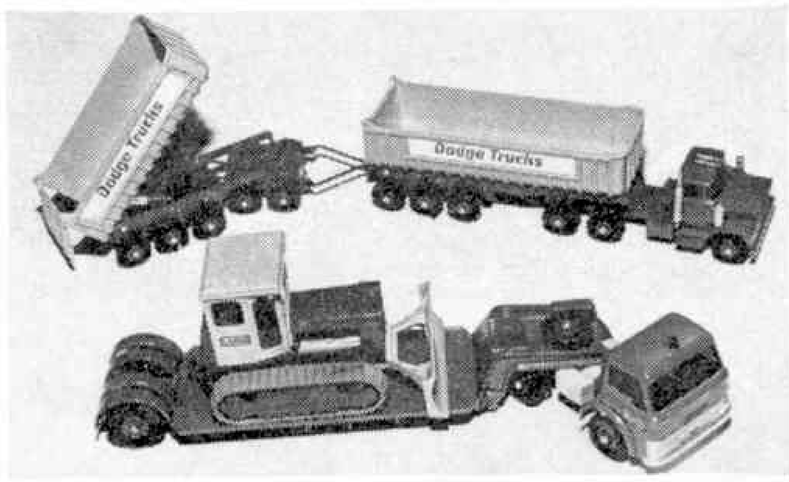
Excellent wheels and tyres are supplied and the motor is one of the very potent and popular can-type Mabuchis.

Included in the kit are all the necessary decals to enable the constructor to provide the model with an authentic finish and a general impression is that this is a superior kit—lacking only in the provision of an assembly sheet in English. From BMW Ltd., 329 Haydons Rd., Wimbledon, S.W.19. **Price 59s 6d**

Left: Massey-Ferguson 165 tractor is the latest addition to the Corgi agricultural range. Apart from the very accurate external details, including dashboard and gear lever, an ingenious device reproduces a characteristic 'tractor' noise as the model is moved along. **Price 5s 9d**

Right: two beauties from the 'Matchbox' King Size series to delight commercial vehicle fans! The American Dodge tractor tows a 'train' of two Fruehauf tipping trailers. The combination has 26 separate wheels, and measures 11⅞ in overall—the longest 'Matchbox' model yet, it costs (with one trailer) **14s 11d**

Another recent 'Matchbox' release—the Ford D700 series tractor and Dyson trailer with Case caterpillar bulldozer. **Price 13s 11d**



BRITAIN'S RAILWAYS UNDER STEAM
by J. B. Snell

Published by Arthur Barker Ltd., 20 New Bond Street, London, W.1. **Price 50s**
244 p.p. 16 colour pages, 6 maps, 170 half-tone illustrations. 11¼ in. by 8¾ in.

In the field of railway literature much has been written on the history of British Railways and the Steam Locomotive, and although this book is basically a history of both, it differs by giving a broad outline of how and why the British Railways system reached its present form. The main lines and trunk routes of different sections of the country are dealt with individually, and the author covers their development and construction, and traces the effects of competing lines and company rivalries. In a book of this kind, detail would be out of place, and the author sensibly concentrates on giving a general picture of railways during the steam era, and is both factual and informative.

Attention is given in the second part of the book to steam locomotive design and practice since 1900, and although this once again, is a subject already well covered in great detail by other publications, the author gives what might be described as a synopsis of the important changes in the development of the steam locomotive, and these are outlined in non-technical language that can be understood by everyone.

Well written in a readable entertaining style, the book takes the steam locomotive and the steam era as its key-note and is undoubtedly useful as a reference book. Profusely illustrated with photographs of outstanding quality, it will undoubtedly be enjoyed by all enthusiasts of steam.

LONDON TRANSPORT LOCOMOTIVES AND ROLLING STOCK

Published by Ian Allen Ltd., of Terminal House, Shepperton, Middlesex. **Price 4s 6d**
72 p.p. plus 24 p.p. half-tone illustrations. 7⅛ in. by 4⅞ in.

In recent times many changes have occurred to the rolling stock of London's Underground railway system. Much old stock has been scrapped or transferred and new trains introduced on to the various lines. This booklet, one of the A.B.C. series, lists the present day rolling stock, service, battery and electric locomotives. Trains are listed in multiple-unit formation, now usual on London Transport, and are grouped under the headings of the various lines, and not in classes as previously. A section is also included on headlight codes, and descriptive matter deals with the individual classes of trains.

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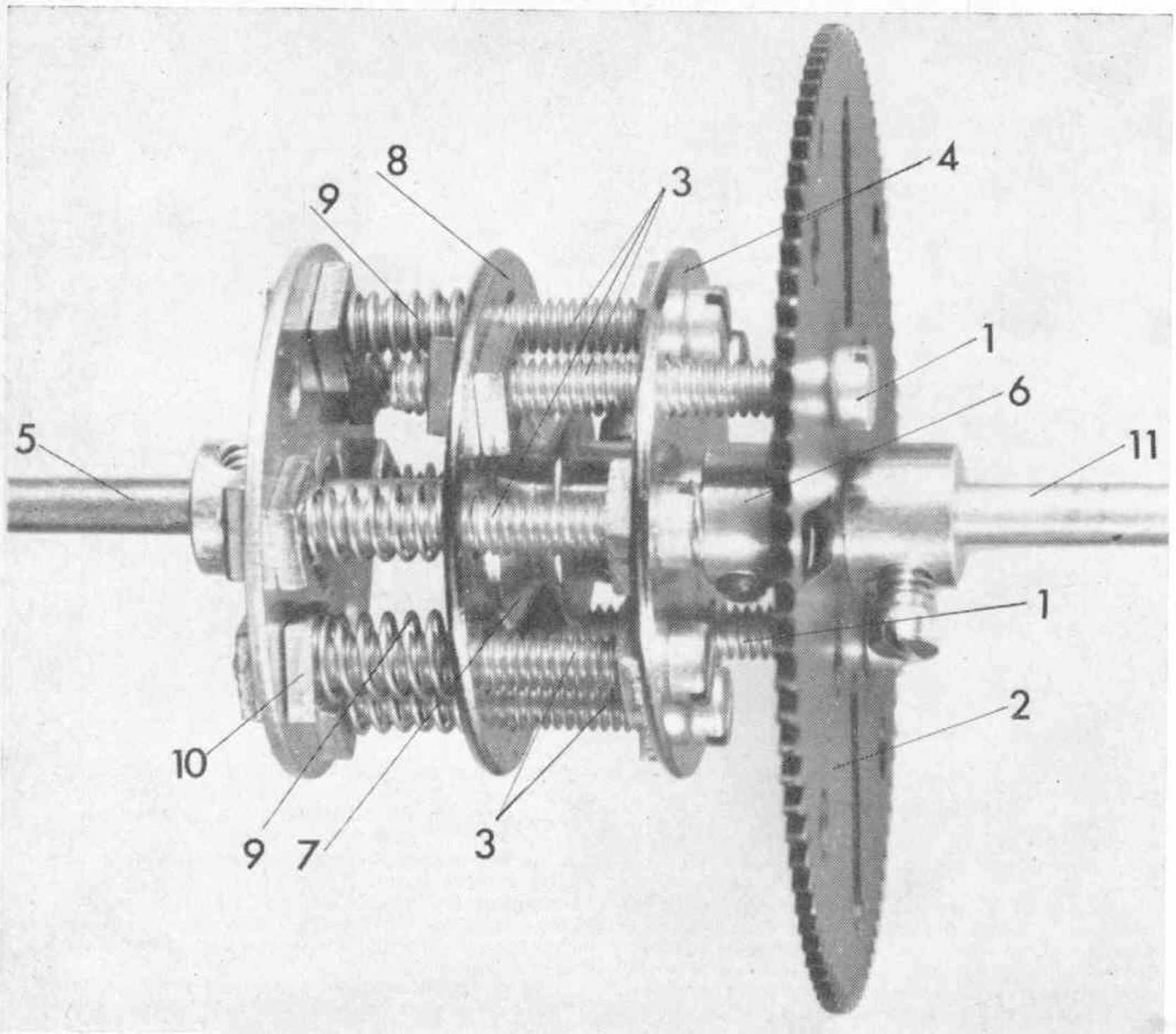


Mr. S. K. Maw of Epworth, Nr. Doncaster, Yorkshire, designed this simple clutch, suitable for light-duty work

AMONG THE MODEL BUILDERS

MECHANICS is a subject studied by every schoolboy sometime during his educational career and I am, therefore, sure that all readers will know something about that most elementary feature of mechanics—the Lever. You will be familiar with such terms as 'Load', 'Effort' and 'Fulcrum', and will know that, by using a lever, it is possible to shift a greater load with a specific amount of effort than it would be possible to shift with the same amount of effort if a lever were not employed. The further the fulcrum is from the effort, the greater is the load that can be shifted.

Of the many different types of lever in existence, perhaps the most commonly used is the ordinary crank handle, although a lot of people do not realise that this qualifies as a lever. As you know, the crank handle is made up of three basic parts: the actual handle which is turned, the shaft, running parallel to the handle, and the transverse section joining the handle to the shaft. The load is carried by the shaft. The effort is applied to the handle, and the centre-line of the shaft acts as the fulcrum. In theory the longer the transverse section, the greater is the load that can be moved. In practice, however, it is usually undesirable to have a long transverse section. Not only does it make the crank handle unwieldy but, particularly in Meccano models, it tends to get in the way.

As far as Meccano is concerned, the problem of obtaining increased leverage while keeping the transverse section comparatively short has been overcome by Mr. H. H. Taylor of Huddersfield, who designed the crank handle featured here. By incorporating a Single Throw Eccentric he has produced what, in effect, is a 'lever within a lever', and this, of course, gives the same results as an increase in the length of the transverse section.

In the accompanying illustration Mr. Taylor's crank handle is shown journalled in a couple of Flat Plates. These Plates were used to provide a mounting for the assembly so that it could be photographed. When included in a model, only the handle on a suitable shaft would be used, the actual mounting depending entirely on the particular model being built.

Handle

Construction of the unit is quite simple. The Rod forming the shaft of the crank handle is passed through the boss of a Single Throw Eccentric 1, that is fixed by a $\frac{3}{4}$ in. Bolt 2 in its throw hole to the side of the model. The Rod must be free to turn in the boss, and must protrude half an inch through the Eccentric. Three Washers are slipped on the protruding end of the Rod, followed by a Crank 3, which is then fixed in place. The arm of the Eccentric is extended by a $1\frac{1}{2}$ in. Strip 4, at the same time lock-nutting another $1\frac{1}{2}$ in. Strip 5 in place. Finally, the other end of this Strip is lock-nutted to the Crank, as shown, while a Threaded Pin 6 is fixed in the end hole of Strip 4 to act as a handle.

Parts required

2 of No. 6a
7 of No. 37a
3 of No. 37b
3 of No. 38
1 of No. 62
1 of No. 111
1 of No. 115
1 of No. 130a

Light-Duty Friction Clutch

Mr. S. K. Maw, of Epworth, Nr. Doncaster, Yorkshire, recently wanted a friction clutch for a small model he was making but, unfortunately, he could not find details of a unit small enough to meet his requirements. He then took the only course left open to him and designed his own mechanism, sending us details of the unit when he had finished it. The unit is featured here and, although I have not actually tried it out in a model, it should be quite adequate for smaller constructions.

To build the clutch, two $1\frac{1}{8}$ in. Bolts 1 are fixed by Nuts to a $2\frac{1}{2}$ in. Gear Wheel 2, the Bolts passing through inside diametrically opposite holes in the Gear Wheel. Another six $1\frac{1}{8}$ in. Bolts 3 are now fixed by Nuts in an 8-hole Wheel Disc 4, leaving two diametrically opposite holes free. The Wheel Disc is now slipped onto a Rod with Keyway 5, to the end of which a Collar 6 is fixed.

Wheel Disc 4, still on the Rod, is now slipped onto the shanks of Bolts 1, then a $\frac{1}{2}$ in. Pulley with boss 7, carrying a Keybolt in its boss, is mounted on the Rod with Keyway, to be followed by a second 8-hole Wheel Disc 8 which is fixed by Nuts on Bolts 1. At the same time Bolts 3 protrude through the holes in this Wheel Disc.

Wheel Disc 4 is moved up the shanks of Bolts 1 until it traps Pulley 7 against Wheel Disc 8. A Tension Spring 9 is now slipped onto the shank of each Bolt 3 and is held in place by a Nut. An 8-hole Bush Wheel 10 is fixed on the end of the Bolts by Nuts and, finally, a suitable Rod 11 is fixed in the boss of Gear Wheel 2. To provide greater friction between Pulley 7 and Wheel Disc 8, incidentally, it is advisable to cover the side face of the Pulley with a rough material. 'I used Elastoplast discs', says Mr. Maw .

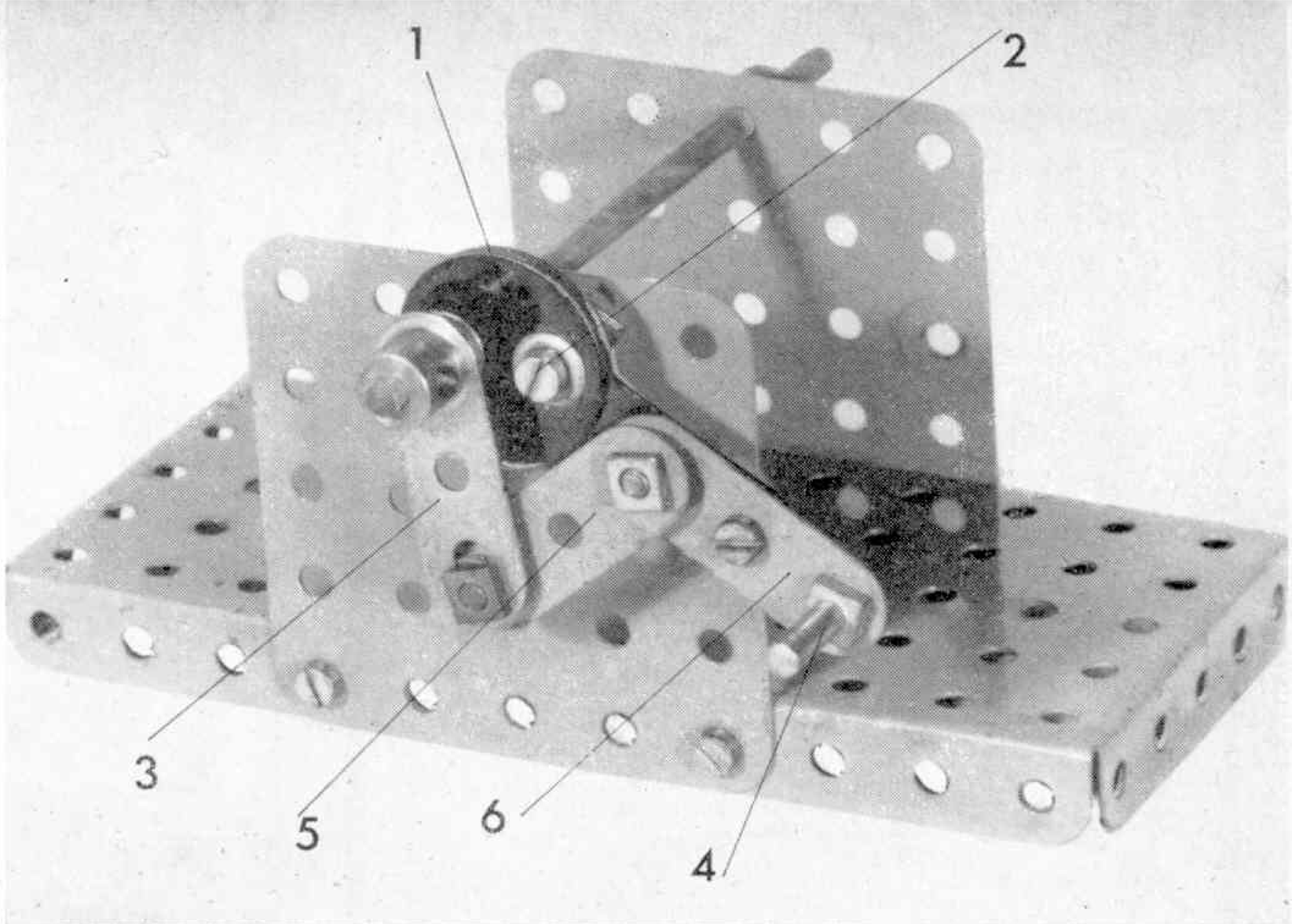
It must be remembered that the above building instructions apply only to the basic clutch, as illustrated. The clutch, itself, must be built into a suitable housing in the particular model for which the unit is required, and also a suitable operating linkage must be provided. Assuming that the Rod with Keyway 5 is mounted in bearings which do not allow it any lateral movement, the drive from the motor can be taken direct to Gear Wheel 2 via a Pinion and, in this case, Rod 11 can be used to disengage Pulley 7 from Wheel Disc 8. With Bush Wheel 10 being prevented from sliding on Keyway Rod 5 by a suitable stop, pressing Rod 11 will move Wheel Disc 8 down the shanks of Bolts 3 away from Pulley 7.

As an alternative, the drive could be taken to Rod 11, but in this case, Rod 11—and thus Gear Wheel 2—would need to be prevented from moving laterally by suitable bearings. Pressure on Bush Wheel 10 would cause Wheel Disc 4 to move up the shanks of Bolts 1, thus easing friction between Pulley 7 and Wheel Disc 8. The problem here, of course, is finding a way of applying pressure to the Bush Wheel while the unit is revolving. Mr. Maw suggests an Angle Bracket, one lug of which is slipped over Keyway Rod 5, against the boss of the Bush Wheel, and the other bolted to a Collar mounted on a Rod journalled in suitable bearings. This seems a good method as a linkage could also be attached to the Rod. When activated, the linkage would cause the Rod to revolve which, in turn, would cause the Angle Bracket to press against the Bush Wheel.

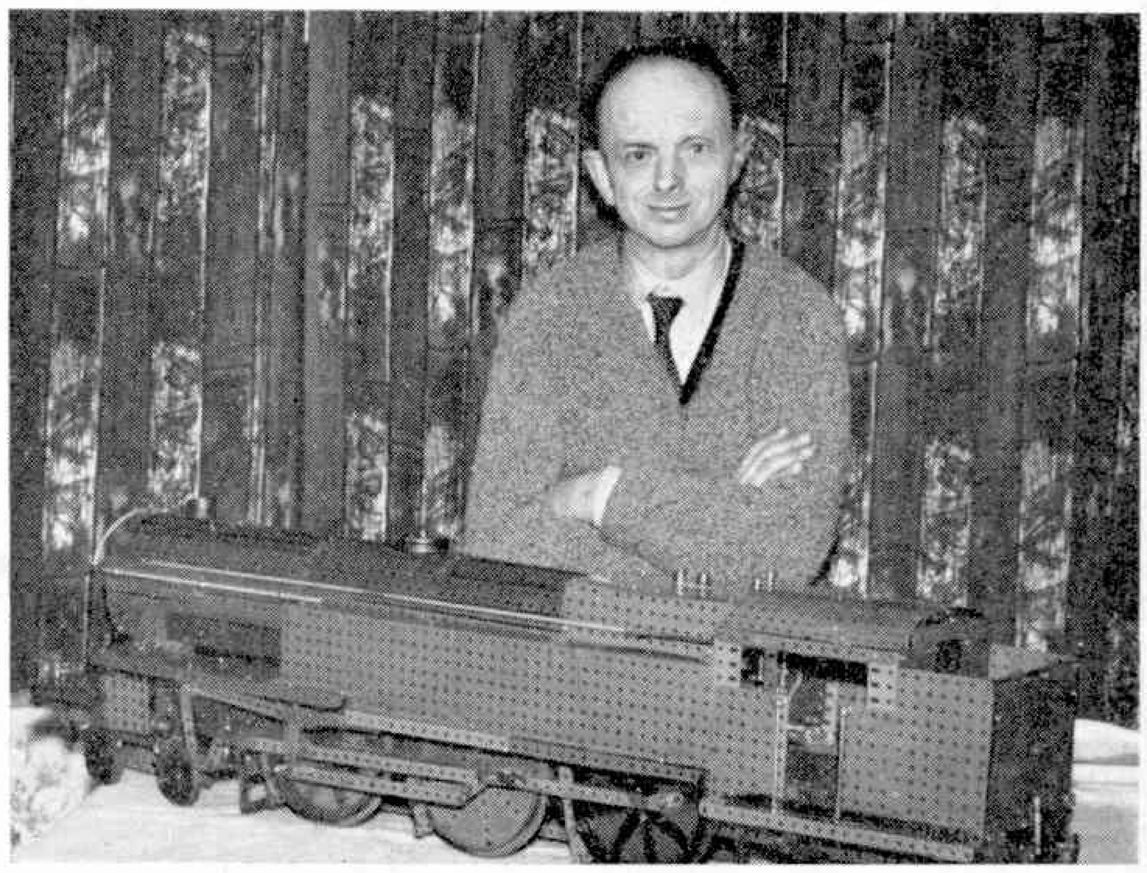
One last thing to remember is that the following parts list applies only to the basic clutch as it appears in the accompanying illustration.

Parts required

1 of No. 23a	24 of No. 37a	1 of No. 230
1 of No. 24	1 of No. 59	1 of No. 231
2 of No. 24a	8 of No. 111d	
1 of No. 27c	6 of No. 120b	



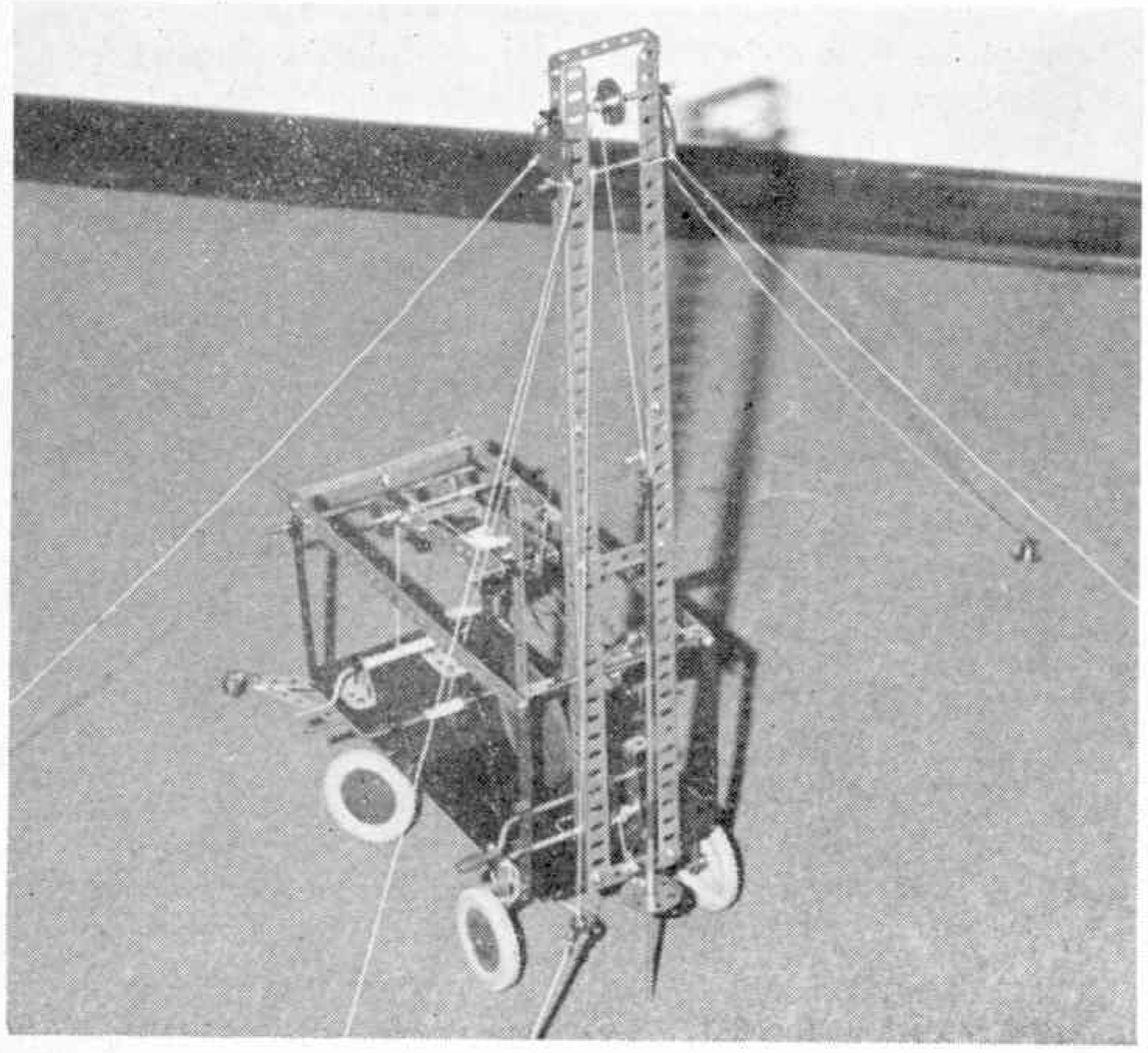
Above: 'A lever within a lever.' This useful Crank Handle was designed and built by Mr. H. H. Taylor of Huddersfield, Yorks.



Right: A model-builder of long-standing is Mr. George Lowe of Grinsley, Notts., seen here with an excellent model of a 4-6-4 Tank Locomotive he has built. Born in 1909, Mr. Lowe took up the Meccano hobby when he was nine years old and has been an enthusiast ever since

Below right: Meccano also appeals to all ages and, sometimes, both sexes. This picture shows young John Hewitt of Winterbourne, Newbury, Berkshire, building a Gantry Crane from his instruction book, helped by his sister, Brenda

Below: Meccano is an international hobby, as is proved by the fact that this interesting Water Drilling Rig was designed and built by a Master Kruger, an 11-year old schoolboy from Witbank, South Africa



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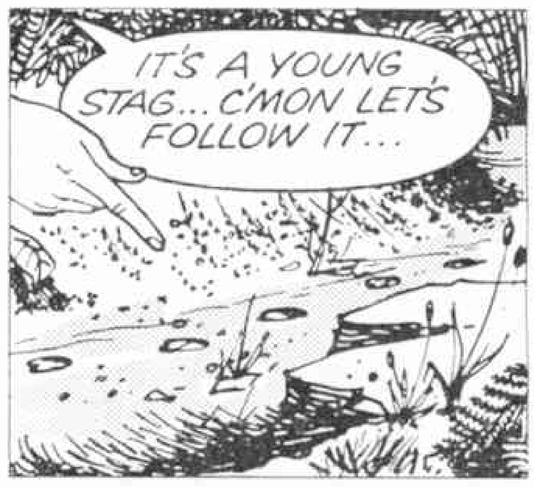

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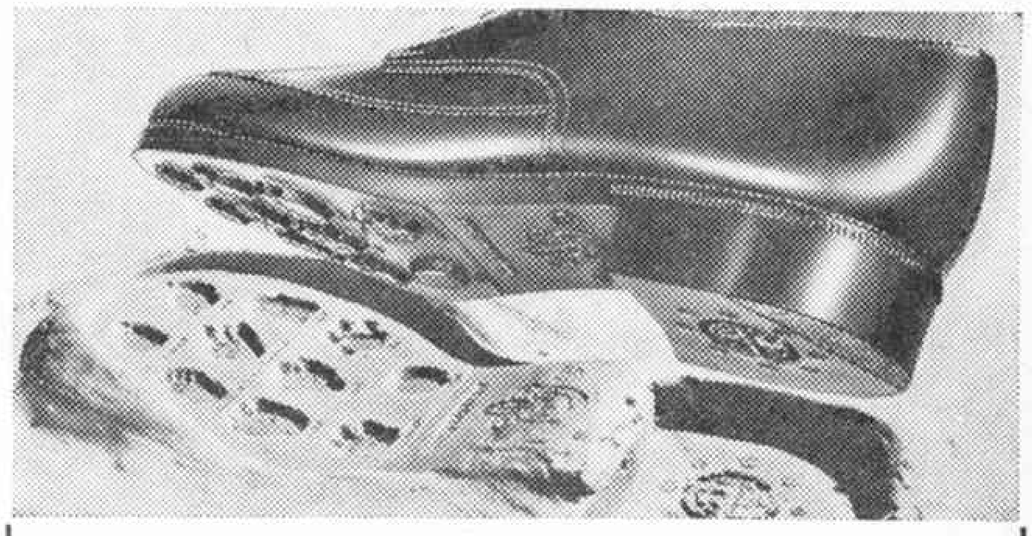

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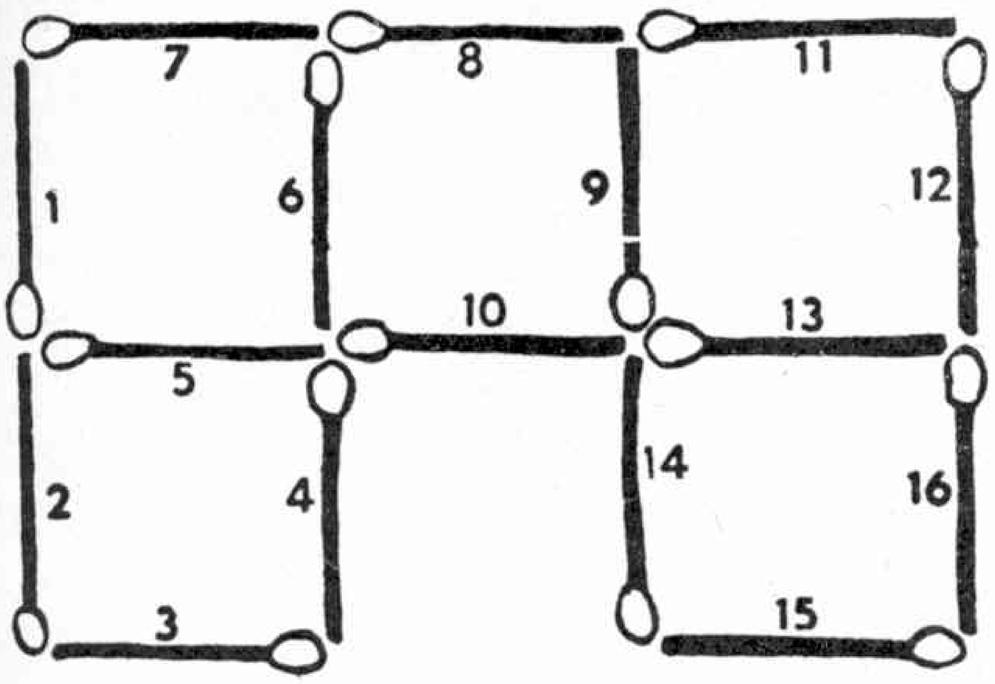
PLAYING WITH MATCHES



Sixteen matches form five squares above. See if you can move three matches to new locations and have the 16 matches form just four squares.

