VOL. XLII. No. 8 AUGUST 1957

MECCANO MAGAZINE

THE LOCKHEED HERCULES

(See Page 375)

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Muir-Hill Dumper Truck
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Length 5 1/4 in. **8/9**

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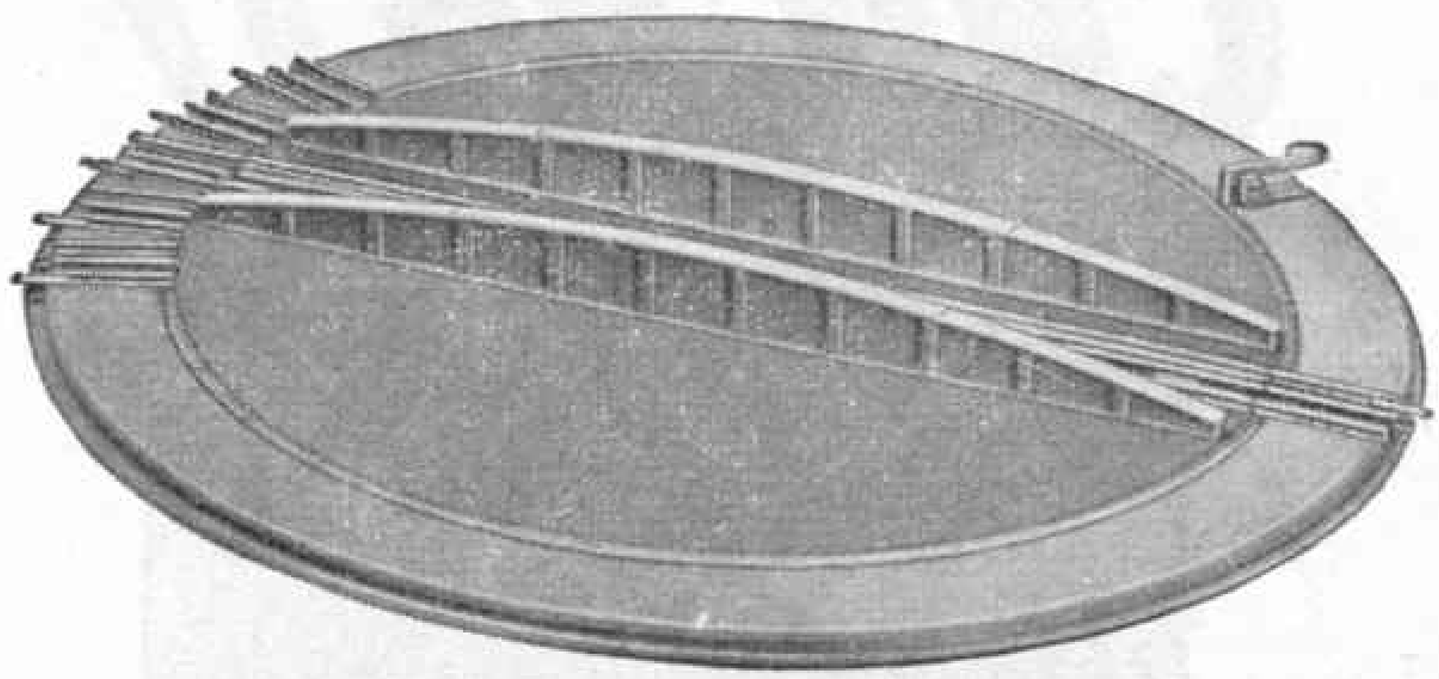
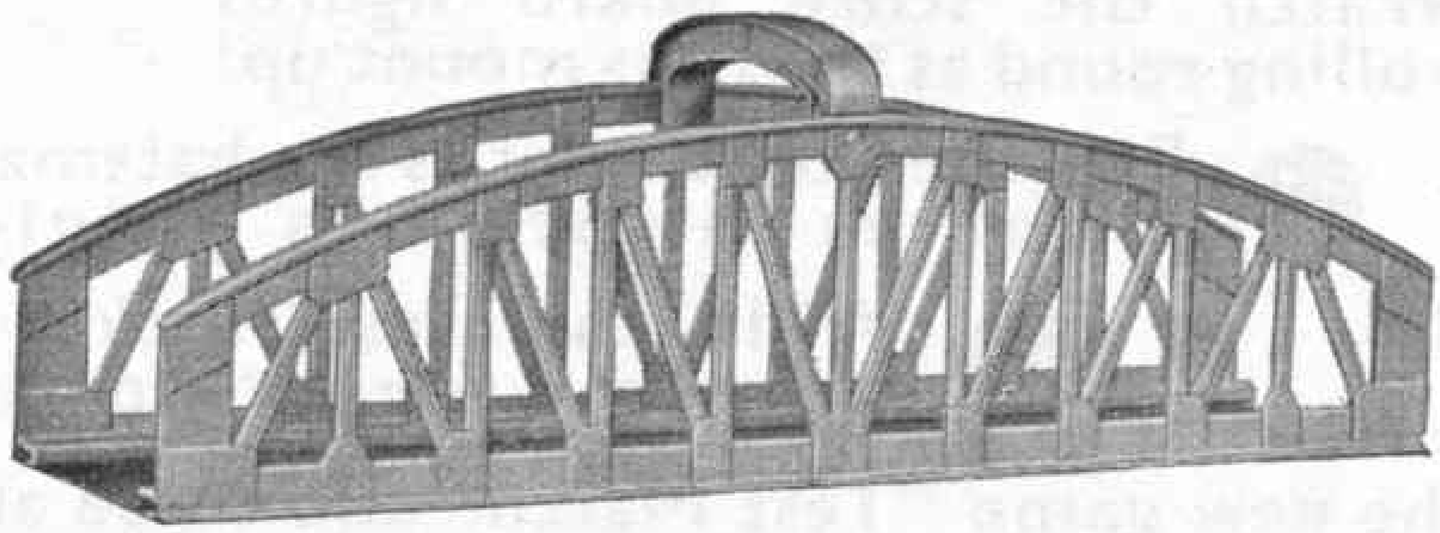


HORNBY-DUBLO D1 TURNTABLE

This component is a realistic representation of the balanced hand-operated type of Turntable found on British Railways. The revolving section of the Turntable is mounted on a substantial base and a locking device holds it correctly in position with any one of the five lengths of outlet track. Each outlet track is electrified only when it is in alignment with the Turntable. This Accessory is complete in itself, and no switches or other devices are required with it. The base is finished in green and grey with the side girders of the centre section in orange.

Overall diameter 14⅝ in. **U.K. PRICE 45/-** *(inc. Tax)*



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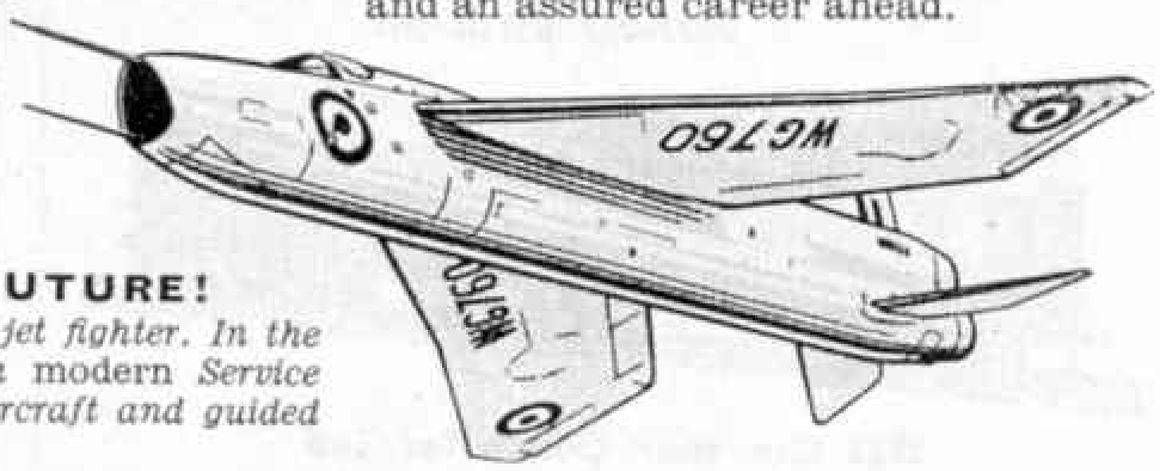

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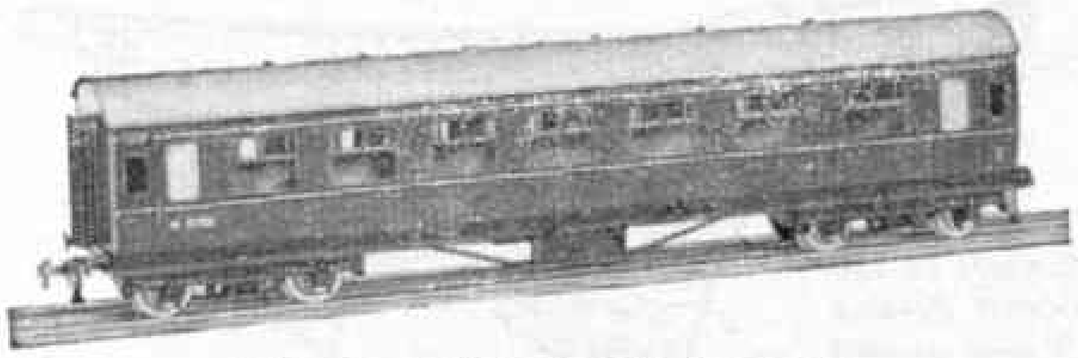

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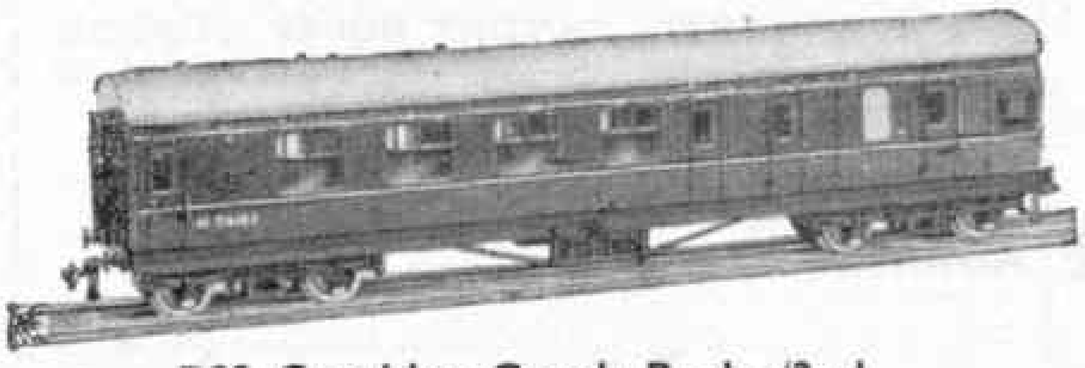

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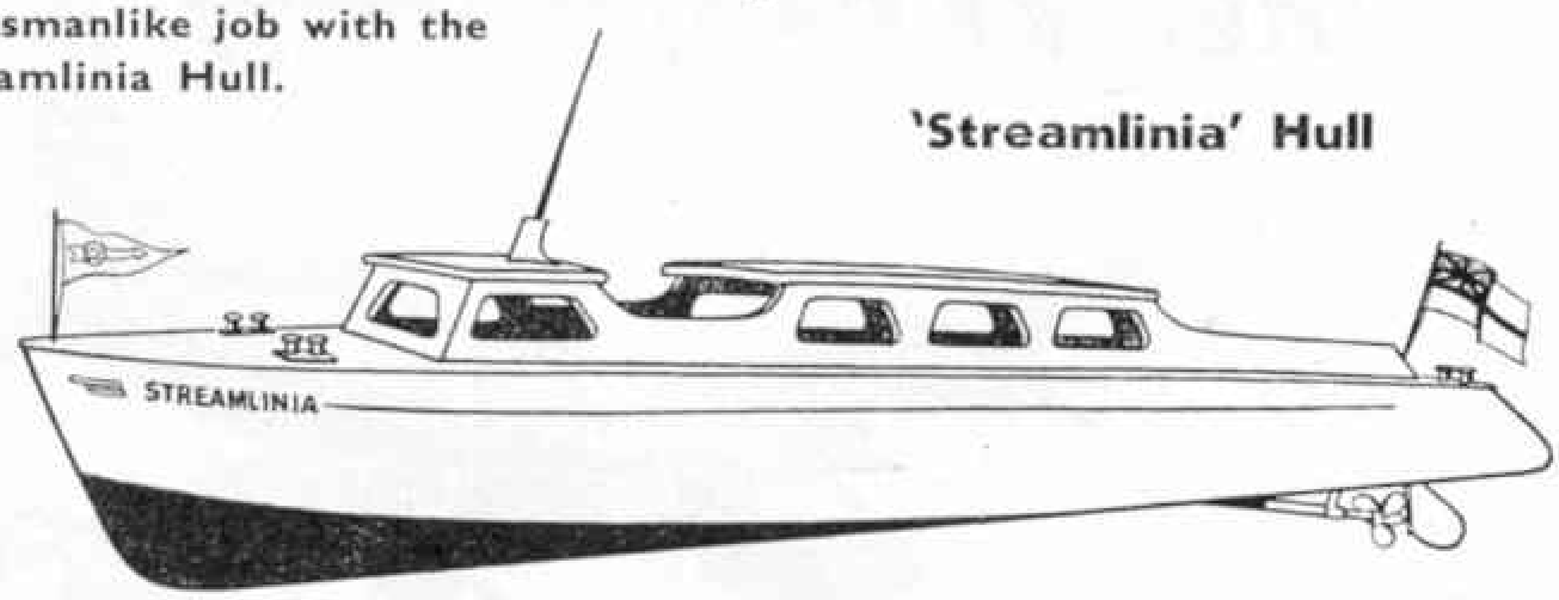

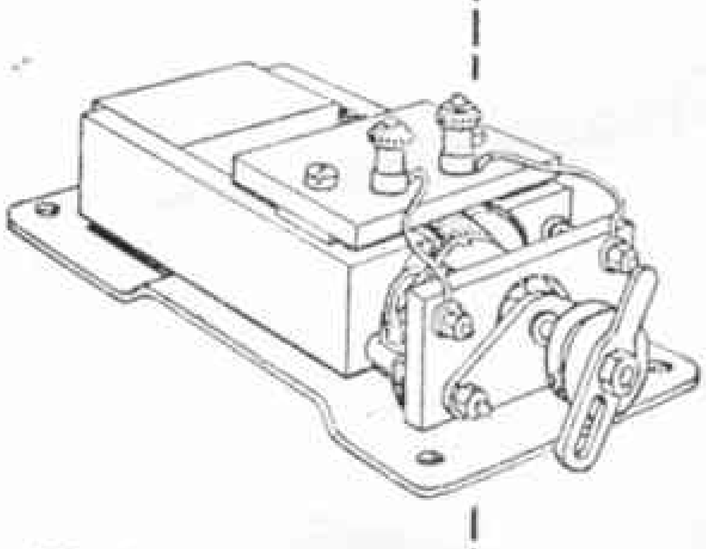

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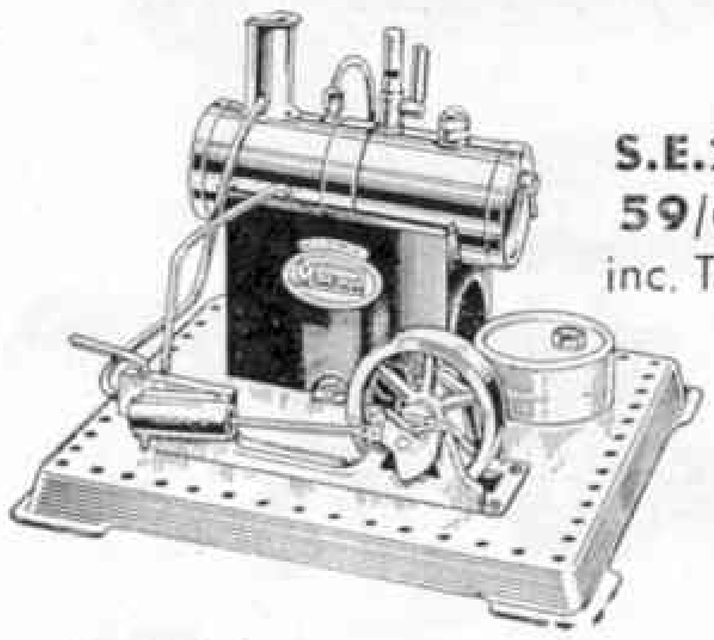

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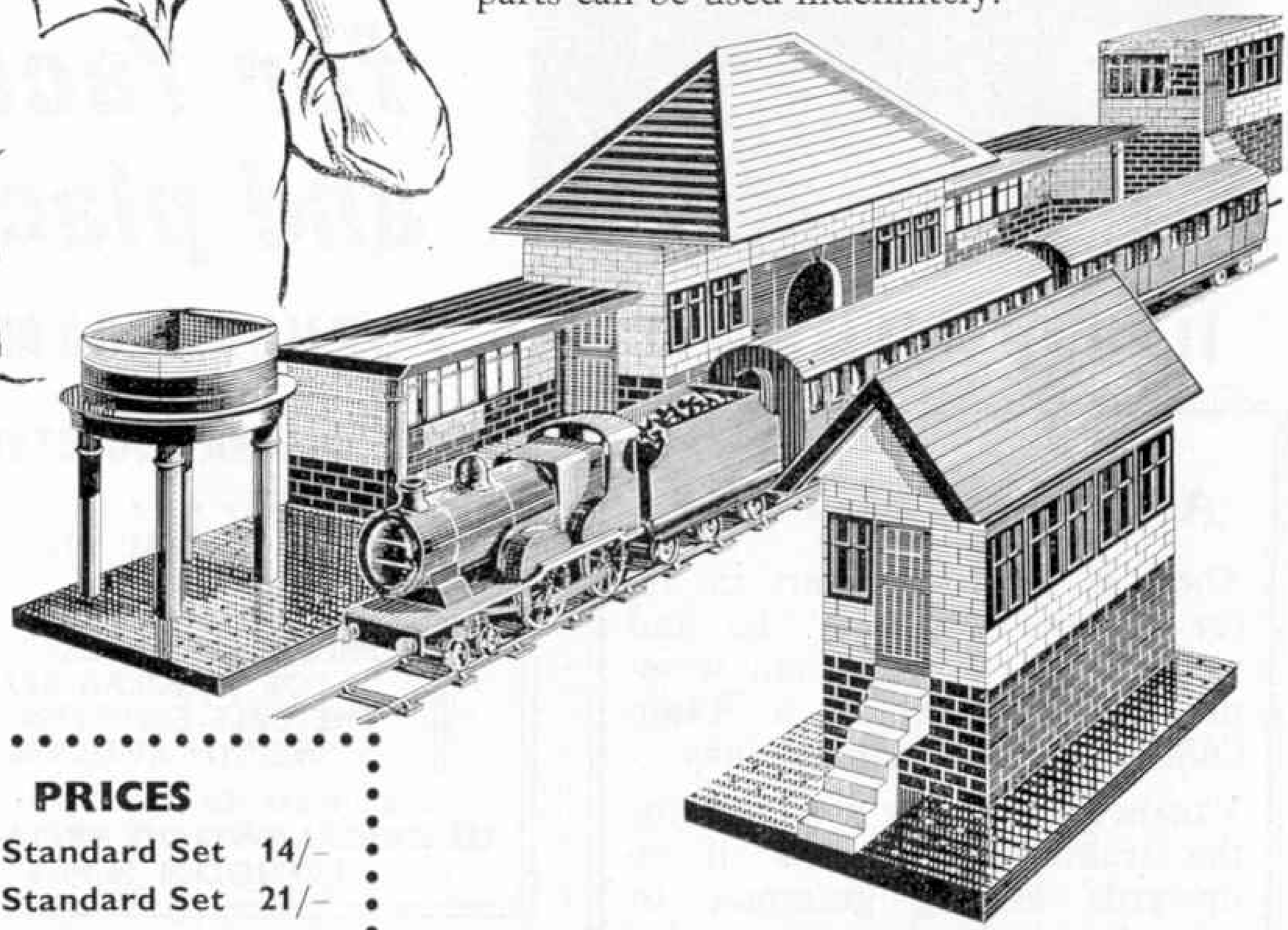

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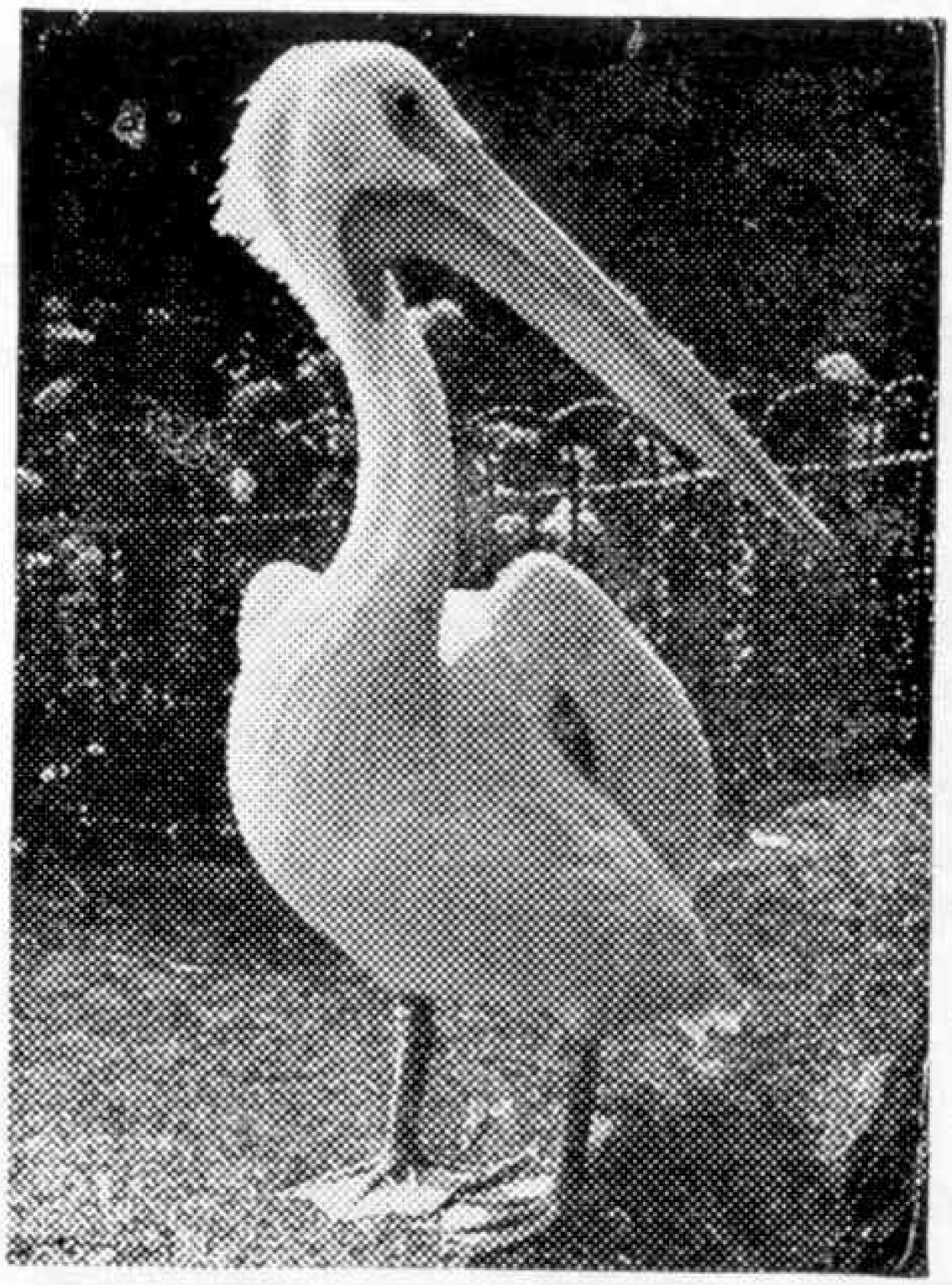

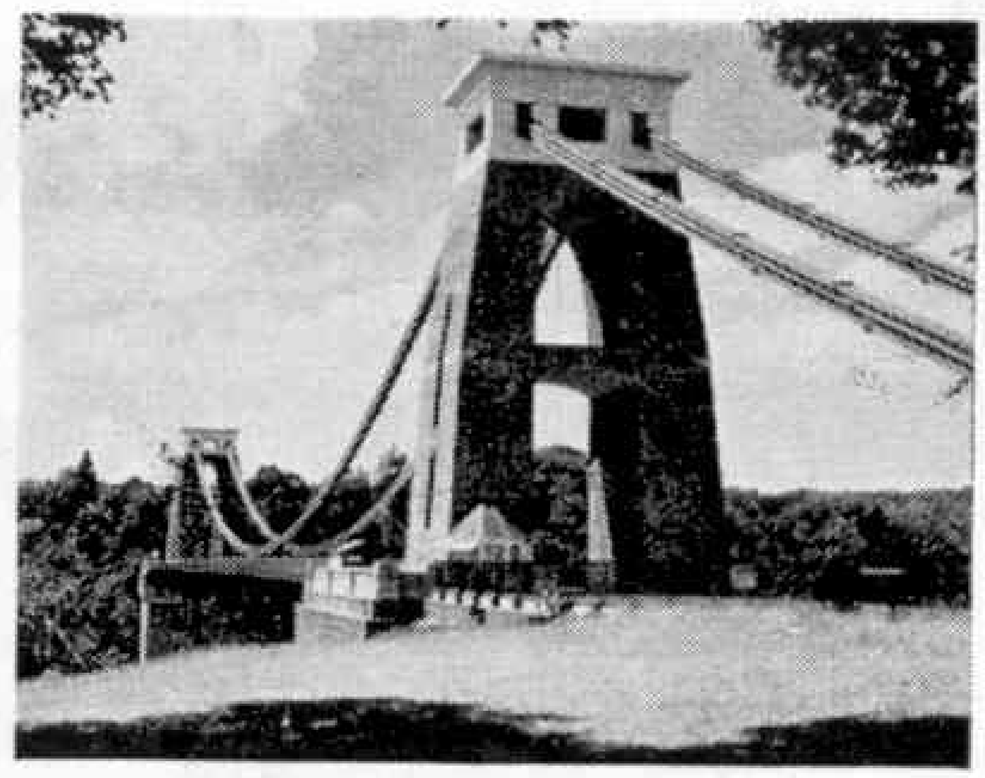

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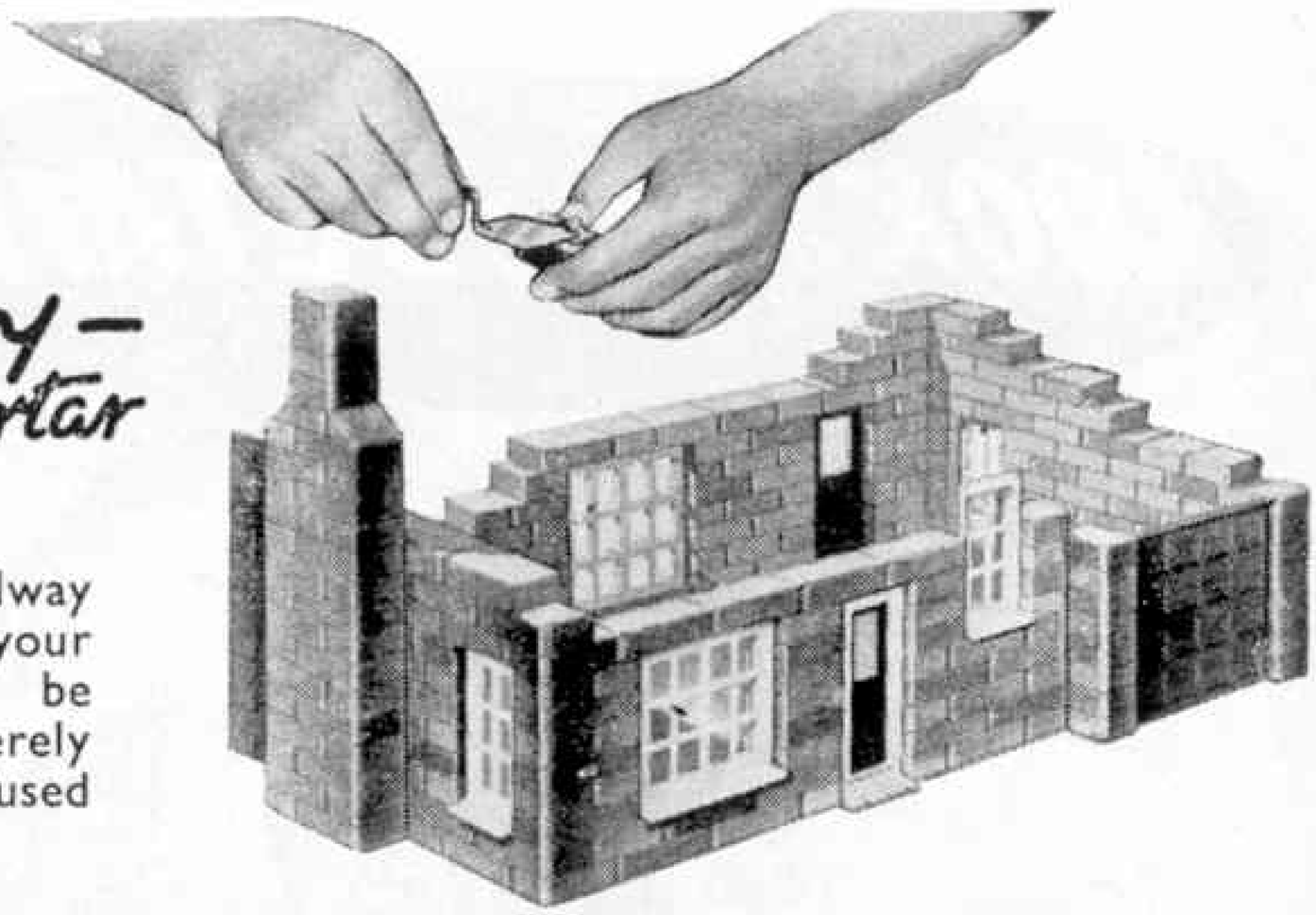

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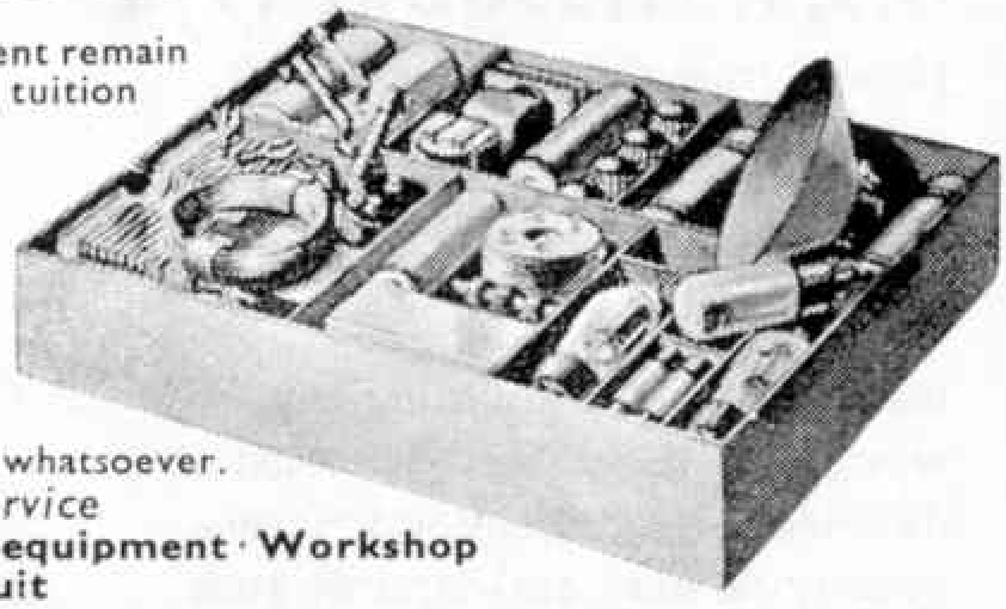

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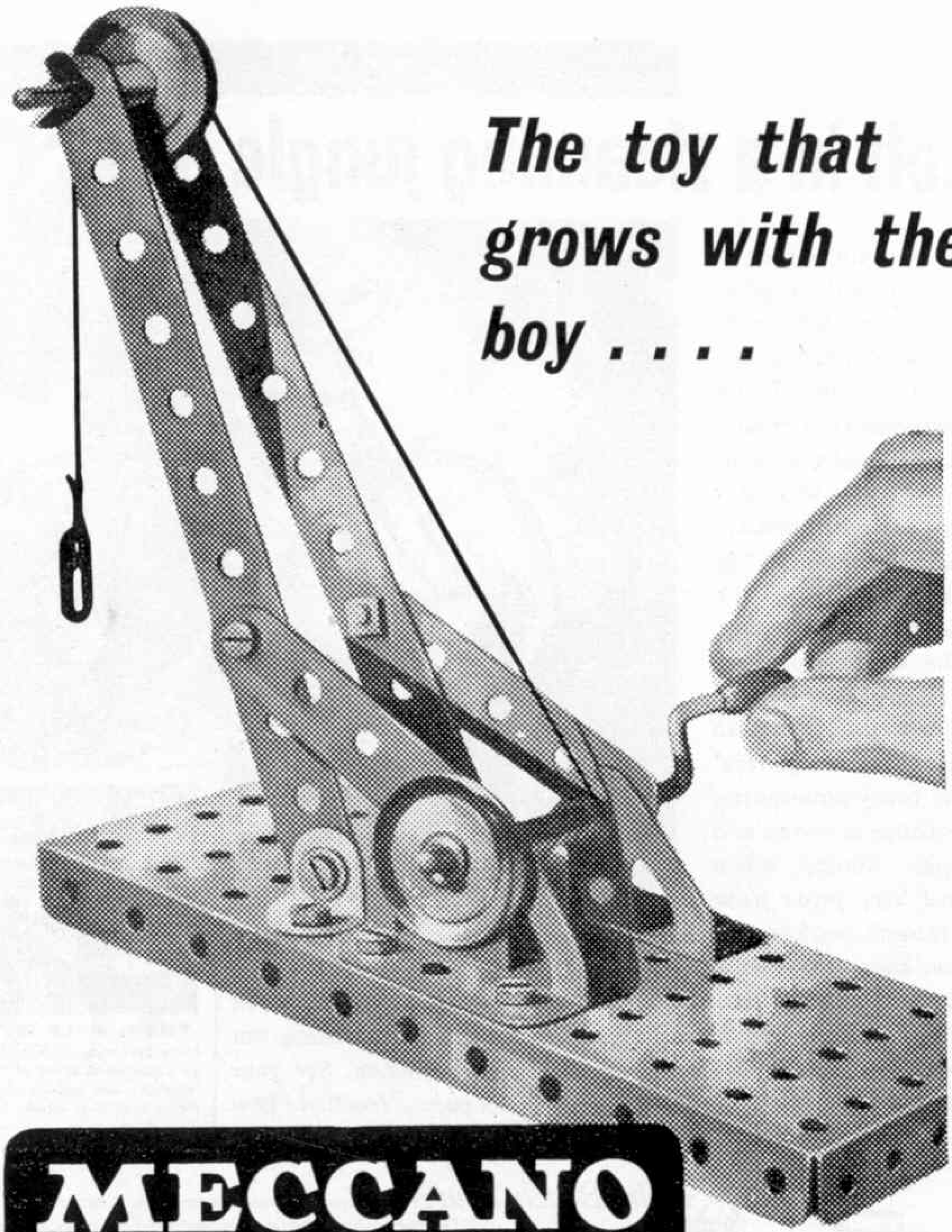

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Next Month: "DEATH'S HEAD INVASION"

MECCANO MAGAZINE

Editorial Office:
Binns Road
Liverpool 13
England

EDITOR : FRANK RILEY, B.Sc.

Vol. XLII
No. 8
August 1957

Three-Second Railway Tickets

I wonder how many *M.M.* readers had any idea how much printing was necessary to the railway world. Such things as working timetables, posters and handbills account for a lot of this, but even ticket production has meant printing on a large scale. This became evident when the ticket printing and issuing machine seen in my picture came into use at Doncaster earlier this year, for then it was no longer necessary to print in advance the 2,514 series with which the Doncaster booking office had previously to be stocked. And goodness knows how many actual tickets had to be there, ready to be issued. Now any ticket wanted is printed there and then, and it is ready in three seconds.

Issuing a ticket from one of the three recently installed machines at Doncaster. Each machine can print up to 1,260 different tickets, and it also adds up the receipts. B.R. (Eastern Region) photograph.

Magazine Price Increase

I do not need to tell you that the cost of producing the *M.M.* is continually rising, because all of you must now be used to learning that this and that is going to cost more. Now the rise has gone so far that the price of the *M.M.* in Great Britain, Northern Ireland and the Channel Islands will have to be 1/3, with corresponding rises in other countries, beginning next month.

The only way of avoiding this would have been to reduce the number of pages in each issue, but that way of escape did not appeal to me at all. I shall indeed increase the number of pages in forthcoming issues, so that the *M.M.* will continue to be as useful as possible to every reader.

I am sure that in this you agree with me. The *M.M.* today is something we all share, a link of friendship between Editor and staff on the one hand, and on the other a vast array of enthusiasts, more than 100,000 of them—to say nothing of other members of their families who look forward to the first day of each month as eagerly as they do! And no effort will be spared to keep up the high standard the Magazine has attained, and indeed to seize every opportunity of making it better than ever.

The Editor

Charcoal Burning Today

Revival of an Ancient Woodland Craft

By Geraldine Mellor

IT will astonish most people, and especially visitors from abroad, to know that this highly mechanised, atomic age is responsible for the revival of Britain's ancient woodland craft of charcoal burning. Indeed, there is today a constant and ever-increasing demand from industry for this pure carbon fuel, made by heating wood in the absence of sufficient air for complete combustion.

Old time charcoal burning. Picture Post Library.

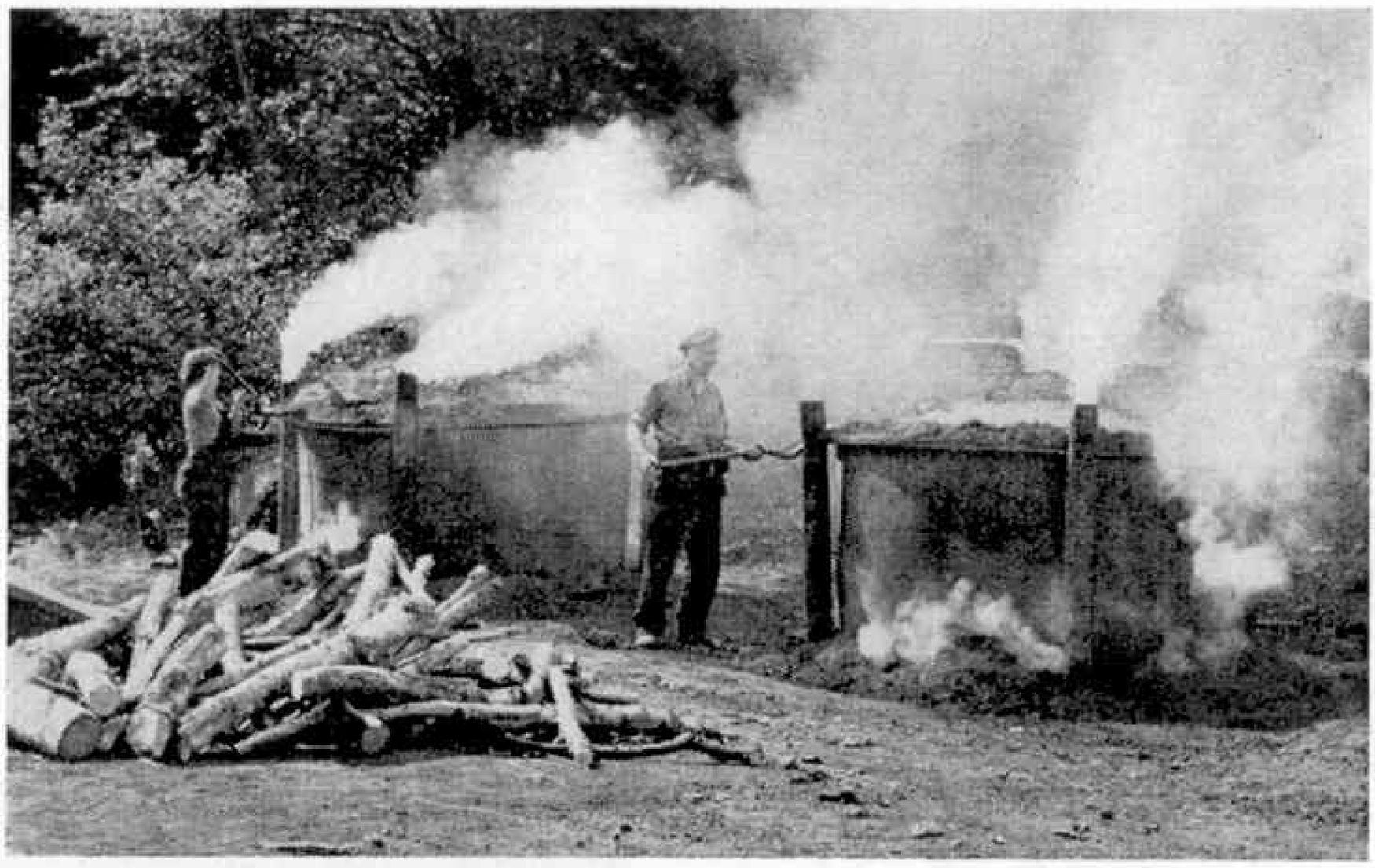
Charcoal was the first of man-made fuels, though little is used for this purpose nowadays. The most prosperous days of charcoal burning were undoubtedly in the time of chain mail and armour making, and during the period when the Kentish Weald was a centre of the iron smelting industry. In medieval times and later it was also widely employed as a preservative packing. In fact, it is no exaggeration to say that the foundations of this country's industrial wealth were laid by the forest charcoal burners.

Modern industry in Britain employs charcoal in a wide variety of ways, as for instance in the making of nylon, the manufacture of new fabrics and new medicines, and in the production of new plastics. It is applied as a filter in large-scale industrial air-conditioning plants, and is still used in large quantities in various metallurgical operations, where its low ash content and capacity for producing an unvarying high temperature when burned are invaluable.

Charcoal is also in demand for "blooming" high-grade optical lenses, as well as for making printers' ink, and the dyestuffs industry is always requiring large quantities. It is also employed in photography and horticulture. Its medicinal use as an absorbent of gases is fully recognised, and we actually export charcoal that has been refined for pharmaceutical and medicinal purposes.

You will come across woodland charcoal burners in the Lake District, in Worcestershire's Wyre Forest, and in the counties of Berkshire, Sussex, Kent, Hampshire, Dorset, Devon and Cornwall. One of the places where charcoal is still made in the traditional manner is Bedgebury, in the high Weald of Kent. Different types of wood are employed to produce various kinds of charcoal. If, for example, a hard product is required the charcoal burner will use oak, chestnut, larch and ash. For a softer charcoal willow and beech are selected.

The method of making charcoal necessitates the controlled slow combustion of suitable wood. The wood is first cut into lengths of 3½ feet, and is fired either in the



The charcoal burner still carries on his ancient craft, in more modern form, in a forest clearing so secluded that his work is seldom seen.

original large round heaps, or in the modern widely-used metal kilns.

In the original method a shallow pit, or bury, is sunk, with a level floor of earth or ashes. On this floor the pile of timber is skilfully and carefully built. In the middle of the pit a long pole is driven vertically into the ground, and a chimney of split logs is packed round it. The other logs, left in the round, are heaped in layers placed sloping inwards towards the chimney, forming a beehive-like dome. Once the wood is in place, a straw covering is put on, and over this turf or ashes, which will ensure very slow burning by excluding most of the air.

The charcoal burner then takes away the central pole, leaving a central flue down which burning sticks soaked in paraffin are dropped. When the stack is alight, he closes the flue hole with earth, and the heat gradually spreads outward from the centre.

If the fire is smouldering at the proper rate it will show an opaque white smoke, which seeps out continuously. But if the smoke is bluish, and small flames flicker out, the heap is burning too rapidly. The flow of air must then be reduced immediately, or else the entire stack will disappear in flame and smoke. That is the reason the charcoal burner lives in a caravan or hut beside his charge during the summer burning season.

The hearth burns for eight days from building to finish. When the burning is completed, the hearth is opened, the outer crust is raked away with an implement called a corrack, and the solid charcoal is allowed to cool. It is then scooped up into sacks with a long handled iron shovel, collected by lorries, and taken away to be sold. In favourable conditions the yield from one pit is some 65 sacks of charcoal, each weighing 50 lb.

(Continued on page 418)

Modern portable charcoal kilns, each of which holds three tons of wood. The conversion into charcoal takes about three days and about half a ton of charcoal is formed in each.

Project Vanguard

The United States Artificial Satellite

By J. Humphries, B.Sc.(Eng.), A.F.R.Ae.S., A.M.I.Mech.E.

WHEN the American artificial satellite programme was announced in August 1955, very few details of the project were released. Since that date there has been a steady flow of information from the U.S. Government and the firms and Universities involved, so that it is now possible to build up a fairly complete picture of the satellite project.

As far back as December 1948 the U.S. Government announced their interest in Earth satellite vehicles. At that time various firms had been investigating the possibilities for two years and, although no specific statement of the fact was made, it is fair to deduce that the prospects were not considered bright, as no further official announcements were made. Until the early 1950's, the emphasis in the various journals dealing with space-flight was on a man-carrying satellite, but with the development of the U.S. high-altitude rocket programme it came to be realised that a small instrument-carrying satellite could prove extremely useful.

