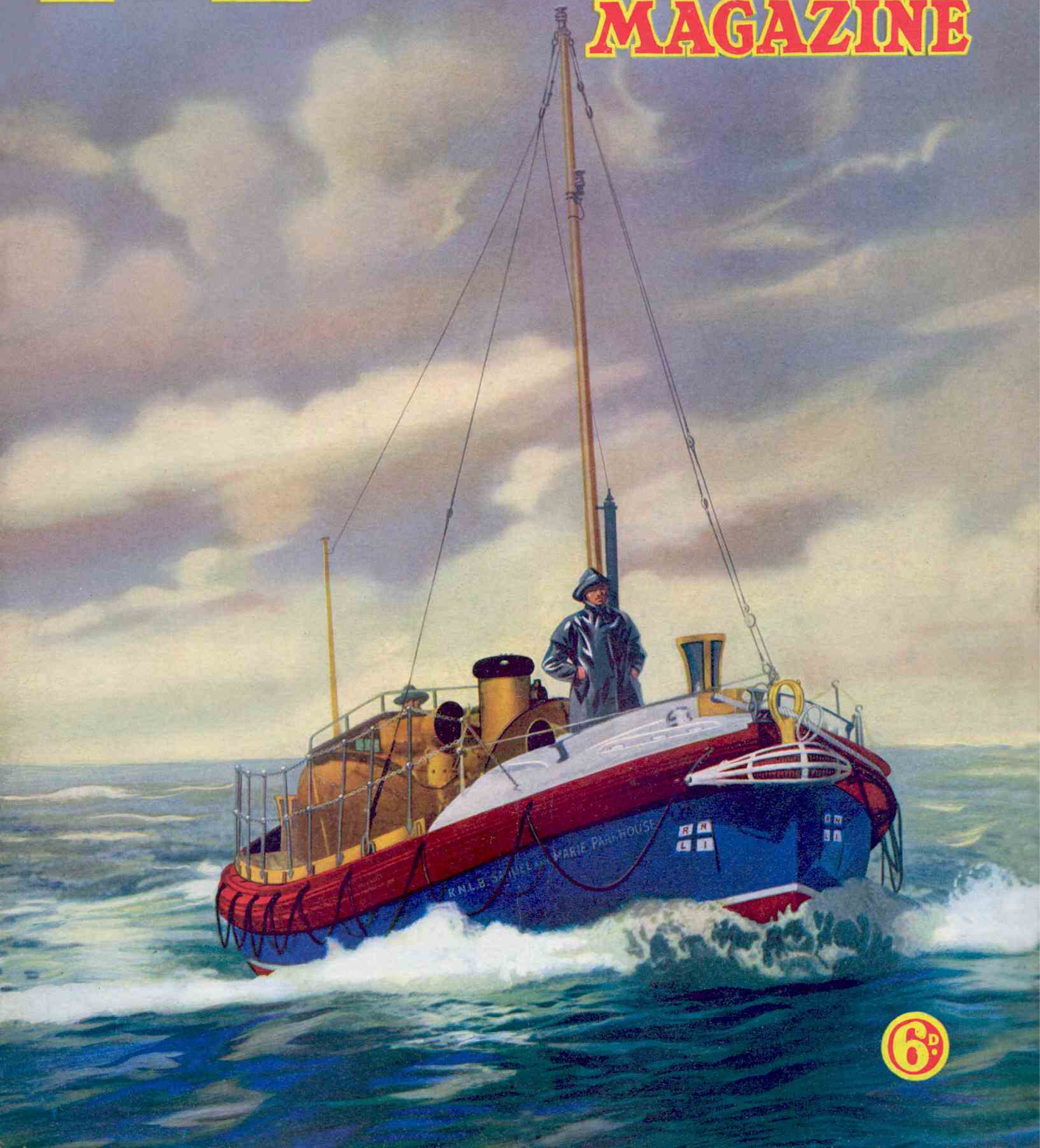
VOL. XXIV. No. 11. NOVEMBER 1939

MECCANO MAGAZINE



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SPECIAL NOTICE TO READERS

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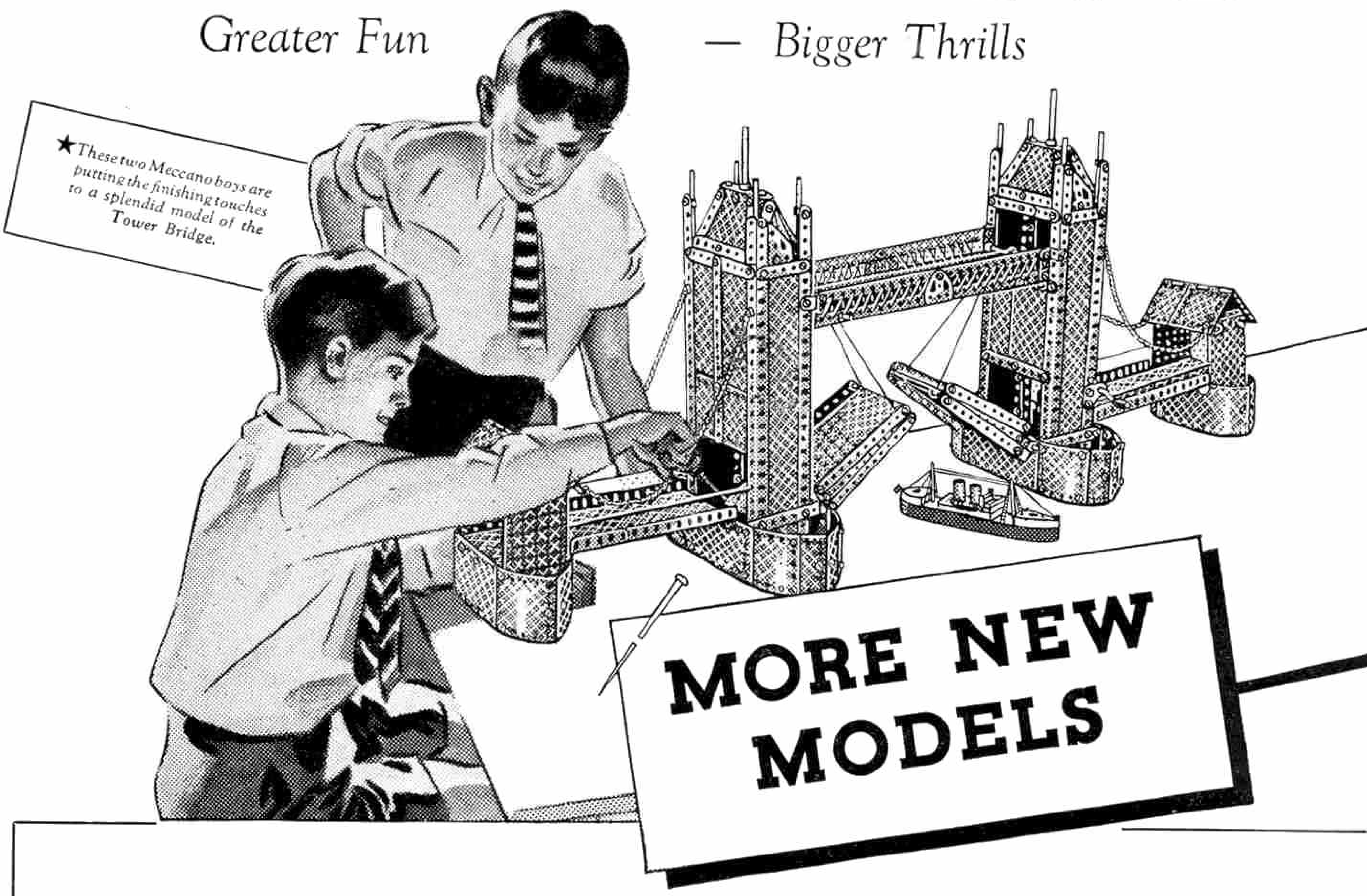

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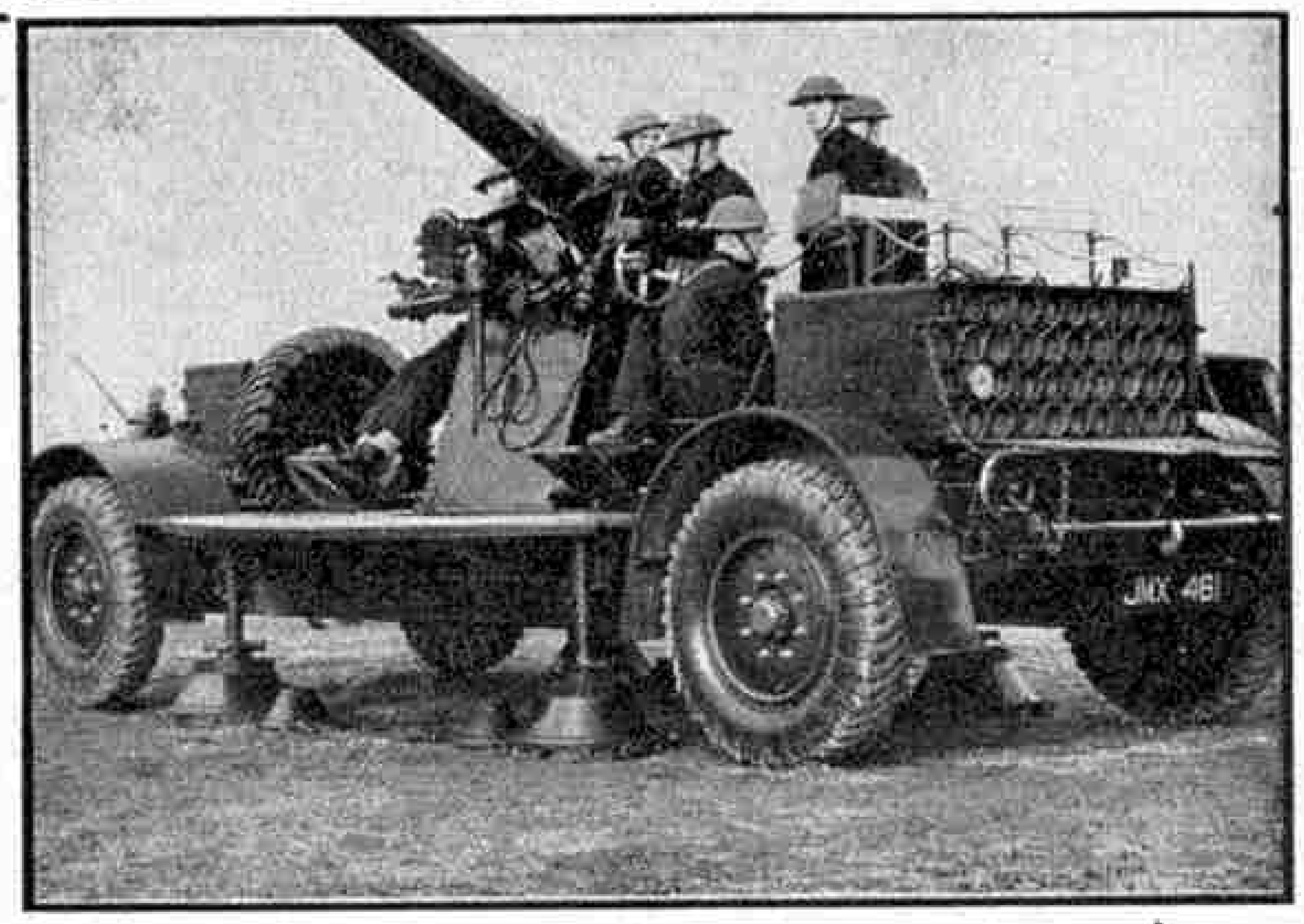

ROYAL TANK CORPS MEDIUM TANK SET

151A 151D 150D 151C

151B

Dinky Toys No. 151

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Price of complete set **4/-**

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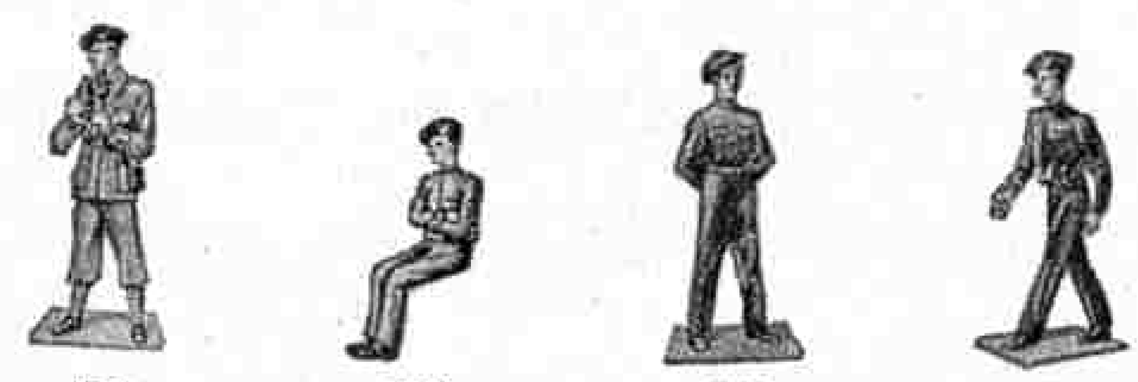

150a 150b 150c 150e

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No. 150a	Officer	...	each **2½d.**
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Price of complete set **1/-**

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152a 150d 152b 152c

Dinky Toys No. 152

No. 152a Light Tank ...	each **1/2**	No. 152c Austin Seven Car	each **5d.**
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Comprises scale models of a Quick-firing Anti-aircraft Gun mounted on a mobile platform and a Searchlight mounted on a lorry. Both Gun and Searchlight have elevating and traversing movements. Price **3/6** per set

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Comprises scale models of an 18-pounder Quick-Firing Field Gun, Trailer and "Light Dragon" Motor Tractor. Price **2/6** per set

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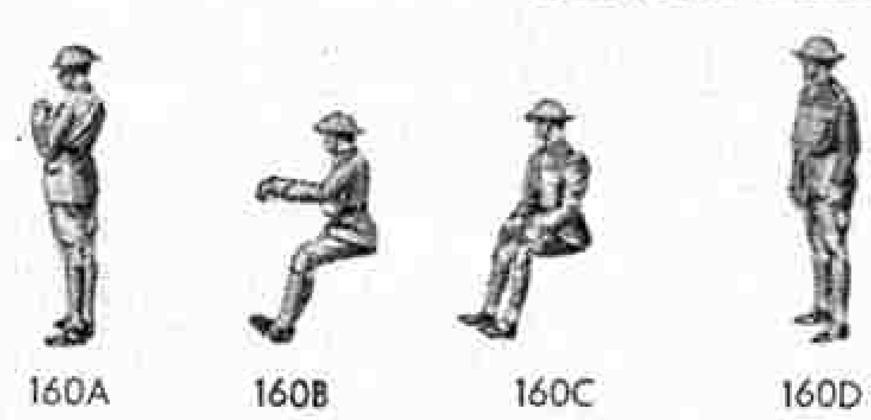

160A 160B 160C 160D

Dinky Toys No. 160

For use with Dinky Toys No. 161, Mobile Anti-Aircraft Unit and No. 162, 18-pounder Quick-Firing Field Gun Unit.

No. 160a	N.C.O.	each **2½d.**
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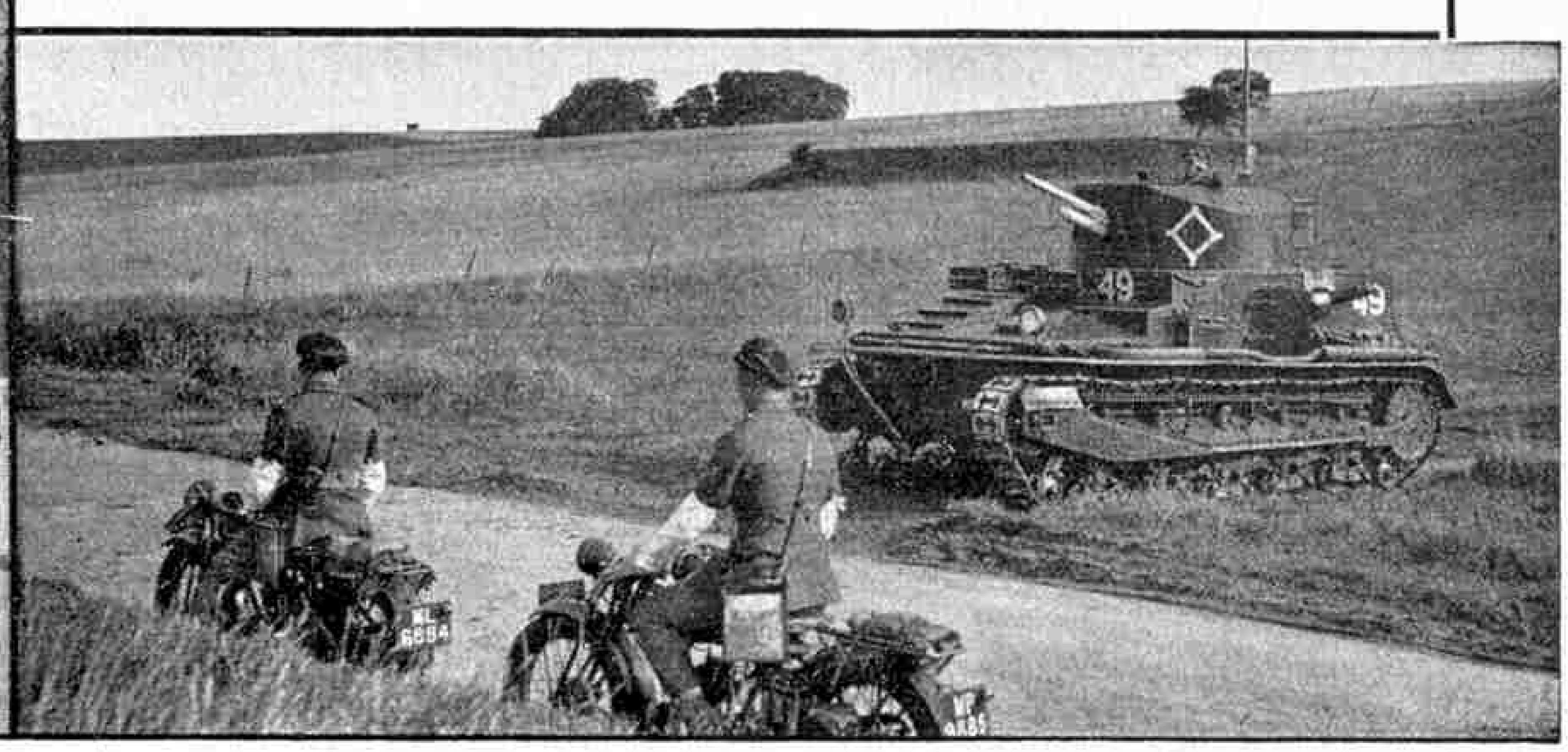
Price of complete set **1/-**



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PATENTS PENDING

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Everybody, young and old alike, will want to play this exciting new game. Few will be able to resist the fascinating combination of "GEO-ME-TRICKS," and, being suitable for any number of players, it is ideal for parties.
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British Patent 479430

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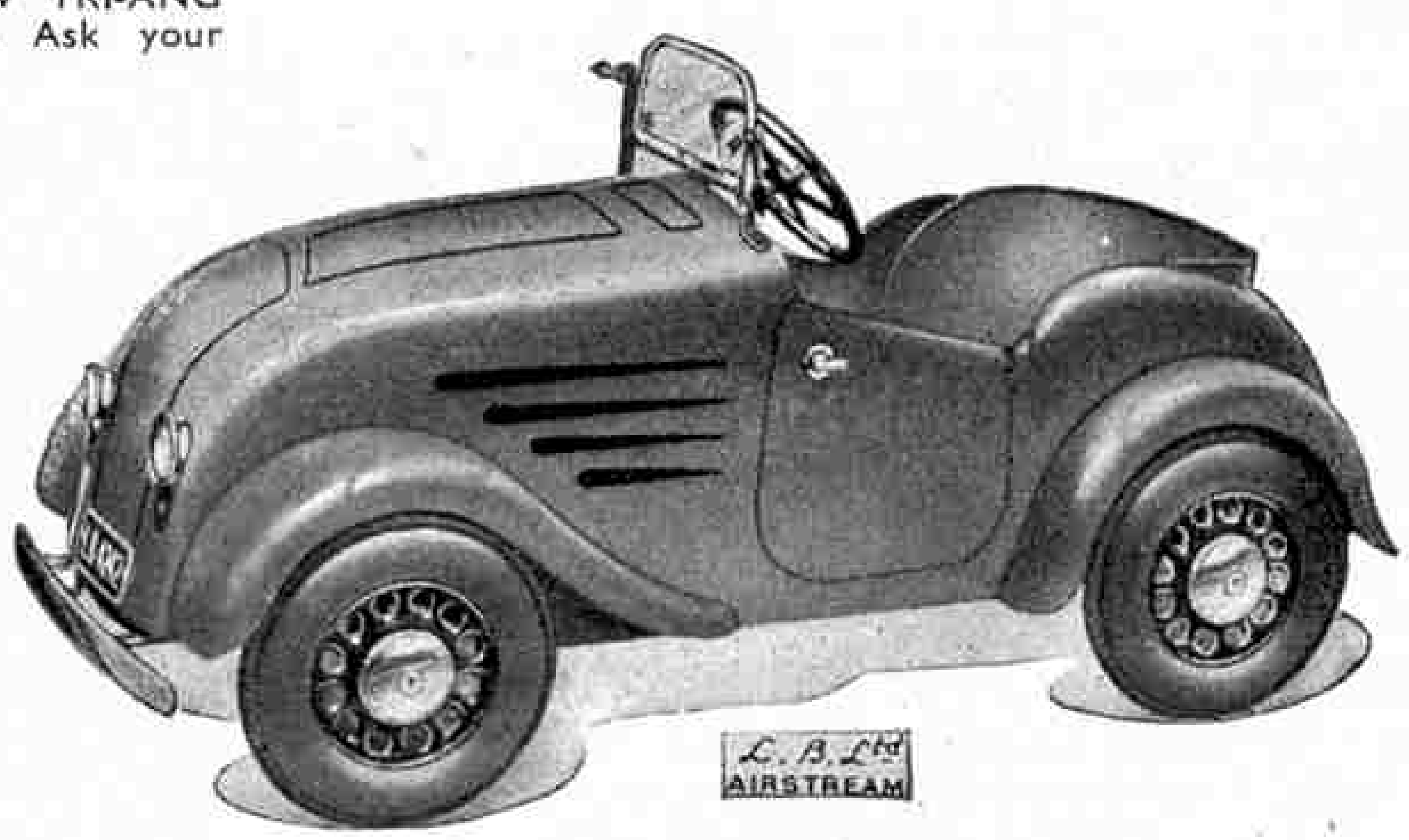


TRI-ANG AIRSTREAM

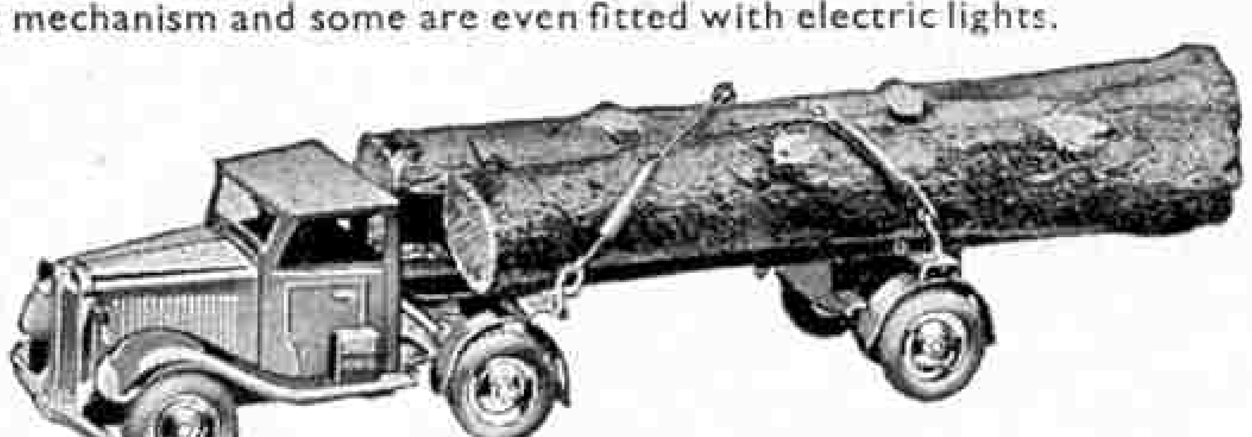
New Model. Steel body with opening side door, upholstered seat. Adjustable wind screen and direction indicators. 9 in. new type easy-clean wheels with malleable hubs, ⅝ in. tyres. Hand brake. Length 44 ins. Suitable for ages 4 to 7.

MINIC

ROAD TRANSPORT TRUE TO SCALE

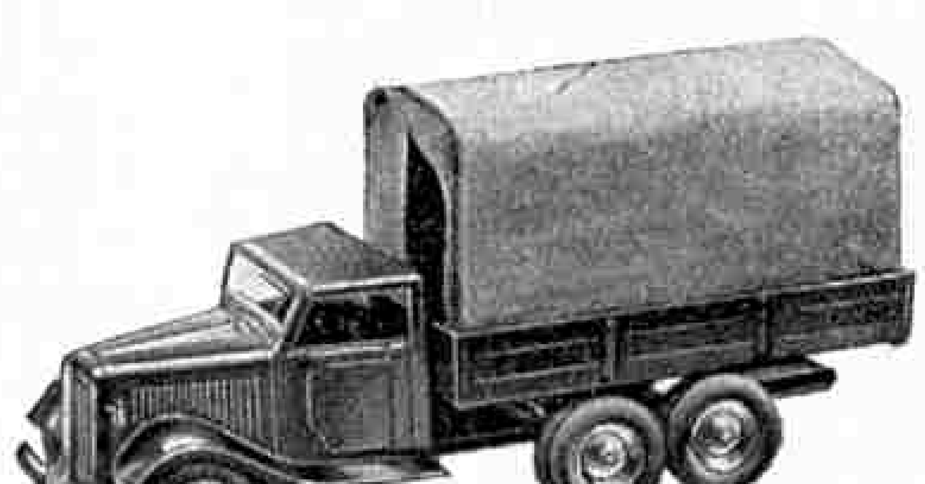
Here's a fascinating new hobby, collecting real true-to-scale models of every form of road transport, with perfect replicas of garages, petrol stations, etc. If you are already a model railway enthusiast become a transport enthusiast as well—or start with a hobby by becoming a model transport collector. Almost every type of road transport is represented. Each model is strongly constructed and fitted with long running mechanism and some are even fitted with electric lights.

MINIC Traffic Control Car. LENGTH 5 ins.



MINIC Log Lorry. LENGTH 8 ins.

MINIC Coal Lorry. LENGTH 6 ins.



MINIC Canvas Tilt Lorry. LENGTH 5½ ins.

There are over seventy different models to choose from. Ask your dealer to show you the range.

TRI-ANG TRICYCLE No. 5B (Regd. Trade Mark)

Cycle chain drive with free-wheel. Frame and Forks best quality weldless cycle tubing, 16 in. front and rear wheels, 1¼ in. jointless sponge-rubber tyres. Rim brake. Ball bearings throughout. Coil spring saddle. CHROMIUM FITTINGS. Black, blue or maroon.

Made by LINES BROS. LTD., Tri-ang Works, LONDON S.W.19

MECCANO MAGAZINE

Editorial Office:
Binns Road, Liverpool 13
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Vol. XXIV. No. 11
November 1939

With the Editor

Splendid Spirit of Readers

I expected a considerable response to the appeal for letters I made last month, but frankly I have been amazed at the number of letters that have come in. The variety of these is extraordinary, and a particularly pleasant feature is that quite half of them come from readers who have taken the Magazine regularly for years, but have never before sent me a line.

Turning over the pile of letters before me, my strongest impression is that of the splendid spirit shown by the writers. Many of them have had their normal pleasant lives torn up as it were by the roots, and yet there is no grumbling. Indeed, the only complaints come from those who have been of necessity separated—in most cases only temporarily—from their model-building sets and their beloved model railways!

All but my very youngest readers—and even some of these—are doing what they can to help things along. Some have been digging trenches—and occasionally falling into them and getting very wet and frightfully dirty! Others are serving as messengers connected with various local organisations and the Scouts National Service, and older readers have tackled A.R.P. work in earnest, many of them as Auxiliary Firemen.

Laughs in the Blackout

There are lots of amusing passages in the letters, many of them describing comical encounters in the darkness. Funniest of all are the accounts of the first efforts to black out windows with paint that cracked off as soon as it was dry, wooden contraptions that refused to stay up, and black paper which, in spite of an abundance of drawing pins, persisted in showing streaks of light at the edge. By the way, there appears to be a widespread opinion that drawing pins deliberately get out of the woodwork and spread themselves on the floor with the business end up!

Admiral of the Fleet Sir Dudley Pound, G.C.B., G.C.V.O., First Sea Lord and Chief of Naval Staff.

Order Your "M.M."

Many readers who do not place a regular order for their "*M.M.*" had difficulty last month in securing their copies. In these times of emergency this difficulty is likely to increase. I therefore earnestly ask all readers who have not already done so to place a regular order for the "*M.M.*" with their dealer or newsagent. By doing this they will not only make sure of their copies, but at the same time will help me considerably.

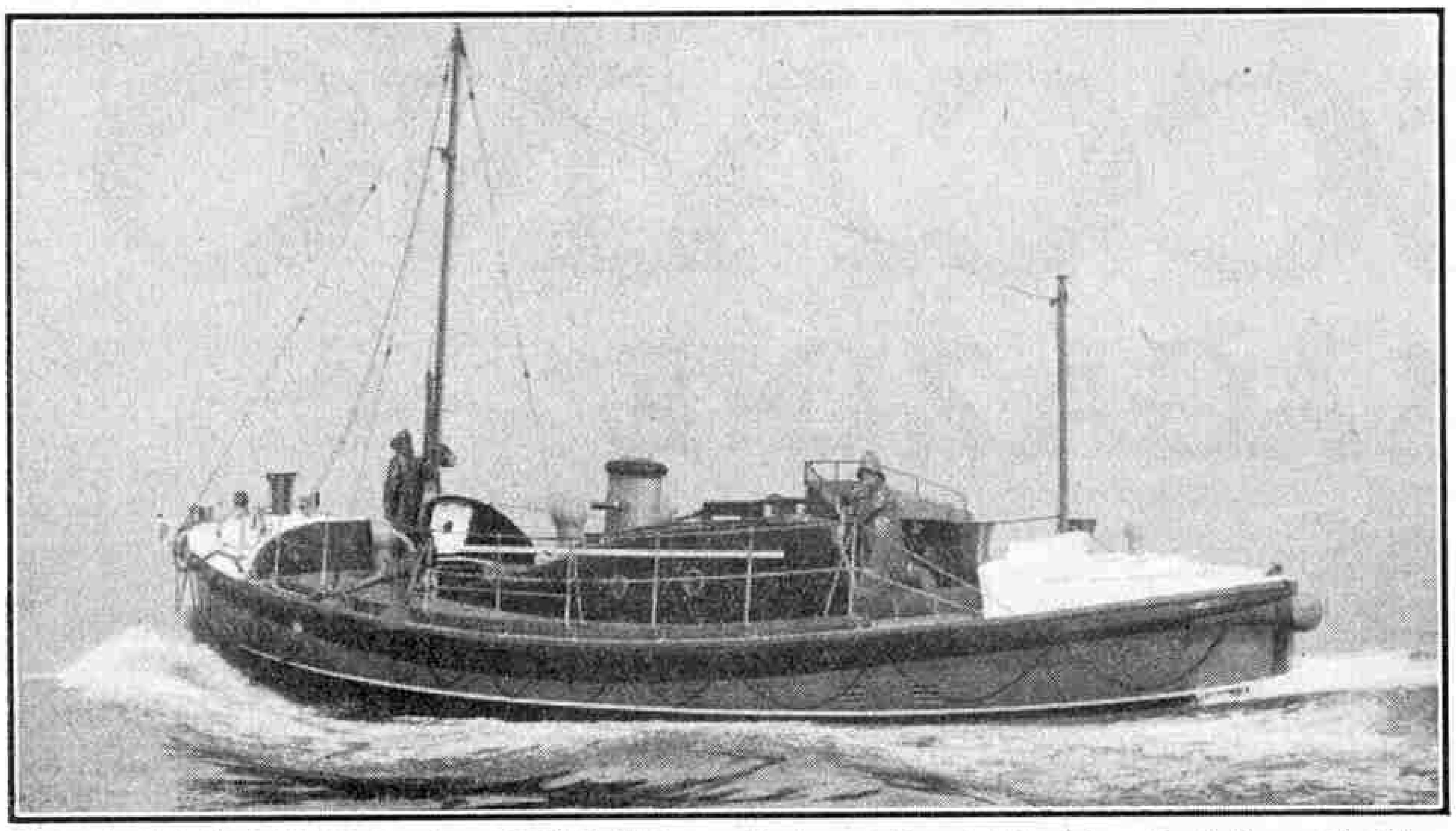
Last month also transport delays, inevitable in the circumstances, caused certain dealers and newsagents to receive their supplies of the "*M.M.*" a few days late. I am making arrangements to have the magazines despatched even earlier than usual, but I am afraid that such delays cannot always be avoided.

Leaders in the War

II. Sir Dudley Pound

Admiral of the Fleet Sir Dudley Pound has had a varied and distinguished career. At the Battle of Jutland he was Captain of the battleship "*Colossus.*" From 1932 to 1935 he was Second Sea Lord, an appointment that involves responsibility for the manning of the Navy and the welfare of officers and men. In March 1936 he became Commander-in-Chief of the Mediterranean Fleet, and held this appointment during the difficult period of the civil war in Spain.