Answer: Lift matches 11, 12 and 7 and use them to complete a square having as its right side match number 1.

FUN & GAMES

For answers to puzzles please see page 49

A With the exception of one item each time, all the names, etc., in the groups below are associated in some way. Can you find the odd men out?

1. Chelsea, Manchester United, Tottenham Hotspur, Liverpool, Burnley, West Ham, Birmingham, Leeds.
2. Clarinet, oboe, flute, bassoon, saxophone, trumpet.
3. Davis Cup, The Ashes, F.A. Cup, Ryder Cup, Wightman Cup, Walker Cup.
4. London, Brussels, Paris, New York, Oslo, Rome, Madrid, Berne.
5. 22, 103, 33, 121, 143, 99, 132.

B Here's a recipe. Follow the directions carefully and see if you get the right answer. Take $\frac{1}{5}$th of *Perversion,* add $\frac{1}{4}$ of *Arms* and $\frac{1}{3}$rd of *Fleece*—and you should have something for which we're all looking.

C A certain telephone number consists of four digits. The second number is three more than the first, and the last is three times the first, while the difference between the first and third figures is equal to the second. If all four figures add up to 20 what is the phone number!

D Make sense of the following collection of words by taking *one* letter from each. If you are right, an intelligible sentence will be formed. They dray wasp every finer fort them timer off then yearn, sow wet hand as nicer tripe ton they motors.

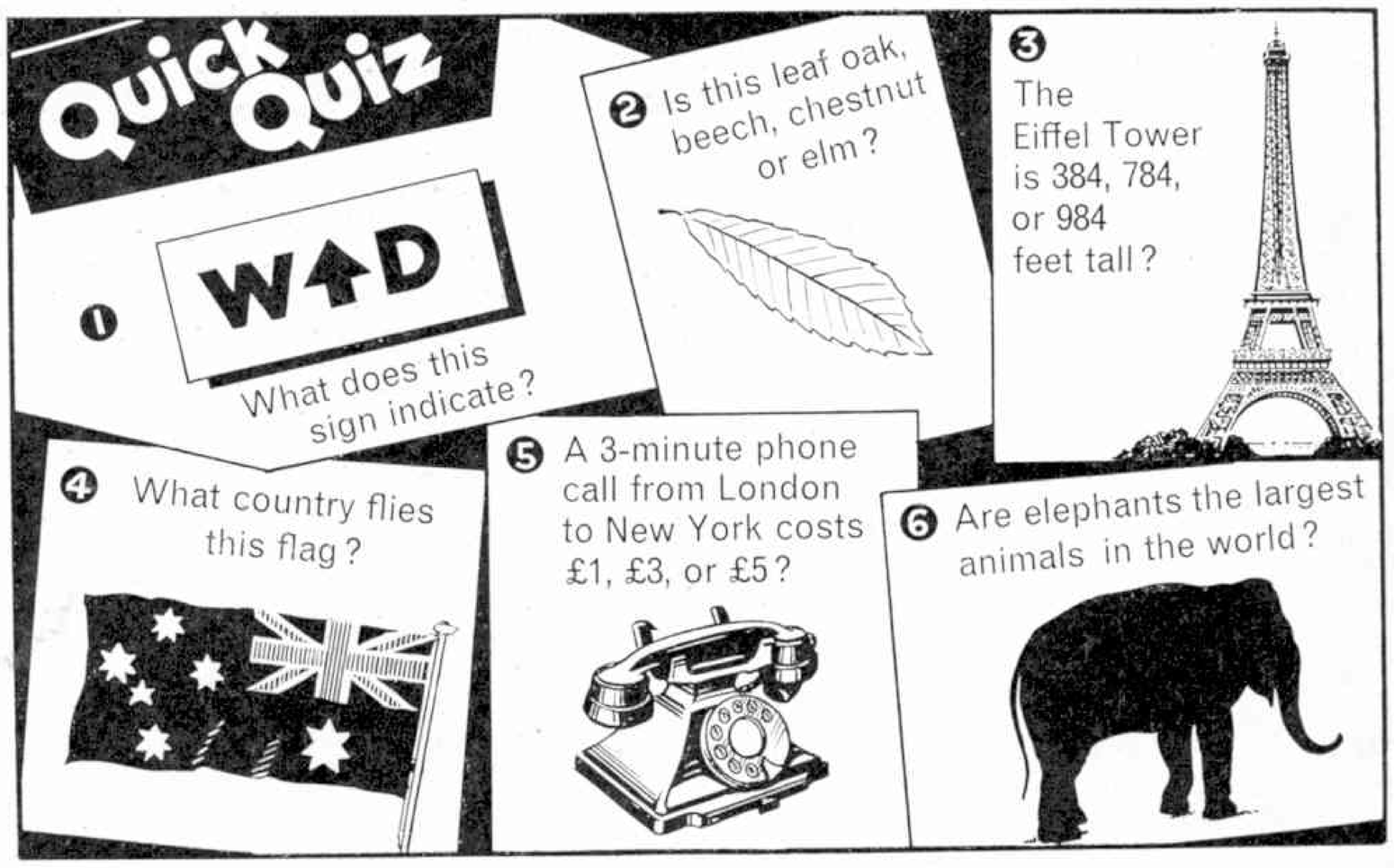
PHANTOM FIGURES

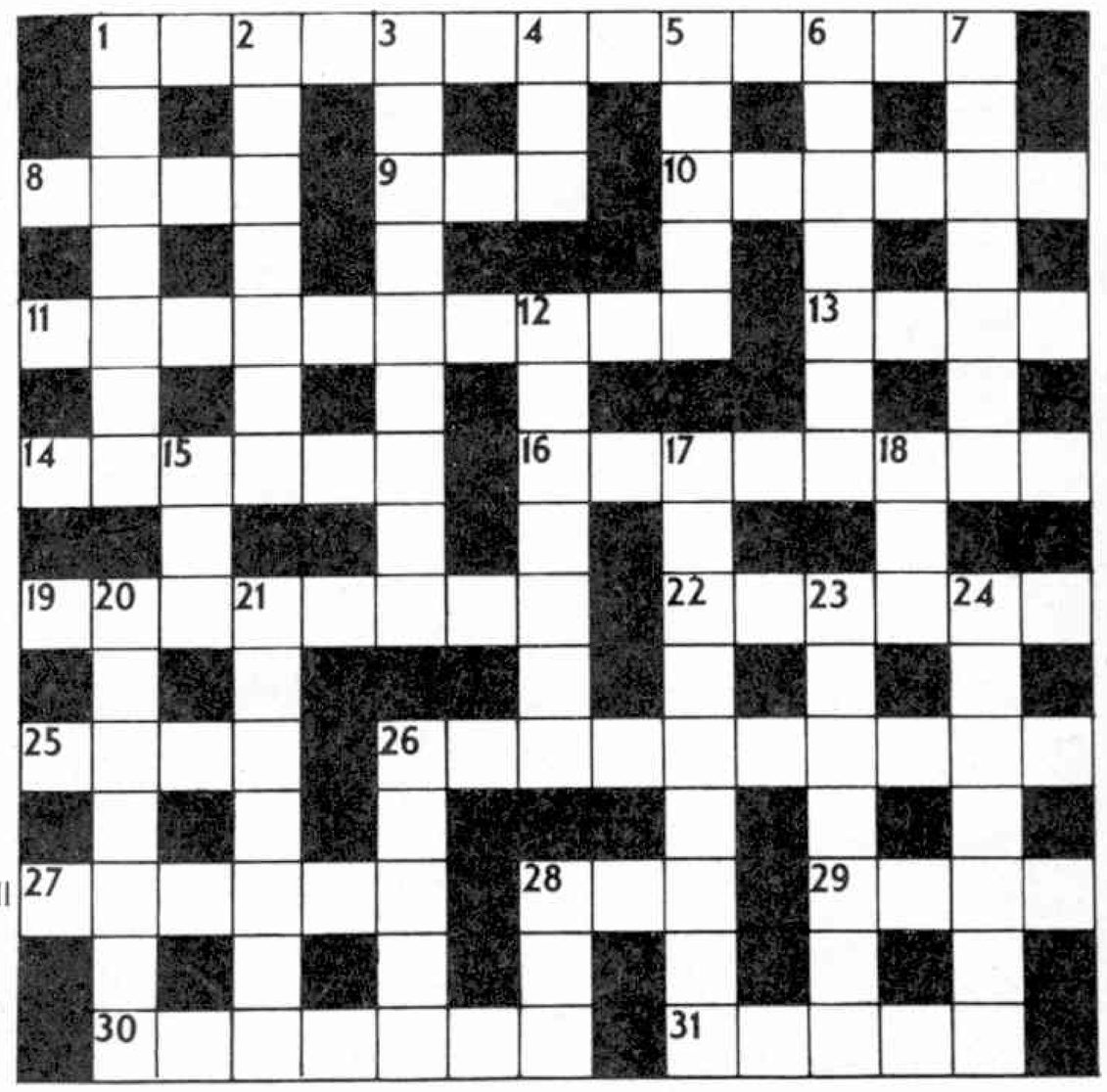
Complete this problem in multiplication, in which only five of the figures are given.

You will recall that in the multiplication tables there are only three pairs of numbers that give a product ending in 9. You will also note that in this problem two times one of the numbers in the pair must give a product ending in 4. The rest is easy.

```
      x x x 7
      x 2 x 7
      -------
    x x x x 9
    x x 4
  x 0 x
  -----------
  5 x x x 9
```

Answer: Four zero seven times one two seven is five one six eight nine.





ACROSS
1 A group of stars
8 A stain
9 Sit in the past
10 Rain cloud
11 Violent tempest
13 The standard
14 Attractive young females
16 What a lax card-player often does!
19 Warmly acclaims
22 Not at home
25 A large cask
26 Found in most forms of transport
27 Secret way of writing
28 A top card
29 Forbidden
30 Rabbits live in them
31 Not on the level!

DOWN
1 An envelope which might well be addressed to the moon!
2 Nothing artificial about this
3 Trial runs (4 and 5)
4 No use trying to rent this!
5 Female relatives
6 Very big
7 Not taking sides
12 Goddess of vengeance
15 Ignited
17 Not belonging to any country
18 Gone
20 To feed
21 A type of axe
23 River festival
24 A stunt flyer
26 A fish
28 Short 'announcements'

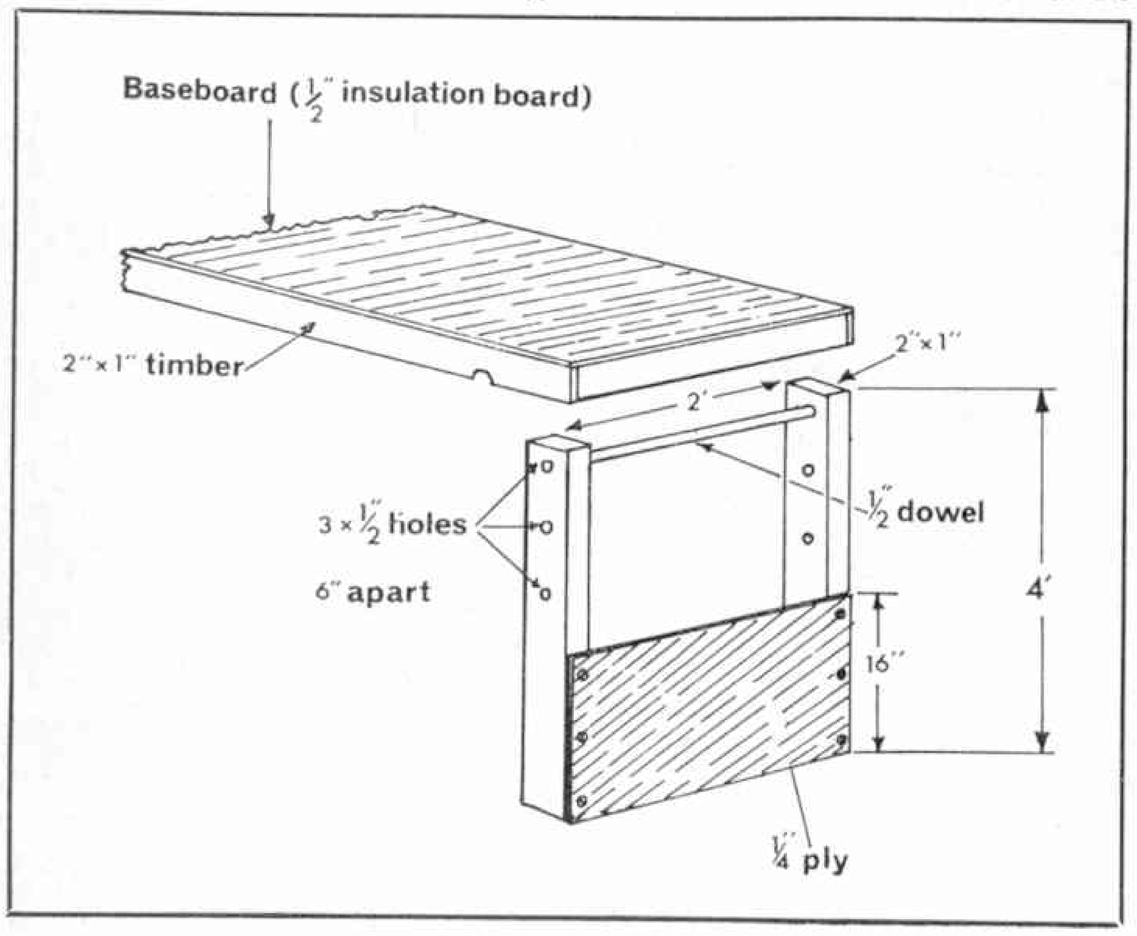
GET UP THERE!

CARS have been used in sporting events ever since the far-off pioneer days of motoring. In those early days, when all motor vehicles were largely experimental, many events were organised not merely for sport or public spectacle, but as 'reliability trials' to test the stamina and performance of the latest 'Horseless Carriages'. Such trials were often extremely arduous, and always included a section of very steep hills on which observers were posted with stop-watches to check the times and speeds of the ascending vehicles as they chugged and gasped their way to the next summit.

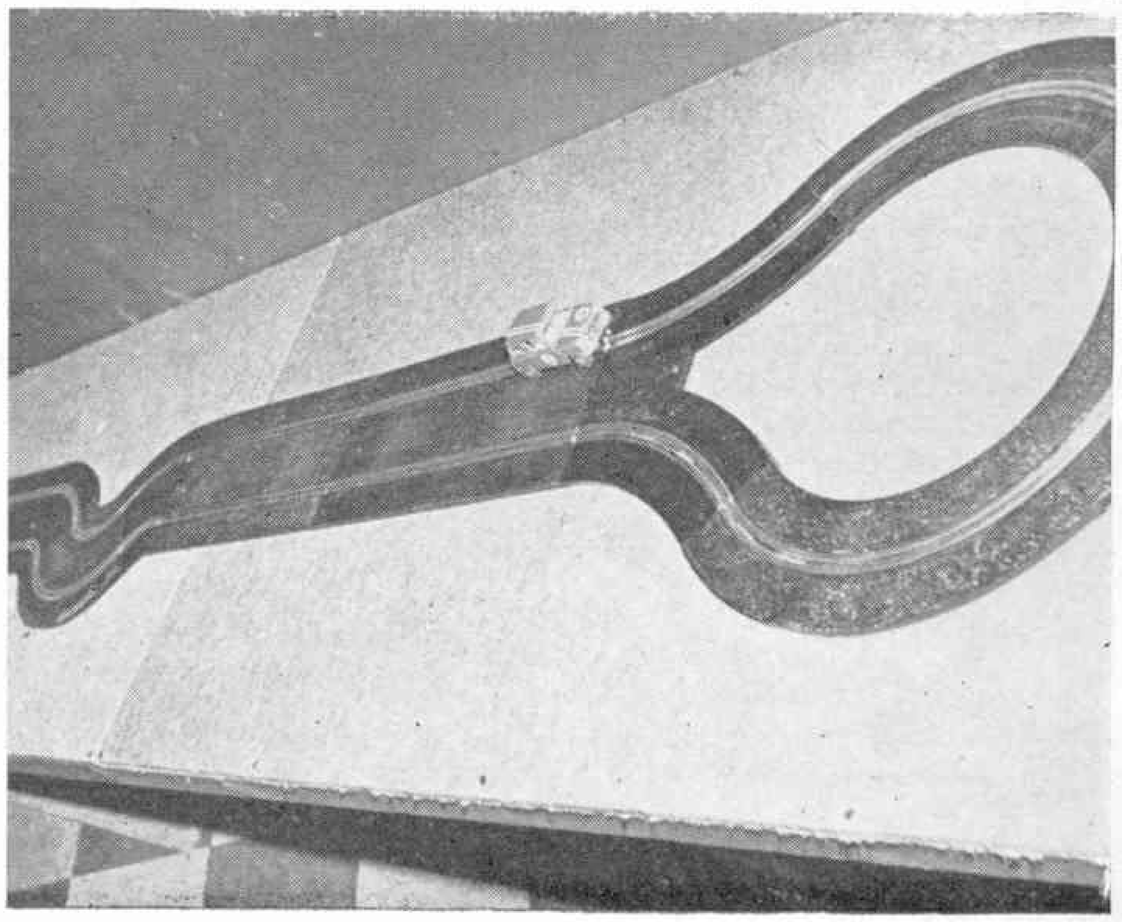
Much was learnt from the early reliability trials, and by the early 1920s even small cars could climb almost any hill likely to be encountered during every-day motoring, but the pioneering spirit was not dead. A sport was developing which rivalled even motor racing for popularity—the Hill Climb. Probably the best known hill-climb in England is Shelsley Walsh, a steep and tortuous track which winds up a wooded hill in Worcestershire. During the 'twenties and 'thirties the surface was extremely rough, and at week-ends and holidays crowds would gather to watch an incredible variety of machines roaring up the rubble strewn track, skidding round hair-pin bends, and sometimes colliding violently with the high banks which bordered the road. Then, as now, there were 'souped up' versions of standard models; Austins, Morris's, Singers and Fords, and there were also the 'specials'; home-made cars built only for hill climbing, based on a fascinating variety of engines and chassis; G.N.'s, chain-drive Fraser-Nash's and a host of names almost forgotten today. Another hill, which although not strictly a hill climb in the accepted sense of the word but nevertheless well known in the pre-war years, was the Brooklands Test Hill. This was an artificial ramp in the centre of the Brooklands circuit at Weybridge, Surrey, and was used by the motoring press of the day to test the climbing capabilities of the latest models. The ruling gradient was about 1 in 4, and on one occasion in the mid-thirties during the testing of an eight cylinder Railton sports car, the vehicle made a standing start at the foot of the hill, and was travelling so fast at the summit that it leapt into the air, with all four wheels off the ground!

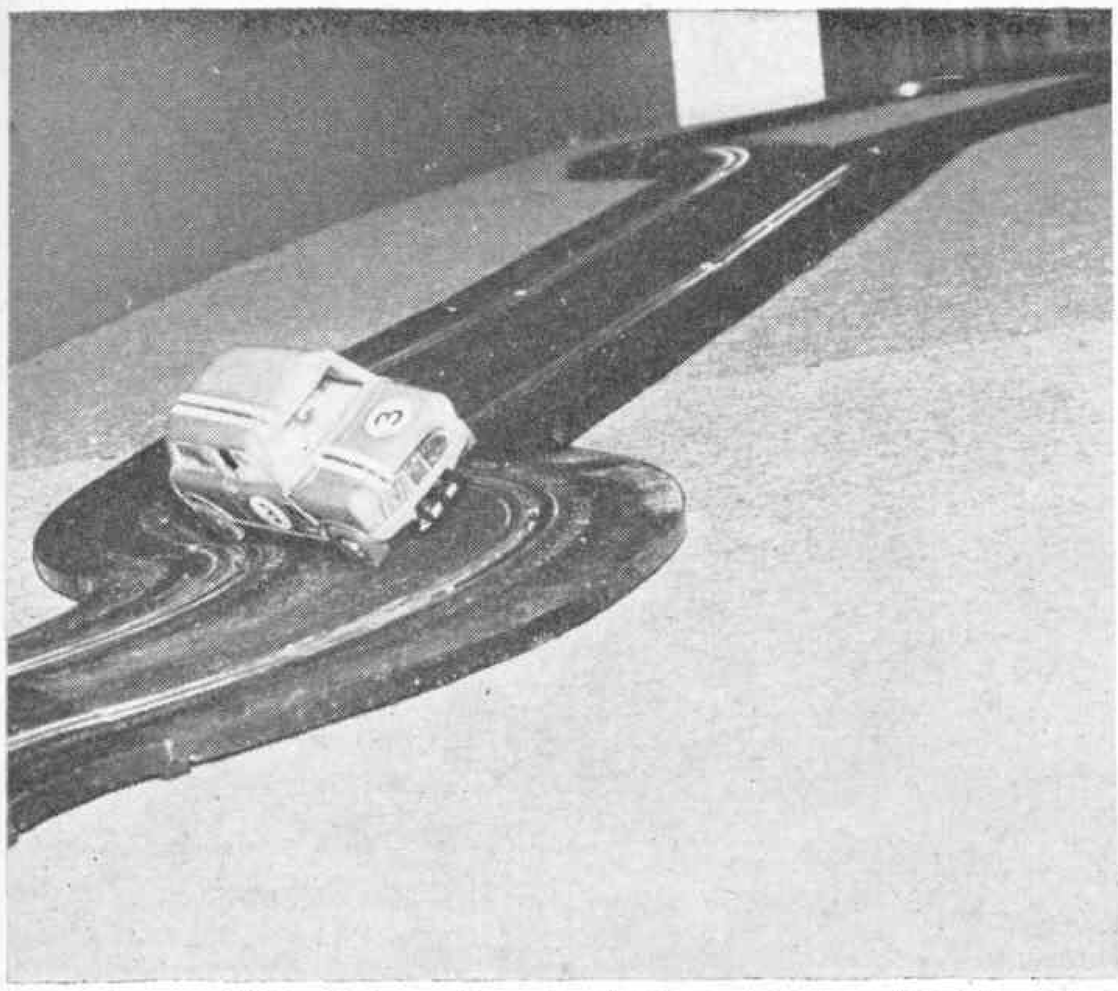
Hill climbing still draws crowds today, and events are still held at the famous Shelsley Walsh climb—only the cars and the surfacing of the track have changed. Until fairly recently, however, slot-racing enthusiasts seem to have ignored the terrific potential of hill climbing in miniature. The Scalextric Hill Climb set greatly simplifies the construction of a model hill climb. It consists of a compact 'return loop' which clips on to the standard Scalextric two-lane track sections, and when situated at the top of a 'hill', enables cars to turn and run back down using the other lane. Our hill climb layout was very simply constructed in a couple of hours and consists simply of an 8 ft. by 2 ft. baseboard, cut from an 8 ft. by 4 ft. sheet of ½ in. insulation board, and framed with 2 in. by 1 in. timber glued to the under edges of the board and screwed in place with 1 in. by No. 8 woodscrews. The track, which is simply a straight run ending in the 'hill climb turn', has a bend halfway up as an extra hazard to descending cars. The lowermost section of straight track, where the starting line is situated, must level off gently, and the section can be quite easily curved to the required shape by hand, as shown in the photograph. Track is secured to the base-

A suggested trestle for supporting the upper end of the 'hill', which provides for a choice of gradients to suit different types of car. The half-round 'notches' in the baseboard frame locate onto the ½ in. dowel rod, which can be fixed in three positions

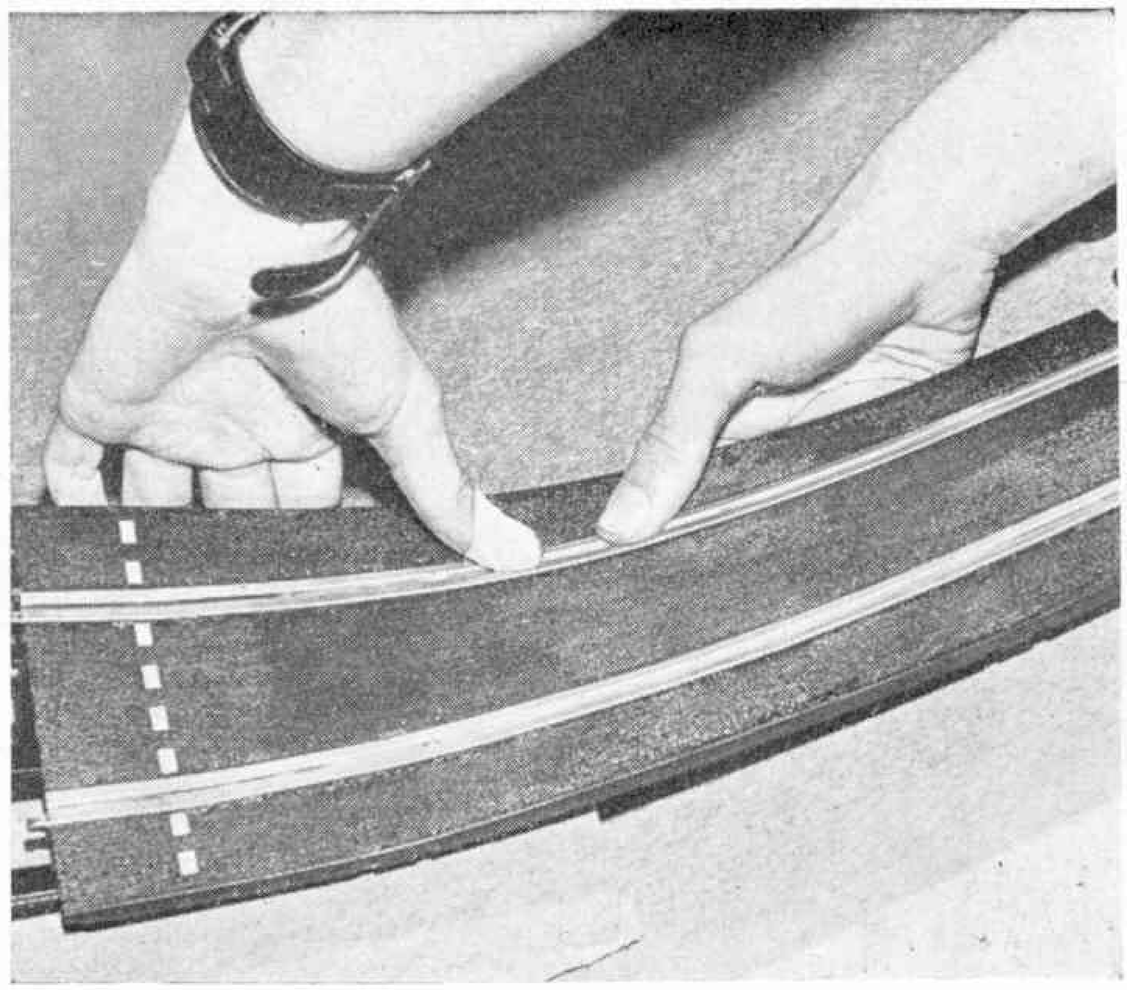


Below: general view from the top of the hill, showing the 'Hill Climb Turn' loop





It really happened! The Mini was driven downhill through the 'wiggle' a trifle too fast, and the camera 'froze' it in the act of hurtling off the track!