In particular, if the scientific records could be sent back to earth by radio there would be no need for the satellite to return intact. By following this line of thought, several authors on both sides of the Atlantic showed that, using modern methods of construction, a three-stage rocket to put up to a 100 lb. payload of instruments in an orbit a few hundred miles above the Earth could definitely be made.

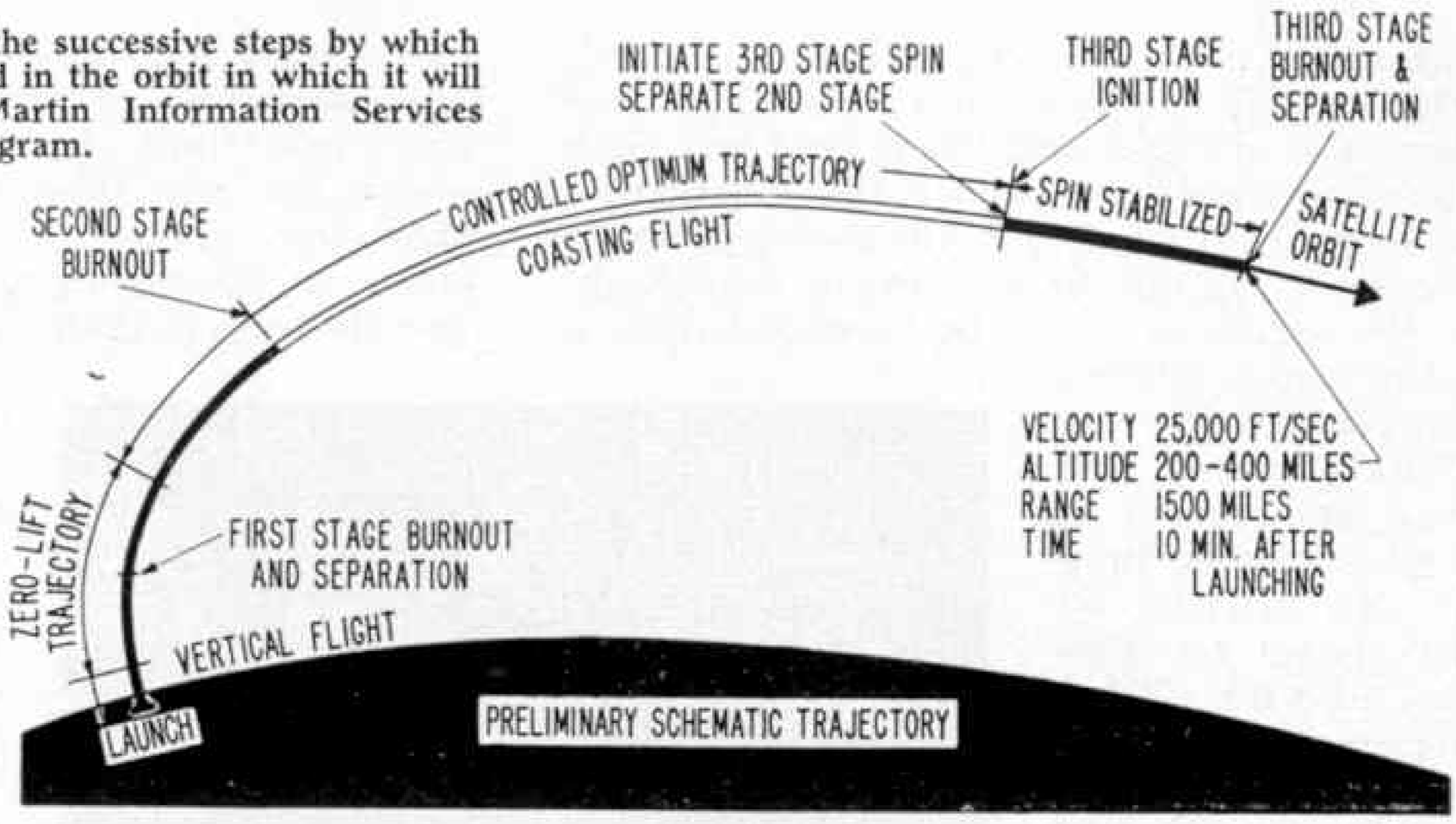
The Vanguard, as the U.S. vehicle is known, is to carry aloft a satellite weighing only just over 20 lb., with a diameter of 20 inches. The exact weight will probably vary slightly from satellite to satellite. By using improved rocket propellants, and new methods of construction, the all-up weight of the Vanguard has been kept down to 22,000 lb. This is 7,000 lb. lighter than the V.2 and only 7,000 lb. heavier than the Viking high-altitude sounding rocket now in use by the U.S. Navy.

The illustration on page 374 shows an artist's impression of Vanguard at the instant of launching. It is a slim pencil-like projectile, and one is immediately struck by the complete lack of fins for stabilising or rudders for steering. Rockets without fins have previously been fired, but they have only been very small ones. Vanguard will in fact be stabilised and guided by moving the rocket combustion chamber, which is mounted in gimbals. By cutting out the fins and rudders quite a lot of weight has been saved.

Firing a Viking rocket in the United States. U.S. Information Service photograph.

The overall job of producing Vanguard has been entrusted by the U.S. Navy, who themselves are acting on behalf of the National Academy of Sciences, to The Martin Co., one of America's largest aircraft firms and the producer of the Viking high-altitude sounding rocket. This is obviously sound policy, as the firm is basing the design of the first step on the Viking; it has the same diameter,

This diagram illustrates the successive steps by which the satellite will be placed in the orbit in which it will encircle the Earth. Martin Information Services diagram.



45 inches, but is rather longer so as to accommodate more propellant.

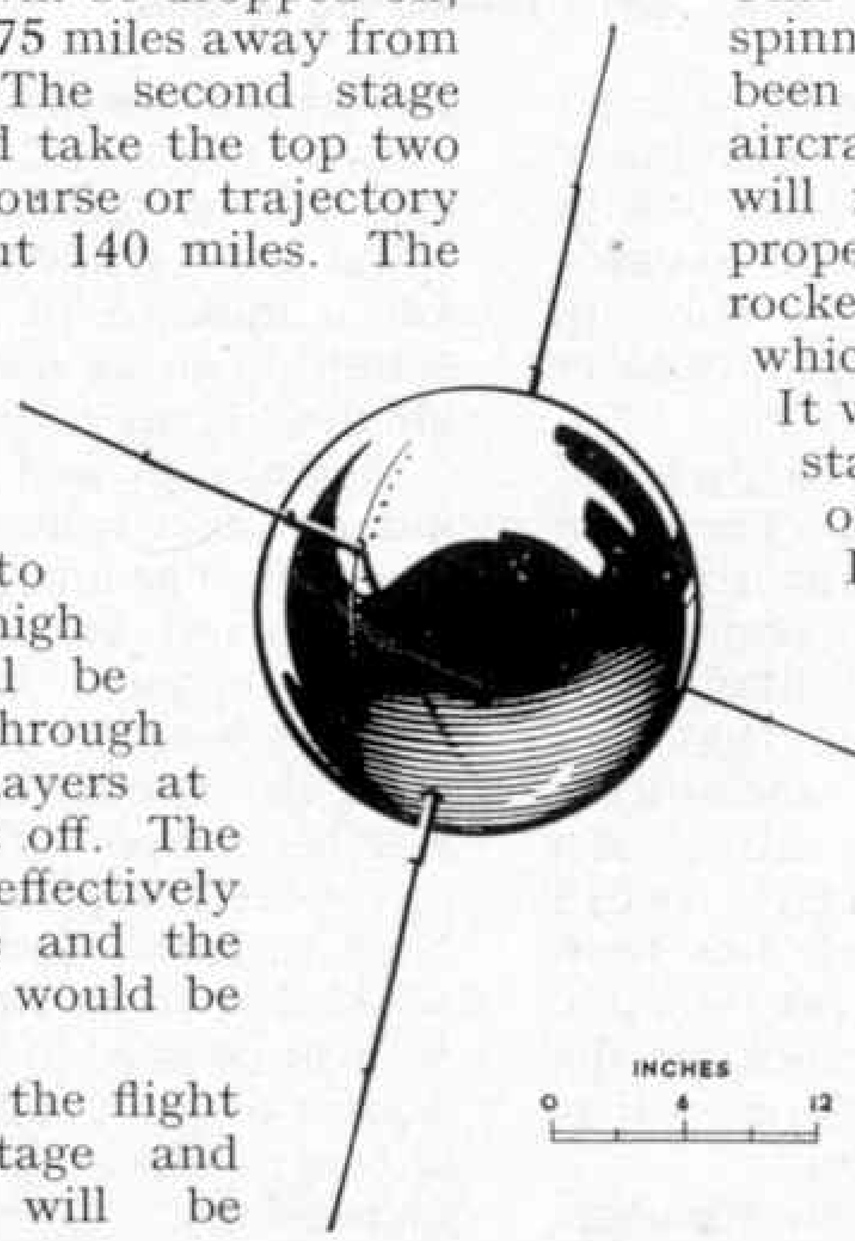
Because of its revolutionary nature the production of Vanguard is very much a matter of national prestige, and consequently as many firms as practicable have been brought in to manufacture the various components. For example, the rocket engine for the first stage is to be built by the General Electric Co., a firm that has long experience in making rockets using liquid oxygen, as this one does. The rocket engine for the second stage is to be made by the Aerojet-General Corporation, and the smaller items have been sub-contracted to dozens of other firms.

The upper drawing on this page shows how the three-stage vehicle carrying the satellite is to be fired. It will take off vertically from its launching platform, as shown on page 374, and when it is clear of the densest part of the atmosphere it will automatically be tilted over slowly. At a height of about 36 miles and a speed of 3,750 miles per hour the first stage will run out of propellants and will be dropped off, to land approximately 275 miles away from the launching point. The second stage rocket will then fire and take the top two stages along a curved course or trajectory up to a height of about 140 miles. The speed will then be just over 9,000 miles per hour. At this point the nose-cone over the spherical satellite, which is intended to protect it from the high temperatures that will be encountered in coming through the lower atmospheric layers at high speed, will be cast off. The vehicle will now be effectively outside the atmosphere and the nose-cone from here on would be so much dead weight.

In the next phase of the flight the satellite, third stage and empty second stage will be allowed to coast up to about 300 miles altitude. During this time the vehicle will be kept pointing in the direction in which it is travelling by means of short bursts from small jets arranged in suitable positions on the periphery of the rocket. If this were not done the vehicle would tumble over and over during the coasting period because of the lack of atmosphere, and in that case it would almost certainly be pointing the wrong way when the top stage was fired!

As a result of this guidance, the vehicle will be parallel to the Earth's surface when it reaches the top of its free trajectory at about 300 miles. There will be no guidance in the top step and so, before separating from the second stage, small solid rockets will be fired to impart spin to it. This method of stabilising by spinning is well-known and has been used on a number of air-to-air aircraft rockets. The top stage will now be fired. This is to be propelled by a solid-propellant rocket, unlike the first two stages, which use liquid-propellant rockets. It will bring the speed of the third stage plus satellite up to just over 17,000 miles per hour.

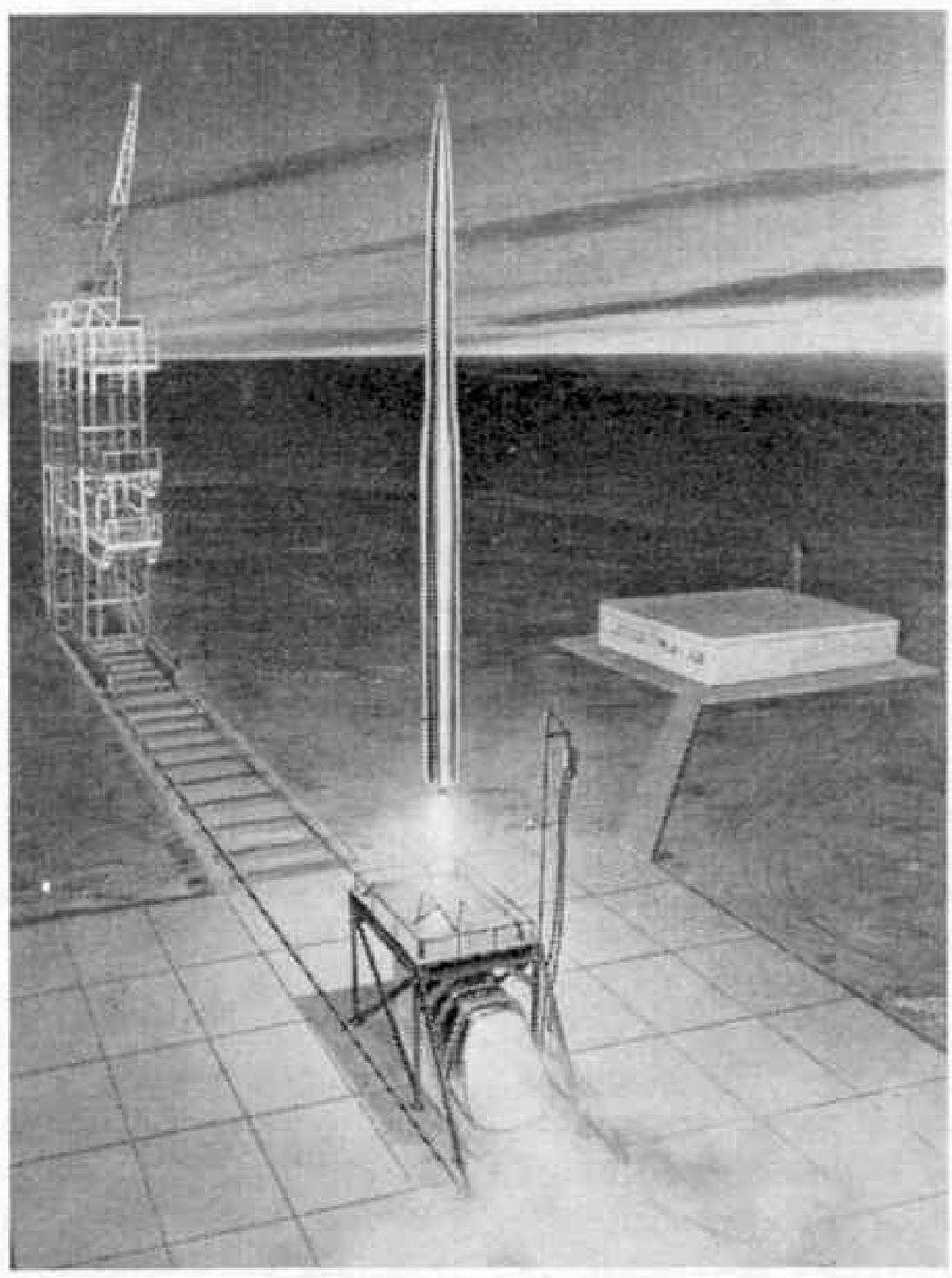
In order to make certain scientific measurements the satellite must be by itself in its orbit, that is its course round the Earth, and so small "retro-rockets" on the



What the satellite will look like when finally in its orbit. It will measure about 20 in. across. The aerials are extended only when it reaches its orbital height.

carcase of the third stage will now be fired. These solid rockets will point in the direction of flight and when fired will slow the third stage down slightly thus separating it from the satellite. All this will have happened within 10 minutes of launching.

The satellites are to be launched from a long-range rocket testing base in Florida and the first one or two at least are to be fired at an angle of 40 deg. to the Equator. The accuracy required from both the rocket engines and the guidance equipment is very high, but even so it is likely that the orbits of individual satellites will vary very widely. It is highly unlikely that any of the orbits will even be approximately circular, and the best that can be prophesied is that the satellites will not recede farther than 1,400 miles from the Earth, nor approach closer than 200 miles. The latter figure of course applies only to the initial circuits of the Earth, as even at 200-300 miles there is an extremely tenuous residual atmosphere which will in time cause the satellites to spin in towards the Earth, and they will finally burn up like meteors at a height of approximately 100 miles.



The launching scheme for a satellite, showing the gantry crane used to place the rocket on its launching stand, and the concrete blockhouse from which it will be fired. Martin Information Services.

The uses of these artificial satellites will be many and extremely varied. The main drawback to them is that because they are small the amount of scientific equipment that can be carried is severely limited. And they will not be recovered, so that any information obtained must be transmitted to ground stations by radio. An extremely small lightweight radio transmitter known as Minitrack has been developed for this purpose and, as its name suggests, it will be used for tracking the satellite and determining its orbit as well as for transmitting scientific data.

The power for operating both scientific instruments and transmitter will be supplied from batteries for the first few satellites. This will limit the useful life of the equipment and later satellites will carry what are known as silicon solar cells. These are devices for generating electricity directly from sunlight, which will enable the electrical equipment to continue operating indefinitely.

A few of the investigations to be carried out are measurements of the intensities of cosmic rays and ultra-violet radiation from the Sun, the determination of the number of micro-meteorites in space and the measurement of the heat radiated out from the Earth into space. Even if all the instruments failed the satellite would not be useless, as the measurement of its path around the Earth will be used for a number of purposes. For example, it is known that the atmosphere thins out gradually into space and that even at several hundred miles altitude an extremely small amount of gas still exists. As already noted, this will be sufficient to make the satellite spiral very gradually back towards Earth, and a measure of the loss in height of the satellite can be used to calculate the exact air density at these extreme heights.

Again, it is well known that the Earth is not an exact sphere, but has a bulge at the Equator. The amount and disposition of the bulge is not known to any high degree of exactness, but it will have an effect on the satellite's orbit and by means of rather intricate calculations a better idea of the Earth's shape will be obtained.

Twelve complete Vanguard vehicles have been ordered, but only six of these are scheduled to be fired complete. The other six will be used in preliminary tests. It is a matter of some speculation as to how many of these vehicles will perform their mission successfully.

Well-Named the Hercules

By John W. R. Taylor

HERCULES, or Heracles, to give him his correct Greek name, of which Hercules is the Latin equivalent, was the hero who spent his life doing mighty deeds. So Lockheed's big new C-130A Hercules transport aircraft, shown on our cover this month, is well-named, because few aeroplanes can do so much, so quickly.

Nor did its makers waste much time in getting it off the drawing board and into the air, for it was only 6½ years ago that Lockheed entered the U.S. Air Force design competition for such an aircraft. They were awarded a contract for a YC-130 prototype on 11th July 1951, followed by a production contract on 19th September 1952. The prototype flew for the first time on 23rd August 1954 and the first production C-130A on 7th April 1955, less than four years after detailed design work began. And the first deliveries to a U.S.A.F. squadron were made towards the end of 1956.

First unit to receive the new aircraft was the 463rd Troop Carrier Wing of the 18th Air Force at Ardmore Air Force Base, Oklahoma, and its initial batch of C-130A's arrived in spectacular fashion on 9th December last. They took off from the giant Lockheed factory at Marietta, Georgia, where they were built, and covered the 735 miles to Ardmore in 170 minutes despite a 70 m.p.h. headwind.

Arriving over the airfield in a tight diamond formation, the first four aircraft peeled off in steep turns and landed only a few seconds apart, followed by a fifth whose pilot stamped on the brakes and put the propellers into reverse-pitch to demonstrate its ability to stop within eight times its own length.

The picture at the head of this page shows the U.S. Air Force's new airlift transport, the Lockheed C-130A Hercules. For the illustrations to this article, and for the photograph on which our cover this month is based, we are indebted to the Lockheed Aircraft Corporation, U.S.A.

From out of the first Hercules came a 46 ft. long Type F-6 refuelling trailer weighing nearly 12 tons. Number two disembarked a 10-ton trailer-mounted test stand for the Allison T56 turboprop, four of which power the Hercules. The third carried a Nike anti-aircraft guided missile and booster, nine of which can be packed into the huge freight-hold.

That was only a start, because yet another C-130A appeared over the field and in three seconds dropped by parachute 10 tons of supplies, packed in 18 special

containers, having carried them about 1,000 miles from Pope Air Force Base.

Finally, to round off this display of the versatility and performance of the new transports, Lockheed test pilot Joe Barrett lifted one of them off the ground after a run of only 800 ft., reached a height of over 3,000 ft. in a climbing turn within 60 sec. of starting his take-off run, and then made two low-level fly-pasts, one at more than 350 m.p.h. and the other at 150 m.p.h. with the underfuselage loading ramp-door open, to demonstrate how slowly the Hercules can be flown when dropping supplies and vehicles out of the back by parachute.

Since then, large numbers of C-130A's have entered service and they will in time be standard equipment in all the medium transport wings of the U.S.A.F.'s Tactical Air Command. In size, they are mid-way between the twin piston-engined Fairchild C-123 Provider assault transports, which are intended for delivering men and supplies into front-line battle areas, and the much larger four-turboprop Douglas C-133A's, which can carry a 36-ton payload but need larger airfields than the C-130A.

All three types have been designed to give the U.S. Army, and particularly its airborne divisions, the kind of mobility that is essential in a nuclear age. As a result, the emphasis is on high performance, rugged reliability, quick loading and unloading, and the ability to use rough airstrips in combat areas.

High performance was made possible in the C-130A by the Allison T56-A-1 turboprop, which gives 3,750 horse-power for take-off. With four of these engines, the aircraft has a maximum cruising speed of 370 m.p.h. and can fly for up to 2,900 miles at 330 m.p.h. with an 11-ton payload. With a full payload of 17½ tons, it will still fly for nearly 2,000 miles and can cruise at heights of around 35,000 ft.

Like the other new U.S.A.F. transports, it is built around a big, roomy fuselage, with a sharply upswept tail and a loading ramp which forms the underside of the rear fuselage in flight. Operated hydraulically, this ramp enables vehicles to be driven straight on board; or it can be lowered part-way to form a platform at the same height above the ground as the tailboard of a lorry. The total unobstructed cabin space is 4,300 cu. ft., which is nearly twice that of the "short-nose" Bristol Freighter, and the usable volume is around 3,680 cu. ft., after allowing for the gangways on each side.

To keep the cabin clear of obstructions, the main wheels of the nosewheel-type undercarriage retract into bulged fairings on the sides of the fuselage. There are two wheels in tandem on each side, fitted with low-pressure tyres for operation on soft landing fields. An interesting feature is that the panels which form the rear portion of each fairing are hinged, and can be opened outwards to form wind-shields while paratroops are jumping from the doors just to the rear of the fairings.

A crew of four is normally carried, consisting of pilot, co-pilot, flight engineer and navigator. Their roomy flight deck is fully-pressurised, and so is the main cabin, which will accommodate up to 92 troops, or 64 fully-equipped paratroops as an alternative to cargo. On air ambulance duties, the Hercules will carry 70 stretchers and six attendants or 74 stretchers and two attendants.

Its 4,230 gallons of fuel are carried in

The Hercules can carry a U.S.A.F. type F-6 5,000-gall. fuel tanker and tractor in its 66 ft. long cargo compartment.

four tanks, two in each wing. It can also be fitted with two 1,165 gall. underwing tanks; but the total fuel load must not exceed 4,413 gallons, so the internal tanks must then be only partly filled.

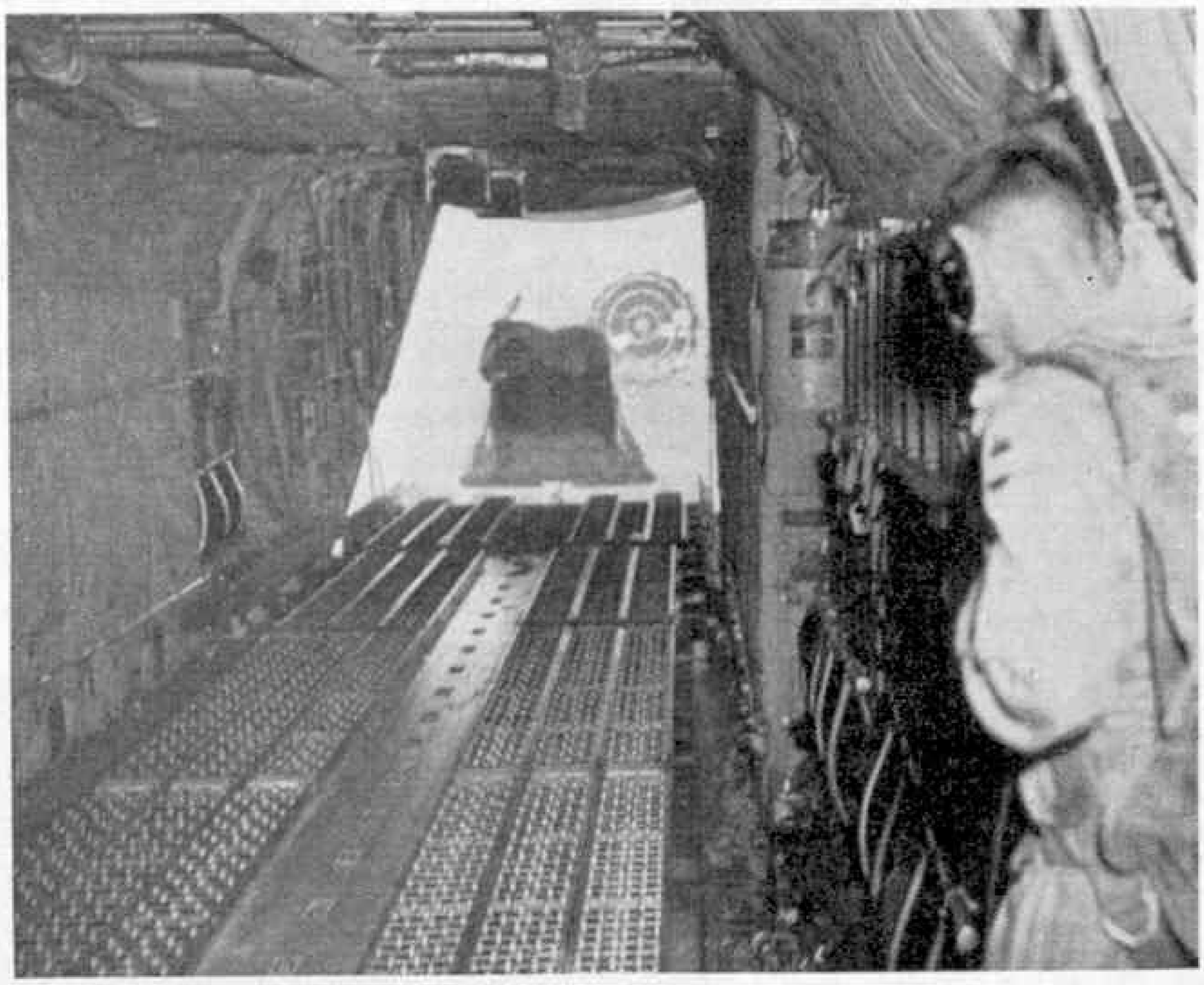
Very comprehensive radio and radar are fitted, for safe operation in all weathers, and production C-130A's have a large black nose-blister housing a scanner that can be used either to provide a "map" of the area over which the aircraft is flying or to give warning of bad weather, high ground or other aircraft ahead.

Add to all these qualities the fact that the Hercules handles well at fast or slow speeds, high or low altitudes, and it is obviously an aeroplane with a big future. Already, several new versions are under development, including the improved C-130B, a KC-130 flight refuelling tanker, a photographic version, a command headquarters version and the Ski-130, which is fitted with a combined wheel-ski undercarriage for operation in polar regions.

The skis produced for the Ski-130 are the largest ever built, the two main ones measuring 19½ ft. long by 5½ ft. wide. In tests from a frozen lake at Bemidji, Minnesota, they enabled the aircraft to take off at a loaded weight of 111,000 lb., which was only 9,000 lb. less than its normal maximum weight and the heaviest load ever lifted on skis.

Snow, ice and temperatures down to 48 deg. below zero—almost cold enough to freeze its fuel—failed to keep the aircraft on the ground during three months of cold-weather testing at Eielson Air Force Base in Alaska. Its take-offs and landings on wheels and skis on deep slush or hard-packed snow were, in fact, as short as those on paved, clear runways in warmer climates.

Little wonder that the U.S.A.F. likes its new tactical transport, or that Lockheed's expect it to remain in production at Marietta for 10 to 15 years. Already, the Royal Australian Air Force has decided to order a dozen, and it seems certain that other air forces will follow, especially if, as seems likely, the fuselage can be "stretched" to take even bulkier loads.



A platform heavily loaded with military supplies rolls rapidly out of the ramp door of the Lockheed C-230A Hercules and follows the extraction parachute into mid-air.

In addition, Lockheed hope to market a civil version in due course, and have said that this will reduce the cost of air freighting to far below that with any present-day aircraft. If this is so, there is certainly room for it, because the airlines have neglected cargo-carrying for too long and there are big profits waiting for anyone who tackles the business properly with a fleet of the right kind of aircraft.

Articulation in Amsterdam—(*Continued from page 397*)

two parts of the bus is so cleverly arranged that passengers are caused no inconvenience on sharp bends or high bridges, which are negotiated with great smoothness. The rear axle of the trailing portion is connected to the turntable system that couples the two parts together by rods, so that it aids in the steering, the wheels being turned at a slightly less acute angle than the front steering wheels.

A thorough trial of the new A.E.C./Kässbohrer has led to a decision to put two of these vehicles into experimental service. It is hoped that this will provide a further step towards the efforts of the Transport Department of Amsterdam to move passengers more quickly at traffic peak hours.

Railway Notes

By R. A. H. Weight

A Fine L.M.R. "Jubilee" Run

I was recently aboard the noon Manchester-Euston express. This runs by way of the shorter Potteries route, which presents a harder task to the locomotive as far as Stoke-on-Trent in the way of gradients, and at the time on account of slowings where pre-electrification bridge repair and other track improvement works were in hand. Passengers were embarked at Stockport, Macclesfield and Stoke, then, 3-min. late, we were off in sunshine from the last named station for a 146-mile non-stop run to London, smartly timed in 152 min. The engine was 6P, 3-cylinder, Jubilee 4-6-0 No. 45644, *Howe*, stationed at Longsight, Manchester, ably handled by a Camden, London, driver and fireman. With 10 modern coaches, including a heavy kitchen car, the load behind the tender was about 365 tons gross.

The Crewe-Euston main line was joined at Colwich. Every signal was clear and, having attained speed beyond the junction, *Howe* covered the 119 miles from Rugeley to Willesden, including an engineering slack at Tring, in 108 min., at an average of 66 m.p.h. in the best "Royal Scot manner" one might say. Maximum speed was 83½ m.p.h. Euston was reached in 143 min. at 3.42 p.m., so that we arrived 6 min. early, having averaged more than a mile a minute all the way from Stoke. It was an excellent performance; a most comfortable and enjoyable journey.

More Summer Service Developments

There is on trial and available to passengers at Scarborough a number of light Self-Help Luggage Barrows devised at York. They have two wheels, rubber tyres, ball bearings, hooks for small packages and are easily pushed with one hand though carrying up to 3½ cwt. They are certainly handy if there are no porters available!

The 7.20 p.m. sleeping car express making the long Euston-Inverness run, and the corresponding southbound 5.15 p.m. service, have as in pre-war days received the title *The Royal Highlander*. The 9.15 a.m. St. Pancras-Edinburgh and 10.5 a.m. Edinburgh-St. Pancras expresses via Leeds and Carlisle (speeded-up like a number of other Midland line principal trains) are now styled *The Waverley*. At one time they were named the *Thames-Forth*.

An additional Paddington-Bristol express on fast timings with light load runs on Mondays to Fridays, starting at 3.5 p.m. and returning from Temple Meads at 6.10. Outward, there is a stop at Swindon, whence the route is via Badminton. Return is by way of Bath with a call at that city. *Stokesay Castle* has made many lively runs with these trains, completing a 236-mile round trip in little over 5 hr. Gas Turbine locomotive No. 18000 also has taken them.

The *Morning Talisman* 6¾-hr. expresses between King's Cross and Edinburgh, calling at Newcastle, with an early start provide arrivals in the English and Scottish capitals by 2.30 p.m. The similar fast 4.0 p.m. departures from each end continue; they are styled at present the *Afternoon Talisman*.

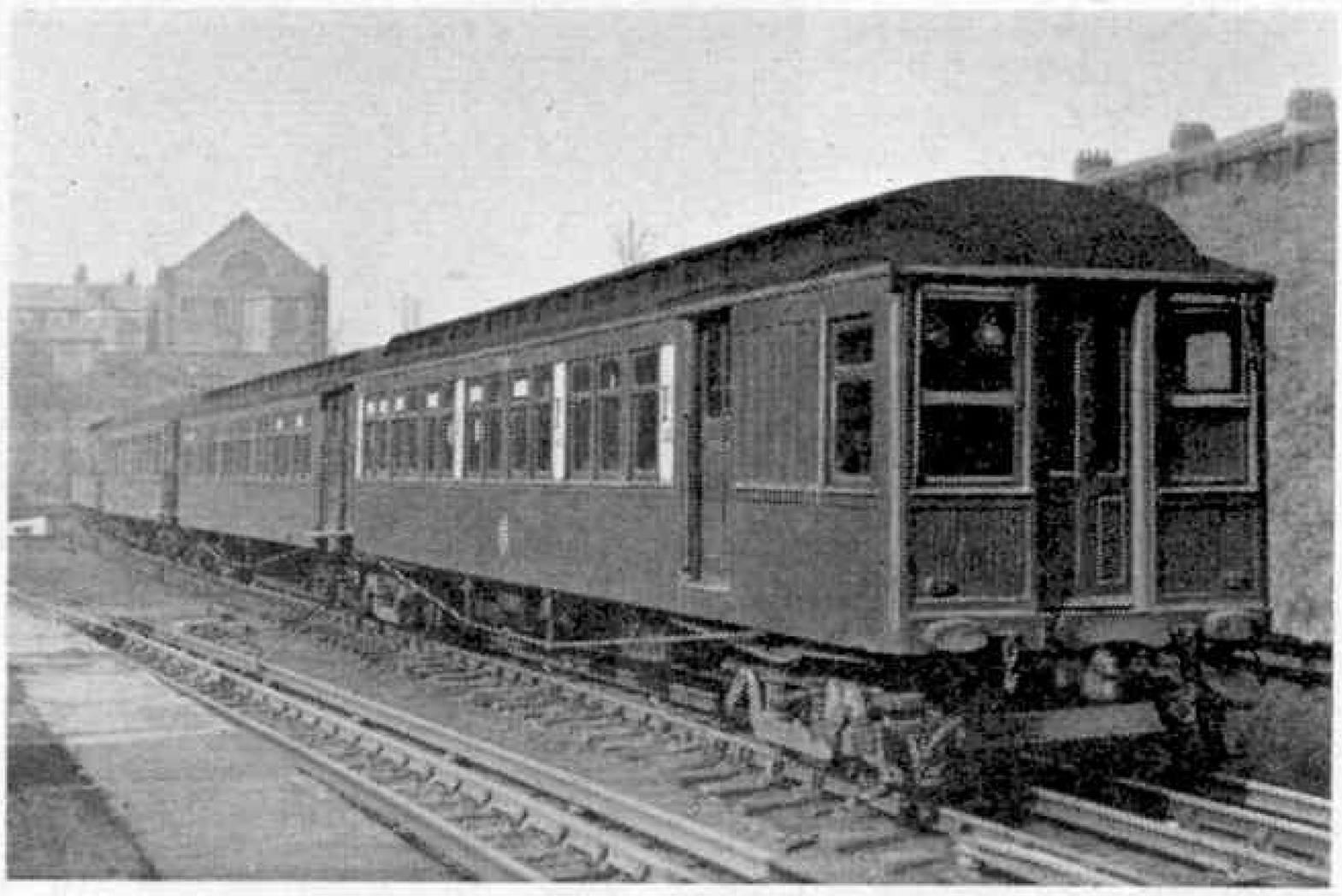
More local diesel services have been introduced around Birmingham, Manchester and elsewhere. There have been more improved freight facilities.

London Midland Tidings

A new 1,500 ton motor ship for the Anglo-Irish cargo and livestock trade is to be built at Troon, Ayrshire.

An Inter-Regional Timekeeping Competition based on the performance of all regular weekday express passenger trains and the longer running fast freight ones, by recording the number of minutes lost or otherwise per 100 train miles, has resulted in the award of a Shield for the best 1956 results to the London Midland. L.M.R. runs some 400 express passenger and over 200 fast freight services daily, as well as hundreds of slower ones.

Among signalling works completed, a new signal box at Denbigh in North Wales incorporates control of three single lines over a distance of 1¾ miles; there were previously three cabins. It has track circuits, illuminated diagram and electrically operated single-line token system.



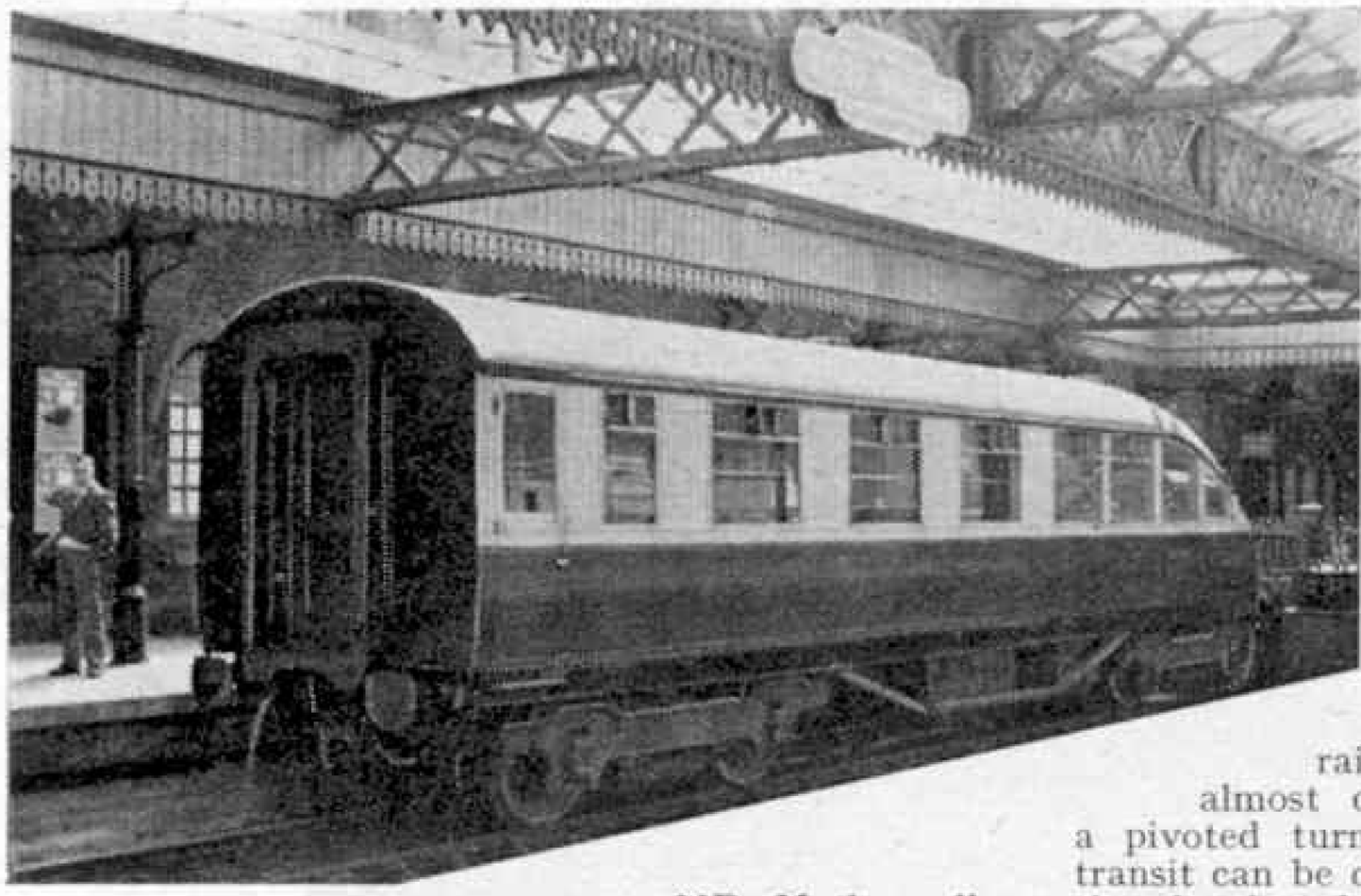
A train of ex-Mersey Railway stock, with the American outline clearly apparent in the first two vehicles, now replaced by lightweight electric trains of modern outline with power-operated doors. Photograph by Geoffrey Rose.

Locomotives in the News

In addition to the rebuilding of the S.R. Merchant Navy Pacifics without exterior casing and with modified valve gear, etc. (half of that programme has been completed) 15 of the smaller West Country engines are being similarly treated. The first is No. 34005, *Barnstaple*, now in service. Five Schools 4-4-0s, Nos. 30903-7, have moved to Nine Elms Depot from St. Leonards, where only Nos. 30900-2 now remain.

New locomotives have been added to stock and allocated as follows: class 9 2-10-0, Nos. 92131-5, 21A, Saltley. In class 4, 4-6-0s numbered 75060-1, 15C, Leicester; 2-6-0s: Nos. 76086 also to Leicester; 76087-9, 17F, Trafford Park, Manchester. Class 5 4-6-0s, Nos. 73168-71, 50A, York. Class 2 2-6-2Ts, Nos. 84021-4, 74A, Ashford; 84025-9, 74B, Ramsgate.

Diesel-electric shunting engines entering service have included Nos. 13347, 62B, Dundee; 13348-50,



This beaver-tail coach from the pre-war "Coronation" train, used latterly as an observation car on the West Highland line, was caught by the camera of C. Lawson-Kerr at Fort William.

66B, Motherwell; 13362, 82C, Swindon, followed by four more to be allocated. Drewry diesel-mechanical lighter type numbered 11222, 75A, Brighton; 11220–1, 11223–5, 73C, Hither Green, also working on trial elsewhere.

The Latest in Great Northern Diesel Trains

For the *Enterprise* express service operated by the Great Northern Railway Board, Northern Ireland, and other main or secondary working, 24 excellently equipped diesel rail cars have been completed at Dundalk Works. The initial set to form the 10.30 a.m. Belfast-Dublin *Enterprise* fast train, returning at 5.30 p.m., replacing long established steam operation, consists of three powered cars and three intermediate non-powered ones. Additional vehicles may be added if necessary, and design permits of running in various formations. Powerful A.E.C. vertical type diesel engines are incorporated. There is ample heating and lighting, braking and safety devices. Main structural parts of the coaches, which are of all-metal body construction, have been supplied by British United Traction Ltd., and Messrs. Park Royal Vehicles Ltd.

A buffet car with kitchen and latest equipment is included and this also can be used for ordinary seating, as meals and refreshments will be served throughout the train.

Lightweight Rail Buses

Contracts have been placed with five firms, including one in Germany, for the construction of 22 light diesel rail buses, having single under-floor engines developing 112–150 h p., seating about 50 passengers. They are to be suitable for operating rural services, attaining speeds up to 55 m.p.h., and are intended for introduction next year on selected lines in four Regions.

British and American Miscellany

Several of the London Tube Railways have recently passed their Jubilees; that is to say they have been operating for 50 years or more. In most cases the original lines were much shorter than now. Extensions have taken the modern trains, looking considerably different from the early ones, well out into suburbs, with open air running in some cases for a number of miles. American design and partial construction of rolling stock figured a good deal in early London and other electric railway planning

More B.R. standard electric sets for operating with third or fourth rail traction have been completed for use on the Southern, also L.M.R. London suburban routes.

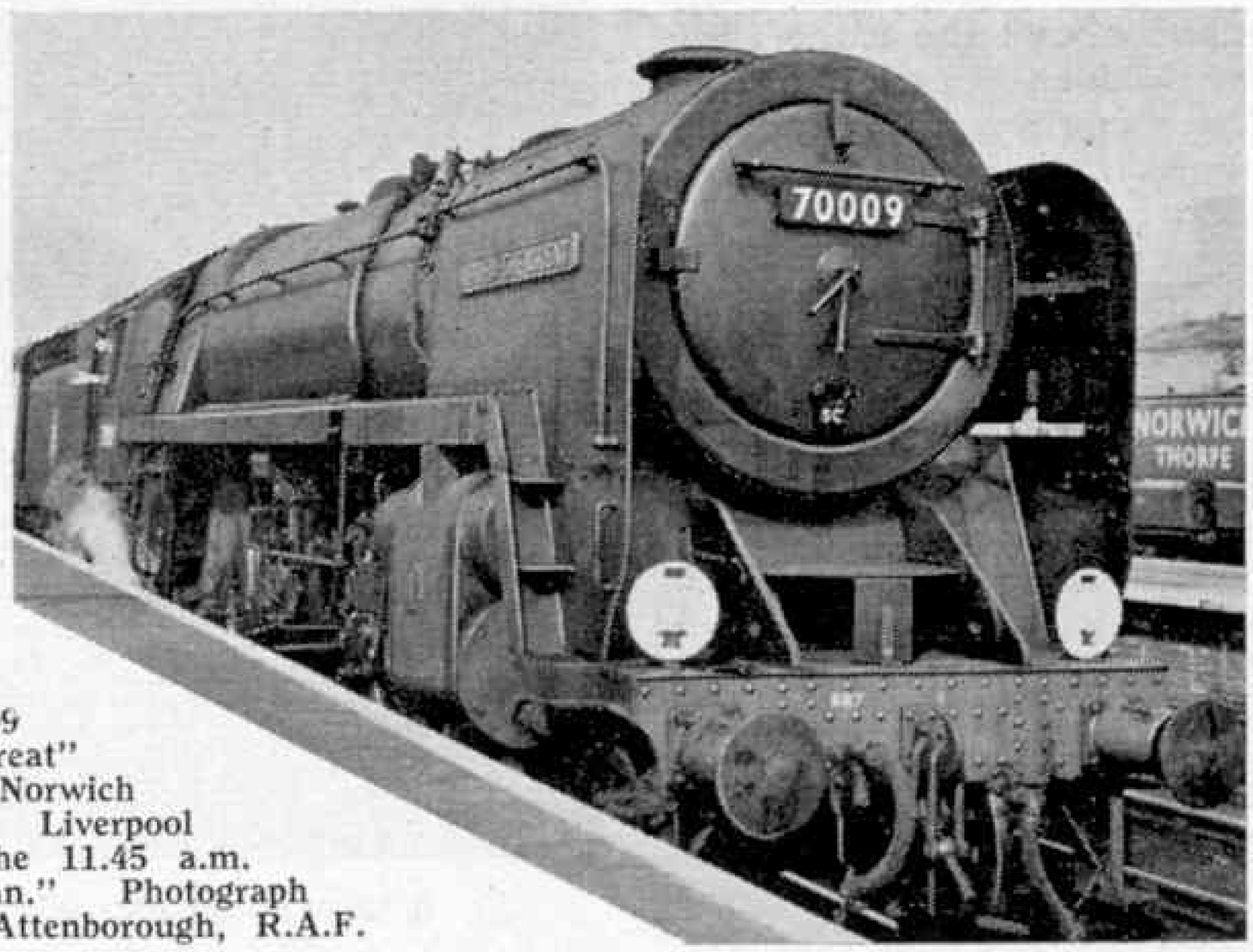
The Western Region has introduced a unique type of railway van having roller shutters that almost completely open up each side, with a pivoted turntable on the floor. Motor cars for transit can be driven over ramps on to the turntable, then be slewed and secured in position for safe travel within a few minutes.