In June of this year Sir Dudley became First Sea Lord and Chief of Naval Staff.



The motor Life-boat "Violet Armstrong," 46-ft. Watson cabin type, stationed at Appledore, North Devon. The illustrations to this article are reproduced by courtesy of the Royal National Life-boat Institution.

The Life-boat in War

A Service that is Always Mobilised

WHEN the Royal National Life-boat Institution was founded 115 years ago it was laid down "that the subjects of all nations be equal objects of the Institution as well in war as in peace." In that spirit it has worked throughout the years, always fully mobilised for the saving of life at any point around the shores of the British Isles. The difficulties with which the Life-boat crews have to contend are great enough in peace, but in war they are vastly increased. Long before the end of the last war, the young men had all been called up to serve in minesweepers, trawlers and drifters, leaving the older men to carry on. And carry on they did, answering every call for help, no matter how great the danger. On one occasion, of a crew of 18 men, 12 were over 50 years of age, and two of these 12 were aged 72.

From 9th August 1914 to the signing of peace on 28th June 1919 the Life-boats were launched 1,808 times, and 5,322 lives were rescued. Many of these rescues were from the ordinary perils of the sea, but the boats were launched 552 times to the help of ships or aircraft of the Navy, or to merchant vessels wrecked or in distress on account of the war. In the great majority of cases they had been disabled by torpedoes or mines. Besides these 5,322 lives, the Life-boats saved 186 boats and vessels. To estimate the full value of such services one has to remember that nearly all the lives saved were those of men (and a few women, chiefly nurses) in their prime, engaged on war service, and that these 186 vessels meant thousands of tons of shipping for the carrying of food and raw stuffs during the critical time when there was real danger that the supplies of the Allies would fail before the attack of the German submarines.

One of the finest Life-boat services in the last war was the service rendered to the steamship *"Rohilla,"* 7,400 tons, of the British India Line, on Friday, 30th October 1914 when she was wrecked at Saltwick Nab, near Whitby. The *"Rohilla"* had been requisitioned for service as a hospital ship, and at the time of the disaster was bound from Queensferry to Dunkirk to bring back wounded soldiers. She carried 229 persons, including the medical staff and five nurses. Between four and five o'clock on the morning of 30th October the vessel was driven on to the rocks by a terrific gale. Pounded by mountainous seas she quickly began to break up, and many of those in the after part of the ship were at once washed away and drowned. Signals of distress were sent up, but with such a sea nothing could be done while darkness lasted. As soon as day broke, in face of the utmost difficulty, involving the lifting of the boat over a sea wall 8 ft. in height, the Whitby No. 2 Life-boat *"John Fielden"* was launched, and after a terrific struggle reached the wreck, took off 12 men and the five nurses, and brought them ashore. The boat was launched again, and after another desperate struggle, during which it was filled time after time by the heavy seas, 18 more persons were saved.

By this time the boat was unfit for further service, and therefore other Life-boats were summoned. One of them, the Upgang boat, was lowered by means of ropes down the almost precipitous cliffs, but could not at first be launched against the tremendous seas crashing in on the shore, and when she was launched, could not reach the wreck, although she tried again and again until her crew were utterly exhausted. The Scarborough Life-boat and the Whitby No. 1 both put out, towed by steam trawlers, but found it impossible to approach the wreck; while the Teesmouth boat was damaged and forced to put back.

In spite of heroic efforts, these four pulling and sailing Life-boats had failed; nothing but a motor Life-boat could have any chance of saving the *"Rohilla's"* survivors. The nearest was at Tynemouth, the *"Henry Vernon,"* and she was therefore summoned. Within a quarter-of-an-hour of the receipt of the call she was manned and under way. After a hazardous journey of 44 miles through the wild night storm, with all coast lights extinguished on account of the war, she fetched Whitby in the small hours of the Sunday morning. Four hours later the *"Henry Vernon"* left harbour for the wreck, taking a supply of oil to subdue the waves. When she was near the wreck the oil was discharged and the Life-boat raced at full speed past the stern of the vessel. Guided with splendid skill and courage, she got under the lee of the wreck and remained alongside until, with infinite difficulty, while enormous waves swept over the wreck, all on board, 50 in number, who had survived the ordeal of 50 hours, were safely taken off. On her return journey the *"Henry Vernon"* was struck broadside on by a great wave that threatened to throw her on her beam ends, but she gallantly withstood the shock and safely made the harbour with the lives she had rescued.

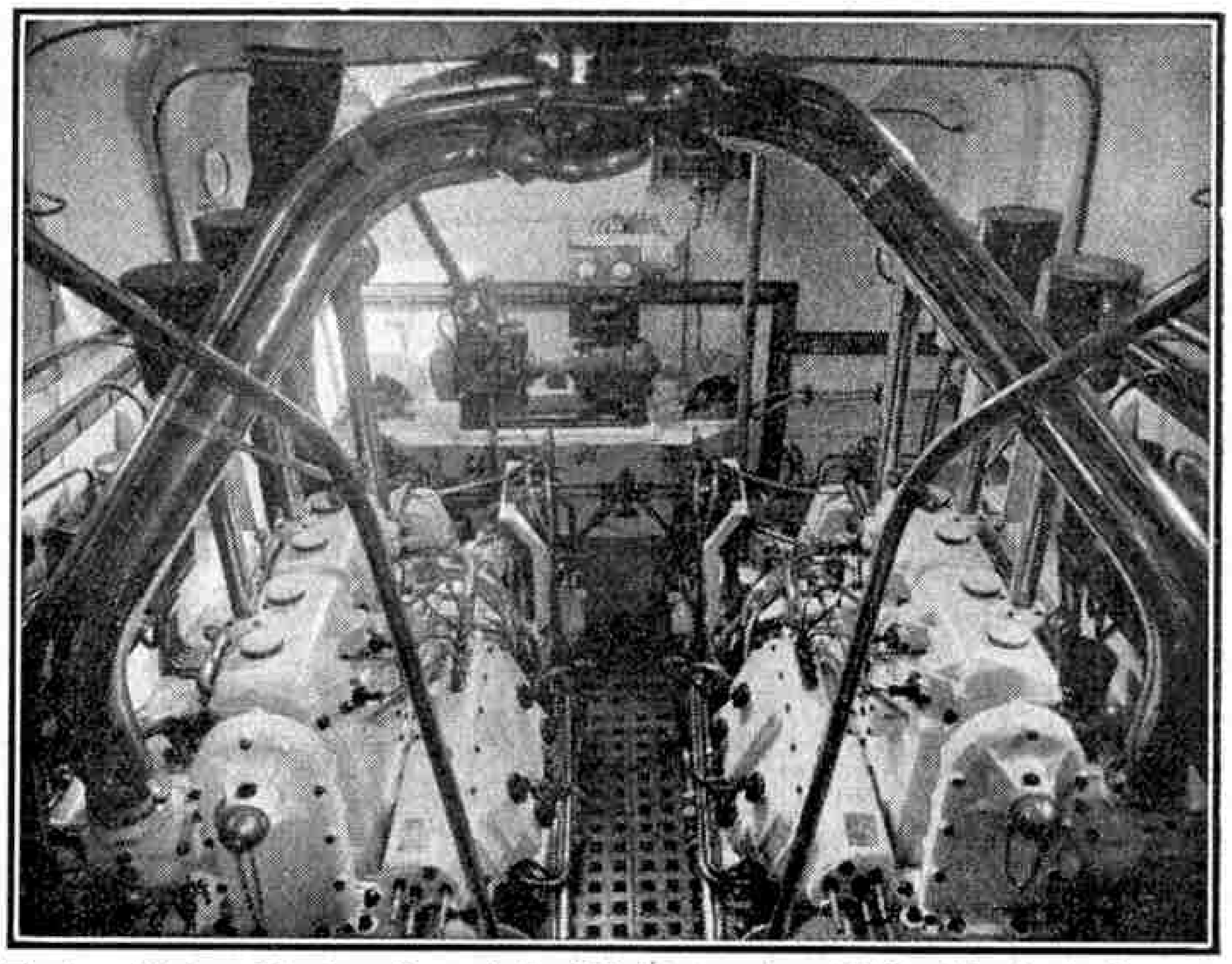
There is, unfortunately, no doubt

that during the present war many urgent calls will be made upon the boats of the R.N.L.I.; and equally there is no doubt that these calls will be responded to as nobly as in the past. Only a few days after the outbreak of war a Life-boat rescued 74 persons from the British steamship *"Magdapur,"* sunk in the North Sea. During the first six weeks of the war Life-boats were launched on 84 occasions and 199 lives were saved.

The censorship makes it impossible to give full particulars of rescues, or even to state the stations of the Life-boats concerned. But, whatever the public may hear of its operations, the Life-boat Service is continually at work. Many more calls are being made upon it, and its crews are rescuing life in face of far greater difficulties and dangers than in times of peace.

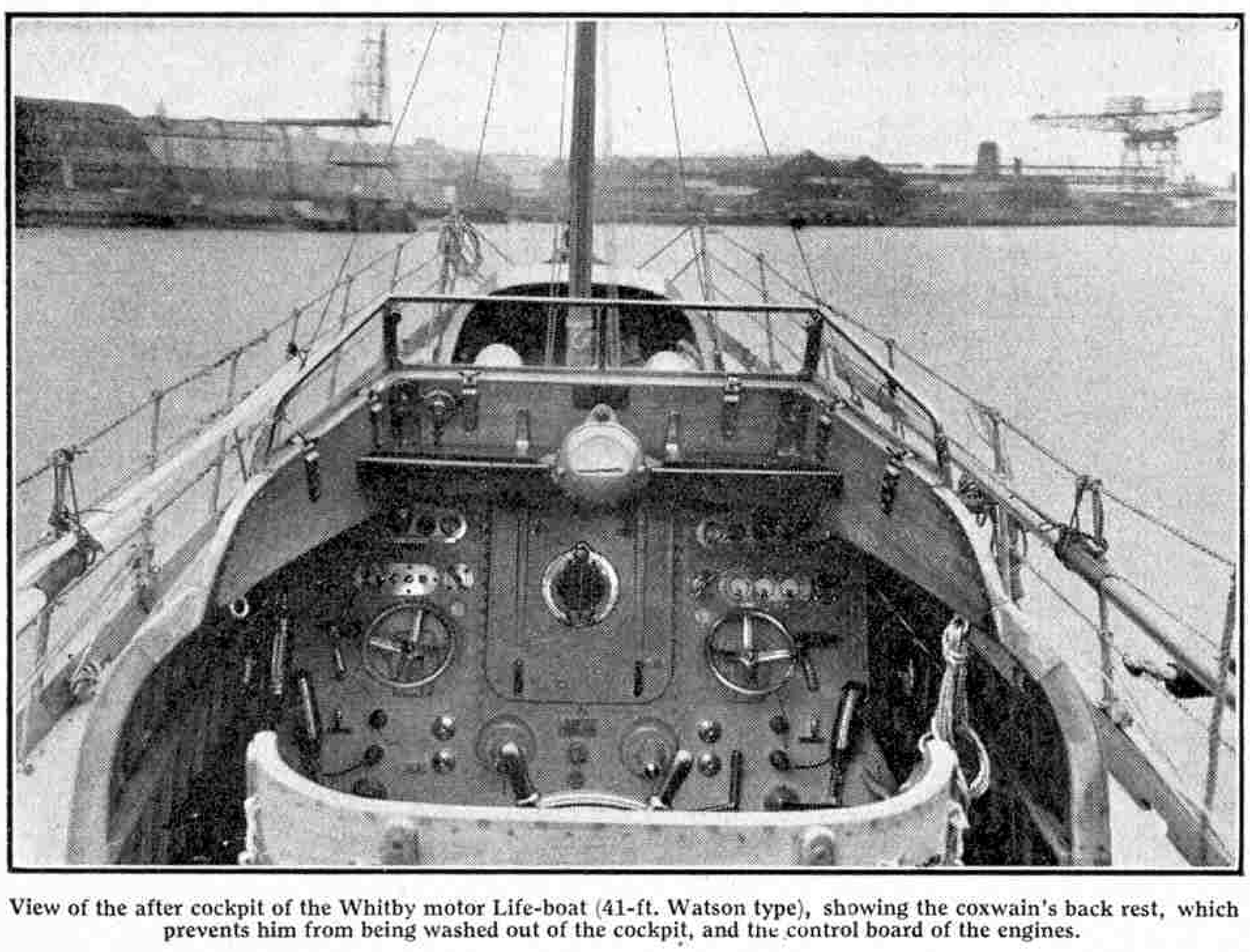
The greatest development of R.N.L.I. work of the past 60 years has been the introduction of the motor Life-boat. The first experiments were made in 1903. The problem was to design an engine that should comply with the stringent requirements of the Service. Such an engine had to be watertight but not airtight, and able to run in all conditions of night and storm without attention. It had to have controls not only simple, but easy to distinguish by touch so that they could be operated in the darkness; it had to run and to lubricate itself with certainty at any angle. At the same time, when the capsizing point was reached it had to cut itself off automatically, for if the boat were of the self-righting type she would right herself and be carried away by her engine, leaving the crew in the water. In addition to all this the engine must not interfere either with the self-righting quality of the boat or with its sailing powers.

Such was the problem, and it has been solved. The first Life-boat to be converted to motor power was completed in 1904 and sent to Tynemouth. Now, 35 years later, the Institution has over 140 motor Life-boats in its fleet.



The two 40 h.p. Diesel engines of the "Violet Armstrong." The big black pipes are the exhausts extending up to the funnel.

Our cover, reproduced from a photograph kindly supplied by the R.N.L.I., shows the motor Life-boat stationed at Salcombe. She is of what is known as the 46 ft. Watson cabin type with certain modifications made to suit her for working over the dangerous Salcombe Bar. She is of lighter draft, but owing to her modifications she weighs 21½ tons, that is 1½ tons more than the standard type. She has whale-backs forward and aft, instead of a flat deck, to throw off the water. Her after-shelter has been carried forward to cover the engine-room; this has been done partly to give added strength to meet the blow of the seas and partly to shed the water quickly. She has been given a strong stern frame below the rudder to protect it from damage if she should strike the Bar, and the steering gear is provided with an auxiliary tiller, which can be quickly shipped if the wheel should be damaged. She has twin screws and is driven by two 40 h.p. Diesel engines. The engineroom is a watertight compartment, and each engine is itself watertight, so that it can continue running even if the engineroom were flooded. Her speed is 8¾ knots, and she carries enough fuel to travel 200 miles at full speed without refuelling. The boat carries a crew of eight, and can take on board 95 people in rough weather. She is lighted by electricity, and has a line-throwing gun and an electric searchlight.



View of the after cockpit of the Whitby motor Life-boat (41-ft. Watson type), showing the coxwain's back rest, which prevents him from being washed out of the cockpit, and the control board of the engines.

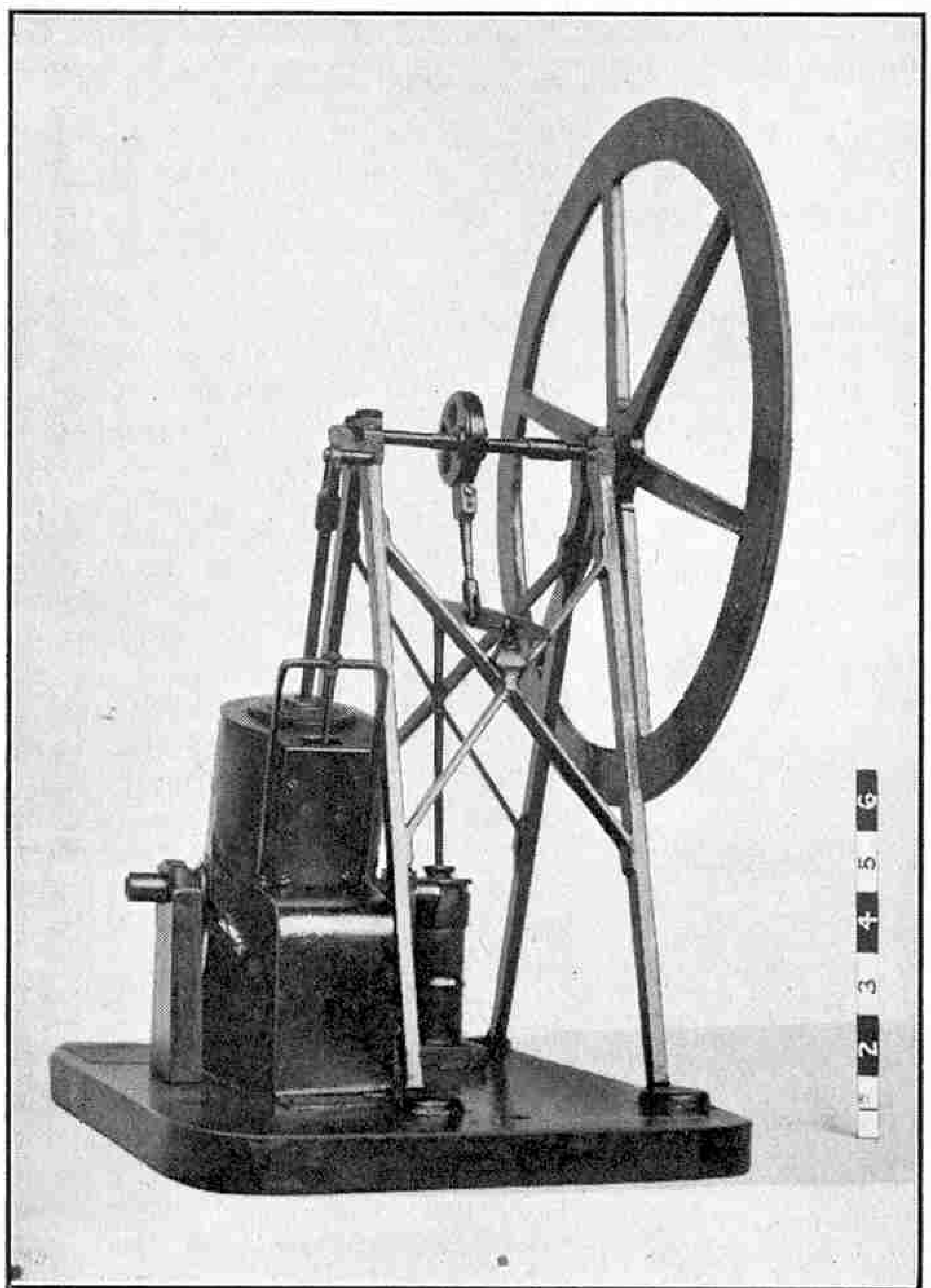
There is a still larger Life-boat, the 51-ft. Barnett type. With crew and gear on board she weighs 26½ tons, and lies afloat. She is driven by two 60 h.p. Diesel engines, has a speed of nearly 9 knots, and a range of 300 miles without refuelling.

At the outbreak of war the R.N.L.I. had under construction 16 motor Life-boats, due to be completed this year or next. Eight are for English stations, four for Scottish, one for Wales, one for Ireland, one for the Isle of Man and one unallocated. The Institution hope to complete these Life-boats and send them to the coast.

William Murdock, Pioneer of Gas Lighting

A Life of Service to James Watt

WILLIAM MURDOCK was born on 21st August 1754 at a hamlet in Ayrshire, near Old Cumnock, his father being a farmer and millwright of considerable mechanical skill. The boy was brought up in his father's trade, and soon showed his practical ability and inventiveness. At about the age of 20 he was employed to build a stone bridge across the River Nith, near Dumfries, and carried out the work successfully. The neighbourhood offered little scope for his talents, however, and when he was 23 he set out for Birmingham to try to get a job with the already famous firm of Boulton and Watt. At the Soho Works he was interviewed by Matthew Boulton, who at first refused to engage him. During the conversation Boulton noticed the peculiar hat that Murdock



Murdock's model oscillating engine, built about 1785. The illustrations to this article are reproduced by courtesy of the Director and Secretary, Science Museum, London.

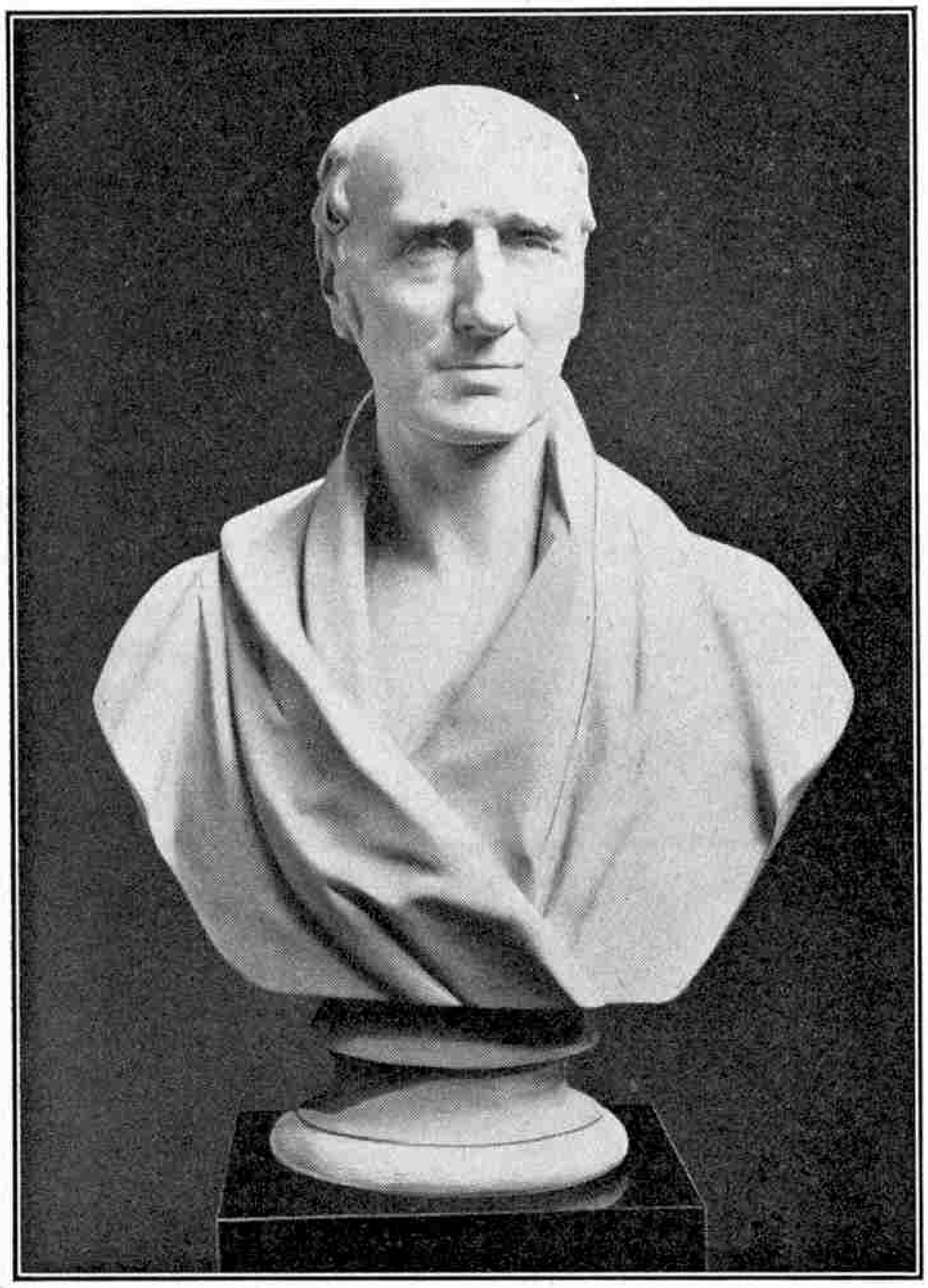
was nervously turning in his hands, and asked to examine it. To his astonishment he found that it was made of wood, and was told that the young man had turned it on a lathe of his own construction. Such a job required a lathe that could turn an oval shape, and Boulton realised that the designing and building of a machine of this kind showed quite remarkable skill. So, to his great joy, Murdock was engaged.

Murdock threw himself heart and soul into his new job, and quickly established himself as a skilful and reliable workman. In 1779 he was sent to Cornwall to superintend the erection of James Watt's pumping engines in the mines. Watt himself had already spent a good deal of time in that county, but had not got on well with the mine "captains" who, besides being of a rough and ready type, were prejudiced against the engines, and considered the charges made for their use unduly high. A further difficulty was that there was a rival engine manufacturer, Hornblower, already in the field. Murdock was just the man for the job. His great physical strength, and capacity to use his fists to good purpose when necessary, made a strong appeal to the mine captains, and they soon learned also to appreciate his straightforwardness and honest dealing. From this time to the end of his career Murdock displayed unswerving loyalty to his firm, a loyalty that was not altogether deserved by Watt.

Murdock toiled early and late to install his firm's engines and keep them running, and often lay awake hours at night turning over in his mind some problem or other that had worried him during the day. An amusing story is told of this period. The people of the house where Murdock lodged were suddenly roused one night by the sound of a great disturbance overhead. Considerably alarmed, they rushed up to Murdock's room, and there found him heaving away in his sleep at one of the bedposts and shouting: "Now she goes, lads! Now she goes!"

About this time Murdock's attention was turned to the possibility of making a steam engine capable of driving a vehicle, and he began the construction of a working model. His locomotive had two large driving wheels in the rear and a third and smaller wheel at the front mounted on a swivel and used for steering. Each of the wheels had eight strong wire spokes and was fitted with a small tubular rim. The body of the locomotive consisted of a long narrow platform, on the rear part of which the steam engine was mounted, while at the other end was the steering handle that passed down through the platform to the swivel. On the platform and in front of the steering mechanism was a tall vertical pole, to the top of which one end of the engine beam was attached. The other end of this beam was connected to the cylinder piston rod that canted it up and down when the engine was working. Close to the piston rod was another rod that extended down the beam, passing through the platform to a crank on the axle of the driving wheels. Steam was raised in the boiler by a small spirit lamp beneath it, the chimney of the lamp extending upward through the boiler.

The model locomotive worked successfully when tried out in a room, and Murdock then decided to make a longer and more severe test in the open. He decided that it would be risky to take out the engine during the day, because it might create alarm among the townspeople; and therefore he selected a dark night for his trial. He took the locomotive to a narrow lane screened on each side by high hedges, and lit the spirit lamp. In a short



Bust of William Murdock, born 21st August 1754, died 15th November 1839.

time the necessary steam was raised, and with the lamp flame shooting out of the short chimney the locomotive moved off. It gained speed so rapidly that soon Murdock was in full chase after it. The story goes that the rector of the parish on his way home encountered the engine puffing and hissing along in an alarming and unearthly manner, and at first believed it to be undoubtedly a manifestation of the Evil One!

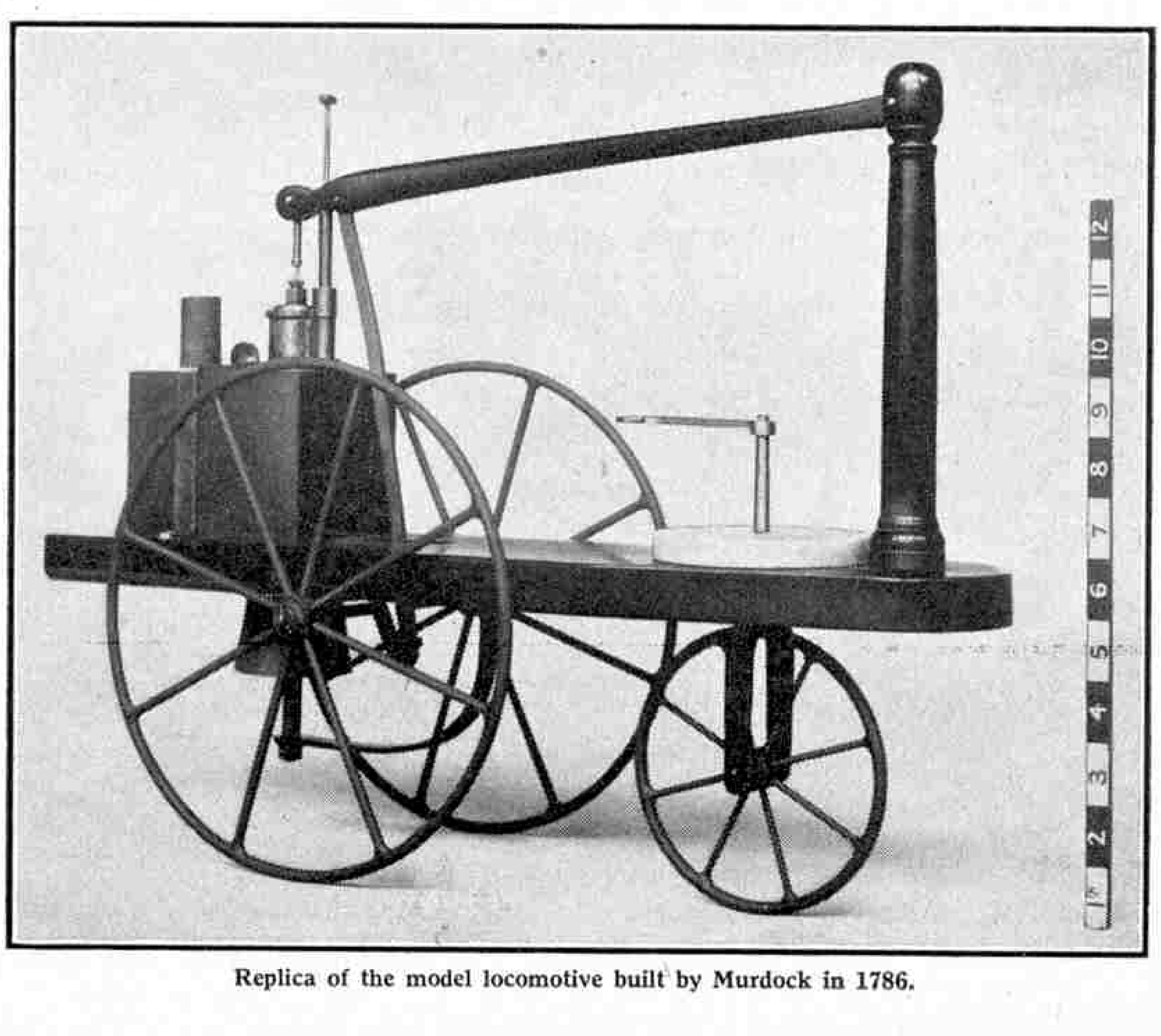
Murdock was naturally delighted with the speed and power exhibited by his model, and packing it carefully he set off with it to London in the hope of securing a patent for it, and later persuading Boulton and Watt to start manufacturing steam locomotives. Boulton happened to meet him at Exeter, however, and as he was alarmed at the possibility of the firm losing their best engineer in this manner, he persuaded Murdock to return. When Watt heard of Murdock's experimenting he was annoyed, for he regarded steam carriages as impracticable. Eventually Murdock abandoned his work on the locomotive and turned his attention to devising improvements for Watt's steam engine.

Important as were Murdock's contributions to the development of the steam engine, his invention of lighting with coal gas was his greatest achievement. Sometimes when we are watching a coal fire we see a small jet of smoke emerge from the side of a lump of coal and burst into flame; in that tiny jet there is coal gas. In 1794 Murdock began to experiment with coal gas as an illuminant. He heated coal in a closed iron pot fitted with a pipe through which passed the gas given off in the process. To the pipe he connected a short tube that led to a bladder, and thus collected the gas. When the bladder was full it was disconnected and a thimble with a small hole through it was fitted on to the free end of the short tube. The gas passed out through the hole in the thimble, and was there lighted, giving a flame greatly superior to that of the candle or oil lights then exclusively used. After lighting the jet Murdock passed the thimble and pipe through a hole cut in the bottom of a lantern, and fastened it securely; and with this curious contrivance he lighted his way home across the Cornish moors during the dark winter evenings. By attaching a long pipe to his iron pot Murdock was able to lead the gas into his house and use it for illumination, to the amazement of the local inhabitants, who turned up every night to see the astonishing spectacle. No one had believed it possible that an illuminating flame could be obtained without using a wick, and as the news of his achievement spread, people began to come from great distances to see for themselves this new miracle.