The lowermost section, where the gradient levels out, can easily be curved to the required shape by bending gently between the fingers and thumbs, as shown above

board with 1 in. black tacks (don't use too many—two per track section is quite sufficient) and the lowest track section on the board is not secured at all, as this must be lifted in order to attach and remove the bent 'starting line' section referred to above.

The method of supporting the upper end of the 'hill' will, of course, vary according to the circumstances of the owner—it could easily be propped up against an armchair or table——but a free standing trestle is not difficult to build from 2 in. by 1 in. timber, and could be made to accommodate a variety of different gradients, as shown in the diagram.

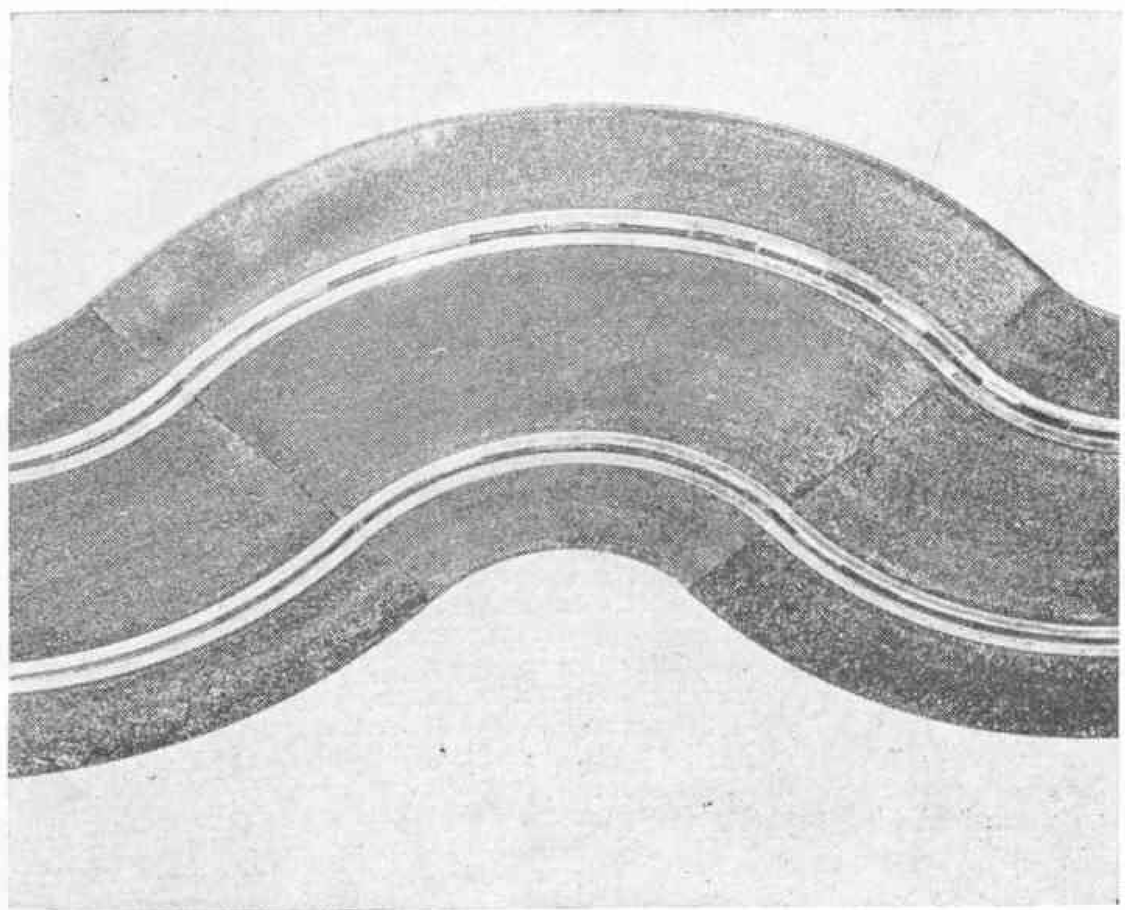
The steepness of the gradient really depends on the climbing ability of the cars which are used on the layout—for maximum excitement, use a gradient that is just within the capabilities of your least powerful car. Our board was set at a gradient of about 1 in 3, and we entered two Scalextric Mini Coopers for the first event! Hill climbing, as the beginner will soon realise, requires entirely different skills to ordinary 'flat' racing. On our layout, the Minis needed full throttle from the word 'go', and could be put through the 'wiggle' on the way up at full speed. Very careful driving is needed, however, when the loop at the top is reached—if it is taken too fast, the car will fly off, and if the speed is too low the rear end of the Mini, lacking centrifugal force to hold it on the road, will slide downhill off the track! Having successfully negotiated the summit, more skilful driving is required to bring the car back to the finishing line. If the 'wiggle' is taken just a trifle too fast on the downward run, the car will leave the track and somersault to the bottom in a most spectacular manner!

Last month, we mentioned that the position of the contact braids on the Scalextric front wheel drive Minis was very critical, and this applies to an even greater extent when hill climbing. If the braids are bent too far down towards the track, adhesion will be lost and the car will not climb, but if they are bent too far up into the nose of the car, much control will be lost on the descent. It is best to experiment in order to find the 'happy medium'.

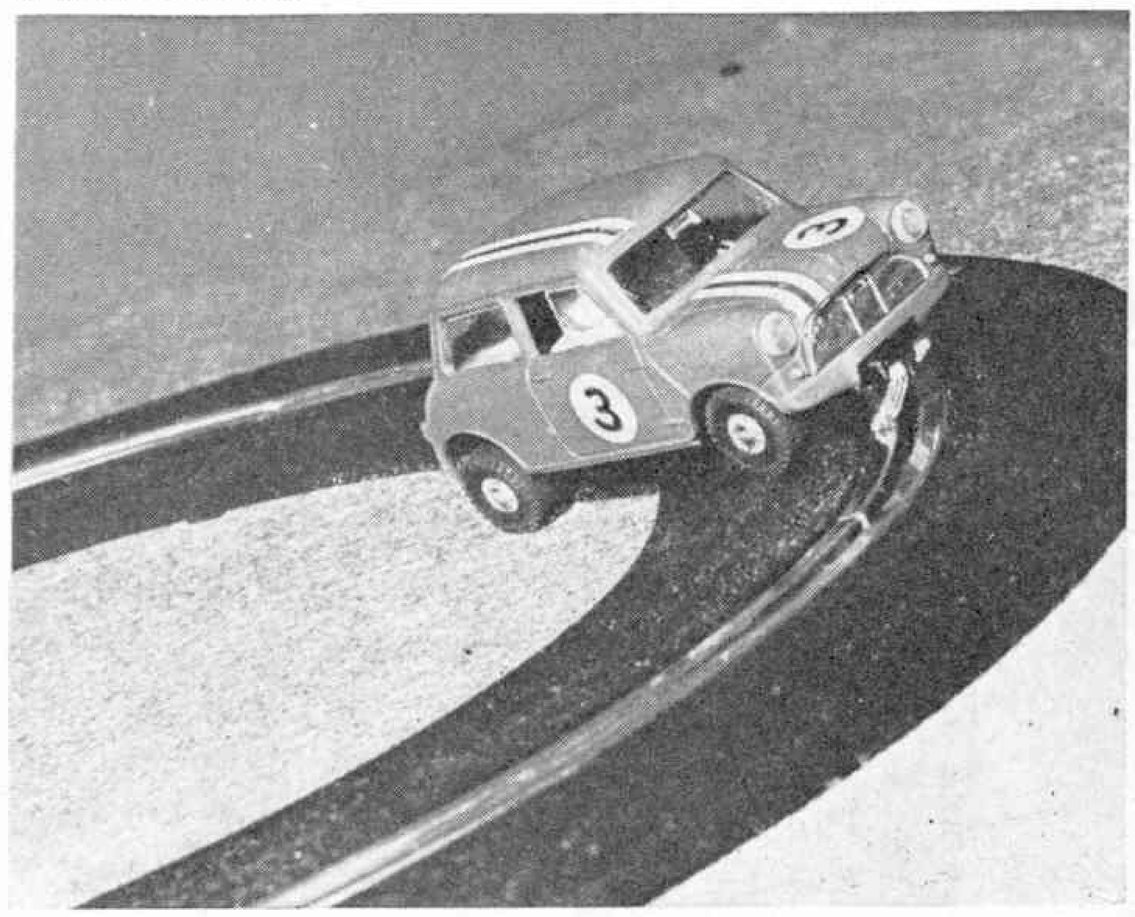
Miniature hill climbs, despite the excitement they arouse amongst onlookers and the driving skill needed by the competitors, are really very simple events to organise. A timekeeper is the only 'non-driver' needed, and he times each car from the moment it crosses the starting line until it crosses the line again in the downward direction. The car which completes its run in the shortest time is naturally the winner—but it must stay on the track throughout the run! If two or more cars 'tie', then elimination runs can be held. In real hill climbs, of course, the finishing line is usually at the summit, and the drivers return to the bottom 'paddock' via another road, but in miniature it is much more exciting and exacting to use the 'up and back' system.

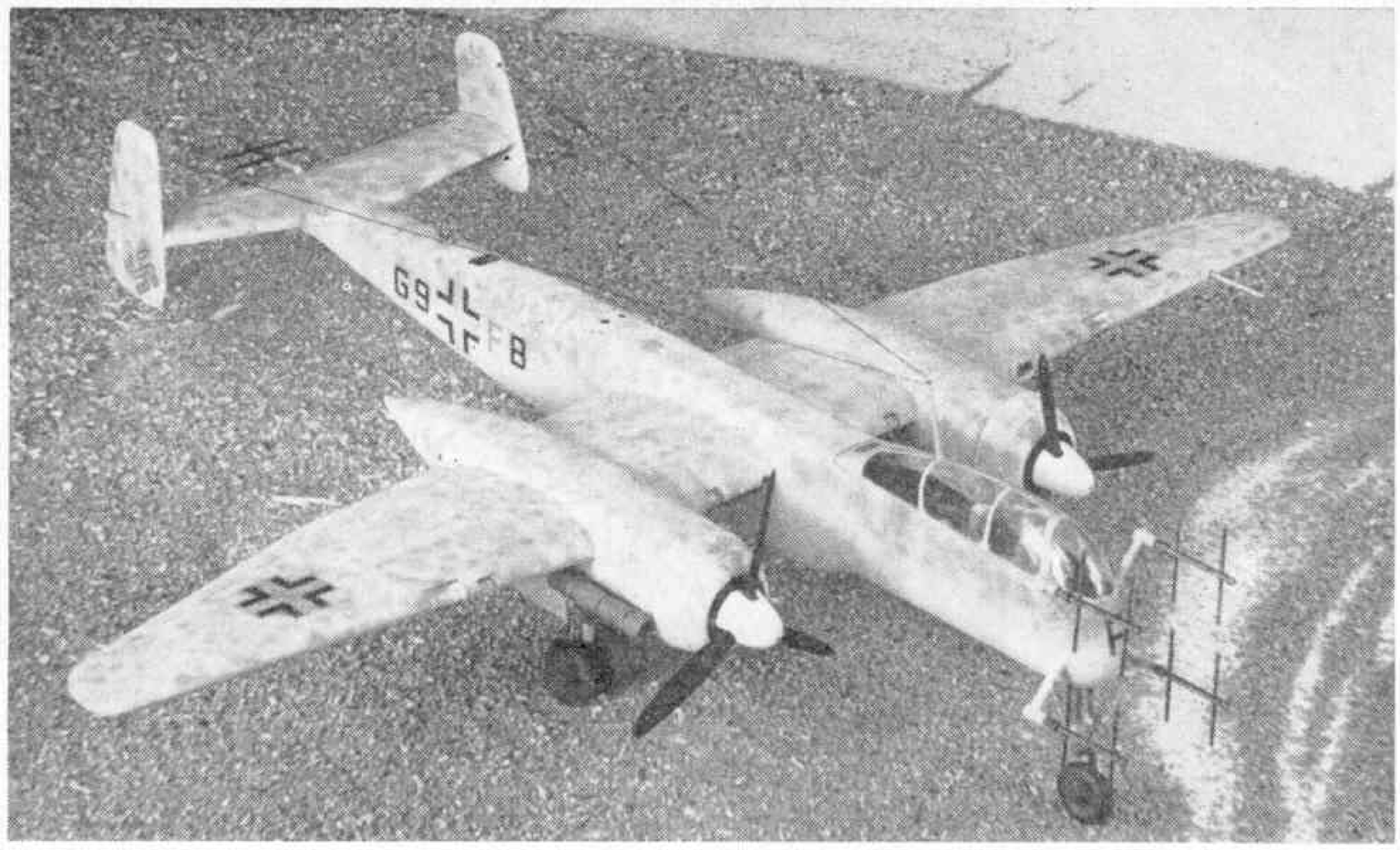
Two Scalextric Hill Climb sets, one at each end of a long level straight, make an excellent dragster strip, and although there are no dragster models included in the Scalextric range, the new 'Race Tuned' cars can be used to very good effect. In the United States, miniature drag racing is extremely popular, and the scratch-building boys produce model dragsters, powered by six volt motors, capable of speeds up to 65 *actual* miles per hour. It is not surprising that such meetings draw large crowds, and are almost as popular as 'full size' events.

The 'wiggle' half-way up is constructed from two Scalextric 45° Inner Curves (PT 52) and one 90° Double Inner Curve (PT 56)



Right at the top of the hill this Mini took the turn too slowly, and the rear end slid downhill, off the track





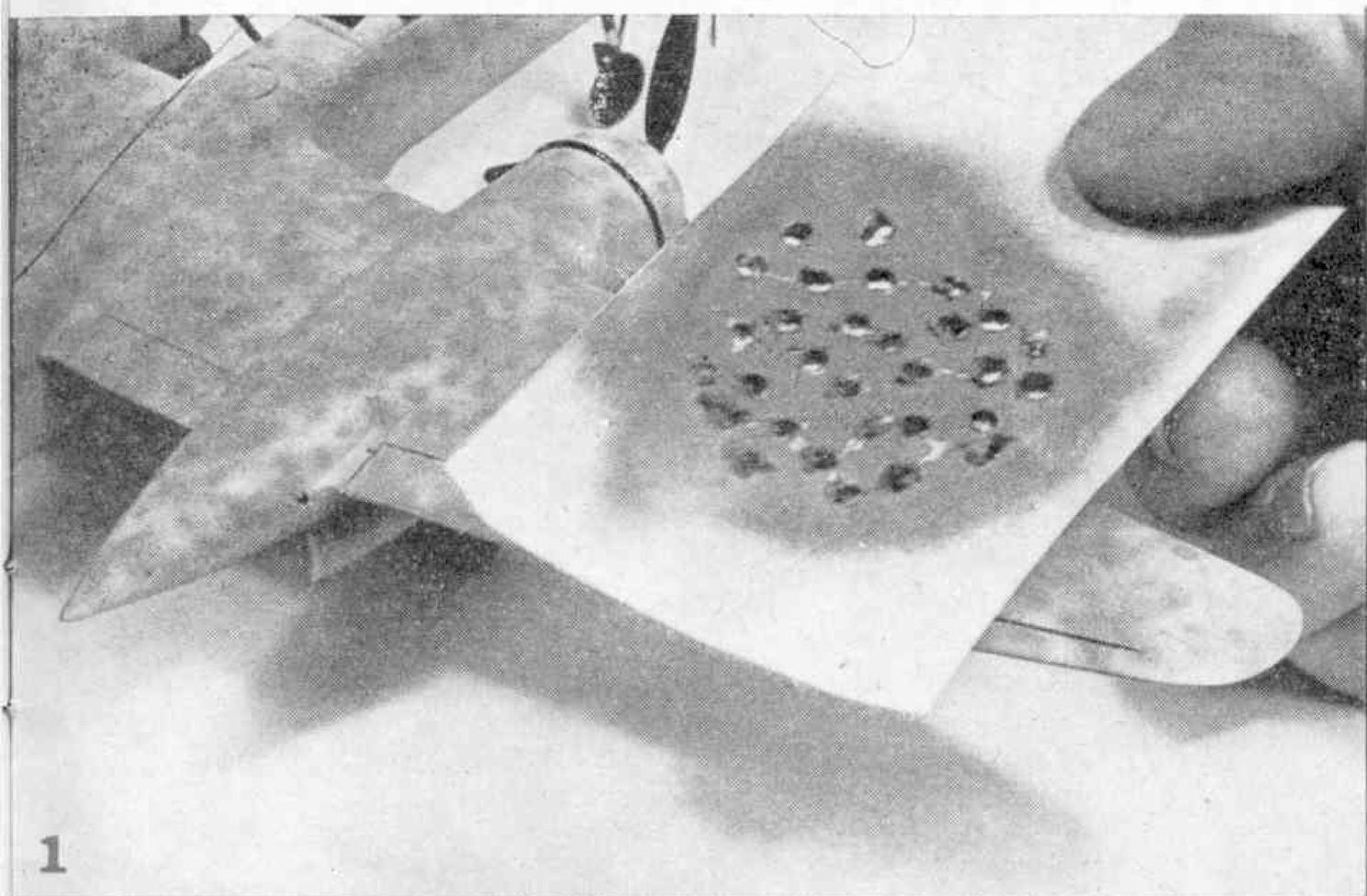
The Night Fighting Owl

A truly original model from a fine kit that introduces some noteworthy innovations

This new Frog kit is the first ever to be offered of the Heinkel He 219. It will be eagerly bought by collectors, enthusiasts and common or garden plastic kit builders who will certainly find the unusual and distinctive shape of this aeroplane irresistible !
The 'Uhu' ('Owl'), as it was appropriately known to the Luftwaffe, was a radar-equipped night-fighter of considerable merit. A big aeroplane—it measured 61 ft. wingspan—the 'Owl' scored numerous successes against invading bombers, seeking them out with its sensitive radar 'eye' which used those rather clumsy-looking antler-like aerials clustered round the nose. The 'Owl' was very fast for its day and sported a whole armoury of machine guns and cannon beneath its fuselage and in its wings. Some versions also carried two heavy calibre cannon mounted in the fuselage just behind the wing and arranged to fire *upwards* into the vulnerable undersides of their opponents as they flew overhead.
Perhaps the most notable advance introduced to the Frog range by this kit is the matt printed transfer sheet. In the past, builders have been forced to devise all manner of makeshift remedies for the unrealistic glossy markings that characterise most kit transfers—they will swoon over the 'Owl's transfers !
The matt finish is only one of the unique features of this new style transfer sheet. It also contains *two* sets of markings and these are complete with swastikas for the fins ! For many years manufacturers have fought shy of including this emblem in their kits because of the fact that such kits would be banned in Germany. Moreover, since there are two sets of markings in each kit, purchasers will have a pair of spare swastikas for earlier models not so equipped. Full colour details are provided for two alternative schemes for the 'Owl'.

These photographs of our model will help you to produce a replica to be proud of, and by special request, we are including some details of the method we use to achieve the 'Airborne' effect in our Meccano Magazine plastics pictures.

1. The dark grey mottle is achieved with the aid of a spray gun using a card 'mask' made by piercing a number of irregular holes in a piece of thin card. This is held about an inch away from the surface and sprayed 'through'. Use a Humbrol 'Jet Pack' spray gun charged with matt enamel well thinned down and keep the mask as clean as possible, never allowing the holes to become completely clogged.
2. When assembling the nose antennae, allow the four main fuselage stems to dry completely before fixing the aerial rods in place.
3. If the model is intended to be displayed 'on the ground', you will have to add a considerable amount of lead to the nose to prevent the tail from dropping. This can be done by means of a lead block in the nose-wheel bay as shown, or by filling the engine nacelles and forward fuselage with Plasticene charged with lead shot.
4 & 5. Here's how we simulate a flying attitude in our pictures. First of all a background 'sky' is produced by spraying a piece of white card with irregular patches by means of a black aerosol spray can. This card is then placed against a sheet of insulating board and a length of $\frac{1}{8}$ in. steel wire is sharpened and pushed into this board, pointing it directly towards the camera. The model is now mounted on the other end of the wire using the slot already provided for the kit stand. The position of the 'Owl' was determined by the necessity to hide the non-retractable main undercarriage legs beneath the wing, but the nosewheel can be retracted. Propellers can be blown round as the exposure is made and lighting must be very 'diffused' in order to prevent a shadow from the supporting wire from being cast on the background. If you can do the photography out of doors and out of the direct rays of the sun, you will achieve the right effect with no extra lighting equipment —the wind will blow your propellers round too !



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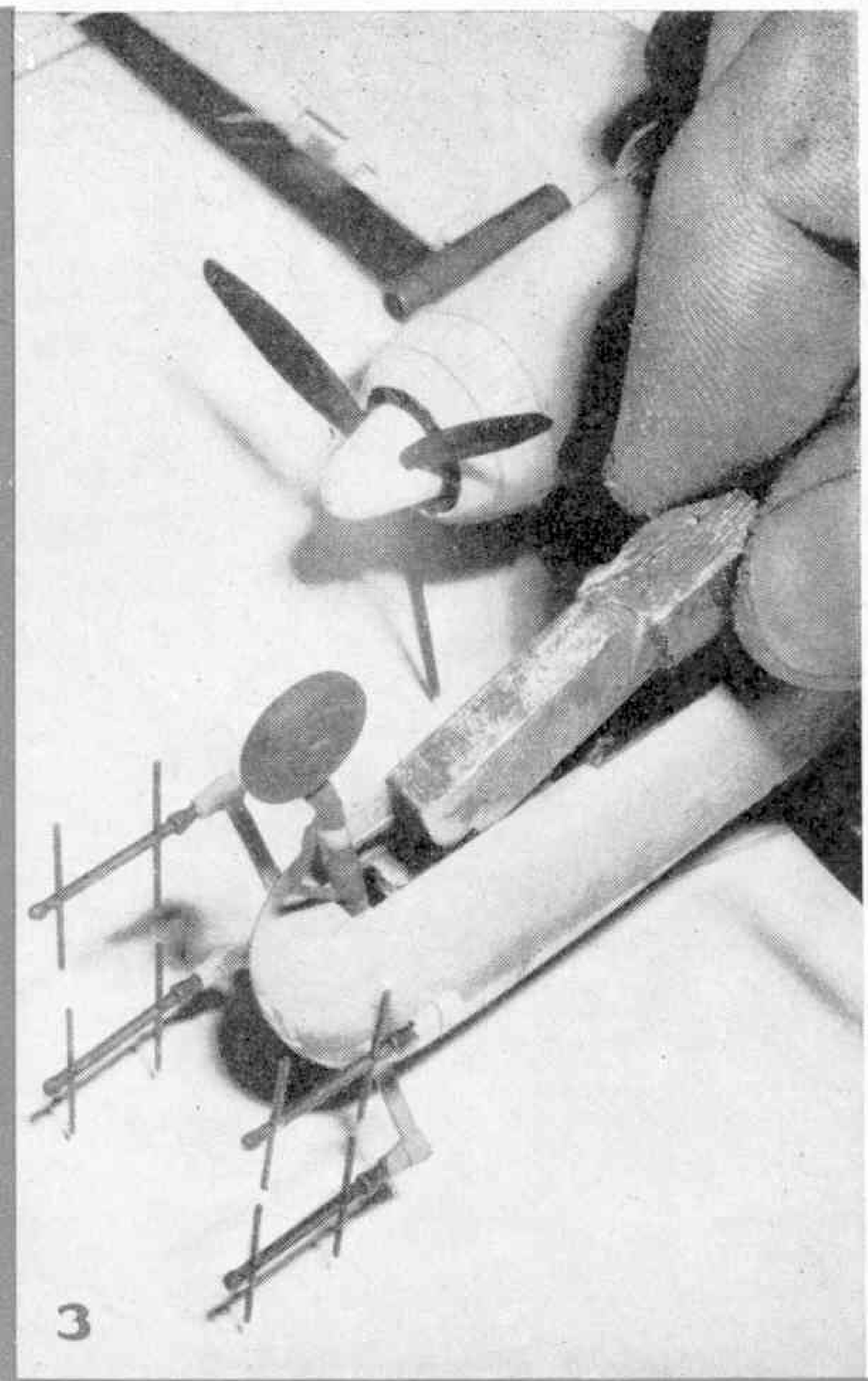

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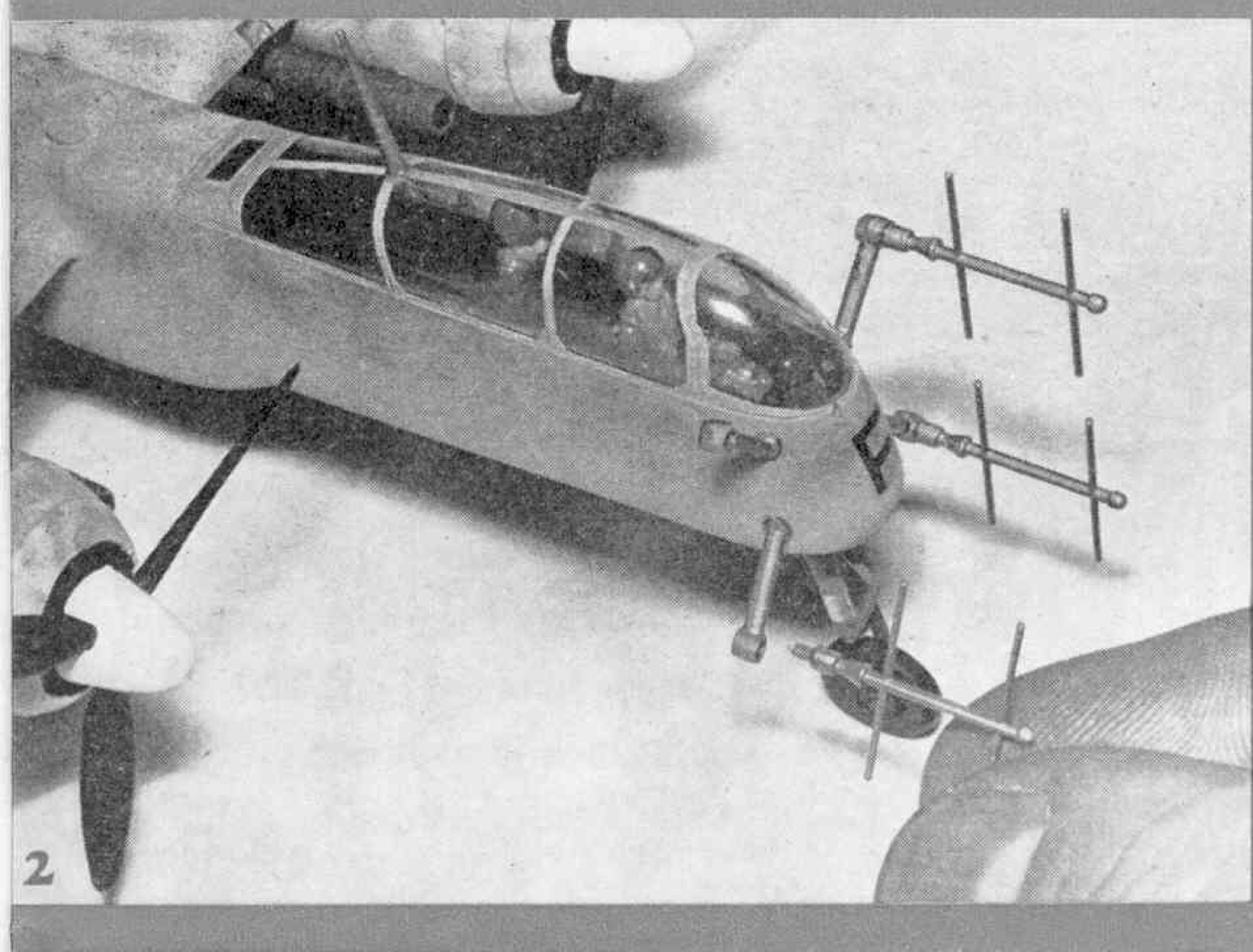