The Illinois Central Railroad, U.S.A., announces improved and more frequent running of certain long distance expresses, such as the *City of Miami* (Chicago-St. Louis-Miami) and *Panama Limited* (Chicago-New Orleans) streamliners; also the *Night Diamond* and *Hawkeye*.

The last surviving U.S. regularly scheduled, steam operated, narrow gauge passenger train—known as *The Silverton*—which in recent years was in danger of being closed down, has now become extremely popular with tourists. In consequence it is being run again this summer, until 15th September. *The Silverton* operates between Durango and Silverton, Colorado, on one of the last remnants of the once extensive narrow gauge system of the Denver and Rio Grande Western Railroad. It is hauled regularly by one of the massive 2–8–2 Mikado type locomotives, and its route passes through magnificent mountain scenery.

The New York Central System has retired its last steam locomotive and is now entirely operated by diesel and electric types. The last steam engine, 2–8–2 No. 1977, finished service on 2nd May last.

Another item of American news is that the Union Pacific Railroad, which already operates a number of gas turbine electric locomotives, is taking delivery of a further batch. The new engines will be of 8,500 horse power.



B.R. No. 70009 "Alfred the Great" is here leaving Norwich (Thorpe) for Liverpool Street with the 11.45 a.m. "East Anglian." Photograph by Cpl. W. Attenborough, R.A.F.

The Giant's Quoit, a Cornish cromlech. The illustrations to this article are from photographs by the author.

Giants of Olden Days

By Reece Winstone, A.I.B.P., A.R.P.S., F.R.S.A.

IN the dim past, prehistoric folk imagined a race of giants inhabited the land, and named some of the more picturesque landmarks after them. These place names linger on today, such as the Giant's Causeway in Northern Ireland.

Perhaps the best known English giant is the one at Cerne Abbas, in Dorset, a very old hillside carving now in the care of the National Trust. It is well seen from the Sherborne road. It dates back to Neolithic times and was made about the same time as Maiden Castle in the same county. The carving shows the skill those early men had in producing such a figure on the round surface of the hill, especially when we know that it measures 186 ft. from head to toe, and exactly the same from finger tips to the butt of the club.

The "lines" are trenches a foot wide and deep, and the Giant is kept clearly defined by the action of rain down the hillside. Above his head are traces of the pit dwellings of the neolithic age. Besides being an old pagan god, he guarded these primitive homes. How fearsome he would appear to invaders coming on him from the West, a huge club brandished above his head!

Amongst the ancient stones of Cornwall is a cromlech at Madron, near the deserted Ding Dong Mine, known as the Giant's

A Giant's Footprint in rock at Blaise Castle, Bristol.

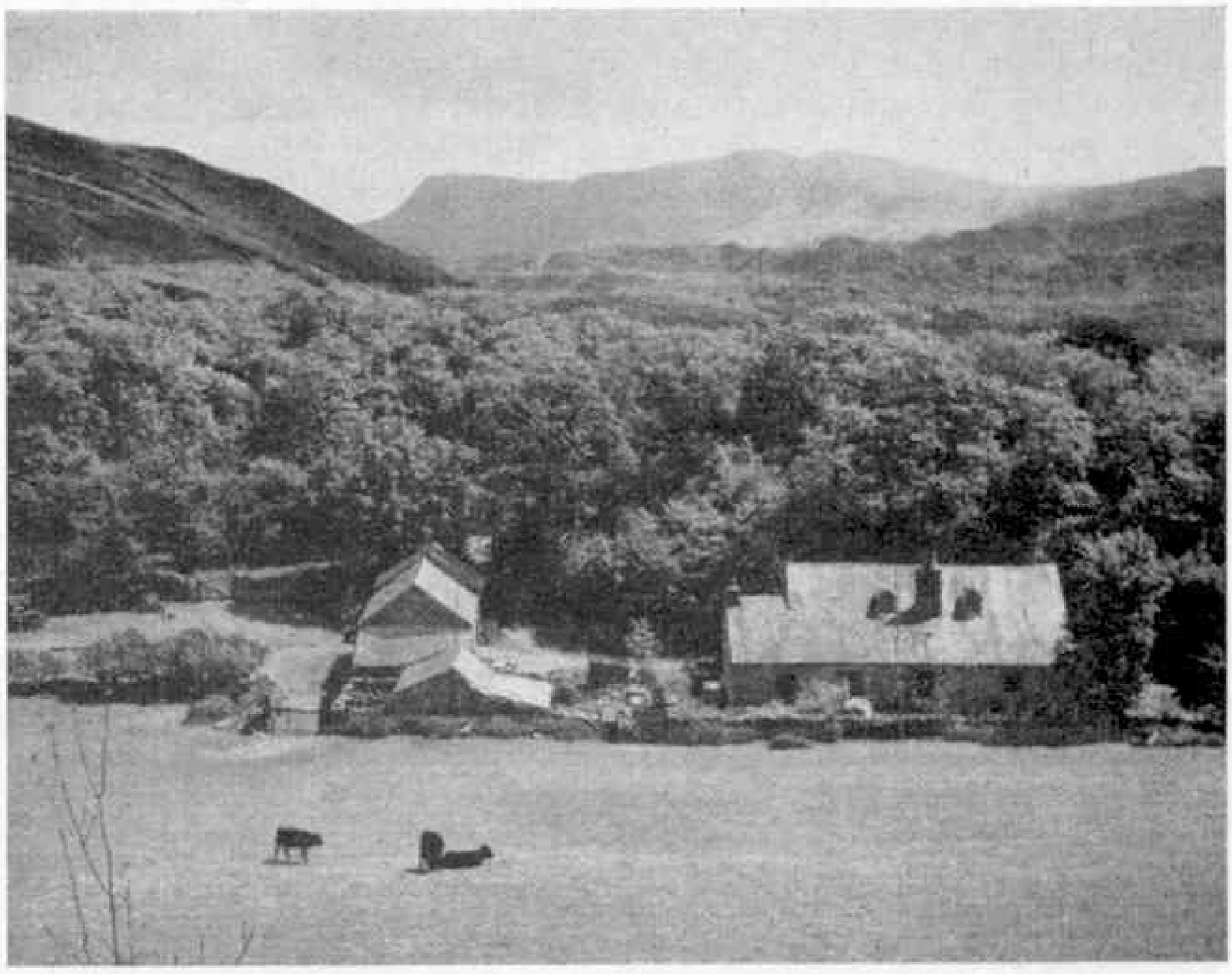
Quoit. This too is National Trust property. Legend probably accounted the upper stone to be thrown on the others in some playful giant's prank.

Bristolians will tell you of their own two giants, who formed some of the natural beauties of the district. Goram and Vincent were their names and they were twin brothers. When they looked down on the lake where Bristol now stands, a lake on whose banks the ichthyosaurus and plesiosaurus basked, the pair talked over a scheme for making themselves immortal as benefactors. They decided to cut a channel to the sea, thus making the Avon Gorge. They had, however, only one pickaxe, and threw it to each other six times a day with a warning shout. One day, after dinner, Goram took forty winks in his chair, failed to hear Vincent's voice across the divide, and was killed when the axe struck his skull.

Vincent finished the Gorge alone, burying his brother at the mouth of the river and erecting over his grave the tumulus that we know today as Denny Island. The vantage point that gives the best view of the famous Gorge is now named St. Vincent's Rocks, and in Blaise Castle Woods, you will find Goram's Chair, a high limestone cliff above the glen. But to give proof of this story, on one of the paths up the hill to Blaise Castle is the Giant's footprint in rock, measuring some fifteen feet across!

A smaller giant, yet still a giant among men, is envisaged at Penrith, Cumberland. The Giant's Grave, 12 feet long, is supposed to hold the remains of Ewen Caesaurus, King of Cumberland, an ancient Briton of great stature. This hero of early times was responsible for the killing of wild boar in the local forest many centuries ago.

The well known Welsh mountain Cader Idris, a name that means "The Chair of Idris," also should be mentioned. An old legend records that Idris was a giant and anyone spending a night in his chair awoke next day either a madman or a poet. However that may be, the mountain is frequently and easily climbed and is now safe from despoliation by having been declared a reserve by The Nature Conservancy. Cader Idris, illustrated above, is 2,927 feet high.



Cader Idris, in legend once the chair of a giant named Idris.

Other traces of the Giants may be mentioned briefly. There are the Giant's Head Mountains, at Barmouth, N. Wales; the Giant's Castle, in the Scilly Isles; the Giant's Hedge, a seven mile long earthwork 7 feet high, 20 feet wide, from Lerrin to Looe in Cornwall; and the Giant's Walking Stick, a stone at Llanfairfechan, in North Wales.

"NARROW GAUGE ALBUM"

By P. B. Whitehouse, F.R.S.A., A.R.P.S.

(Ian Allan)

Narrow gauge railways have almost vanished from these islands, but interest in them is increasing among railway enthusiasts. The appearance of this book is evidence of this. It contains short articles dealing with many of the narrow gauge railways of Great Britain and Ireland, both those now long vanished and the few that are still in operation.

The articles are lively and interesting, but undoubtedly the best feature of the book is the large number of finely reproduced photographs and line drawings, which together with two coloured illustrations, maps and tabulated historical information make it essential for the narrow gauge devotee.

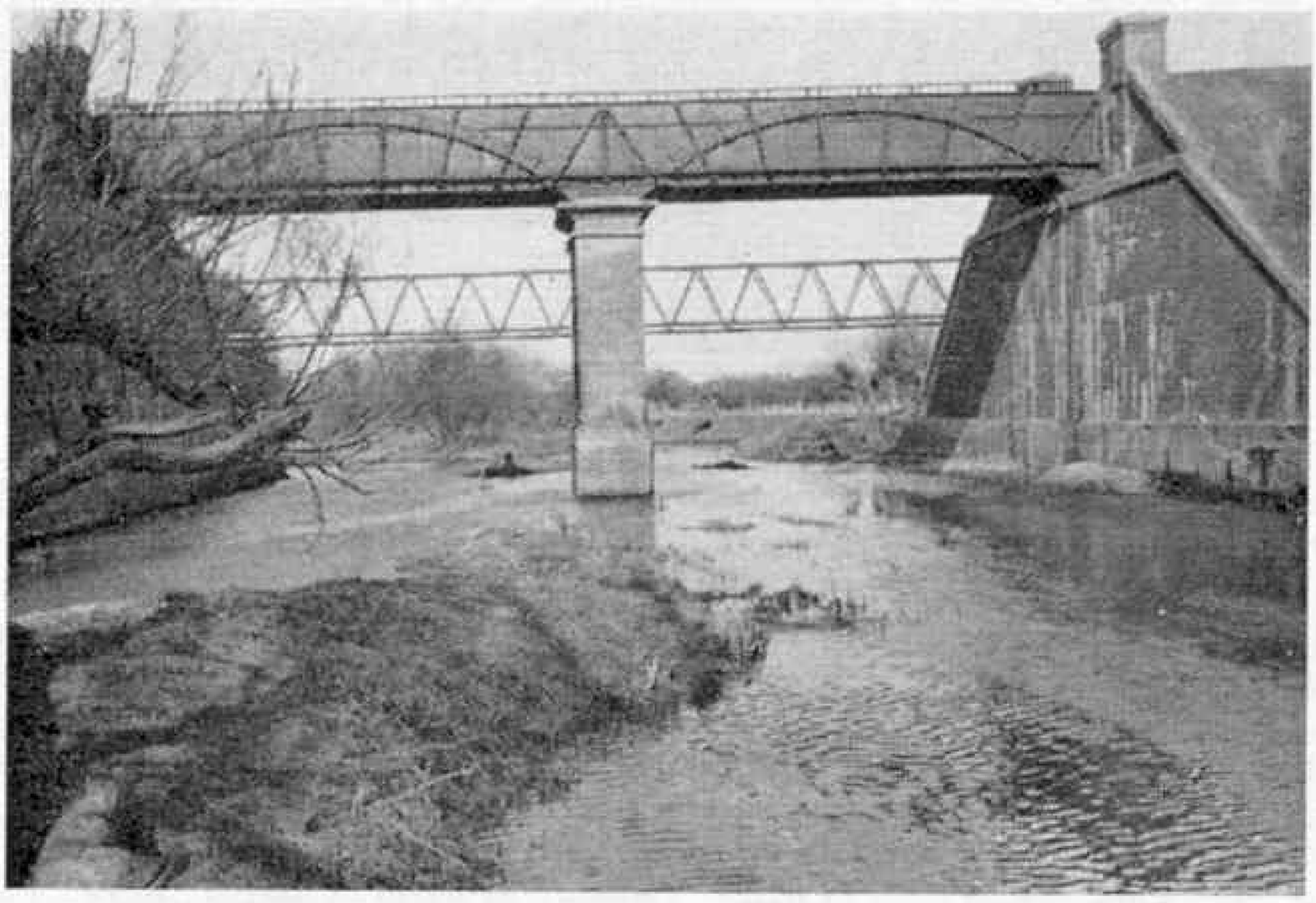
Narrow Gauge Album is obtainable from leading booksellers, price 25/- nett. It can also be obtained from the publishers, Ian Allan Ltd., Craven House, Hampton Court, Surrey.

Castles in the Air

By C. P. and C. R. Weaver

IT was in 1759 that Francis, the third Duke of Bridgewater, applied for and obtained an Act of Parliament granting powers for the construction of a canal to carry coal from his collieries at Worsley to Manchester. Not only did this Act usher in the Canal Era, but it unwittingly enabled James Brindley—whom the Duke employed as surveyor and engineer—to become the first engineer in this country to construct an aqueduct carrying a navigable waterway over a river.

When Brindley planned the original Barton aqueduct, by which he proposed to carry the Bridgewater Canal over the River Irwell, critics spoke of it as a "Castle in the Air." Nevertheless, Brindley persevered and in 1761 a stone aqueduct of three arches, with a central span of 63 ft., was completed and barges could be seen sailing 39 ft. above the waters of the Irwell. People were dumbfounded and came from far and wide to gaze on what was then considered to be one of the wonders of the age.



The aqueduct carrying the Grand Union Canal across the River Ouse at Wolverton.

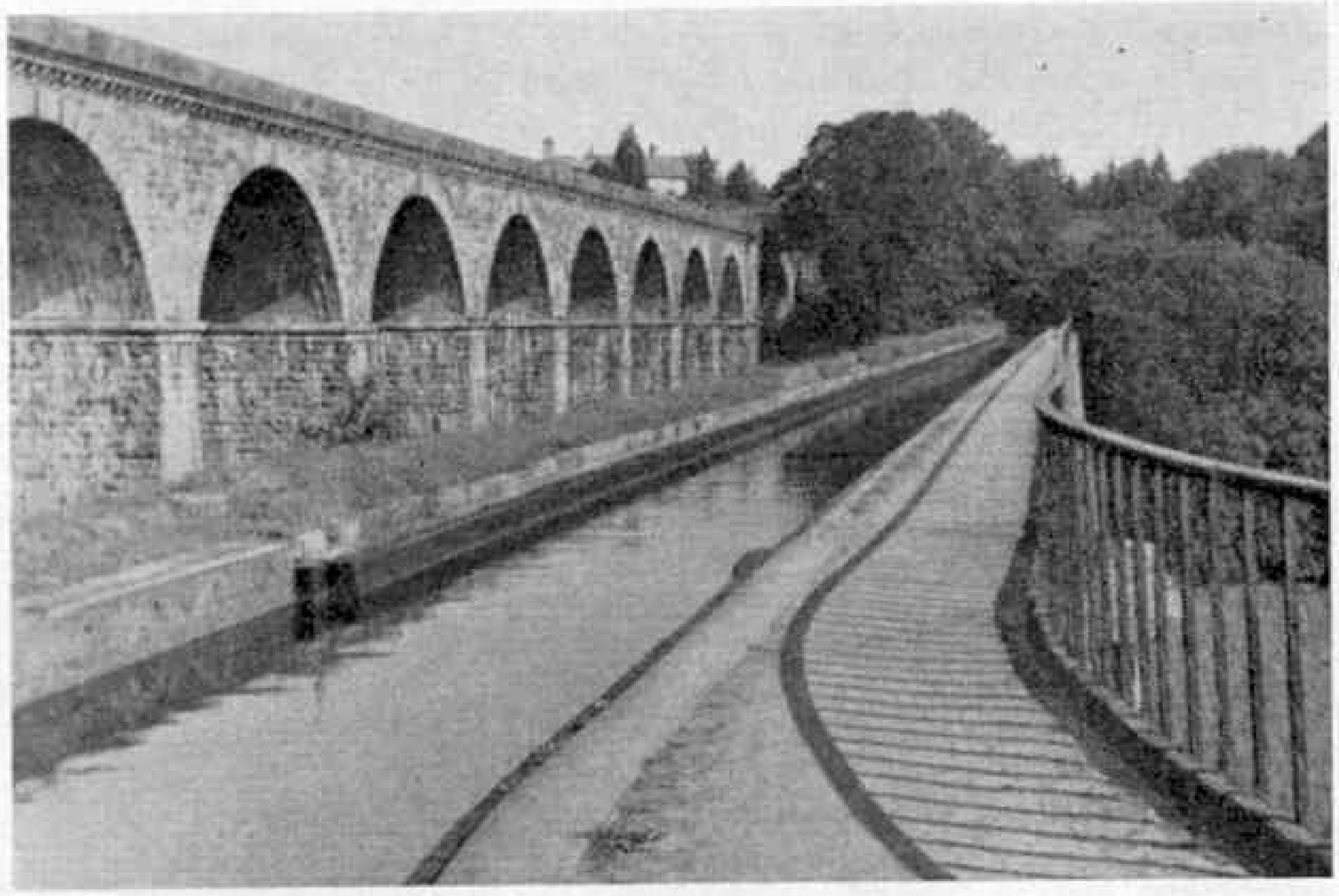
Brindley was not the originator of the aqueduct, however. Many centuries earlier the Romans had mastered the mechanics of the masonry arch and had applied this knowledge to building road bridges and aqueducts. Few examples of their road bridges remain, but one or two aqueducts still stand as silent witnesses to the soundness of design and material. The most notable is the Pont du Garde at Nimes in France. This was erected about 19 B.C. to carry water drawn from the rivers Eure and Airon at Uzes, across a valley to Nimes. The 180 ft. high stone structure consisted of three tiers of arches surmounted by a water channel 4 ft. wide. A length of 900 ft. of this remarkable structure still remains in surprisingly good condition.

The open channel to Nimes was the forerunner of our modern piped system, whereby water is brought long distances from reservoirs in remote gathering grounds, delivering it to distributing points near our large cities. In this article, however, we are not concerned with these forms of aqueduct, but rather with those that Brindley pioneered and which became an accepted engineering feature of our canal system.

The Barton "Castle in the Air" survived until 1894, when it was demolished to make way for the Manchester Ship Canal, and replaced by a steel swing aqueduct designed by Sir E. Leader Williams. This ingenious structure is 234 ft. in length, and weighs 1,600 tons when full of water. It is always swung full of water, gates being provided at each end and at the shore ends of the canal to prevent leakage. In design it is very similar to the adjacent swing bridge, both being controlled from one tower on a "traffic island" in the ship canal.

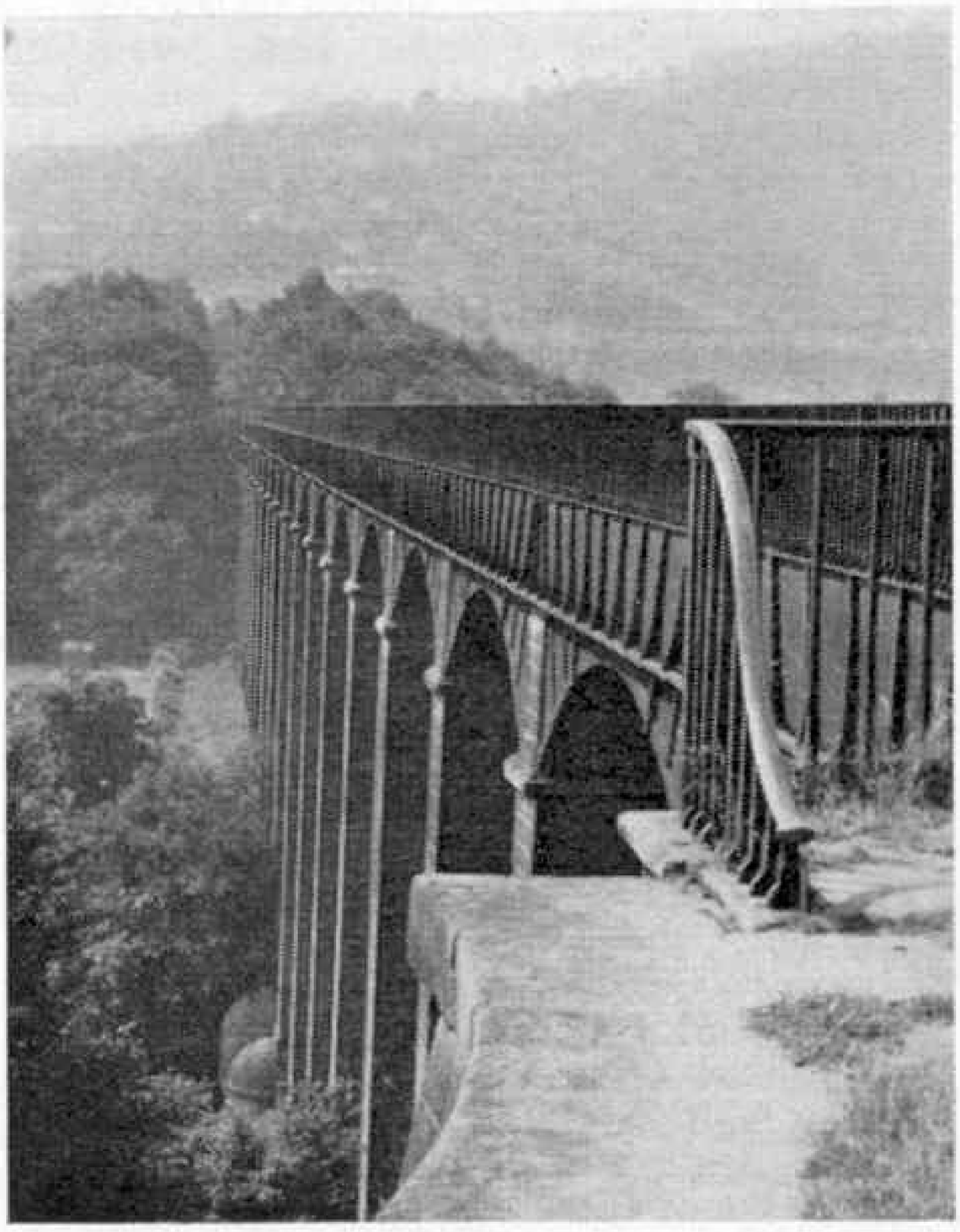
Brindley's later aqueducts followed the same general pattern as his prototype at Barton. Some of the best examples, all still in excellent condition, were erected in the Great Haywood district of Staffordshire, where the Stafford and Worcester and

Trent and Mersey Canals cross the River Trent. His pioneer work came to an end with his untimely death in 1772, but canal construction forged ahead under Robert Whitworth and John Smeaton, the former completing many of Brindley's unfinished projects. In Scotland, Smeaton built the Forth and Clyde Canal, opened in 1790, which has a fine aqueduct at Maryhill. The Union Canal, which ran from Leith to a junction on the Forth and Clyde, has three small aqueducts.



Chirk aqueduct on the Shropshire Union Canal looking northward to the entrance to Chirk Tunnel. This was built by Telford, and is one of two that are claimed to be Britain's finest aqueducts.

The "Canal Mania" is generally accepted as having begun with the passing of the Cromford Canal Act in 1789. Both this and the Peak Forest Canal, engineered by Outram and opened in 1796, feature superb aqueducts. The former crosses the River Derwent at Cromford on a fine masonry structure, which has shown signs of subsidence over past years but is still watertight, while the Peak Forest Canal crosses the River Goyt at high level on a fine three-arched stone structure at Marple. This aqueduct has curious pierced spandrels and was financed by Samuel Oldknow, the "Cotton King."



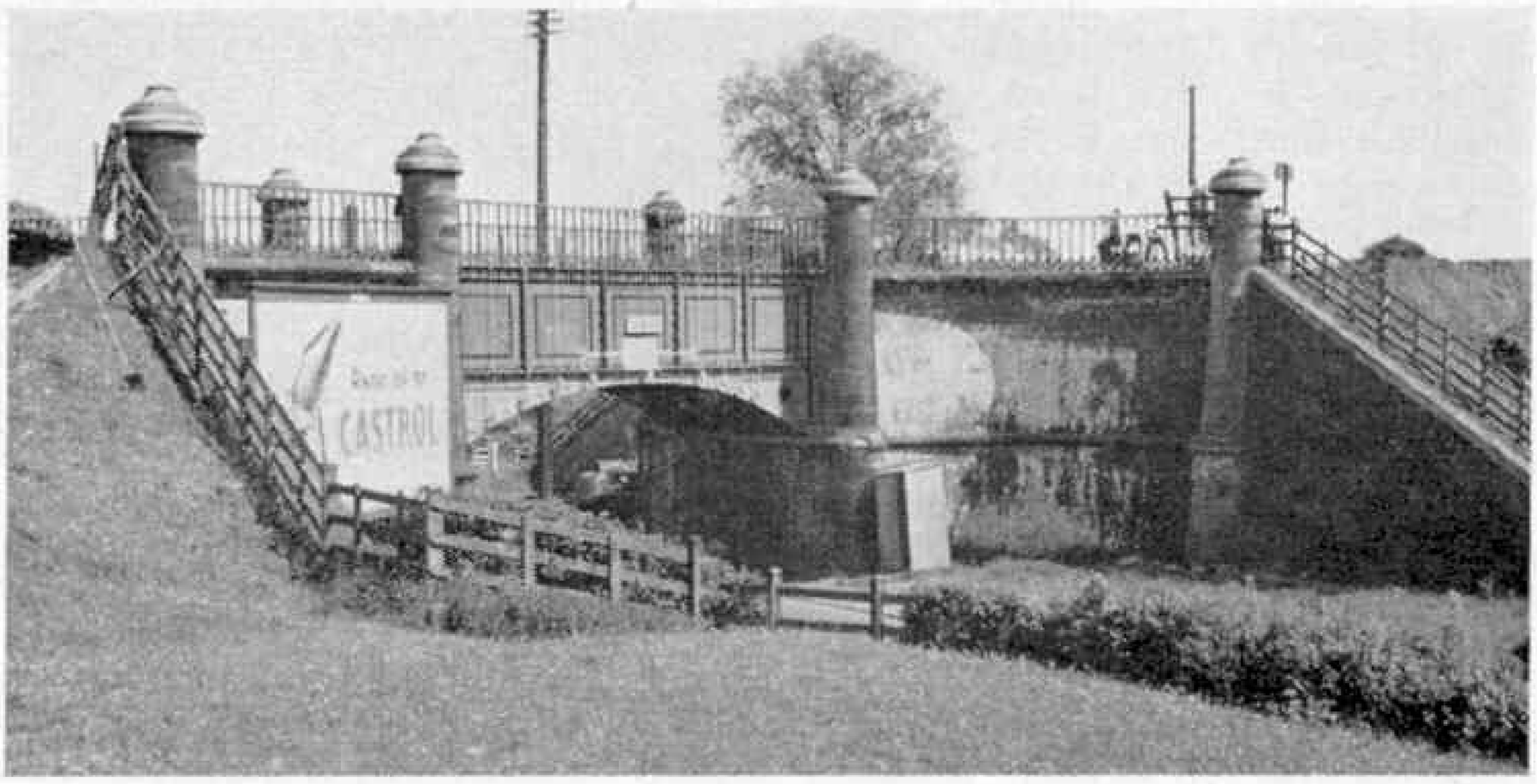
The second of the two famous aqueducts on the Shropshire Union Canal built by Telford. It is the Pont-y-Cyssyllte crossing of the River Dee, in the vale of Llangollen.

Thomas Telford, the famous civil engineer, directed much of his genius towards the advancement of waterway design. He found the Brindley type of aqueduct ponderous and totally unsuited for his ideas of canal construction, which aimed at directness of approach, lofty embankments, equally lofty aqueducts and a minimum number of time wasting locks. Consequently, when as engineer to the Shrewsbury Canal he decided to use a light cast iron trough supported on iron pillars for the River Tern crossing at Longdon, he ushered in a new phase of engineering achievement. The Tern aqueduct was built in 1793 and still stands, although in a much neglected condition. It is completely isolated, for the Shrewsbury Canal was abandoned in 1944 and since then parts of it have been filled in.

Telford's finest aqueducts, and indeed Britain's finest, are at Chirk and Pont-y-Cyssyllte on the Ellesmere Canal near Llangollen. The smaller, at Chirk on the Ceiriog Valley crossing, is 720 ft. long and 72 ft. high. It consists of an iron trough set in a masonry viaduct of 10 arches. The upper part of the supporting pillars and the spandrels are hollow. This method of construction ensured a low centre of gravity, thus partially offsetting stresses induced by wind

pressure, and also enabled a close watch to be kept on the quality of workmanship. It is still in excellent condition.

Pont-y-Cyssyllte, an airy structure over the Dee Valley, is one of the seven wonders of the waterways and is of much more advanced design. The cast iron trough 1,007 ft. long is supported by iron spandrels seated direct on 18 stone pillars, the tallest of which carries the canal 126 ft. above river levels. As at Chirk the pillars are solid to 70 ft. above ground level and thence upward are hollow, with interior cross walls, for the same reasons as at Chirk. The aqueduct proper is approached by an equally lofty embankment 1,500 ft. long. Such was the excellence of design, workmanship and material that little or no maintenance has been necessary despite its age. It was opened in 1805 after taking 10 years to build.



Also on the Shropshire Union Canal, at Stretton, is this aqueduct by Telford, which carries the waterway over Watling Street.

A smaller aqueduct of simple construction, but combining features of Pont-y-Cyssyllte and Longdon, was erected on the Stratford-on-Avon Canal at Bearley, Warwickshire, in 1813. It is 630 ft. long and 63 ft. high, the piers being built of bricks.

John Rennie, another great engineer of the closing years of the eighteenth century, also played his part in canal development and construction. His more important works included the Grand Western, Kennet and Avon, Lancaster and Crinan Canals. There are four major aqueducts on the Kennet and Avon Canal, the two best known being the great stone structures at Dundas and Avoncliffe. By these the waterway crosses and recrosses the River Avon in the Limpley Stoke Valley, thus preserving an unbroken nine mile level between Bath and Bradford on Avon. These were finished in 1798. They are of similar three-arched design, with two small elliptical arches on either side of a large central span. Construction was of finely dressed Bath stone, with all the architectural embellishments of that period.

Rennie's greatest constructional work was perhaps the aqueduct carrying the Lancaster Canal over the River Lune at Lancaster. The design of this structure is attributed to one Alexander Stevens, and a memorial to this effect may be seen on the south wall of Lancaster Church. The structure is 600 ft. long and yet has only five arches, each very similar to the central arches of the Dundas and Avoncliffe aqueducts. Local sandstone was used and the present excellent state of preservation once again bears testimony to excellence of workmanship and material.

The Grand Union Canal, running from London to Birmingham, can boast at least two famous aqueducts. The first is in the form of a combined road, rail and canal crossing named Windmill Bridge at Hanwell, Middlesex. It was built by Brunel to carry the erstwhile Grand Junction Canal over the Great Western Railway branch line from Southall to Brentford and the Greenford to Osterley road over the canal. The oblique nature of the several crossings represent the arms of a windmill and hence its name.

The second of these two aqueducts is to be found midway along the high embankment by which the canal crosses the Ouse Valley between Cosgrove and Wolverton. When the Grand Junction Canal was opened in 1805, the Ouse Valley crossing consisted of a flight of locks on each side of the escarpment and a canal at river level. Remains of these can still be seen west of the present embankment.

This embankment built by local

(Continued on page 418)

From Our Readers

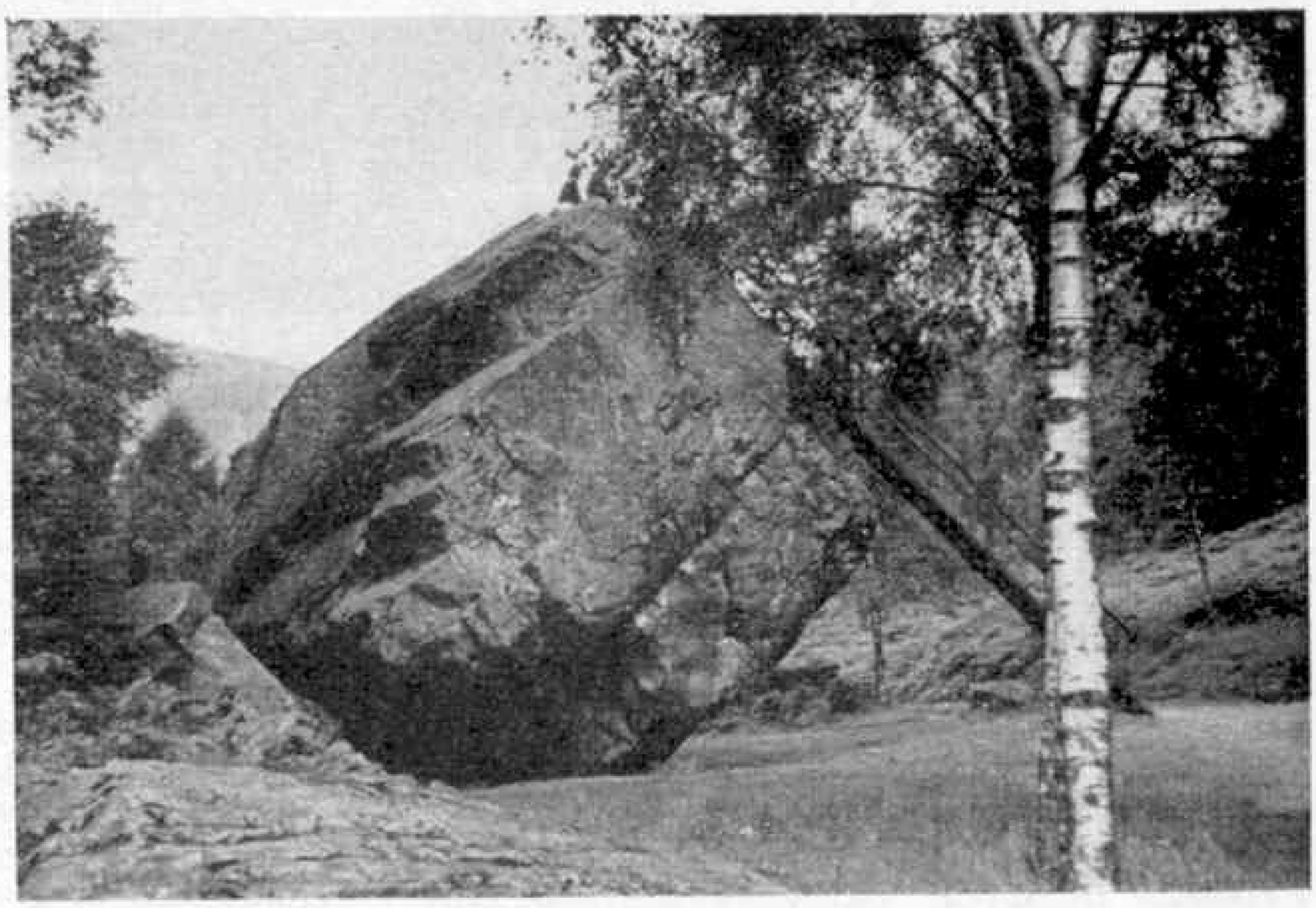
This page is reserved for articles from our readers. Contributions not exceeding 500 words in length are invited on any subject of which the writer has special knowledge or experience. These should be written neatly on one side of the paper only, and should be accompanied if possible by original photographs for use as illustrations. Articles published will be paid for. Statements in articles submitted are accepted as being sent in good faith, but the Editor takes no responsibility for their accuracy.

THE BOWDER STONE

It is commonly supposed that the enormous piece of rock seen in the upper picture on this page rolled down the mountainside, and remained balanced on a very fine edge, thus defying natural laws. But this is not so. It is the Bowder Stone, a well-known feature of Borrowdale, in the Lake District, and was transported to its present position by the glaciers of the Great Ice Age. The reason for believing this is that the type of rock of which it is composed is not found nearer than Scandinavia.

There is of course a legend attached to the Stone. This says that its name is really The Balder Stone, after the Scandinavian Sun God, who was presumed to have been killed by a mistletoe arrow fired at him by one of the other Gods of his time.

K. BIRKETT (Cheadle Hulme).



The Bowder Stone, in Borrowdale, Cumberland. Photograph by K. Birkett, Cheadle Hulme.

AFRICAN REED CANOE

Lake Chad is partly in Northern Nigeria, but mostly in French West Africa. While working in the Province of Bornu I had occasion to go to a town near to Chad, and took the opportunity of visiting this great inland basin. Its average area, over the years, is about 5,000 square miles, but low rainfalls and the fantastic evaporation rate cause great fluctuations.

A reed canoe on Lake Chad. Photograph by J. Wade, Oswestry

The area of the Lake has been known to vary between 8,000 and 4,600 square miles, and its depth between 3 and 13 feet. It is generally supposed that it lost a third of its area during last century, either because of climatic changes that reduced the inflow of water, or as the result of the drifting of sand from the Sahara Desert. Few streams reach the Lake, and of these only one, the Shari, from the south east, is of any size. Its waters vary from fresh to brackish.

In appearance the Lake is disappointing, being fringed with reeds, tall grasses, etc., that extend far out into the Lake. This broad fringe offers shelter to numerous animals, amongst which are hippopotamus and elephant.

In general the area is very sandy. The people who live near the Lake are expert fishermen, and also undertake journeys to the French lakeside towns and villages, carrying goods. Owing to the scarcity of other materials from which boats may be built, the people have developed a method of making boats or canoes out of the reeds that grow in such abundance on the shores of the Lake. These canoes are propelled by punting poles.

The lower illustration on this page shows a reed canoe near the edge of the Lake. The way in which the reeds are packed and tied, and the method of holding the head, are clearly shown. Naturally such canoes cannot last very long, but then the supply of reeds is inexhaustible!

The Lake Chad reed boat is an excellent example of the triumph of man over his environment. It may be primitive and insubstantial, but it makes possible a livelihood for hundreds of people in very difficult conditions.

J. WADE (Oswestry).

The "Director," the first of seven new Admiralty diesel-electric paddle tugs to go into service. Photograph by courtesy of Yarrow and Company Limited, Scotstoun.

Shipping Notes

THE British Admiralty naturally requires many tugs for handling warships in naval harbours and in the royal dockyards. In the past these have been chiefly steam tugs, but in more recent years diesel-electric vessels have been introduced, and one of the most modern of these is seen in the illustration at the head of this page.

It will perhaps come as a surprise to many readers to notice that this is a paddle tug. Most commercial ship owning firms make use of tugs driven by screw propellers. The Admiralty too use vessels of this kind, but for certain duties paddle tugs still remain the most effective. They are specially suitable for manœuvring large warships, such as aircraft carriers, in and out of basins and docks.

Seven diesel-electric tugs of the same design have recently been ordered by the Admiralty from Clyde shipyards, for use in Her Majesty's Dockyards. Of these four were ordered from Yarrow and Co. Ltd., Scotstoun, and the vessel seen in the picture is the first of these to be completed. It has been named *Director*. The remaining vessels from this shipyard have been given the names *Dexterous*, *Faithful* and *Forceful*. Two others, from the yard of William Simons and Co. Ltd., are the *Grinder* and the *Griper*, and from Ferguson Bros. (Port Glasgow) Ltd. will come the *Favourite*.

A glance at the illustration shows that the vessels are of the flush deck type. The twin funnels, set side by side, and the superstructure are somewhat squat, the reason for this being that the tugs may be called upon to operate under the overhanging sides of aircraft carriers. For the same reason their masts are so mounted that they can be lowered when necessary. Although the vessels have been built chiefly for harbour service they are also capable of proceeding to sea if required, and they are fitted with life-saving equipment.

The tugs are 157 ft. in total length, and have a breadth of 60 ft. They have a loaded displacement of 710 tons, and with a loaded draft of 10 ft. their speed is 13 knots. Power comes from four diesel generators, connected in series with two independent propulsion motors. Each of the latter drives one paddle in harbour service, where the tug is called upon to make sharp turns. If the vessel is required to go to sea the two paddle shafts can quickly be connected by means of a clutch.

Each motor develops up to 800 h.p. at 212 r.p.m. The drive to the paddle shaft is made by means of chains, with a reduction gear ratio of 8:1. A flexible coupling is fitted between each motor and its pinion shaft, and a semi-flexible coupling is provided in each paddle shaft. The paddle wheels are of the feathering type and are 17 ft. in diameter. Each has nine floats 12 ft. 6 in. wide, made of Canadian rock elm.

Another vessel with an unusual feature is seen in the upper picture on the opposite page. This is the *Hudson Point*, which is distinguished by its raised quarterdeck, in which is the accommodation for the crew, with the machinery space below. The bridge, with the wheelhouse and the accommodation for the captain and officers,

is well forward, but the general appearance of the vessel is suggestive rather of a tanker than of a cargo vessel.

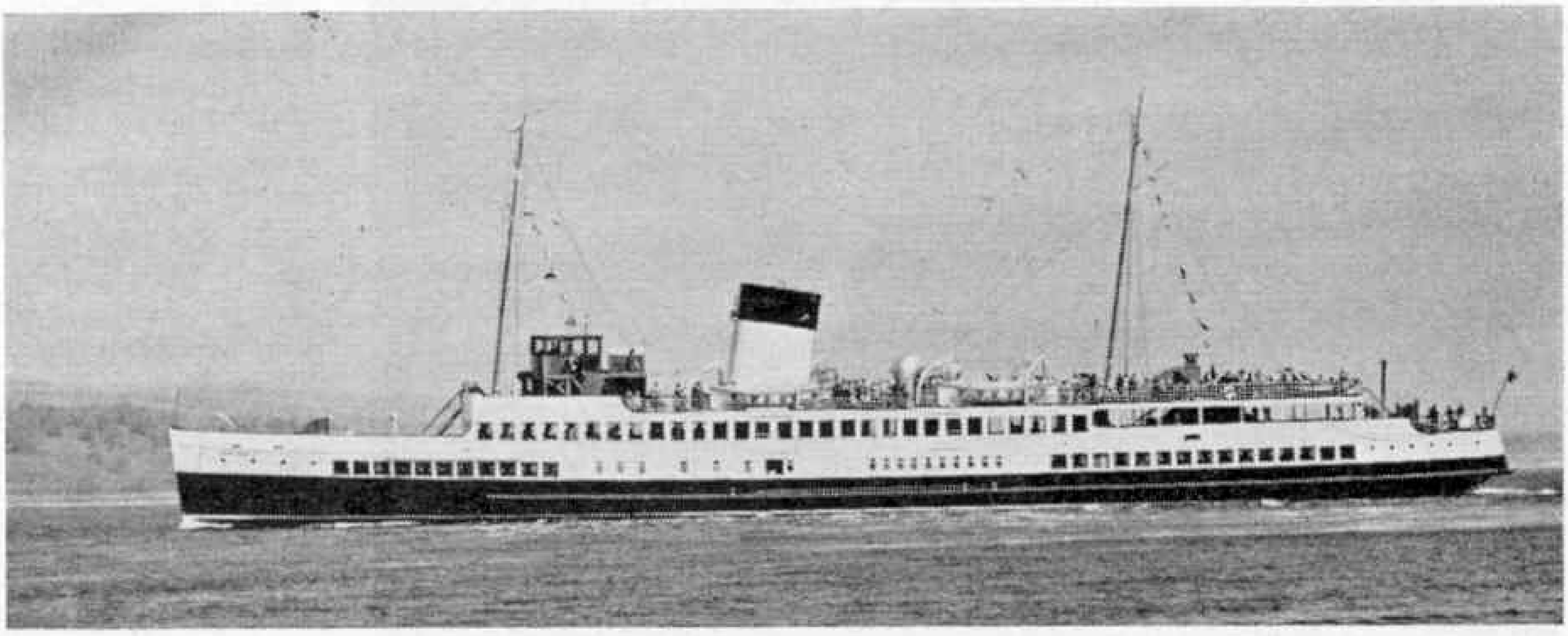
Ships of this type have been built previously by John Readhead and Sons Ltd., South Shields, who built the *Hudson Point* for the Hudson Steamship Company Ltd. In the new vessel the deadweight capacity of this design has been taken a stage further by the increase to 10,560 tons. The ship is designed particularly for carrying bulk cargos, and for a large part of the year is engaged in carrying sugar from the West Indies to Great Britain. There are five holds, two forward of the bridge and the other three between the bridge and the quarterdeck, so that all are forward of the machinery. They are equipped with MacGregor patent sliding steel hatches.