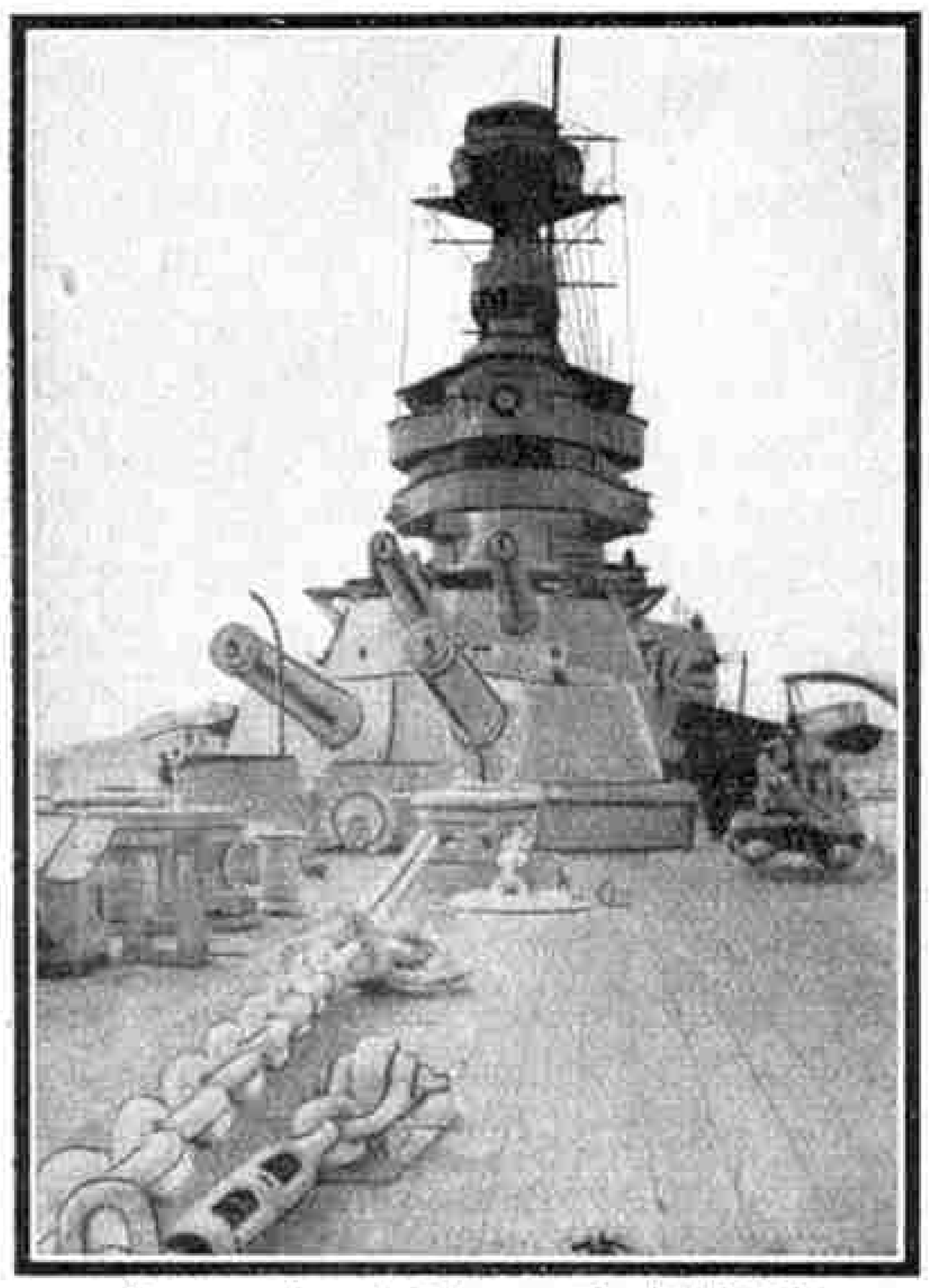
An interesting experiment that illustrates simply the principle of Murdock's contrivances can be carried out by any *"M.M."* reader. Take a clay pipe and fill the bowl with some very small pieces of bright coal. Plug the bowl with a piece of clay, and then place the bowl in a hot part of the fire, or hold it over a gas burner, with the stem pointing slightly upwards. Soon greenish-brown smoke will begin to come out of the stem; this is coal gas, and if lighted it will burn.

At Birmingham some years later Murdock successfully built a plant for manufacturing and purifying coal gas in large quantities. A great event was his brilliant illumination of the front of Boulton and Watt's works at Soho in 1802, to celebrate the signing of the Peace Treaty between Britain and Napoleon at Amiens on 27th March of that year. In 1812 or 1813 the first gas company was formed, and a gasworks erected in Westminster.

Murdock subsequently became a partner in the firm of Boulton and Watt. In 1830 he retired, and on 15th November 1839 he died at his home at Sycamore Hill, not far from the works.



Replica of the model locomotive built by Murdock in 1786.


Guns and control tower of a battleship.

Ships of the British Navy

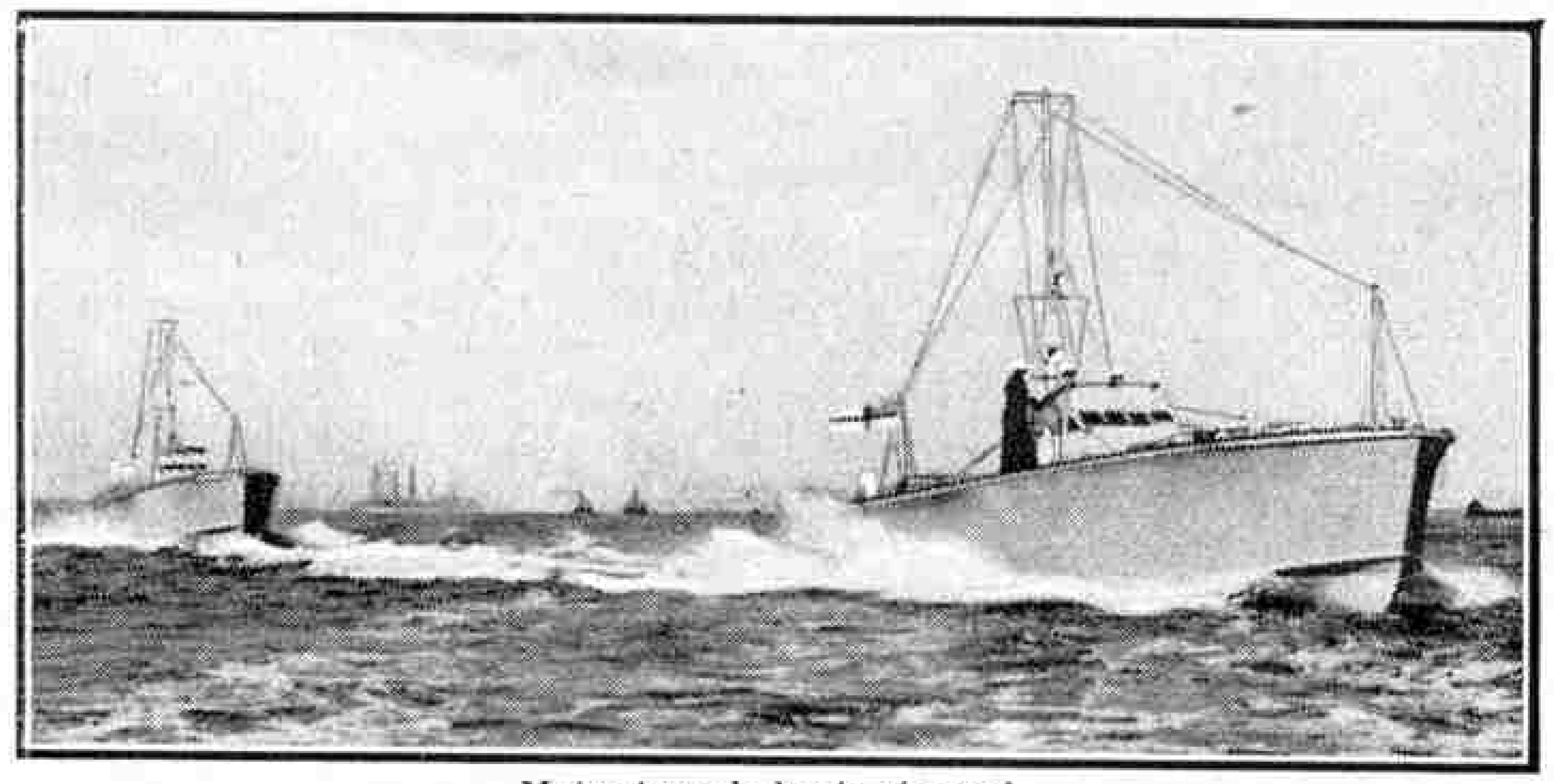
What they do in War

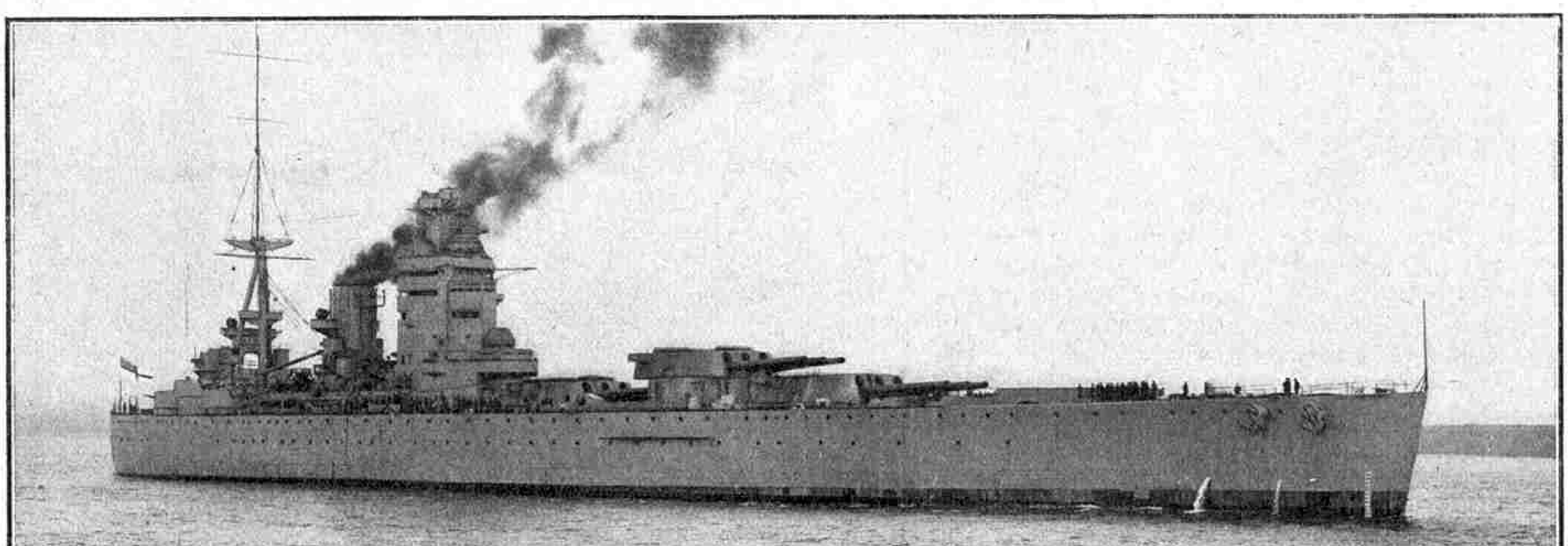
THE ships of the British Navy are a source of keen interest to every "*M.M.*" reader in times of peace; at the present time this interest is vastly increased. Recently many readers have written to ask for information regarding Naval vessels and the special purpose for which they are designed, and the object of this article is to give a brief survey of the various types.

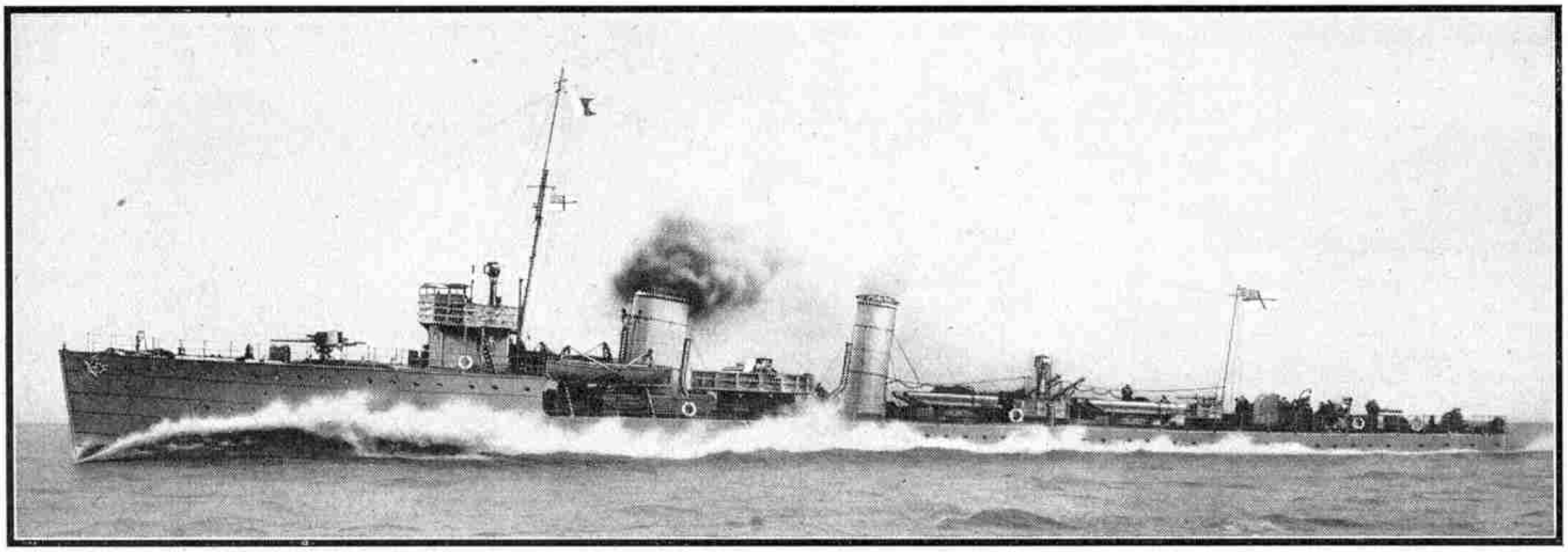
First of all comes the battleship, the most powerful unit of the fleet. The first all-big-gun ship was the "*Dreadnought,*" completed in 1906, and from this vessel the modern battleship has been developed. The chief characteristics of a battleship are a liberal equipment of the heaviest guns, and armoured protection sufficient to enable her to stand up to the most severe punishment she is likely to receive from enemy vessels of any kind, including ships of her own type. At one time it was confidently said in some quarters that the development of the submarine meant the end of the battleship's sphere of usefulness, and in recent years the coming of the air bomber has given rise to similar doleful predictions. Whatever may be the future of the battleship, however, this magnificent type of vessel still forms the backbone of the fleet. The great guns of a large battleship are capable of firing shells weighing over a ton to a distance of 15 to 17 miles; and during the course of their journey these shells rise to a height of three miles or more. The force of the explosion that takes place when a big gun is fired is such that a man standing on deck within a few feet of the muzzle would be killed by the concussion. Inside the gun turret the shock of the discharge is damped by the thick steel armour. The guns are not aimed and fired from the turrets in which they are housed, but from a director tower placed high up in the ship.

Next in size and power to the battleship is the battle cruiser, which dates from 1911 and owes its origin to the desire to produce a heavily-armoured cruiser of the all-big-gun type. She may be regarded as a battleship in which armour and gun power are reduced to the extent necessary to obtain greatly increased speed.

The term "cruiser" represents such a variety of ships that it is difficult to give a definition of the type. A cruiser may be a 10,000-ton ship with 8 in. guns, or at the other extreme may be little bigger than a flotilla leader, which is merely a large destroyer. Cruisers have to carry out an enormous variety of duties at sea, and their design, therefore, must be to some extent a compromise, which explains why the latest cruiser is always wrong according to the ideas of some of the experts. One of the most important tasks of British cruisers is that of protecting our trade routes and thus ensuring the safety of the ships that carry our food and other supplies. For this work they require high speed and


Motor torpedo boats at speed.


The battleship is the backbone of the fleet.



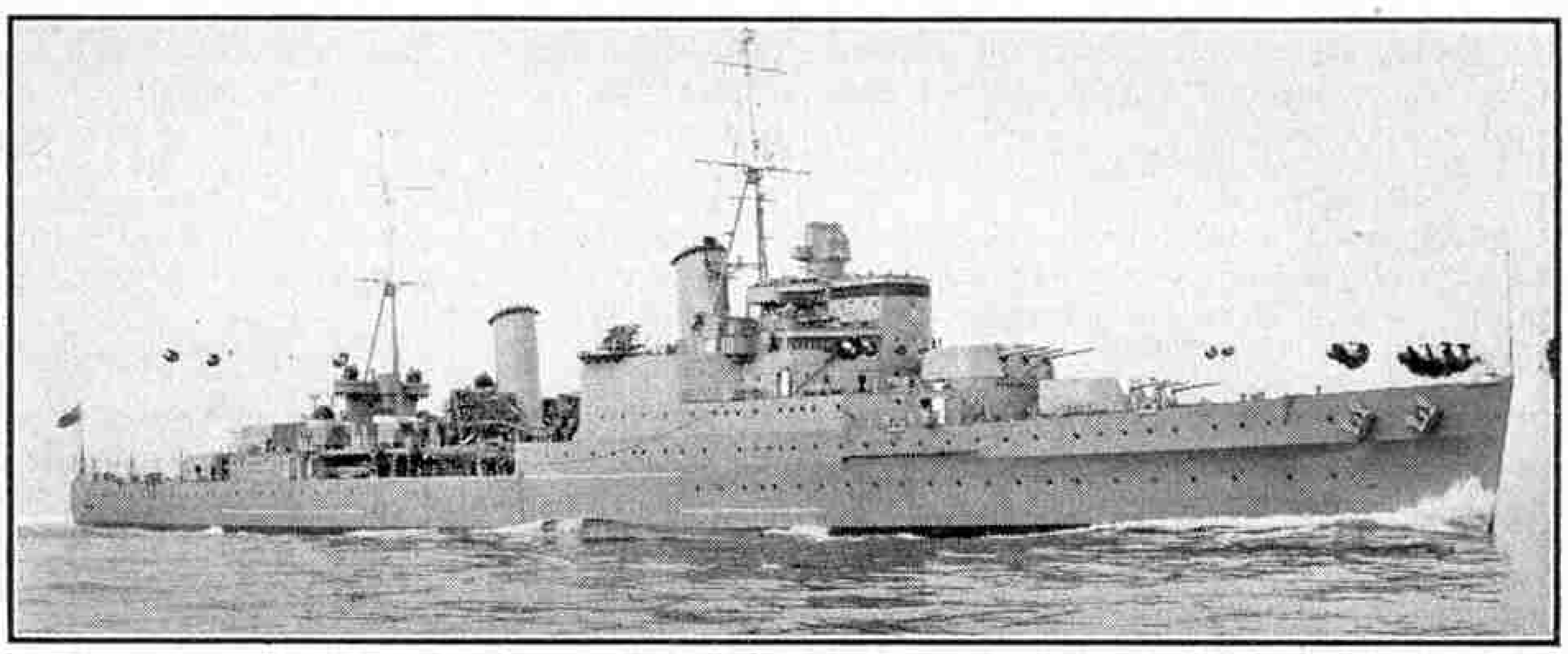
A fascinating type of warship; the destroyer, the greyhound of the fleet.

sufficient armament to deal with commerce raiders. Other important functions of the cruiser are to destroy enemy commerce and prevent troop movements at sea; to carry out blockade work, and to give warning to the battle fleet of the approach of enemy ships. The cruiser in fact may be regarded as a direct descendant of the frigate of Nelson's day.

The destroyer, the greyhound of the fleet, is in many respects the most interesting and valuable type of ship in the Service. When the torpedo became a practicable weapon, high-speed boats of a new type were constructed to make use of it. These vessels were known as torpedo boats. Then some kind of ship had to be designed to attack the torpedo boats, and a vessel of a similar type, but of still greater speed, was produced under the name of torpedo catcher. These catchers proved so useful that they also were fitted with torpedo tubes and, growing rapidly in size and speed, they developed into the torpedo boat destroyer of recent years. The designers of the earliest destroyers were afflicted with speed mania to such an extent that the vessels they produced were not only frightfully uncomfortable and very wet, but actually too fragile in structure to withstand heavy seas. The destroyer of to-day represents a vast improvement in these respects, and is capable of keeping the sea in all weathers. Destroyers are organised in flotillas led by a flotilla leader, a larger vessel of the same type carrying the commanding officer of the flotilla and his staff.

The functions of the destroyer are extraordinarily varied. They include the screening of the battle fleet from hostile destroyers and submarines; the attacking of larger vessels by torpedo; the sinking of hostile destroyers by gunfire, and the setting up of smoke screens. A further very essential duty is that of convoying merchant vessels. During the last war the convoy system played an extremely important part in bringing to an end the menace of submarine attack, which at one time seriously threatened the food supplies of the nation. Once again we find our destroyers engaged in convoy duty, making it perilous for enemy submarines to make an attack.

The submarine is at present more in the public eye than any other warship. The cylindrical appearance, tapering towards the stern, of these undersea ships is well known. A deck extends for about one half of the length of the vessel, and this carries the conning tower, which houses the navigating bridge and instruments, and the steering wheel. Projecting above the conning tower is the upper end of the periscope, which is the eye of the submarine; the lower end of the periscope passes down to the control room. When the vessel is running submerged the deck equipment cannot be used, and therefore a duplicate of it is provided below. The control room is situated amidships, and here are accommodated the steering gear and the very important hydroplane gear that controls the horizontal rudders by which the required depth of the vessel is maintained. For propulsion on the surface



The cruiser is a direct descendant of the frigate of Nelson's day.

a submarine uses Diesel engines; for running submerged these engines are cut out and electric motors driven from batteries are used. The batteries are charged during the periods when the submarine is on the surface.

The submarine carries out its deadly work mainly by means of torpedoes. A torpedo is a metal object shaped like a cigar, about 20 ft. long, having an explosive head that explodes when contact is made with any solid structure. The contrivance is propelled under water by its own engines, driving screw propellers. A torpedo is not, as many people think, fired in the same way as a shell from a gun, but is merely ejected from a tube by means of compressed air, or by a small charge of powder. In either case the object is simply to get the torpedo into the water; once there its own engines take up the running. Torpedoes (Continued on page 670)

Railway News

Shunting Engine with Motor Car Bonnet

During the past few years several railway vehicles using internal combustion engines as their power units have been produced by road-vehicle builders, and of these the streamlined rail-cars constructed for the G.W.R. by the Associated Equipment Co. Ltd., Southall, Middlesex, are probably the best known. The makers of these cars have now entered on a further sphere of railway work by the introduction of a neat 0–4–0 shunting locomotive, designed for service on sidings and goods yards, and in large works. The locomotive has rather a novel appearance, for it has a radiator and bonnet identical with those used on the A.E.C. "Regal" and similar types of motor-coaches. The wheel arrangement is 0–4–0, the spacing between the leading and trailing axles being somewhat wider than usual. The wheels have a diameter of 37 in.

The main frames are constructed from ¾-in. steel plates, reinforced by channels and angles to give strength to resist shunting shocks. The plates forming the buffer-beams are of considerable depth, and are united with other frame members to give a structure of great rigidity. The buffers are of the standard railway type.

The power unit is largely a standard A.E.C. oil engine of the four-cylinder type, with a bore of 120 mm. and a stroke of 146 mm., and develops 78 brake horse-power at 1,700 r.p.m. A plate clutch of standard type couples the engine to the gear-box, which is provided with four speeds and a countershaft assembly for the transmission of power to the leading and trailing axles. A reverse gear is also incorporated, which gives four forward and four reverse speeds and renders the locomotive particularly mobile.

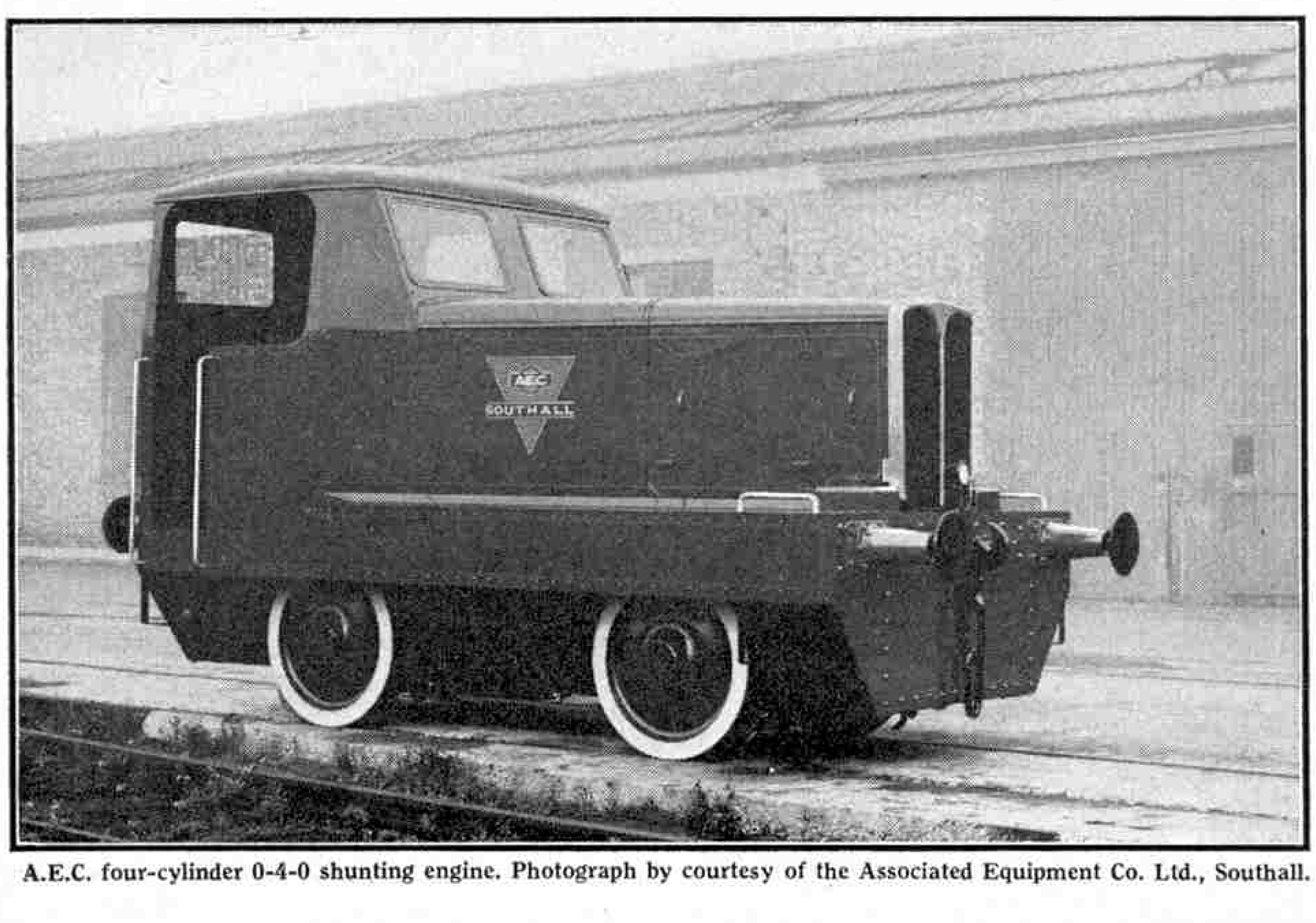
The location of the gear-box is between the axles, and the countershaft assembly in the box is independently coupled to the two axles by universally jointed shafts similar to those used for road vehicles. The springs are of the leaf type, and are arranged to take torque reaction in a very efficient manner. This is a necessary feature on a locomotive used for shunting service.

The brakes are operated by a screw and hand wheel, with a link adjustment between the column and the cross shaft to provide for wear take-up. Sanding gear is fitted to the four wheels, and the controls for this, as well as for the clutch and accelerator, are duplicated in the cab to allow the locomotive to be handled easily from either side. The change speed lever and the reverse lever are placed centrally, and are also easy to reach. The wide windows at both the front and rear of the cab are interesting, for they are designed to minimise "blind-spots" as far as possible, and to give the driver a wide view of his own and the adjoining tracks.

Hand-rails, step-irons, and other features familiar on locomotives are embodied in the fittings of the vehicle, and its design has been arranged to provide large easily cleaned surfaces and great accessibility. The fuel tank is carried between the engine and the cab, and the sand-boxes are located on each side of the radiator at frame level. Provision has been made for the fitting of lamps, current for these being obtained where necessary from the dynamo driven by the engine.

As it is proposed to supply the locomotive with an alternative six-cylinder engine giving approximately 50 per cent. more tractive effort, all the parts have been designed accordingly, and are very sturdy. With an overall length of 18 feet 1½ inches, and a height of 11 feet 4 inches, the locomotive should prove one of the most powerful and compact shunting units yet built. Up to the present, it has been employed on the Associated Equipment Company's own sidings. In service there it has proved very satisfactory.

T. R. Robinson.



A.E.C. four-cylinder 0-4-0 shunting engine. Photograph by courtesy of the Associated Equipment Co. Ltd., Southall.


The track walker at work. Photograph by G. E. Stone, Newcastle-on-Tyne.

The Track Walker

The above illustration shows a track walker at work near Kirkby Stephen in Westmorland. During the course of a day's work he walks several miles in all weathers. Among his many jobs are securing loosened keys, tightening up loose fishplate bolts, and keeping a sharp look out for fractured chairs or fishplates. He also oils points and repairs broken fences.

The track walker makes a daily report on his section and so helps to make British railways the safest in the world.

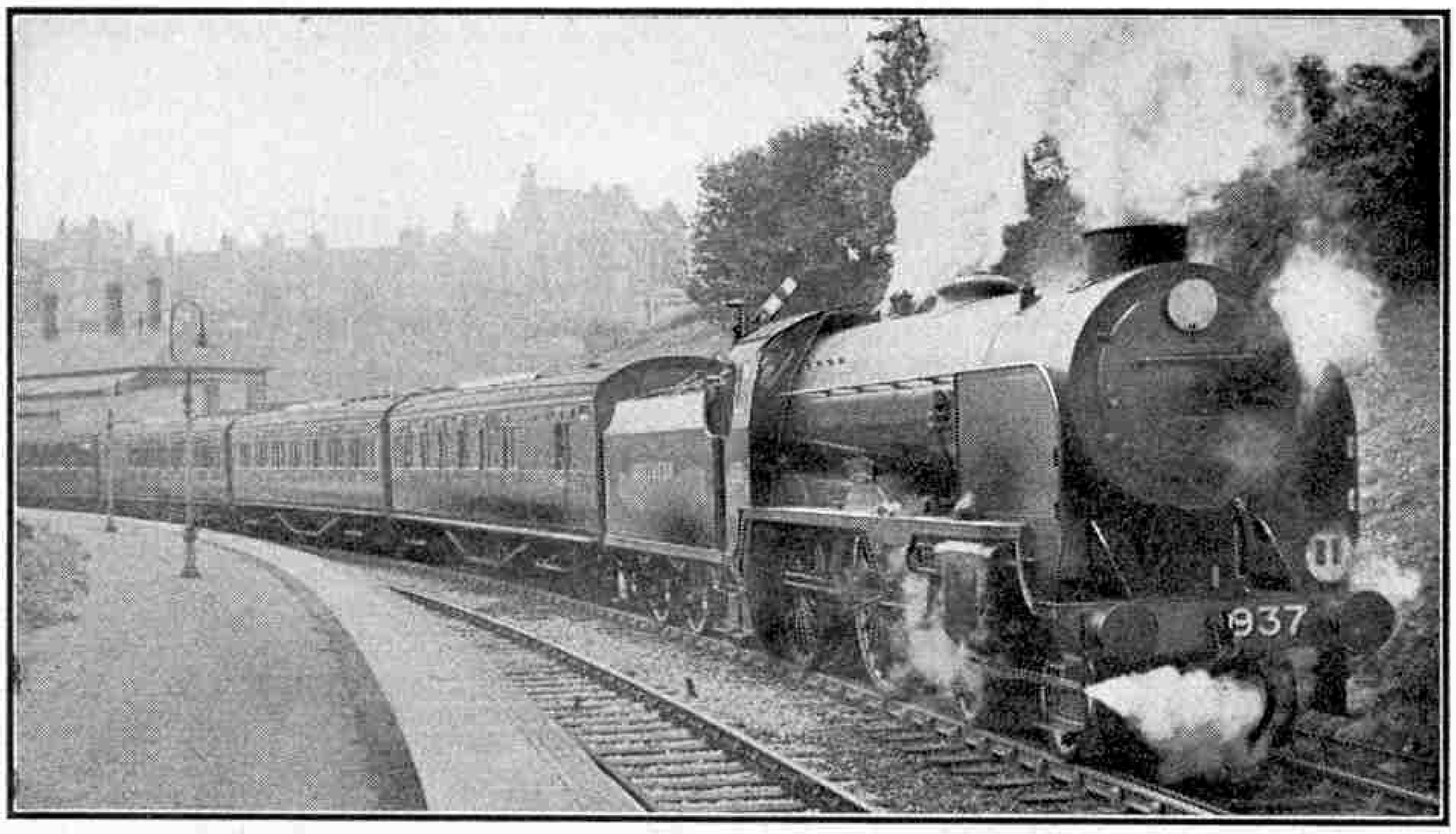
New American Mechanical Stoker

The Baltimore and Ohio Railroad of America will start shortly to equip 40 more of its locomotives with mechanical stokers of a new design. All American locomotive stokers now in use in the United States feed coal into the fire-box from the back end, either through an opening just above the fire grates, or through the fire-box door opening. In contrast to this conventional type, the newly-developed mechanism will feed the coal from the front end of the fire-box, and is therefore called the "front end stoker."

The new design was introduced primarily with the idea of reducing losses of coal through the chimney. When coal is fed into the fire-box from the area of the door, the pulverized parts have almost direct passage over the arch through the flues into the front end stack, without being burned. These unconsumed particles also have a tendency to cut the flues at the back end, and cause frequent repairs or renewals.

With the front end type of stoker, the coal is fed into the fire-box at its hottest point under the arch, and a very large part of the pulverized content is consumed, thus generating heat and power that otherwise would be wasted. Extensive testing of the new stoker shows that it gives a considerably increased fire-box temperature.

The new stoker also has other advantages over previous types. It can be applied without extensive changes in the fire-box. The entire mechanism is removed from the cab, and the door of the fire-box is left free for inspection and for the preparation of the fire and attention to it.