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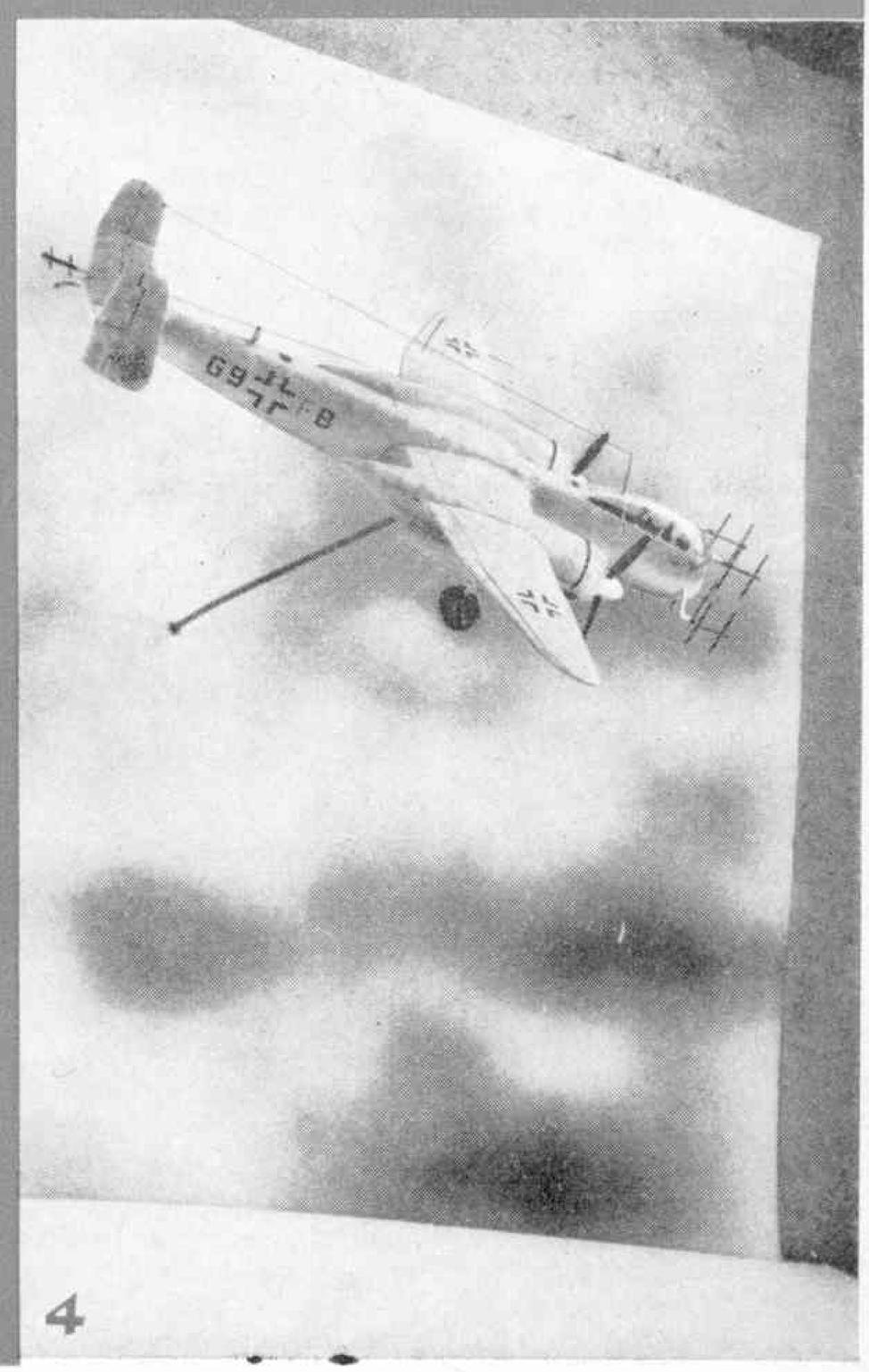

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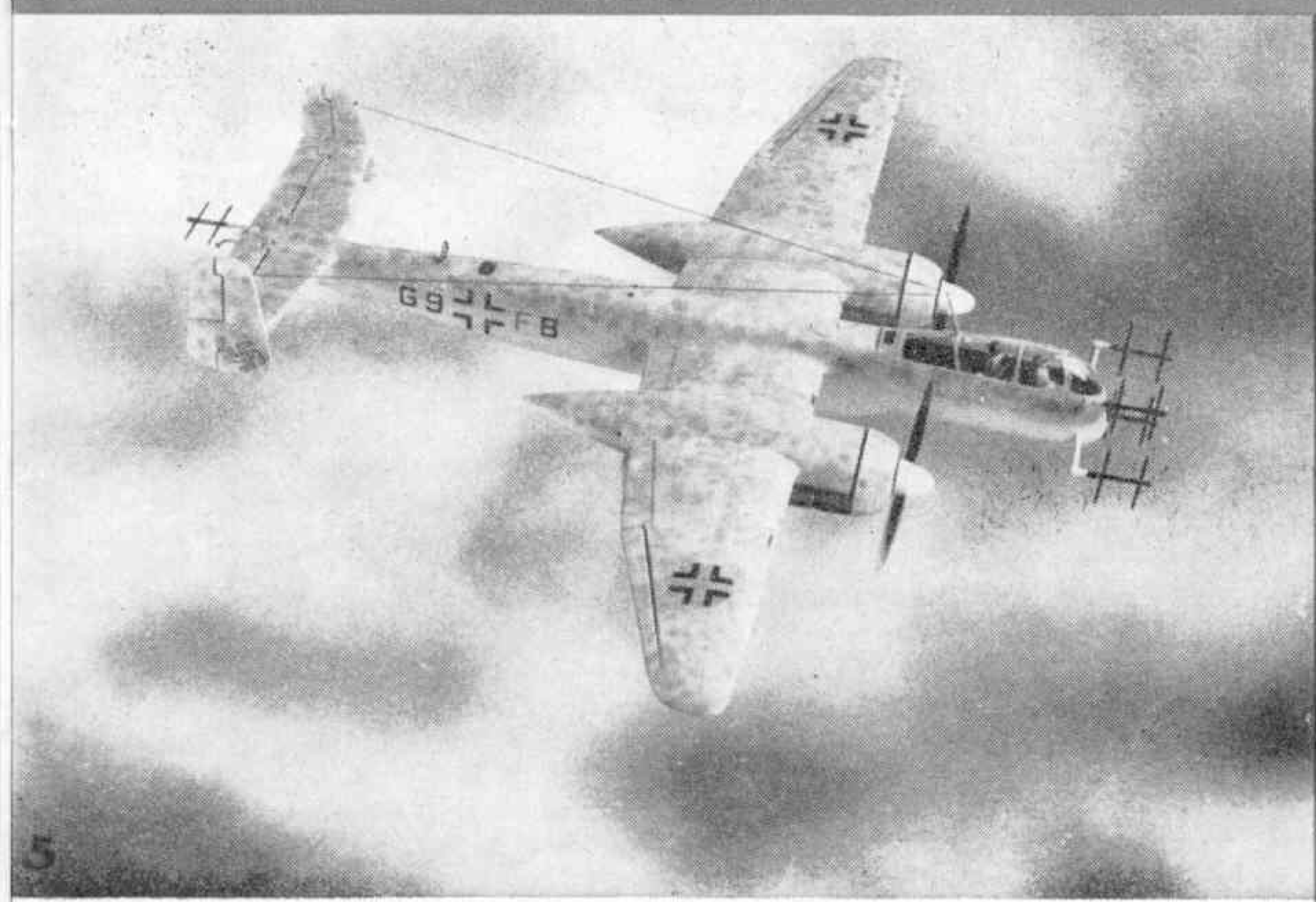

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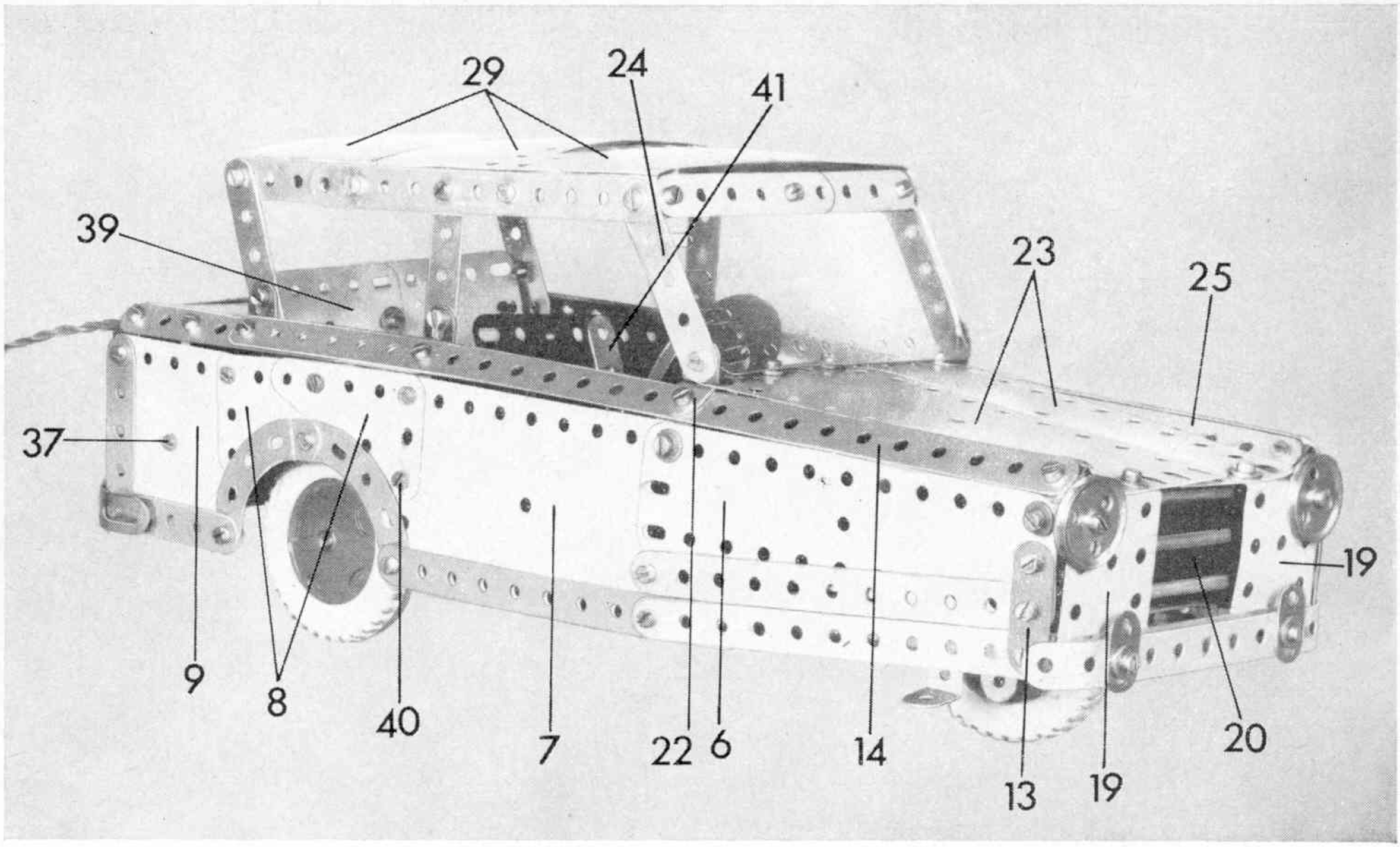


REALISTIC RELIANT

BY SPANNER

This model of the ever popular Reliant three-wheeler shows well the high degree of realism that can be attained in even the simplest Meccano model.

UNDENIABLE is the immense potential of Meccano as a miniature engineering system with which it is possible to reproduce all sorts of mechanical movements. I have heard it said, however, that while models can be made to perform exact mechanical manoeuvres, Meccano versions of actual objects or machines do not look very much like the original. This is obvious nonsense, and you have only to look at the model described below to prove it as such. Anybody interested in the motoring scene could tell at a glance that it is based on the popular Reliant 3-Wheeler. In fact, you couldn't get another constructional model looking much more realistic than does this particular example. The actual model illustrated is built with Meccano Outfit No. 7, but if you follow the building instructions given below, you will see that 14 Obtuse Angle Brackets are required to complete it, whereas only eight are included in the set. This problem is overcome by bending six Fishplates to form Obtuse Angle Brackets.

Chassis

Two 12½ in. Angle Girders 1, each extended by a 2½ in. by ½ in. Double Angle Strip 2, are connected by another 2½ in. by ½ in. Double Angle Strip 3. Bolted to each Angle Girder 1 is a 4½ in. by 2½ in. Flat Plate 4, as shown, then these Flat Plates are joined by a 3½ in. by 2½ in. Flanged Plate 5.

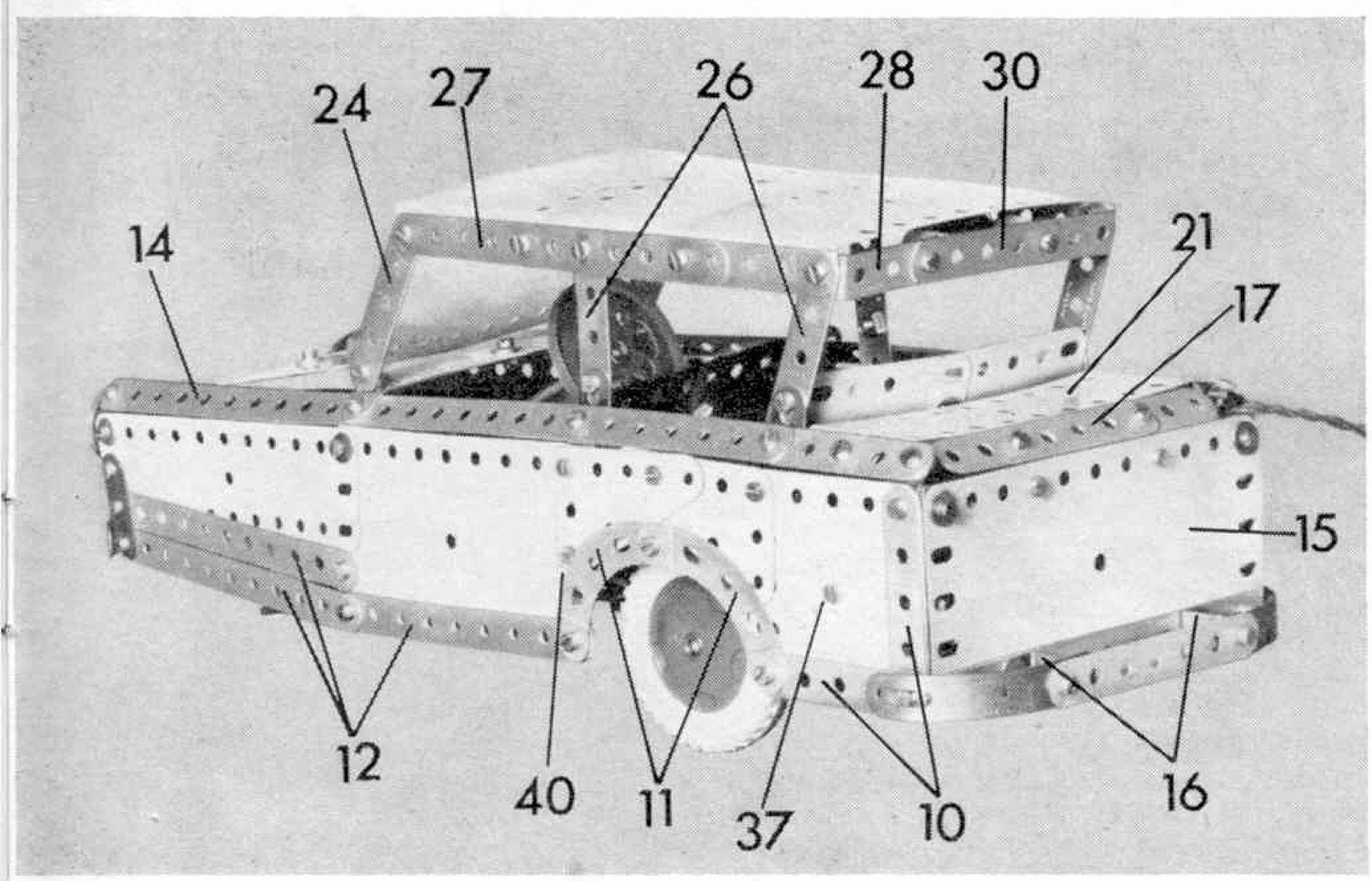
Body

Both sides of the body are similarly built up from a 5½ in. by 1½ in. Flexible Plate 6, a 4½ in. by 2½ in. Flexible Plate 7, two 2½ in. by 1½ in. Flexible Plates 8 and a 2½ in. by 2½ in. Flexible Plate 9. The Plates are edged by two 2½ in. Strips 10, two 2½ in. Stepped Curved Strips 11, three 5½ in. Strips 12 and a 1½ in. Strip 13, while a compound 14½ in. strip 14 is attached to the upper edges of the Plate by Obtuse Angle Brackets. The compound strip consists of a 12½ in. and a 5½ in. Strip overlapped seven holes.

At the rear, the sides are joined by a 5½ in. by 2½ in. Flexible Plate 15, edged along the bottom by a 5½ in. Strip, Angle Brackets fixing the Plates to the side. The Plate is also bolted direct to the rear lugs of Double Angle Strips 2, at the same time fixing Double Brackets 16 in position. The rear bumper, obtained from a 3½ in. Strip extended by two Formed Slotted Strips, is attached to these Double Brackets. Fixed to the top of Plate 15 by Obtuse Angle Brackets are two 3½ in. Strips 17 overlapped five holes.

Secured to the front ends of Angle Girders 1 by Angle Brackets is a compound 4½ in. strip 18, obtained from two 3½ in. Strips, at the same time fixing two 2½ in. by 1½ in. Flexible Plates 19 in place. The resulting gap is enclosed by a 2½ in. by 1½ in. Flanged Plate 20, attached to Double Angle Strip 3 by Angle Brackets. Three 3½ in. Rods are held in the flanges of this Plate by Spring Clips to represent the radiator grille, while a 1 in. Pulley without boss is bolted to each Plate 19 to represent headlamps. A shaped 5½ in. Strip serves as the front bumper, which is attached to Strip 18 by ½ in. Bolts, but is spaced from it by four Washers on the shank of each Bolt. Two Fishplates act as overriders. Compound strip 18, incidentally, is connected to the sides by Angle Brackets.

Compound strips 14 at each side are now joined by a shaped 5½ in. by 1½ in. Flexible Plate 21 and a shaped 5½ in. Strip 22. Bolted to Strip 22 are two 5½ in. by 2½ in. Flexible Plates 23, overlapped one hole, at the same time securing in position two Angle Brackets to each of which a 2½ in. Strip 24 is attached. Before tightly fixing Plates 23, however, they must be overlapped three holes at the front so as to form a tapered bonnet. A 5½ in. Strip 25 is attached to each compound strip 14 by an Angle Bracket, after which Plates 19 are bent over at the top and bolted to Plates 23.



Two $2\frac{1}{2}$ in. Strips 26 are connected by Obtuse Angle Brackets to each compound strip 14. Note that Strips 26 are fixed to Obtuse Angle Brackets through their second holes. The upper ends of Strips 26 are now connected together and to Strip 24 by a compound strip 27, obtained from two $5\frac{1}{2}$ in. Strips, at the same time fixing an Angle Bracket in place at the front and a $1\frac{1}{2}$ in. by $\frac{1}{2}$ in. Double Angle Strip 28 in place at the rear. In addition, the holding Bolts also secure the roof, which is composed of three $5\frac{1}{2}$ in. by $1\frac{1}{2}$ in. Flexible Plates 29. Double Angle Strips 28 are joined by a $2\frac{1}{2}$ in. Strip 30, while the windscreen, a $4\frac{1}{2}$ in. by $2\frac{1}{2}$ in. Transparent Plastic Plate overlaid by a $4\frac{1}{2}$ in. compound strip, is bolted to the Angle Brackets at the front. The compound strip is composed of two 3 in. Strips overlapped three holes.

Steering and drive

It is best to construct the steering and front axle assembly separately, and to mount it in the model as a completed unit. Two $2\frac{1}{2}$ in. by $\frac{1}{2}$ in. Double Angle Strips 31 are joined at one end by a $3\frac{1}{2}$ in. Strip 32, to the centre of which a 1 in. by $\frac{1}{2}$ in. Double Bracket is lock-nutted, at the same time fixing a $2\frac{1}{2}$ in. Strip 33 through its second hole between the lugs of the Double Bracket. The lugs are extended by further $2\frac{1}{2}$ in. Strips, but note that only one Bolt is used to fix each Strip to the respective lug. A $1\frac{1}{2}$ in. Rod 34 carrying a $2\frac{1}{2}$ in. Road Wheel is journalled in the second holes of the $2\frac{1}{2}$ in. Strips, as shown.

Lock-nutted through the fourth hole of Strip 33 is a $1\frac{1}{2}$ in. Strip, to the other end of which an Angle Bracket is lock-nutted. A Crank 35 is, in turn, lock-nutted to the free lug of this Angle Bracket, after which the complete unit can now be mounted in position by bolting Double Angle Strips 31 to Angle Girders 1. The steering column is a $4\frac{1}{2}$ in. Rod fixed in the boss of Crank 35 and journalled in an Angle Bracket bolted to the underside of Strip 22 and in a $\frac{1}{2}$ in. Reversed Angle Bracket bolted to the right-hand Double Angle Strip 31. A 2 in. Pulley acts as the steering wheel.

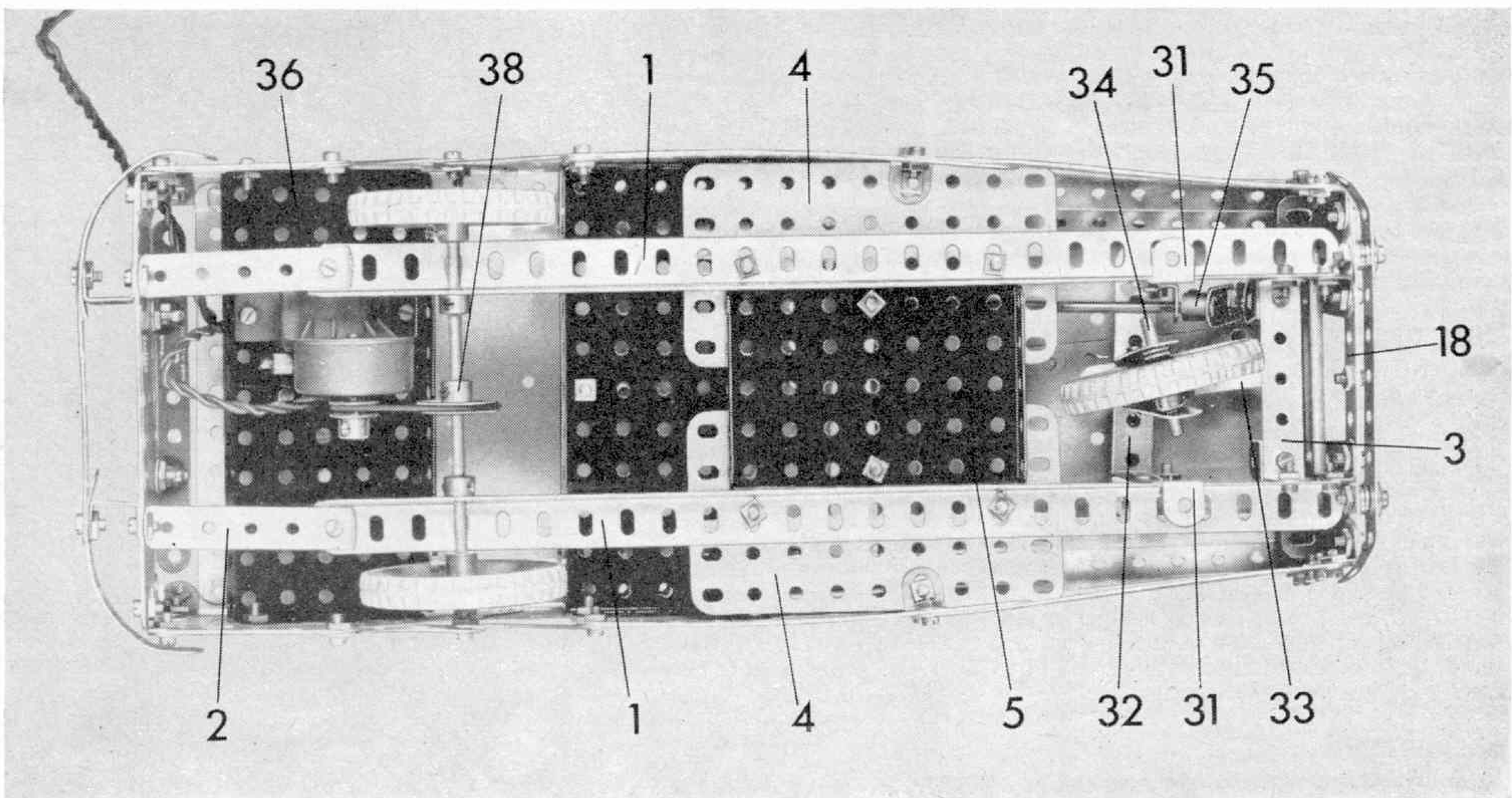
An Emebo Motor with a $\frac{1}{2}$ in. Fixed Pulley on its output shaft is bolted to the underside of a $5\frac{1}{2}$ in. by $2\frac{1}{2}$ in. Flanged Plate 36, which is then fixed at an angle between the sides, being held by Bolts 37. The Pulley is connected by a $2\frac{1}{2}$ in. Driving Band to a 1 in. Fixed Pulley 38 on a 5 in. Rod held in Girders 8 by Collars. Two $2\frac{1}{2}$ in. Road Wheels are also fixed on this Rod.

Besides providing a "bed" for the Motor, part of Flanged Plate 36 also acts as the rear seat, the back of which is provided by two $2\frac{1}{2}$ in. by $1\frac{1}{2}$ in. Flexible Plates 39, overlapped one hole and connected to the Flanged Plate by a 1 in. by 1 in. Angle Bracket. The front seat is also provided by a $5\frac{1}{2}$ in. by $2\frac{1}{2}$ in. Flanged Plate, held by Bolts 40, the back being supplied by two $2\frac{1}{2}$ in. by $1\frac{1}{2}$ in. Plastic Plates, overlapped one hole and overlayed by a $1\frac{1}{2}$ in. Strip 41. Again, it is fixed to the Flanged Plate by a 1 in. by 1 in. Angle Bracket.