The *Hudson Point* has a four-cylinder Doxford oil engine, which has an output in service of 4,400 b.h.p. at about 112 r.p.m. The speed in normal service is 13 knots, but during progressive loaded trials a speed of 14.29 knots was achieved, and on trials in ballast an average speed of 14.63 knots was recorded. The ship is equipped with modern navigational aids and equipment, and an unusual feature in a ship of this size is the complete air conditioning of the accommodation for officers and crew.

Readers who are interested in the Clyde fleet of British Railways will perhaps know that the turbine steamer *Queen Mary II* of the Caledonian Steam Packet Co. Ltd. has been converted to oil burning. Another change that is involved in this conversion is that she now has one funnel instead of two, as can be seen from the picture of the vessel in her present condition at the foot of this page.

Looking aft from the bridge of the "Hudson Point." Photograph by courtesy of John Readhead and Sons Ltd., South Shields.

This work was carried out by Barclay Curle and Co. Ltd., Glasgow. It involved replacing the existing double-ended Scotch boiler by a single Yarrow type water tube boiler that produces 55,000 lb. of steam an hour. It is only half the weight and half the size of the boiler it has displaced, and the space saved has allowed the fitting of oil fuel storage tanks capable of holding a sufficient quantity of oil for six days' service.



The Clyde steamer "Queen Mary II" after conversion to oil burning. B.R. Scottish Region photograph.

HAVE YOU JOINED YET?

THE DINKY TOYS CLUB

Founder and President : ROLAND G. HORNBY

THE splendid Dinky Toys layout seen in the picture at the foot of this page is a fine example of the fascinating reality that it is possible to obtain by anyone who possesses a fair assortment of Dinky Toys and who is prepared to take a little trouble in making up a few simple buildings. The excellent display shown in our picture is the property of A. M. Ross, Wembley Park, seen in the upper picture, who is a very keen young Dinky Toys enthusiast. Ross tells me that he made the layout some time ago and although it is quite small he finds that careful planning of the roads and good siting of the buildings, gives him plenty of scope for manœuvring his Dinky Toys about the layout. He and his friends have lots of good times playing with the layout, and I have no doubt that in view of his enthusiasm his collection of Dinky Toys will soon be so big that he will have to extend the boundaries of his little town in order to make use of them all! An interesting point to note in the picture is that the fences, which look so realistic, are actually strips of corrugated paper! The various buildings are made from cardboard.

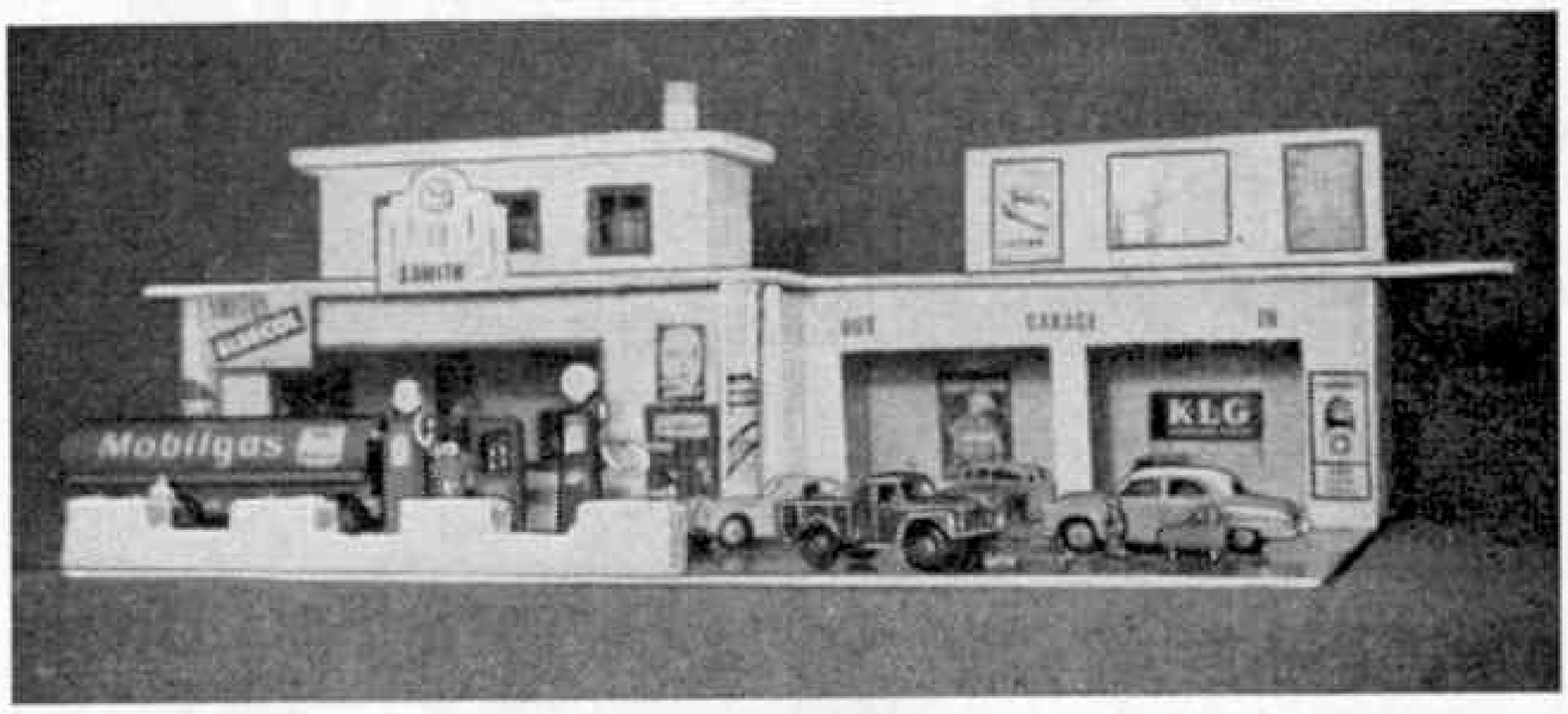
A. M. Ross, Wembley Park, Middlesex, who owns the fine Dinky Toys layout shown in the picture below.

I am sure that there must be hundreds of other Dinky Toys Club members who have made up attractive layouts and I do hope that they will try to get photographs of them taken. I shall be delighted to see any prints they care to send me and those that prove suitable may be reproduced in the *M.M.* So hurry up and see what you can do.

With each week that passes more and more boys and girls are to be seen wearing the attractive Badge that is the emblem of membership of The Dinky Toys Club. If you are not already entitled to wear this handsome badge why not join the Club now? Write to Secretary, Dinky Toys Club, Binns Road, Liverpool 13, enclosing a P.O. for 1/- to cover cost of Membership Badge and Certificate.

MECCANO MAGAZINE

Junior Section



A fine Dinky Toys garage, which helps to provide good fun for its owner, Paul Wilkinson, Heaton, Bradford 9.

AS I write this, I do not know what the weather will be like in August. It is fine enough now, and has been for a little time, and that attracted me to the picture at the foot of this page, for it suggests the best place for a Dinky Toys layout at this time of the year, and indeed for a Hornby or Hornby-Dublo railway.

One interesting thing about the layout of I. Charsley, Bexleyheath, the Dinky Toys enthusiast seen in the picture, is the excellent use he has made of the flagged path across the garden. It makes a perfectly splendid modern highway in miniature, with plenty of room for two or three lines of traffic each way. Other roads can easily be arranged with boards, or even with lengths of stout cardboard, and a garage fits splendidly into such a scheme. Moving the Dinky Toys vehicles along will provide exercise too, and if there is too much for the owner he can always arrange a sort of garden party and let his visitors do it!

Talking of garages, how do you like the one shown in the upper picture on this page? Paul Wilkinson, of Bradford, its owner, is lucky, for his interest in Dinky Toys led to his father making the garage for him. It is a fine building, well designed for its purpose, and as the centre piece of a Dinky Toys layout, such a structure just cannot be beaten.

By the way, where is Taumatawhakatangihangakoauauotamateapokaiwhenuakitanatahu? If you do not know, or cannot find out, don't worry. I will tell you next month.

A flagged path in the garden makes a fine broad highway for I. Charsley's Dinky Toys cars and lorries.

Easy Model-Building

"Spanner's" Special Section for Juniors

Aeroplane—Saloon Car

THE effective little model aeroplane shown in Figs. 1 and 2 was built by Mr. W. L. Gale, Stoke-on-Trent, for his son, who had so much fun with it that he thought other Meccano enthusiasts would find it equally attractive. So he sent details of the model to me. It resembles a Tiger Moth, and is chiefly notable for the very realistic effect obtained with only a few simple parts, all of which are contained in a No. 1 Outfit.

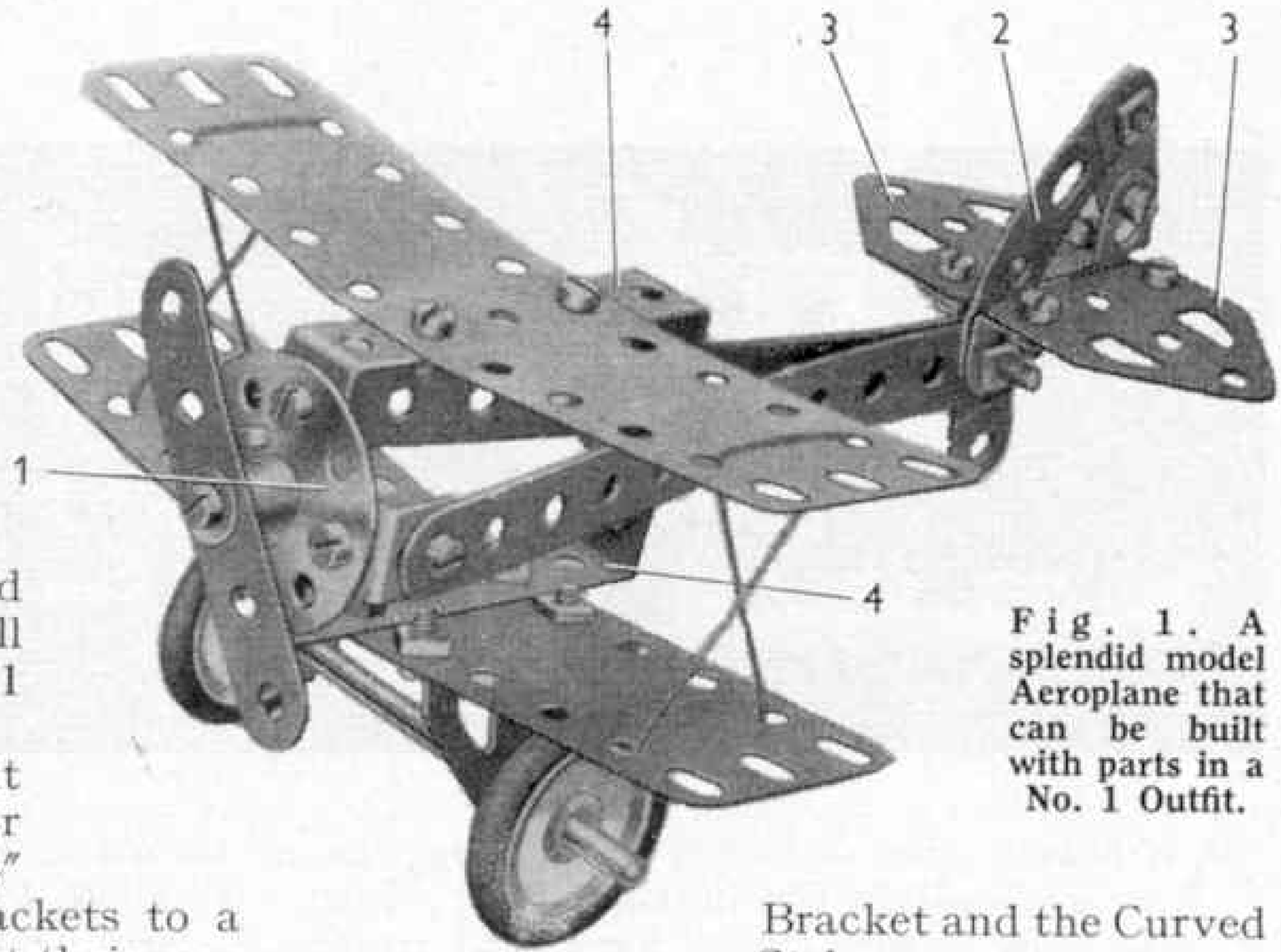


Fig. 1. A splendid model Aeroplane that can be built with parts in a No. 1 Outfit.

The fuselage and tail unit should be built first, and for these you will require two $5\frac{1}{2}''$ Strips connected by Angle Brackets to a Bush Wheel 1. Join the Strips at their rear ends by a $2\frac{1}{2}''$ Stepped Curved Strip 2 and two Angle Brackets, each of which supports a Flat Trunnion 3. Connect the rear ends of the Flat Trunnions by a Fishplate, and use one of the bolts holding this in position to fix an Angle Bracket in place. You can complete the tail unit by bolting a Fishplate between the Angle Bracket and the Curved Strip.

The next step is to bolt two $2\frac{1}{2}'' \times \frac{1}{2}''$ Double Angle Strips 4 to the Bush Wheel and connect their rear lugs by two Fishplates bolted together. The Double Angle Strips support the $5\frac{1}{2}'' \times 1\frac{1}{2}''$ Flexible Plates that form the wings of the model, and these should now be connected by Cord as shown. Now fix two Trunnions 5 to the lower Flexible Plate and pass through them a $3\frac{1}{2}''$ Rod to carry the landing wheels. The propeller is a $2\frac{1}{2}''$ Strip mounted freely between Washers on a $\frac{3}{8}''$ Bolt that is fixed in the boss of the Bush Wheel.

A list of the parts required to build this model is given at the end of this article.

The saloon car shown in Figs. 3 and 4 is a neat and effective model, but it has one peculiarity! No matter in what direction it is pushed, it returns to its starting point! This feature is achieved by a simple elastic motor connected to the front axle, and the effect can be very puzzling to your friends if they do not know the secret. If required a base plate can be fitted to conceal the mechanism.

Each side of the Car consists of a $5\frac{1}{2}'' \times 1\frac{1}{2}''$ Flexible Plate and a Semi-Circular Plate 1. First bolt these together and then fix two

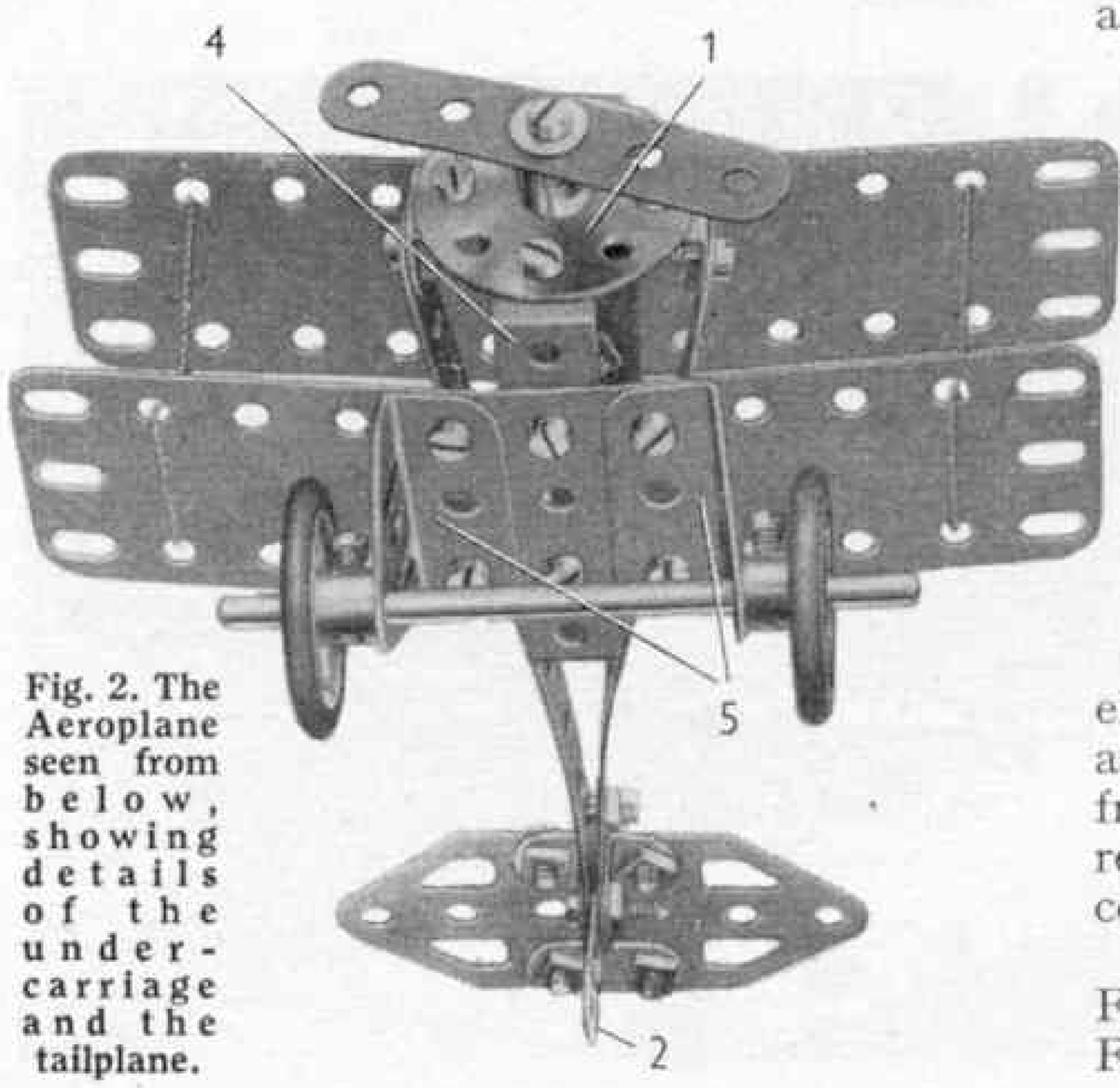


Fig. 2. The Aeroplane seen from below, showing details of the under-carriage and the tailplane.

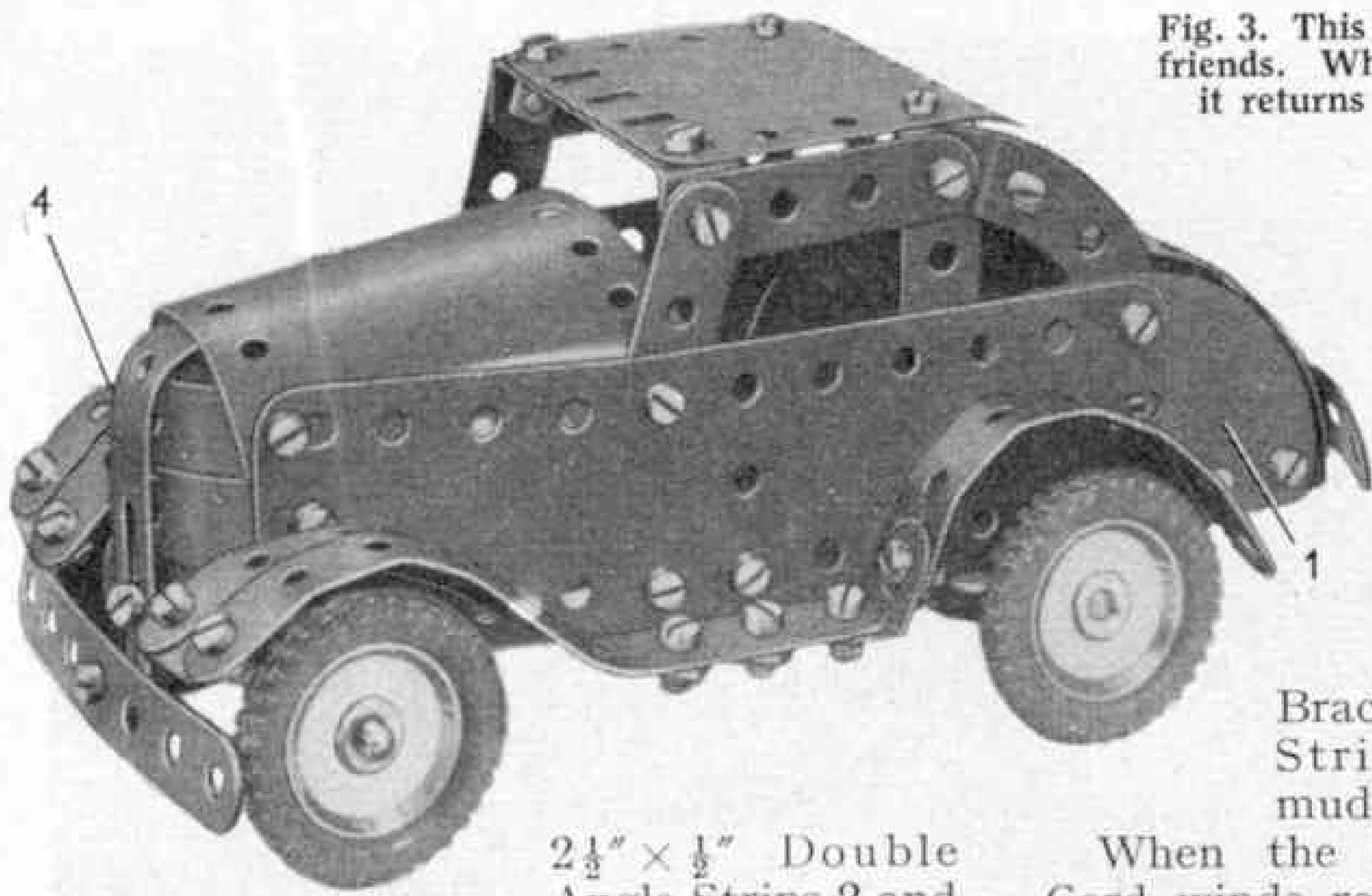


Fig. 3. This realistic Saloon Car will puzzle your friends. When it is pushed along the ground it returns automatically to its starting point.

$2\frac{1}{2}'' \times \frac{1}{2}''$ Double Angle Strips 2 and 3 between the Semi-Circular Plates. To make the radiator you require three Formed Slotted Strips curved as shown and bolted between the Flexible Plates. To make the top of the bonnet you should shape a $3\frac{1}{2}'' \times 2\frac{1}{2}''$ Flexible Plate as shown and fix it between the sides. Bolt a curved Formed Slotted Strip 4 between the Flexible Plate and the radiator.

The window frames are made from two $1\frac{1}{2}''$ Strips, a $2''$ Strip and a $2\frac{1}{2}''$ Stepped Curved Strip. For the roof of the car use a $2\frac{1}{2}'' \times 2\frac{1}{2}''$ Flexible Plate supported by a $2\frac{1}{2}'' \times \frac{1}{2}''$ Double Angle Strip 5 and two Angle Brackets, and fill in the tail by a $1\frac{11}{16}''$ radius Curved Plate bolted to the Double Angle Strips 2 and 3. Use $\frac{1}{2}''$ Bolts to attach the Plate to Double Angle Strip 3, and space a $3\frac{1}{2}''$ Strip representing the rear bumper from the Plate by a Spring Clip on each Bolt. Make the front bumper from another $3\frac{1}{2}''$ Strip and space this from the Formed Slotted Strip 4 by a Spring Clip on a $\frac{3}{8}''$ Bolt.

For the rear axle use a $3\frac{1}{2}''$ Rod and support it in $2\frac{1}{2}''$ Stepped Curved Strips bolted to the sides. The front axle is a $3\frac{1}{2}''$ Rod fitted with a Cord Anchoring Spring, and it is mounted in Fishplates and is held in place by Collars. Tie a length of Cord to the Cord Anchoring Spring and to a Driving Band. Pass the Band through a hole at the rear of the model, and prevent it from slipping back by a $\frac{3}{8}''$ Bolt 6 and two nuts.

You can make each of the front mudguards by curving a $4\frac{1}{2}''$ and a $2\frac{1}{2}''$ Strip as shown and then joining them together with a Fishplate. Attach the $4\frac{1}{2}''$ Strip to the side by two Angle Brackets, and use another Angle Bracket to support a curved $3\frac{1}{2}''$ Strip that forms the rear mudguard.

When the Car is pushed along, the Cord winds round the axle and stretches the Driving Band. As soon as the model is released the Band contracts and returns the Car to its starting point.

Parts required to build the Saloon Car: 2 of No. 2a; 4 of No. 3; 2 of No. 5; 2 of No. 6; 4 of No. 6a; 4 of No. 10; 8 of No. 12; 2 of No. 16; 4 of No. 22; 3 of No. 35; 43 of No. 37a; 38 of No. 37b; 4 of No. 38; 1 of No. 40; 3 of No. 48a; 2 of No. 59; 4 of No. 90a; 2 of No. 111a; 2 of No. 111c; 4 of No. 142c; 1 of No. 176; 1 of No. 186a; 2 of No. 189; 1 of No. 190; 1 of No. 190a; 1 of No. 200; 2 of No. 214; 4 of No. 215.

You will require the following parts to build the model Aeroplane: 2 of No. 2; 1 of No. 5; 4 of No. 10; 5 of No. 12; 1 of No. 16; 2 of No. 22; 1 of No. 24; 24 of No. 37a; 22 of No. 37b; 2 of No. 38; 1 of No. 40; 2 of No. 48a; 1 of No. 90a; 2 of No. 111c; 2 of No. 126; 2 of No. 126a; 2 of No. 155; 2 of No. 189.

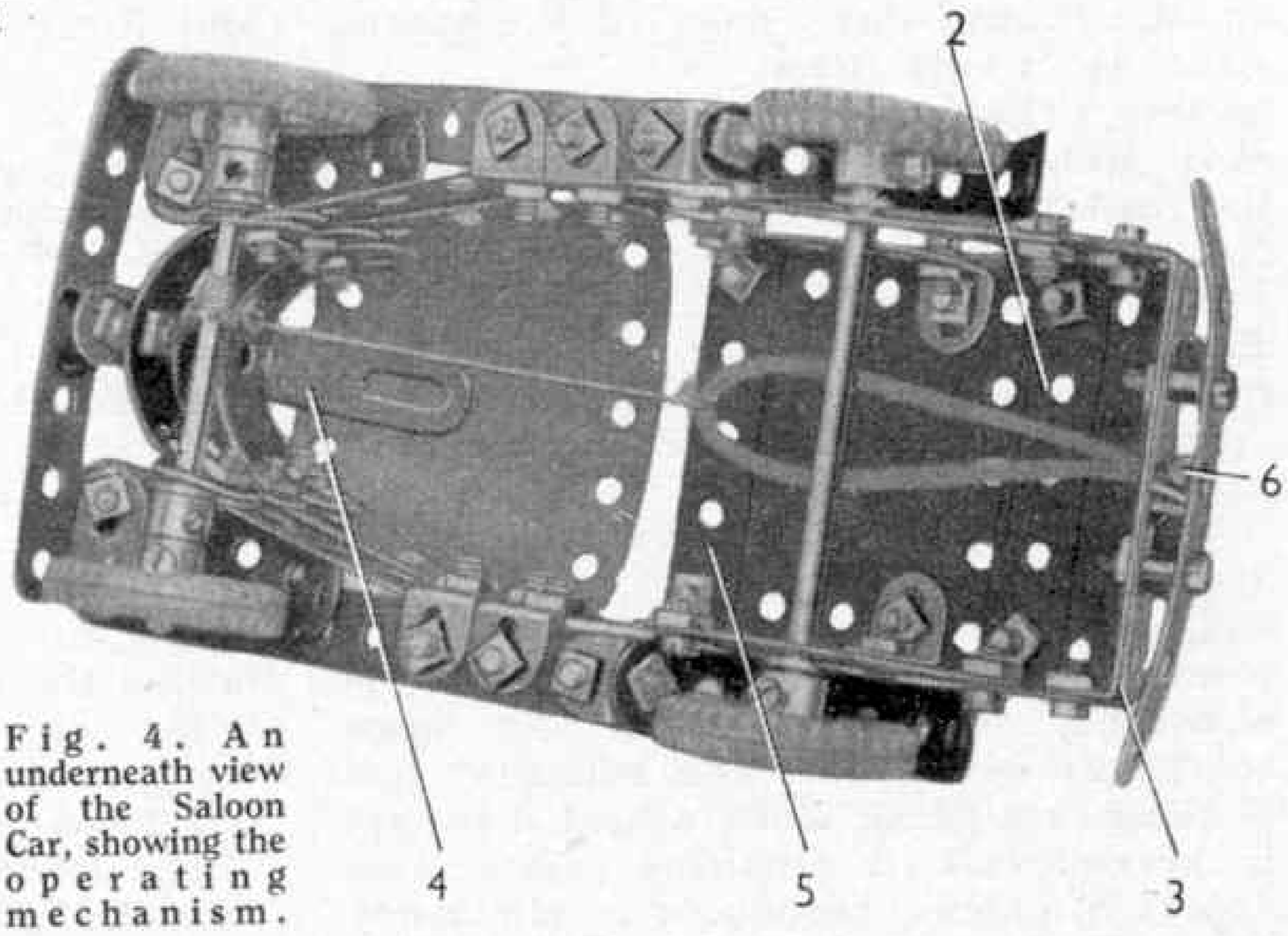
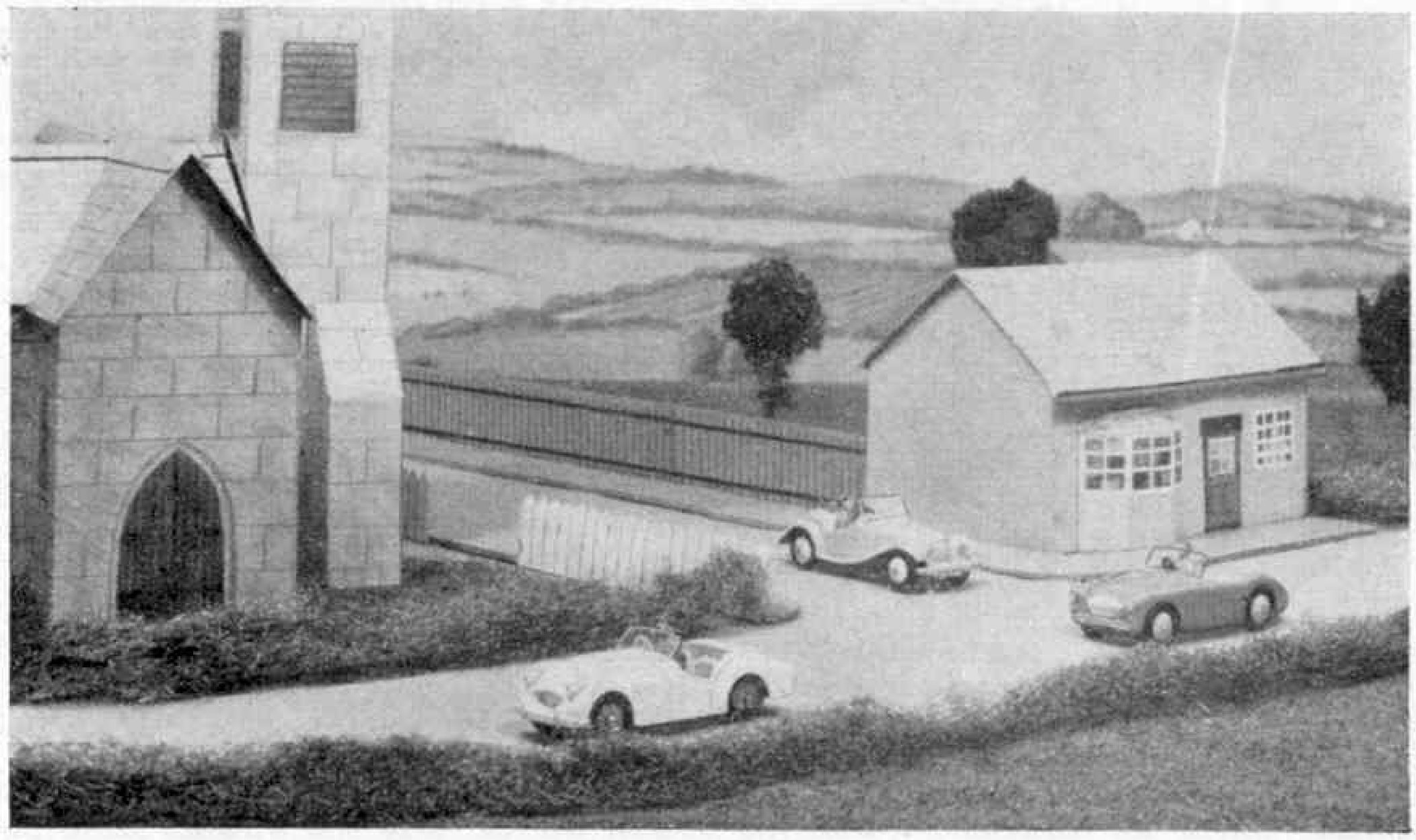


Fig. 4. An underneath view of the Saloon Car, showing the operating mechanism.



DINKY NEWS

Sports Cars in Touring Finish

By **THE TOYMAN**

I MENTIONED in my last chat with Dinky Toys enthusiasts that to meet the demand from collectors, popular sports cars in the range were being made available in touring finishes, and I was able to include pictures and brief details of the modified Aston Martin DB3S and the Sunbeam Alpine Sports. This month I am illustrating three more of the sports cars in their new finishes. These are the M.G. Midget, No. 102, the Austin Healey 100, No. 103, and the Triumph TR2, No. 105. They are shown in the realistic country scene above and in the "plain" pictures at the foot of the next page.

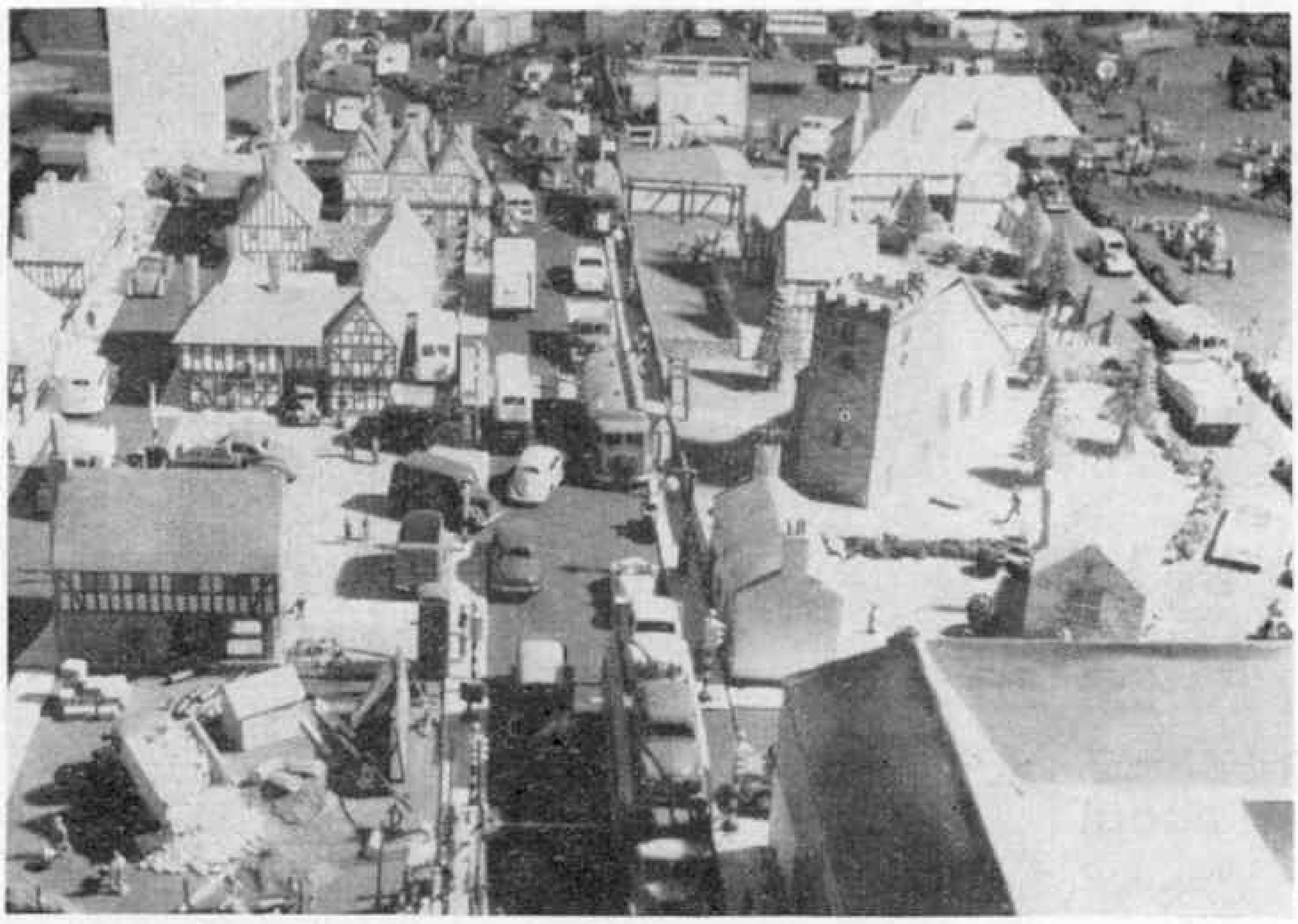
A realistic country setting for three of the Dinky Toys Sports Cars, all of which are seen in their new touring finish.

The modified sports cars look really attractive in their new colour schemes, and they can be put to good use in both town and country layouts. There is something fascinating about an open sports car in real life, and whenever one of these cars passes along a road it is sure to be followed by admiring looks. This appeal is no less pronounced in miniature, as you can see from the fine impression given by the latest models in my pictures.

Each model is available in two attractive colour schemes. The M.G. Midget Sports (touring finish) can be obtained in Yellow and Red or in Green and Cream, and the Austin-Healey 100 Sports (touring finish) is available in Cream and Red or in Red and Grey. The Triumph TR2 Sports (touring finish) is supplied in Grey and Red or in Yellow and Green. The models have transparent windscreens and each car is provided with a miniature driver finished in appropriate colours.

The busy scene shown in my other picture this month is part of a large layout made and operated by Mr. A. B. Cooper, Stanmore. There is an interesting story behind the construction of this, for it was begun some years ago to help Mr. Cooper to pass away the time while he was convalescing after an illness.

The layout is a big one and covers an area of 11 ft. × 5 ft., made up from sections



One section of an attractive town layout made by Mr. A. B. Cooper, Stanmore, which provides plenty of scope for a really good display of Dinky Toys.

of hardboard approximately 2 ft. square, to which all the buildings, pavements etc. are permanently attached. It is a good idea to make a large layout baseboard in sections, for apart from ease of handling when the layout has to be moved, the sections can be treated as miniature layouts on their own. The buildings and scenic details of each section can be completed before work on the next section is started, and the finished sections can be used before the layout as a whole is completed.

An overall plan of the layout should be prepared first of all, to ensure that the various sections match each other. With a bit of ingenuity in designing the road plans on the sections, these might even be made interchangeable, so that a new town could be made to spring up overnight, so to speak.

Mr. Cooper's layout is exceptionally well-detailed, and he tells me that he spent as many as 36 hours each on some of the sections before he obtained the effect he wanted. The result is well worth the time he gave to the layout, as I am sure you will agree if you examine the picture closely.

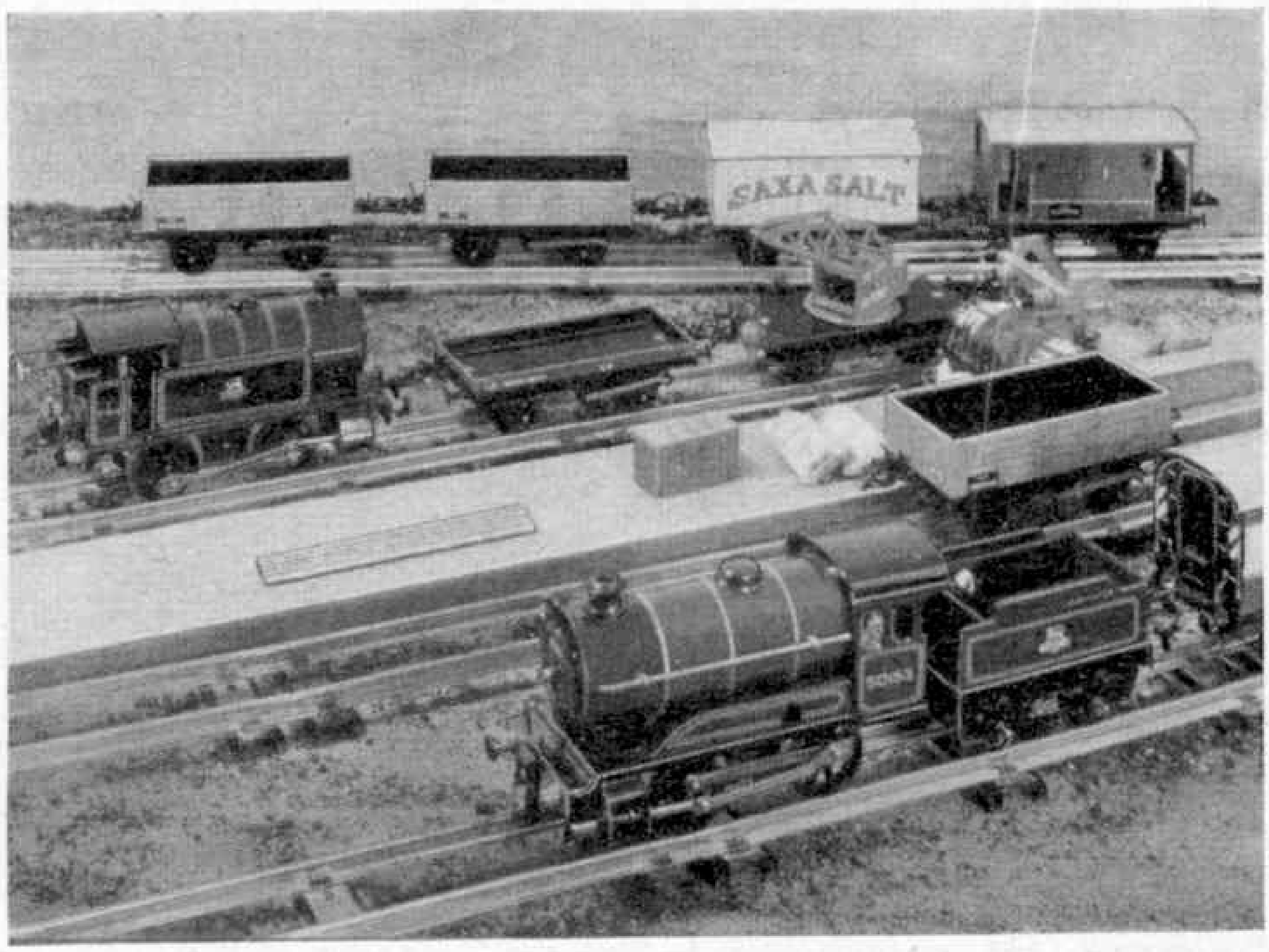
Such a large scheme requires a really extensive collection of Dinky Toys to fill it, and Mr. Cooper has over 250 models on the layout. Some of these would give special delight to ardent Dinky Toys collectors, for they belong to the pre-war range of Dinky Toys.

Although the layout is full of attractive details, Mr. Cooper has not made the mistake of overcrowding the scene. There is plenty of space between the buildings, and open spaces are left for buildings under construction, contractors' yards, etc. The roads are wide enough to accommodate the busy traffic easily, and there is ample room to operate the models. In one corner of the layout there is a railway station and goods yard, using Hornby-Dublo components.

Some of Mr. Cooper's ideas for scenic effects may be helpful to other collectors engaged in building a layout for their Dinky Toys. For hedges he uses strips of sponge rubber painted in suitable colours, and the grass verges alongside the roads are made from putty. Some of the trees are fir cones, and others are decorative Christmas trees removed from their bases and embedded in pieces of putty carefully moulded and shaped to form the tree trunks, and then suitably painted.

The three latest additions to the range of Dinky Toys Sports Cars (touring finish). They are No. 103, Austin Healey, No. 102, M.G. Midget and No. 105, Triumph TR2.

"Tommy Dodd" writes about



Further No. 50 Additions

LAST month I told you about the No. 50 Goods Brake Van that has recently been added to the Hornby range. Further additions have since been made in this No. 50 series and I am sure you will want to know something about them. They include No. 50 Tank Wagons in two styles, and No. 50 Low Sided Wagons with either Insulated Meat or Furniture Container. These vehicles have the new features I wrote about a month or two ago and I am sure that in giving your layouts the new look they will make running on them more enjoyable.