Hastings to Charing Cross express hauled by "Schools" 4-4-0 No. 937, "Epsom." Note the double chimney and extended smoke-box. Photograph by J. P. Wilson, Nottingham.

Railway Coaches as "Rest Rooms" at Junction Stations

With a view to providing as much comfort as possible for members of H.M. Forces making train journeys that entail a change of trains at provincial junctions, the railway companies are arranging for them to use empty carriages as "rest rooms." The arrangements provide that wherever possible empty carriages will be set aside at provincial junction stations. These will be utilised for either rest or sleep by members of H.M. Forces who may have some considerable time to wait for their connections. There will be no fear of oversleeping, as the station staff will inform the men in good time when connecting trains are due.

Restaurant Car Services Restored

After being completely withdrawn from service owing to war difficulties, limited restaurant car facilities were provided last month on over 130 of the principal long-distance trains. The re-instated services cater for the important towns on the four main line systems between which there is a heavy business traffic.

Hospitals on Wheels

The British Railways are engaged in the construction of ambulance trains for use both at home and overseas. Several have already been completed, and to enable further trains to be placed into service rapidly, work on different sections is being carried out at seven different railway workshops throughout the country. Each train is fully equipped with kitchen cars and cars for travelling staffs of nurses and doctors, as well as cars that are provided as travelling pharmacies.

Casualty evacuation trains also have been built for immediate use in the event of casualties occurring as a result of Air Raids. Their purpose is to assist in the distribution of injured civilians to hospitals throughout the country.

L.N.E.R. Locomotive Notes

"Green Arrow" locomotives Nos. 4798, 4828, 4831 and 4832 are now stationed at Gorton. Several "Pacifics" have visited Gorton Locomotive Works, and these include No. 2554 "*Woolwinder*" and No. 4478 "*Hermit.*" No. 2558 "*Tracery,*" which used to work between Manchester (London Road) and Marylebone, has been transferred from Manchester. C. H. S. Owen.

A Fine "*Flying Scotsman*" Run

As readers will be aware, the L.N.E.R. summer schedule, as operated in 1938 and during this season up to the outbreak of war, provided a non-stop seven-hour run over the 392.7 miles between King's Cross and Edinburgh each way daily, including Sundays. During May and June last this overall time was unaltered with the addition of the Newcastle stop, although the train was lighter than in the height of the holiday season.

On one of the busy Saturdays during August "*The Flying Scotsman*" put up a notable run, following the most exceptional feature of a 5½-min. late start from King's Cross. The train consisted of 13 coaches, included a new triplet restaurant car set and a buffet car, and weighed 461 tons tare or 485 tons full. The engine in charge of the train was streamlined Pacific No. 4482 "*Golden Eagle*" of Haymarket shed, Edinburgh. A London driver and fireman were on the footplate as far as the half-way point near Tollerton, Yorks., and an Edinburgh crew completed the journey.

Once over the gradients of the first 25 miles, very fast travelling ensued; Huntingdon 58.9 miles being passed in 59½ min. and, following a burst of 85 m.p.h., Peterborough, 76.4 miles from King's Cross was passed in 74½ min. Stoke Bank was mounted steadily at an average of over 50 m.p.h. The 50½ miles between Grantham and Doncaster needed only 46 min., as compared with a fast booking of 47 min. Selby was passed at the usual much reduced speed. The 156.6 miles from passing Hatfield, including one severe and several lesser service slacks, had been covered in 145½ min. at an average of 64.7 m.p.h. The schedule allows 149½ min., representing a mean rate of 62.8 m.p.h. for that fast stage.

Through York, and on past Darlington, "*The Flying Scotsman*" was 2 to 4 min. behind booked times, and so far had suffered nothing but a slight signal check, notwithstanding intense traffic. The Bridge House semaphores, south of Durham, unfortunately pulled the train up for about half a minute, however, and this resulted in the loss of about 4 min.

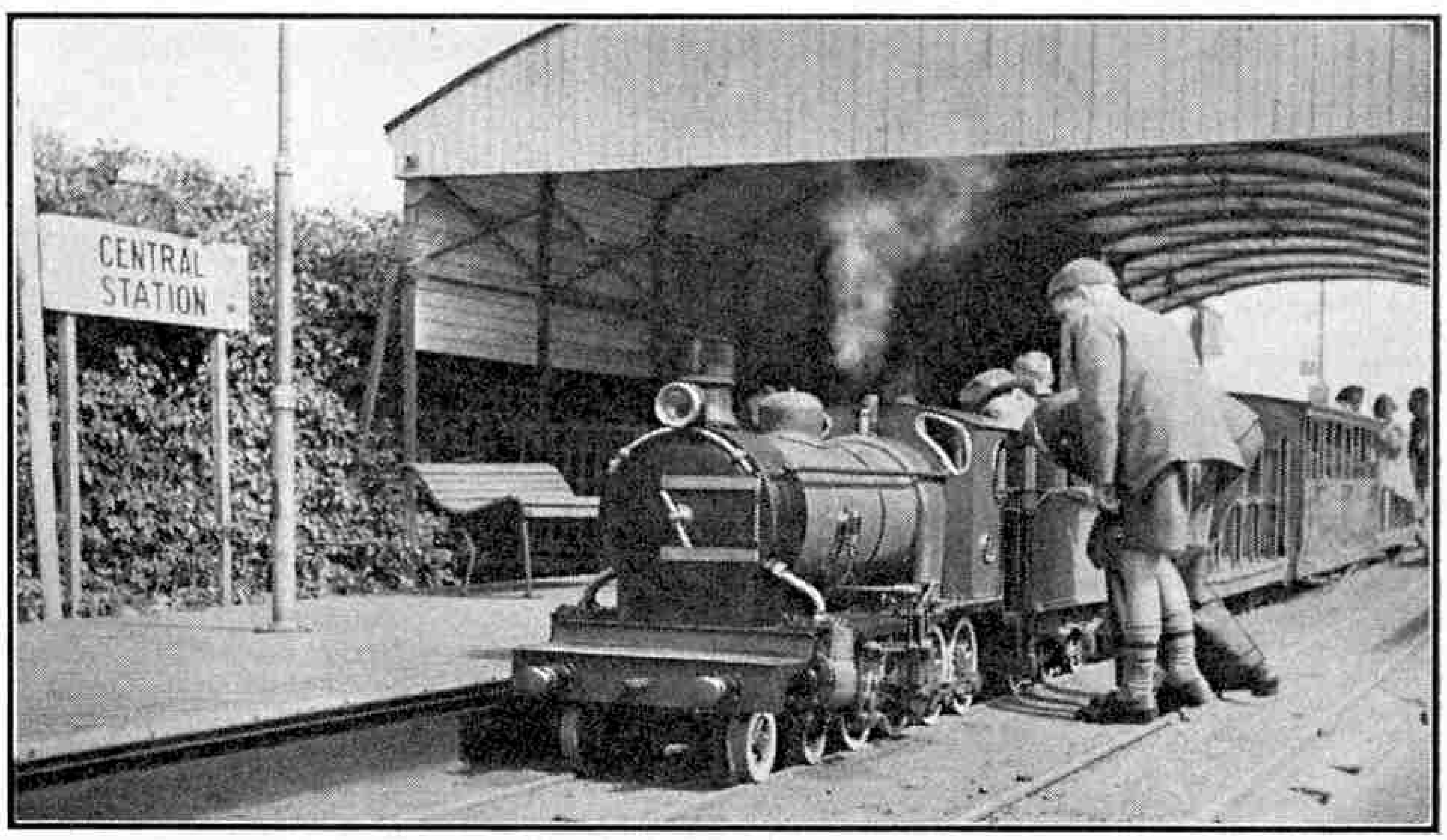
Durham and Newcastle were passed 8 min. late, and a punctual arrival at Edinburgh now seemed out of the question. Fortunately there were no further delays and a fine recovery ensued. On reaching Berwick 6 min. had been won back, leaving only 2 min. in the wrong column; at Dunbar and Drem "*The Flying Scotsman*" was exactly punctual, while the arrival at Waverley station, Edinburgh, was 2 min. early, concluding a 131-min. run over the more difficult final 124½ miles from the dead-slow passage of Newcastle. Thus the actual overall time was only 6 hr. 52½ min. and not more than 6 hr. 48½ min. net.

R. A. H. Weight.

South African Miniature Railway

Details have been received of a very interesting 15 in.-gauge miniature railway that is operated at Durban in South Africa. The accompanying illustration shows a scene on the line, which is half a mile long and is operated daily throughout the year. The engine is a 4–8–0 with cylinders of 3 in. dia. and 4 in. stroke. It is 10 ft. 6 in. long and is capable of hauling a six-coach train accommodating 60 adult passengers and 30 children. The engine has Walschaerts valve gear and a boiler pressed at 100 lb. per sq. in. The stations on the line are named after far away places in Africa and this is a source of delight to the children.

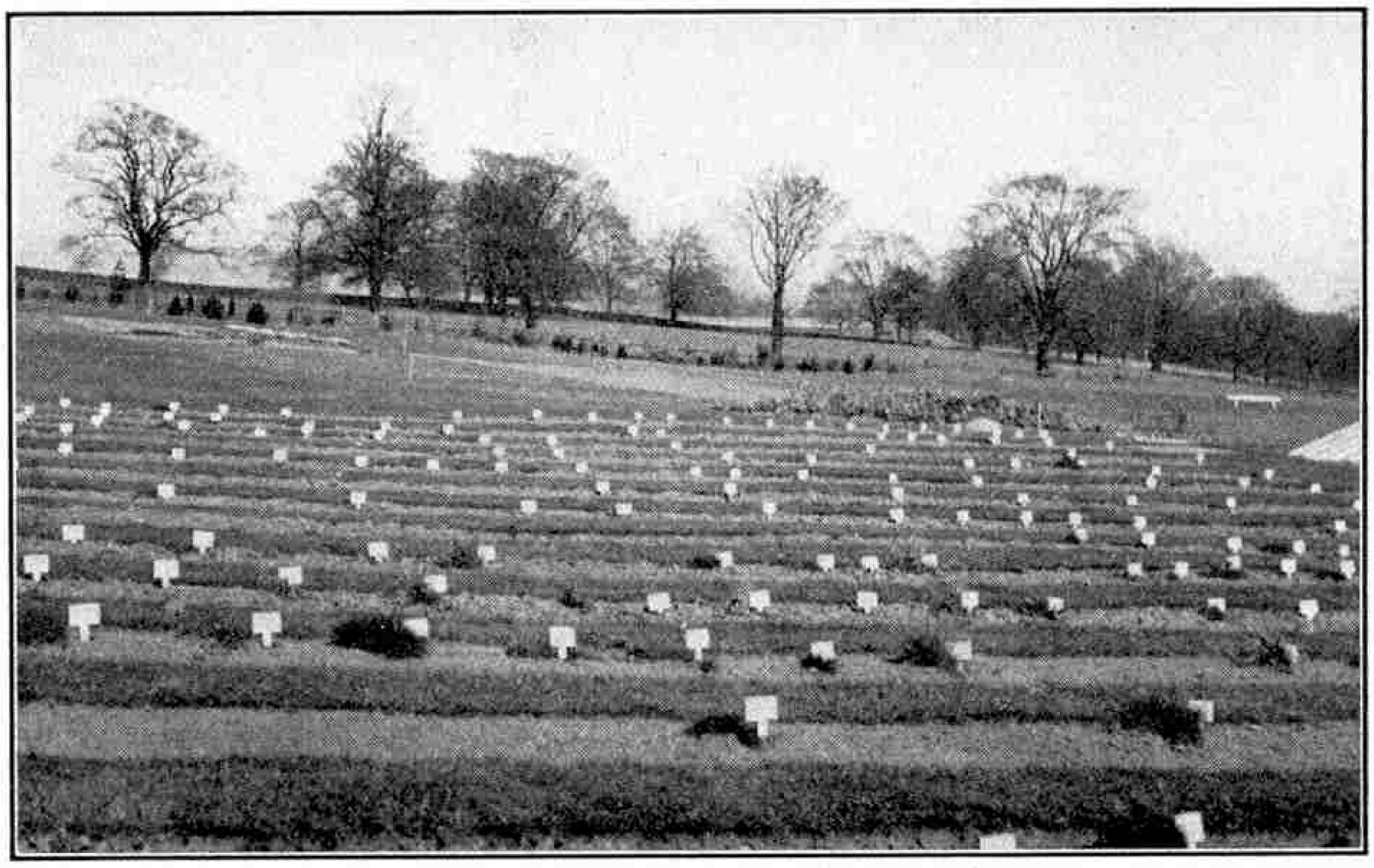
We are indebted to Mr. J. Cowen, Durban, South Africa, for the details and photograph of this interesting line.



An interesting South African 15 in.-gauge miniature railway. The engine is a 4-8-0 capable of hauling 90 passengers.

Perfect Lawns in the Making

By Sydney Moorhouse, F.R.G.S.



The main experimental ground of the Board of Greenkeeping Research Station, where there are over 1,000 plots on each of which a trial is being carried out.

VERY few of us realise when we see the perfect grass surfaces at Wimbledon, on the leading golf courses, and on the lawns in front of such fine residences as Buckingham Palace, that the ideal lawn is now a product of the combined work of green-keeper and experimental scientist.

A visit to the Board of Greenkeeping Research Station at St. Ives, Bingley, Yorkshire, the only one of its kind in Europe, therefore would prove a surprise to those who have hitherto imagined that turf assumes the "velvety" surface that all greenkeepers and gardeners love to see, by perfectly natural methods. At St. Ives, at an altitude of 600 ft. above sea level, is an area of over six acres in extent laid out in experimental plots of grass, as well as laboratories where chemists and botanists are constantly revealing new and interesting facts about lawn grasses by means of scientific research.

The Main Experimental Ground has well over 1,000 plots, each covering an area of about 10 sq. ft. and each is the subject of some interesting experiment. On entering the ground one is amazed to see a collection of what are obviously weeds growing in one corner, and to note with surprise that these are being well cared for. This is the "Weed Museum." Many of the weeds are allowed to flower and produce seed, and the latter becomes the object of experiments, the ultimate result of most of which is to find methods of exterminating the weeds.

Not every weed has to be discouraged, however. Such plants as Marram Sea, Matweed and Sea Lyme Grass are exceptionally useful for binding sand-dunes together, a discovery that has been of interest to those engaged in the preparation of golf courses at the seaside resorts.

More trial plots. Even weeds are grown at the Station in order to discover how best to get rid of them.

Beyond the "Museum" we come to the actual plots, and in front of us is laid out a veritable patchwork quilt composed of grass of every shade and kind of green. Only when we remember that here are more than 1,000 plots, all being treated in some special fashion, do we understand how grass can be grown with so many different shades. One section is devoted to plots undergoing different kinds of surface treatment, and there are 64 experimental plots where the effect of mowing once a week and three times a week at ⅛ in. and ⅜ in. height can all be studied in combination. On every occasion the yield of the clippings from each plot is collected and weighed, and an estimation of the dry matter carried out.

Successful manuring has a great deal to do with the making of the perfect lawn surface, as also has the use of fertilisers. In one place an area of 896 sq. yds. of turf has been divided into 128 equal plots in order that the influence of nitrogen, phosphate, calcium, iron, compost and spiking may be studied. The layout of this section permits each one of these to be studied alone, as well as in combination with each or all of the others. Labels show which of the six factors is being used for each plot, and it will probably be found that nitrogen is fed to the most velvety plots, and also that the grasses that look least healthy are suffering from want of this element.

Finding the best means of getting rid of pests is an important feature of the work at St. Ives. All lawn-growers are familiar with the leather-jacket, as the larva of the daddy-long-legs is called, which is one of the biggest nuisances of all. This creature, which grows to a length of one inch, is particularly fond of the young shoots of grass, and it will be remembered that its ravages at Lords Cricket Ground a few seasons ago created consternation. Lead arsenite has long been considered as the best killer for these pests, but detailed experiments have shown that while wholesale slaughter is the result for a single season, applications are not very successful beyond that period. The St. Ives experts have now perfected an emulsion by which the pests can be brought to the surface of the ground and then destroyed.

Moles, too, are enemies of those engaged in lawn cultivation. At one time the death of this animal was brought about by soaking pieces of darning wool in strychnine and then threading them through earthworms. The worms when introduced into the moles' burrows were soon devoured, with fatal results. This method is no longer used. Not only has the controlled sale of strychnine prohibited its extensive use, but it was found that this method of poisoning was extremely cruel, and that the poor creatures suffered unbelievable agonies before they died. Scientific experiment has yielded a gas that gives much better results. This is pumped into the burrows, and as the mole communities have no A.R.P. schemes, the various passages are soon filled with gas and the mole population can be wiped out in a very short time.

One of the most interesting sections of the Main Experimental Ground is that devoted to sample plots from different places. One of these is a section of camomile lawn from Buckingham Palace. In appearance, camomile shoots are not unlike an extremely small form of yarrow, and a pleasant fragrance is exuded as one walks across the lawn. Although camomile lawns are a rarity to-day, Drake is said to have played his famous game of bowls on Plymouth Hoe on a green composed of camomile turf.

The work at St. Ives can be divided into two separate classes, research and advisory. Officials of golf and sports clubs from all parts of the British Isles write for advice regarding their turf problems and often submit samples for experiments, and the Director of the station and his assistants annually travel many hundreds of miles to visit golf courses and give advice on their better maintenance. Carefully arranged flags on a map in the entrance hall show where these visits have taken place, and there are few counties in Britain left unmarked.

The United States of America can claim to be the pioneers of investigational work into turf culture, and experimental work of this nature now is undertaken at most of the leading Colleges there. The St. Ives station, founded in 1929, remains the only one of its kind in Europe, but there are stations undertaking similar work in South Africa, New Zealand, New South Wales, Queensland and Victoria.

Tunnelling Single-handed for 32 years

AFTER 32 years of solitary labour William H. Schmidt in September 1938 completed the driving of a 2,000-ft. mining tunnel through a mountain in Kern County, California. The only power at his command was that of his own muscles, and he had no help at any time. For sheer pertinacity Schmidt's feat is outstanding, and as a one-man mining achievement it is probably without parallel. He had no money when he started, and during 26 of the 32 years he worked as a ranch hand in the valley of the South Fork of the Kern River every summer. His pay, meagre though it was, sufficed to see him through the following winter's tunnelling operatings. Six years ago he sold one of his mining claims, and the money he received enabled him afterwards to devote all his time to driving the tunnel.

Schmidt was 36 years old when he started the bore, and 68 when he completed it. He is bent and stooped from the work, but in general good health. Like all true mining men, his optimism has never waned, and he believes financial independence will be his lot.

Schmidt's claims are on the inside of a range of mountains. In order to ship out ore in quantity overland it would have been necessary to build miles of roads over difficult country. The alternative was to drive a tunnel straight through the hill, emerging at a point overlooking the Mohave Desert to the south. Schmidt chose to do this, and to forego actual mining until the job was done. In the first three months after the tunnel was finished he took out 20 tons of ore, the average value of which in gold, silver, copper, and lead was about £12 per ton. He is still working single-handed.

The tunnel is 5 ft. by 8 ft. in section, and Schmidt drilled it all with a four-pound single jack hammer. His drill steel was of whatever section and size he could obtain, and it varied in diameter from ⅝ in. to 1 in. Although he had never had any previous mining experience, Schmidt learned as he went along, and during the 32 years he sharpened by hand every piece of steel he used.

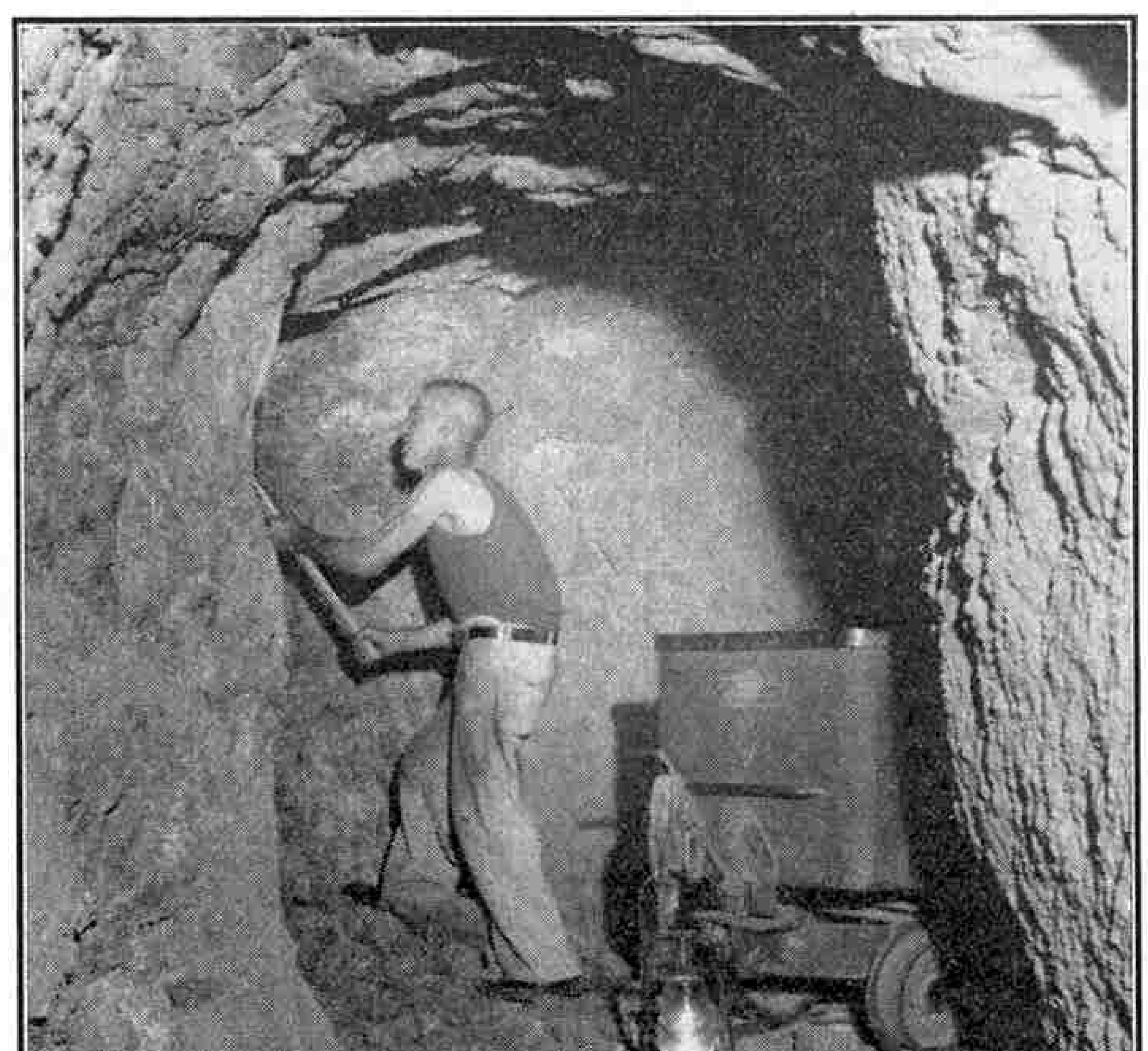
The rock penetrated by the tunnel is a weathered and partially disintegrated granite. It is stable enough to stand up well, and no timbering was required to support the opening. At the same time it is soft enough to shatter well when blasted. As a result, after firing a shot, Schmidt was able to knock down by means of a bar, a pick and a hammer a good deal of loosened or projecting material before drilling another hole.

Disposal of the spoil was a laborious and time-consuming operation. Schmidt laid rails on the tunnel floor and procured a steel ore car. He loaded this by hand, pushed it out to the dump, and pushed it in again. A lantern furnished his only illumination. Assuming that there was no overbreak of rock, Schmidt handled approximately 2,500 cu. yd. of spoil, measured in the solid. Towards the end of the job, the length of the trip from the face to the dump and back was about four-fifths of a mile.

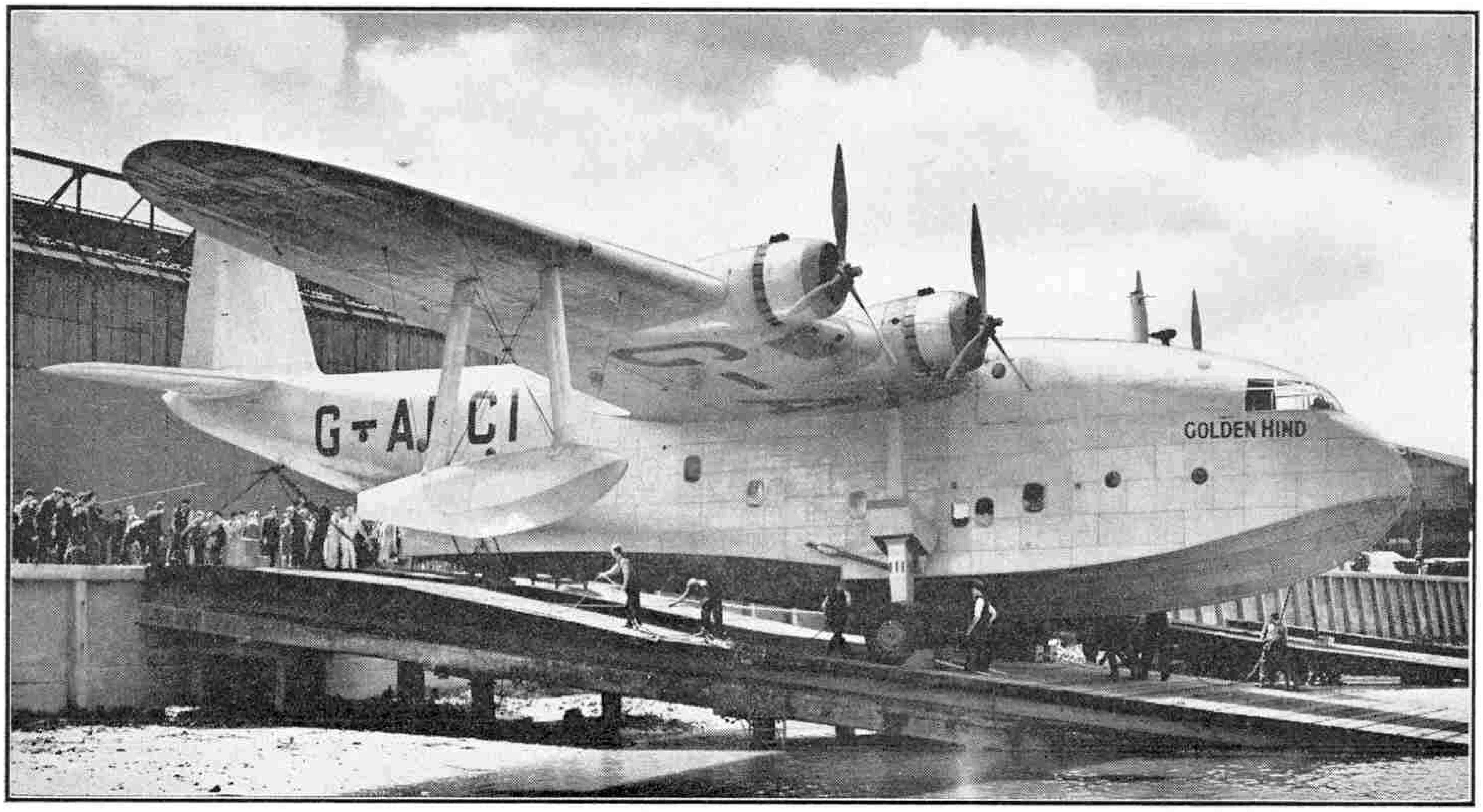
Schmidt is a native of Rhode Island and became interested in mining when he first visited California in the nineties. After working there two years for a land company, he returned to his home, but in 1900 he came back. He located some claims in the Black Mountains. They showed promise, and a syndicate leased them for development, but after driving an exploratory drift a short distance they gave up. The claims lay idle for six years, and then Schmidt resumed work in the drift. After going only 40 ft. he struck ore of commercial value, but it was smelting ore and the problem of transportation arose. To solve it, he decided to continue the bore through the hill.

Throughout the 32 years Schmidt, a bachelor, lived in a small shack, with no neighbours within several miles. He was in the tunnel at work soon after sunrise, and usually it was nearly dark when he returned to the cabin. His only companions were donkeys, of which he has had two or more at all times. These animals drew his buck-board wagon on the occasional trips he made to the outside world to obtain food and supplies. He claims that he has been too busy to be lonely. He completed the tunnel with only one mishap. Years ago some loose rocks fell from the roof, causing painful but not serious injuries. It is estimated that Schmidt could have completed his tunnel in under five years if he had had a compressed air rock drill!

We are indebted to the Editor of the "Compressed Air Magazine" for permission to reproduce this article and the illustration.



William Schmidt taking down loose rock with a pick when starting a crosscut inside his tunnel. In the foreground is the lantern that furnished his only illumination, and behind it is the car in which he removed spoil.



A fine photograph of the "Golden Hind," the 31½-ton flying boat, on the slipway. Photograph reproduced by courtesy of Imperial Airways Ltd.

Air News

The "Starliner" takes the Air

An air liner with two engines but only one propeller has completed successful trial flights in the United States. It is a six-seater low wing monoplane called the "Starliner" and is fitted with two six-cylinder Menasco engines of 260 h.p. each, which are mounted side by side and are equipped to drive the single airscrew. This assembly forms what is called the Unitwin power plant, which has the great advantage that it offers much less resistance to passage through the air than radial engines. The engines are controlled separately, and if one should fail an automatic clutch comes into play to disengage it, leaving the propeller to be driven by the other.

The "Starliner" is the first product of the Vega Airplane Company, a subsidiary of the Lockheed Aircraft Corporation. With its full gross weight of about three tons it is expected to be able to climb to the height of 23,500 ft., in the regions below the stratosphere. Its top speed is 220 m.p.h. at a height of 7,500 ft. and it cruises at 200 m.p.h. with the engines giving three quarters of their full power. The landing speed is 63 m.p.h. and the aircraft has a tricycle undercarriage.

An Arctic Airline Survey

An aerial mapping survey of Greenland and Iceland involving the taking of 6,000 photographs has been completed by the Danish Geographical Institute. Heinkel aircraft of the Dutch Air Arm were used by the survey party. The information obtained by the survey will be of very great importance when air transport to the United States by the Arctic route begins to be organised.

Autogiro Mail Service in United States

The Autogiro postal service introduced between Camden Airport, New Jersey, and the Philadelphia Post Office has proved a great success. The Autogiro employed takes off from the flat roof of the Post Office after a run of less than 150 ft., and accomplishes the short flight to the airport in five or six min., as compared with the 25 min. required to convey the mails by surface transport. Up to 150 lb. of mail can be carried, and five trips in each direction with full load are made daily. This unique service is operated under contract by Eastern Air Lines.

The Kellett KD-113 Autogiro used has a three-bladed rotor and is fitted with a Jacobs 225 h.p. engine, which gives the machine a top speed of 108 m.p.h.

Air Mail in Orkney Islands

The General Post Office have awarded Scottish Airways a contract for the carriage of mails by air between the Orkney mainland and the island of North Ronaldsway, the most northerly of the Orkney Islands. During the winter months this island is often inaccessible by surface transport, and when the mails have been delayed excessively the Post Office have chartered an aeroplane from Scottish Airways. Foodstuffs also have been conveyed there in this way when prolonged storms have cut off normal transport.

Control cabin of the "Golden Hind." This flying boat was described in last month's "M.M." Photograph by courtesy of Short Bros. (Rochester and Bedford) Ltd.

A New American Bomber

The lower illustration on this page shows the latest Douglas aircraft, the DB-7 high-speed bomber. It is claimed that this all-metal, twin-engined monoplane is faster than anything of its type in service to-day, and that it possesses superior range and striking power. It has a tricycle undercarriage with retractable nose wheel. The engines are a Pratt and Whitney type rated at 900 h.p. at 12,000 ft., and they drive three-bladed, constant-speed airscrews. The new bomber is expected to have a speed far in excess of 300 m.p.h. and a ceiling of over 24,000 ft. when flying with full load.

Another Byrd Antarctic Expedition

The famous American explorer, Admiral Richard Byrd, has been commissioned by the United States Government to lead an Antarctic expedition. The purpose of this is to claim for the United States unspecified territory within the western hemisphere that is considered as likely to be valuable as a site for air bases. The expedition is due to start this month, and it is expected that it will be away about five years. It will probably total about 70 men, and three United States Coast Guard aircraft have been placed at the disposal of Admiral Byrd for use in mapping the territory explored.

Admiral Byrd is an experienced Polar explorer who gained the distinction of being the first to fly over the North and South Poles. His flight over the North Pole was made in May 1926 in a Fokker high-wing monoplane, and in 1929, when he was leader of a large American expedition to the Antarctic, he made several great flights over the Ross Barrier and on one of these reached the Pole itself. This flight was made in a Ford all-metal monoplane that had two Wright "Whirlwinds" fitted under the wings and a 525 h.p. Wright "Cyclone" in the nose. The machine was fitted with skis in order to enable it to rise from snow-covered ground.

* * * *

In Italy the keenly developed sense of hearing of blind men is being utilised by the Italian Air Force. The men are employed as operators of listening apparatus.

The Russian Giant Air Liner

More details are now available about the giant Russian air liner that has been built to replace the *"Maxim Gorky,"* lost in 1935. The *"Maxim Gorky"* was the largest aeroplane in the world at that time.

The new air liner is a six-engined monoplane with a wing span of 201.6 ft. and a height of 22.4 ft., and when fully loaded weighs 50 tons. It can carry 64 passengers, 14 of them in a comfortable cabin in the forward part of the fuselage, and the others in two large and one small cabin farther aft. Inside the huge wings there are four cabins each equipped with four sleeping berths, and the toilet and cloakrooms.