Parts required

2 of No. 1	1 of No. 20a	2 of No. 111a
17 of No. 2	1 of No. 22	1 of No. 111c
6 of No. 3	2 of No. 22a	3 of No. 125
2 of No. 4	6 of No. 35	3 of No. 187
14 of No. 5	138 of No. 37a	4 of No. 188
4 of No. 6a	132 of No. 37b	3 of No. 189
2 of No. 8	30 of No. 38	2 of No. 190
8 of No. 10	2 of No. 48	2 of No. 191
4 of No. 11	5 of No. 48a	6 of No. 192
1 of No. 11a	1 of No. 51	1 of No. 193c
18 of No. 12	2 of No. 52	2 of No. 194
2 of No. 12a	1 of No. 53	2 of No. 215
8 of No. 12c	2 of No. 53a	4 of No. 221
2 of No. 15	2 of No. 59	1 Emebo Motor
3 of No. 16	1 of No. 62	
1 of No. 18a	4 of No. 90a	

An underneath view of the model showing the chassis, drive and steering arrangement



TIME PLEASE?

BY SPANNER

Right: a close-up view of the switch controlling the winding mechanism, and below right: a rear view of the 'gearbox' showing the escapement

CLOCKS of all kinds have always proved popular with advanced Meccano model-builders, perhaps because a reasonably accurate clock is a useful thing to have around, but more probably because the intricate and critical nature of its construction provides a challenge, besides resulting in an immense feeling of satisfaction if successfully completed. Ever alert to the requirements of its readers, Meccano Magazine has published details of several clocks over the years, all of which have been well received. Now we feature another working model which we believe to be a particularly excellent example. Congratulations and full credit go to its builder, Mr. R. A. Fail of Bedford, who not only designed the clock, but who has spent several years modifying and improving it.

Mr. Fail's model is similar to several past Meccano clocks in that it is pendulum controlled and is driven by a large weight, but here the similarity ends. Whereas all earlier weight-driven clocks needed frequent winding, Mr. Fail's example will run indefinitely without attention—it's self-winding! A cleverly-designed mechanism, powered by a Meccano E15R Electric Motor, automatically raises the weight when it reaches the end of its drop. What's more, the mechanism is so arranged that the drive to the clock remains in operation when winding is in progress, thus removing the danger of the clock stopping at this time.

I have prepared the following article from notes and photographs kindly supplied by Mr. Fail. Not actually having the model itself, however, I have been unable to complete step-by-step instructions, but these are not necessary as construction is fairly evident from the photographs. I have described the sections where difficulty is likely to be encountered, of course, and have also included a couple of diagrams which should prove helpful.

Generally speaking, the model can be divided into three sections—the main framework, the 'gearbox' at the top of the main framework, and the switch mechanism for the winding operation, situated part-way up the main framework.

In the case of the main framework, the accompanying photographs are sufficiently well-detailed to give you a good idea of its construction. Basically, it consists of four 43 in. Compound Angle Girders 1, joined by suitable Angle Girders, Strips and Plates. Each Compound Girder is obtained from a 24½ in. and an 18½ in. Angle Girder, placed end to end and 'butt-jointed' by another smaller Angle Girder. Plenty of cross bracing is provided down three sides of the model by various Strips, the majority of the fourth side being left open so as not to interfere with the 'forks' controlling the winding movement.

Construction of the 'gearbox' is, again, fairly obvious from the illustrations. Compound Girders 1 at the front are joined by a 5½ in. by 3½ in. Flat Plate 2 while Girders 1 at the rear are joined by a 5½ in. by 2½ in. Flat Plate 3 and a 5½ in. Angle Girder 4. Two 7½ in. Angle Girders 5 are bolted between 5½ in. Angle Girders 6 joining the sides then Angle Girders 5 are joined by two 5½ in. by 3½ in. Flat Plates 7. A 1½ in. Flat Girder 8 is added to one of the rear Girders 1.

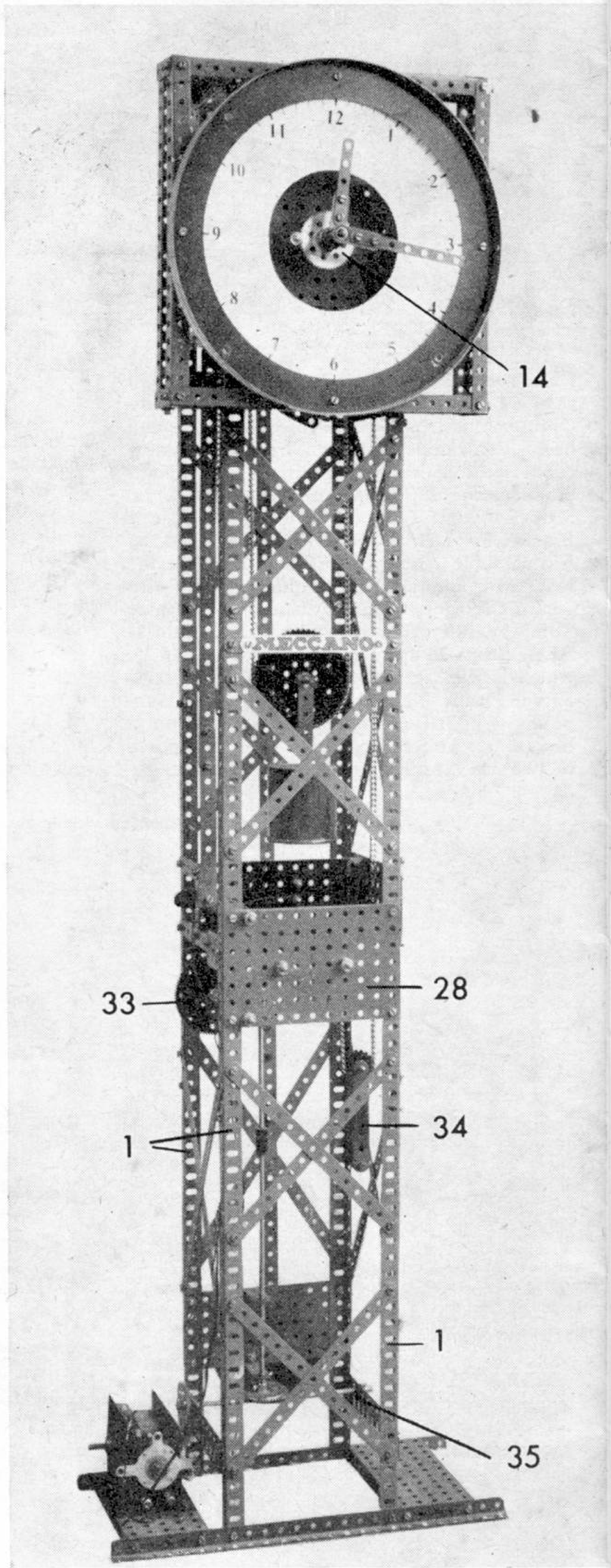
Two Squares 9 are now built up each from four 9½ in. Angle Girders, then they are connected together at the corners by 1½ in. Angle Brackets. The complete arrangement is fixed to Front Girders 1 and to a 9½ in. Strip 10, bolted across the middle of Flat Plate 2.

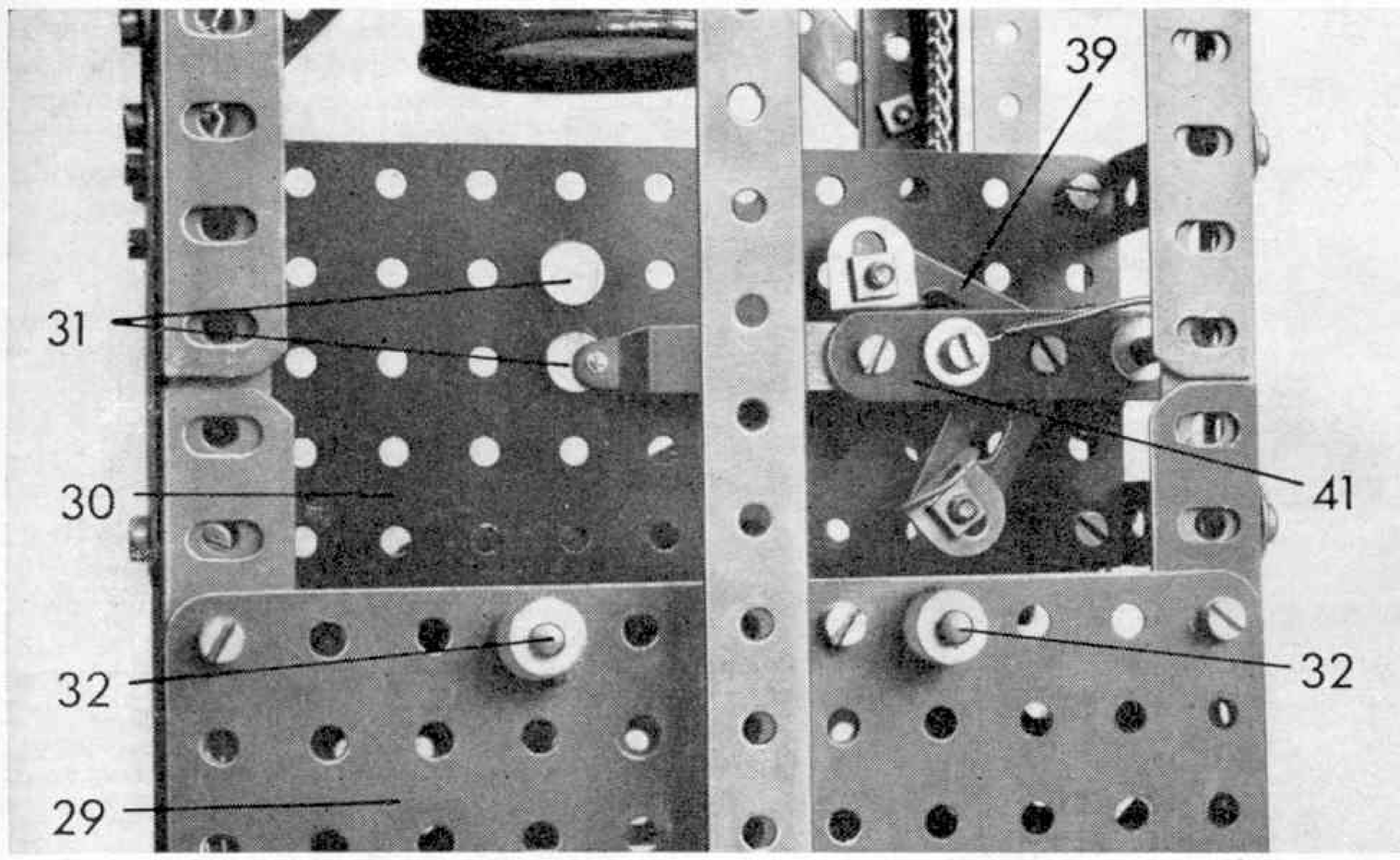
Gear assembly

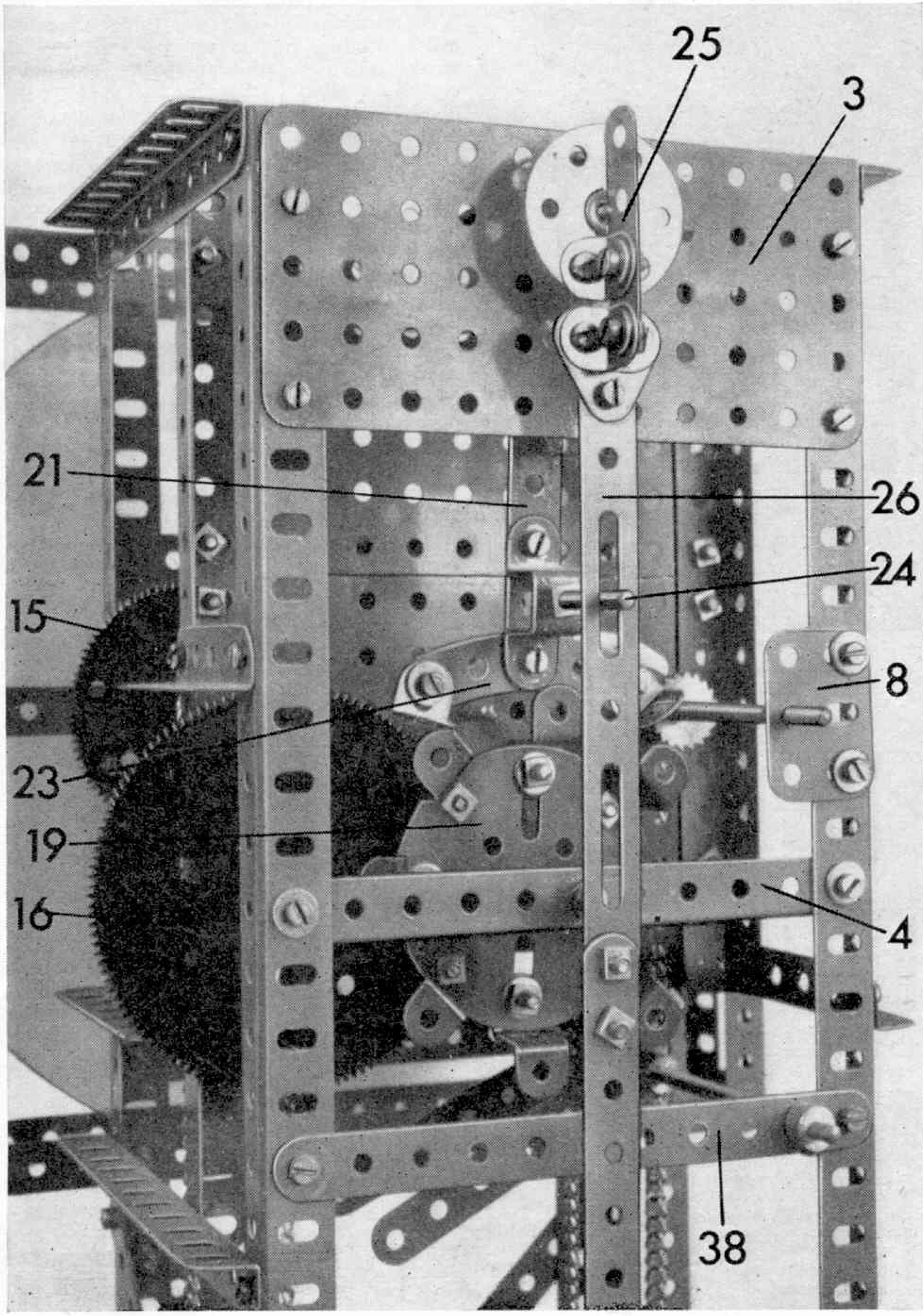
A suitable Rod A (Fig. 1), carrying a ½ in. Pinion 11 and a 3½ in. Gear Wheel 12, is journalled in the centre hole of Plate 2 and in the corresponding hole of lower Plate 7. Pinion 11 meshes with a 57-teeth Gear Wheel 13 on a short Rod B (Fig. 1), journalled in Plate 2 and a Double Bent Strip bolted to the front of the Plate. Rod B also carries a $\frac{7}{16}$ in. Pinion C (Fig. 1), on its outside end, that meshes with a 60-teeth Gear Wheel 14, loose on Rod A. Gear 12 meshes with a ½ in. Pinion D (Figs. 1 and 2), also journalled in Plates 2 and 7 on a level with Rod A. In addition to ½ in. Pinion D, Rod E carries a 1 in. Sprocket Wheel F (Figs. 1 and 2) and a 2½ in. Gear Wheel 15, the latter in mesh with a second ½ in. Pinion G (Figs. 2 and 3) on a fourth Rod H (Figs. 2 and 3) journalled in Plates 2 and 7. Mounted on the end of this Rod, behind Plate 7, is a 3½ in. Gear Wheel 16. A 6½ in. Rod, carrying a 1 in. Sprocket Wheel 17 and a Ratchet Wheel 18, is journalled in Flat Plate 2 and Flat Girder 8. A Pawl fixed to lower Plate 7 engages with the Ratchet.

Escapement

An Escapement Wheel is now produced by bolting eight ½ in. Reversed Angle







Brackets to a Face Plate 19. This is a critical part of the mechanism, therefore the Brackets must be exactly placed with identical distances between their free lugs. The completed wheel is mounted on a 2 in. Pivot Rod J (Fig. 3), as also is a ½ in. Pinion 20, and the Rod is then positioned in the clock, being held by Pivot Bolts, one fixed in lower Plate 7 and the other in Angle Girder 4. Pinion 20 meshes with Gear Wheel 16. The escapement lever consists of a 4½ in. Strip 21 mounted on a 3½ in. Rod 22, journalled in upper Plate 7 and Plate 3. A 2½ in. Curved Strip 23, to each end of which an Angle Bracket is fixed, is bolted to the lower end of the 4½ in. Strip, at the same time securing a Double Bent Strip in place. A long Threaded Pin 24 is attached to this Double Bent Strip.

To build the pendulum, a 2 in. Flexible Strip 25 (Elektrikit part No. 530) is attached to a 6-hole Bush Wheel by an Angle Bracket. Fixed by Angle Brackets to the lower end of this Strip is a 1 in. Triangular Plate, to which a 5½ in. Slotted Strip 26 is bolted. Threaded Pin 24 engages in the upper slot in this Strip, which is extended by Ordinary Perforated Strips. The pendulum 'bob' consists of a 6 in. Circular Plate, to which six 2½ in. by 2½ in. Flat Plates are bolted. The distance from the centre of the bob to the pivot should be about 37½ in. The 6-hole Bush Wheel, incidentally, is fixed on a Threaded Pin mounted in Flat Plate 3.

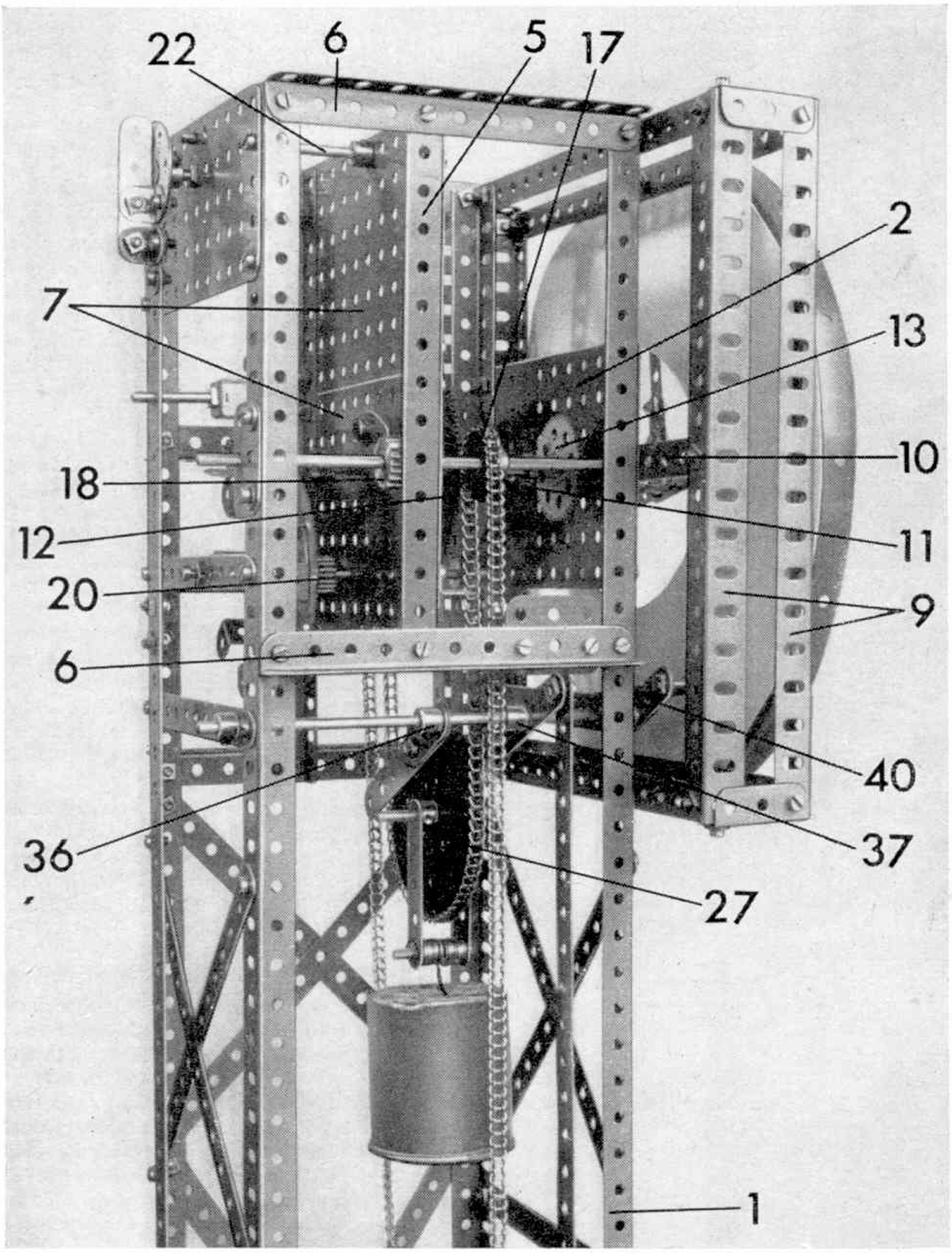
It is interesting to note that coarse adjustment of the time-keeping can be made by altering the length of the pendulum in half-inch steps and finer adjustment by moving one or more of the 2½ in. by 2½ in. Flat Plates up or down.

Drive and winding arrangements

As already mentioned, power for the clock is provided by a large weight which, in fact, is the only non-Meccano part other than the cardboard face used in the model. It is obtained by melting about 3 lb. of lead into a can with a diameter of approximately 2 in. and a depth also of 2 in. Before the lead solidifies a piece of wire must be buried in it to act as an attachment for fixing by a 1⅛ in. Bolt to a couple of 2½ in. Strips. Mounted between these Strips is a 3 in. Sprocket Wheel 27 on a 2½ in. Rod, journalled in the end holes of the Strips.

Bolted part way up the mainframe between front girders 1 is a 5½ in. by 3½ in. Flat Plate 28, while a 5½ in. by 2½ in. Flat Plate 29 is bolted between girders 1 at the rear. The front and rear girders are then joined at one side by another 5½ in. by 2½ in. Flat Plate and at the other side by a couple of 5½ in. Strips. Fixed between these Strips and the Plate is a 5½ in. by 2½ in. Insulating Flat Plate 30, attached by 2½ in. Angle Girders. Two Contact Studs 31 are bolted to this Plate.

Journalled in Plates 28 and 29 are two 6½ in. Rods 32, each carrying a 1 in. Sprocket Wheel. Another 6½ in. Rod carrying a 2½ in. Gear Wheel 33 and a 1 in. Sprocket Wheel is also journalled in the Flat Plates. A 90 in. (approx.) length of Sprocket Chain is now passed round the 1 in. Sprocket Wheel on the Rod carrying Gear Wheel 15; is taken down and around 3 in. Sprocket Wheel 27; is brought up and passed round 1 in. Sprocket Wheel 17; is taken down and around the 1 in. Sprocket Wheel on the Rod carrying Gear Wheel 33; is brought up and taken over the 1 in. Sprocket Wheels on Rods 32; is taken round a 1 in. Sprocket Wheel in a special



tensioning weight 34, after which the ends of the Chain are joined together to form an endless belt. The tensioning weight is obtained by bolting several $2\frac{1}{2}$ in. Strips together between two $3\frac{1}{2}$ in. Strips and by mounting the 1 in. Sprocket Wheel on a Rod journalled in the end holes of these $3\frac{1}{2}$ in. Strips.

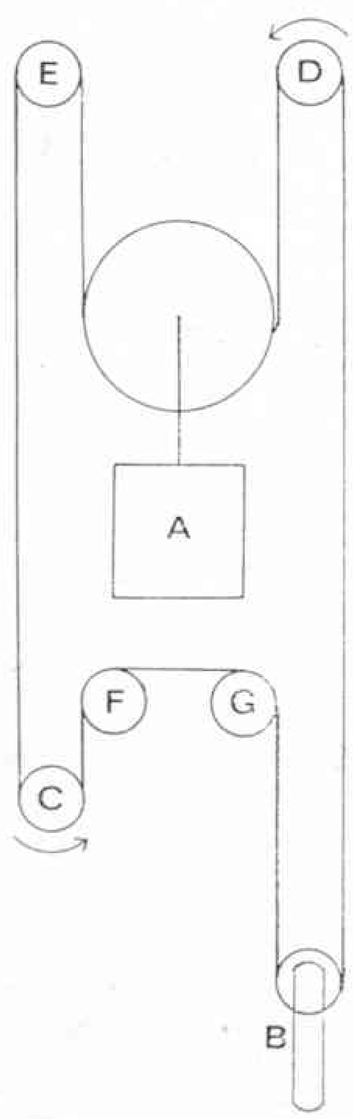
Two $12\frac{1}{2}$ in. Angle Girders joined by two $5\frac{1}{2}$ in. by $2\frac{1}{2}$ in. Flanged Plates are bolted to the lower ends of compound girders 1 to provide a base, and an E15R Motor is mounted on one of the Flanged Plates. Girders 1 are connected at the sides by two $5\frac{1}{2}$ in. Flat Girders 35 in which a $6\frac{1}{2}$ in. Rod carrying a 57-teeth Gear Wheel and a $\frac{1}{2}$ in. Bevel Gear, is journalled. The 57-teeth Gear meshes with a $\frac{1}{2}$ in. Pinion on the Motor output shaft, while the Bevel Gear meshes with a $1\frac{1}{2}$ in. Bevel on the end of a vertically-mounted compound rod. A Worm fixed on the other end of this Rod meshes with a $2\frac{1}{2}$ in. Gear Wheel 33.

Winding control

Perhaps the most critical part of the model is the switch arrangement controlling the automatic winding of the clock. Two similar "forks" are both built up in the same way. A Crank 36 and a Double Arm Crank 37 are fixed approximately $1\frac{1}{2}$ in. apart on an Axle Rod. The Crank is extended by a $3\frac{1}{2}$ in. Strip, while a $4\frac{1}{2}$ in. Strip is bolted to the Double Arm Crank so that it protrudes backwards two holes. One of the Rods is now journalled in $5\frac{1}{2}$ in. Strips 38, while the other Rod is journalled in Plates 28 and 30, then the extended arms of the Double Arm Cranks are coupled together by a $16\frac{1}{2}$ in. compound strip, lock-nutted in place. A Bell Crank 39, to each arm of which an Angle Bracket is bolted, is fixed on the inside end of the lower Rod, while an ordinary Crank 40 is fixed on the outside end of the upper Rod. A Threaded Pin, carrying a Tension Spring, is attached to the arm of this Crank. The other end of the Tension Spring is secured to the further vertical Girder 9.