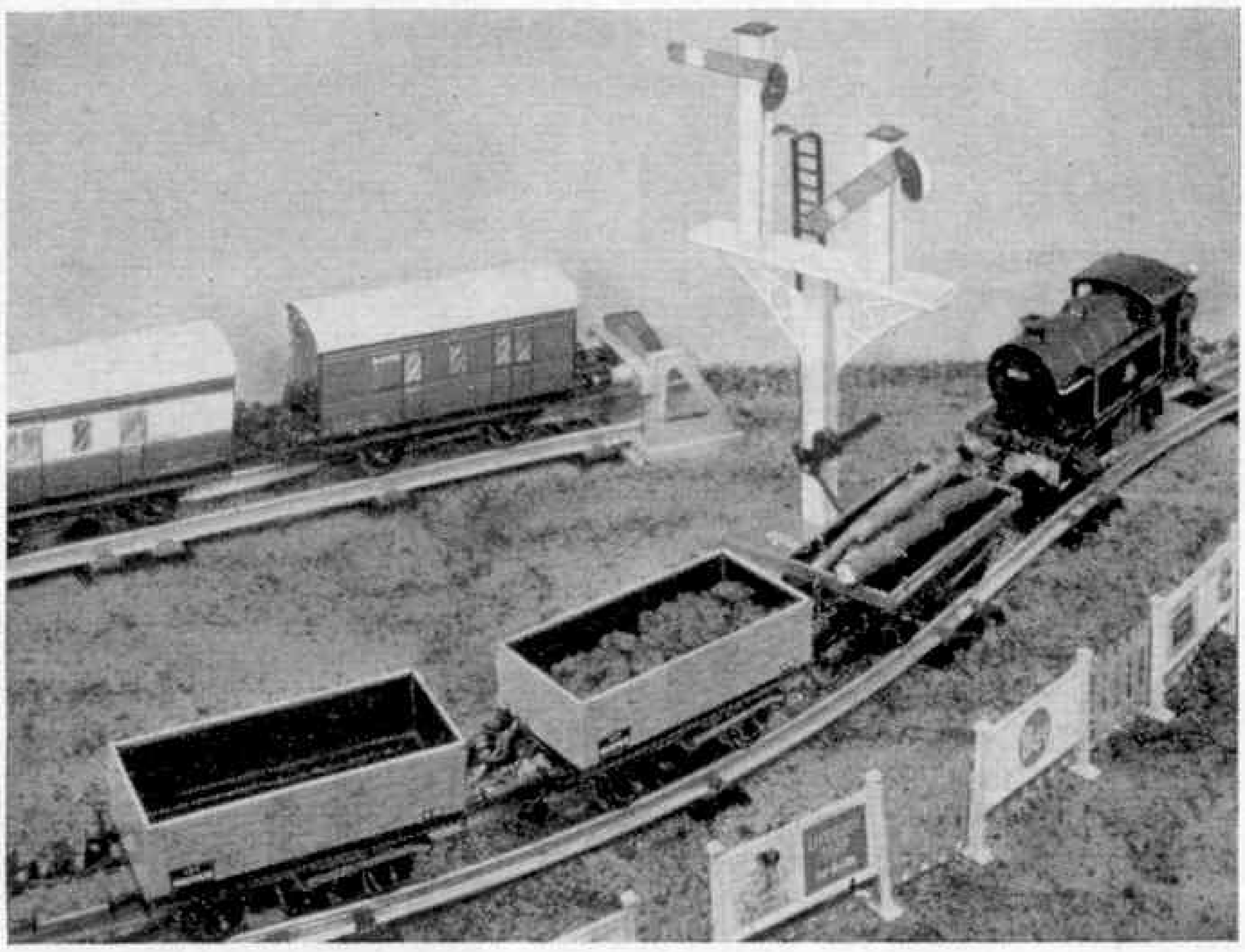
Above, a passenger train with a No. 51 locomotive passes a goods loading bank, where a No. 40 Tank is busy with a Low Sided Wagon and a Crane Truck, both of the No. 50 type.

All Hornby Train owners like Tank Wagons. These have been popular items in the Hornby range almost from the day they first made their appearance and I know of one or two on layouts that must be at least 30 years old! And collecting Tank Wagons in the numerous different finishes is a favourite pursuit of Hornby railway owners today.

The newcomers have the new standard base, and strong and attractive tanks with die-cast ends, which give the right impression of smooth finish that is in keeping with modern tank wagon practice. A small detail that also has been improved is the dummy filler cap, which is a neat new die-casting.

The No. 50 Tank Wagons are available in two styles, *Shell Lubricating Oil* with the tank finished in yellow and *Manchester Oil Refinery* with the tank finished in green. Both tanks carry the star marking showing that the wagons can be run in semi-fast freight trains. You can see tank wagons very often in trains nowadays—some trains indeed consisting entirely of tank wagons—and they are frequently found in yards, while in some industrial installations they are practically the only type of rolling stock in use. So there is every reason for using Hornby Tank Wagons in miniature, whether your railway is a large one or even a small one just starting. Incidentally, the owner of even the simplest kind of Hornby Train, the No. 20 Goods Train Set, is able to choose a Tank Wagon for his line from the range of No. 20 Rolling Stock that is available.

Shunt with care should be the rule when your Tank Wagons are being marshalled or moved about in the siding; and it is



Timber forms the load of the Low Sided Wagon next to the engine of this mixed goods train, for which the Junction Signal indicates "Line clear."

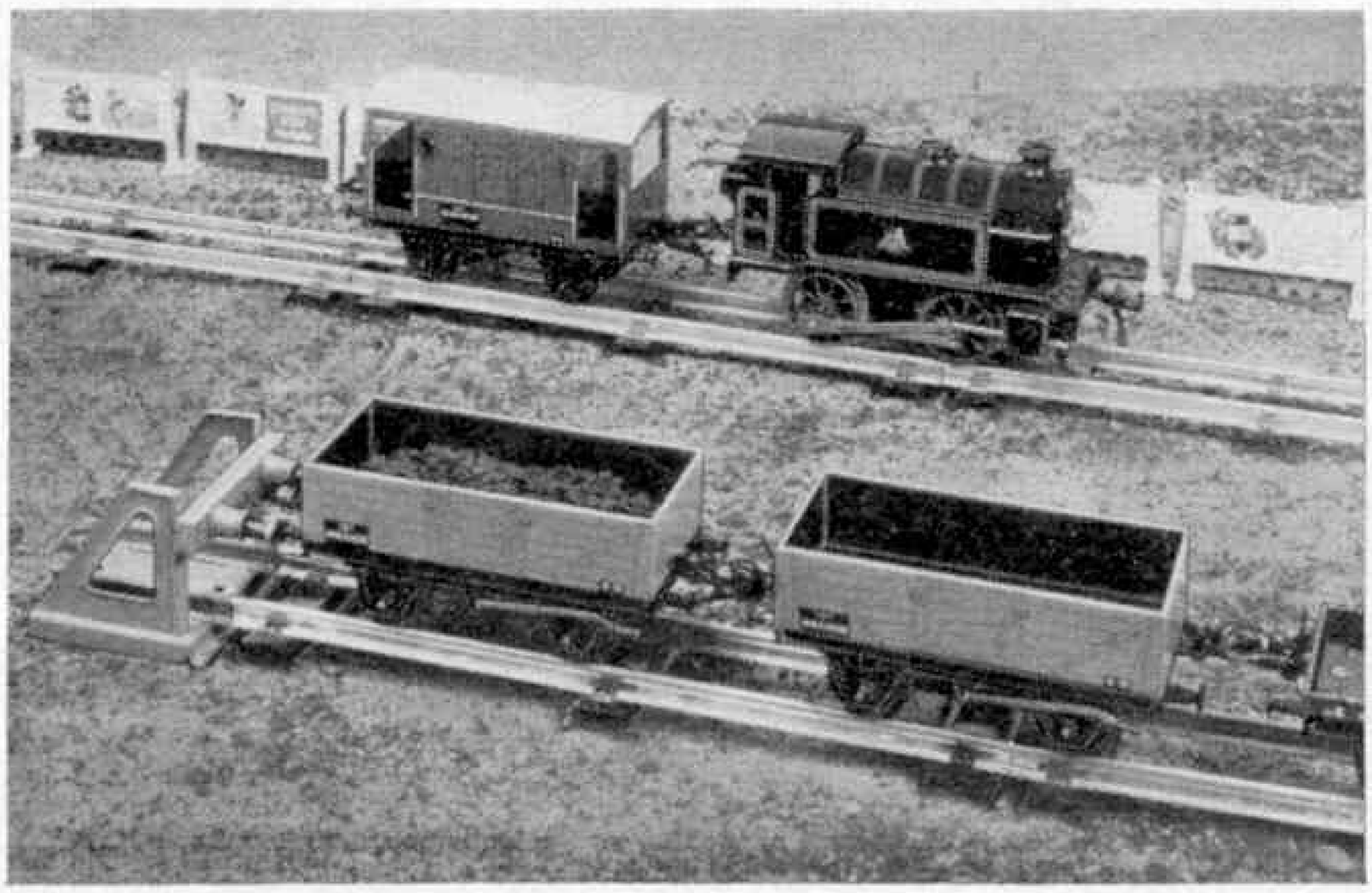
important that tanks supposed to be carrying spirit should be arranged in the centre of the train if at all possible. The general effect of using Tank Wagons is greatly improved if your lineside effects are made to match. Storage tanks, pipe lines and other plant or buildings can be made up fairly easily and this sort of thing is really quite good fun. I hope you will let me know of any special installations of this kind that you may design and add to your railways.

Now for the Low Sided Wagon No. 50. This was among the early introductions in this new series and indeed I mentioned it in my first talk on the new stock. This vehicle is now available with a Furniture Container or with an Insulated Meat Container, these being the standard Hornby items, which are useful and popular pieces of equipment.

So why not now begin a rail-road container service on your own system? The No. 50 Low Sided Wagons and Containers form useful items with which to begin, and for the road part of the job our old friend Dinky Toys No. 432, Guy Flat Truck, is just what is wanted.

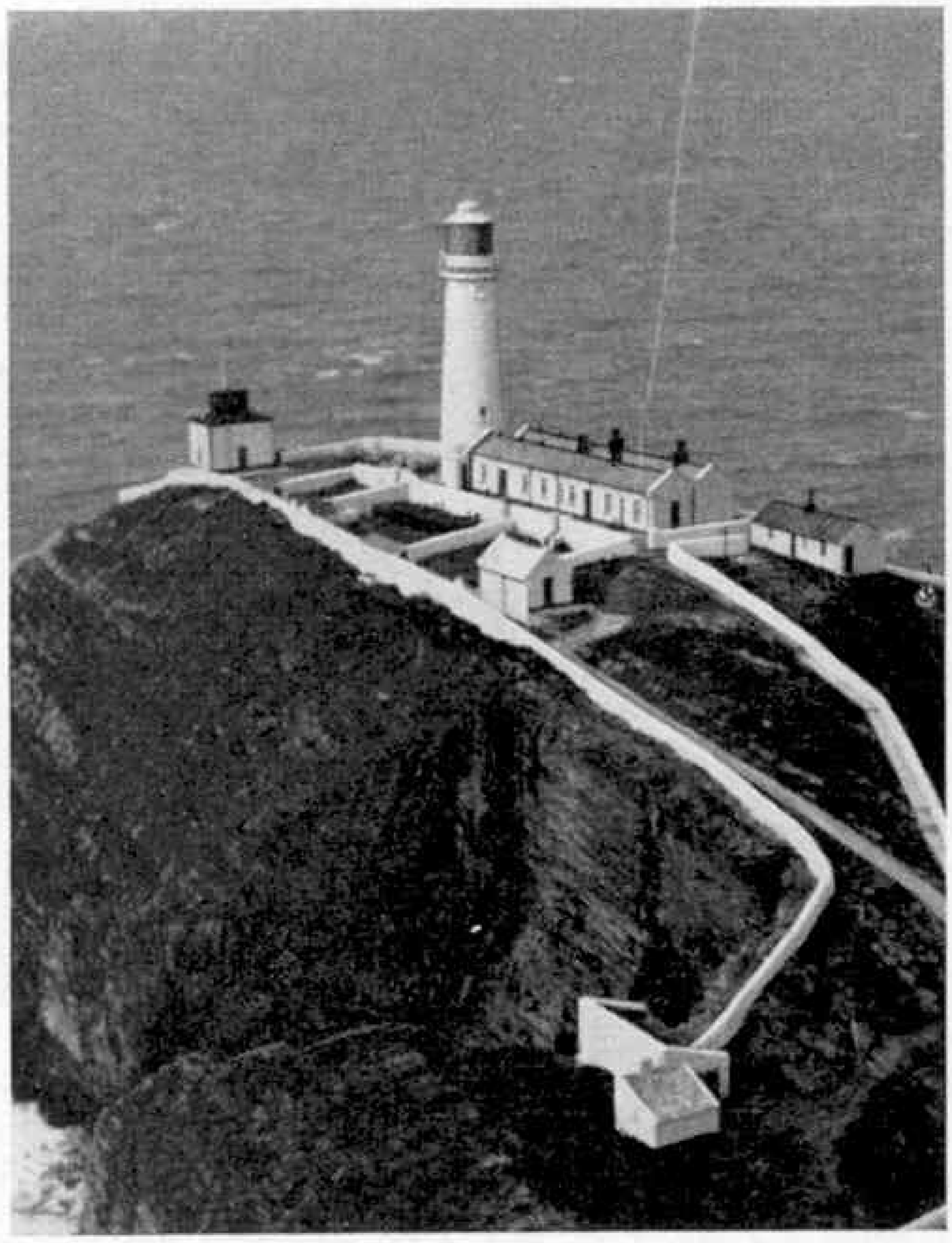
Of course rail-road traffic with Containers means that the latter have to be transferred from a road vehicle to the Low Sided Wagon at some point on their journey, and of course to be changed over the other way round. On a Hornby layout this can be managed beautifully by means of Dinky Supertoys No. 971, Coles Mobile Crane, one of the most useful vehicles that can be employed in connection with your railway.

Altogether, I feel that the rolling stock enthusiast has plenty with which to occupy his attention in the Hornby range at the moment. I shall be telling you about further additions later on.



An engine and a new No. 50 Goods Brake Van make their way along the main line. The Wagons next to the Buffer Stop also are of No. 50 type.

Of General Interest



The South Stack Lighthouse, Holyhead. Photograph by Stanley A. Bennett, Shirley, Warwickshire.

HERE is a place from which it is possible in fine weather to look across the seas to both Ireland and the Isle of Man. It is the South Stack Lighthouse, at Holyhead, photographed by Stanley Bennett, Shirley, Warwickshire, who has visited it and described its situation. He points out that the lighthouse has been built on a small islet off the high cliffs of Holyhead Island, and that the intervening gulf is spanned at a height of about 60 ft. by a small chain suspension bridge, to reach which visitors have to walk down 389 steps!

The lighthouse gives a white light, flashing for half a second every 10 seconds, which can be seen 20 miles away. Many ships coming up channel have more fear of South Stack in calm, foggy weather, than at any other time, for the lead gives no help in such deep water. The islet is the resort of thousands of sea birds.

Here below is a picture of the *Kathleen and May*, claimed to be the only three-masted wooden schooner still trading under the British flag. Besides her master, Mr. G. Jewell, she has a crew consisting of the Mate/Engineer, for a small diesel engine is now fitted, a deckhand and a boy. She plies between Avonmouth and North Devon, carrying between 160 and 200 tons of cargo.

The schooner carries less canvas in these days, and her mighty masts have been pruned somewhat. Otherwise she has retained her original form. The picture was taken by Alan P. Reice, Portishead, to whom I am also indebted for sending in these details of the vessel.

The "Kathleen and May." Photograph by Alan P. Reice, Portishead.

Articulation in Amsterdam

An Experimental A.E.C. now in Service

SINGLE decker buses seem to be almost universal on the continent, and in many cases these have trailers. The one shown in the picture at the head of this page is even more remarkable, as its "trailer" is really a part of the entire vehicle, which is articulated. There is a turntable between the two parts of the bus, with a flexible body connection. Passengers can move freely through the two coaches at all times, and the view that is in front of anyone entering the bus at the rear is the long vista seen in the picture at the foot of the page.

This remarkable bus is an experimental one that caused quite a sensation when it first appeared on the streets of Amsterdam, in Holland. The upper picture shows it negotiating a bridge over one of the many canals in that city. It is a blue and silver monster that readily weaves its way through dense traffic in the crowded centre of the city. From the traffic point of view one of its great merits is that it provides accommodation for 150 passengers, 47 of them seated and 103 standing, and indeed it has been introduced in order to cope with the dense crowds of peak traffic hours.

The bus has the well known A.E.C. Regal IV Monocontrol chassis. The articulated unit and the bodywork were both made in Holland, the former by Kässbohrer and the latter by Verheul, the largest bodybuilders in that country. The whole vehicle is 55 ft. long. Passengers enter the bus at the rear platform, and have to pass the conductor's seat on the right of the entrance before entering the main body. The conductor takes the money and hands out tickets before the passengers move on towards the front of the vehicle. There are four doors, three for getting out and the entrance door, and all of these are controlled by the conductor. They cannot be seen in the picture above because they are on the opposite side to that shown, for right hand running is the rule of the road in Holland.

The articulated connection between the

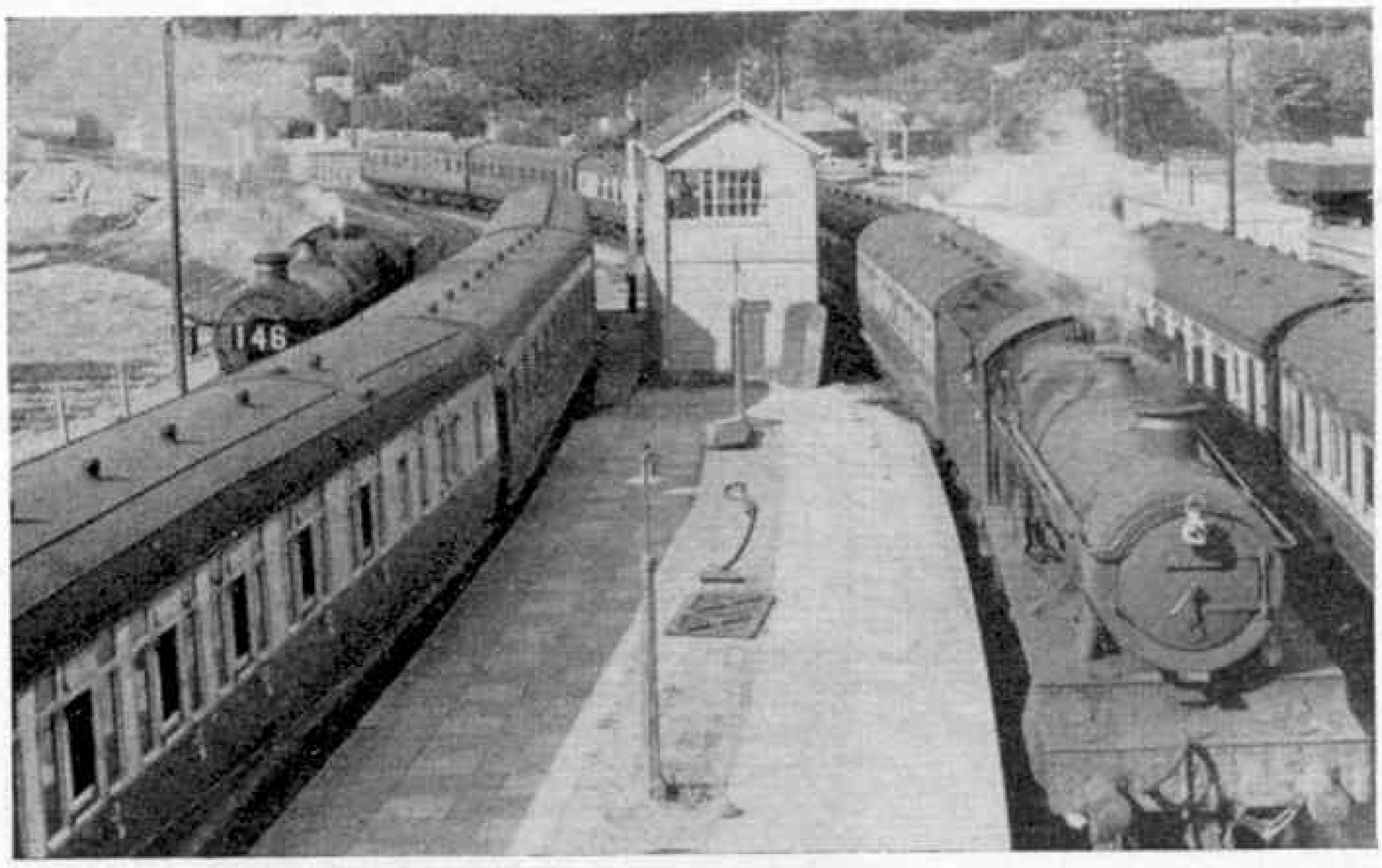
(Continued on page 377)

At the head of the page an experimental A.E.C./Kässbohrer articulated bus is seen crossing a canal bridge in Amsterdam. The lower picture gives the view inside along the bus.

The Kingswear Branch Line

By R. E. Toop

ABOUT one mile west of Newton Abbot in Devon, at Aller Junction, the railway to Torquay and Kingswear leaves the W.R. main line to Plymouth and Cornwall, which it has paralleled so far, keeping straight on, with the main line swinging sharply away to the right. Soon it is rising at 1 in 152 and this steepens to 1 in 110 for some two miles, passing Kingskerswell station in 1½ miles from Aller Junction. Then after a short level stretch at the summit the line drops at 1 in 73/55, the main road adjoining and crossing it several times. It passes Torre before reaching Torquay station, quite close to the main sea front.



No. 4920 "Dumbleton Hall" arrives at Kingswear with a down semi-fast train, while No. 7004 "Eastnor Castle" after working the down "Torbay Express" waits in the background to return to Newton Abbot sheds.

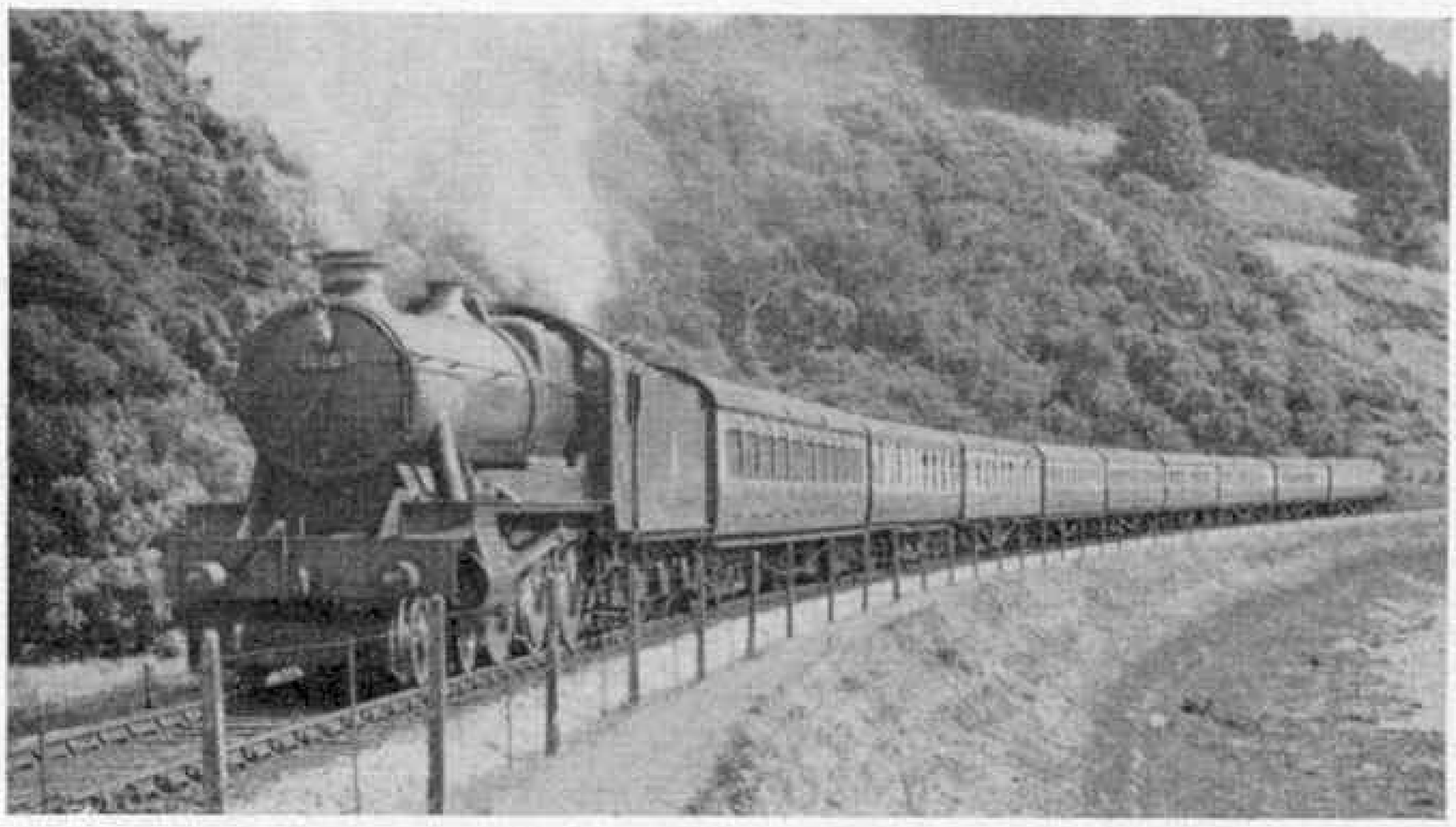
After a level half mile, there follows a series of minor gradients through the built-up area between Torquay and Paignton, which end with a drop of 1 in 81 down to Paignton itself, where the signalmen spend many wearisome hours opening and closing the level crossing gates at the approaches to the station. Here the line crosses the very heart of the shopping centre at the top of the main street to the promenade. Then follows a gentle stretch of about three quarters of a mile out to Goodrington Sands, where a large number of trains to this popular district terminate.

One of British Railways' local modernisation plans is intended to ease the present difficulties of dealing with these trains. The scheme involves the construction of a turntable, with locomotive sidings, and a water tower, together with sidings for storing empty carriages. Already this plan has involved the replacement of Tanner's Road level crossing by an over-bridge, with steps leading down to the two platforms of Goodrington Sands Halt.

From the southern end of this Halt the line becomes single and is launched on the climb to Churston. Beginning at 1 in 71 the line at first runs alongside the sea shore and then commences twisting and bending its way up the incline, passing a holiday camp, with caravans on one side of the line and tents on the other side, the sea and the great sweep of Tor Bay being in sight for most of the way. By the time it makes its way over Broadsands Viaduct the gradient has steepened to 1 in 60, and then a long right hand curve brings trains to the summit and Churston station.

One can get some idea of the severity of the curvature by the fact that a *fixed* "distant" signal appears at the end of Broadsands Viaduct, on the steepest part of the climb.

The line becomes double track through Churston station and here connecting services with Brixham are provided by the auto-train or pull-and-push unit, operating from a short bay platform and run on weekdays only, powered by the usual 14xx 0–4–2 tank engine. This generally runs light from Newton Abbot to Churston in the morning, the first trip to Brixham



No. 1010 "County of Caernarvon" is seen here pulling away from Kingswear up the estuary of the River Dart with a local passenger train for Newton Abbot.

starting at 7.34 a.m., and remains on the branch throughout the day, returning to shed during the early evening, sometimes with a light pick-up goods train. When the author has been on holiday in this area, it has been a joy to see good numbers of people flocking out of trains here to patronise the *Brixham Whippet*, as it is locally known. Another "named" train!

From the southern end of Churston station the line again becomes single track and falls first at 1 in 90. Then it steepens to 1 in 75 and after traversing Greenway Tunnel at 1 in 100 and passing over Higher Greenway Viaduct, comes to the beautiful tree-lined slopes of the River Dart. There is many a fine view down through the trees as the line falls steeply at 1 in 66 down to Britannia Halt—also known as Kingswear Crossing Halt—where the main road along the coast crosses the railway and cars board Dartmouth's upper ferry. The level crossing gates are operated by hand. Then follows a level mile of railway along the banks of the river to the terminus at Kingswear. This consists of an island platform, with a regular ferry service across to Dartmouth.

The down "Torbay Express" arrives at Churston station behind No. 5028 "Llantilio Castle", to connect with the Brixham branch line train powered by 0-4-2T No. 1427.

Dartmouth also has a fully-fledged British Railways Western Region station, but with one important difference. If you were to step off the platform there would not be any danger of a train running over you; instead, you would get a good soaking in Dart water. The journey across from Kingswear in the launch takes about five minutes.

Kingswear possesses a turntable and several carriage sidings, but locomotives that have brought in through trains such as the *Torbay Express* and the *Devonian*, which end their journeys there, invariably return for servicing to Newton Abbot sheds. One amusing feature of this is that the engine for the up *Torbay Express*, which leaves Kingswear at 11.20 a.m. on Saturdays and 11.25 a.m. Mondays to Fridays, complete with title board and reporting numbers at the front, works down to Kingswear soon after 10 a.m.—at the head of a local passenger train from Newton Abbot!

At holiday times traffic on the branch increases considerably and I have even seen such a large engine as a "Castle" class 4-6-0 pressed into service to bank a heavily loaded up passenger train out of Torquay and up the 1 in 55/73 gradients past Torre.

A Tupolev Tu 104 jet-liner of the Soviet airline Aeroflot, at Le Bourget Airport, France. Photograph by John W. R. Taylor.

Air News

By John W. R. Taylor

On Board the Tu 104

At the beginning of June I visited the 22nd International Air Show in Paris and saw a great many interesting aeroplanes, which I expect you would like to know about.

Biggest thrill of all was when I was invited to board one of the Tupolev Tu 104 jet-liners that the Soviet airline Aeroflot is now operating on several of its medium-length routes, because it was the first time that I had been able to inspect closely a modern Russian jet aircraft. It was certainly full of surprises.

Seen from a distance, on the ground and in the air, it is a fine looking machine with the Red Flag proudly emblazoned on its swept fin. Two huge 14,850 lb. thrust Mikulin M-209 turbojets give it a cruising speed of around 500 m.p.h. on 2,000-mile stage lengths, carrying up to 70 passengers. The workmanship is good, and although its wing is thick by modern standards this enables it to take off and land with a comparatively short run, which is a great asset.

The Tu 104 uses the wing, undercarriage, engines, fuselage nose and flight deck of the twin-jet bomber known in the West as "Badger," but that does not lessen Russia's achievement in getting it into service at a time when no other airline in the world is flying jets, and the aircraft I inspected was the 24th production machine.

By contrast with its trim exterior, the cabins are rather like the 19th century drawing rooms, with lace cloths on the tables, purple brocade fabric on some of the seats, porcelain figures in glass cases, hand-painted scenes on cupboard doors, and brass-and-string-mesh luggage racks that seem to have come straight out of a railway carriage. The cabin pressurisation is effective only up to some 30,000 ft., and there are ugly black rubber tubes for the oxygen masks that must be worn at higher altitudes. Most surprising of all, there are no seat belts for the passengers.

The Flying Atar

The Tu 104 may have been surprising; but the SNECMA C.400 P-2 Flying Atar—illustrated on the next page—took first prize for originality, and I'd hardly have believed it could fly if I had not seen it do so.

It works in the same way as the famous Rolls-Royce Flying Bedstead, using downward jet thrust to raise it off the ground; but, unlike the Bedstead, it is nothing more than a turbojet engine mounted vertically on four spindly legs, and with the pilot seated precariously on an ejector seat above its air intake. As a result, it looks highly unsafe and likely to topple over at any moment.

Nevertheless, the Flying Atar put up a remarkable performance. After taking off vertically in a cloud of dust, its pilot, Auguste Morel, made it fly—one is tempted to say walk!—across the airfield at 100 ft., then rotate about its axis and finally whoosh up several hundred feet into the air like a space rocket before settling back to earth in another dust cloud.

Britain's Black Knights

The air forces of France, Britain, Italy and the United States all sent superb aerobatic teams to the flying display at Le Bourget Airport. From Bitburg in Germany came the U.S.A.F.'s Skyblazers in F-100C Super Sabres. Their performance was very like that of the Thunderbirds, described in last month's *M.M.*, including a hair-raising low-level cross-over from the four points of the compass at the end.

For sheer dash and tremendous power their act would take some beating. The loudest applause, however, was kept for the Italians, whose formation-keeping in their red, cream and blue Sabres was beautifully precise, and for the five black-painted Hunters of No. 111 Squadron, representing the Royal Air Force.

Flying in their first international display these Hunters, in the hands of ordinary squadron pilots, were the finest possible advertisement for British aircraft and training. Time after time they changed formation in the middle of a loop or roll, sometimes to a pattern where the wing men could not see the leader. Yet never once was there a gap of more than a few feet between those black shapes.

Iron Curtain Aircraft

In addition to the Tu 104, there were several other aircraft from behind the Iron Curtain, including a Polish-built version of the Russian Mi-1 three-seat helicopter and a Czech-built version of the 12-28 seat Il 14 air liner, which is in much the same class as the Convair-liner, with two 1,900 h.p. M82T piston-engines. Known as the Avia 14, it has a normal range of 810 miles at 200 m.p.h., and proved itself very manœuvrable even with one engine stopped.

Another aircraft from Poland was the TS-8 Bies trainer, which looks rather like a Harvard with a nosewheel undercarriage. Powered by a 320 h.p. WN-3 radial engine, the aircraft shown had recently set up an altitude record for its class of 23,240 ft. and a closed-circuit distance record of 1,790 miles.

Engine News

As at all air shows, there was much of interest in the exhibition hall, especially on the stands of the engine makers. General Electric showed for the first time the CJ-805 civil version of their revolutionary 12,000 lb. thrust J79 turbojet, which will power the Convair 880 jet-liner. And Pratt & Whitney displayed their 15,000 lb. thrust JT4 which will be used in most of the Boeing 707 and Douglas DC-8 jet-liners so far ordered.

Even more interesting was a placard shown for a time against the Rolls-Royce Conway by-pass turbojet, indicating that the military version now gives 17,250 lb. of thrust and the civil version 16,500 lb. This great engine has been in the news lately, because B.O.A.C have ordered 35 Vickers VC10 air liners, each powered by four Conways, and the Air Ministry have announced that the Mk.2 version of the Handley Page Victor bomber will also have four of these engines. Simultaneously, it was made known that the Avro Vulcan Mk.2 will have four 16,000 lb. thrust Bristol Olympus BOl.6 turbojets.

These developed bombers should have a terrific performance, because the Mark 1 versions of the Victor and Vulcan have been dived at supersonic speed and can fly faster and at higher altitudes than any other big bomber in the world, except the experimental Convair Hustler.

The S.R.53

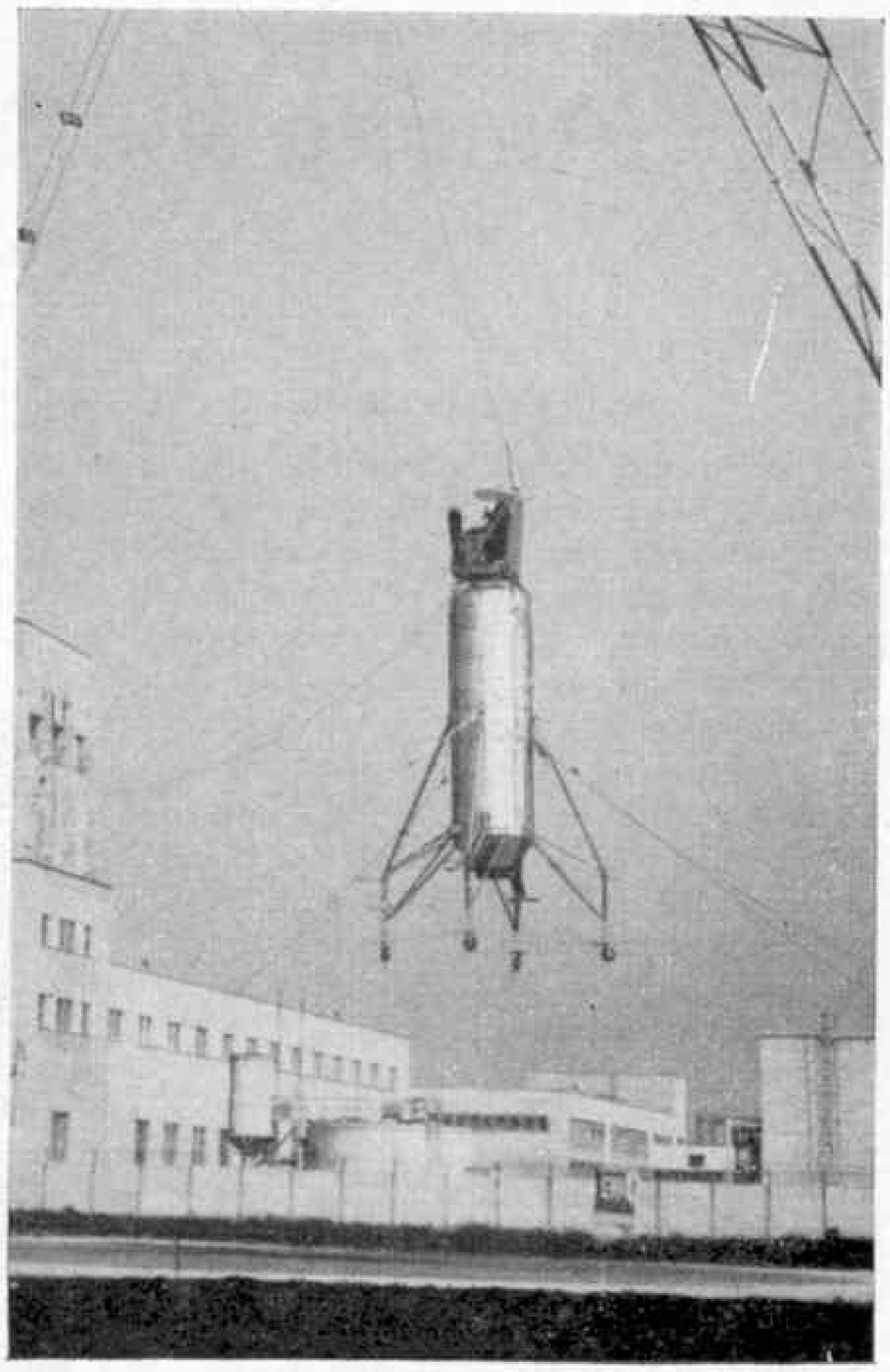
Although the little S.R.53 mixed power-unit interceptor was not at the Show, having made its first flight only on 16th May last, there were some interesting references to it on the joint de Havilland-Saunders-Roe stand.

The prototype has an Armstrong Siddeley Viper turbojet and a de Havilland Spectre rocket-motor mounted one above the other in its fuselage. But a later version is reported to have a more powerful de Havilland Gyron Junior turbojet in place of the Viper, and an installation of this type was shown in mock-up form. The result will be a very fast-climbing interceptor, probably with a speed of around 1,500 m.p.h.; and a drawing of such an aircraft on the stand showed it armed with de Havilland Firestreak air-to-air guided missiles, carried at the wing tips.

Although the R.A.F. will not have any more interceptors after the English Electric P.1, it has been stated in the House of Lords that the Royal Navy are interested in the Saunders-Roe S.R.53 and its developments.

B.E.A. to Sell Elizabethans

Now that B.E.A. have an increasing number of Viscount 802 and 806 aircraft coming into service, to supplement their fleet of Viscount 701's, they are planning to sell the 19 *Elizabethan*-class Airspeed Ambassadors that have served them so well. Three have been bought by Butler Air Transport of Australia, and others are expected to be snapped up by German airlines.



The SNECMA C.400 P-2 Flying Atar during its early tethered tests.

New Height Record

Balloons are so seldom in the news that it is interesting to recall that they have held the official world's height record for well over 20 years. This record was raised to 96,000 ft. on 2nd June by Captain J. W. Kittinger, a U.S.A.F. test pilot, who ascended more than 18 miles in a pressurised aluminium capsule suspended under a huge plastic balloon. No mere stunt, the ascent formed part of a vast U.S.A.F. programme to investigate how airmen can live and work at extreme altitudes where there is virtually no air.

Lost Property

It seems that air travellers are very careless with their belongings, because American Airlines have accumulated 12,000 items of lost property during the past year.

The Polish TS-8 Bies trainer aircraft referred to at the top of this page. Photograph by John W. R. Taylor.

Among the Model-Builders

By "Spanner"

It Comes Back

The simple model shown in Fig. 1 is an amusing toy that will provide fun for the younger members of the family. If it is rolled along a level surface it will always return to its starting point!

In the picture on this page the model is not cased in so that the operating device can be clearly seen, but if a Flexible Plate or a strip of cardboard is bolted round the Double Angle Strips to conceal the mechanism, the action of the gadget is very puzzling to onlookers not "in the know."

The model is made very easily by bolting four $2\frac{1}{2}'' \times \frac{1}{2}''$ Double Angle Strips between two 3″ Pulleys. A 6″ Driving Band is then passed through the bosses of the Pulleys and held firmly in place by bolts screwed into their bosses. A $\frac{1}{2}''$ fixed Pulley, a $\frac{1}{2}''$ loose Pulley, Wheel Discs and a Collar are placed on a $1\frac{1}{2}''$ Rod, and the Driving Band is passed between the two Pulleys. The Collar and the $\frac{1}{2}''$ fixed Pulley are then pressed together and fixed on the Rod, so that the Driving Band is gripped tightly in position.

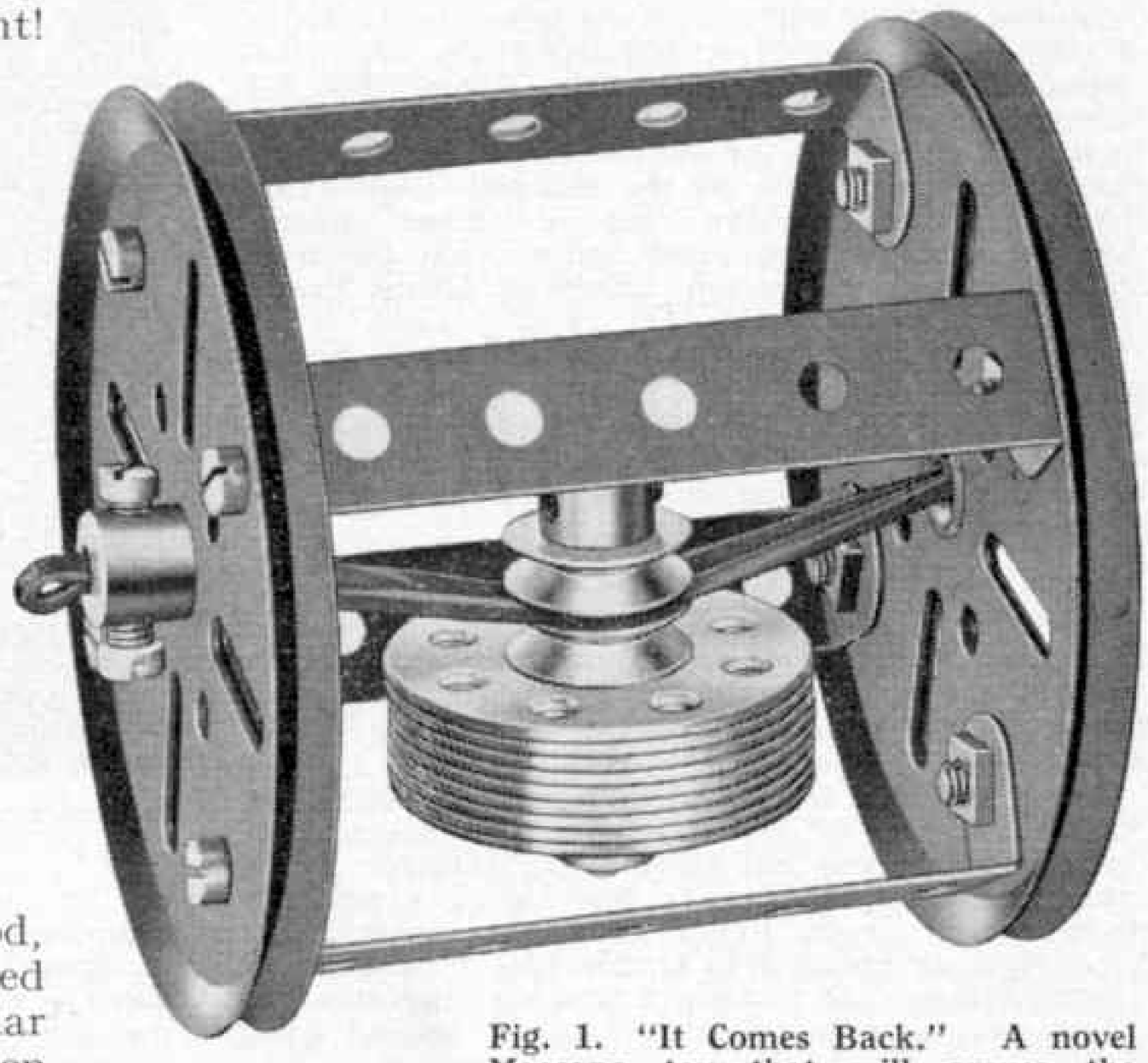


Fig. 1. "It Comes Back." A novel Meccano toy that will amuse the younger members of the family. Details of it are given on this page.

A Compact Centrifugal Clutch

A centrifugal clutch specially designed for transmitting light high-speed drives is shown in Fig. 2. It is notable for its compact and neat design, and is particularly suitable for use in the drive from an Electric Motor. The clutch was devised by Mr. J. F. Sharp, Huddersfield, who is good enough to place his idea at the disposal of other model-builders interested in such devices.