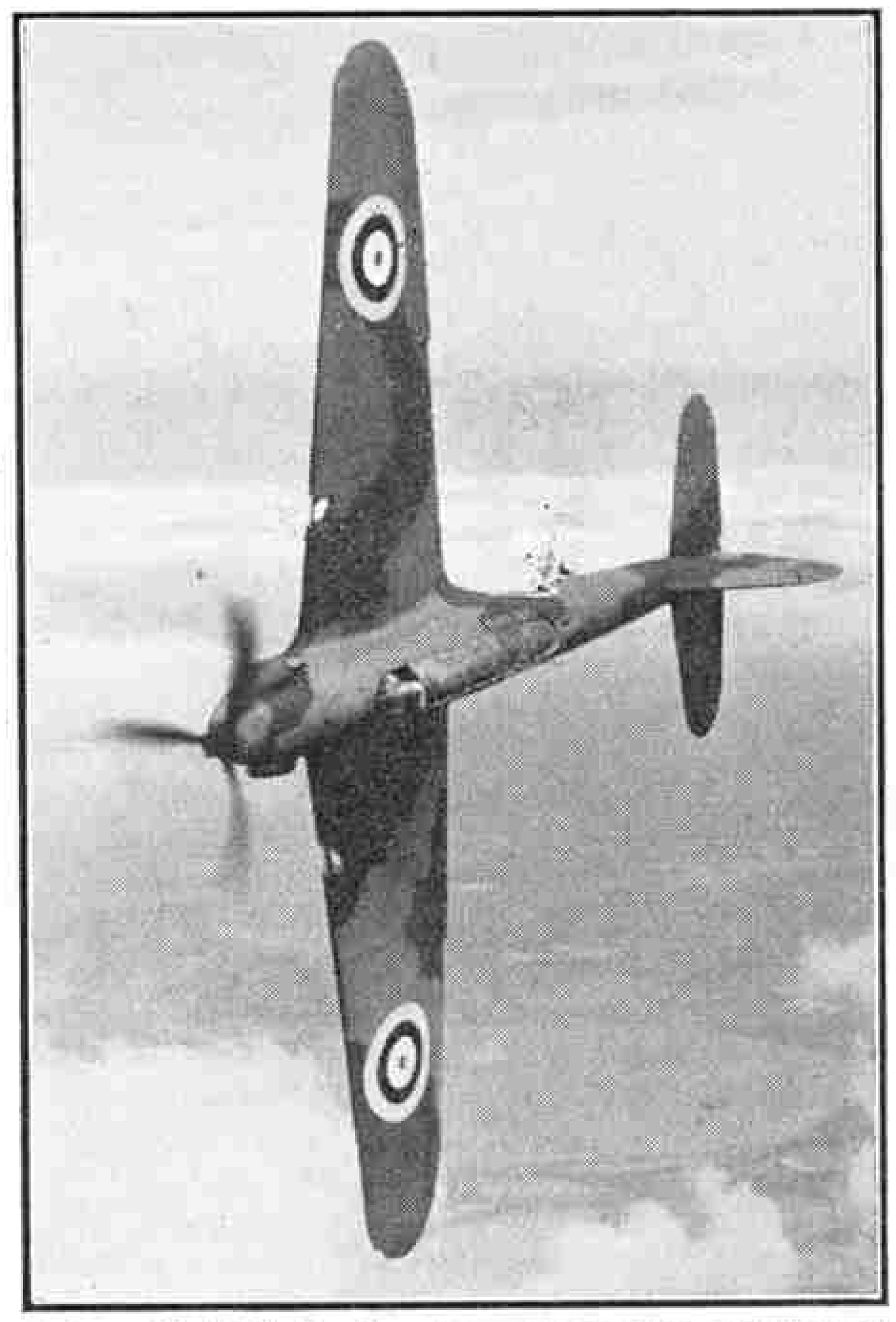
The "U.S.S.R. L-760," as this air liner is called, is manned by a crew of eight, consisting of two pilots, navigator, radio operator, two stewards, and two engineers who occupy special cabins, one in each wing, behind the engines. There is also a separate cabin for the radio operator. The control cabin is fully equipped for both day and night flying. The six engines develop a total of 7,000 to 8,000 h.p.

More Lockheed 14 Transports

Two Lockheed 14 air liners have been ordered by the Linea Aeropostal Venezolana, the Government subsidised air line company of Venezuela. This company already has six smaller Lockheeds in use on passenger services between the main cities of the country. When the new aircraft are completed they will be delivered by air, flying over Mexico, Central America and the Panama Canal Zone before crossing the Carribbean Sea to Caracas. The Lockheed 14 is a twin-engined middle-wing monoplane with a top speed of 243 m.p.h. and a range of 1,590 miles with full load of passengers and cargo.

Flying Continuously for a Fortnight

A record endurance flight was achieved recently in the United States by two brothers named Moody. Flying a "Taylorcraft" two-seater high wing monoplane fitted with a 55 h.p. Lycoming engine they remained in the air for 343 hrs. 46 min., or just over 14 days. The aeroplane was refuelled every three hours, two gallons at a time, the fuel being hauled up into the aeroplane from a motor vehicle.



Fairey "Battle" Bomber shows its powers. Photograph by courtesy of "Flight."

New Seaplane Height Record

A new world altitude record for seaplanes, of 40,700 ft., has been set up by an Italian airman, Col. Nicolas Mauro. The previous record was 38,550 ft.

* * * *

The steady increase in the number of private aircraft in the United States continues. Recent figures for the first half of 1939 show that 1,162 civil aircraft for private use were produced in that country during the period, as compared with 853 for the same period last year.

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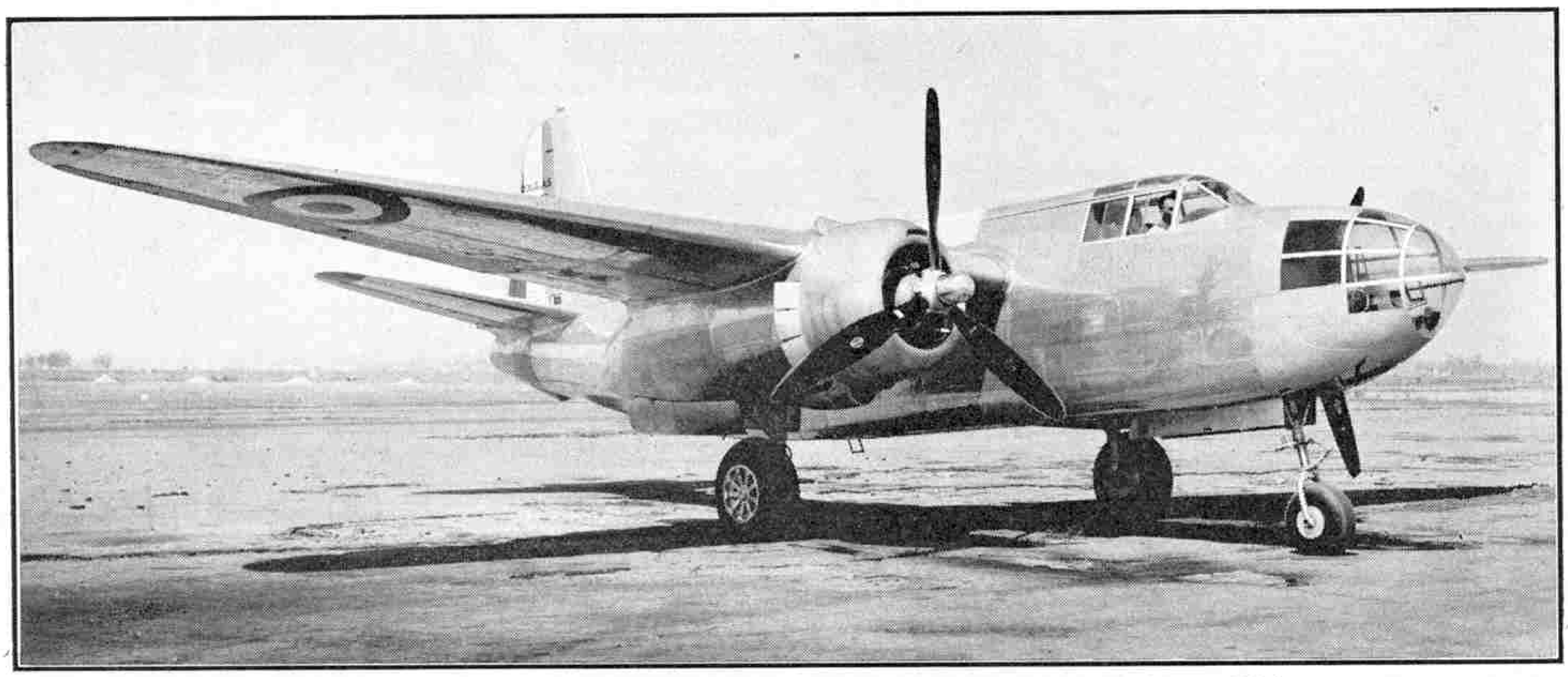
Plans are well advanced for a regular Danish air service between Denmark and England. The Danish terminus will be Copenhagen, and the service will operate by way of Aalborg, in the north of Jutland.



A Douglas DB-7 high-speed bomber. Photograph reproduced by courtesy of the Douglas Aircraft Company, U.S.A.

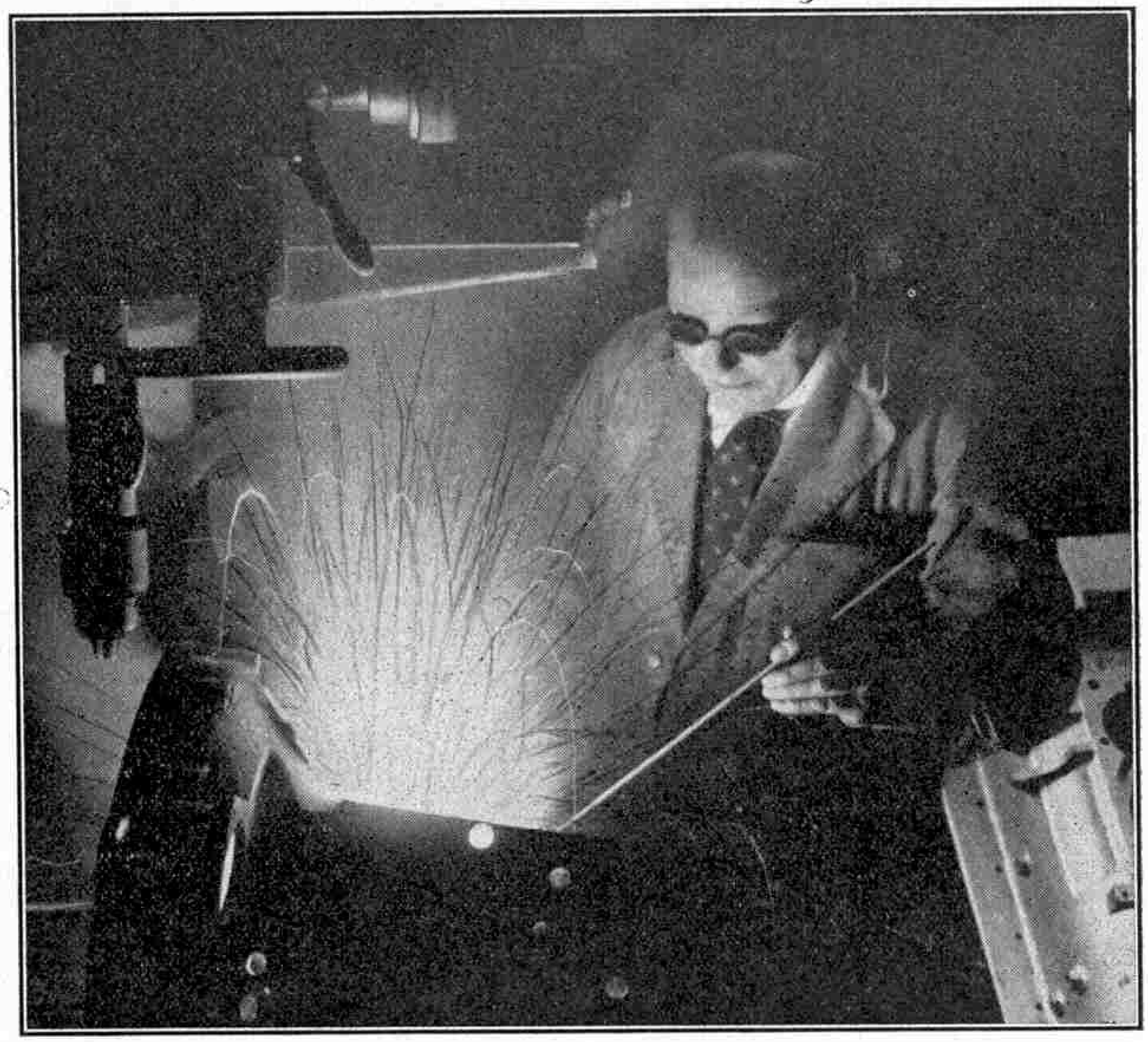
Out with the Welding Repair Squad

Emergency Work in Strange Conditions

By C. W. Brett

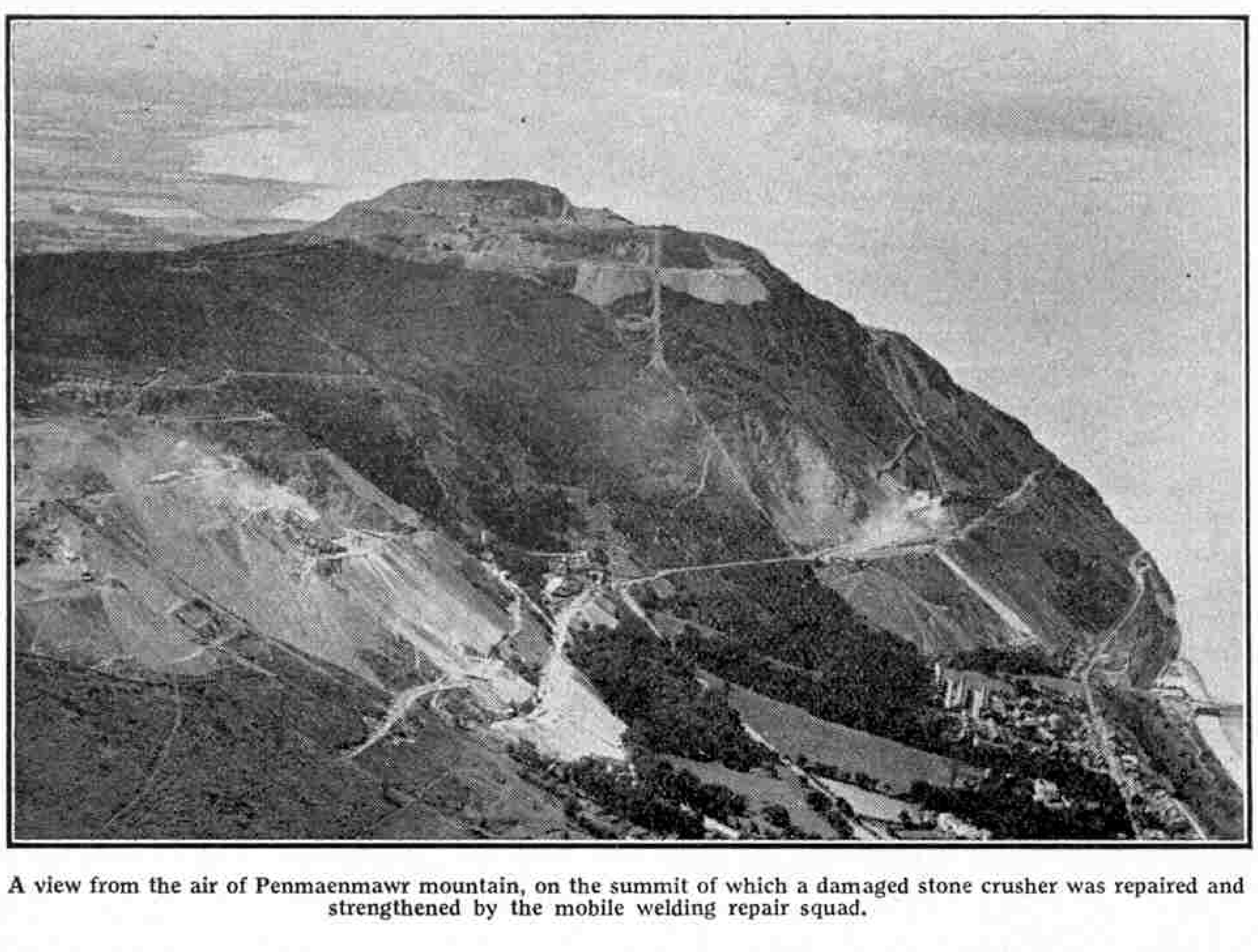
IN this country alone there are tens of thousands of people whose chief job in life is to deal with an emergency whenever it may arise, whether by day or night. It is interesting to consider the extent of such need, and although it is doubtful if welding engineers will be included in a list of emergency services, there are welding firms that hold operators in constant readiness so that they can go with portable welding equipment to deal with breakdowns without the loss of precious hours.

It may surprise some readers of the "*M.M.*" that such speedy attention is required following upon a machinery breakage. Obviously this is not always the case, but many instances could be quoted in which a key unit of a factory has broken down, thus stopping output entirely. If large orders are in hand, perhaps involving a penalty if there is a delay in delivery, it will be realised that a loss of hundreds of pounds a day can quite easily arise. Naturally manufacturers seek to duplicate such important items of equipment, but for various reasons it is not always possible to do this.



Welder repairing housings inside a gear-box. Photographs reproduced by courtesy of "The Daily Sketch."

Last year the emergency welding repair squad set off for Penmaenmawr and found their job 1,500 ft. above sea-level on the mountain, well known to tourists and holiday makers, and at the base of which is one of the most famous motor roads in North Wales. It was found that the largest of a battery of crushers in the great granite quarry on the mountain was badly smashed. This crusher, which is probably the biggest of its type in the country, can reduce blocks of granite weighing five tons to a size suitable for road-making purposes almost as quickly as these words can be read. Examination showed that one side of this machine, a single casting weighing 25 tons, was badly fractured through metal several inches in thickness, and to a length, in one instance, of 12 ft.

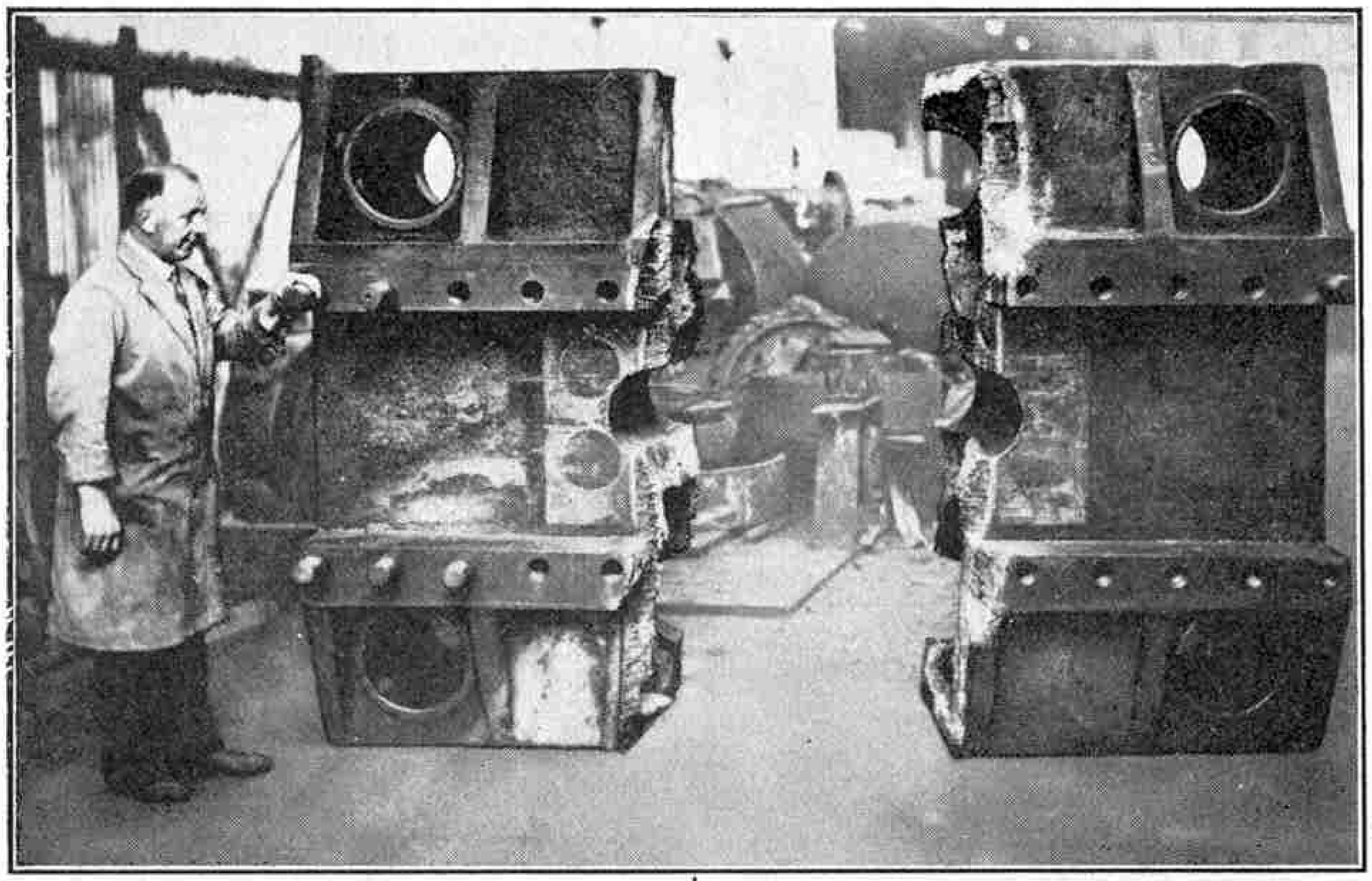


A view from the air of Penmaenmawr mountain, on the summit of which a damaged stone crusher was repaired and strengthened by the mobile welding repair squad.

It would have taken a year to make and fit a replacement, but it was not for this reason that the owners decided that the cracks must be welded. They wished to make quite sure that they would not have to face the same problem a second time, and therefore told the repair engineers that the broken part must not only be made good, but also must have increased strength. Furthermore, the result had to be guaranteed and the work completed quickly.

Welding is one of the speediest means for repair, but in this instance the trouble was so extensive that it required six weeks of almost continuous labour in relays before the task was completed. The finishing touches were given on the day promised. The crusher was set to work immediately, and for some time afterwards it was kept going night and day until arrears were wiped out.

The welding is done by means of feed rods which, in the case of heavy work, are usually from about $\frac{3}{8}$ in. to $\frac{5}{8}$ in. in diameter. These are melted by means of the oxy-acetylene flame or the electric arc, depend-



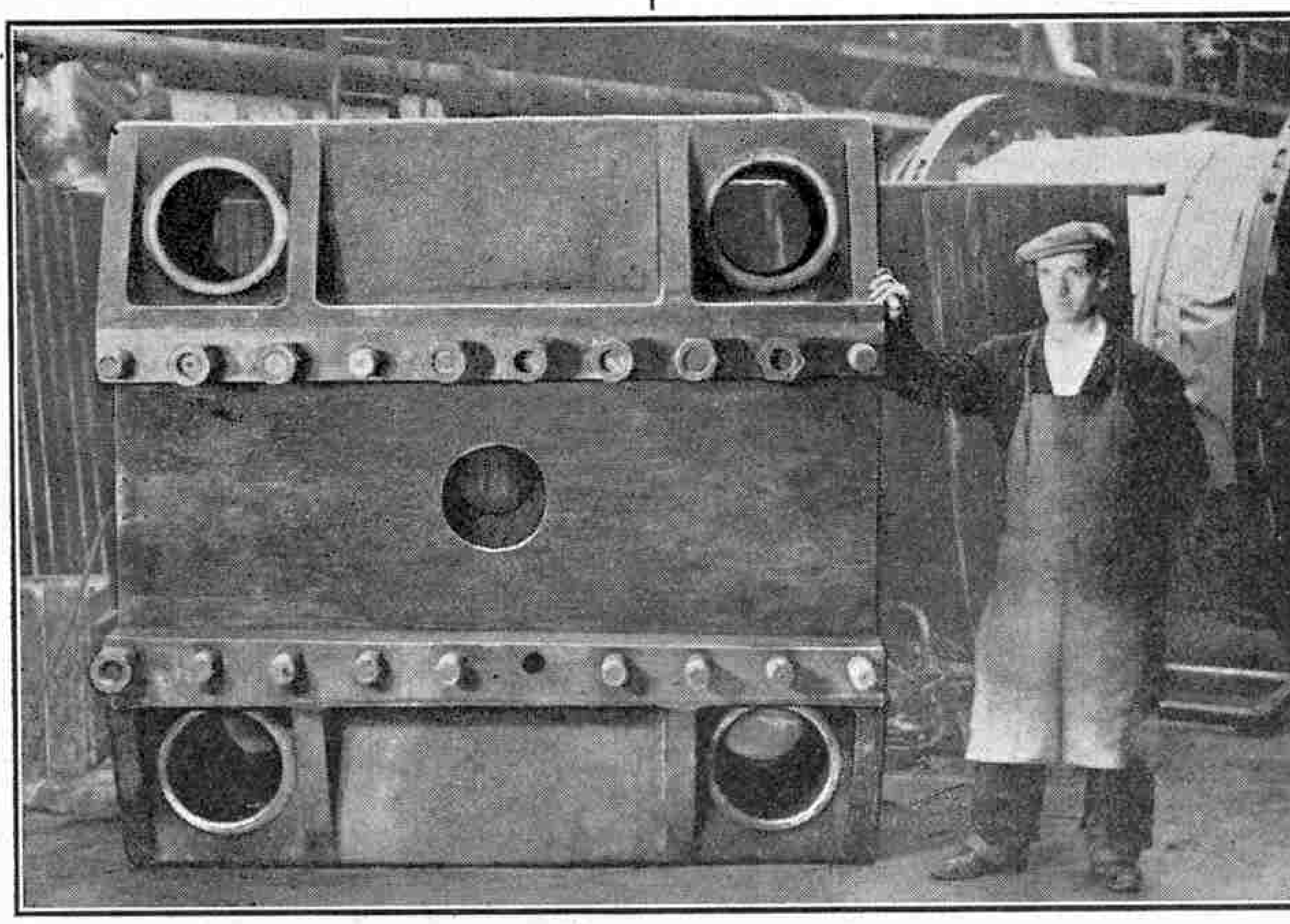
ing upon which system is better for the job in hand. When the rods become molten they are skilfully amalgamated with the main casting, and it is by no means unusual for a ton or so of them to be used upon a big repair.

Sometimes a fusive operator is called upon to don a diving suit and undertake work in water. This is an interesting sight that few people have witnessed, although occasionally at large industrial exhibitions demonstrations are given in tanks with glass windows so that sightseers can watch what is going on. Very little repair work is carried out under these conditions, although there are some notable exceptions in ships that have received welding attention under water without docking—stern posts, rudders and propellers sometimes being in need of such aid. For the most part the oxy-acetylene flame, which can even be lighted under water, is used for destructive purposes, and divers often find the cutting flame, as it is termed, invaluable for cutting away the wreckage on sunken ships, or perhaps for penetrating to a strong room in order to recover bullion or other material of value, the presence of which does not permit the use of explosives.

At one time the erection of steelwork was invariably noisy on account of riveting, but some of the most modern steel frame buildings rise almost silently. A particularly important example is the Bank of England, for the steelwork of this magnificent new building was welded almost entirely and is one of the finest examples of this class of work so far undertaken. Even in shipyards noise is tending to decrease for precisely the same reason, although in most instances a combination of riveting and welding is favoured by naval architects. Welding is being used to such an increasing extent, however, that it seems reasonable to suppose that rivets will be superseded even in shipbuilding, one of the results being a considerable decrease in the weight of the hull.

When an electric cable core is completed, huge presses squeeze the lead covering in position as the cable travels slowly along. With fairly large cable the hydraulic presses used can exert a pressure of 1,000 tons. Not long ago the misfortune of a broken press was suffered by an important firm of cable manufacturers that had government contracts in hand, with penalties in the event of delay. The part that fractured was the head, which is a single casting measuring 6 ft. by 6 ft. by 3 ft. 6 in. and weighing 15 tons. The break was a clean one across the centre, and through metal varying from 3 in. to 5 in. in thickness. The emergency squad set to work to put matters right and continued night and day until their task was completed. At the same time they reinforced the fractured casting so that further failure would be virtually impossible. The greatest care had to be taken to ensure that the broken parts were aligned to a hair's breadth, work which called for the greatest skill and concentration on the part of the operator. The result proved absolutely successful.

A 15-ton casting, the head of a powerful hydraulic press, that had split in two pieces, and was repaired and strengthened by welding. The upper illustration shows the casting before welding, and below it is seen on completion of the work.



Welding work is sometimes carried out in conditions that are definitely dangerous. In a large block of flats recently erected in London, the built-in tank, containing many tons of fuel for the central heating system, commenced to leak along a seam. To have removed the offending container and replaced it with a new one would have cost hundreds of pounds, mainly on account of the large amount of brickwork that it would have been necessary to remove and then to replace. The advice of welding engineers was sought, and after the tank was emptied a careful examination was made. It was then found that a satisfactory fusive repair was not only feasible, but likely to make the tank infinitely stronger.

The danger arose on account of the confined space in which the operator had to work, combined with the possibility of gassing from the fumes generated by the heat of welding. For these reasons members of the emergency squad were allowed to work only for short intervals, and were protected by a life-line, at the other end of which was a watcher who could haul the man to safety in the event of his being overcome suddenly.

By way of contrast to these big undertakings, welding specialists are often called upon to repair model engines and other small parts. Some time ago a beautifully-made steam engine, measuring only a few inches in height, was sent to a firm of scientific welding engineers for attention. The owner explained that he had made it years before and now wanted to put it into working order for his son. Parts of the cylinder were broken, but it took only a few minutes to make good the fault.

A number of lathe parts belonging to amateur engineers have been repaired successfully, while model aircraft motors are by no means infrequently in need of fusive attention. Welding work on the cylinders is usually simple, and the same remark applies to crankcases, provided they are made of aluminium. If they are die castings, in which an alloy with a zinc base is sometimes used, then welding may be difficult. In any event, whether the job be large or small, scientific welding engineers are ready to tackle any difficulty.

We are indebted to Barimar Ltd., London, for the information contained in this article and for our illustrations.

ENGINEERING NEWS

The Westinghouse flood-control dam described on this page, showing the gates raised. This photograph and the lower one on the opposite page are reproduced by courtesy of the Westinghouse Electric and Manufacturing Co., East Pittsburgh.

Protecting a Large Works from Floods

The upper illustration on this page and the lower one on the facing page show features of a flood prevention scheme that has been installed at East Pittsburgh, in Turtle Creek Valley in the United States of America. In this valley are situated the great works of the Westinghouse Electric and Manufacturing Co., and the area has been several times flooded by the overflowing of Turtle Creek. In future, however, when flood water from the river threatens the valley, two huge steel gates will be lowered into position to provide a barrier against the rising water, which will then be pumped through three large tunnels and carried around the gates to be discharged farther down the valley in the Ohio River.

The gates are installed near a viaduct that carries the main tracks of the Pennsylvania Railroad across the creek just below the chief works of the Westinghouse Electric and Manufacturing Company. One of the gates is 80 ft. long by 30 ft. high, and forms a dam across Turtle Creek, while the other, which is 40 ft. long and 20 ft. high, closes a main street that runs parallel with the river. When not in use the gates are raised about 20 ft. above the street level.

The three pumps installed are of the propeller type and have a total combined capacity of more than 3,300,000 gallons a minute. They are driven at 112 r.p.m. by three 5,000 h.p. electric motors each 23 ft. in diameter. The motors are connected by 30 ft. steel shafts with the propellers of the pumps, which are placed 10 ft. below the flood stage of the creek.

From the creek above the dam the flood water pours into three entrance tunnels and rushes down a sharp incline to pumping pits 11 ft. below the creek's normal surface. The propeller pumps then spin the water upwards through vertical wells, from which it is deflected into horizontal chambers that permit the flow to expand gradually and reduce its velocity before it is emptied from the grille controlled outlets situated on the downstream side of the dam.

The first floors of the Westinghouse workshops are 738½ ft. above sea level, yet in a severe flood in 1907 some floors were covered with water to a depth of over 4 ft. In 1924 about two feet of water swished over the floors and in a flood in 1936 one manufacturing aisle was buried under 7½ ft. of water!

Liquid Fuel from Natural Gas

Liquid fuel is now being produced in Canada from waste natural gas. The method employed is to heat the gas in a furnace of special design, and it is found that from 1,000 cu. ft. of it from three to four gallons of liquid fuel of the benzole type can be produced. The gas remaining after this treatment is used for the production of carbon black.