Bolted through the centre end hole of Insulating Plate 30 is a long Threaded Pin on which a $2\frac{1}{2}$ in. Insulating Strip 41 is pivotally held by Collars. This Strip is

Continued on page 47



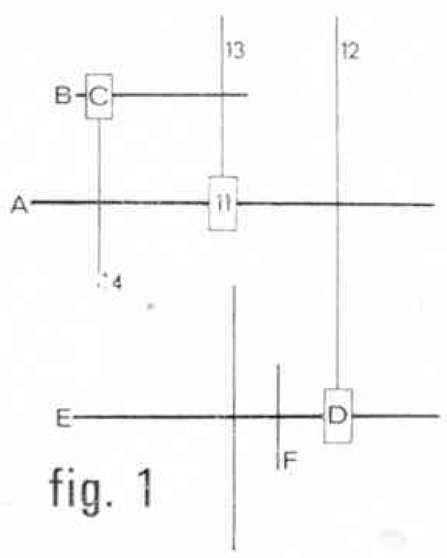


fig. 1

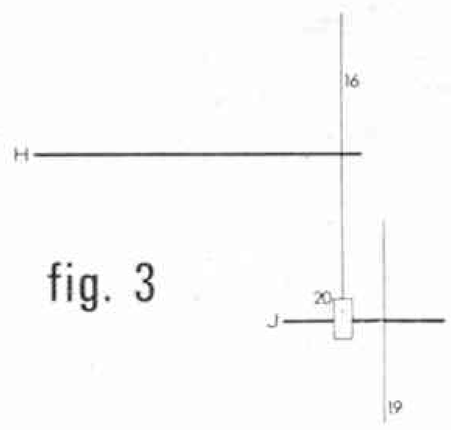


fig. 3

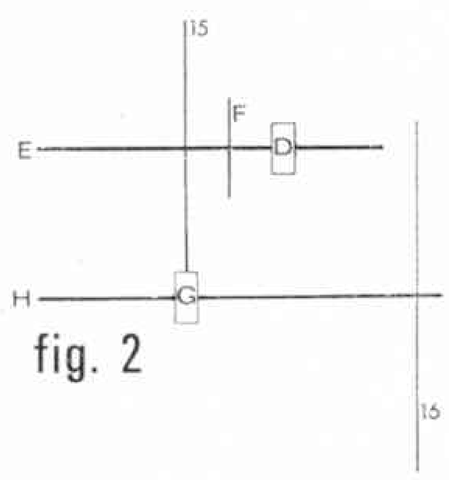


fig. 2

Left: this diagram shows the Sprocket-and-Chain driving and winding arrangement. A—driving weight; B—tensioning weight; C—winding drive Sprocket; D—'gearbox' drive Sprocket; E. F. G—free-running Sprockets. Figs. 1, 2 and 3 show the layout of the 'gearbox' in diagrammatical form. The numbered and lettered parts are referred to in the text, but note that Sprocket Wheel 17 is not shown

Above: in this view of the clock, the construction of the 'gearbox' can be clearly seen

Parts required

3 of No. 1	1 of No. 24b	2 of No. 103
15 of No. 1a	5 of No. 26	3 of No. 103h
8 of No. 1b	1 of No. 26c	1 of No. 109
8 of No. 2	2 of No. 27a	2 of No. 115
3 of No. 2a	2 of No. 27b	2 of No. 115a
4 of No. 3	2 of No. 27c	1 of No. 120b
8 of No. 5	1 of No. 27d	8 of No. 125
4 of No. 6a	1 of No. 30a	1 of No. 128
4 of No. 7	1 of No. 30c	1 of No. 146
4 of No. 7a	1 of No. 32	1 of No. 155
6 of No. 8	1 of No. 43	1 of No. 167b
9 of No. 8a	2 of No. 45	1 of No. 171
1 of No. 8b	2 of No. 52	1 of No. 230
6 of No. 9	5 of No. 52a	1 of No. 231
1 of No. 9b	1 of No. 55	1 of No. 235
1 of No. 9d	16 of No. 59	1 of No. 235b
12 of No. 12	8 of No. 62	1 of No. 502
2 of No. 13a	2 of No. 63	1 of No. 510
7 of No. 14	1 of No. 70	1 of No. 530
1 of No. 15a	6 of No. 72	1 of No. 533
1 of No. 16	1 of No. 77	2 of No. 544
1 of No. 16b	1 of No. 90	2 of No. 545
2 of No. 18a	90 in. of No. 94	1 of No. 549
1 of No. 18b	1 of No. 95b	1 E15R Electric Motor
1 of No. 22	6 of No. 96	

Results of Meccano Model-Building Contest

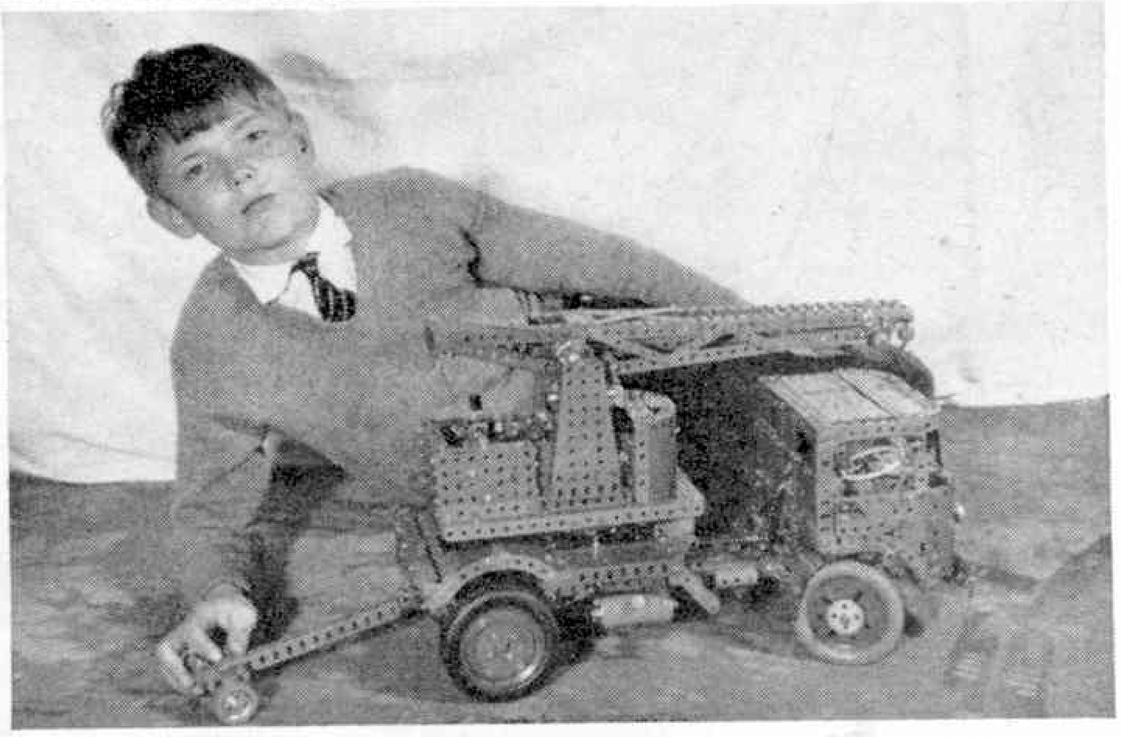
Section A (Competitors under 14 years of age on closing date). First prize, £5 5s. 0d.; J. Boothman, Datchet, Bucks. Second Prize, £3 3s. 0d.; K. White, Panchgani, Dist. Satara, Maharashtra State, India. Third Prize, £2 2s. 0d.; D. R. S. Upcott, South Harrow, Middx.

Ten Prizes of 10s. 6d.; R. Croydon, Newton Abbot, Devon; R. Soper, Shepton Mallet, Somerset; J. Taylor, Sheffield, Yorks.; G. B. Davies, Alfrick, Worcs.; P. S. Berry, Bury St. Edmunds, Suffolk; R. Thorne, Fleet, Hants.; R. F. Capodici, Mar del Plata, Argentina; J. Smith, Enfield, Middx.; J. Norris, Billacombe, Devon; D. P. Shah, Calcutta 25, India.

Section B (Competitors aged 14 and over on closing date). First Prize, £7 7s. 0d.; R. H. Groen, Amsterdam, Holland. Second Prize, £5 5s. 0d.; H. J. Halliday, London, S.E.15. Third Prize, £3 3s. 0d.; J. F. Hulse, Shrewsbury, Salop.

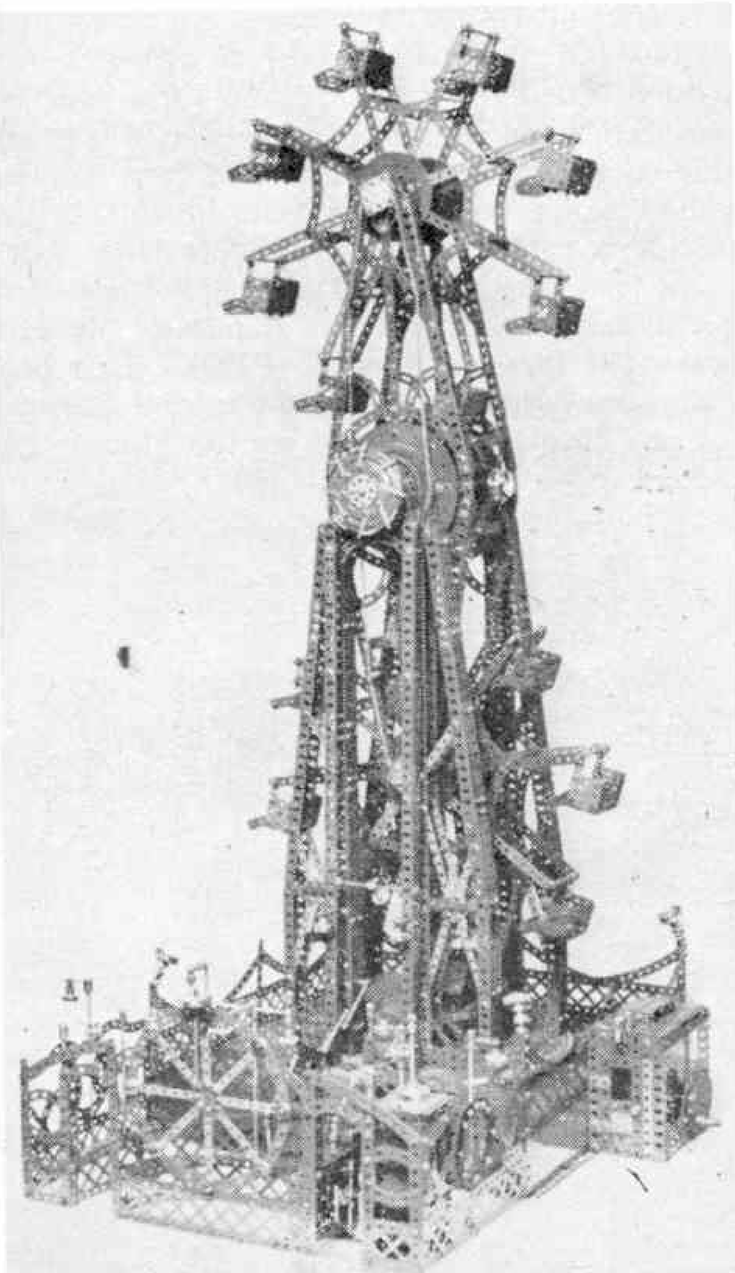
Ten Prizes of £1 1s. 0d.; C. J. Dove, Bishopton, Renfrewshire; A. Jennings, St. Albans, Herts.; C. A .Burnett, Huntingdale, Victoria, Australia; M. A. Capet, Le Havre, France; G. Servetti, Piacenza, Italy; W. Borthwick, St. Andrews, Fife; H. R. Manohar, The Nilgiris, S. India; G. Bennett, Hatfield, Doncaster, Yorks.; W. Croydon, Abbotskerswell, Nr. Newton Abbot, S. Devon; A. E. Encinas, Mexico 14, Mexico.

'Spanner' will discuss some of these interesting models in next month's issue of Meccano Magazine



Third Prize in Section A was won by Dixon Upcott, of South Harrow, Middx., seen here with his winning Mobile Crane model

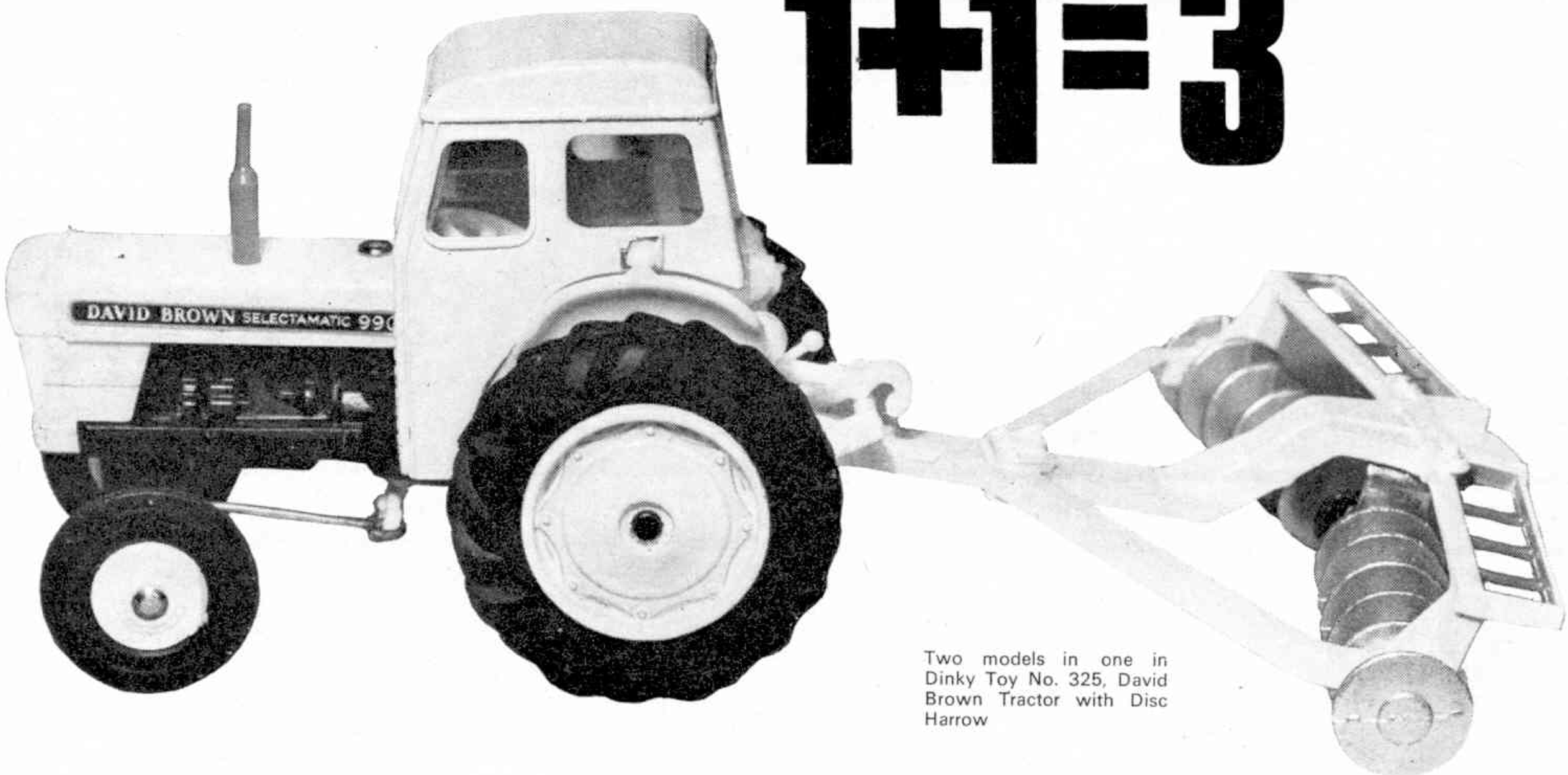
Another prize-winner in Section A was J. R. Taylor of Sheffield. His winning model was of a Pistol-cum-Rifle



Mr. H. J. Halliday, of London, S.E.15, gained Second Prize in Section B with this unusual model of a Big Wheel

Well worthy of a prize in Section B was this superb free-lance Tank designed and built by Sqn. Ldr. G. Bennett, of Doncaster

CHRIS JELLEY SAYS 1+1=3



Two models in one in Dinky Toy No. 325, David Brown Tractor with Disc Harrow

THAT'S not right, is it? One and one make two, not three, don't they? Of course they do—unless you're talking about the new Dinky Toys marketed this month! Admittedly, only two new releases have appeared, Nos. 156 and 325, but three new models are on sale. How so?—because No. 325 is two models under one number, these being the David Brown Tractor complete with a miniature Disc Harrow. 'The David Brown Tractor's not new,' you may be saying, and it is true that Meccano did introduce a model of the David Brown Selectamatic 990 last year. Since then, however, the David Brown people have completely re-styled the full-size machine and this latest Dinky Toy is based on the modified version.

Having seen the Tractor and Disc Harrow I can say in all honesty that they make a really striking couple worthy of inclusion in any collection, but they will appeal particularly to young collectors on the look-out for 'play value'. Besides the basic enjoyment which can be had with a composite model of this type, the Tractor itself is packed with all sorts of interesting features. To begin with, it is equipped with a strong die-cast cab fitted with windows. This is removable to give access to the steering wheel, which must be possible as movement of the steering wheel turns the front wheels. In other words, working steering is included! Also present is a working reproduction of the special three-point-hitch apparatus fixed to the rear of the real tractor, which is controlled by a lever just aft of the driver's seat. Further fun is provided by a 'clicker unit' built into the chassis and acting on the rear wheels to simulate the sound of engine tick-over noise when the model is pushed along in either direction. On the original, the three-point-hitch apparatus not only provides the anchoring point but also height control for towed farm implements such as ploughs, etc.

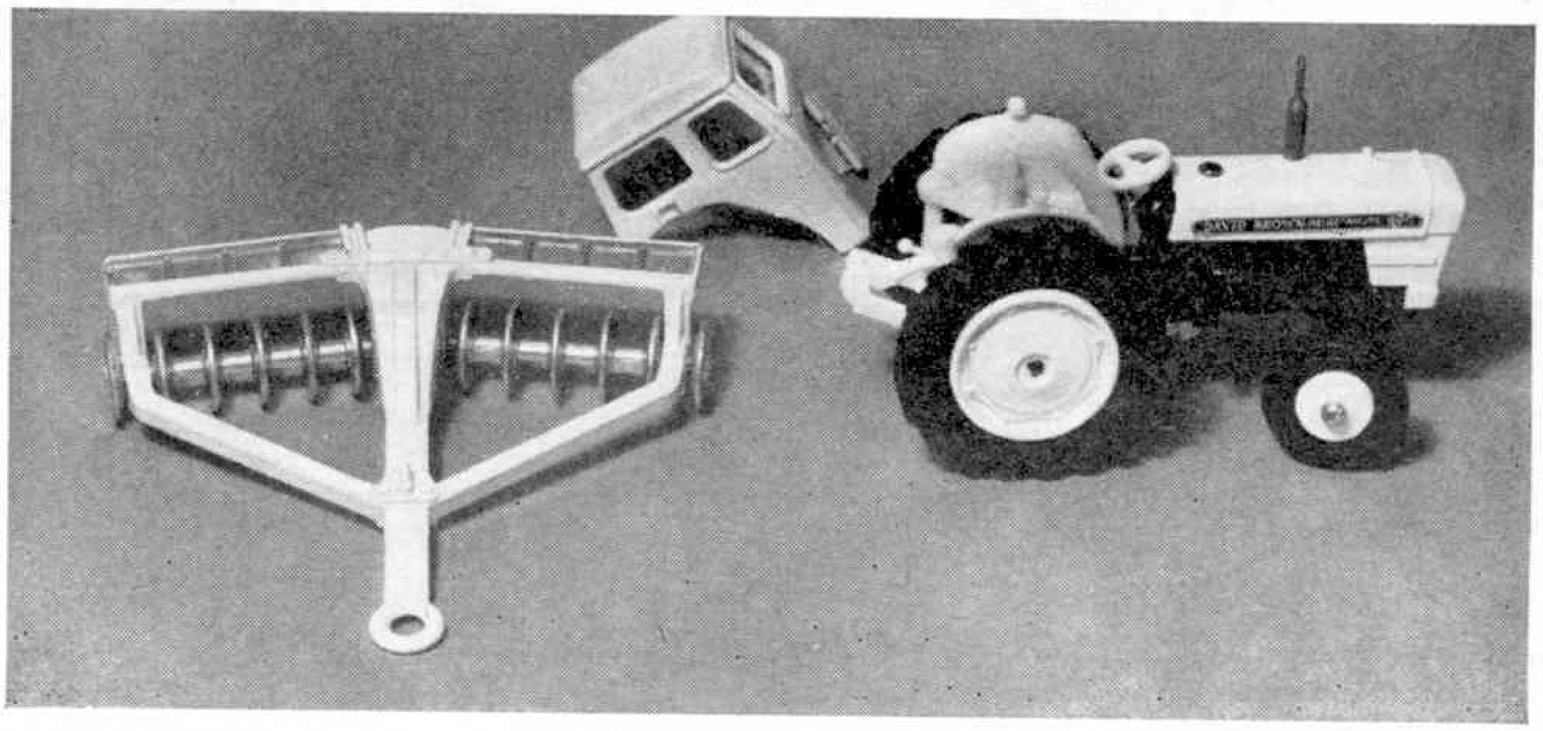
Turning to the Disc Harrow, this consists of a die-cast frame in which two 'banks' each of six circular discs, are mounted. As on a real harrow, the banks are angled so that, when in operation, the discs stir and loosen the soil in which they are working instead of simply scoring a series of parallel furrows, as they would do if the banks were in a straight line at right-angles to the direction of travel. The finish of both models is predominantly white, with brown chassis and engine casting in the case of the Tractor and with silver discs and red platform in the case of the Harrow. At the rear of the Tractor, below the three-point-hitch apparatus, is a large, fixed towing hook which provides the hitching point for the Disc Harrow. Approximate overall lengths of the Tractor and Harrow, individually, are $3\frac{1}{4}$ in. and $3\frac{1}{16}$ in respectively, while the combined length with the two items coupled together is $5\frac{3}{4}$ in.

In real life the main differences between the current David Brown Selectamatic 990 Tractor and the earlier version lie in the engine cowling and radiator grille. Whereas the cowling on the earlier version had a rounded look about it, the present cowling is clean cut and angular. The radiator grilles themselves are quite different. The current grille is large, square and flat-fronted while the old grille was smaller, pointed and narrowed towards the bottom. The current power plant, however, seems to be unchanged, still being a four-cylinder direct injection diesel engine of 185·8 cu. in. capacity (3,045 c.c.) that develops a maximum power output of 55 b.h.p. at 2,200 r.p.m.

Fitted as standard to the tractor is a six forward and two reverse speed gearbox which enables the machine to be driven at the correct ground speed for every normal farm job. If required, a special alternative gearbox is available giving twelve forward and four reverse gears. This unit is specially useful if the tractor is to be used for high precision work such as planting and transplanting. A particularly important standard feature present is Power Take-Off (PTO). This provides separate power through special linkages for any implements towed by the tractor that require power to operate.

One of the main selling points of the full-

Working steering and removable cab are only two of the interesting features fitted to the Tractor, shown here separated from the Disc Harrow

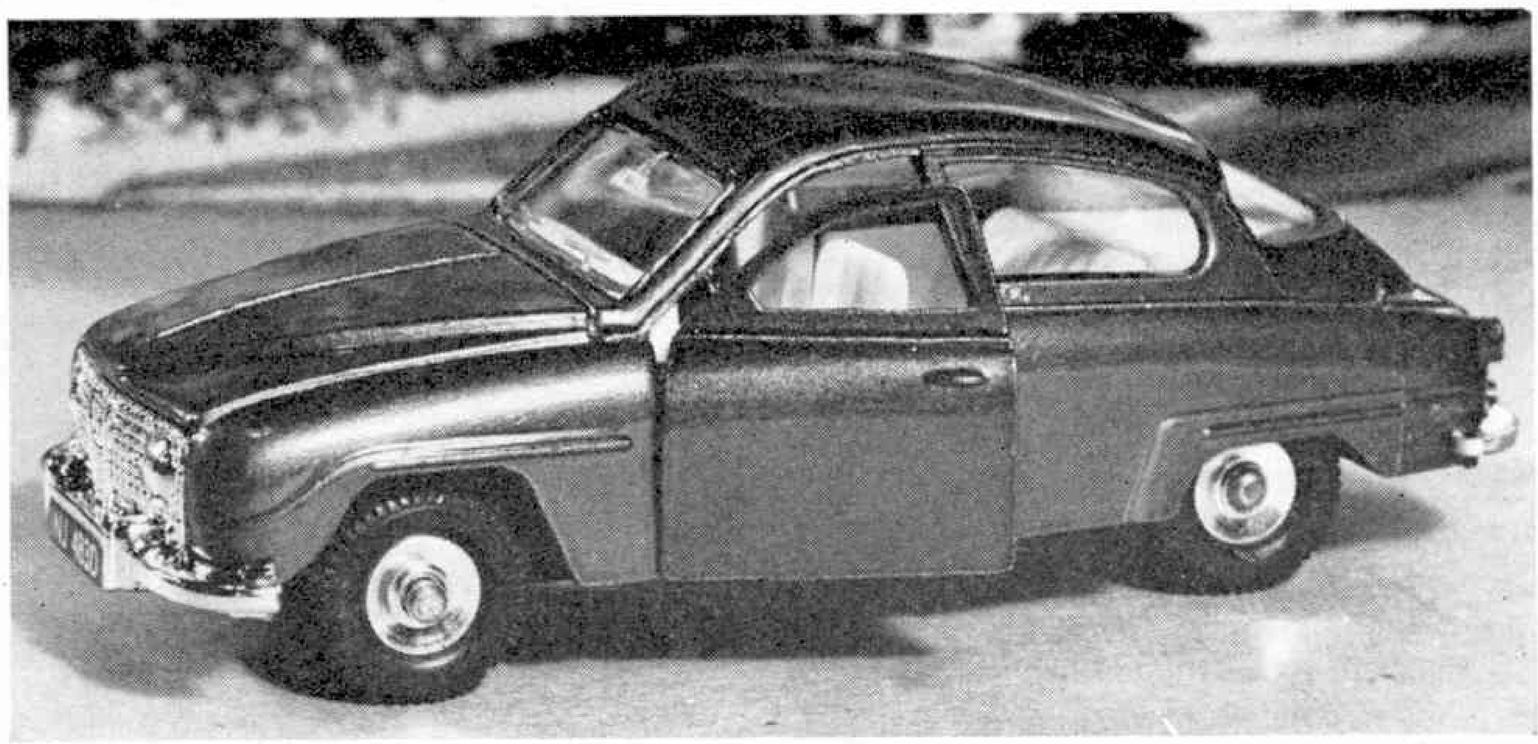


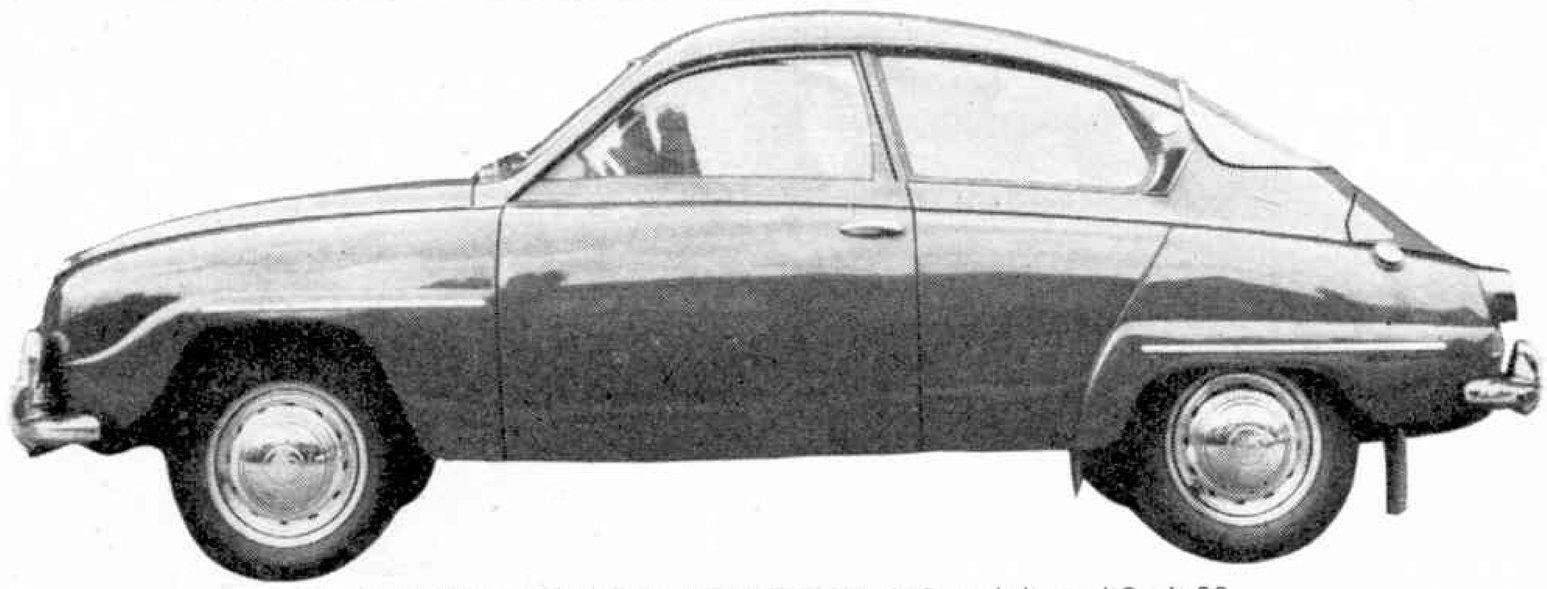
size tractor is its easily-operated four-in-one hydraulic system, referred to as 'Selectamatic'. This system incorporates four separate hydraulic circuits — depth control, height control, traction control and external services control—all selected by a simple dial and controlled by a single quadrant lever. As the David Brown people themselves say, 'For years farm tractor hydraulic systems have tended to become more complex and more bewildering to the average tractor driver. Now David Brown engineers have produced the simplest, most foolproof hydraulic control system yet devised . . . Operation is ultra-simple. The driver dials the hydraulic service required and then controls the implement or attachment by means of a single control lever.' It certainly sounds easy!