The drive to the clutch can be transmitted through a $\frac{1}{2}''$ Pinion to a 57-tooth Gear 1. This Gear is free to turn on the output shaft 2, but is held in place by a Collar. Two Hinges 3, each of which is fitted with a Set Screw fixed in position by a nut, are bolted to the Gear but are spaced from it by Washers on the bolts. The Hinges are arranged so that their free portions are located between the shaft 2 and a $\frac{3}{4}''$ Flanged Wheel fixed on the shaft. The inner surface of the Flanged Wheel should be lined with thin rubber or some other suitable friction material.

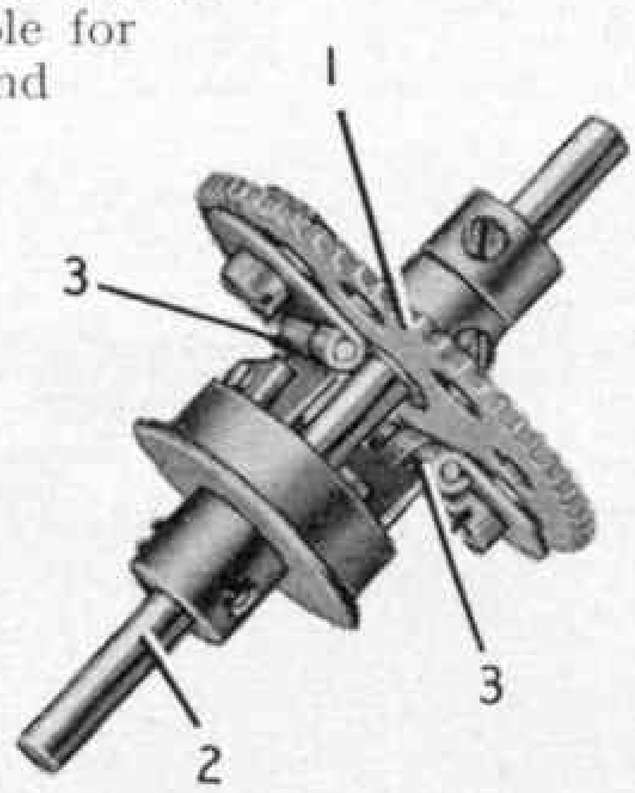
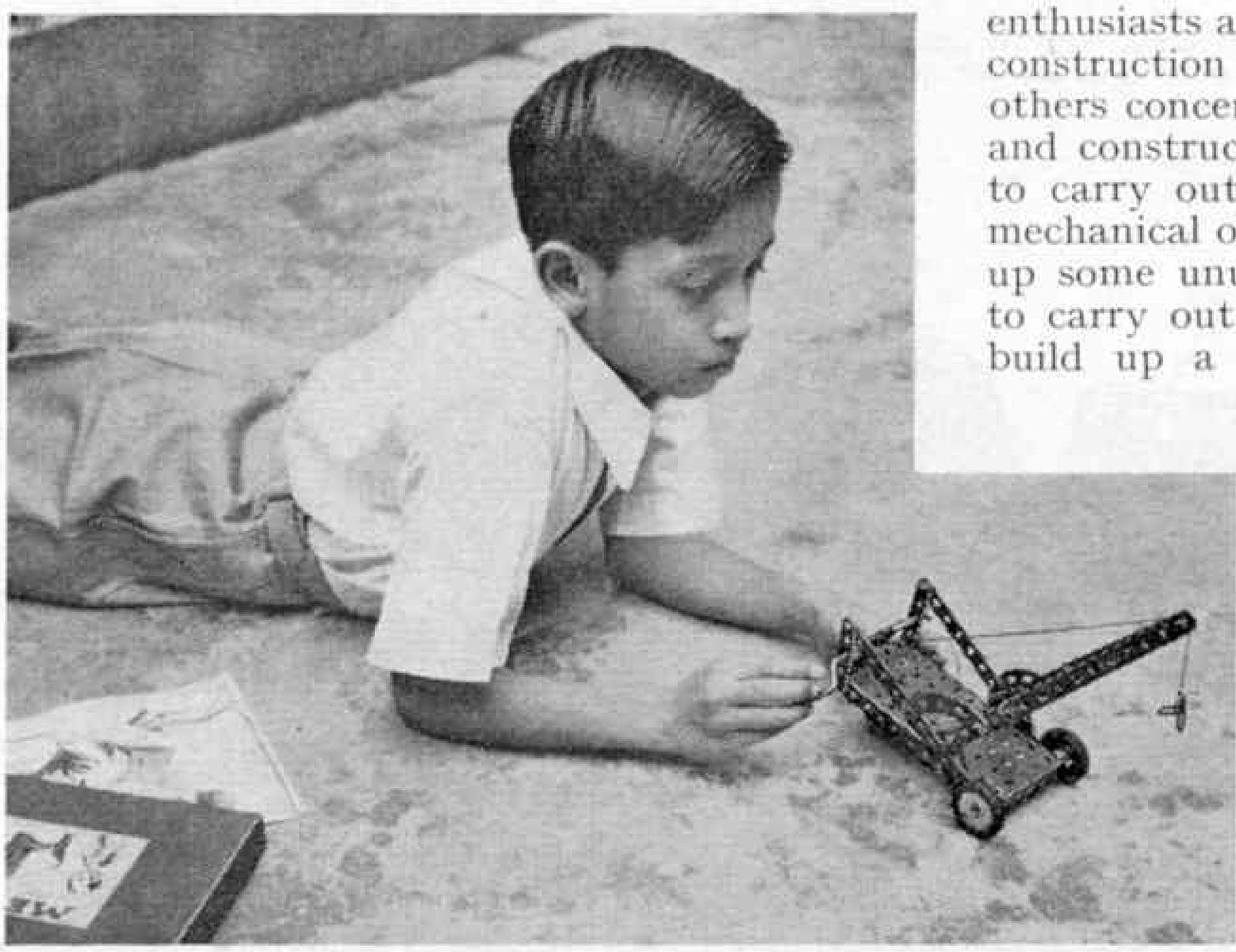


Fig. 2. A compact clutch designed by J. F. Sharp, Huddersfield.

A Powerful Screw Brake

Brakes of some kind are among the mechanisms most frequently required in model-building, and the different types it is possible to construct from Meccano parts are extremely varied. In Fig. 3 is shown a screw type brake that is very powerful and although it is not suitable for slowing down a rotating shaft gradually, it can be used



A young Indian Meccano enthusiast with one of his models. This attractive illustration is reproduced from a photograph sent to us by Mr. G. Nanja Nath, Delhi, India.

effectively as a parking brake for a trailer, or as a holding brake in a model crane to prevent a winding drum from turning when the drive to it is disengaged. I am indebted to D. Clubbe, Hazel Grove, Nr. Stockport, for this suggestion.

It will be seen that only a few parts are required to build this mechanism and assembling them is very simple. First a Collar 1 is placed on the Rod to which the brake is to be fitted, and then a Rod Socket 2 is screwed into a threaded hole in the Collar. A Rod is fixed in the Rod Socket and is passed through suitable bearings. A Crank or a Bush Wheel fitted with a Threaded Pin should be fixed on the Rod to form a control handle. When the handle is turned the Rod Socket screws into the Collar until its shank grips the Rod and prevents it from turning.

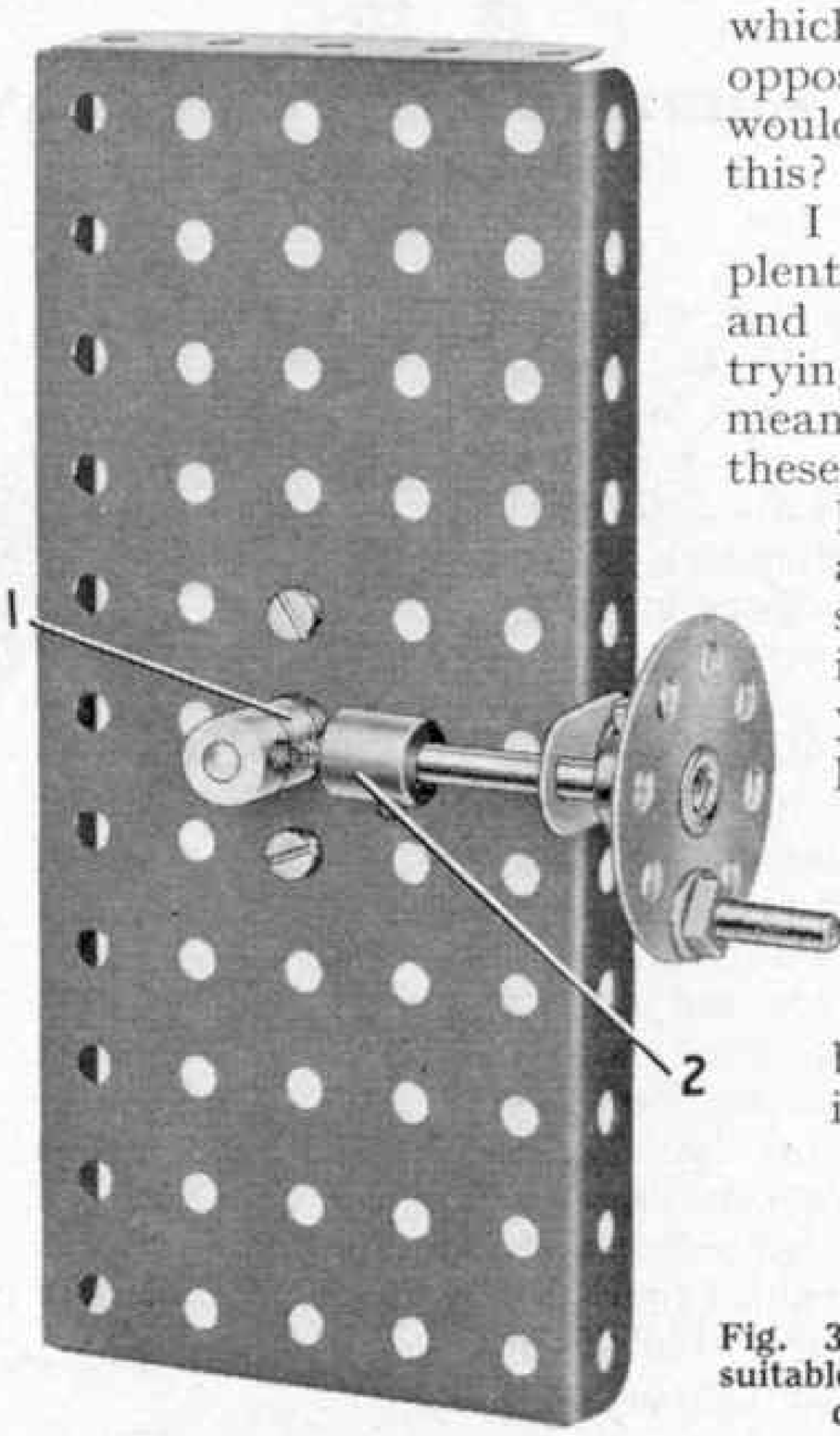


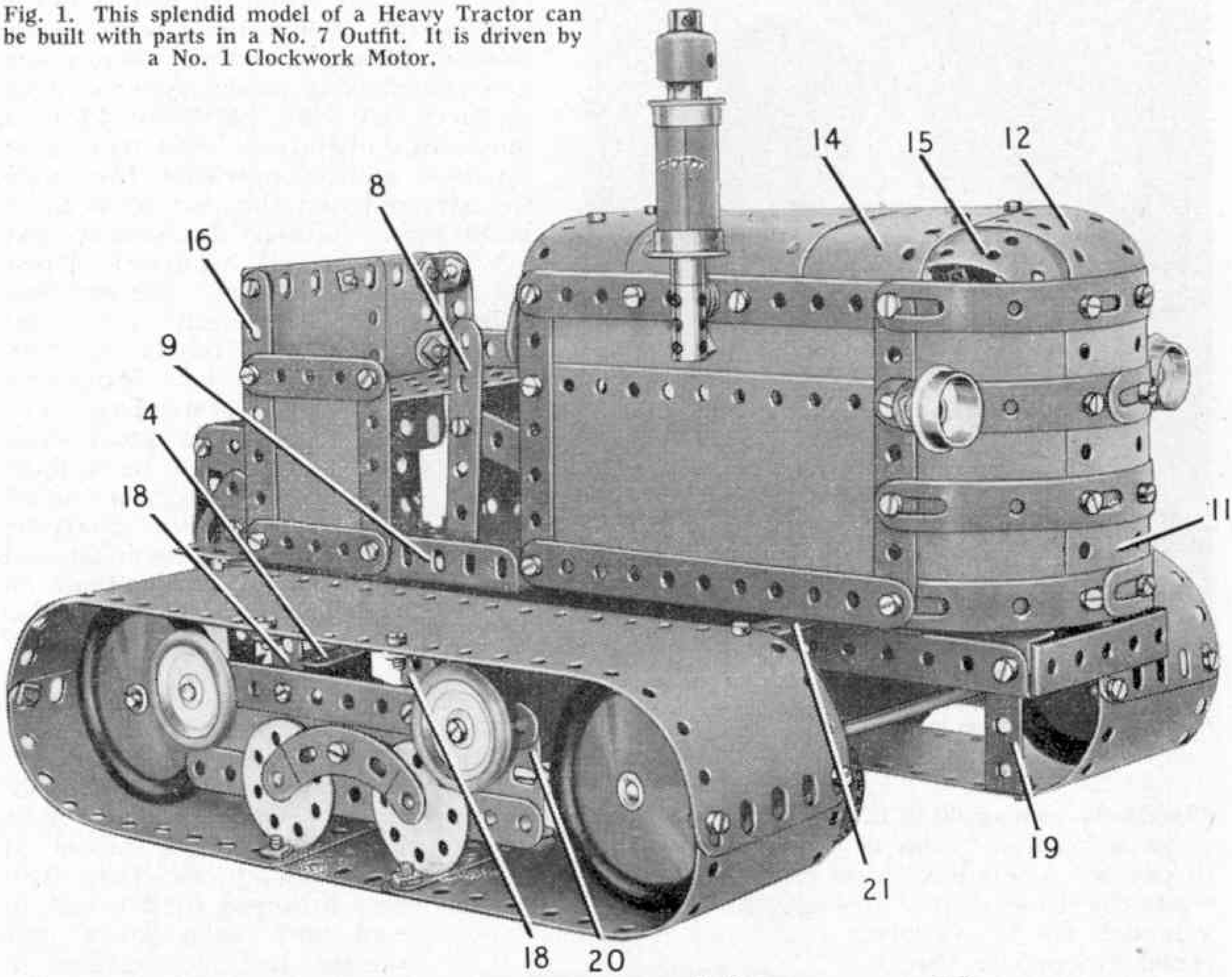
Fig. 3. A powerful screw brake suitable for locking the winding drum of a model crane.

Be a Real Inventor!

Although most Meccano enthusiasts are interested mainly in the construction of complete models, many others concentrate entirely on devising and constructing mechanisms designed to carry out some particular form of mechanical operation. First they think up some unusual operation they wish to carry out and then set to work to build up a suitable mechanism that will achieve their purpose. Those who have not yet tried their hands at this kind of Meccano construction are missing a great deal, for it can be a most absorbing and instructive pastime. To spur them on and to encourage them to have a shot at this kind of work I offer the two following suggestions. Suppose you were building a model bus and wanted to fit it with automatically opening and closing doors. What kind of mechanism would you use for the purpose? Or supposing that you were building a certain model in which it was necessary to drive two shafts that were arranged in line end to end with each other, but which had to rotate in opposite directions. How would you set about doing this?

I think you will find plenty of food for thought and lots of good fun in trying to devise suitable means of achieving both these objectives. Let me know how you go on, and if possible please send me a print of any ingenious mechanisms you design for the purpose. I shall be interested to hear from you, and it is quite possible that some of the ideas you think up will be well worth mentioning in the *M.M.* later on.

Fig. 1. This splendid model of a Heavy Tractor can be built with parts in a No. 7 Outfit. It is driven by a No. 1 Clockwork Motor.



MODEL OF THE MONTH

Heavy Tractor

THIS month our model is one that will appeal specially to those enthusiasts who delight in building well-detailed models of modern machines, but who have only a limited stock of parts at their disposal. It is based on a typical heavy-duty tractor, and can be constructed with the parts in a No. 7 Outfit.

The model is neatly designed and easy to build. To bring it within the scope of as many enthusiasts as possible, and to avoid the use of a large number of Strips or Flat Girders, working creeper tracks are not fitted, but the tracks are represented neatly and realistically by Strip and Flexible Plates and the model runs on wheels concealed by the track assemblies. A No. 1 Clockwork Motor bolted underneath the chassis of the Tractor provides the drive to the rear wheels. The front wheels are mounted in a castor unit

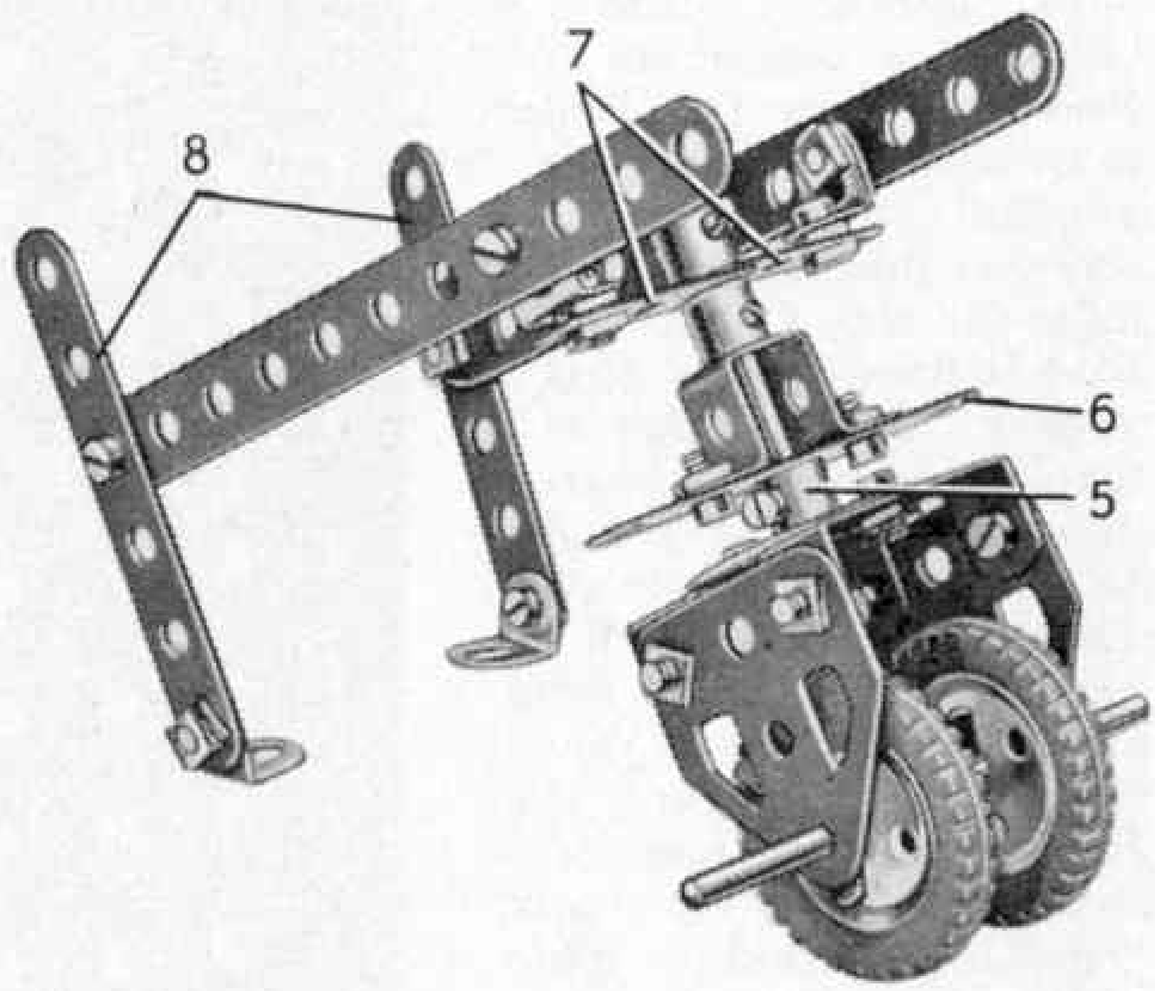


Fig. 2. A close-up view of the front wheel assembly removed from the chassis to show the layout of the steering controls.

steered by levers in front of the driver's seat.

Tractors of the type represented by our model are used extensively for work on building sites and constructional schemes of many kinds. Their powerful engines enable them to handle heavy loads with ease, and their creeper tracks allow them to operate successfully under difficult conditions.

For full building instructions and a detailed list of the parts used in the construction of the Heavy Tractor write to the Editor, enclosing a 2d. stamp for return postage.

Main Meccano agents in Canada, Australia, New Zealand, South Africa, Ceylon, Italy and the United States of America receive copies of the current "Model of the Month" instructions, and readers in those countries should apply to the appropriate agent, enclosing suitable stamps for postage.

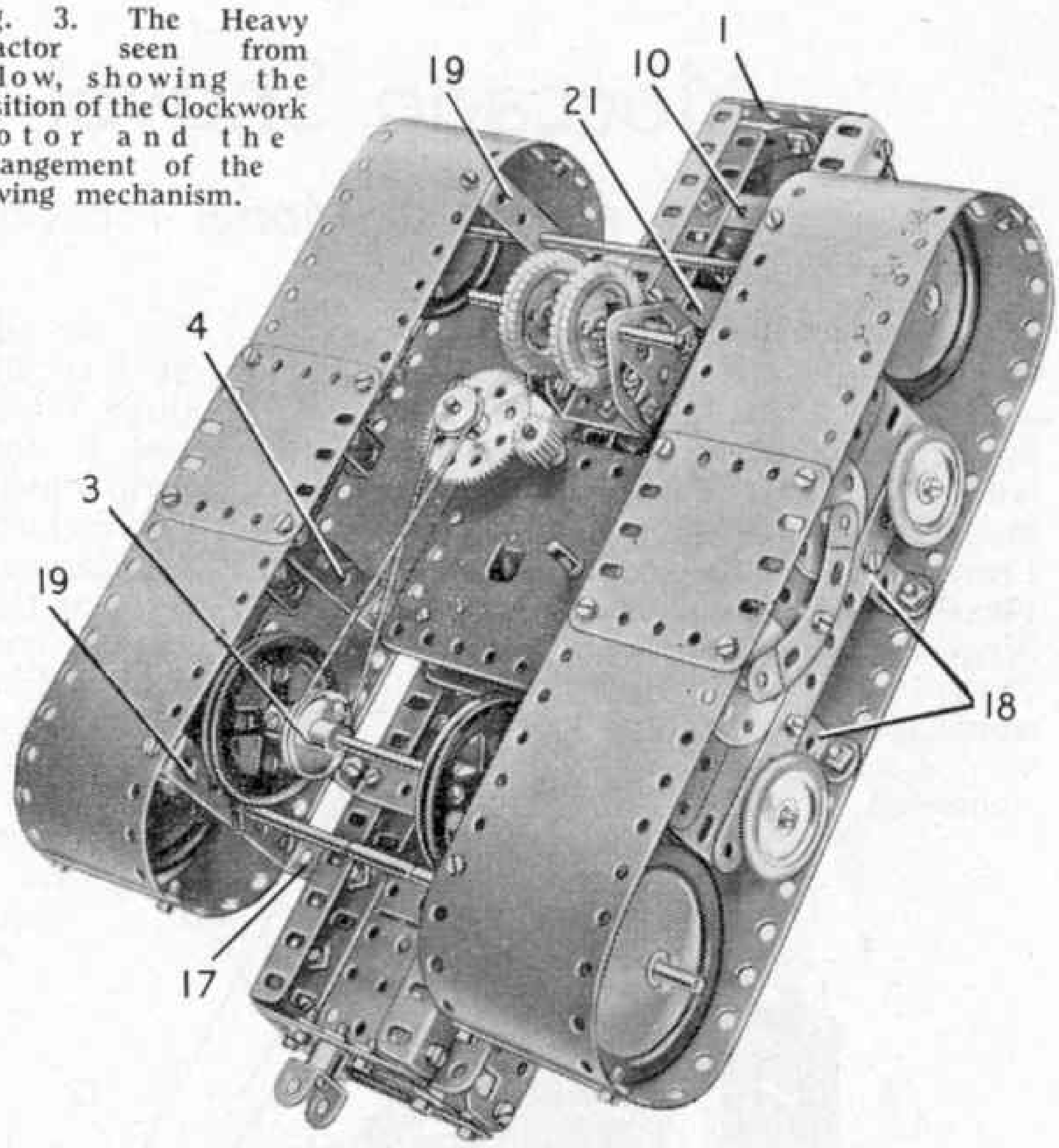


Fig. 3. The Heavy Tractor seen from below, showing the position of the Clockwork Motor and the arrangement of the driving mechanism.

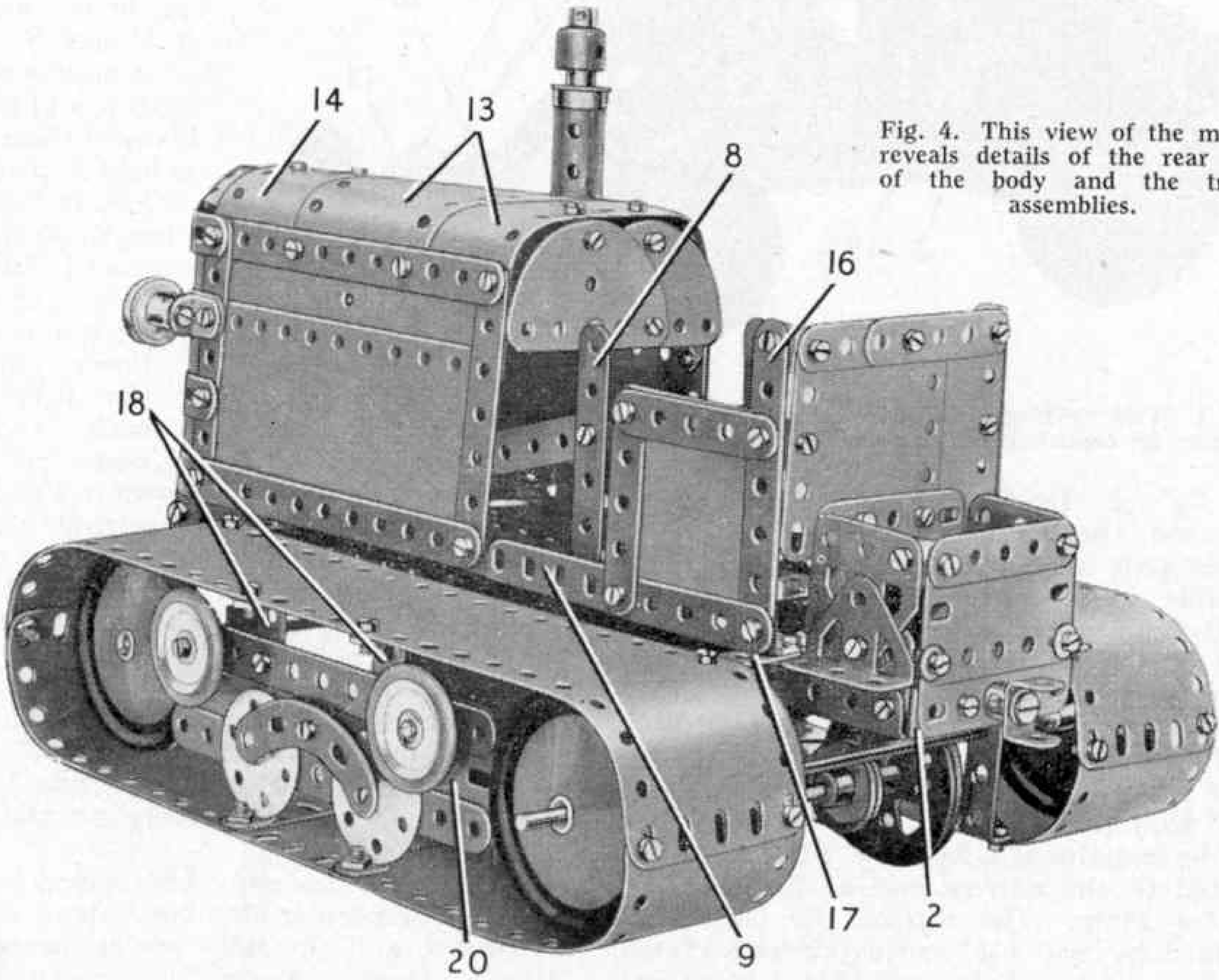


Fig. 4. This view of the model reveals details of the rear end of the body and the track assemblies.

Meccano Shovel Loader

An Attractive Model for Outfit No. 4

CONSTRUCTION of the model is begun by making the chassis, which consists of a $5\frac{1}{2}'' \times 2\frac{1}{2}''$ Flanged Plate and a Flanged Sector Plate overlapped three holes and bolted together. Each side of the cab is made by fixing a $3\frac{1}{2}''$ Strip 1 and a $2\frac{1}{2}'' \times 1\frac{1}{2}''$ Flexible Plate 2 to the Flanged Plate. The Flexible Plate is strengthened by a $2\frac{1}{2}''$ Strip, and this is extended upward by two Fishplates that form the windscreen frame. The sides are connected by $2\frac{1}{2}'' \times \frac{1}{2}''$ Double Angle Strips bolted between the Strips 1 and between the upper pair of Fishplates, and by a similar Double Angle Strip 3.

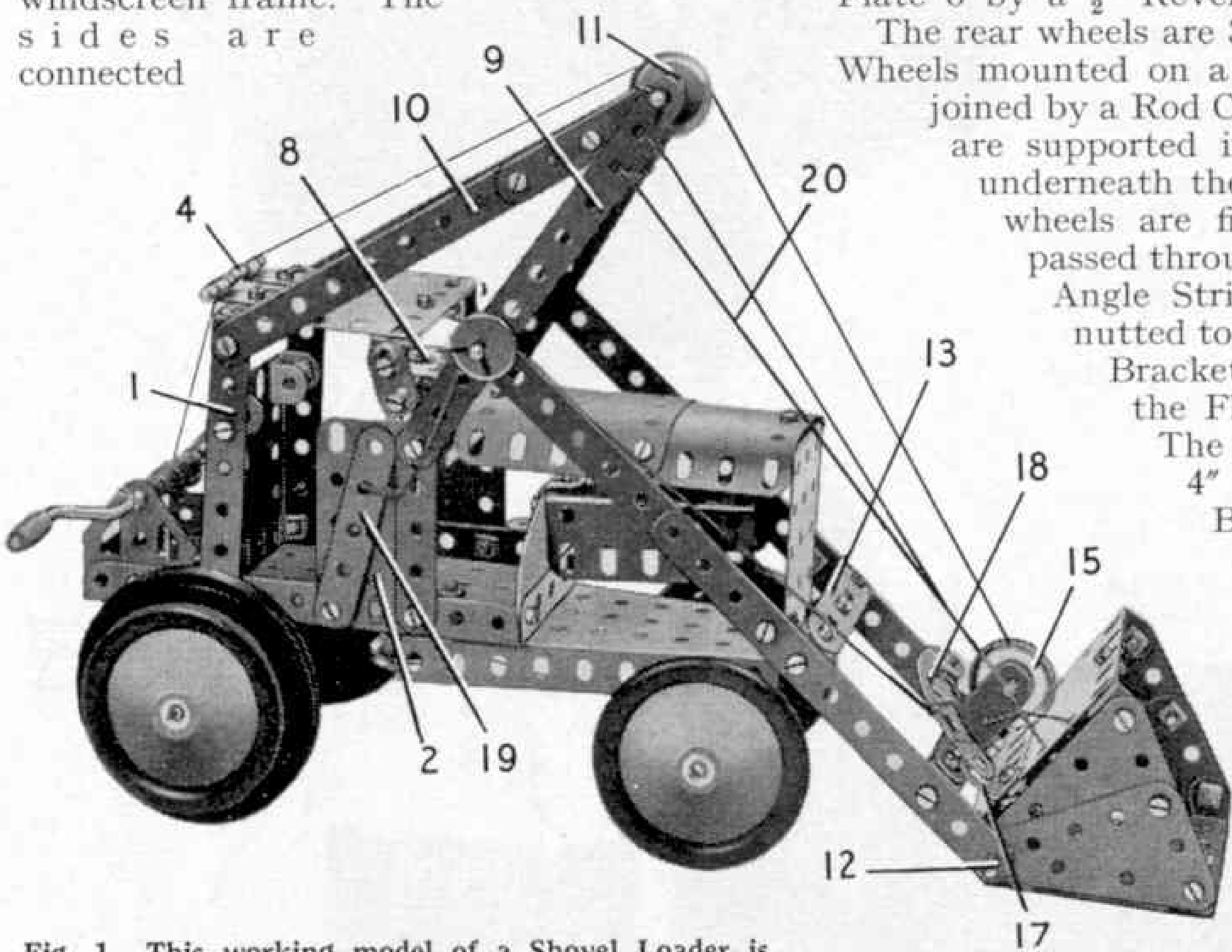


Fig. 1. This working model of a Shovel Loader is designed for construction with parts in a No. 4 Outfit.

The cab roof is a $2\frac{1}{2}'' \times 2\frac{1}{2}''$ Flexible Plate, and the back of the cab is another $2\frac{1}{2}'' \times 2\frac{1}{2}''$ Flexible Plate bolted to Double Brackets fixed to the Strips 1. Two Right Angle Rod and Strip Connectors are attached to the rear edge of the roof, and these support a 2″ Rod 4.

The radiator is a $2\frac{1}{2}'' \times 1\frac{1}{2}''$ Flanged Plate bolted to the narrow end of the Flanged Sector Plate. The top of the bonnet is formed by two $1\frac{11}{16}''$ radius Curved Plates overlapped two holes and bolted together. The top of the bonnet is attached to the $2\frac{1}{2}'' \times 1\frac{1}{2}''$ Flanged Plate by a $\frac{3}{8}''$ Bolt, with three Washers on it for spacing purposes, and is connected to the Double Angle Strip 3 by an Angle Bracket. The bolt used to fix the top of the bonnet to the Angle Bracket supports also a $2\frac{1}{2}''$ Strip 5, which projects three clear holes into the cab. The engine unit is represented by a U-section Curved Plate connected to a Semi-Circular Plate 6 by a $\frac{1}{2}''$ Reversed Angle Bracket.

The rear wheels are 3″ Pulleys and Road Wheels mounted on a $1\frac{1}{2}''$ and a $3\frac{1}{2}''$ Rod joined by a Rod Connector. The Rods are supported in Trunnions bolted underneath the chassis. The front wheels are fixed on a $3\frac{1}{2}''$ Rod passed through a $2\frac{1}{2}'' \times \frac{1}{2}''$ Double Angle Strip 7, which is lock-nutted to a $\frac{1}{2}''$ Reversed Angle Bracket bolted underneath the Flanged Sector Plate. The steering column is a 4″ Rod fitted with a Bush Wheel 8. The Rod is supported in Strip 5 and in the Flanged Plate, and is held in place by a Spring Clip. A length of Cord is wound four or five times round the lower end of the Rod, and each end is tied to the Double Angle Strip 7 as shown in Fig. 2. A 1″ Pulley fixed on the steering column prevents the Cord from slipping out of place.

The jib that supports the shovel arm consists of a $5\frac{1}{2}''$ Strip 9 and a made-up strip 10 on each side, bolted to the cab. Strip 10 is formed by a $5\frac{1}{2}''$ and a $2\frac{1}{2}''$ Strip overlapped three holes. The Strips on each side are connected at their upper ends by a $1\frac{1}{2}''$ Rod fitted with Spring Clips. A 1″ Pulley 11 is mounted freely on the Rod between the Strips.

Each side of the shovel is formed by two $2\frac{1}{2}'' \times 1\frac{1}{2}''$ Triangular Flexible Plates arranged as shown, and the sides are connected by $2\frac{1}{2}'' \times \frac{1}{2}''$ Double Angle Strips. An Angle

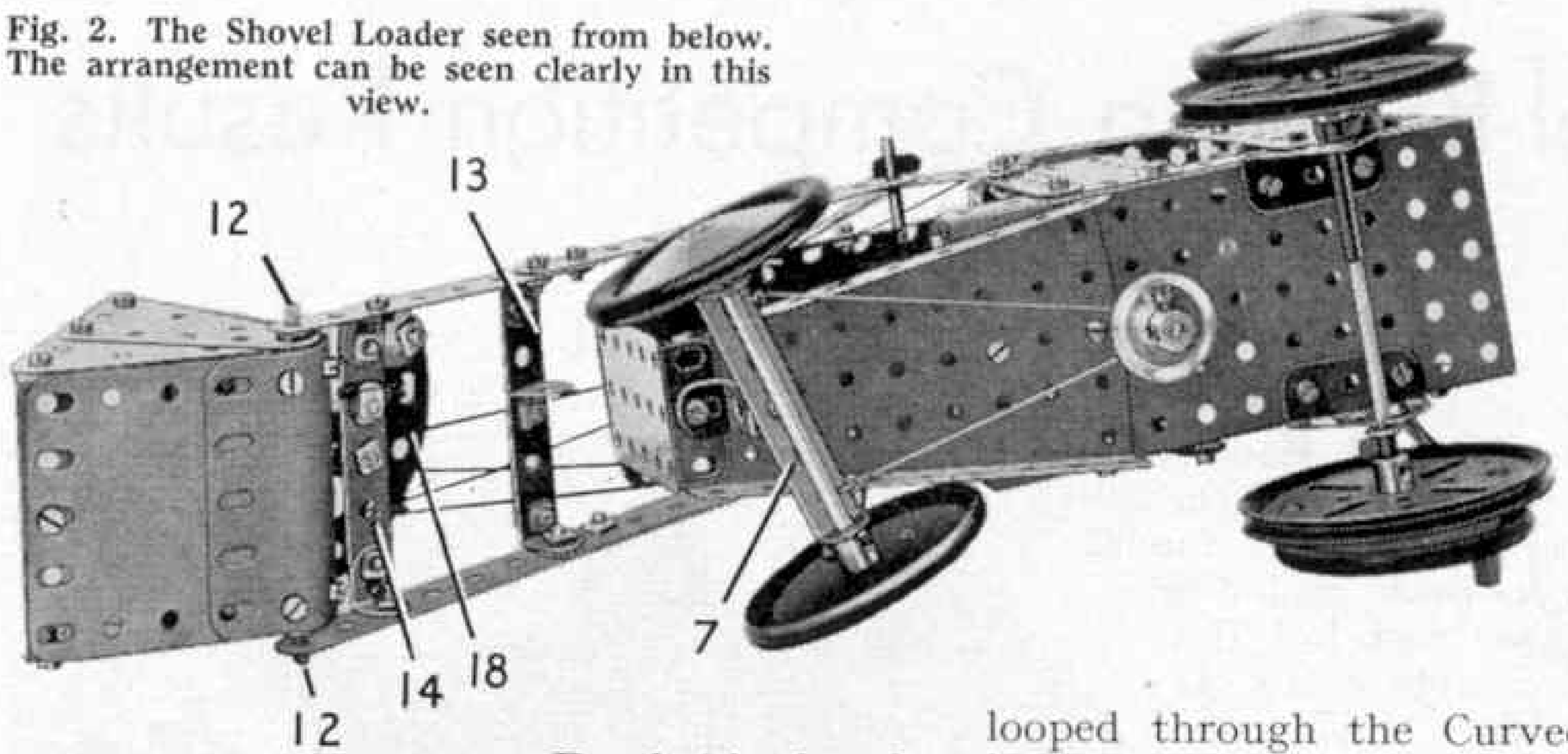


Fig. 2. The Shovel Loader seen from below. The arrangement can be seen clearly in this view.

Bracket is placed on a $\frac{3}{8}''$ Bolt 12 passed through the Triangular Flexible Plates on each side and fixed in them by a nut. The Angle Brackets support a U-section Curved Plate and this is connected to the Double Angle Strips by two $2\frac{1}{2}'' \times 2\frac{1}{2}''$ Flexible Plates.

Each side of the arm supporting the shovel is made from two $5\frac{1}{2}''$ Strips overlapped five holes. The sides are connected by two $2\frac{1}{2}''$ Strips 13 and 14. Strip 13 is bolted to an Angle Bracket and a $1\frac{1}{2}'' \times \frac{1}{2}''$ Double Angle Strip, while Strip 14 is attached to two Angle Brackets. A Stepped Bent Strip is fixed to Strip 14 and a 1" Pulley 15 is fixed on a 1" Rod mounted in it. The arm pivots on a $3\frac{1}{2}''$ Rod held by Spring Clips in the Strips 9.

The shovel is raised or lowered by turning a Crank Handle mounted in Flat Trunnions bolted to the chassis. An Angle Bracket 16 bolted to one of the Flat Trunnions is arranged to press against the lugs of a Spring Clip on the Crank Handle, to prevent it from turning too freely. Cord fastened to the Crank Handle is taken over Rod 4 and Pulley 11, round Pulley 15, and is tied to one of the Strips 9.

The catch to lock the shovel in its loading position is made from an Angle Bracket 17 that engages under one end of a $2\frac{1}{2}''$ Stepped Curved Strip 18. The Curved Strip is lock-nutted to a Fish-plate, which is bolted to Strip 14. A $2\frac{1}{2}''$ Driving Band is looped through the Curved Strip and is bolted to Strip 14, so that normally it pulls the Curved Strip against the Stepped Bent Strip. The catch is released by operating a lever 19, lock-nutted to one side of the cab. Cord tied to the lever is passed over the Rod on which the shovel arm pivots, and is tied to the Curved Strip 18. When the shovel arm is raised, releasing the catch allows the shovel to swing down to discharge its load. The shovel is returned to its working position automatically as the arm is lowered by a Cord 20. This Cord must be taut when the shovel is at ground level with the catch engaged.