Drilling for Oil in the Arctic

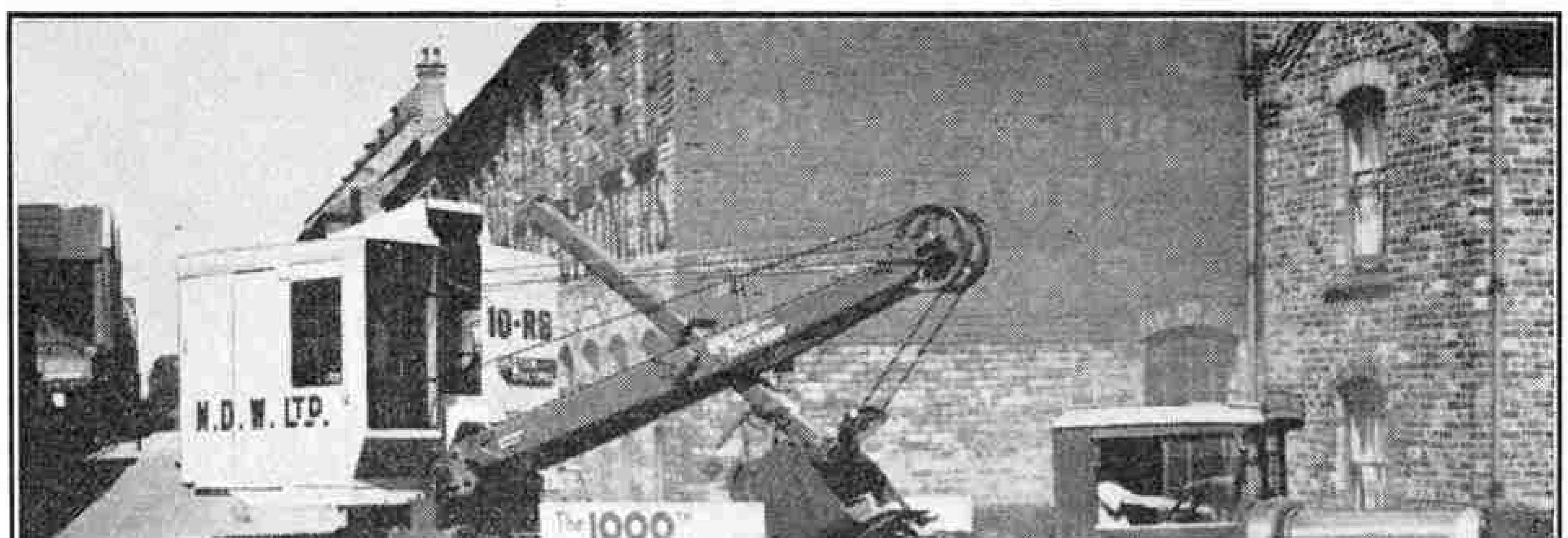
A party of 100 Russian experts recently sailed from Krasnoyarsk to a point at the mouth of the River Yenisei, Siberia, where they are to undertake oil drilling to a depth of 5,000 ft. on the fringe of the Arctic. This is the first time that deep oil drilling has been attempted in these regions, and the present expedition is expected to continue its work for two years. A further party of 300 engineers and other personnel will be sent to the scene of operations in due course.

An Oil-blending Machine

A machine that automatically blends lubricants from many different component stocks to exact specifications has been developed. The apparatus is connected to the various storage tank pipe lines and is set to produce oil of the correct formula by means of a series of dials. Within a few minutes of setting the machine in motion lubricant of the desired blend is ready for delivery. The machine will produce about 50,000 gallons of correctly blended lubricants per day.

A Loom without a Shuttle

A new type of loom that does not require a shuttle to carry the bobbin has been invented by two Soviet engineers. The new loom is said to be simpler in construction than the types now in use, as the elimination of the shuttle does away with the necessity for "picking" motion and other auxiliary parts. Another advantage claimed for the new loom is that exhausted bobbins can be replaced while the machine is in motion, and owing to the simple design of the mechanism stoppages through the breaking of warp and weft are eliminated. In addition the loom automatically stops working if anything goes wrong. It is reported that looms of this type are installed at a large spinning and weaving mill near Moscow.



This ⅜ cu. yd. Ruston-Bucyrus excavator, seen being delivered from the maker's works, is the 1,000th machine of its type that has been constructed during the last five years by Ruston-Bucyrus Ltd., Lincoln, to whom we are indebted for our photograph.

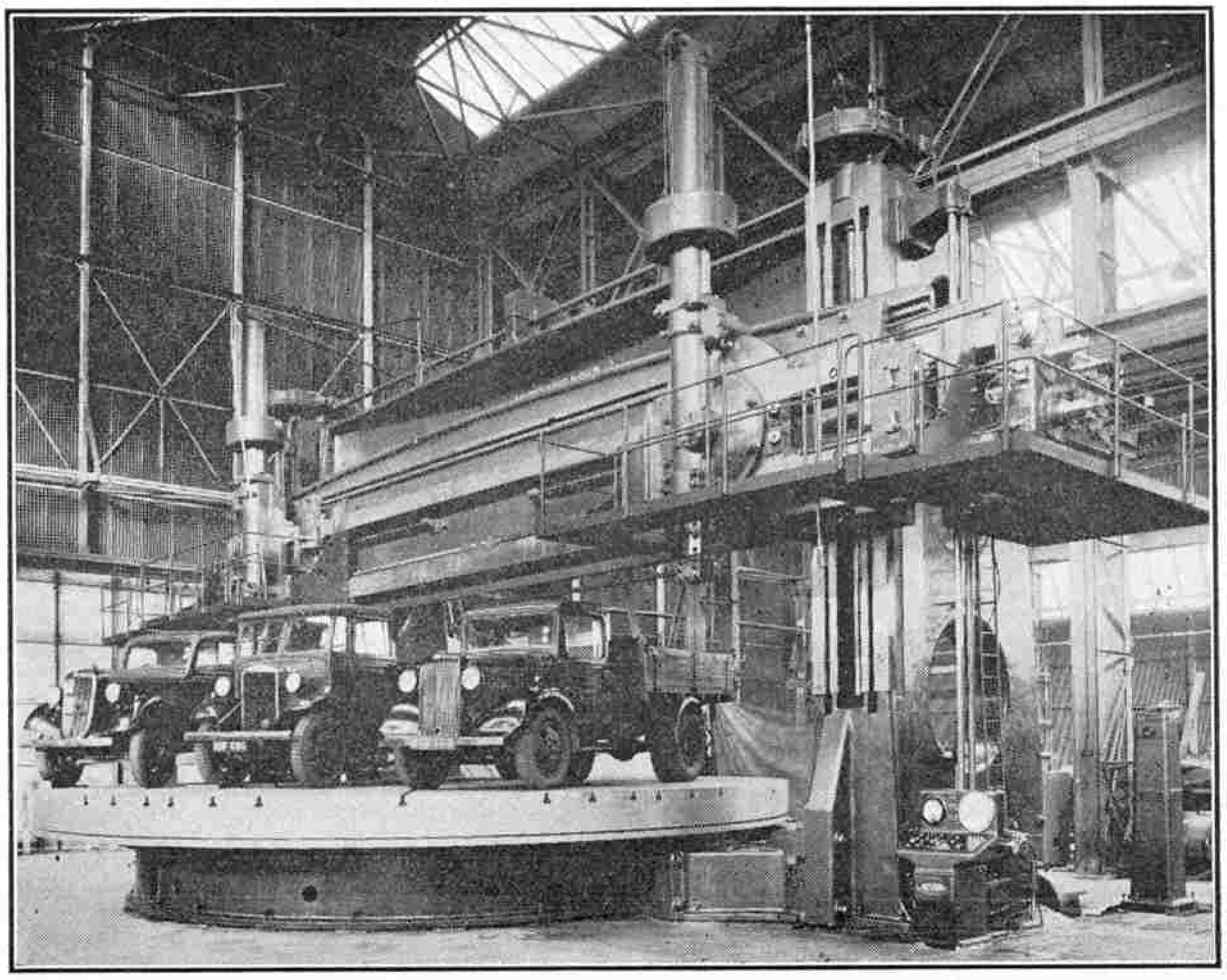
Britain's Largest Turning Mill

The upper illustration on this page shows a great boring and turning mill recently completed by George Richards and Co. Ltd., Broadheath. It is the largest machine of its type yet built in this country and will deal with work up to a maximum diameter of 35 ft. and 12 ft. in depth.

The cutting tools of this giant machine are carried in two movable heads that travel to and fro on a massive cross-slide. The heads are arranged in a manner that allows either parallel or tapered turning to be done. They are traversed along the cross slide by means of separate 10 h.p. reversing motors, which are placed one at each side of the machine and controlled either by means of push buttons on the control desks or from pendant switches.

The huge circular work table is 30 ft. across, and is provided with machined tee slots to take the holding down bolts that fix the job securely in position. A 100 h.p. variable speed motor, working through a six-speed gear-box, rotates the table at various rates according to requirements, gear changing being accomplished electrically by a small independent motor operated by push buttons from one of the control desks.

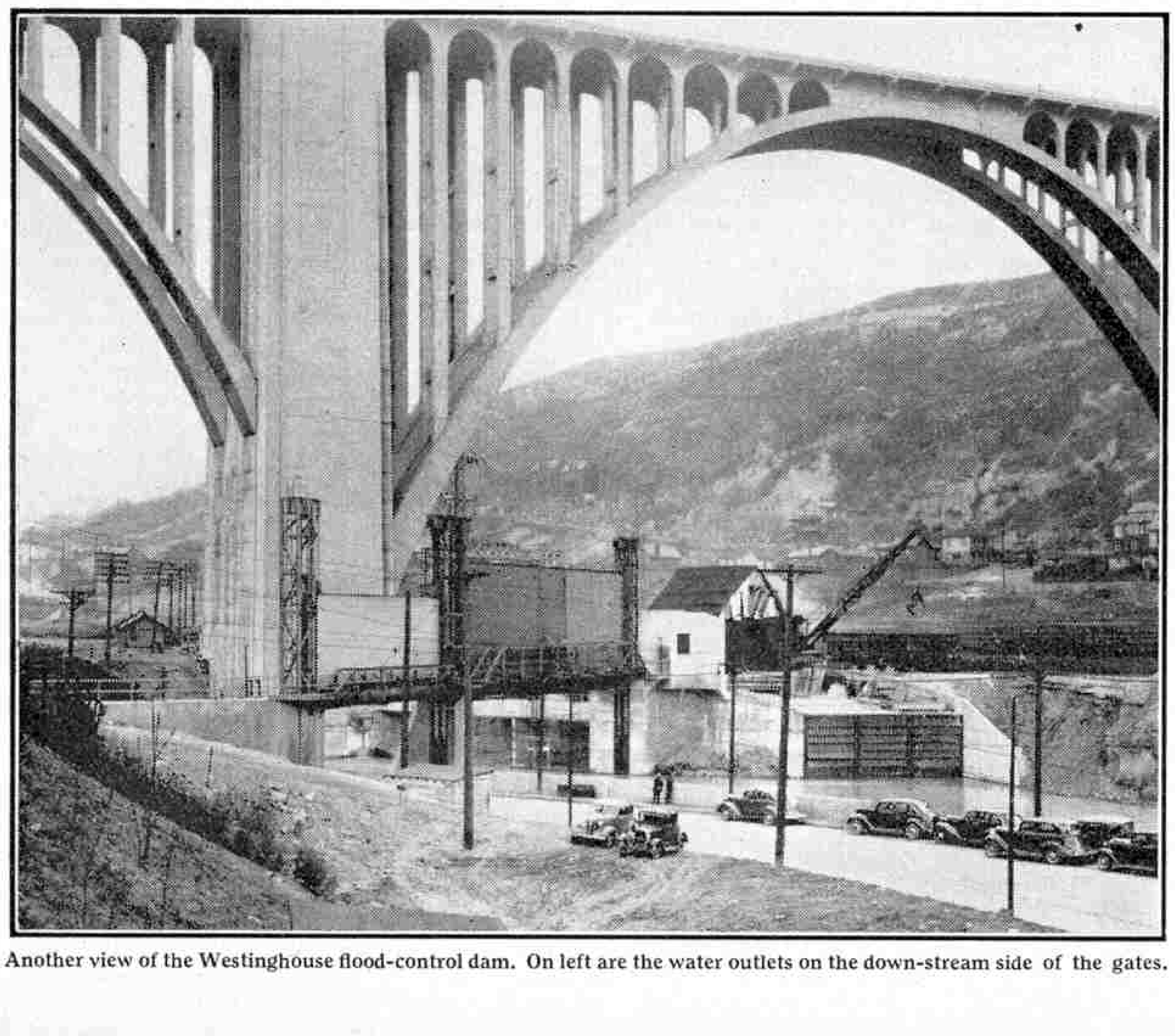
One of the main considerations in the design of a great machine of this kind is the necessity for complete and easy control of all its various motions, as this is of great assistance in enabling the operator to obtain the maximum output. This is facilitated in the machine illustrated by means of an ingenious gear selector, speed and feed indicator situated on the main control desk, which shows at a glance the most suitable operating conditions for every job that has to be tackled.



A 35 ft. boring and turning mill, which is the largest of its kind yet built in this country. It was designed and constructed by George Richards and Co. Ltd., Broadheath, to whom we are indebted for this photograph.

New Records in Bridge Construction

The use of concrete in the construction of bridges has extended rapidly in recent years, and many fine examples of bridges built from this material are now either in service or in course of erection in all parts of the world. One of the latest is a fine structure that is now being built across the Angerman River, in Northern Sweden. This bridge is particularly interesting as it will have a main span measuring over 860 ft. that is said to be the longest span yet built of concrete. The bridge will connect the western shore of the river with an island in the stream, and the roadway will then be continued across the island on viaducts, to be linked up to the opposite shore by a girder bridge of concrete. The latter also will set up a world record, in that the distance between its supporting pillars at one place will be 235 ft.



Another view of the Westinghouse flood-control dam. On left are the water outlets on the down-stream side of the gates.

A Large Floating Piledriver

Steel piles, many of which are 175 ft. long, are being driven in the bed of the Potomac River in the United States of America to provide the foundations for a new bridge. It was stipulated in the contract that the piles should be driven by a steam hammer having a ram weighing not less than 14,000 lb., delivering 37,500 ft.-lb. per blow. Special floating pile-driving equipment was therefore built for the purpose. The complete hammer of this weighs 16 tons, and it has a 7-ton ram, which strikes 60 blows a minute.

A Powerful Miniature Magnet

A small permanent magnet, about the size of a pea yet sufficiently powerful to lift 1,500 times its own weight, has been produced at the General Electric Company's research laboratories. Under test it was found to lift a weight of more than 6 lbs.! The secret of this powerful magnet lies in the material of which it is made. This is Alnico, an alloy of aluminium, nickel, cobalt, and iron, and it is already being used in making permanent magnets for radio receivers, motors, generators and other electrical equipment in place of electromagnets.

New Locks for Panama Canal

A new set of locks parallel with the existing system is to be built on the Panama Canal as it is felt that an additional set will give added security against aerial bombardment. The new structures will be placed at distances varying from a quarter of a mile to a half from the existing locks, and will be connected to the canal by converging by-pass channels.

The locks will be 1,200 ft. long, 135 ft. wide and 45 ft. deep.

Books to Read

Here we review books of interest and of use to readers of the "M.M." We can supply copies of these books to readers who cannot obtain them through the usual channels. Order from Book Dept., Meccano Limited, Binns Road, Liverpool 13, adding 1/- for postage to the price. Postage on different books varies, but any balance remaining will be refunded.

"Science Marches On"

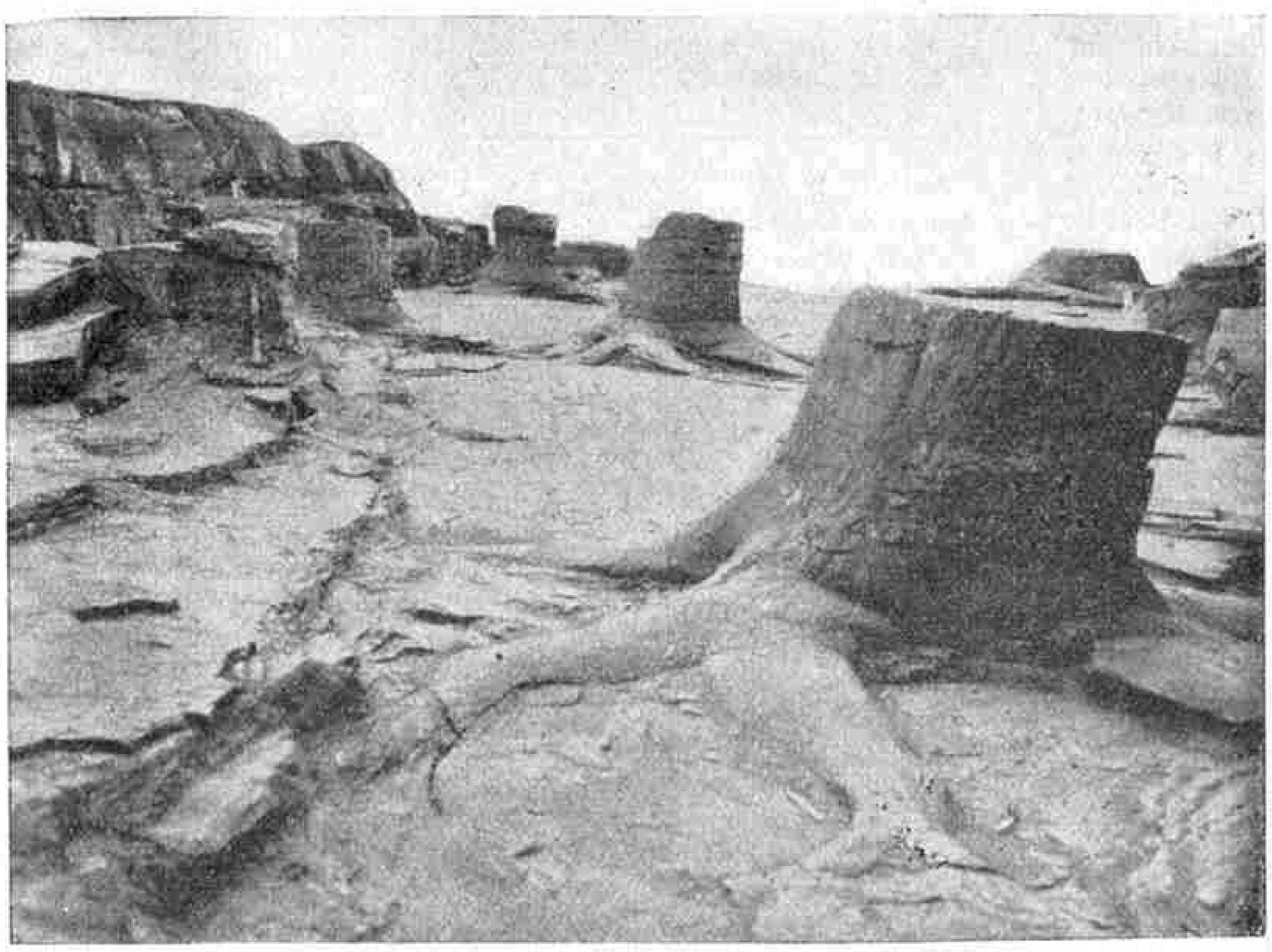
By W. Sheppard, F.G.S. (Harrap. 8/6 net)

Of many books surveying the wonderful achievements of science this is the most fascinating that we have read for a long time. It provides its readers with an amazing wealth of facts, new and old, that will startle them and make them think. It does more than this, however, for its real purpose is to show how science itself advances, and the many discoveries with which it deals serve as illustrations of the general principles. The author is expert in describing and explaining facts, and his readers are given these with such clearness that they grasp them easily and realise the ideas developed from them.

A start is made with the growth of the alphabet and of writing, which is essential for communicating ideas and for keeping records. Then we pass on to more primitive discoveries and curiosities, such as the capture of fire, the use of various stones and the discovery of useful metals. The hunt for the Philosopher's Stone is told in full and its discovery during the present century is shown to lead to new and even more exciting mysteries than were dreamed of by the alchemists.

Then we come to what can best be described as a remarkable survey of the world as it is revealed in further branches of science. The marvels of modern chemistry come first. The story of the Earth follows, and here we find ourselves plumbing the ocean, analysing earthquake waves and rising high into the stratosphere. Then we read how man is patiently working out problems of life and disease. The fascination of figures and of exact measurement is next dealt with. So we come to the mystery of light, and this leads on to astronomy, which makes a marvellous story, beginning with the quaint ideas of the ancients and ending with the question of life on Mars. Musical sound furnishes another fascinating story, and we are astonished to learn of the scientific production of sounds intense enough to burn wood. The marvels of electrical discovery are well explained, after which we look ahead to the possibility of reaching the Moon by rocket.

The book has an excellent index, and is illustrated by 31 full-page plates.



Tree stumps in the fossilised forest at Glasgow. From "Science Marches On," reviewed on this page.

"The Boy's Romance of Aviation"

By Capt. A. O. Pollard, V.C. (Harrap. 7/6 net)

Although this fine book was first published only four years ago, a revised edition has already become necessary in order to keep pace with the very rapid advance in aviation. In it Capt. Pollard, whose history of the Royal Air Force is a standard work, tells the story of aviation from the earliest legends to the present day. He describes the failures and successes of the more famous pioneers of aviation, and shows how their achievements contributed to the development of balloons, airships, aeroplanes and gliders. After dealing with the important influence of the war of 1914–18 on aircraft he goes on to describe the post-war development of civil aviation and the romance of the great Empire air routes. Other very interesting chapters give accounts of Atlantic crossings by air and of notable long-distance flights.

On the technical side the author describes the actual construction and equipment of aircraft, and explains the rigging of an aeroplane. A chapter on the development of the various types of aero engines concludes with an account of how aeronautical engineering has helped in the attainment of record speeds on land and water. The testing of aircraft for flight and the purpose and working of air navigation instruments are explained. A new chapter in this edition of the book deals with aircraft of the Royal Air Force, and includes accounts of record flights carried out by R.A.F. pilots. The final chapter is concerned with flying in the future.

The illustrations include nearly 50 full-page half-tones and many line drawings.

"The Restless Earth"

By R. Gheyselinck (The Scientific Book Club. 2/6 net)

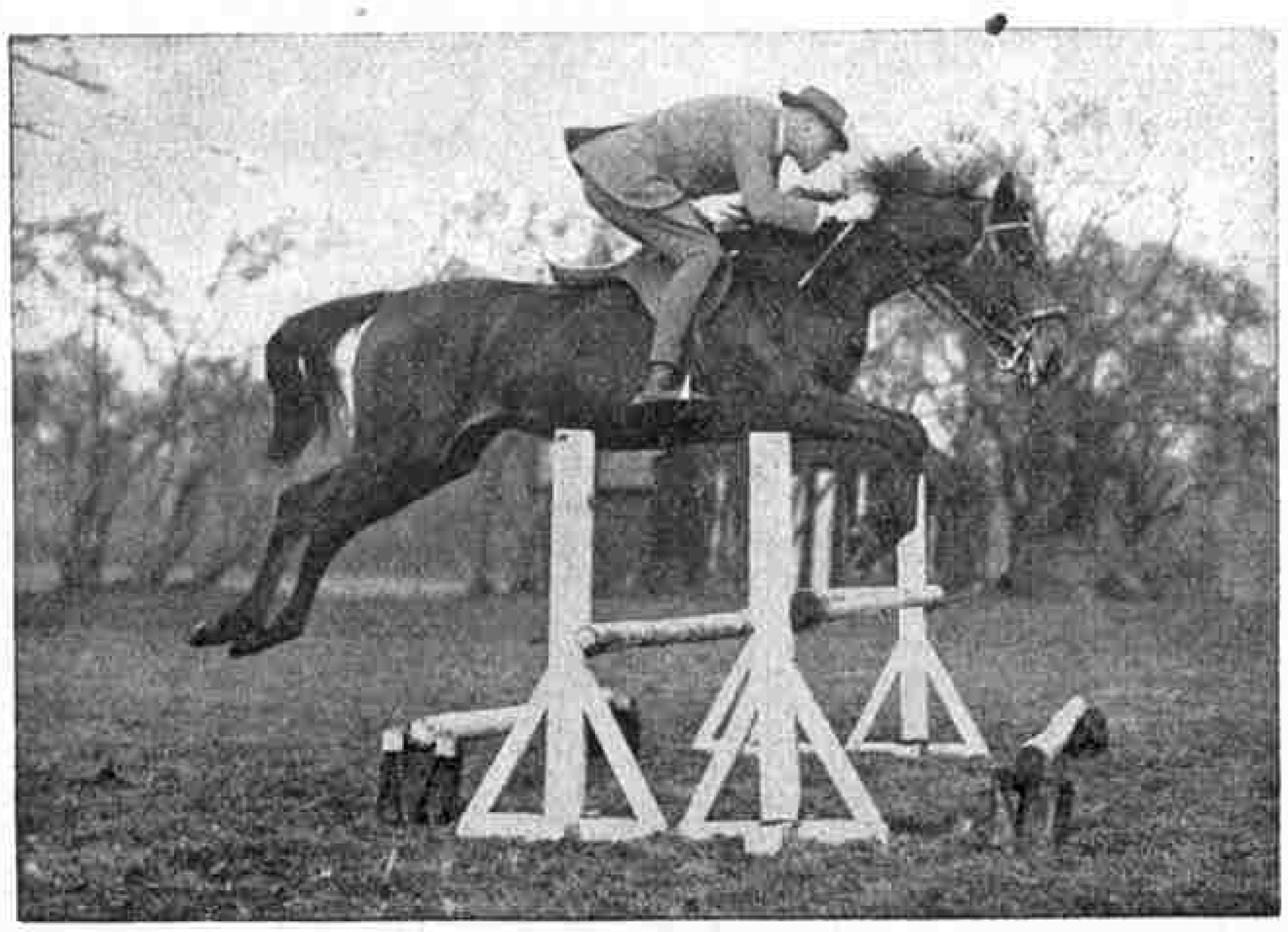
This book is described as geology for everyman. The author points out that the Earth is not lifeless, but is a restless living thing, and he has set out to show to the ordinary reader how its face changes and how our existence depends on its rhythm of geological events. The result is a picture that will fascinate its readers, and will give them an entirely new idea of the world upon which they live.

We are introduced to wonderful ideas in the first chapter, which tells us how the planets, and with them the Earth, came into existence, and explains the history of our planet in the days when the Moon was torn away from it. The effects of the cooling that followed are then described, and we read of the wandering of the Poles, which has given us such mysteries as the presence in Arctic lands of coal representative of tropical vegetation of past ages.

It is only on the face of the Earth that cooling has progressed far, and the author dips below the surface to show us the arrangement of the successive shells of our planet, right down to its hard solid core. Then we turn to the record of the rocks in the Earth's crust, which tell us many strange things of the climates of the past, of the varying distribution of land and water, and of the creatures of the past, many of them amazingly different from those with which we are familiar. Next we learn that the most solid rocks are continually being worn away by wind, frost and water, and reformed elsewhere, to be thrust up in the form of mountains or again sunk below the sea. Then there is the fascinating story of the repeated outbreaks of mountain-building activity, which have followed on volcanic outbursts resulting from increases in temperature in the liquid layer that lies beneath the Earth's crust. This restlessness is not yet ended. We read how the ground under our feet trembles and shakes, and how volcanoes break out into violent activity, and gain a vivid idea of the life that still prevails in our planet.

A final section explains the brilliant idea that the continents are huge solid masses afloat on the thick liquid layer below the Earth's crust. They seem to be moving slowly, and Greenland is approaching America at the rate of about 104 ft. a year.

The book is illustrated by a frontispiece and seven full-page plates.



A young horse jumping freely. From "Riding for All," reviewed on this page.

"Riding for All"

By R. S. Summerhayes. (Bell. 3/6 net)

Riding continues to be a popular form of quiet recreation in spite of the invention of the motor car. The author of this book indeed insists that the present is a golden age for both horsemen and their horses, and points out that riding is one of the few pursuits that are available for old and young alike. His book is written for the novice. It does much more than explain how to mount and sit and to hold the reins, however. The complete rider must know something about his horse, just as a fisherman should know a good rod and the right kind of bait. This information is given in simple and practical form by one who is thoroughly equipped with the necessary technical knowledge, and at the same time is able to give his instructions in readable form.

The mentality of the horse gives a good start, and this is followed by instructions on saddling and bridling, mounting and sitting. Then come sections dealing with the different gaits, and in particular the best way of preventing a mount from pulling. Exercises to improve carriage and riding generally follow, and then we learn something of jumping and show ring appearances. How to recognise a good horse is fully explained, and there is good advice on suitable management, feeding and grooming. Don'ts for riders and a useful glossary complete an excellent little volume that is well illustrated by means of instructive photographs.

"From Serf to Page"

By C. H. Abrahall (Harrap. 5/- net)

This is an exciting tale of the stirring times of the Peasant's Revolt in the reign of Richard II. The hero is John, a boy of 14, who has been brought up by a ploughman. By an act of heroism John attracts the attention of his master, who sends him to school, and when unrest spreads John is torn between the desire to support his benefactor and to follow his supposed father. Many stirring events follow. John is sent to London and there sees the rebels destroy houses and buildings and is a witness of the famous meeting between the King and Wat Tyler.

"The Red Keep"

By Allen French (Harrap. 5/- net)

Mr. French has written a fine boys' story of feudal times in Burgundy. The Red Keep is the stronghold of the knight to whom Conan, the hero, is a page, and is burned to the ground by enemies, leaving a girl as the only survivor of her family. In her determination to regain her lands the heiress is strongly supported by Conan, and success is achieved after many thrilling fights, in which the robber barons are destroyed.

The story is a thrilling one and gives an accurate and brilliant picture of life in those distant ages.

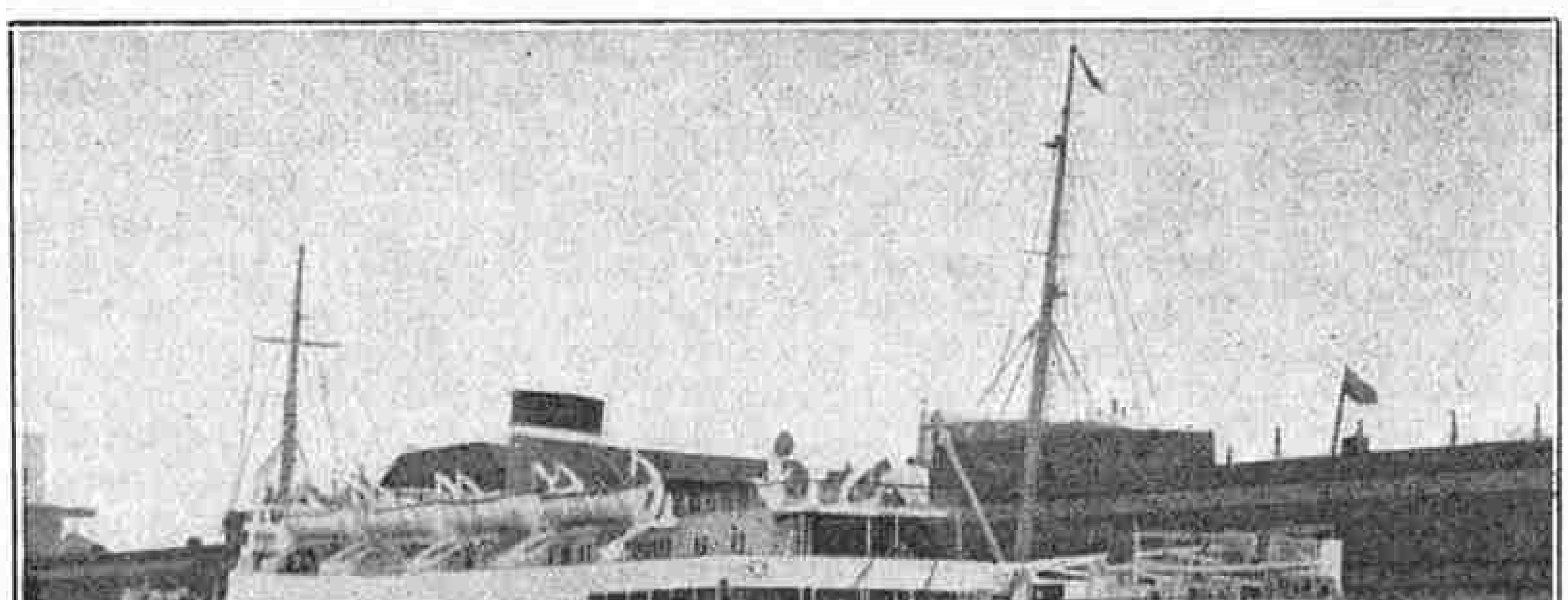
"A Country Holiday"

By Arthur Davenport (The Children's Book Club. 2/6 net)

Anthony Carr is a country lad, the son of a West Country landowner, and Noel Steele is a Londoner, who spends an exceptionally long holiday in the former's country home. This gives the town boy a magnificent opportunity to learn something of the ways of the wild, with the country youth as his guide, and the result of their wanderings and talks is a really delightful book.

Young Anthony recognises every rustle in the hedge, every call in the thicket, and even the passing shadows on the grass, and is so familiar with them all that he does not need to turn to find out the cause. At first Noel sees and hears little, but gradually he learns to recognise the signs that mean so much to his companion. They spend a night in the woods, and wander by the river, on the moors and on the marshes by the shore. With them we meet many fascinating country characters, from gamekeepers to poachers, and from farmers to a lighthouse keeper who tells stories of fishing and storms at sea.

The whole presents a vivid picture of life in the real country, revealing the secrets of country people and of the creatures with which they come into daily contact.



The twin-screw motor vessel "Leinster," built for service between Liverpool and Dublin. From "Clyde and other Coastal Steamers," reviewed on this page.