So much for the new release No. 325. Now, what about No. 156? A glance at the accompanying illustration will show you that this model is based on Sweden's Saab 96, which must be one of the most widely known cars in the world today, thanks to its enormous success in past Monte Carlo Rallies. The specific cars which have achieved so much success in international sporting events may, perhaps, have been tuned up to a certain extent, but the standard production version is still an amazing vehicle. Power is supplied by a 3-cylinder, two-stroke engine of 841 c.c. capacity developing a power output of 40 b.h.p. to give the car a maximum speed in excess of 75 m.p.h. Two of these facts are surprising. Excluding 3-wheelers, virtually all standard British cars have four-stroke engines and all, to my knowledge, have at least four cylinders. The thing I found most surprising about such a comparatively small car, however, is the fact that it is fitted with triple carburettors — presumably one for each cylinder, which is unknown on even the most sophisticated high-performance sports cars in this country.

Dinky's Saab 96 is a charming and substansive replica of very good quality. All the distinctive body features of the original are, of course, faithfully reproduced right down to the door handles. The doors themselves open to reveal considerable detail on their insides, as well as giving access to the tipping backs of the front seats. Windows and a steering wheel are also fitted inside the model while, outside, it sports plated bumpers and radiator grille, 4-wheel suspension, and number plates. In addition, rear-view mirror and windscreen wiper representations appear on the windscreen moulding.

Back in the full-size world, the Saab 96 is a fairly common sight on Britain's roads. I, myself, have seen several, and I did notice that they were all finished in red. This seems the most popular colour for them, therefore, it is hardly surprising that the new Dinky Toy should also be red. To be exact, in fact, it is finished in flamboyant carmine with off-white interior—very striking, indeed!





The Saab 96 in model form, Dinky Toy No. 156, and the real Saab 96.
'One of the most widely known cars in the world today'

The David Brown **Selectamatic 990** Tractor as it appears in real life

Meccano clock from page 44

extended by an Elektrikit Wiper Arm which is so arranged that it makes contact with Contact Studs 31. The Wiper Arm is connected by insulated wire to one terminal of the Motor, while the lower Contact Stud 31 only is connected by insulated wire to one terminal of the power source. The other terminal of the power source is connected direct to the other terminal of the Motor.

The winding switch is, of course, activated by the weight coming in contact with either of the two 'forks". Movement of the forks causes Bell Crank 39 to move which, in turn, moves the Insulating Strip/Wiper Arm arrangement, thus switching the Motor on or off.

All that now remains to be fitted are the hands and face. The hour hand, consisting of a Crank extended by a $2\frac{1}{2}$ in. Narrow Strip, is loosely mounted on the Rod A carrying Gear Wheel 12 and is attached to 60-teeth Gear Wheel 14, while the minute hand, consisting of a Crank extended by a $3\frac{1}{2}$ in. Narrow Strip is fixed tightly on the Rod. The face is obtained from a circular piece of card, suitably marked and edged by a $9\frac{7}{8}$ in. Flanged Ring.

It is a good idea to include a friction drive in the model, which would allow the hands to be easily set and, in fact, Mr. Fail's model does include such a mechanism. It is obtained by substituting a Rod with Keyway for the Rod A carrying Gear Wheel 12. A Collar, a Compression Spring, and a 1 in. Pulley with Rubber Ring, the latter carrying a Keybolt in its boss, are added to the Rod. The Collar presses the Compression Spring against the Pulley which, in turn, is forced against Gear Wheel 12, but remember that Gear Wheel 12 must be loose on the Rod, in this case. The Keyway Rod can be extended to the required length by an ordinary Rod and Coupling.

PUSH BUTTON CONTROL

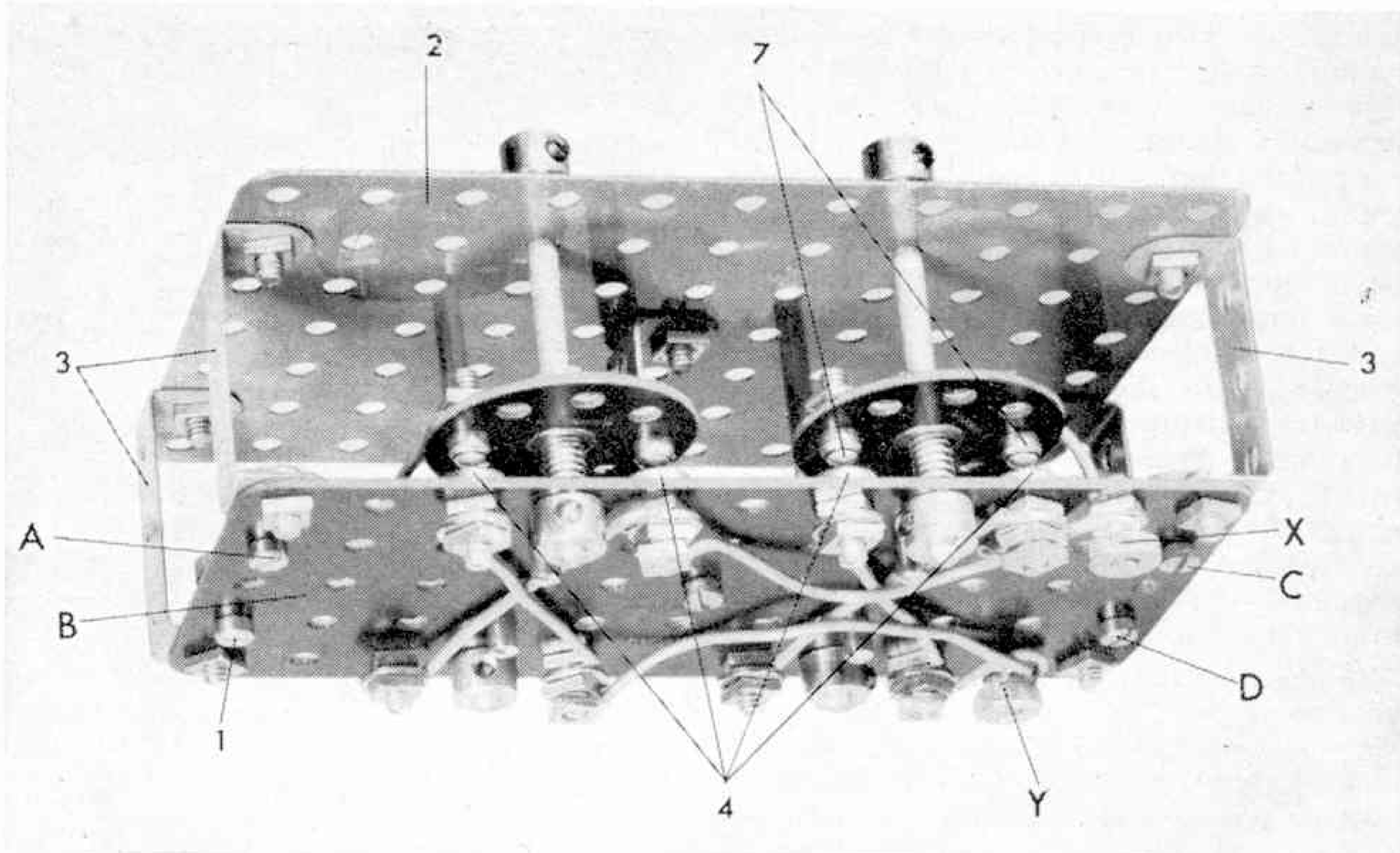
FEATURED in these pages last month was a large, working model of a Tank, operated remotely from a hand-held control box. While being perfectly adequate for the job, this control box, which was lever-operated, may not appeal to some builders who are used to the button-operated control boxes supplied with most commercially-produced remote control models. For the benefit of these builders, therefore, we have designed an alternative control box working on the 'push-button' system, and you will find it described below.

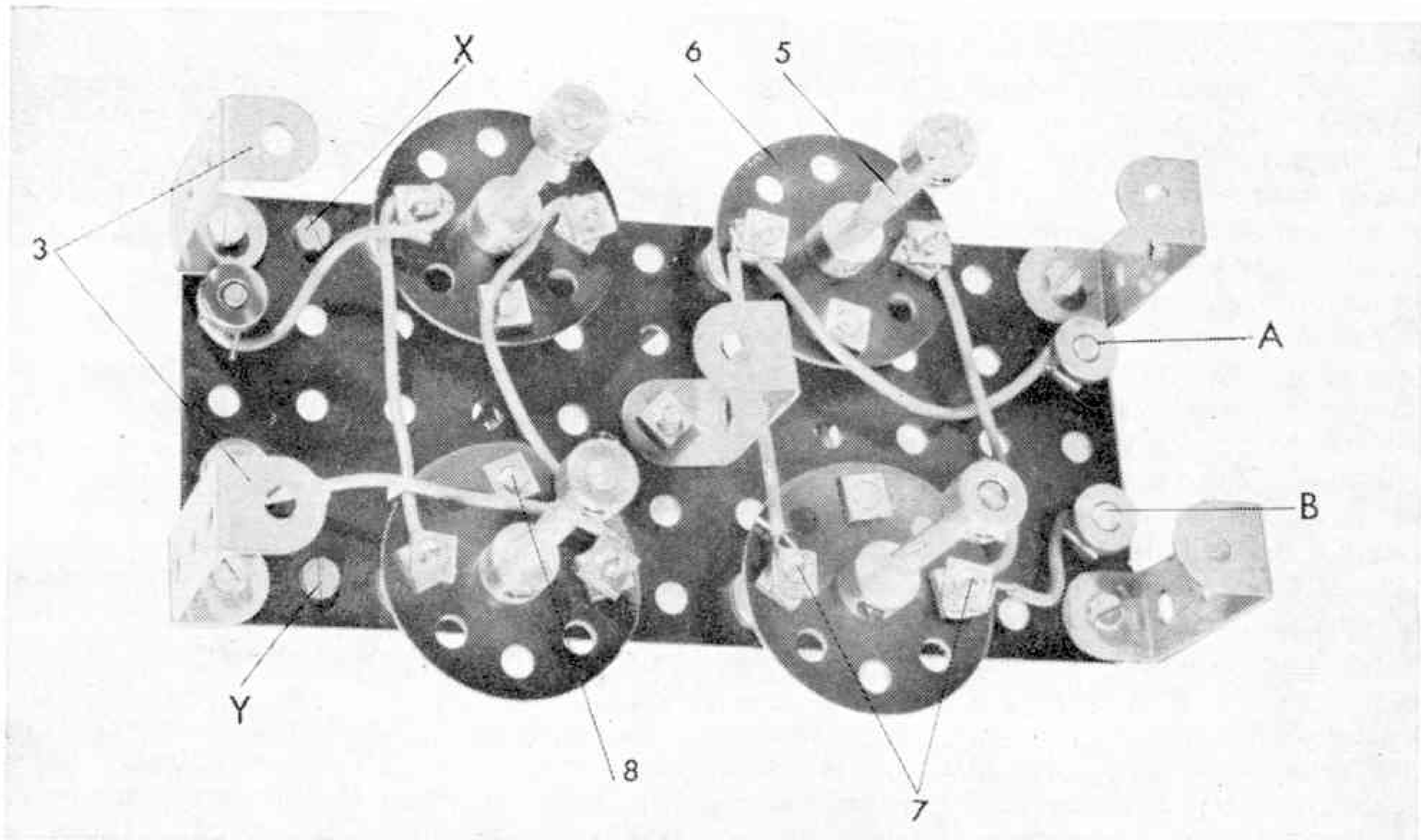
If you saw last month's Tank article you will remember that each track of the model was powered independently by its own Meccano Emebo Motor. With this system it is possible to perform all the manoeuvres of a full-size tank by running the Motors either together or singly in a given direction. The piece of equipment described here provides the necessary forward and reverse control for each Motor.

You will see from the accompanying illustrations that, basically speaking, the Control Box incorporates four 'buttons'. If wired up as shown in the accompanying wiring diagram, the two right-hand buttons will control one Motor while the two left-hand buttons control the other. In each case, pressing the upper button causes the respective Motor to drive its track in the forward direction, with the lower button giving reverse motion.

The actual framework of the Control Box consists of a 5½ in. by 2½ in. Insulating Flat Plate 1 connected to a 5½ in. by 3½ in. Flat Plate 2 by five 1½ in. by ½ in. Double Angle Strips 3. Before actually building the box, however, it is best to complete the electrical circuit of the Insulating Plate. Eight Contact Studs 4 are fixed to the Plate, four down each long edge, through the third, fifth, seventh and ninth holes. Through the tenth holes ⅜ in. Bolts X and Y are fixed to act as terminals.

Using insulated wire, the first Contact Stud at each side is connected beneath the plate to the second Stud on the opposite side, then the third Stud at each side is connected to the opposite fourth Stud. When finished, the second and fourth Studs down each side are connected to the respective terminal.





Top: An underneath view of the control box clearly showing the wiring of Contact Studs 4. Above: In this view, the 5½ in. by 3½ in. Flat Plate 2 has been removed to show the wiring of Contact Screws 7 in Insulating Bush Wheels 6

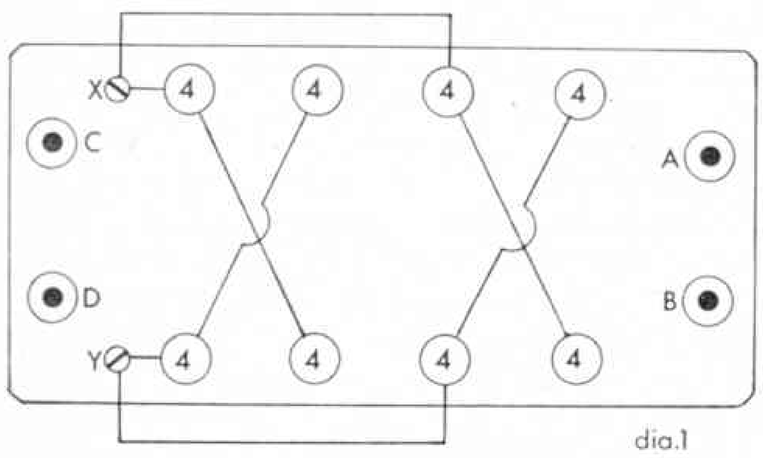
If you study the Insulating Plate, you will see that the eight Contact Studs are actually arranged in four pairs, the Studs in each pair being separated by one hole. Journalled in this hole and the corresponding hole in Flat Plate 2 is a 2½ in. Rod 5, carrying a Collar at each end and an 8-hole Insulating Bush Wheel 6 between the Plates. A Tension Spring is mounted on the Rod between the Bush Wheel and the Insulating Plate.

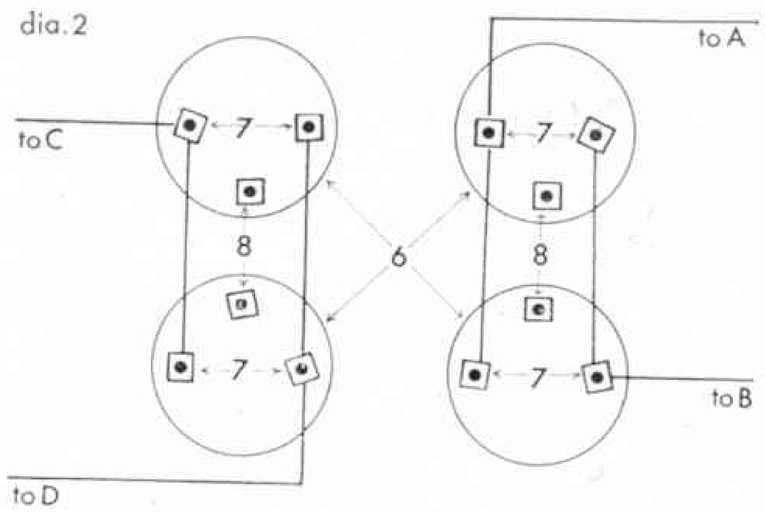
Two Contact Screws 7 are fixed in the holes in Bush Wheel 6 lying immediately above the Contact Studs 4. Assuming that the Contact Screws pass through the first and fifth holes of the Bush Wheel, a Threaded Pin 8 is fixed through the third hole so that it protrudes through the corresponding hole in the Insulating Plate. This prevents the Rod from turning in its bearing.

As there are four pairs of Contact Studs, four Rod and Insulating Bush Wheel arrangements are constructed. Each must be set so that, when the Collar at the top of the Rod is pressed down, Contact Screws in the Bush Wheel make contact with Contact Studs 4 in the insulating Plate. Four terminals, A, B, C and D, are now provided, two at each end in the insulating Plate, by ⅜ in. Bolts, Nuts and Terminal Nuts, then Contact Screws 7 can be wired together following the wiring diagram on this page.

Spanner

Diagram 1: This diagram shows the wiring between the terminals and Contact Studs fixed in Insulating Flat Plate 1. Remember that terminals X and Y and Contact Studs 4 are wired beneath the Plate. Terminals X and Y are connected to the battery or power source. The leads from one of the Emebo Motors in the Tank are connected to terminals A and B, while the leads from the other Motor are connected to terminals C and D. Diagram 2: This diagram shows the wiring of Contact Screws 7. The four extension leads indicated are connected to terminals A, B, C and D in Insulating Flat Plate 1





Parts required

4 of No. 16a	1 of No. 52a	1 of No. 510
54 of No. 37a	8 of No. 59	4 of No. 514
10 of No. 37b	6 of No. 111c	6 of No. 542
8 of No. 38	4 of No. 115	8 of No. 543
5 of No. 48	4 of No. 120b	8 of No. 544

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Last Month's Dinky Toy Winners

BELOW is a list of fifty names of readers whose entries for last month's 'Silhouette' competition were the first correct answers to be selected by the Editor. If your name appears in this list, then write on a postcard to: *Silhouette Prize, Meccano Magazine, Thomas Skinner & Co. Ltd., St. Alphage House, Fore Street, London, E.C.2*, and claim your FREE Dinky Model Jaguar Mk. 10. If your name does not appear in this list, even though you entered for the competition, don't be disappointed—try again!

C. Baker, Cold Blow Crescent, Bexley, Kent. *P. Barnfield*, Bridge St., Great Kimble, Aylesbury, Bucks. *J. W. Blackett*, Bonney Rd., N.P.E., Leicester. *C. Blackler*, Stratton Ave., Wallington, Surrey. *G. Blake*, Priory Cres., Wembley, Middx. *D. Bouch*, Cambridge Gdns., Langford, Beds. *J. Bowyer*, Cherry Way, Upper Halliford Rd., Shepperton, Middx. *S. Chappell*, Elmer Gdns., Isleworth, Middx. *S. Clarke*, North Dr., Streatham, London, S.W.16. *A. W. Croshaw*, Delamere Rd., Bedworth, Warks. *R. Cross*, Priory Rd., Fishtoft, Boston, Lincs. *D. Curson*, Heslop Rd., Balham, London, S.W.12. *P. Dorey*, Grosvenor Gdns., London, N.14. *A. Dyke*, Home Farm Cres., Whitnash, Leamington Spa. *R. Emery*, Vicarage Dr., East Sheen, S.W.14. *K. Fraser*, Soughtonhall Dr., Edinburgh 9. *P. Gardiner*, Bevin Rd., Hayes, Middx. *R. Gilbert*, Forest Way, Orpington, Kent. *P. Goodman*, Westbury Lane, Buckhurst Hill, Essex. *P. Gregory*, Ravenscourt Park Mansions, Dalling Rd., London, W.6 *P. Gribble*, *Ruskin Rd., Carshalton, Surrey*. *P. Griffiths*, Taytons Lane, Sydenham, London, S.E.26. *I. Harman*, Argos Hill, Rotherfield, Crowborough, Sussex. *M. Hill*, Overdale, Ashtead, Surrey. *P. Ingelbrecht*, Coventry Rd., Ilford, Essex. *R. Keyworth*, Cavendish Hse., Hartingdon Rd., London, S.W.8. *R. Law*, Littlestone Rd., Littlestone-on-Sea, Kent. *D. S. Luning*, South Lodge Cres., Enfield, Middx. *A. C. Marsden*, Park Lane, Broxbourne, Herts. *M. Morris*, The Grove, Sidcup, Kent. *P. E. Norman*, Sperhall Rd., Wissett, Halesworth, Suffolk. *J. Parsons*, Hall Lane, Upminster, Essex. *M. Pegram*, Ashurst Rd., Tadworth. *D. M. Prowse*, The Drive, Loughton, Essex. *A. N. Raby*, Newbold Ave., Chesterfield. *K. Richardson*, Joshua St., Todmorden, Lancs. *S. P. Schwitzer*, Shepherd's Hill, London, N.6. *R. Short*, Tylers Close, Loughton, Essex. *T. H. Silver*, Norbury Close, Norbury, London, S.W.16. *A Sliney*, Vernon Ave., Clontarf, Dublin 3. *M. Smith*, Appledore Cres., Sidcup, Kent. *P. Smith*, Orchard Grove, Cowplain, Hants. *A. Stackhouse*, College Rd., Kensal Rise, London, N.W.10. *A. M. Taylor*, Chesterfield Drive, Hinchley Wood, Esher, Surrey. *J. C. Warningham*, Westbury-on-Severn, Glos.

Overseas Winners of Competition 'N'—Mercedes Benz

G. Delasalle, rue Mage, 31 Toulouse 01, France. *B. Foster*, Molkomsbacken, Farsta, Sweden. *R. Pisani*, Bastion St., Senglea, Malta. *P. Symul*, rue Bonry, Rotheux Prov., Liege, Belgium. *R. Theisen*, rue Marechal Foch, Virton, Belgium.

Solutions to puzzles on page 35

	C	O	N	S	T	E	L	L	A	T	I	O	N
	A		A		E		E		U		M		E
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C	I	P	H	E	R		A	C	E		T	A	B	U
	S		E		C		D		S		T		A
	H	U	T	C	H	E	S		S	L	A	N	T

Quick Quiz

1. War Department sign indicating Army property.
2. Chestnut.
3. 984 feet.
4. Australia.
5. £3.
6. No. Blue whales are the largest.

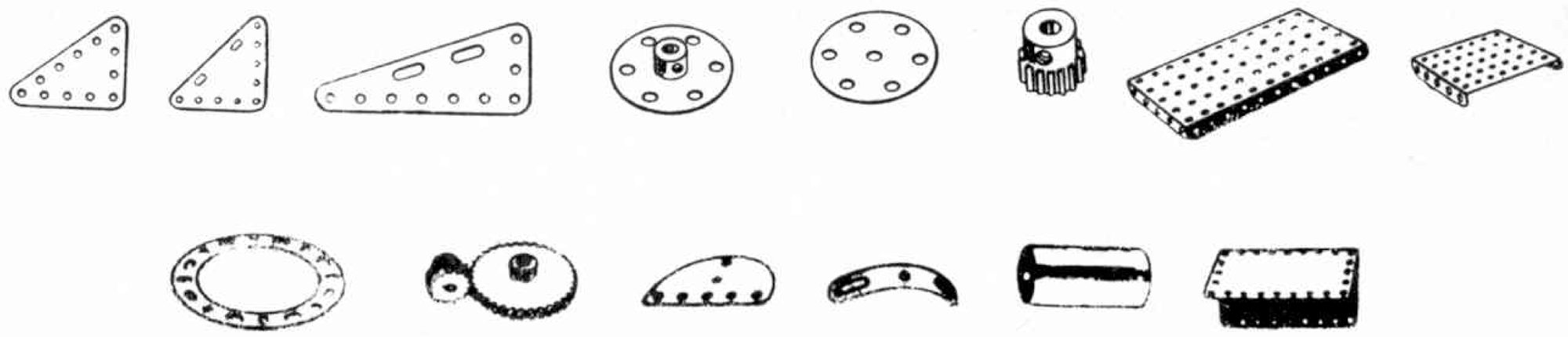
Tricky Teasers

A. 1. Birmingham—all the others are First Division sides. 2. Trumpet—the only non-reed instrument present. 3. All actual trophies except The Ashes. 4. New York—all the other places are in Europe. 5. 103—the only number not divisible by 11.

B. Peace.

C. 2576.

D. The day was very fine for the time of the year, so we had a nice trip to the moors.



Dealers who specialise in Meccano spare parts

Listed below are some of the dealers who sell Meccano accessories and spare parts. This is intended to aid enthusiasts—and there are many of them—who constantly require additional spare parts for their Sets. All dealers can, of course, order Meccano spare parts for their customers, but those listed here are among our spare part specialists.