Parts required to build the Shovel Loader: 8 of No. 2; 2 of No. 3; 7 of No. 5; 5 of No. 10; 2 of No. 11; 8 of No. 12; 1 of No. 15b; 3 of No. 16; 1 of No. 17; 2 of No. 18a; 1 of No. 18b; 2 of No. 19b; 1 of No. 19g; 3 of No. 22; 1 of No. 24; 6 of

(Continued on page 418)

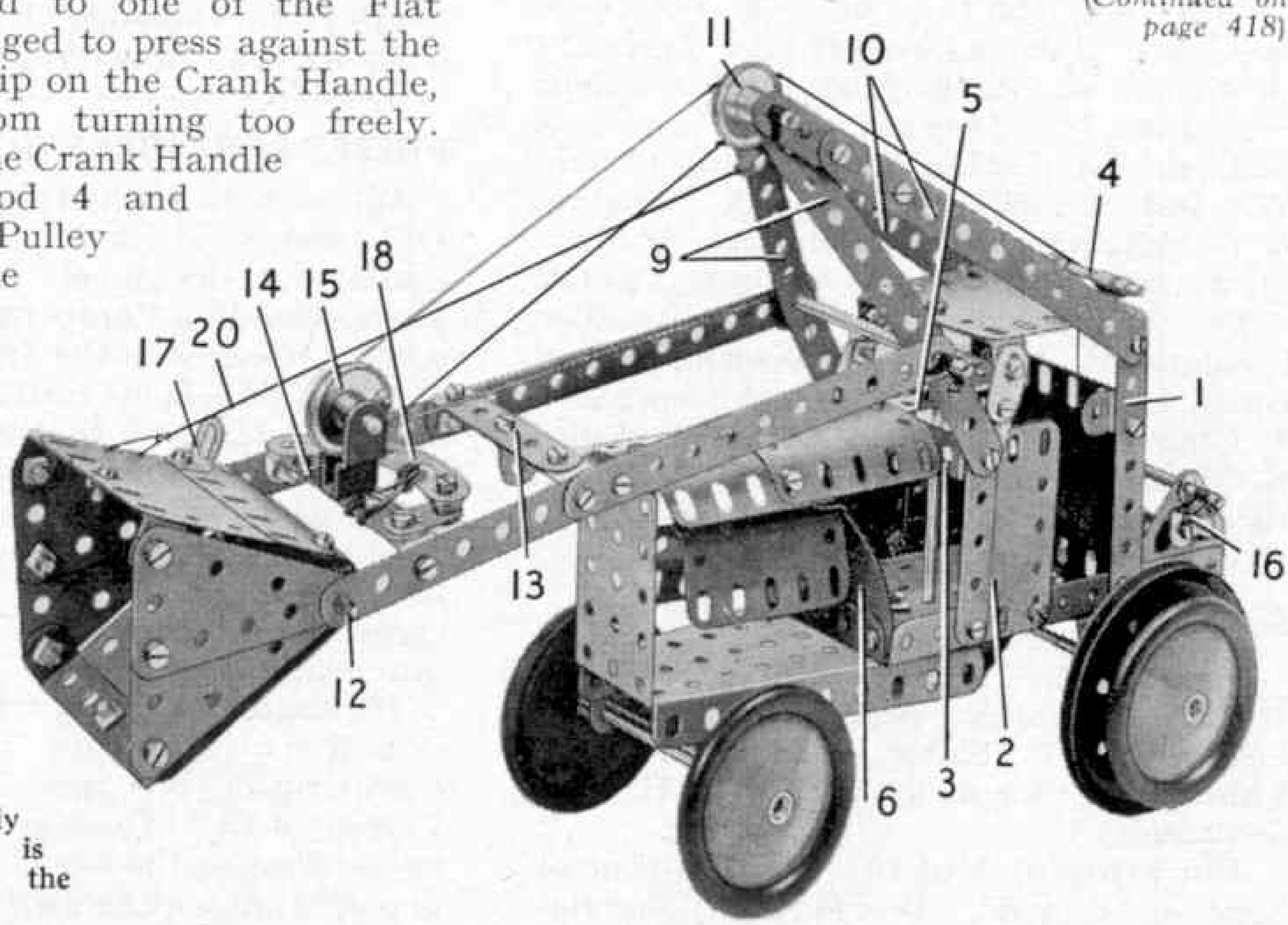


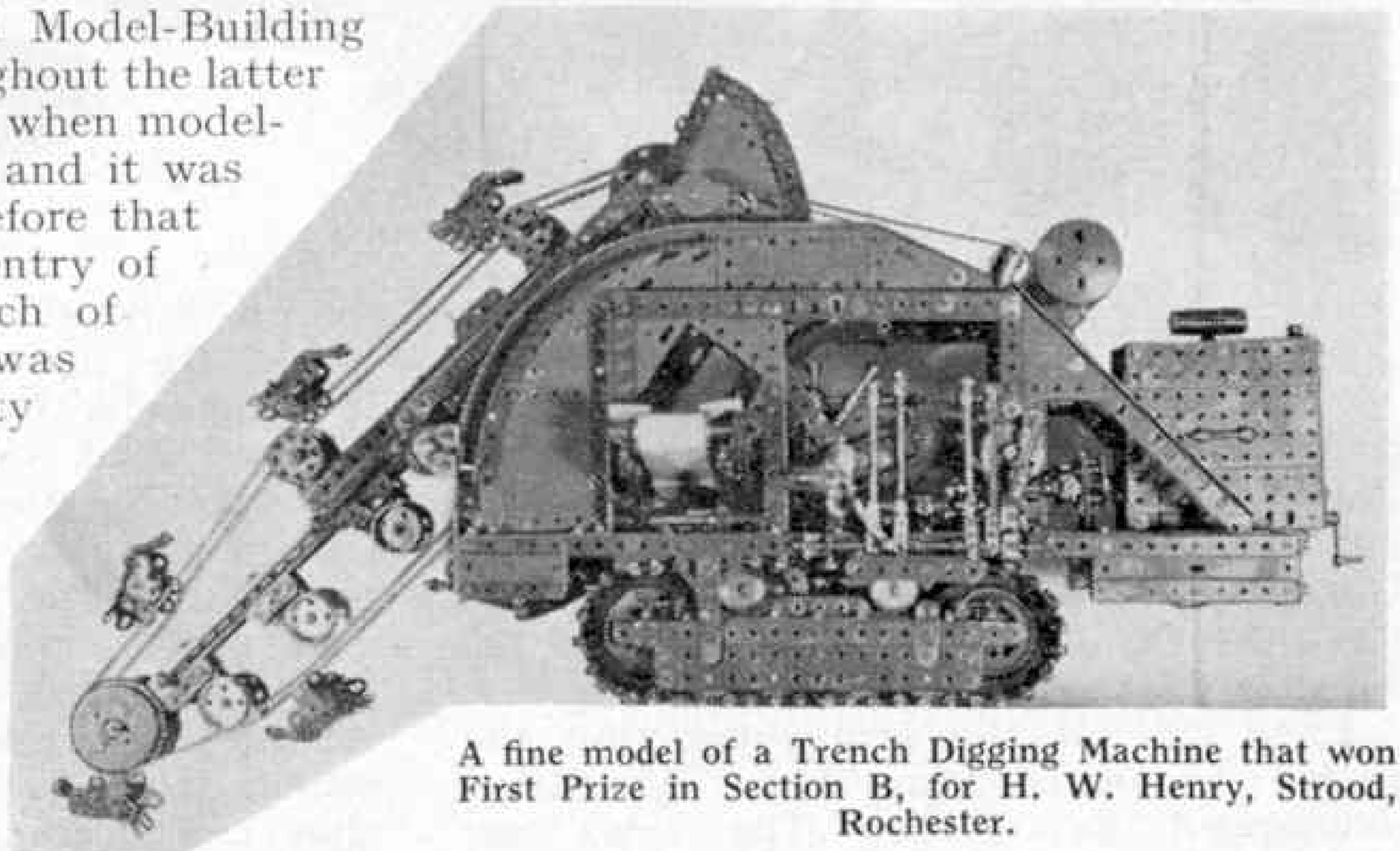
Fig. 3. In this view the operating arm of the Shovel Loader is partly raised, and the catch is released to discharge the contents of the shovel.

Model-Building Competition Results

By "Spanner"

February General Contest

THE February General Model-Building Competition ran throughout the latter part of the winter season, when model-building was at its peak, and it was only to be expected therefore that it would attract a large entry of outstanding models. Much of the work submitted was excellent both in originality of subject and in the degree of workmanship displayed, and those named in the following lists of prize-winners have every reason to be proud of their success in the face of such fierce competition from their fellows.



A fine model of a Trench Digging Machine that won First Prize in Section B, for H. W. Henry, Strood, Rochester.

The full lists of awards in Sections A and B of the Competition were as follows:

Section A

First Prize, Cheque for £4/4/-: R. W. Denny, Ipswich. Second Prize, Cheque for £2/2/-: R. G. Benson, Harrow. Third Prize, Cheque for £1/1/-: P. Goldsmith, Hornchurch.

Ten Prizes each of 10/-: P. Holmes, Thorpe Bay; The Boys of S. Charles' Minor Seminary, Tabora, Tanganyika Territory; G. Vanstone, North Tawton; B. Culshaw, Scarisbrick; D. Howlett, Hull; F. and M. Mahnen, Esch on the Alzette, Luxembourg; W. and J. Slosse, Antwerp, Belgium; R. G. Matthews, Sutton Coldfield; R. Spain, Stowmarket; W. Stubgen, Toronto, Canada.

Ten Prizes each of 5/-: M. Bradban, London; R. J. Fowler, Norwich; B. J. Green, Birkenhead; M. Hutchins, Camberley; T. Chambers, Lincoln; J. Fairlie, Dundee; K. M. Farrington, Norwich; M. J. Werson, Birmingham 20; A. C. Mason, Coulsdon; R. Yeo, Ashford.

Section B

First Prize, Cheque for £4/4/-: H. W. Henry, Rochester. Second Prize, Cheque for £2/2/-: D. Slater, Lakeside, Canada. Third Prize, Cheque for £1/1/-: G. B. Lewis, Swansea.

Ten Prizes each of 10/-: O. J. McIntosh, Carman, Canada; W. Hirst, Timperley; P. Doherty, Coleraine; R. Coombes, Harrow; M. A. Viglioglia, Buenos Aires; A. E. Pengelly, Vensen Noord, Holland; C. Cohen, Cape Town, South Africa; P. J. Marais, Wynberg, South Africa; E. Feldmann, Leeds; H. Harwood, Darwen.

Ten Prizes each of 5/-: B. Fox, Dundee; M. Harrison, Southland, New Zealand; N. Christie, Blairgowrie; R. Rutherford, Carlisle; J. Weldon, Sheffield; J. Watts, Watford; D. J. Horton, Walsall; J. Harper, Dudley; E. Imboden, Buenos Aires; T. v. Vollenhoven, Slikkerveer, Holland.

PRIZES FOR MODEL BIRDS AND BEASTS

We wish to remind readers that there is still time in which to prepare and submit entries for the novel "Birds and Beasts" Model-Building Competition, full details of which appeared in the June and July issues of the *M.M.* This Contest closes for entries on 31st August, so that to have a chance of winning one of the Prizes offered, you must hurry now and send in your entry.

The Contest is open for simple Meccano models of Birds and Beasts or other creatures of any kind, and these can be humorous if desired.

Photographs or drawings of models only should be sent to "Birds and Beasts Competition, Meccano Ltd., Binns Road, Liverpool 13." There is no age limit and no restrictions on the size of Outfits or quantity of parts that may be used in building models.

Club and Branch News

WITH THE SECRETARY

MAKING THE MOST OF OUTINGS

Reports coming in show that many Clubs have been taking advantage of the fine Summer we have had so far by arranging regular outdoor recreations and visits to places of interest. By thus keeping in frequent touch with the members much can be done to prevent the drifting away that usually occurs when a Club closes down during the Summer.

I hope that on their outings members are remembering to have notebook and pencil handy, so that they can make useful notes, and if necessary rough sketches, of anything they see that might make a good subject for Meccano model-building next Winter. Club committees can encourage this alertness by arranging a "Meccano Model Ideas" competition, based on such outings, the closing date to be at the end of this summer Session. The prize-winning suggestions could be made the subject of a special model-building meeting early in the Autumn.

CLUB NOTES

MILE END (PORTSMOUTH)—Meetings are now held in a much larger room, and conditions are much more comfortable. At a recent General Meeting held jointly with the associated H.R.C. Branch it was decided to have a Meccano display in early Autumn and a combined Club and Branch Exhibition next November. Another successful Open Meeting has been held. A Mock Trial has provided much amusement. Club roll: 30. *Secretary:* Mr. A. J. Nicholson, 213 Sultan Road, Buckland, Portsmouth.

CONSETT AND DISTRICT Y.M.C.A. M.C.—A great deal of Model-building has been completed during recent months, and the extensive programme in hand includes the construction of a model industrial area on a bench 40 ft. long by 3 ft. 6 in. wide. There will be a miniature coal mine, coal grading plant, coke ovens, coke grader, by-products plant and a model steelworks. The model of a threshing machine is almost completed, and the member responsible for it is also instructing a junior member in the assembly of a model baler. Club roll: 26. *Secretary:* T. H. Porter, 38 Backstone Road, Bridgehill, Consett, Co. Durham.

Another interesting picture from the Kota M.C. The five officials in the back row are (left to right): Messrs. M. Singhal, Auditor; H. S. Chablani, Secretary; S. L. Chablani, Leader; M. Mittle, Librarian; and K. Jain, Accountant.

ST. THOMAS AND DISTRICT (EXETER) M.C.—Attendance at meetings has been well maintained. During the Summer these meetings are devoted mostly to games such as table tennis—which is especially popular with the several girl members recently enrolled. Club roll: 15. *Secretary:* E. Milton, 57 Beaufort Road, St. Thomas, Exeter.

SOUTH AFRICA

CAPE PENINSULA M.C.—Model-building meetings are held fortnightly, and excellent results have been achieved. A film show that included the screening of the film *San Demetrio of London* was greatly enjoyed. Club roll: 29. *Secretary:* P. B. Simpson, "Sherwood," Newlands Road, Claremont, Cape Peninsula, South Africa.

Officials and members of the Kota M.C., India. In the middle row the Leader, Mr. S. L. Chablani, is seated on the extreme left, with Mr. R. Khosla, Vice-President, next to him, and then Hari S. Chablani, the Secretary. This excellent and flourishing Club was affiliated with the Meccano Guild in October 1955.

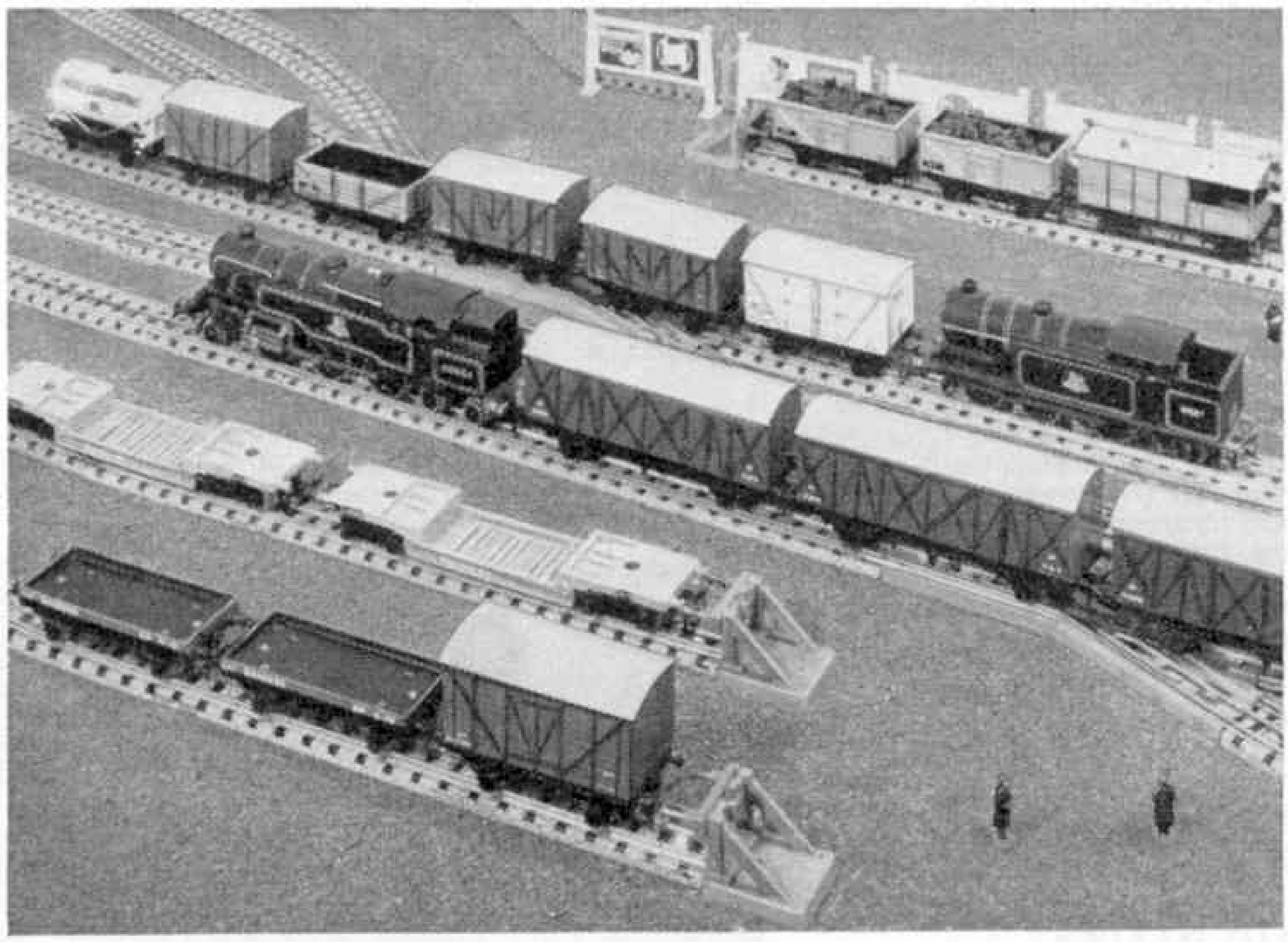
BRANCH NEWS

KIDDERMINSTER—Track operations, railway quiz and model contests have been the main activities. Model aircraft construction has become very popular. *Secretary:* A. J. Potter, 35 Woodfield Crescent, Kidderminster.

ARMLEY (LEEDS)—Meetings have been well attended, and enjoyable track operations carried out. Members work in teams, each team being named after a famous locomotive, and points are awarded for skill in operating the trains on the layout. More scenery and lineside models are being constructed. *Secretary:* M. Blakey, 21 Arley Street, Armley, Leeds 12.

HALE END (LONDON)—Now that the new baseboard has been completed, members have been busy with the planning and setting out of the new layout. *Secretary:* A. L. Coe, 463 Hale End Road, Highams Park, London E.4.

MILE END (PORTSMOUTH)—The hardboard recently purchased to form the basis of a new Branch layout has been strengthened along the edges, and the Dublo track screwed down. The station and other buildings have been fixed in position. *Secretary:* Mr. A. J. Nicholson, 213 Sultan Road, Buckland, Portsmouth.



The Long Wheelbase Vans next to the engine suggest a fast freight train. In the background a shunting movement is in progress.

HORNBY RAILWAY COMPANY

By the Secretary

Good News!

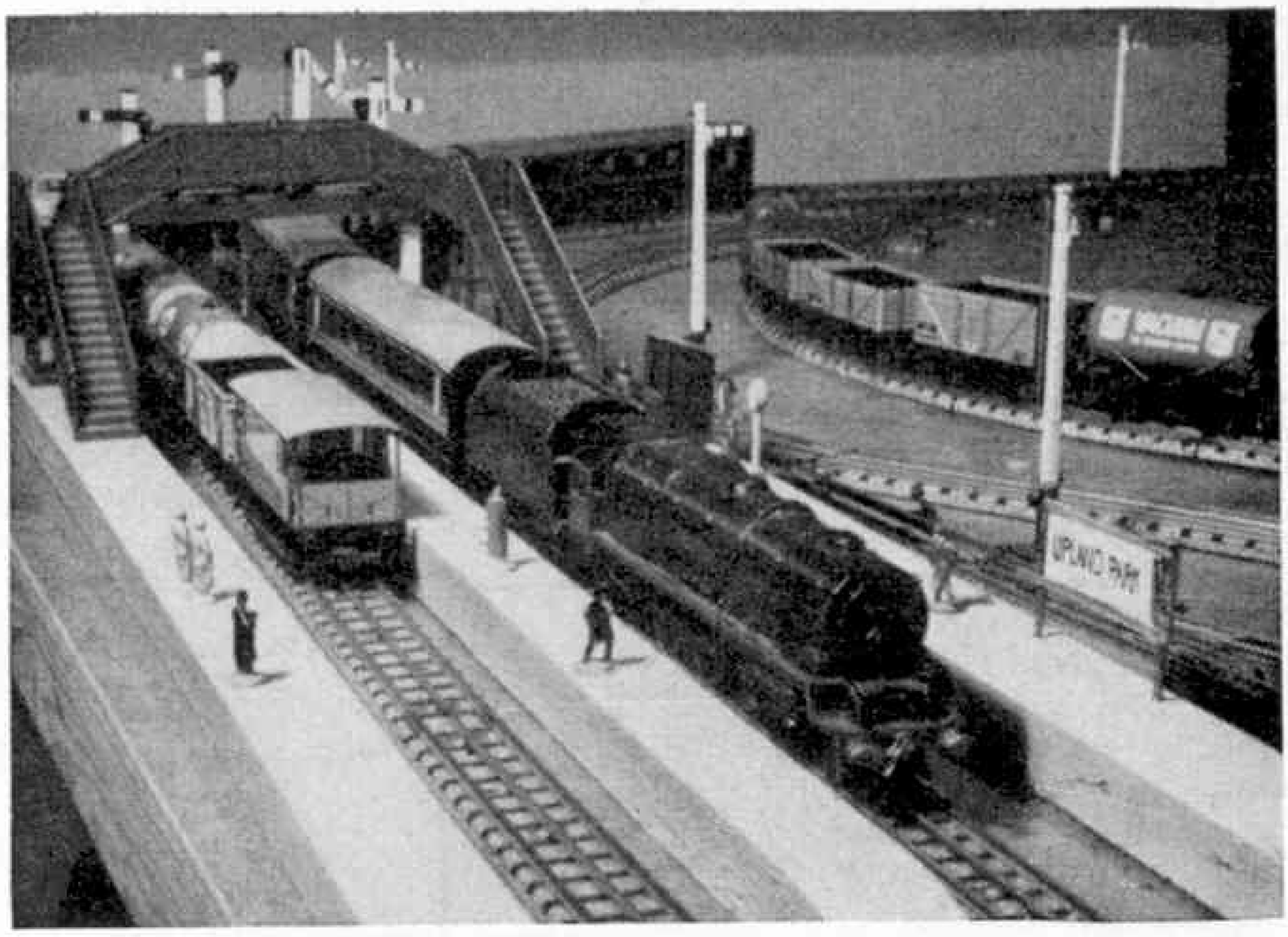
RECENT weeks have seen the appearance of further new things in the Hornby-Dublo system. I expect that some readers will already have seen these, and those who have not will welcome gladly the details that follow.

You are now all familiar with the long-wheelbase goods vehicles added to the range towards the end of last year, and there have been suggestions that a Train Set including these would be specially attractive. Well, this has come along, in the shape of the new EDG19 2–6–4 Tank Goods Train Set. The popular and powerful 2–6–4 Tank has a worthy train in the long wheelbase Ventilated Van, Tube Wagon and Double Bolster Wagon, with the *Mobil* Tank Wagon, distinguished by the latest insignia, and the L.M.R. type Goods Brake Van bringing up the rear.

This then is quite a smart train that can very well mean the beginning of a fast freight service on a Hornby-Dublo layout. Two of the long-wheelbase vehicles represent brake fitted stock, that is fitted with vacuum brakes, and so they are distinguished from the others in the Set by their bauxite colouring.

Recently it has become possible in Hornby-Dublo to follow up the change in livery for B.R. corridor stock that began in actual practice rather more than twelve months ago. I expect that some of you will recall the news that the red and cream livery with which we have become familiar was gradually to be replaced by a one-colour finish in maroon. There are exceptions to this arrangement, but I will say more about these in a moment.

These changes are being made gradually in actual practice. So, in Hornby-Dublo, red and cream stock is retained for the time being. But in another new Train Set, the EDP22 *Royal Scot* with the *Duchess of Montrose* 4–6–2 Locomotive, there are what are known as D22 Corridor Coaches, of the type with pierced windows and internal corridor partitions, available in this latest finish and very good they look, too. There are two types of the new coaches, known respectively as D22 Corridor Coach, Brake 2nd, and D22 Corridor Coach, 1st/2nd. Horizontal lining runs along the waist of these vehicles and above the "lights," as the windows are called by coach builders. The ends are black, as is usual nowadays, and the



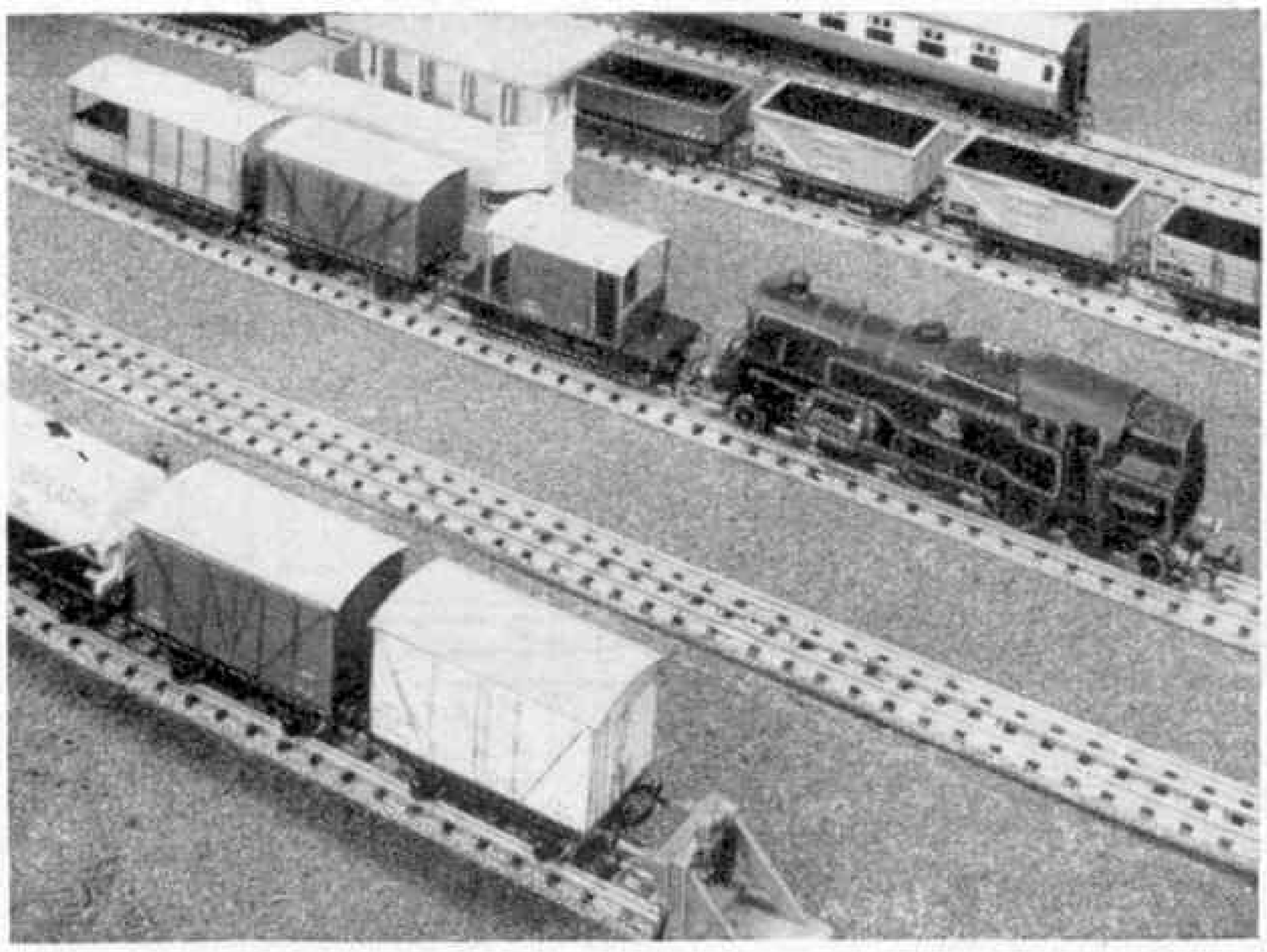
"Upland Park," on the layout of J. D. Wethey, Oxford, with a passenger train of one-colour Corridor Coaches alongside the platform.

roofs are the standard B.R. shade of grey.

Here then is stock that provides you with the opportunity for putting into operation on your layout not only the famous service after which the set is named, but many other long distance main line trains on which Duchess engines are used. Such Coaches would be just the thing also for the newly instituted *Talisman*, which operates morning and afternoon over Eastern, North Eastern and Scottish Region metals. Your *Silver King* is just the engine for this job, with its corridor type of tender for through running purposes.

And here are two suggestions that would give many of you more fun easily. First, there is no reason at all why you should not add the maroon vehicles of the EDP22 Set to an existing red and cream corridor train, for this sort of mixed formation is something that is seen every day at present on the real railways, even on quite important expresses. Second, older Hornby-Dublo owners will recall the Corridor Coaches in the colours of the former L.M.S. that were available before the introduction of B.R. liveries in Hornby-Dublo. Well, the new maroon D22 Coaches have a similar appearance, and the two types could in fact be quite reasonably run together on a layout incorporating old stock as well as new. This is bound to happen on systems that have been built up over the course of several years.

Now for the exception I mentioned earlier. The Western and the Southern Regions are more or less excepted from the change-over to maroon coloured corridor stock. These Regions have their own liveries. There is green for the Southern, while the familiar brown and cream long characteristic of the former G.W.R. has been adopted as standard for Western Region corridor stock used for the principal long distance expresses. It has not yet been possible to incorporate this change in Hornby-Dublo, but who knows? Perhaps I shall have the pleasure of announcing the introduction of one of these Regional colour schemes later on.



A Hornby-Dublo 2-6-4 Tank, with a Cattle Truck and two Goods Brakes, is on its way bunker first to carry out pick-up goods train operations down the line.

Automatic Control for Hornby-Dublo

By Sqn. Ldr. T. W. Newberry, R.A.F.

THE details on this and the following page describe a means for the control of Hornby-Dublo trains at Points or Crossings so that, should two trains approach on converging tracks, the one to arrive first continues, while the other is held until the track is clear, and then it is allowed to proceed. Points operate automatically to allow safe passage to the moving train and signals give the correct indications.

This scheme requires modified or non-standard equipment, including a special rail, a suitable relay and a small dummy collecting shoe. The special rail length has two conductor rails as close together between the running rails as is practicable. One is a normal centre rail and the other is designed to take current from this when they are bridged by the engine collecting shoe or by one of the dummy shoes. From this rail the current is taken to a suitable terminal and thence to the relay.

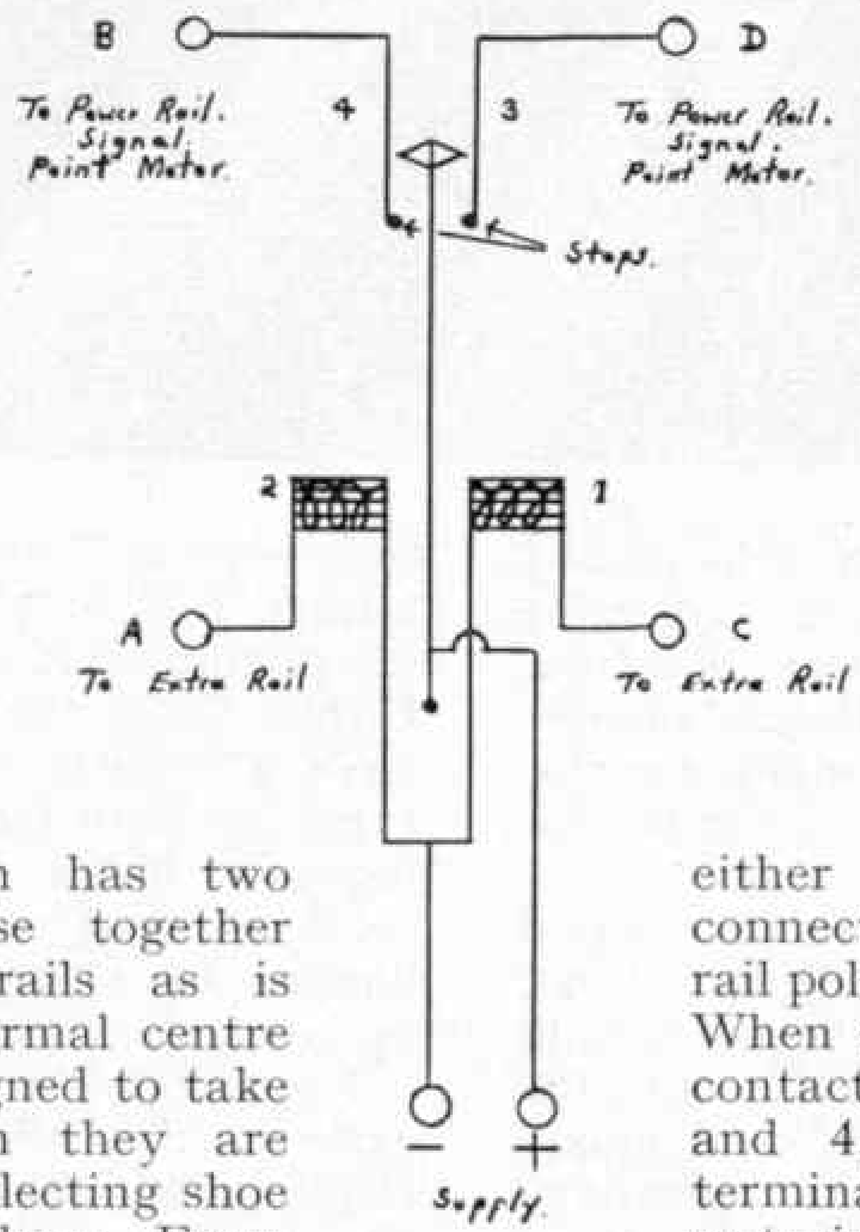


Fig. 1.

One of these special rail lengths is fitted in each approach to the junction or crossing, with one standard rail length between. This standard rail is the safety precaution to guard against over-running of fast traffic; it gives the train more time to come to rest. The special rail, standard rail and Points or Crossing are completely isolated from the rest of the track as shown by the word *Isolation* in Fig. 2, but not from each other.

The relay arrangement is sketched diagrammatically in Fig. 1. Its purpose is to use the current collected from the special rail when the two conductors are bridged by the shoe to effect the switching off of power from the isolated portion of the other line leading to the Points or Crossing, and to operate Points and Signals. It consists of two solenoids, marked 1 and 2 respectively, which have a common centre supply of the same polarity as the running rails, led to the terminal indicated in Fig. 1 by a minus sign. The outer ends of the solenoid connections are led to terminals A and C.

These solenoids are used to deflect a central armature towards either one, and this armature is connected to the terminal of centre rail polarity indicated by a plus sign. When at rest, the armature makes contact with two spring blades 3 and 4, which are connected to terminals B and D. They are restrained from moving inwards, farther than is necessary for good contact with the armature, by stops.

Normally, with power connected to the terminals marked *Supply* in Fig. 1, B and D will be "live" with centre rail polarity. Now, if terminal A is made "live", solenoid 2 will be energised and the armature will be

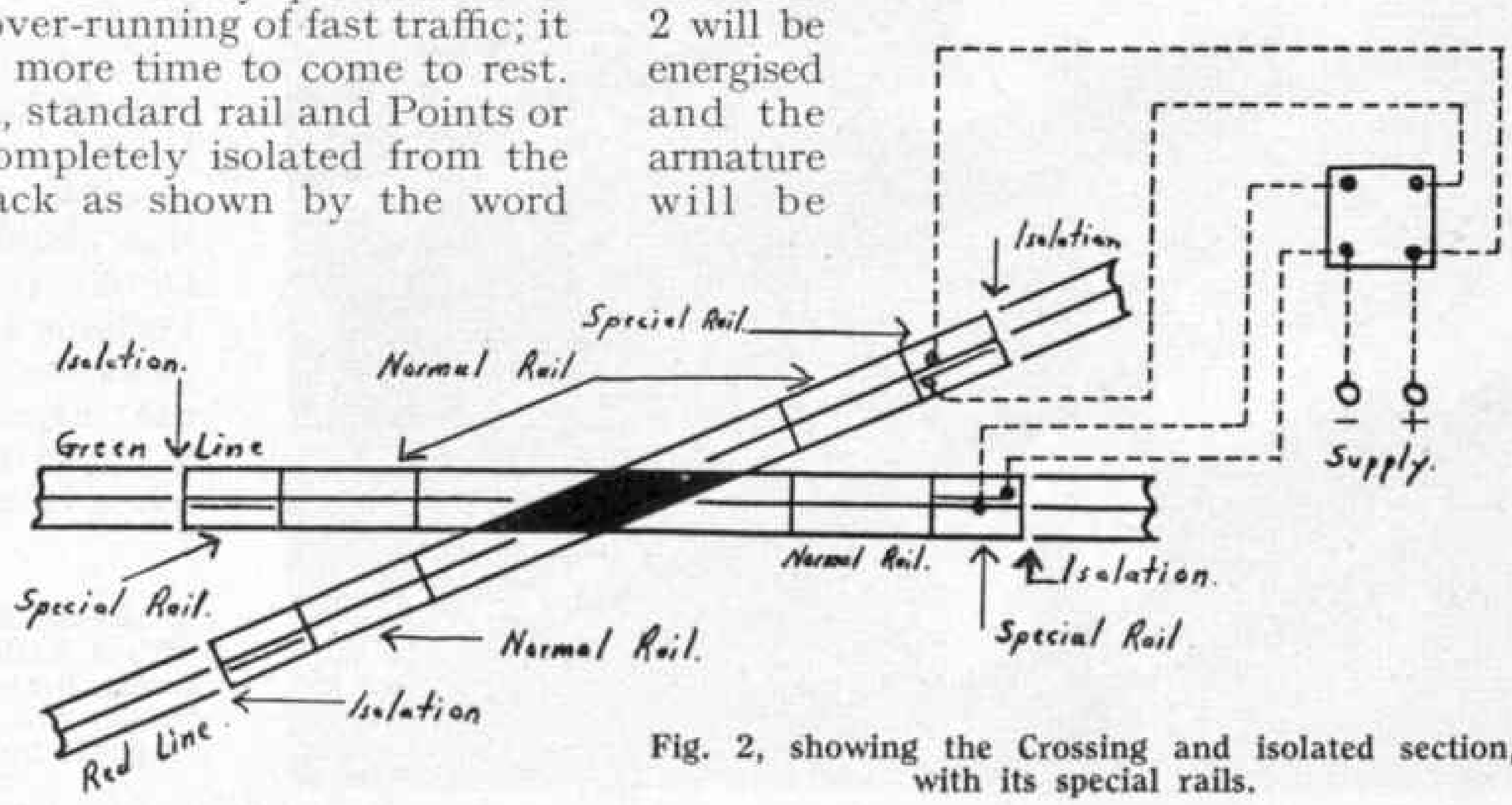
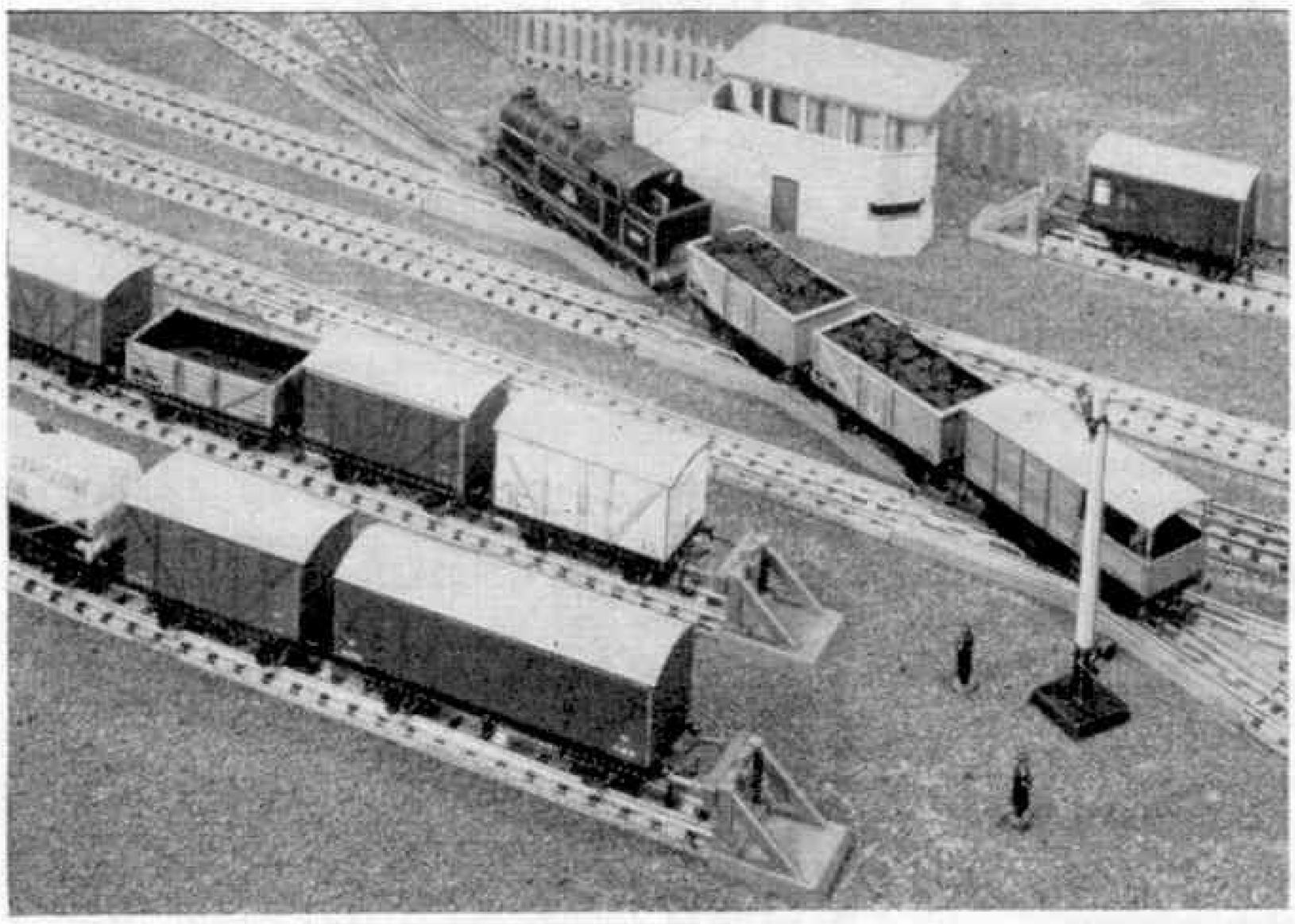


Fig. 2, showing the Crossing and isolated section, with its special rails.



A short coal train traverses a succession of Crossings to reach the sidings on the far side of the main line.

attracted towards it, moving spring blade 4 to the left. Blade 3 can only move as far as the stop, when contact with the armature will be broken. The result will be that terminal B will remain "live" and D will be "dead". Conversely, if the current is applied to terminal C, solenoid 1 will be energised, D will remain "live" and B will be "dead".

The dummy shoe referred to is used on long trains to ensure that the bridging of the double centre rails in the special length of rail continues after the engine has passed, when it is still necessary to keep the track clear. The shoe as shown in Fig. 3 is made of plastic or other insulating material in the form of a broad "hook", which can be clipped over the axle of one of the vehicles. The lower end carries a small metal plate, the sole object of which is to bridge the centre rails. Several of these shoes may be required in one train.

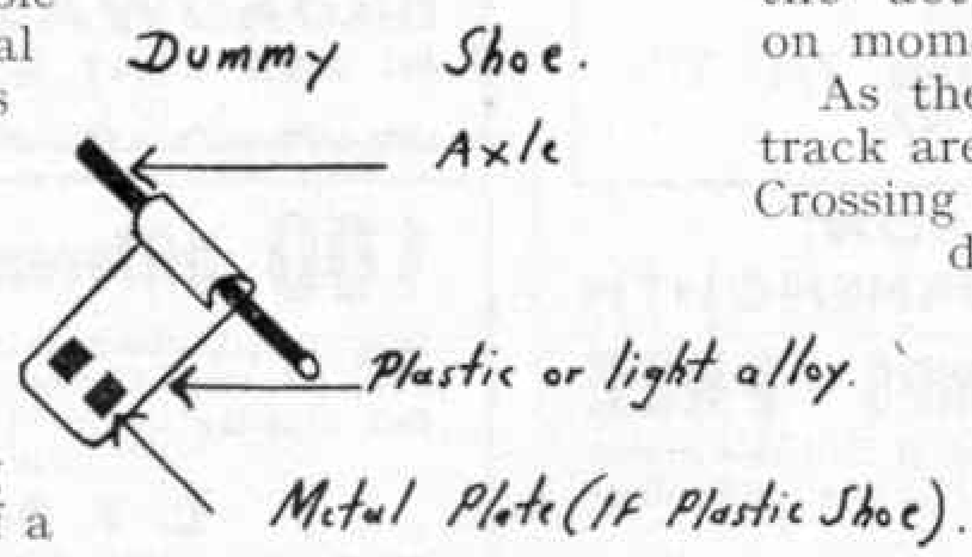


Fig. 3, showing the dummy shoe referred to in this article.

The track is wired as shown in Fig. 2, which shows the intersection at a Crossing of two routes that we can call Green Line and Red Line respectively. The rails adjacent to the Crossing are of standard type and next to these are the special sections with two centre rails in each length. From the beginning of the special rails on each side of the Crossing, the section is completely isolated from the rest of the track.

Terminals A and C of the relay are connected to the extra centre rail in each of the pair of special lengths leading to the Crossing in Green and Red lines respectively. Terminals B and D are connected to the remaining centre rail in each length respectively. The two special lengths in each route are connected to the relay in parallel.

A train approaching the Crossing, on the Green Line, from right to left, will arrive at the isolated special rail, which is fed from terminal B of the relay, and the engine collecting shoe will bridge the two centre rails and take its current from terminal B through the centre rail. It will also close the circuit to terminal A of the relay and, since terminal D will now be "dead", the Red Line route is open circuited and any train on it will be halted at some point after the beginning of the special length, the the actual over-run depending on momentum.

As the two special rails in each track are connected in parallel, the Crossing is protected from either direction. When the engine of the train on the Green Line route has passed the special rails, both tracks become "live" again and the train held on the Red Line will start. For this reason, enough dummy collecting shoes must be fitted to the train to ensure that the two centre rails in at least one of the special lengths in the line are bridged for the whole of the time that the moving train is obstructing the Crossing.

Points and Signal "motors" are connected to terminals B and D as appropriate.

So much for the idea. Its application could take many forms according to the use made of the relay. For two trains, one relay will protect any number of Points or Crossings.

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For other Stamp Advertisements see also pages 416 and xx

Stamp Collectors' Corner

By F. E. Metcalfe

LET'S GET STARTED

During the past few months we have been looking at the hobby of stamp collecting from most angles, and I hope that what I have written on the subject will have thrown some light on the reasons why this pastime enjoys such wide world popularity. This month, in a way, I propose to sum up in the light of recent events.

The cult of collecting stamps is almost as old as stamps themselves, and it is no exaggeration to say that at least half the stamp issues of today have no other purpose behind them than their ultimate sale to collectors.

This of course is the reason why so many are so attractive! Even so, all the publicity given in the newspapers about the Dartford 2d. imperfs being worth £10,000 came as a great surprise to the man in the street, though there had been no sudden change in values. A lot of ridicule was poured on collectors by those outside the hobby, but who cares? Stamp collecting is going stronger than ever, and values are still mounting. As an example of this, it can be mentioned that a pane of Great Britain K.G. VI 2½d. found imperforate in a booklet was sold by auction in 1953 for £320. A similar pane, but this time of current Q.E. II stamps, made £525.

There is still the chance of other examples turning up. But for average collectors such as ourselves, airy-fairy items are outside our collecting world. But it is well to mention them, to show what substance there is behind our hobby, even if we must look twice at every sixpence we want to spend on stamps.

Since I started this series of articles, I have received many letters from those intending to take up the hobby for the first time. Among these correspondents were one or two who had been attracted by the newspaper publicity to which I have already referred, and for these and others attracted to the hobby for similar reasons I wish to make a few comments.

It was quite obvious that it was the £10,000 sheet of stamps with a face value of £2 that had made the greatest appeal, for running through their letters all the time was the monetary theme. That stamps must be a paying proposition was clearly the thought in their minds. To that I would reply, that if a would-be collector can see no more in the hobby than cash profit, do please keep as far away from stamps as you can, for you will be completely disappointed if and when you come to sell your collection, unless you have much more than average luck. On the other hand, if you will count as a gain the pleasure you derive from the hobby, then you will not feel that your outlay, and your time, have been wasted.