"Clyde and other Coastal Steamers"

By C. L. Duckworth and G. E. Langmuir (Brown Ferguson. 12/6 net)

This valuable book follows on the earlier volume by the same authors on *"Clyde River and Other Steamers,"* which was reviewed in the *"M.M."* for May 1937. It is very thorough and complete, and the lover of ships will find no cause for complaint in the wealth of material that the authors have gathered together and presented in convenient form. The companies running coastal fleets operating from the Clyde are treated individually, and in each case the story is that of the company itself, from its earliest days, as well as that of all the vessels sailing from the Clyde and from other ports that have been included in its fleet.

The first chapters are devoted to the various sections of the Coast Lines group, including the British and Irish Steam Packet Company Ltd. and the Belfast Steamship Company Ltd. Early West Highland steamers are then described, and this section is followed by others dealing with the vessels of the Clyde Shipping Company Ltd. and William Sloan and Company. Finally come two chapters on various Clyde Coastal vessels, all being treated with the author's usual precision and detail.

The book contains a long appendix of 166 pages, in which full lists of coastal steamers are given in tabular form, with particulars of dimensions and machinery. A novel feature in this section gives family trees of the shipping companies concerned, showing how they have grown by absorbing other companies or amalgamating with them. A second appendix gives lists of the present-day fleets of the lines concerned, and there is a very full index of boats and shipping companies.

There are over 70 half-tone illustrations. Most of these are photographs of modern ships, and there are many interesting reproductions from early photographs of former vessels of the various lines.

"Pilot's Summer"

By F. D. Tredrey (Duckworth. 8/6 net)

There are few places more interesting to most readers of the *"M.M."* than the cockpit of an aeroplane, especially of one capable of every kind of flying manœuvre, and they will revel in Squadron Leader Tredrey's account of his three month course at the Central Flying School. The full pleasure of the book perhaps will only be available for our older readers, who will enjoy not only the thrills of work in the air, but also the entertaining account the author gives of life in the school.

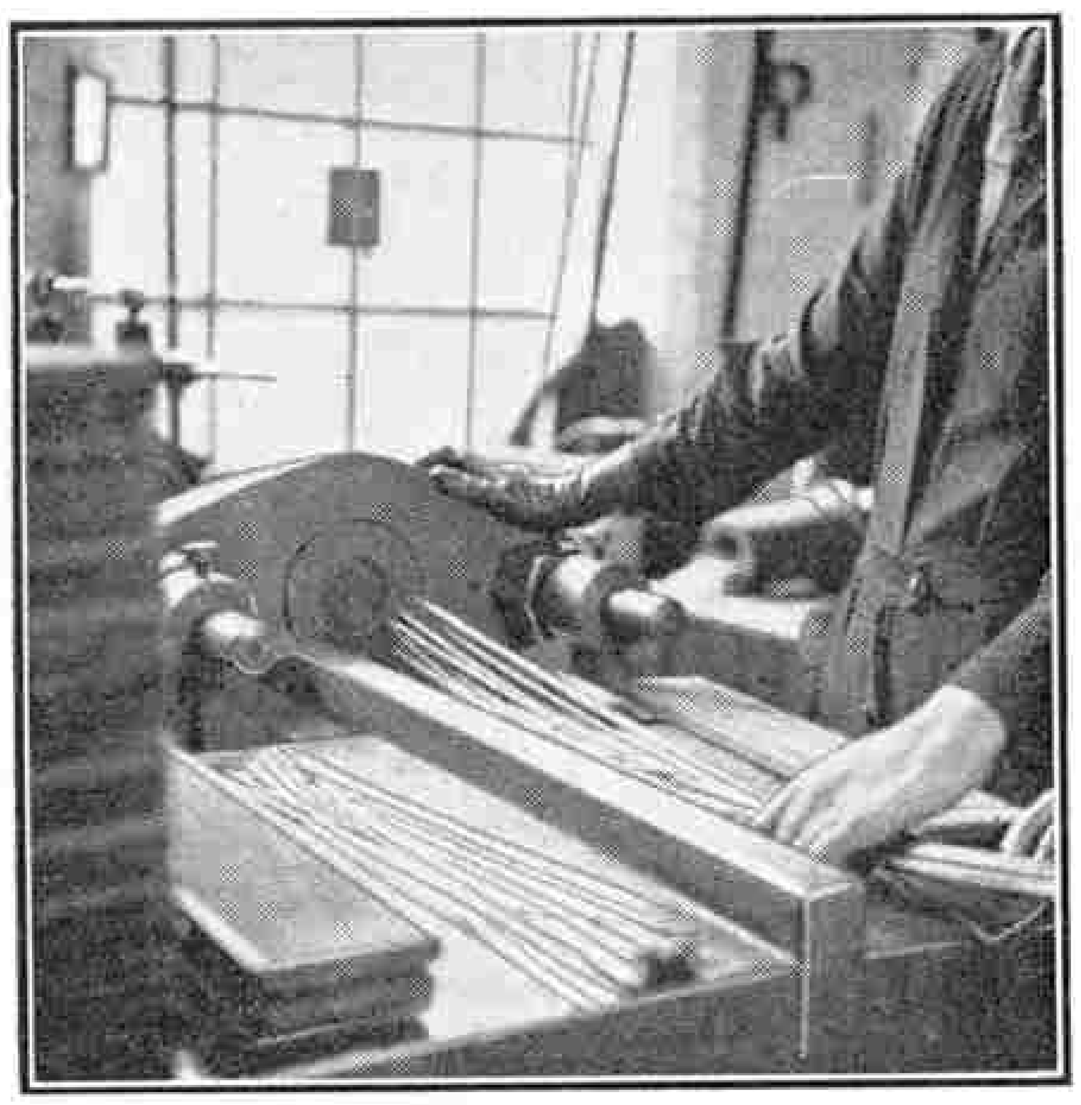
The story begins with the success of the author's application for training as an instructor and then we read of his progress, day by day, in the flying school. The ground training involves engine work and the assembly of two aeroplanes that the pupils themselves fly as a vote of confidence in their own handiwork. Along with this goes a very searching practical training, not merely in every kind of flying, but also in the "patter" and the methods the pupils are to use when they in turn become instructors. All this is described very skilfully, with gentle humour but acute observation.

HOW THINGS ARE MADE:

Lead Pencils

By Garry Hogg

IT is very easy to imagine that because an article costs only a copper or two little thought and care have been devoted to its production. An excellent way to prove this idea to be wrong is to spend a few hours in the pencil factory of F. Chambers and Co. Ltd. at Stapleford, near Nottingham. Few things are cheaper or more widely used than the so-called lead pencil, but one might go a very long way without finding processes of manufacture more interesting than those to be seen in operation in this factory.



The thin leads, or "slips," emerging from the extruding press. The illustrations to this article are reproduced by courtesy of F. Chambers and Co. Ltd.

Nowadays there is no lead in pencils, but some hundreds of years ago lead and lead alloy were used. "Pencils" then were simply short sticks of metal, consisting of five parts of lead, two parts of tin and eight parts of bismuth, softened by the addition of a tiny percentage of mercury, that were wrapped in paper to make a very unsatisfactory article. Then in 1560 graphite was discovered in a Cumberland mine, and for a great many years thin strips of this substance were glued and clamped between wooden holders to form crude pencils. This mine was the sole source of supply, and graphite soon became scarce, so that pencil manufacturers had to seek elsewhere for their raw material. At length they found the mineral they needed in places as far removed as Ceylon, Korea, Mexico and Irkutsk in Siberia. It is of interest to note, by the way, that although graphite is almost the softest of minerals it belongs to the same family as the diamond, which is the hardest. Graphite is actually a crystallised carbon, and is found sometimes in veins several feet thick, like coal, and sometimes in pockets in limestone formations.

After the supply of lump graphite had been exhausted many methods of treatment were tried in order to give a material suitable for pencil making. The graphite was pulverised and then "set" with various gums, resin or sulphur, but it was not until about 150 years ago that the present method was adopted. In this the graphite is mixed with certain types of clay, and the mixture is fired in kilns much as pottery is fired.

The graphite reaches the Chambers factory in bulk, ready for use. It has already been "air-floated," an interesting process during which the roughly pulverised mineral is blown over a series of chambers. The heavier particles drift downward by their own weight into the first chambers, and the lighter the other particles the farther they travel. The clays used are various. They may be kaolin, talc, pipe-clay, or fuller's earth, much of which comes from Surrey.

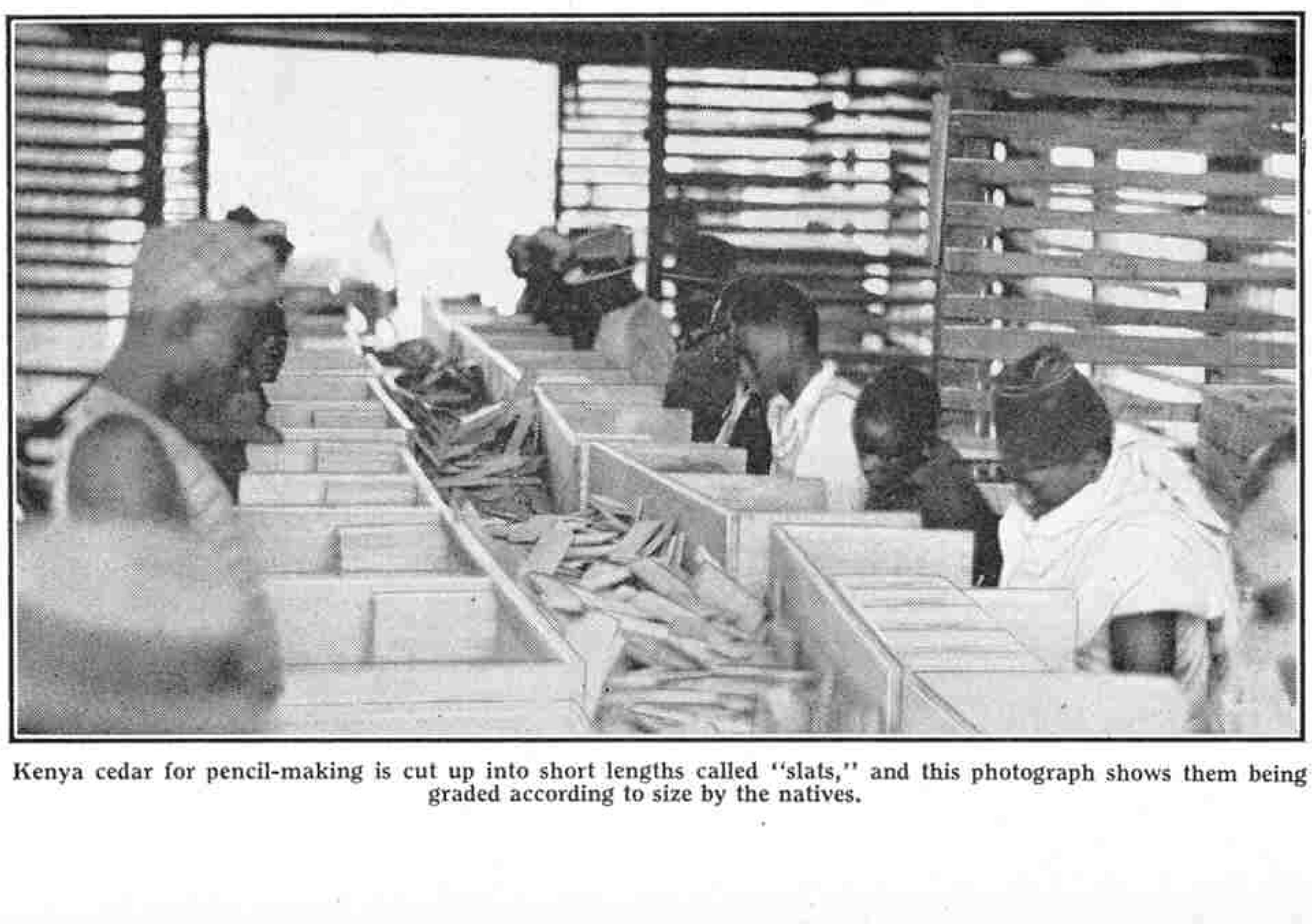
The first stage of the process of manufacture takes place in the mixing room, where the graphite and clay are scientifically blended in the proportion of one part of clay to roughly three of graphite. An approximate guide to the mixing is that every additional two per cent. of clay raises the hardness of the pencil one degree, say, from 2B to B, or from H to HH.

The batch of blended clay and graphite is given a number, and then ground slowly with water in triple granite rolling-mills for anything up to 100 hours. During this process any particles of grit or other unwanted matter that may have escaped notice previously are thoroughly eliminated. The mixture is taken to the "waltzing" machine, which makes it absolutely uniform throughout, and from this it passes in flake form to a press that moulds it into cartridges about 3½ in. long and 2¾ in. in diameter. Each cartridge contains enough graphite to make about five gross pencils.

The graphite is next forced under a pressure of about two tons through dies made of agate or sapphire. This is done in a hydraulic extruding press from which the material emerges in the form of long thin wires called "slips," which are caught neatly by a girl and laid in slip-boards to be cut to length and examined. They are then conveyed to the slow-drying room, where they may remain for a few days or up to six weeks before being taken to the firing room. In this room the slips are placed in numbered boxes, and these are inserted in special kilns, in which the slips are subjected to a temperature varying between 700 and 850 deg. C. They are brittle when they emerge from the kiln, but are very much tougher than one would suppose from their fineness. You may never have noticed that there is a considerable variation in the gauge of the lead in a pencil, the thickness depending on the hardness. The lead in a soft pencil, such as the 6B, is 120 thousandths of an inch in diameter; whereas that in the very hard, or 6H, pencil is a bare 70 thousandths of an inch in thickness. Coloured and copying-ink leads, by the way, are not fired.

Meanwhile the wooden part of the pencil has been undergoing its own series of interesting processes. Cedar is used for all but the very cheapest grades of pencil, because it has a good colour, good texture, a straight even grain, and cuts well. F. Chambers and Co. Ltd. use only Empire cedar, the wood of the *Cedar Juniperus* from British East Africa. The timber is not sent over in bulk. Instead the baulks are cut into slats by natives, and the slats are baled. This method avoids wastage resulting from moisture in the wood, a very important consideration when one is faced with freight charges, and there is practically no wastage from "off-cuts" at the factory end.

When the slats arrive in their bales they are very carefully inspected. Each is a small rectangle of cedar wood, 7¼ in. long and wide enough to make six ordinary half-pencils, or a smaller number of bigger pencils for special purposes. Under a good light the expert can tell at a glance whether each slat is of Grade One, suitable for the best pencils, Grade Two, which is used for the cheaper pencils, or Grade Three, unsuitable for use. His judgment is based



Kenya cedar for pencil-making is cut up into short lengths called "slats," and this photograph shows them being graded according to size by the natives.

on the three prime requisites of straightness of grain, colour and texture.

The wood has been dried but is not yet seasoned. To leave this to Nature might entail a delay of several years, and even then might not give perfect wood, since weather and temperature change without warning in England. Instead the slats are artificially seasoned in special drying chambers kept at known temperatures for given periods. They are removed at exactly the right time, and thus the possibility of warping, which is the bane of the pencil-maker's life, is practically eliminated.

Very remarkable machines then take the slats in hand. When they arrive at the first of these machines they are slightly over ⅛ in. thick. They pass through it at the rate of 40 a minute, and a set of swiftly revolving blades cuts the six grooves for the slips in each slat, true to a thousandth of an inch. From this machine they go to an ingenious device that gives each slat a coat of the finest skin-glue obtainable. It might be thought that a pencil does not need such expensive and superfine glue, but the makers point out that their wares go to every part of the world, and into climates of all types from hot and dry to moist and cold, and only the finest glue will stand up to such extremes. A pencil that splits, they say, is a poor advertisement.

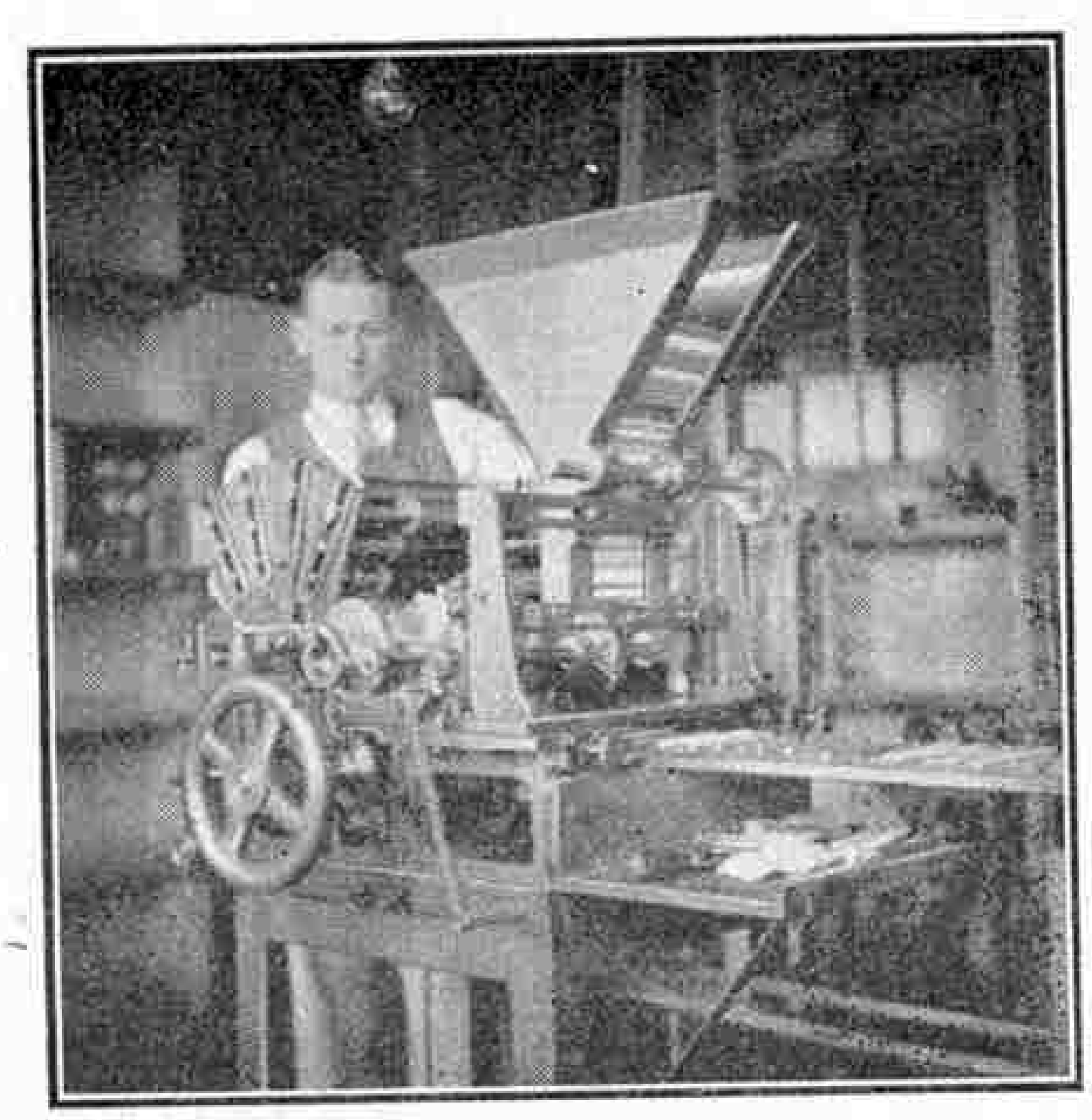
As the glued slat comes out of the machine it is taken by a deft-fingered girl, who drops half a dozen slips into the grooves, claps another slat on top, and passes the "sandwich" to a second girl who screws it, in company with a dozen others, into a clamp that grips it until the glue has set.

The pairs of slats, now so firmly joined that they will split in the grain before splitting at the joint, then pass on to a fine-toothed saw, which cuts them neatly into seven-inch lengths, the standard for pencils. They are then taken to one of the most notable machines in the factory. This passes them one at a time along and over a set of swiftly revolving cutters that divide the lower slat into rounded or angular grooves, according to the shape of pencil desired, and then do the same for the upper slat. As a result perfectly-shaped pencils drop out at the other end of the machine at the rate of three a second.

To touch the pencils at this stage is to realise what a fine surface Kenya cedar possesses. The maker is not satisfied yet, however, and the pencils pass next to a revolving band of glasspaper, which polishes them at a tremendous speed before they go on to the painting machines.

Natives in British East Africa sewing up the slats of cedar in hessian, for export.

A four-colour printing machine used in printing advertisements on the pencils.



Cellulose paint mixed by special machinery is used exclusively in this factory. Its base is called "cellulose clear," and consists of either cellulose acetate or cellulose nitrate in some suitable solvent, such as amyl acetate or acetone. Into this fluid, which is of the consistency of thin treacle, the required pigments are put in powder form and very finely ground.

The mixture is then placed in what are called "pebble-mills," which consist of porcelain-lined churns containing about 10 lb. each of small round pebbles. These are turned at a constant speed for about 72 hours, so that the pigment is ground into the fluid and the two are thoroughly blended. A point of interest is that the base of this paint is identical with the material of which artificial silk is made.

The painting machines put a coat of colour on the pencils at the rate of two a second. Each pencil passes through a bath of paint, and out through a nozzle that automatically wipes off any superfluous paint before the pencil passes along on a moving belt to the next process. It has been found by experiment that a pencil can be handled 80 sec. after painting, and the speed of the travelling belts has been adjusted to achieve this end. Best quality pencils may receive anything up to a dozen successive coats of paint, and very beautiful finishes are obtained by putting colours over a base of aluminium paint.

There are still one or two processes before the pencil finds its way to the packing rooms and stock rooms. It has to be stamped with the firm's name, the appropriate degree of hardness or softness, and so on. This is done with gold or silver leaf. Very likely the printing room is its next destination, however, for millions of pencils are sold yearly for advertising purposes. The printing machine is perhaps the most ingenious in the factory. The pencils are fed into it and then printed by a series of one, two, three, or even four platens, rubber stamps mounted on small rollers, according to the number of colours required for the printing. The way the pencil is automatically spun against each platen in turn so that the colours fit into place is uncanny, and the whole design and lettering is completed in a few seconds.

There remains the pointing of the pencil. A small machine accomplishes this at the rate of one pencil a second. Careful examination of the pencil-point will show that the slip continues the line of the pared wood until the last fraction of an inch, when it suddenly becomes more pronounced, and the tip is almost needle-sharp. To effect this the machine has been fitted with two diamond cutters, set at a slight angle to one another. The first cuts the wood and the part of the slip immediately projecting; the second then comes into action and gives the finishing touch just before the pencil drops out.

At the other end the pencil has been deftly rounded and given the smooth finish that characterises pencils produced by this firm. The curve has been achieved by another set of diamond cutters, adjusted delicately by an operator who must work within extremely fine limits. If the end of the pencil were left cut square the hard enamel-like coating of cellulose paint would tend to chip or flake off.

With machines so timed it is no wonder that this firm alone produces about 20,000,000 pencils every year. Besides the many grades of hard and soft pencils this vast total includes the coloured crayons that children use, "make-up" pencils for actors, copying-ink pencils, carpenters' pencils, and special pencils used by manufacturers of some materials that are otherwise difficult to mark. It also includes a pencil known as the "Markall," which is invaluable to chemists and workers in laboratories. This pencil contains a much higher proportion of pure wax than does the ordinary crayon, so that it can be used effectively on polished glass.

An interesting and very important corner of the Chambers works is the Research Department. Here sample batches of pencils are tried out by an expert, who assesses their degrees of hardness and smoothness by a finely developed sense of touch more efficient than any mechanical method that might be devised. The work demands an extreme sensitiveness that is almost a sixth sense. Yet it may be said that every corner of this factory is a research department, for the little article that is being turned out in such vast quantities is subjected to a rigorous examination at every stage in its career. The slogan of the Chambers company might well be "Perfection for a Penny."

"From Our Readers"

These pages are 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.

Sledging with a St. Bernard Dog

The photograph reproduced below shows my St. Bernard dog, which as readers will see is very big. He is a pure bred dog, some 16 months old, but already he stands 32 in. high and measures 6 ft. from tip to tail! He is very friendly, and is always ready to do his bit. With a weight of 178 lb. he makes light work of a sledge load, pulling me along over the snow in grand style, while in the summer he sometimes takes me for a drive, as you can see in the photograph. And when mealtime comes he is always there to do his bit too, which is more like "a lion's share!"

An unusual "steed" belonging to G. S. Burchill, South Nelson, New Brunswick, Canada.

G. S. BURCHILL (South Nelson, N.B., Canada).

"Red Rocks" in New Zealand

There are many interesting places near the port of Wellington, on the New Zealand coast. Probably the most interesting is Sinclair Head, more commonly known as "Red Rocks." The road round the coast to Sinclair Head ends a little way past a small cove called the "Run-around." This peculiar name is derived from the fact that before the road was made one could only get past this cove by dodging the huge breakers that dash themselves against the base of the cliff.

Red Rocks presents a magnificent sight. Huge boulders are heaped in disorderly chaos; tremendous breakers come crashing in from the Pacific; and overhead seagulls wheel and dive. The whole picture is one of grandeur. Similar scenes can be found in many parts of the coast, but this one is unique in that the rocks, formed by volcanic action in long-forgotten ages, are coloured a dull blood red. A company was formed to cut and polish this stone and market it as red marble.

A typical Maori legend purports to explain the red rocks at Sinclair Head. A young warrior is said to have been in love with the daughter of the chief of a rival tribe, who forbade the match. Eventually the lovers eloped, pursued by the maiden's father. Hiding behind two great boulders the couple were safe from the rage of the old chief, who in anger prayed that the runaways be delivered to him.

The gods in answer to his prayer are supposed to have sent a cloud of mosquitoes between the rocks where the two lay hiding, driving them out to be slain by the waiting chief. The blood-red rocks, the two great stones and the mosquitoes remain to this day, testifying, in the poetic Maori mind of long ago at least, to the truth of the legend.

J. STEWART (Wellington, N.Z.).

Lifting 250-Ton Lock Gates

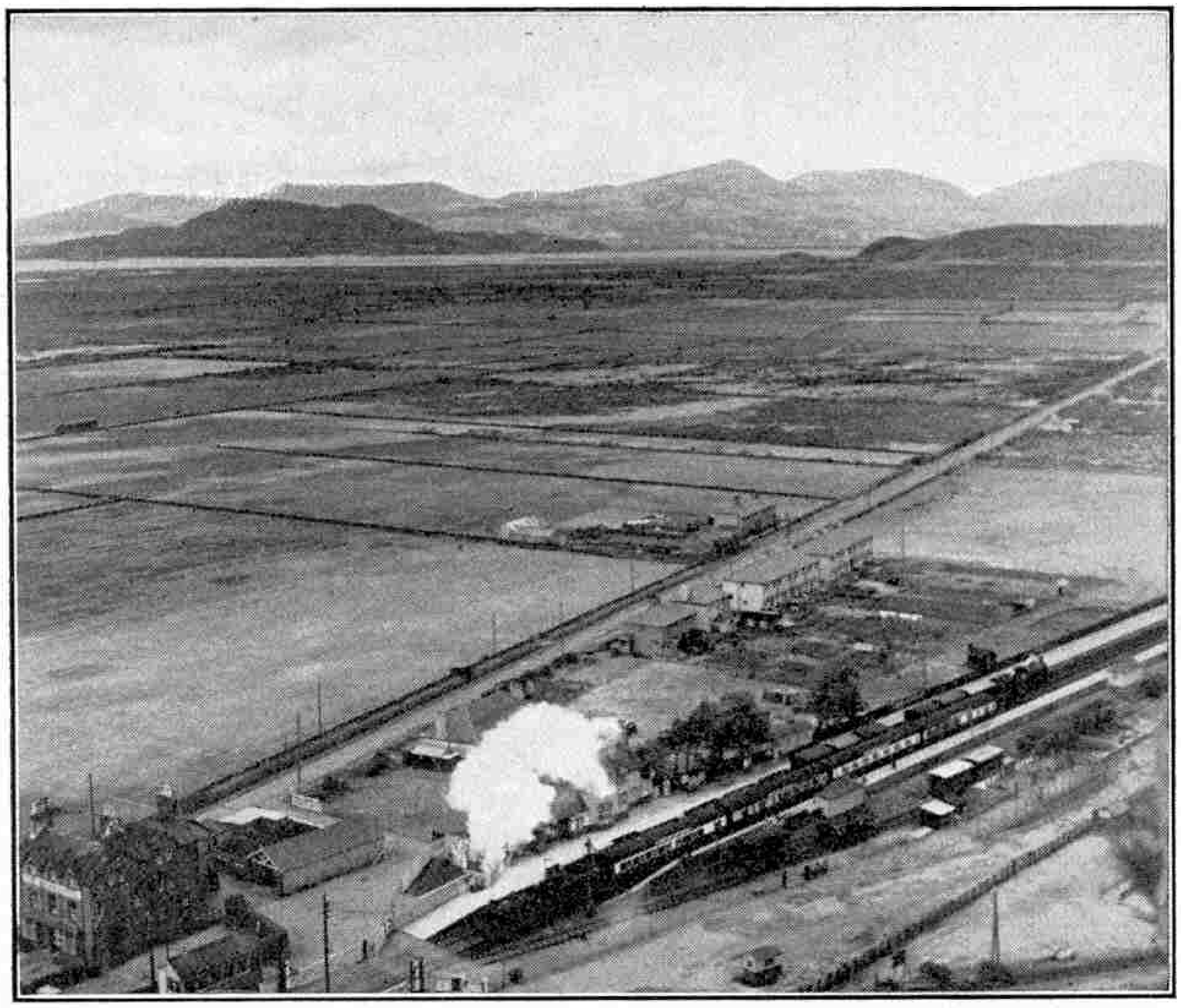
The lower illustration on this page shows a remarkable feat of engineering skill in progress. Two gates of one of the main locks of a canal, which have been in use since the waterway was opened many years ago, were removed and replaced temporarily by steel gates. These new steel gates were specially constructed and took about 12 months to complete. After launching they were towed by a floating electric crane to the lock site. The new gates are plated. Each weighs 185 tons and has 14 "decks," balanced with water ballast.

The old gates temporarily removed weigh 250 tons each, and measure 46 ft. by 44 ft. They are made of greenheart timber specially imported from British Guiana, and are bound with steel plates; and on examination were found to be in a remarkable state of preservation. The floating crane, which has a lifting capacity of 250 tons, had to lift each gate bodily when removing it, but did so in such short time that traffic was only delayed for one tide.

Some 80 men were engaged on the work. The old gates were first of all lifted out and deposited in the water away from the lock and the new gates then placed in their position. After this the old gates were towed to the place where they are being repaired. Eventually they will be returned to their previous position.

W. BARR.

An interesting scene during the removal of two 250-ton lock gates for overhaul and repair. Photograph by W. Barr.



A fine view from high up on the wall of Harlech Castle, in Wales, that resembles a Hornby-Dublo layout. It was taken by W. A. Connor, Blackpool.

How to Find Ideas for Miniature Railway Scenery

I think readers will agree that the photograph reproduced above conveys the impression of a typical scenic layout of the Hornby-Dublo system. Actually it was taken from the wall of Harlech Castle, which is built on a rocky promontory and towers above the G.W.R. line from Aberystwyth to Pwllheli. A passenger train is just setting off from Harlech Station towards Barmouth, while a goods train waits on the up line. Much of the track on this route is single line, so that one train can often be seen standing in a loop, alongside which there is usually a station or a halt, while a train running in the opposite direction occupies the main line.

Although the country in this vicinity looks flat, the land to the right of the picture rises up into the mountains, whilst in the background can be seen the range of the Lleyn Peninsula extending from the left to the Snowdon group on the right. The flat part of the country is called the Morfa and is land reclaimed from the sea. Across this the railway runs in a straight line for several miles, and the scene generally is one that delights the eye of the railway enthusiast.

I think it is a good idea for model railway enthusiasts to carry with them a camera, or sketchbook and pencil, with which to record things of interest that can be applied to their own lines. This practice is especially valuable to those who dabble in scenic work on their layouts, for such a picture as that reproduced can be built up in miniature with splendid effect. The Cardigan coast is certainly a fine district for "aerial" pictures of railway activities, because there are so many high viewpoints overlooking the track.

W. A. Connor
(Blackpool).

A South African Homestead

The beautiful old South African village of Stellenbosch is situated in a fertile valley, with the Hottentots Holland Mountains as a fitting background. It has striking avenues of plane trees completely arching the streets, but one of its most interesting sights is the old fruit farm of "Libertas," where Adam Tas, Governor of the Cape in the days of the Dutch East India Company, often spent his holidays. This is a typical Dutch homestead of the Cape, over-shadowed by massive oaks. Its picturesque gables are still in good condition, making it a great attraction for artists.

The walls of the interior are decorated with paintings by an artist brought out from Holland by the Governor. The story goes that the artist, who was named Hartman, was offered a free passage out for his health, and that he spent a year in South Africa. It is a wonder to me that Hartman, whose own portrait is on one of the walls, is not better known because he was certainly a master. In what looks like the drawing room the first four pictures depict the seasons of the year, and most of the rest represent different occupations of the Cape, such as fruit and farming and fishing. The pictures were painted about 1768. In the wine cellar are large vats, 8 ft. high, specially constructed with flush-fitting manholes for cleaning purposes. The bung of one of them was pulled out, and the smell of wine was still apparent.

The kitchen with its huge fireplace and brick oven is most striking. I should say the chimney is 6 ft. wide and 3 ft. deep. Some years ago the present owner had a sale of the old furniture, which I believe was absolutely complete, even to the old slave bell. The place where the old grandfather clock stood can still be seen in the main dining hall, which is now used for packing fruit, large quantities of which are still grown on the farm.