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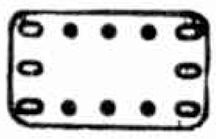

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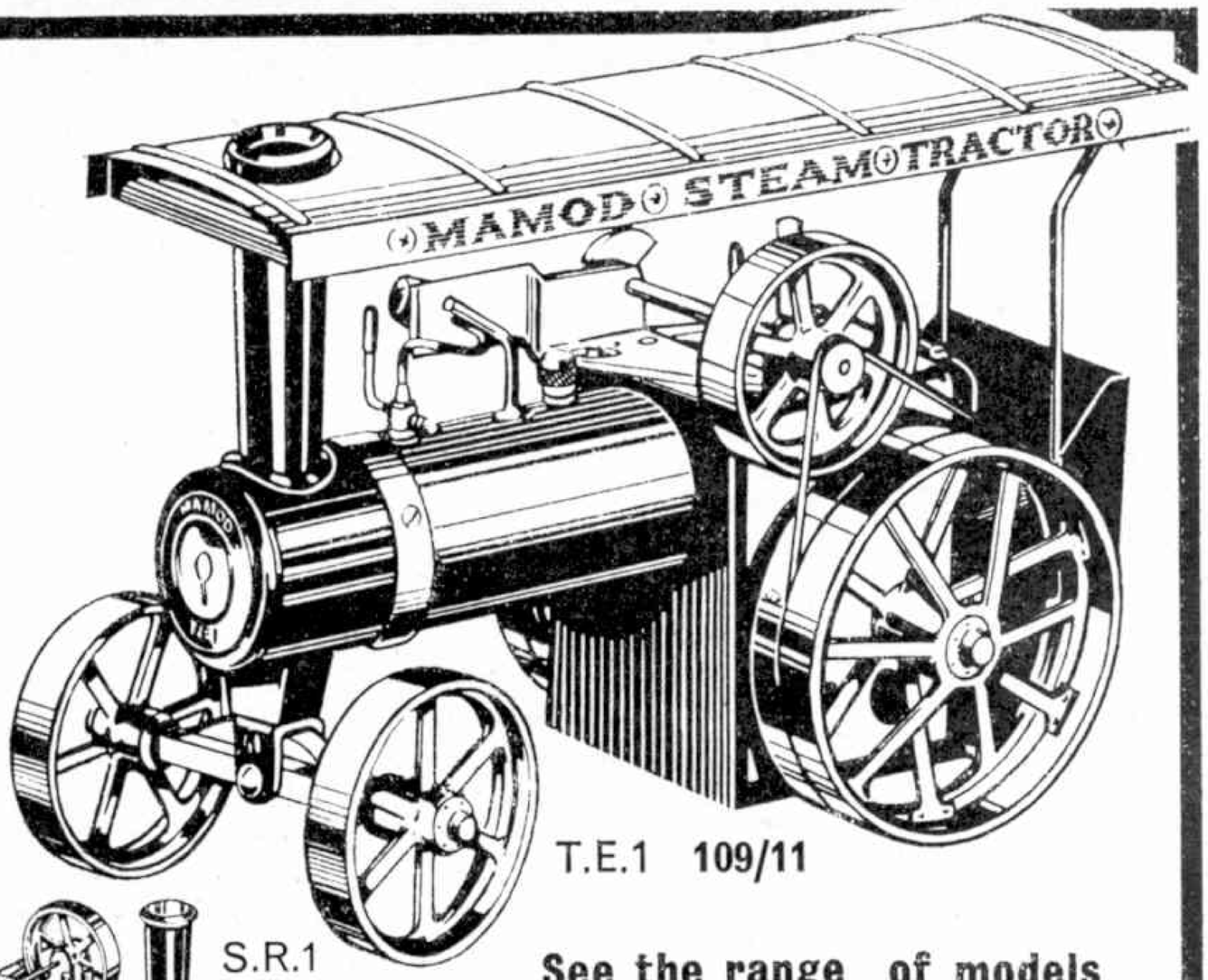

CREATE YOUR OWN POWER
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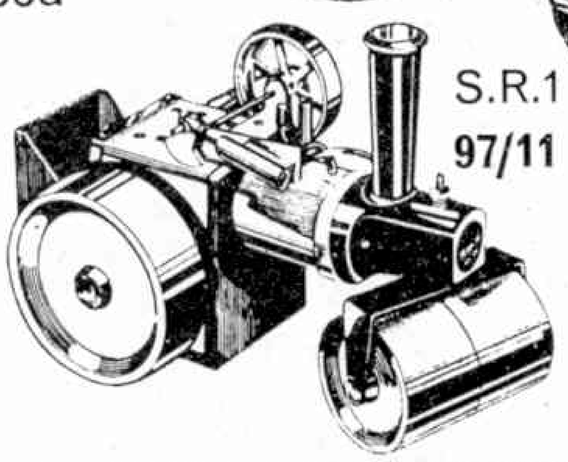

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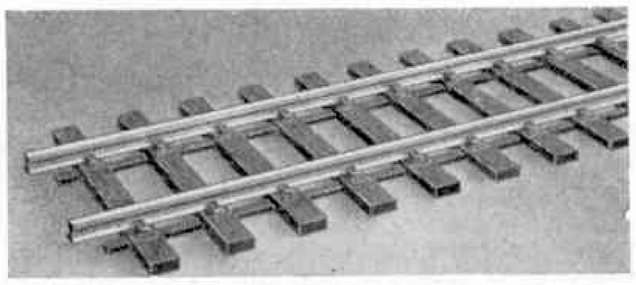

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STAMPS NEWS

BY F. E. METCALFE

Fujeira

I don't suppose that all who read these notes will recognise that country, but they will surely know the man who appears on the stamp which is illustrated. Fujeira is one of those Arabian states that has gone in for stamps in a big way. Others are Sharjah, Ajman, Dubai, Qatar and Umm Al-Qiwain, all of which have issued 'Churchill' sets, each vying with the other to bring out the issue with the greatest appeal. The state of Sharjah is very annoyed with comments that have been made about its postal issues, for there is a post office at Khor Fakkan, which serves the needs of about 5,000 people, and stamps have been prepared exclusively for them! Some adverse comments have been made about them, to the effect that there is really no need for such issues. Back have come the authorities, pointing out that Pitcairn Is., Tristan da Cunha, etc., have much smaller populations, yet their stamps are accepted without a murmur. Fair comment.

Best of both worlds

I noticed that flowers are about the most popular theme amongst collectors, so the African state of Togo has killed two birds with one stone by issuing a set of stamps which not only marks the opening of the 'W.H.O.' Headquarters Building, but also appeals to those thousands who go in for 'flower' stamps. It is a great game nowadays, competing for collectors' pence, and the Stately Homes are not in it for ideas. Look at the trouble they had to go to, to make sure that those sleepy lions didn't eat any of the patrons (there would have been a row if little Albert had been gobbled up), whereas anything can be depicted on stamps with perfect safety.

Watermarks

Collectors of British Commonwealth stamps have always been interested in watermarks, and when I first compiled the Commonwealth QEII Catalogue, I decided to list separately those stamps which had their watermarks inverted. Gibbons later followed suit in their Elizabethan Catalogue, and now collectors seem more interested than ever in such varieties. Perhaps this increased interest stems from the fact that some of the British special issues which have appeared during this past couple of years have been found with the watermark upside down, and some of these stamps, being scarce, fetch several pounds each. Of course, most are only worth a few shillings, but all are more valuable than the normal stamp, so be sure and check up on any copies you come across. I am afraid it is not always easy to see the watermark, but it is certainly worth trying.

2500th anniversary of the theatre

No, a nought has not been added in error! That's the date the Greek Post Office is commemorating, and the stamp illustrated shows the old Athens Theatre of Dionysus. It is, as usual with Greek stamps, a wonderful little set of four stamps. One value shows a copper mask of a tragic actor from the 4th century B.C. which was only found as recently as 1959.

Tip of the month

From time to time, the stamps of certain countries become the vogue. Among Commonwealth collectors, it is the stamps of Australia and Dependencies which are particularly popular. With foreign collectors, it is the Vatican, Israel, and San Marino stamps which are receiving most attention. Austria and Spain look like being the next two countries to take the centre of interest, with all that this implies in increased prices. And after that? Well, I think that the stamps which most deserve special attention are those of modern Greece. The designs are always magnificent; the subjects of those designs incomparable, and the printing first class. The stamps are, of course, popular already, but I am sure there will come a day when they will get their real place in the top half-dozen, and then we will see some fancy prices. No stamps are more deserving of such an honour.

Alas for their passing

You have got to hand it to the U.S. Postal Administration for their broadminded attitude to what they are willing to commemorate by means of a postage stamp. There is nothing stodgy about their way of looking at things, as the stamp they released recently to mark what I imagine they feel to be the passing of the circus. I am afraid that it is years since I visited one. In fact, I think it is years since I had the chance, really. But I look back with pleasure (alas mixed with real nostalgia) at the circuses I used to see, many years ago, when living in Argentina. In those days there were several little circuses, which used to visit even the smaller provincial towns, and how we did enjoy them, particularly the last act. The show always ended with the 'handkerchief' dance, when quite a number of the public joined in the fun. It was glorious! Thank you, the U.S. Postal Administration for a stamp which will evoke such wonderful memories, for young and old. Let's hope the circus is not yet quite dead.

Top left: attractive "flower" stamp, issued by the African state of Togo. Right: Fujeiran "Churchill" issue. Bottom left: United States five cent "Circus" stamp. Right: Greek issue, depicting the old Theatre of Dionysus at Athens.

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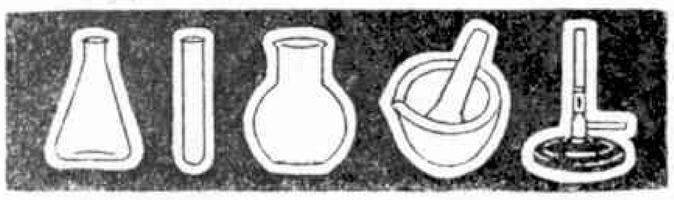
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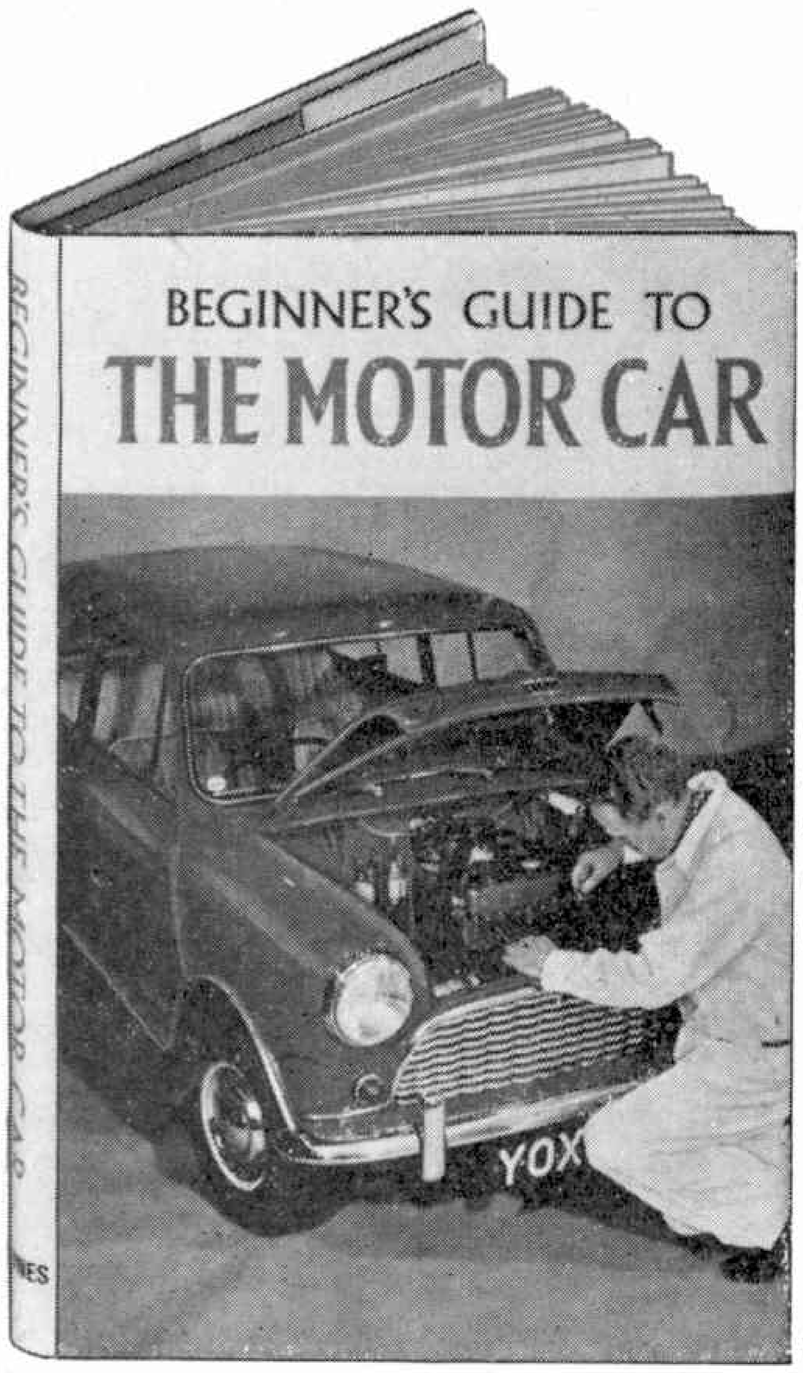

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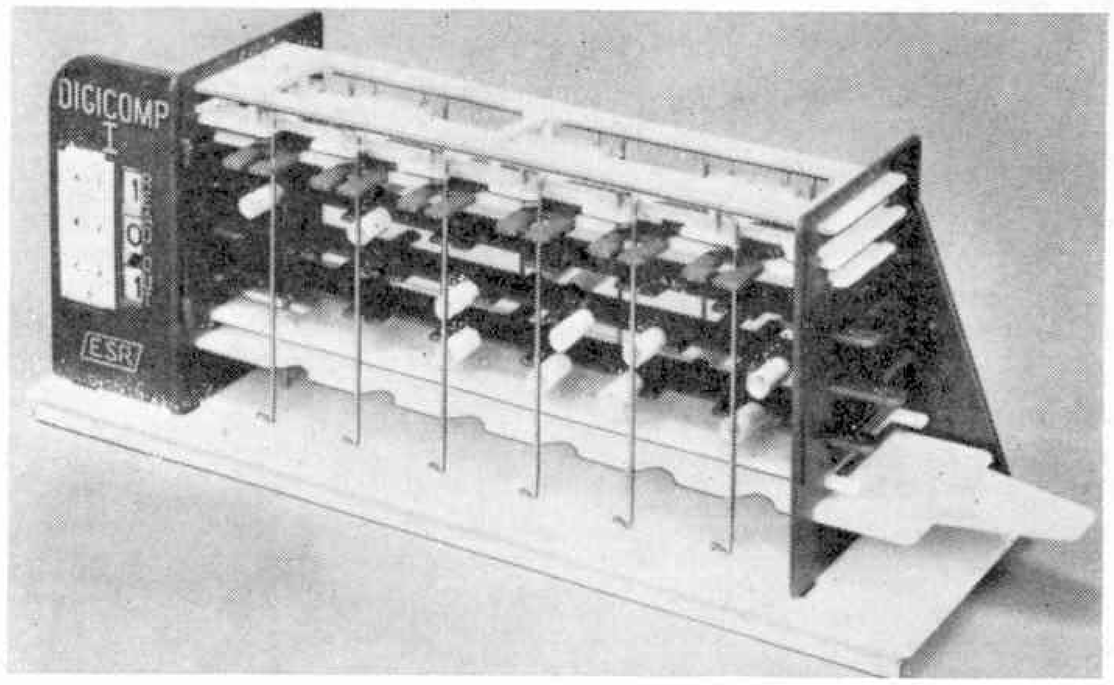

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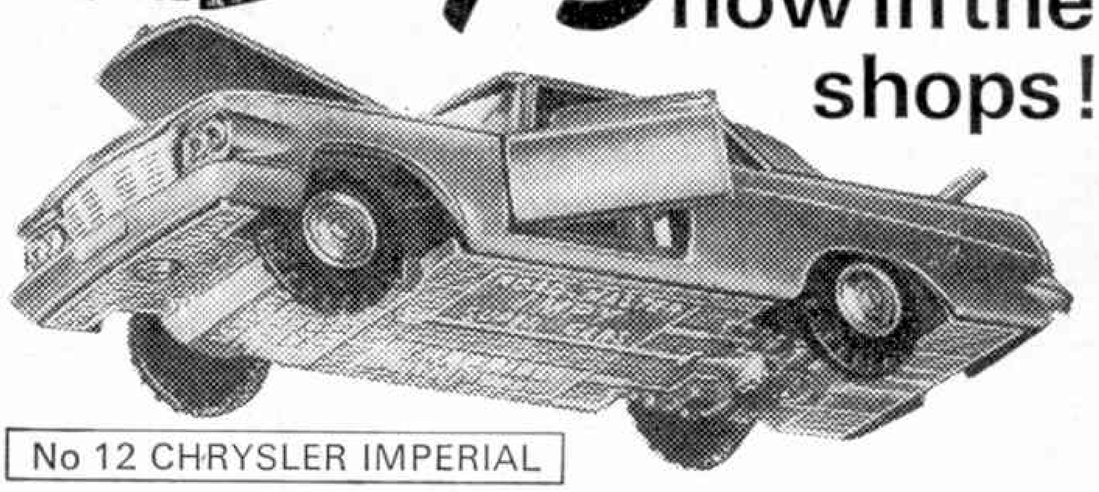

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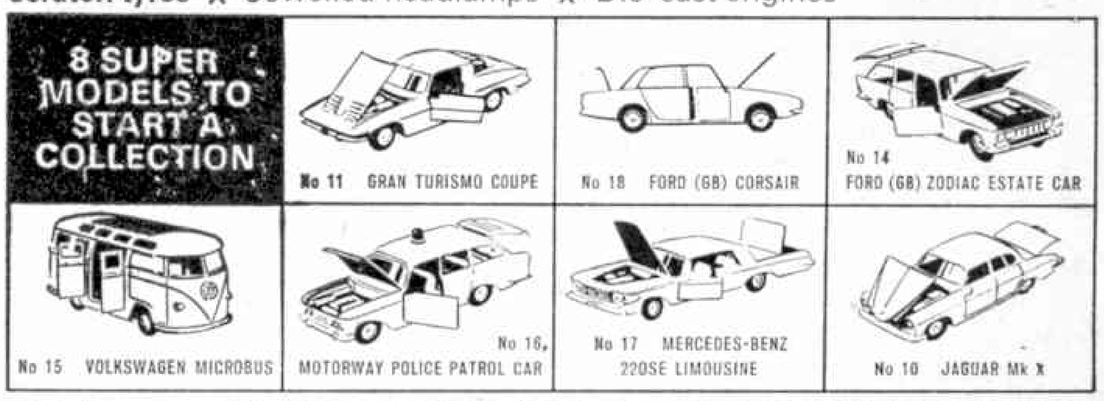

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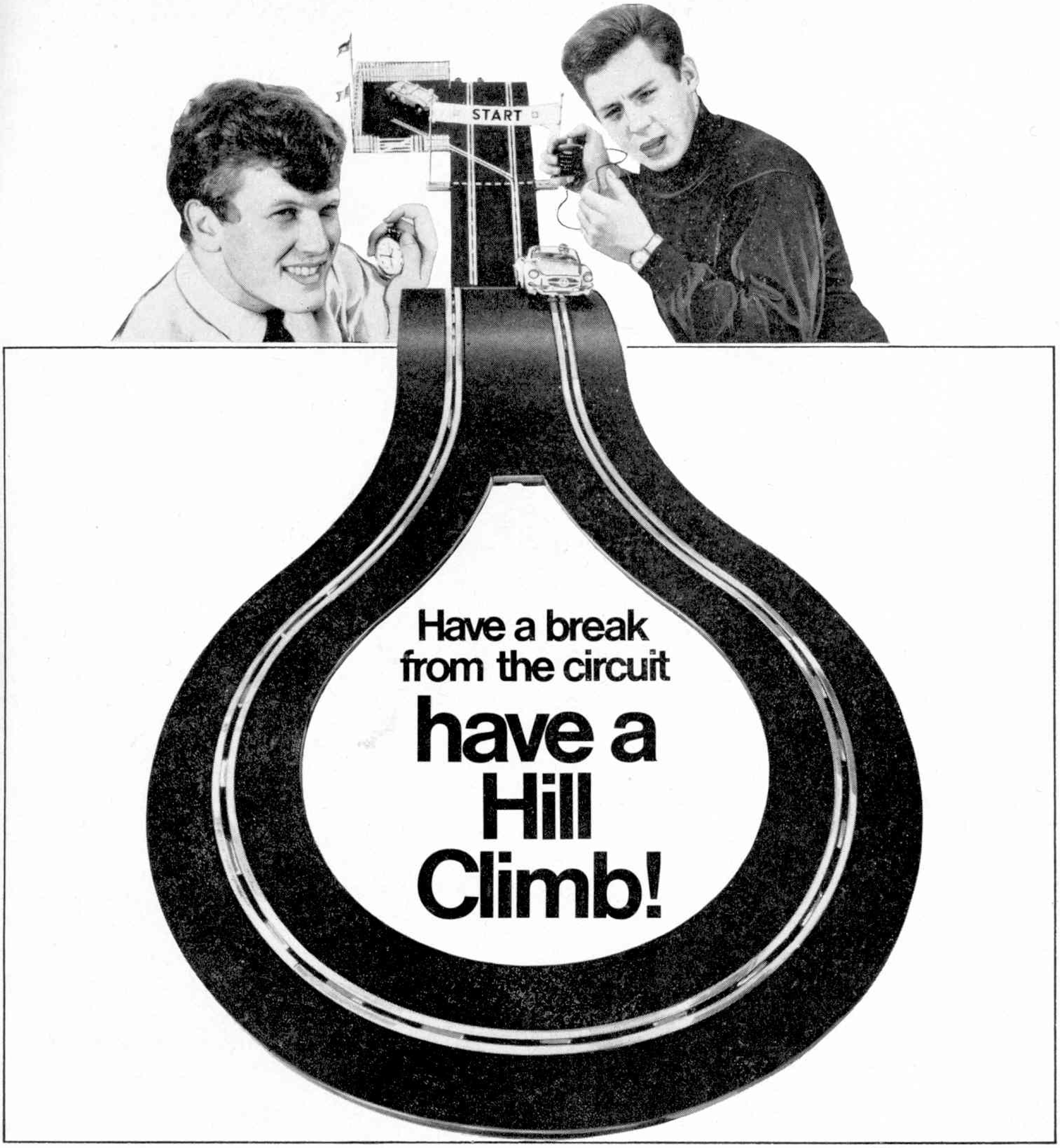

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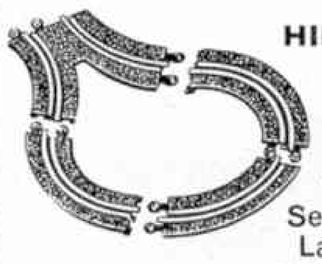

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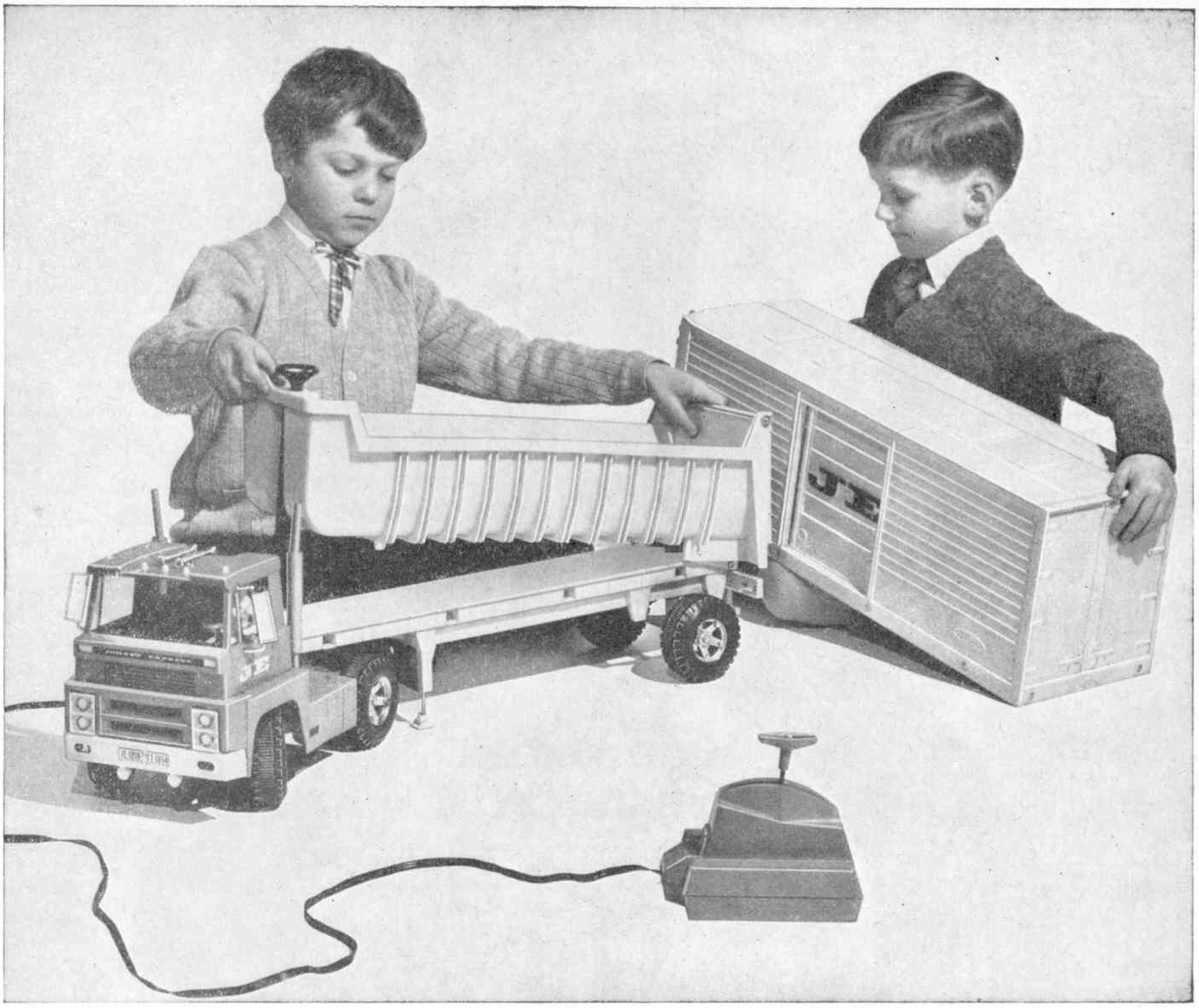

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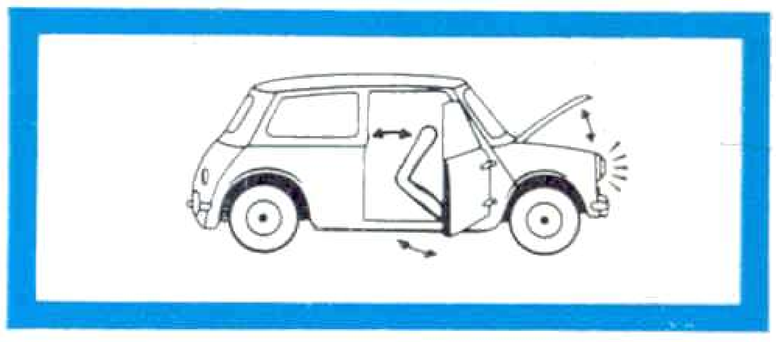

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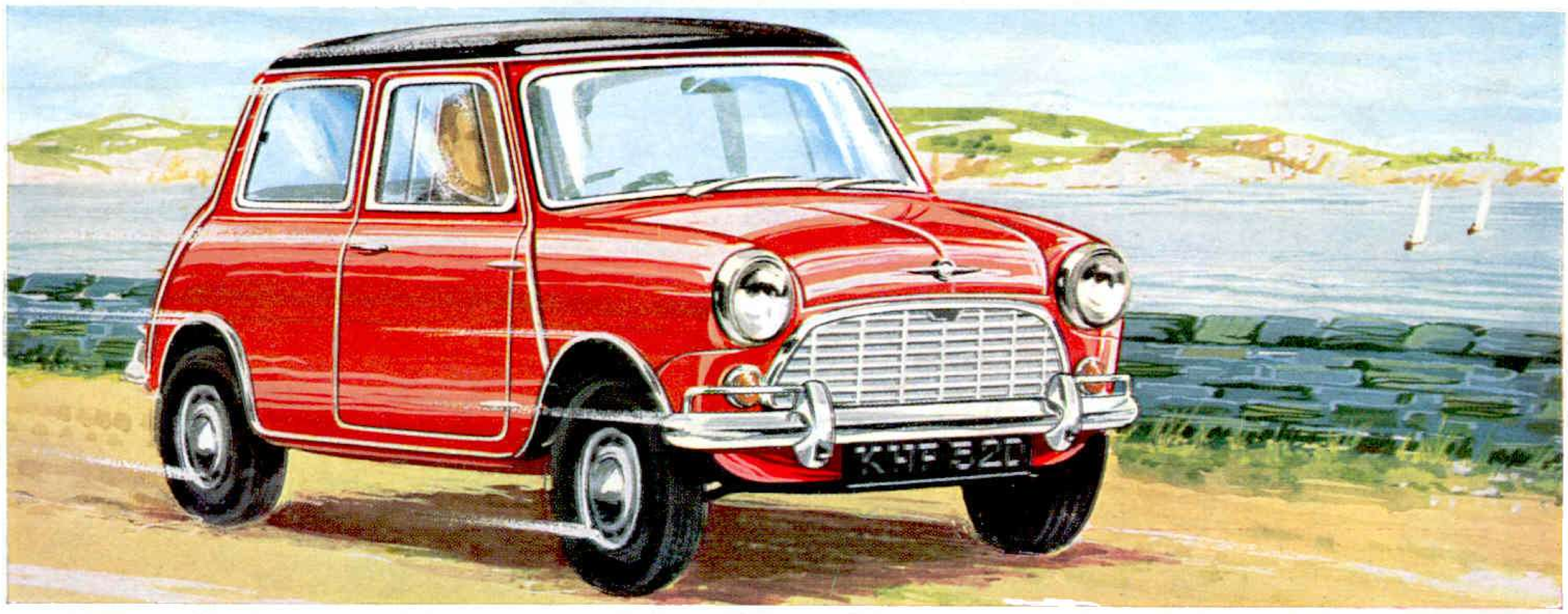

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