Most of the letters I received asked for guidance as to what stamps should be collected. In some cases I felt that some of my correspondents were likely to spend more of their cash than they would want to throw away, and to these and others similarly situated, I would say without the slightest hesitation, go in for British Commonwealth stamps of the present reign. If you do want to collect more extensively, then add the stamps of the last reign to your field of campaign.

The next question is whether to collect mint or used stamps. Mint stamps are definitely more desirable. It is quite easy to get used stamps of the big Dominions such as Australia and Canada, and they are also generally cheaper than mint, but you will want to collect also the issues of the smaller colonies, such as Grenada, St. Lucia, Swaziland, etc., and the only used stamps of these countries that are likely to come your way may be mere cancelled to order specimens that have done no postal service, and in any case do not look half as attractive as mint.

It is nice to be able to say that our own British Commonwealth stamps of today are probably the best investment, as far as stamps are an investment. But those very beautiful modern issues of countries like Austria, France and Hungary cannot help but appeal to many, and there is no reason why you should not collect them if you wish. After all, quite a showing can be made without spending too much, and if neatly mounted and written up in a loose leaf album they will have a fairish re-sale value.

I was in a stamp dealer's shop the other week. A young man came in with one of these printed albums, which had probably cost about 15/-. It contained hundreds of stamps. When the would-be seller had gone out the dealer remarked that the collection must have cost two or three pounds. He was very polite, and remarked that the collection did not interest him, as he had plenty of all the stamps it contained, which was perfectly true.

Now if a collection in a neat loose leaf album had been offered, on which the same sum had been expended on sets, say to a shilling, or even threepence, of Q.E. II or K.G. VI stamps, the dealer would at least have offered a price with some relation to what the collection had cost. As it was, the collection actually offered had practically no re-sale value. So use a loose-leaf album if you can.

The publicity given to stamps, has made the hobby of collecting them more popular than ever, and it is for those planning to start the hobby that I have written on the subject in recent issues. In the past I made all the mistakes you are likely to make. Experience has now taught me how to avoid them, and my aim has been to help you to avoid what can be costly pitfalls.

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Stamp Gossip

FIRST PRIZE

American collectors certainly say what they think to their postal authorities if they don't like any of the stamps they issue. *Linns Weekly Stamp News* runs a yearly competition to find out the best and worst designs, and the commemorative thought least necessary among U.S.A. stamp issues of the past year. Votes came from 18,641 readers, and the stamp depicting an antelope, one of the Wildlife Conservation series, received top marks for best. The "Pure Food" Commemorative received the lowest number of marks, and besides being thought the worst in design it was voted the least necessary!

THAT NEW ALBUM

Many of us are now thinking more about outside rather than indoor hobbies, so let us get all the fresh air we can. But it is possible that a new album may be needed when we next get busy with our stamp collecting. My advice is get it now, for I hear that further stiff rises in the cost of albums are to be expected shortly.

More important, do try to avoid laying your album flat on some shelf, particularly if you go in for mint stamps. Keep it upright, otherwise your stamps will be pressed into the pages, to a degree no one would imagine who did not know what does happen. With the slightest damp about, when the album is not disturbed, after a few months many stamps will be found stuck down, and that puts paid to your mint copies, for when you have prised them off they will, alas, be mint no longer, for as you know, a mint stamp must have full gum.

One more word of warning if you collect Queen Elizabeth Commonwealth stamps. New stamps are coming out all the time, which means that others are going obsolete. So to ignore your collection for even three months could prove quite costly when you have to buy the stamps you had missed.

DAVID THOMPSON

Canada has brought out a stamp in honour of David Thompson, who is worthy of it. David was a young English "charity" boy, as he has been described, who at the age of 13 went to Canada in the service of the still powerful Hudson's Bay Company. He had completed a course in navigation before arrival, but continued his studies, and he was soon carrying out important exploratory work for his company in the North West.

By the time David was 17 he had penetrated as far into Western Canada—a very different country in those days from what it is now—as present-day Calgary. He is said to have had unusual ability to get on with the various tribes on Indians, and this played an important part in the success of his work. He died in 1857 after he had become famous for his achievements in the territories now known as Alberta and British Columbia.

The stamp was issued on 5th June, and the illustration shows that it is one more example of the very beautiful stamps that have made Canadian issues so popular with collectors all over the world.

A GREAT CENTENARY

It is just too bad, that while all the world has been paying stamp homage to the birth centenary of the late Lord Baden-Powell, his own country quite ignores the event. Again I must say it is too bad that countries like Persia have to do the honours. And we are doing nothing about stamps to celebrate the 50th anniversary of the Boy Scouts Movement either, yet countries as far away and as diverse as Korea, Finland, etc., are all doing this.

THE MONTH'S TIP

Recently a pair of current stamps, 20c. and 1/–, were overprinted for Somaliland and issued on 21st May to commemorate the opening of the Legislative Council, 1957. This event has drawn attention to a country that has never seemed to be in the news as far as stamps are concerned. During and after the war there was a bit of fun, for when the Italians invaded the country, they looted the stocks of stamps to be found in the few post offices there and these came on to the market, to lower the values of sets already in collectors' hands.

All that died away and a set of the same designs came out, but with the portrait of King George VI now full faced, and when the currency was changed from annas and rupees to cents and shillings in 1951, the stamps then current were surcharged.

A couple of years afterwards a new set was issued in six pictorial designs, with the Queen's portrait. The surcharged set simply went off sale, but it would seem that not many were put away, for it is getting more difficult to obtain. I feel that it is quite a good little set. It is not a rarity, and it should not be difficult to find one, but I think it is scarcer than the present price indicates. So if you are wanting to treat yourself, or a friend, this Somaliland 1951 overprinted set is one I would suggest you consider buying.

In addition to the straight set, try to get the shades of the 20c. and 70c.—see the Commonwealth Catalogues.

Charcoal Burning Today—(*Continued from page 371*)

In modern methods in which portable kilns are used the metal walls serve to keep out unwanted air, but they do it more efficiently than the earth covering of the older way and allow of easier control.

It was during the last World War that these huge iron cylinders, constructed in two separate 4 ft. high rings with a lid section and chimney on top, were first introduced, and they are employed in most charcoal burning districts. There are four chimneys to each kiln, and inside are eight extra air pipes leading from its heart. Timber is piled into the kiln, the heap is lighted, and the lid is placed on top. The chimney opening is partly blocked with a metal plate once the kiln is burning well, and combustion is thus well controlled.

The kilns hold three tons of wood and the operation covers approximately three days, for while the burning may be completed in a single day, two or more days are needed for the hearth to cool.

Charcoal is black in hue and shows a bright metallic lustre. In a first-class sample the original logs are practically unbroken, and you may still discern the structure of their grain. Incidentally, small pieces of charcoal are quite clean to handle.

Kilns and retorts also are used in charcoal making that allow the recovery of many valuable products that are lost when the methods already described are used. These receptacles are fitted with condensers, the chief product being Stockholm tar or creosote, which is used for preserving timber. More recently low temperature distillation has been introduced with the aim of producing spirits and oils of various kinds, but the quantity and the quality of the charcoal is then reduced.

Castles in the Air—(*Continued from page 384*)

contractors at a later date had a "Brindley" type aqueduct over the Ouse, but poor workmanship accelerated its collapse in a storm soon after erection and a temporary wooden trough was erected until the present 60 ft. long iron trough arrived from Ketley Bank Iron Works in Shropshire. Remains of the piers of the original aqueduct may be seen in the Ouse below.

In British Canal history one of the lesser known and more obscure projects was the Tub boat system of S.W. England, the leading engineer being James Green of Exeter. Two of his fine aqueducts remain, one being at Veala, where the Bude Canal crosses the River Tamar, and the other at Beam, near Torrington. Beam aqueduct has now been merged into the driveway to Beam House, its five round-headed arches with ornamental balustrades having survived since 1825 in virtually untouched condition.

Smaller aqueducts exist up and down the country wherever canals have been constructed, a fine example by Telford being seen at Stretton, where the Shropshire Union Canal crosses Watling Street. It is a common sight to witness narrow boats sailing by sedately far above the hurry and rush of modern motor traffic. Each of these smaller aqueducts is worthy of closer inspection, for few if any are exactly alike and yet all have played a vital, if small, part in the advancement of civil engineering to its twentieth century achievements.

Meccano Shovel Loader—(*Continued from page 407*)

No. 35; 73 of No. 37a; 66 of No. 37b; 12 of No. 38; 2 of No. 38d; 1 of No. 40; 1 of No. 44; 1 of No. 48; 6 of No. 48a; 1 of No. 51; 1 of No. 52; 1 of No. 54; 1 of No. 90a; 5 of No. 111c; 2 of No. 125; 2 of No. 126; 2 of No. 126a; 1 of No. 176; 1 of No. 186; 4 of No. 187; 2 of No. 188; 4 of No. 190; 2 of No. 199; 2 of No. 200; 2 of No. 212a; 1 of No. 213; 1 of No. 214; 4 of No. 221.

"TRAINS ILLUSTRATED SUMMER ANNUAL"

Edited by G. Freeman Allen

(Ian Allan, price 4/6)

Trains Illustrated Summer Annual is intended mainly for holiday reading, but it is a valuable reference work apart from this because of the variety of subjects covered. Produced somewhat on the lines of the popular monthly *Trains Illustrated*, but with a larger size page, the Annual is an "extra" in which several leading railway authors cover such different territory as the Highland line to Kyle of Lochalsh and the China Clay district of Cornwall. Ireland and the Isle of Man are visited, and there is an account of a footplate trip over the Midland main line from London to Carlisle. The reader is also given an insight into the working of the Kent Coast holiday trains, and details of the various routes to the Continent. Some peculiarities of American railroad timetables are described, and to complete the variety the Cambrian Lines of the Western Region, and locomotive chimneys, are dealt with.

The articles are liberally supported by photographs, most of which are of excellent quality. We recommend the book as a worthy addition to any railway library, consisting as it does of 64 pages of absorbing reading and photographs.

"ABC ROYAL AIR FORCE"

By John W. R. Taylor

(Ian Allan, price 2/6)

In April last the Government published a White Paper on Defence in which they outlined the re-shaping of the country's defence programme during the next five years to keep abreast of nuclear developments in the military sphere. The new policy does not involve the sudden, wholesale scrapping of our present military aircraft, and a glance through this excellent book shows the wide range of machines in service with the Royal Air Force. These aircraft are dealt with in alphabetical order of the names of their makers, and in the case of each major type there is a half-tone illustration, three-view silhouette, main specification details and a paragraph recording briefly the Service history of the type. About a dozen types of lesser importance, but still being used by the R.A.F. at home and overseas, also are illustrated, with an accompanying short note on their service.

A chapter explaining the organisation of the Royal Air Force gives a list of the Home and Overseas Commands and the Groups in them. The different branches of training, and the conditions of entry, are explained. There are illustrations of the badges and insignia of the different ranks, and useful notes on the varied Service colours and markings of R.A.F. aircraft.

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Fireside Fun

"According to you and your Astro-Navigation, we've either covered 3,000 miles in 5 days or 5 miles in 3,000 days."

Airman (explaining crash): "I just happened to get into an air pocket."

Sympathetic Old Lady: "Oh, dear! And I suppose there was a hole in it."

* * * *

Employer (to office boy going on errand): "On the way there you'll pass a football ground."

Boy (hopefully): "Yes, sir!"

Employer: "Well—pass it!"

* * * *

"Is that Joe?"

"Yes, this is Joe."

"It doesn't sound like Joe."

"It's me all right."

"Can you lend me £5, Joe?"

"I'll ask him when he comes in."

* * * *

"Only twelve o'clock?" questioned the traveller. "I thought it was much more than that."

"It's never more than that around this part of the country," replied the native. "It goes up to twelve o'clock and then starts all over again."

* * * *

Teacher: "Can any boy tell me what is the highest form of animal life?"

Johnny: "Yes, the giraffe."

* * * *

"Your worship," said the accused, "I deny that I was creating a disturbance, although I may have been making a noise."

"In that case," said the magistrate, "I'll fine you a pound instead of 20s."

* * * *

Alf: "I see that old lady gave you something for helping her across the road. What was it?"

Bill: "When we got across she said 'Here's something for a cup of tea'."

Alf: "Yes, but what did she give you?"

Bill: "A lump of sugar."

Colonel: "You say you served with the Army in Germany."

Cook: "Yes, sir. Officers' cook for two years and wounded twice."

Colonel: "You're a lucky man. It's a wonder they didn't kill you."

* * * *

Lady: "Nothing to do in the summer months? What is your work?"

Beggar: "I'm a football mascot!"

* * * *

BRAIN TEASERS

THE MYSTIC SQUARE

Below is shown a square divided into sixteen small squares, each of which bears a number. Draw the square exactly as shown on a sheet of paper and insert the numbers. Then see if you can cut the square into four pieces and put them together again in a different way to form a square in which each vertical, horizontal and diagonal row totals 34.

1	15	5	12
8	10	4	9
11	6	16	2
14	3	13	7

* * *

MIND THE ROCKS!

Each of the following clue phrases indicates the name of something, and each name ends in the word "Rock". Can you discover the full names?

1. A domestic bird.
2. This colourless one could be Irish
3. A savage one this!
4. You might buy this near a famous tower
5. More famous towers here
6. Maybe it tinkles?
7. A fishy one

* * *

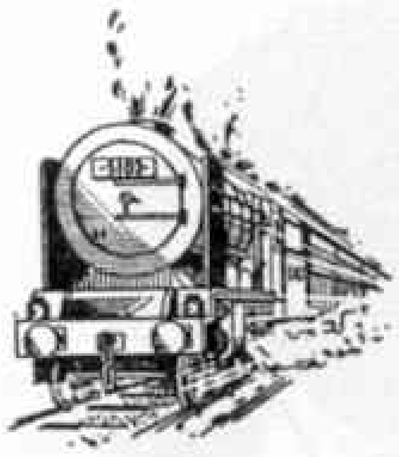
SOLUTION TO LAST MONTH'S CROSSWORD

The solution to the Five Minute Crossword in last month's "Fireside Fun" is shown here.

S	L	I	D	E
H	E		R	L
O				B
P	T		N	O
S	T	R	E	W

Now . . .

is the time
to join the
Ian Allan



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not too deep!

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in case you're wrong

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in the sun
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spoil your fun!

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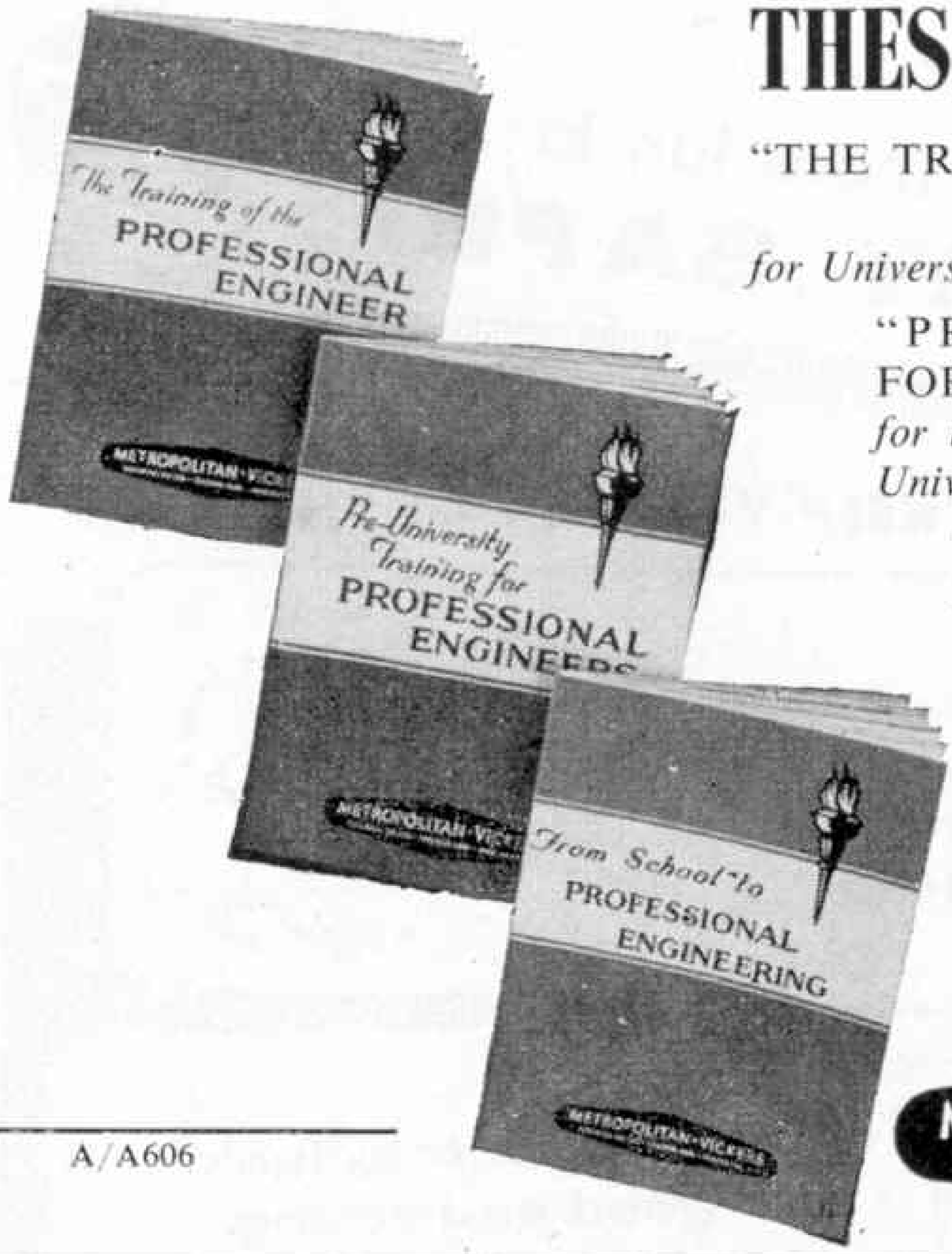

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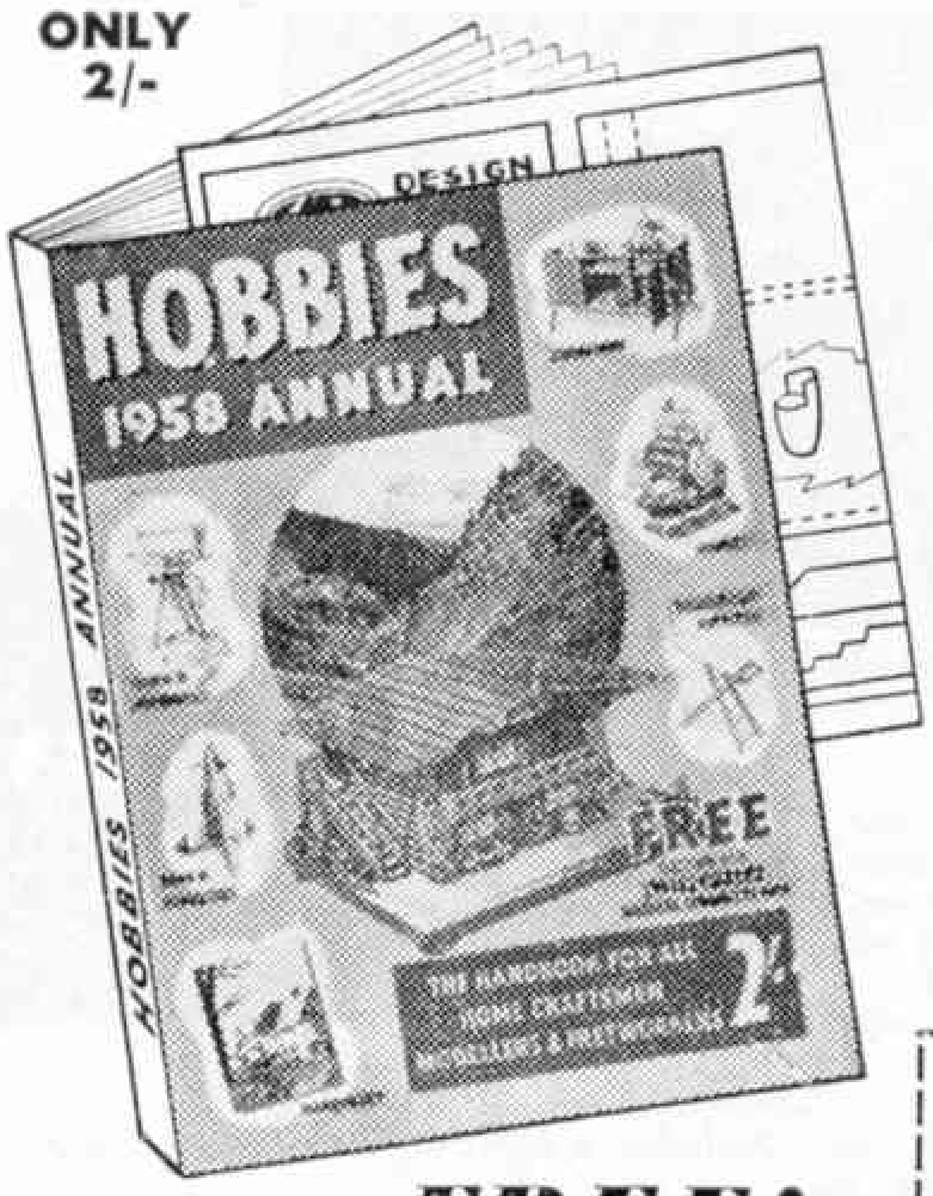

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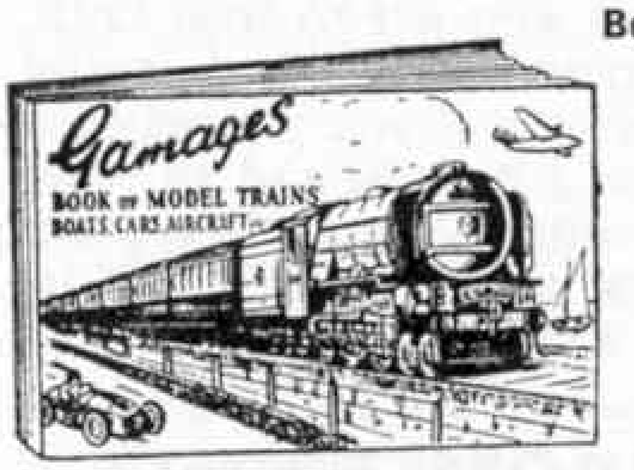

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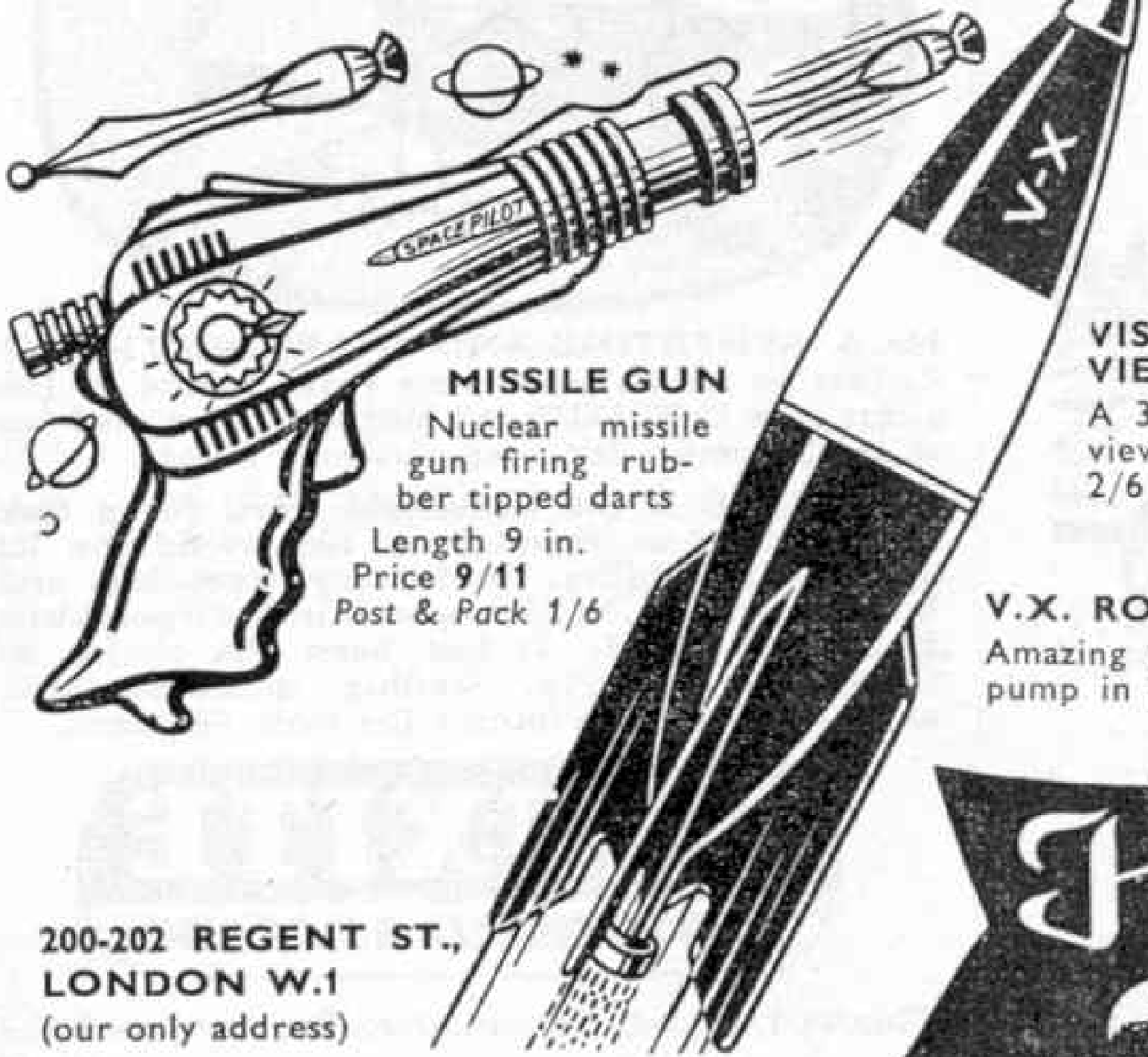

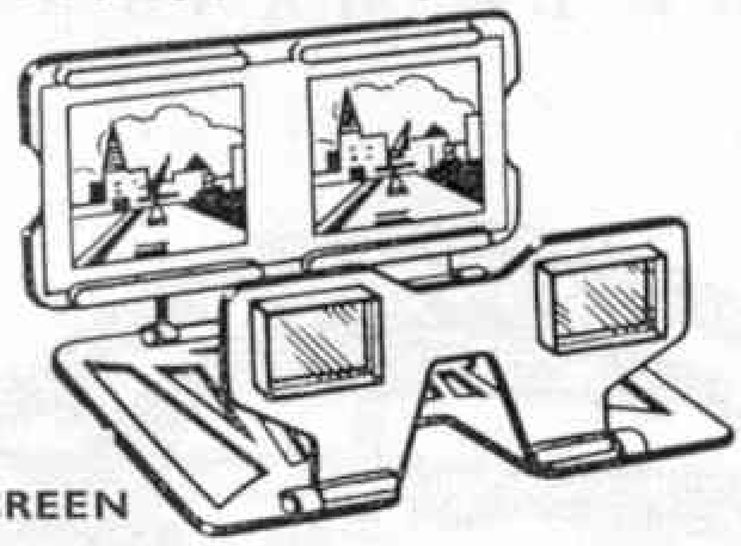

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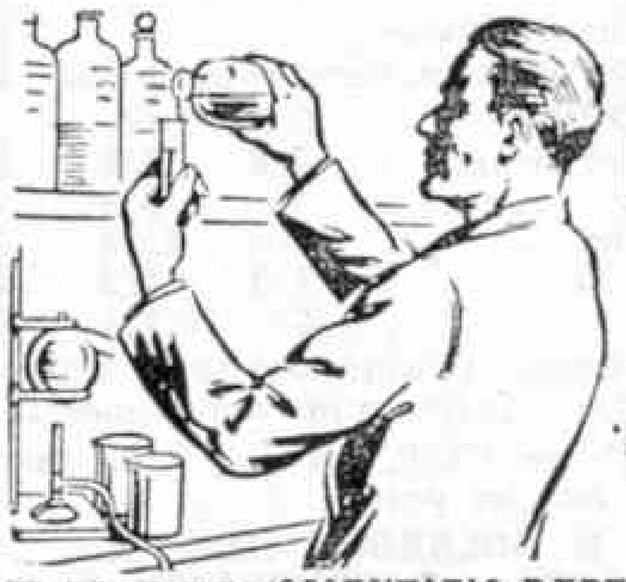

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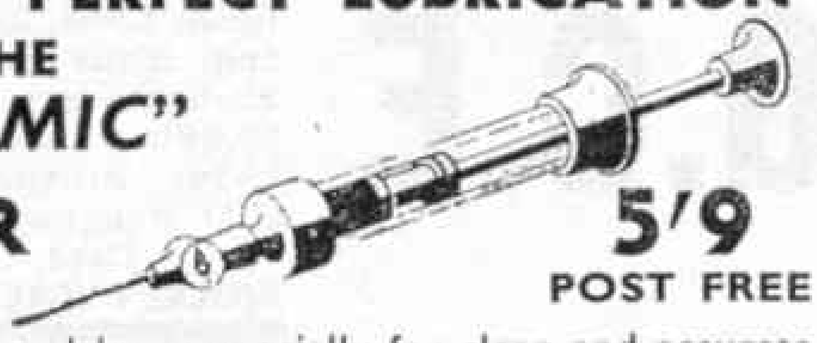

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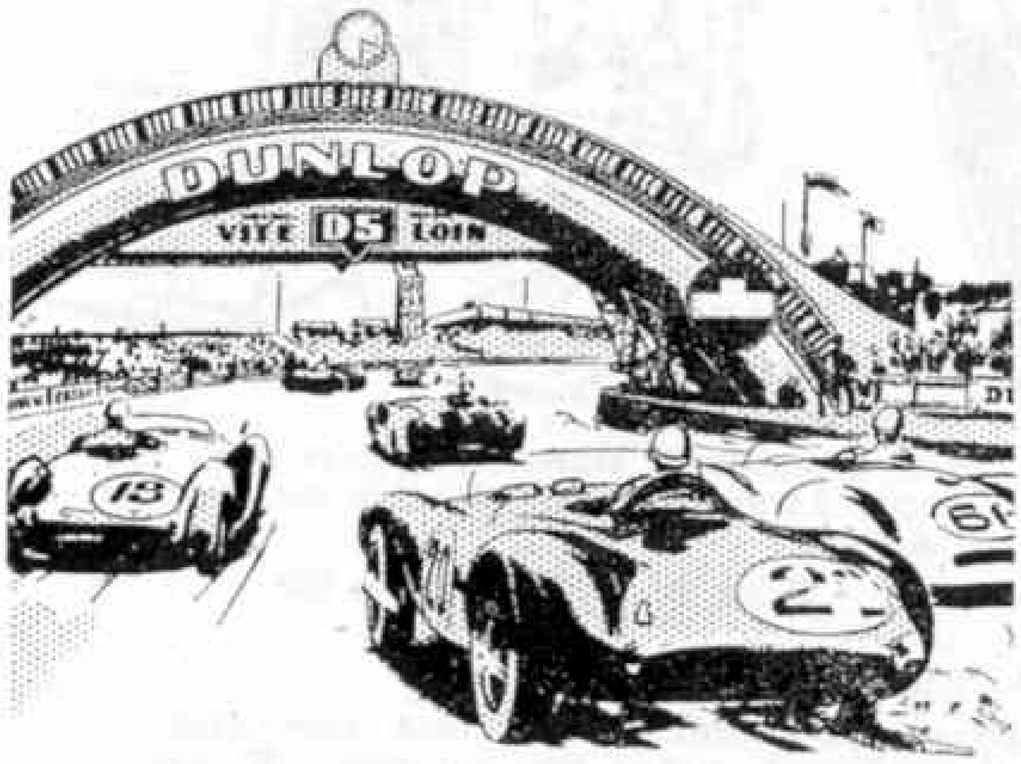

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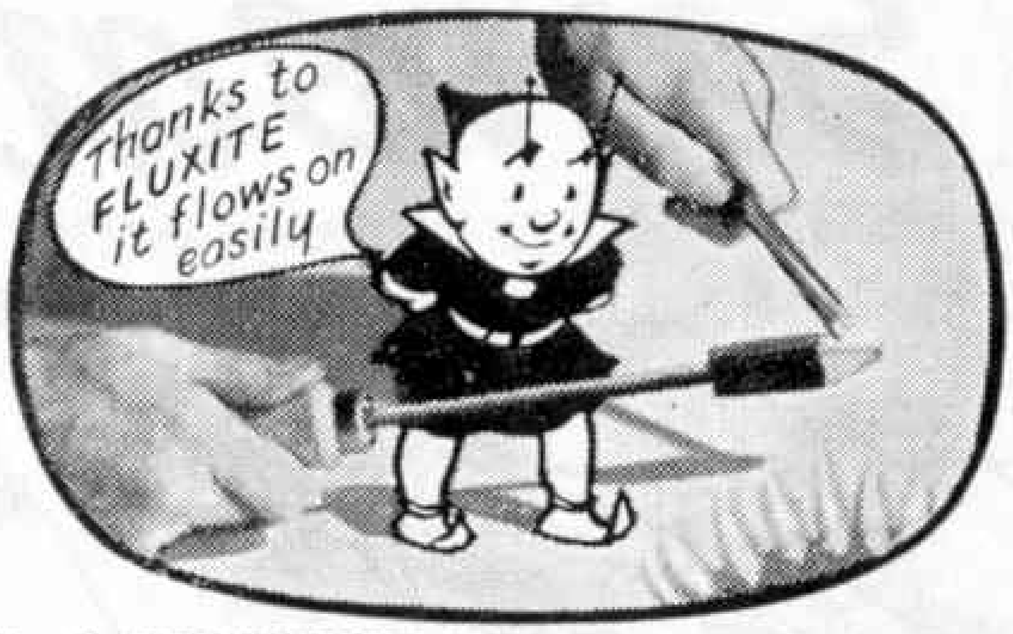

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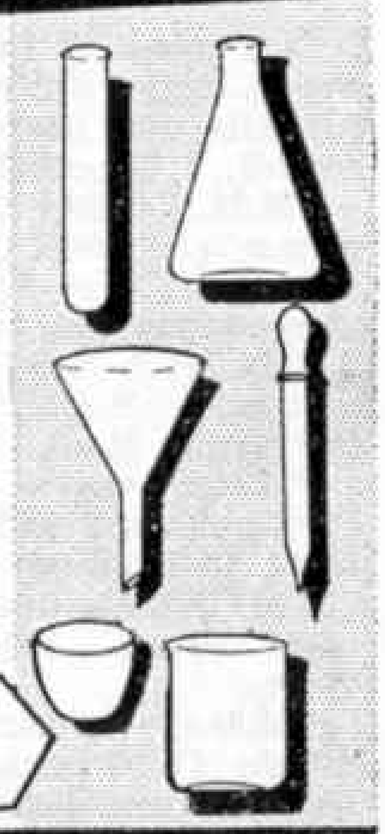

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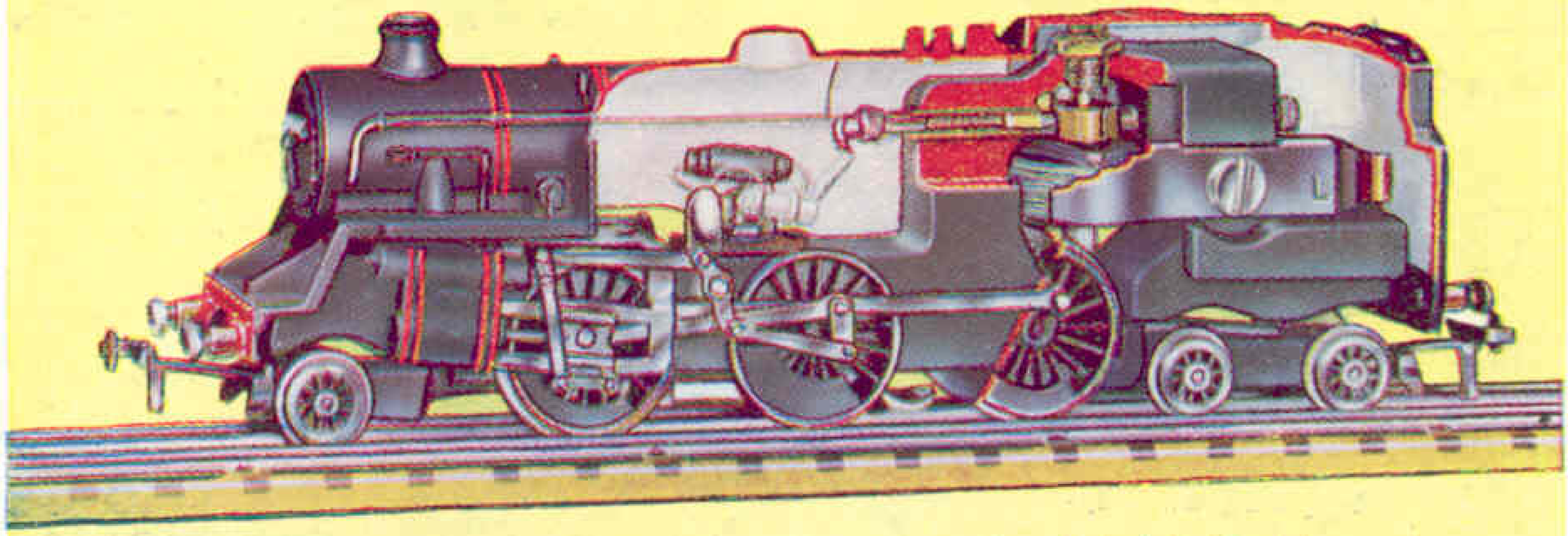

This cutaway view of the 2-6-4 Tank Locomotive shows the neat arrangement of the permanent magnet motor, and the TV and radio suppressor.

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HEAVY TRACTOR

Illustrated in the August 1957 issue of the Meccano Magazine

The Chassis and Driving Mechanism

The chassis of the model consists of two channel section girders connected at their ends by 2½" x ½" Double Angle Strips 1 and 2. Each of the channel girders is made from two 12½" Angle Girders bolted together.

The rear wheels are 2" Pulleys fixed on a 3½" Rod, which carries also a 1" Pulley 3. The Rod is mounted in 1½" Strips bolted to the lugs of a 2½" x 1" Double Angle Strip fixed across the chassis.

A No. 1 Clockwork Motor is bolted underneath the chassis as shown, and a ½" Pinion is fixed on its driving shaft. The Pinion engages a 57-tooth Gear on a 2" Rod, which is mounted in the corner holes of the Motor side-plates and is held in place by a Collar. A ½" Pulley on the lower end of the 2" Rod is connected to the Pulley 3 by a Cord driving belt. A ½" Reversed Angle Bracket isfixed to the Motor brake lever, and is extended by a 2½" Strip 4.

Arrangement of the Steering Mechanism

The front wheels are 1" loose Pulleys fitted with Tyres and held on a 3½" Rod by Spring Clips. The Rod is mounted in two Flat Trunnions bolted to the lugs of two 1½" x ½" Double Angle Strips, which are fixed across a Bush Wheel 5. A 2" Rod is held in the Bush Wheel, and a 2½" Strip 6 and a Double Bent Strip bolted together are passed over the Rod. Two Cranks 7 are fixed on the Rod as shown and an Angle Bracket is lock-nutted to each Crank. A 5½" Strip is lock-nutted to each Angle Bracket and to a steering lever 8 formed by a 3" Strip.

The 2½" Strip 6 is bolted to the chassis, and the levers 8 are lock-nutted to Angle Brackets attached to a 3½" x 2½" Flanged Plate 9. The same bolts are used to fix the Flanged Plate to the chassis.

Details of the Bodywork.

Two 3½" x ½" Double Angle Strips are fixed across the chassis. One of them is indicated at 10, and the other is positioned immediately in front of the Flanged Plate 9. The lugs of these Double Angle Strips support the sides of the bonnet, each of which consists of a 5½" x 2½" Flexible Plate extended upward by a 5½" x 1½" Flexible Plate. Each side of the bonnet is braced as shown by two 5½" and two 3½" Strips.

The radiator is formed by two 1 11/16" radius Curved Plates, two curved 2½" x 2½" Flexible Plates, a 2½" x 1½" Flexible Plate 11 and a curved 5½" x 1½" Flexible Plate 12. These Plates are arranged as shown and are bolted to the sides of the bonnet, with eight Formed Slotted Strips attached to them.

The top of the bonnet consists of two 4½" x 2½" Flexible Plates 13, two opened out U-section Curved Plates 14, and the upper end of the Flexible Plate 12. A 2½" x 2" Triangular Flexible Plate 15 on each side completes the assembly. Two Semi-Circular Plates are bolted together and are attached to the top of the bonnet by Angle Brackets.

The headlamps are ¾" Flanged Wheels on ½" Bolts, which are fixed by nuts in Angle Brackets bolted to the sides of the bonnet. The exhaust

pipe and silencer are represented by a Chimney Adaptor, two $\frac{3}{4}$" Flanged Wheels and a Sleeve Piece held on a $3\frac{1}{2}$" Rod by a Collar and a Coupling. Bolts passed through one side of the bonnet are screwed into the Coupling to support the assembly. A nut on one bolt and two Washers on the other space the Coupling from the side of the bonnet.

The driver's seat is a $3\frac{1}{2}$" x $2\frac{1}{2}$" Flanged Plate bolted between two $2\frac{1}{2}$" x $2\frac{1}{2}$" Flexible Plates, each of which is edged by a $3\frac{1}{2}$" Strip 16 and three $2\frac{1}{2}$" Strips. The Flexible Plates are bolted to the Flanged Plate 9 and are attached to Angle Brackets fixed to a $5\frac{1}{2}$" Strip 17. The back of the seat consists of two $2\frac{1}{2}$" x $2\frac{1}{2}$" Flexible Plates and a $2\frac{1}{2}$" x $1\frac{1}{2}$" Flexible Plate bolted together and supported by Angle Brackets fixed to the Strips 16.

The tool box at the rear of the chassis is made by bolting a $2\frac{1}{2}$" x $1\frac{1}{2}$" Flanged Plate across the channel girders, and by fixing a Trunnion extended by a Flat Trunnion to each flange of the Plate. The back of the box consists of two $2\frac{1}{2}$" x $1\frac{1}{2}$" Flexible Plates bolted to the Double Angle Strip 2 and connected to the Flat Trunnions by Angle Brackets. The towing attachment is a Large Fork Piece held by a Pivot Bolt.

Construction of the Creeper Track Assemblies

The two track assemblies are identical in design. Each of them is made by curving the ends of a $12\frac{1}{2}$" x $2\frac{1}{2}$" Strip Plate as shown, and curving also the outer ends of two $5\frac{1}{2}$" x $2\frac{1}{2}$" Flexible Plates connected by a $2\frac{1}{2}$" x $2\frac{1}{2}$" Flexible Plate. The ends of the Strip Plate and the $5\frac{1}{2}$" x $2\frac{1}{2}$" Flexible Plates are bolted together, and two $2\frac{1}{2}$" x $\frac{1}{2}$" Double Angle Strips 18 and two similar parts 19 are fixed between the Plates.

A $5\frac{1}{2}$" x $1\frac{1}{2}$" Flexible Plate 20, edged by two $5\frac{1}{2}$" Strips, is fixed to the Double Angle Strips 18. Two Wheel Discs are bolted in place, and a $2\frac{1}{2}$" Stepped Curved Strip is attached to the Flexible Plate by a $\frac{3}{8}$" Bolt but is spaced from it by three Washers. A 1" Pulley fitted with a Rubber Ring is fixed to a Threaded Pin at one end of the Plate 20, and at the other end a similar Pulley is held by a $\frac{3}{4}$" Bolt.

The track assemblies are bolted to the ends of the $5\frac{1}{2}$" Strip 17 and another $5\frac{1}{2}$" Strip 21 fixed across the chassis. Four Road Wheels are attached to the ends of two made-up rods, each of which is supported in two of the Double Angle Strips 19. One of the made-up rods is formed by a $4\frac{1}{2}$" and a $3\frac{1}{2}$" Rod, and the other consists of a $6\frac{1}{2}$" and a $1\frac{1}{2}$" Rod. The Rods are joined by Rod Connectors.

PARTS REQUIRED

12 of No. 2.	1 of No. 23a	1 of No. 51	4 of No. 155
6 " " 3	1 " " 24	2 " " 53	1 " " 163
2 " " 4	2 " " 24a	2 " " 59	1 " " 164
11 " " 5	2 " " 24c	2 " " 62	4 " " 187
2 " " 6a	1 " " 26	1 " " 63	6 " " 188
4 " " 8	1 " " 27a	2 " " 90a	5 " " 189
16 " " 12	7 " " 35	2 " " 111	6 " " 190
1 " " 14	158 " " 37a	2 " " 111a	2 " " 191
2 " " 15a	144 " " 37b	2 " " 111c	6 " " 192
3 " " 16	25 " " 38	2 " " 115	2 " " 197
2 " " 17	1 " " 40	1 " " 116	2 " " 199
1 " " 18a	1 " " 45	1 " " 125	2 " " 200
2 " " 20a	1 " " 46	2 " " 126	2 " " 213
4 " " 20b	2 " " 48	4 " " 126a	2 " " 214
5 " " 22	10 " " 48a	2 " " 142c	8 " " 215
2 " " 22a	2 " " 48b	1 " " 147b	2 " " 222
			1 No. 1 Clockwork Motor.