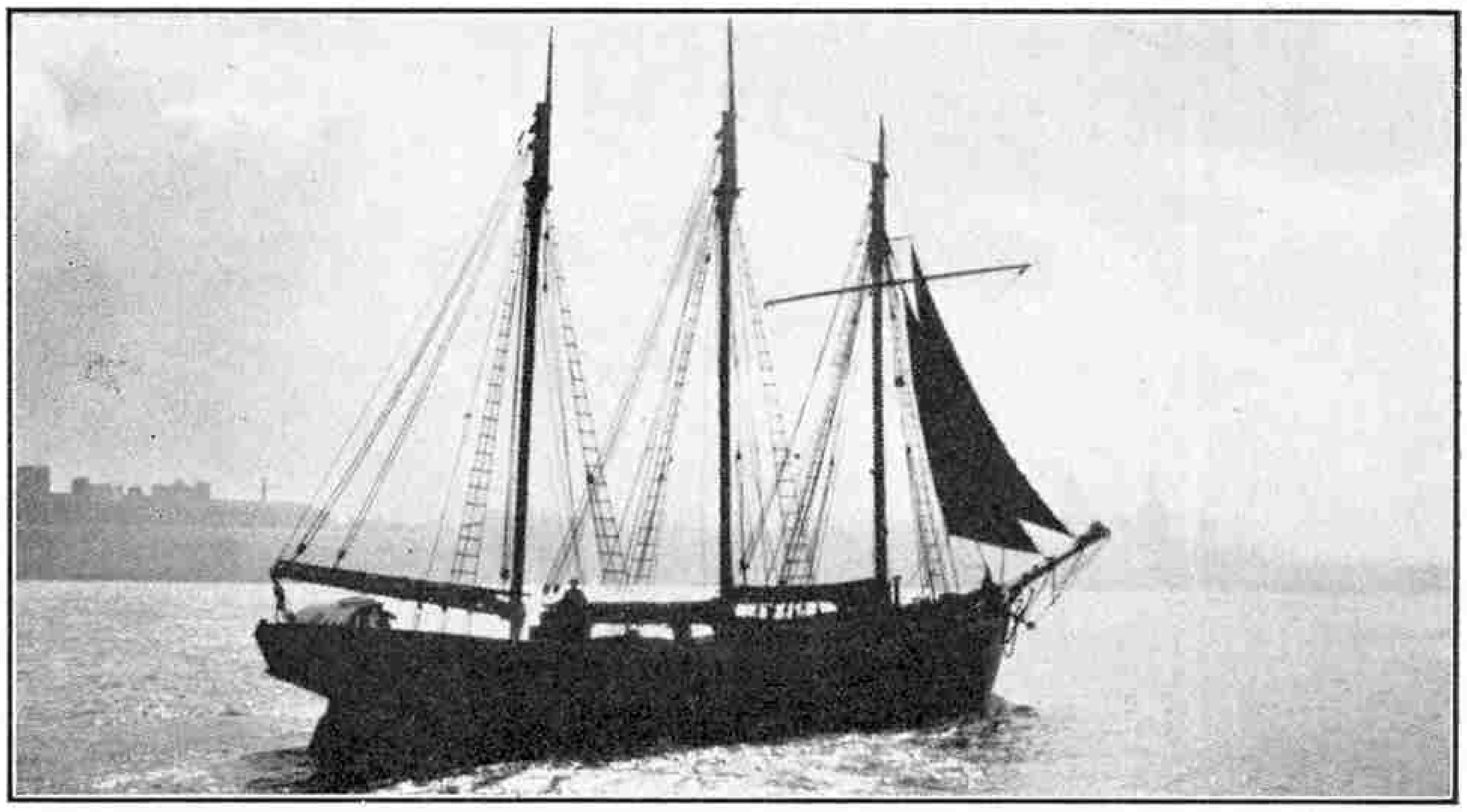
The Monuments Commission have got their eye on the farm, and if they purchase it they will furnish it in the original style, and throw it open to the public.

A picturesque fruit farm dwelling built in the 18th century. Photograph by J. Hoal, East London, South Africa.

J. Hoal (East London,
South Africa).

Vanishing Topsails

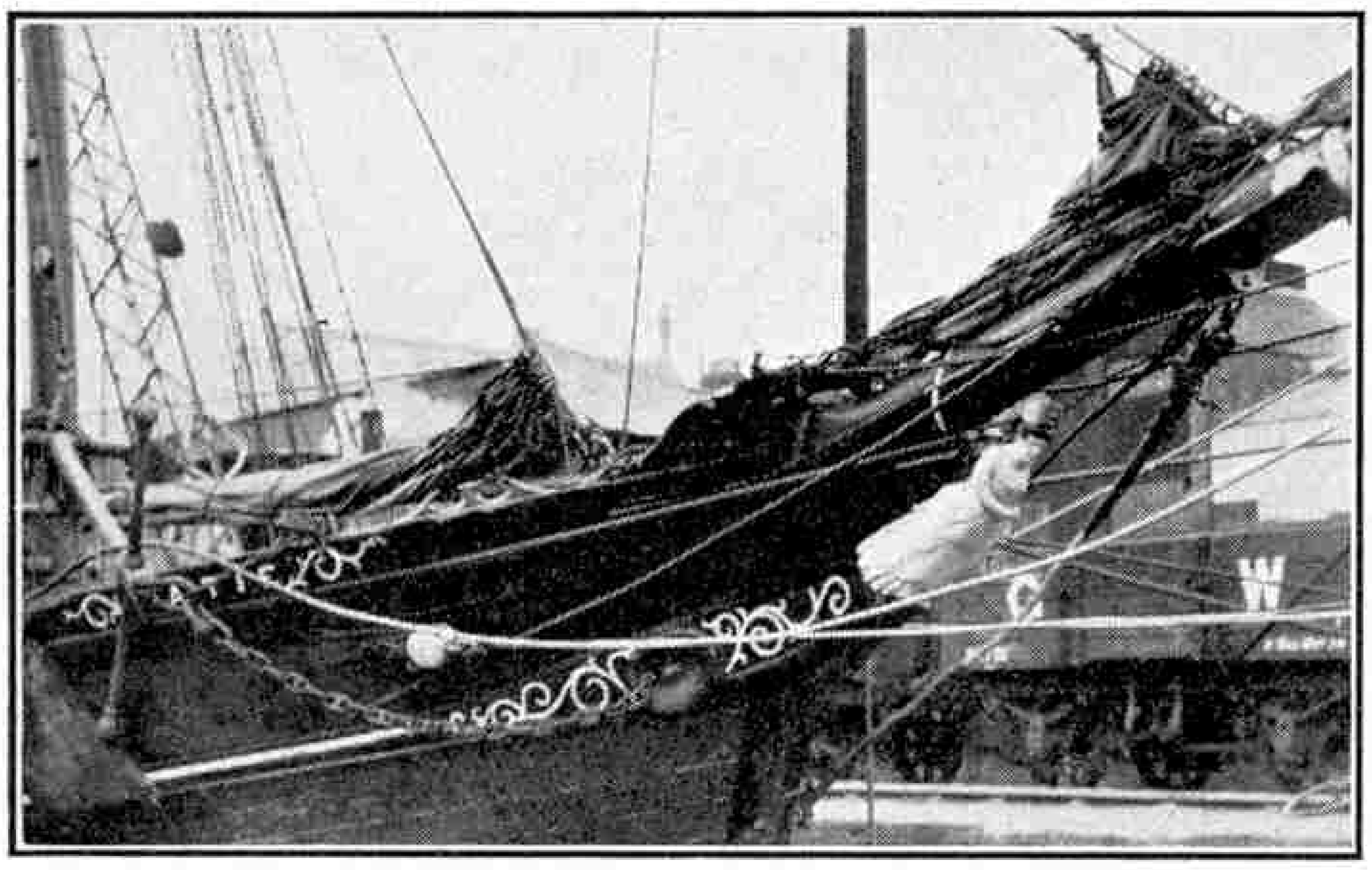
By Michael Bouquet



The motor schooner "Kathleen and May," of Bideford, in the Mersey.

NOT so many years ago every little port and creek in the British Isles owned its fleet of coasting craft, consisting of small schooners and ketches locally manned and owned, and often locally built. The seas around the coast were crowded with their sails, and sometimes hundreds of coasters could be seen anchored together, waiting for a fair wind, in the Downs or at Holyhead. Even 20 years ago there were still scores of sailing coasters in active service.

To-day there are only three left of all these hundreds, only three topsail schooners to carry on the tradition of sail in the British Isles. It was the two or three square sails on the foremast of a schooner that made her into that elegant craft, a tops'l schooner. The square topsails with their yards and braces made her look larger than she really was, and gave her a saucy yet workmanlike air, so that a group of tops'l schooners in some out-of-the-way country port gave the place an air of both beauty and thriving trade.



The figurehead of the coasting schooner "Katie." This was washed away a few years ago in a Channel gale.

The tops'l schooner was a favourite rig 90 years ago for the ships that used to bring oranges and lemons from the Azores, and currants from the Mediterranean. One of these fast clipper-schooners, the *"Brooklands"* of Cork, still remains in active service, trading in the Irish Sea, although she was built as long ago as 1859 at Dartmouth. In her fruit-carrying days she was called the *"Susan Vittery"* and after 80 years at sea the original figurehead representing the lady of that name is still in position on her bows. Now the *"Brooklands"* carries cargoes in the Irish Sea. Last April she crossed from Dungarvan, Co. Waterford, to Swansea in nine hours, a trip which few other ships can have ever made in the time, let alone at 80 years of age.

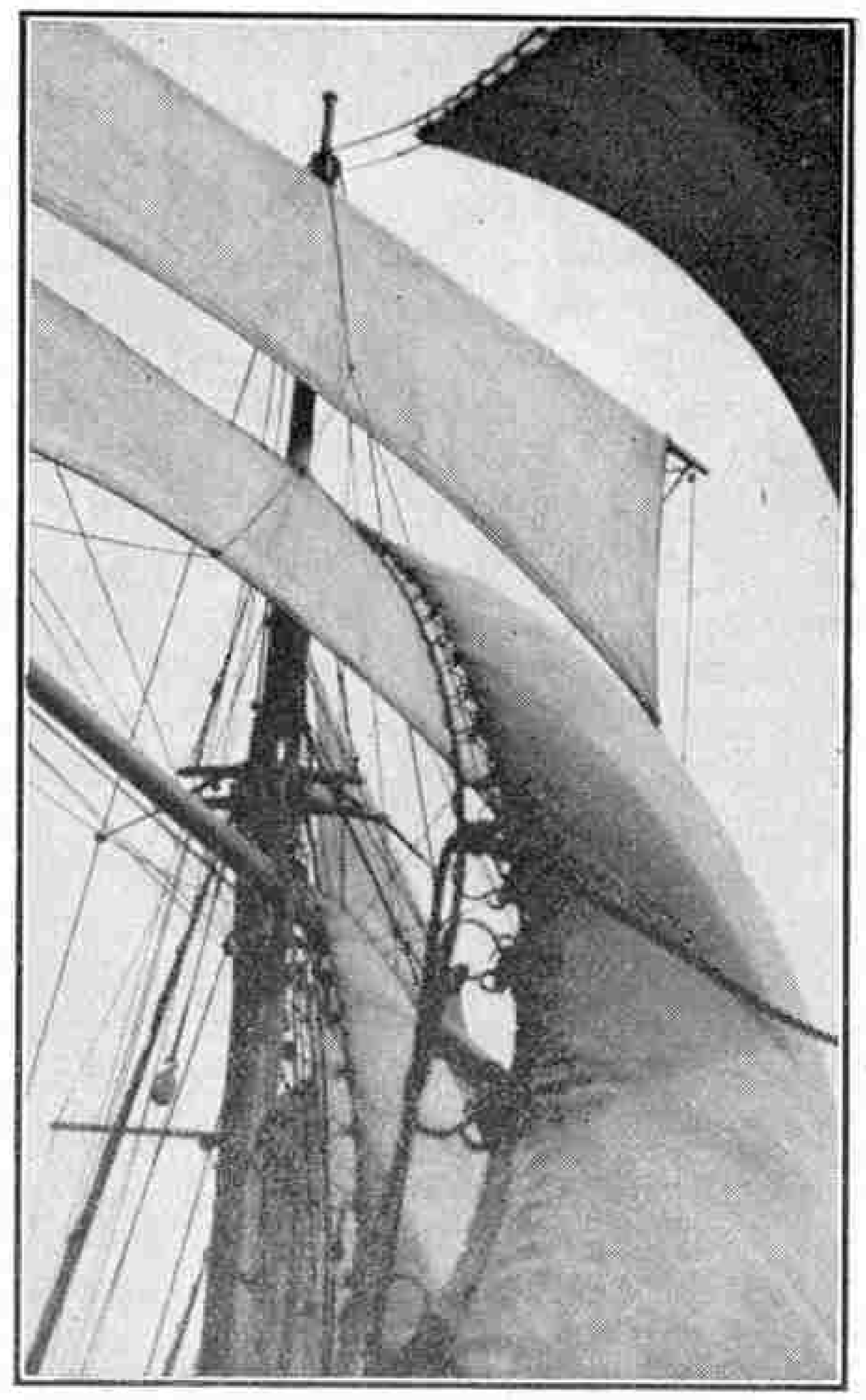
A tops'l schooner that is a familiar sight in the Thames is the *"Katie"* of Padstow, a small two-master built in 1881. Once she carried salt fish from Newfoundland to Spain and Portugal; to-day she carries cement from London to Cornwall, returning with china clay. The *"Katie"* is a game old ship. Month in, month out she makes her trips to and from London River, arriving safely with her cargoes winter and summer. A few years ago her owner put an engine into her and took away her square yards, but after a few trips the engine became such a nuisance that it was taken out, and her square topsail returned. Now she is the last tops'l schooner to be a regular trader to the Port of London.

At one time the *"Katie"* had a figurehead, a decoration that is peculiarly associated with the sailing ship. In coasting vessels the figurehead usually was a female figure, representing the owner's wife or mother or sweetheart, after whom the ship was named. The *"Katie's"* figurehead showed a rather formidable-looking lady dressed in the late Victorian style. I don't somehow think she was anybody's sweetheart, but she looked as though she might have been the skipper's mother-in-law. Whoever she was she came to a bad end, for a few years ago in a Channel gale she was washed away and now the *"Katie"* has no figurehead.

The three-masted tops'l schooner *"Mary Miller,"* of Fowey, is the third of our trio of survivors. She is a vessel of 119 tons, and was built at Carrickfergus in 1881. She is commanded by a Cornish skipper, who often takes his daughter to sea with him, and carries Cornish china clay to Liverpool and the Humber, returning with cargoes of coal.

Vessels such as these are chance survivors of the day of wooden ships and iron men. Their day is done and the sailing ship has gone under in the face of competition from mechanical transport. Yet in the West of England many schooner skippers and owners have tried to move with the times by putting auxiliary engines into their ships and removing the cumbersome square topsails.

The *"Kathleen and May"* of Bideford, illustrated on this page, is one of these motor schooners. I took the photograph in the Mersey early one morning from a little Irish schooner *"Nellie Bywater."* We had come across from Ireland that night and since daybreak had seen this other schooner coming up the channel far astern of us. We anchored to wait for a tide, but the *"Kathleen and May,"* gradually taking in sail, came on past us, with her motor going slow, on her way up to Garston. With the early morning sunshine behind her she made a beautiful picture, but one can see the difference made in a schooner's rig when an engine is put in. The masts are shortened, the square tops'ls disappear from the foremast, leaving only a single yard from which a square sail is set when running before the wind. With a motor a vessel like the *"Kathleen and May"* might carry three or four cargoes while the old *"Brooklands"* or *"Mary Miller"* was struggling against head-winds or lying windbound in port. No wonder that square topsails have almost vanished.



Topsails! A striking view aboard the coasting schooner "Mary Miller."

Nature's Puzzle Pictures

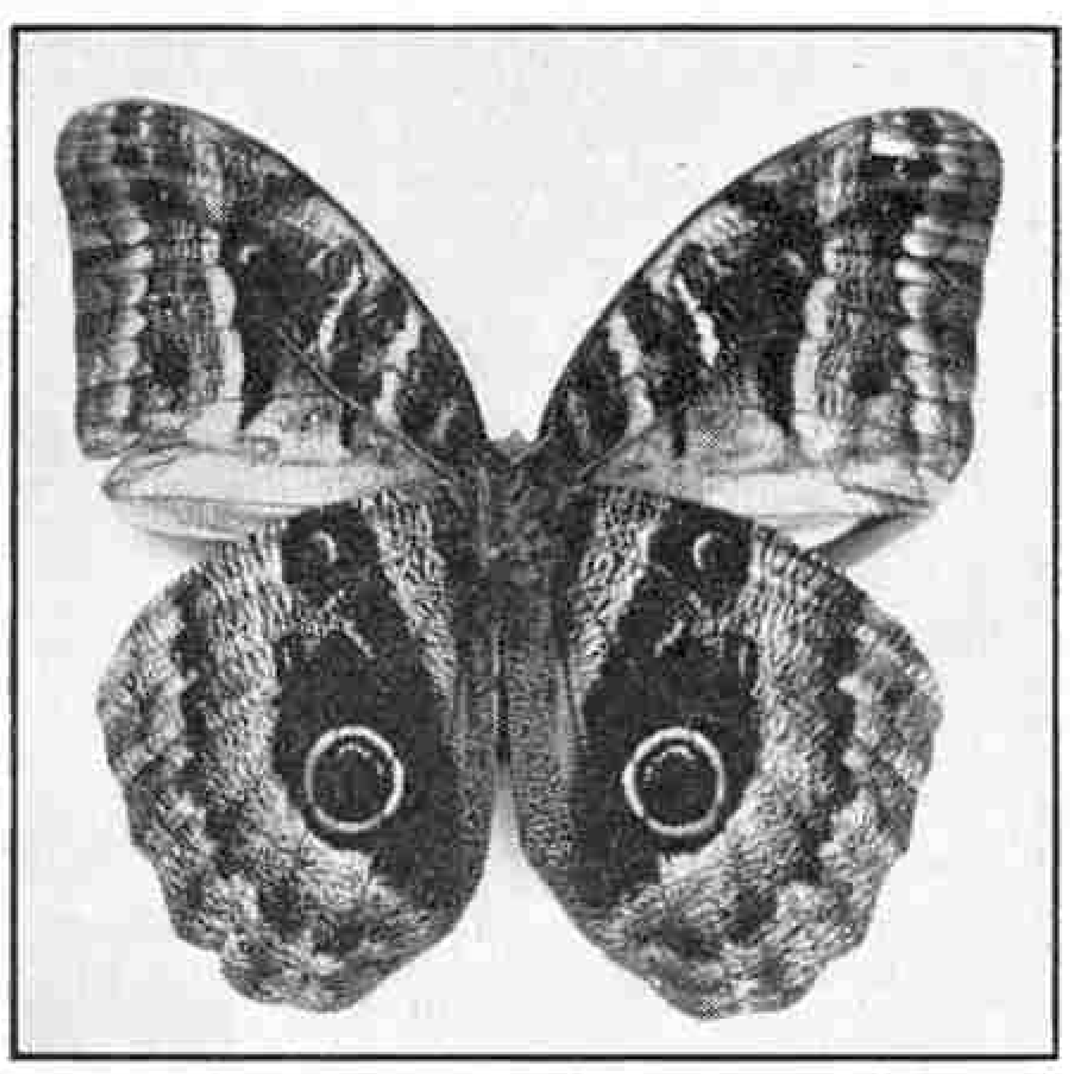
Queer Markings on Butterflies' Wings

By Harold Bastin

SEVERAL years ago I was shown some wonderful pictures and designs constructed from used postage-stamps. These could have been described as mosaic, in which tiny scraps of paper had been employed instead of fragments of stone or glass. The artist had cut up and pieced together his material so skilfully that the flowers, birds and other objects which he had depicted looked exactly as if they had been painted with a brush and water-colours.

It is an interesting fact that very similar results are produced naturally on the wing-surfaces of butterflies and moths by the arrangement of minute variously-coloured "scales." Experts tell us that the latter are really modified hairs; and in truth a complete series showing the transition from hairs to scales may be seen, through the microscope, on the wing of almost any butterfly or moth. Each scale has a tiny stalk, which is fixed to the wing membrane, and they are arranged in overlapping rows, like tiles on the roof of a house.

If we think of Nature as the artist responsible for the pictures painted on butterflies' wings, each scale may be supposed to represent a tiny touch of colour applied by her brush. Everyone knows how attractive and beautiful are the results she achieves, but not infrequently her work has the character of the "puzzle pictures" that were so popular in early Victorian times; it needs careful study before its hidden significance can be fully appreciated.



The Owl butterfly from South America. Why it is given this name is realised on turning the illustration upside down.

A few examples will serve to make this clear. Take first the Comma butterfly, a species that of late years has become much commoner than it used to be in southern England. It has been aptly likened to a weather-beaten Small Tortoiseshell, but is easily distinguished by the two white marks, one on the underside of each hind-wing, which account for its popular name. These resemble commas, and they are also like careless delineations of the letter C. Another British butterfly with a similar peculiarity is the White-letter Hairstreak, which has a white W plainly visible on the underside of each hind-wing.

Yet another instance on a par with the foregoing is an insect, this time a moth, with a silver Y traced on each fore-wing. Many readers doubtless will be familiar with this curiosity, for unlike the White-letter Hairstreak butterfly, which is something of a rarity, the Silver Y moth, as this insect is known, is exceedingly common and represented in every beginner's collection.

The design on the thorax of the great Death's Head moth is extraordinarily like the conventional skull and cross-bones device. So striking is this resemblance that the insect has from time immemorial been an object of awe to the peasantry of Northern Europe, its appearance being thought to forebode some dire calamity such as war, pestilence or sudden death. In parts of Poland, where this moth is especially common, it is called by such names as "Death's-head Phantom" and "Wandering Death-bird."

The forbidding skull and cross-bones on the thorax of the Death's Head moth.

By contrast, consider the quaint puzzle-picture of an old witch, twice repeated on the fore-wings of the Mother Shipton moth, a species that is common almost everywhere in the British Islands. The old hag's eye can be seen on looking at the moth sideways. A curiously contorted white line traces the outline of a grotesque profile, with a low forehead, a fearsomely elongated nose, and a chin of the "nutcracker" type. If the little moth of this name really perpetuates the old dame's likeness, she must have been more remarkable for her wits than for her beauty!

Some very striking pictures and patterns occur on the wings of foreign butterflies and moths. Among these picture butterflies none is more remarkable than the so-called Owl from South America. In the centre of each hind-wing, on the underside, is a great eye-like spot upon a mottled brown ground colour, so that one has only to hold a "set" specimen of one of these insects with the head downwards, for a curious resemblance to an owl's face to become apparent. This butterfly is shown in the lower illustration on this page, and the owl-like appearance is readily seen on holding the picture upside down.

Among the South American butterflies called Catagrammas the underside of the hind-wing frequently bears bold markings that resemble the figures "80" or "88." In India, the great Atlas Moth is often called "Snake" because the markings on the tip of the fore-wing, combined with the outline of the wing itself, suggests the head of an angry cobra seen in profile.

The other Indian butterflies are the "Map" and the "Shawl." The first has on its wings marks like latitude and longitude, while under the wings of the other is a beautiful pattern.

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●

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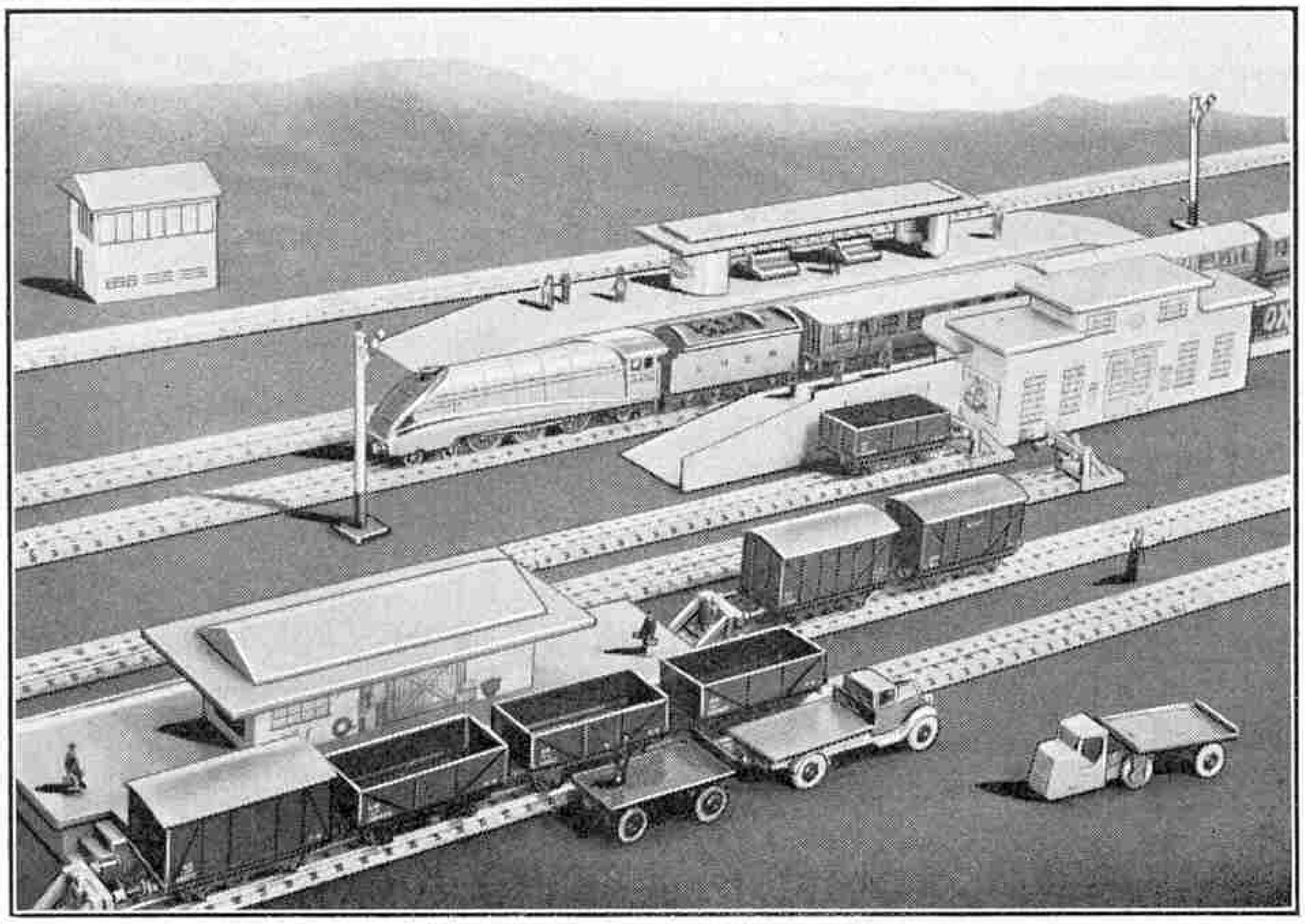
Hornby-Dublo Accessories

Adding Essential Features to a Layout



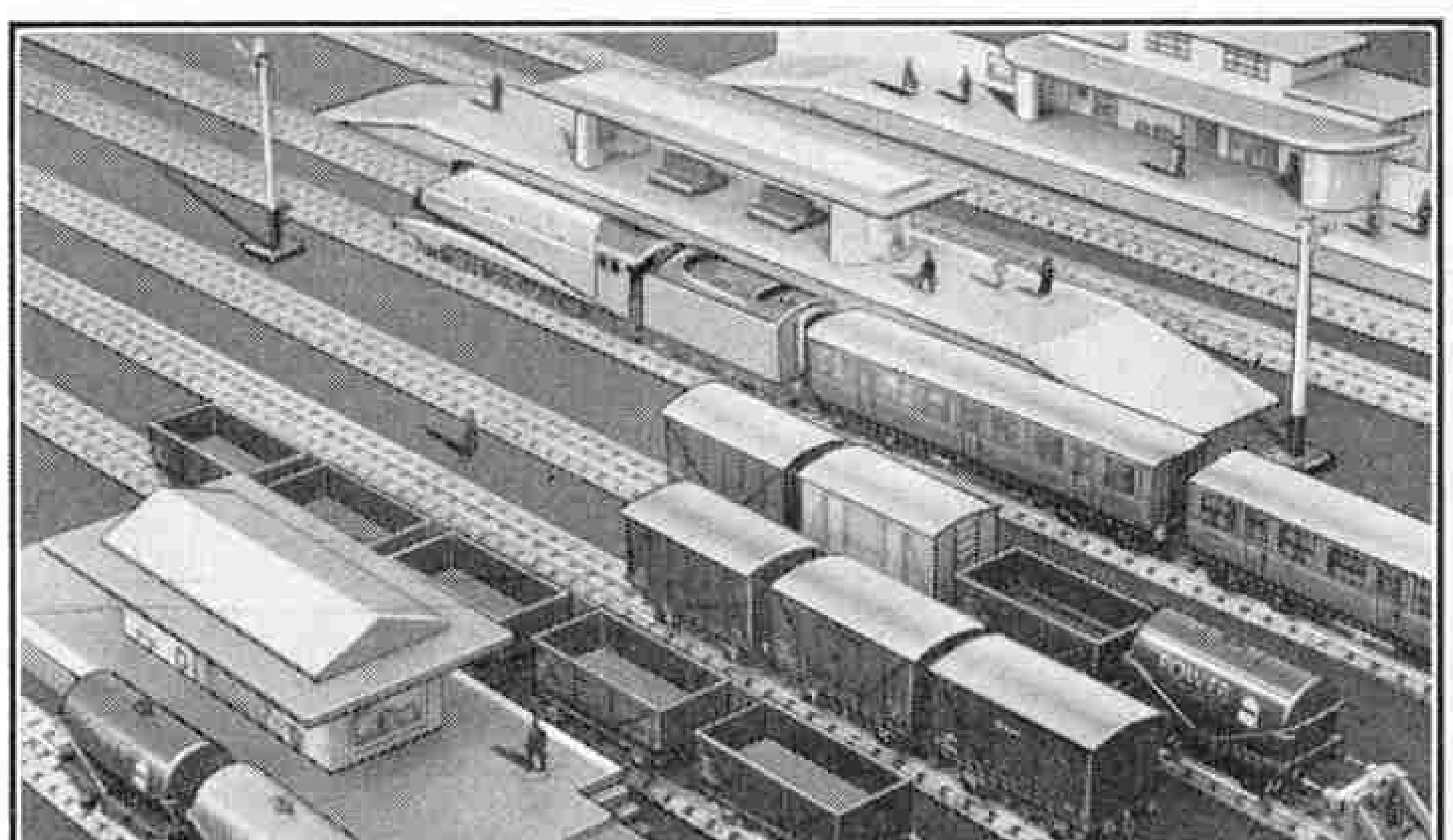
Hornby-Dublo Stations. These are modern in style and their use adds greatly to the realism of a Gauge 00 railway.

A HORNBY-DUBLO railway consisting of a train and a set of rails provides hours of enjoyment, but the keen desire to add something to make it more interesting still is always present. In particular there must be a station, and here Hornby-Dublo owners are fortunate, for they can use the Hornby-Dublo Main Line Station, a fine structure in the modern style with handsome station buildings and a flat roof. It is made of wood and is 24 in. long, so that it wil. accommodate a train of three coaches. Many attractive details are shown on it, including a futuristic clock face; and its appearance is further improved by replicas of familiar advertisements that adorn its exterior. When placed in a suitable position on any Hornby-Dublo layout it is seen at once to be exactly right.

The owner of this station can choose one of four names for it to make it suit the particular railway on which his miniature line is modelled. These names are "Berwick" (L.N.E.R.), "Penrith" (L.M.S.), "Truro" (G.W.R.) and "Ashford" (S.R.), and they are clearly printed on gummed slips ready to stick in position.

Another station is available in the form of the Island Platform, which also is built of wood in exactly the same style as the Main Line Station. This station is intended mainly for placing between the tracks, but as its length is the same as that of the Main Line Station, it can be used effectively with the latter to form a larger and even more imposing station layout. It has an open shelter covered by a flat roof supported by semi-circular ends. Under the roof are four back-to-back seats, and replicas of well-known national advertisements to complete a very handsome structure.

Just as it is necessary to provide a station at which passengers can enter or leave trains, so also there must be some place for the loading and unloading of goods. The Goods Depot included in the Hornby-Dublo System is ideal for this purpose. This is another fine model of modern design for use on a Gauge 00 layout. It is 12 in. long, and has steps at each end for the convenience of the staff. Like the passenger stations it is built of wood, and it is decorated realistically with the usual advertisements that make it look like the real thing.



Buffer Stops are attractive items in this station scene.

Miniature railway enthusiasts who rate the signalling of a layout as the most important work on a layout will find their needs met in the Hornby-Dublo Signals. These are of the latest upper quadrant type, and include a single-arm "Home," a single-arm "Distant," and a combined "Home" and "Distant" Double-Arm Signal, so that they can be used for practically all model railway purposes.

The signal posts are $4\frac{3}{8}$ in. high and are realistically tapered and finished off with a smart cap at the top. With their bases they are die-cast in one piece. The models are greatly improved by the presence of the lamp case and bracket, which are included in the casting. The arms, which are tin-printed in correct colours, are operated by a counterweighted lever at the base, and the arrangement of this ensures that the arms remain steady in the positions in which they are set.

Signals are associated with a Signal Cabin, and there is a fine example of this in the Hornby-Dublo System. It is of medium size and can be used to represent practically any type of cabin seen on main and branch lines. It is supplied with gummed slips printed with the names "Berwick," "Penrith," "Truro" and "Ashford" so that it can be used with the Main Line Station, whatever real railway is favoured.

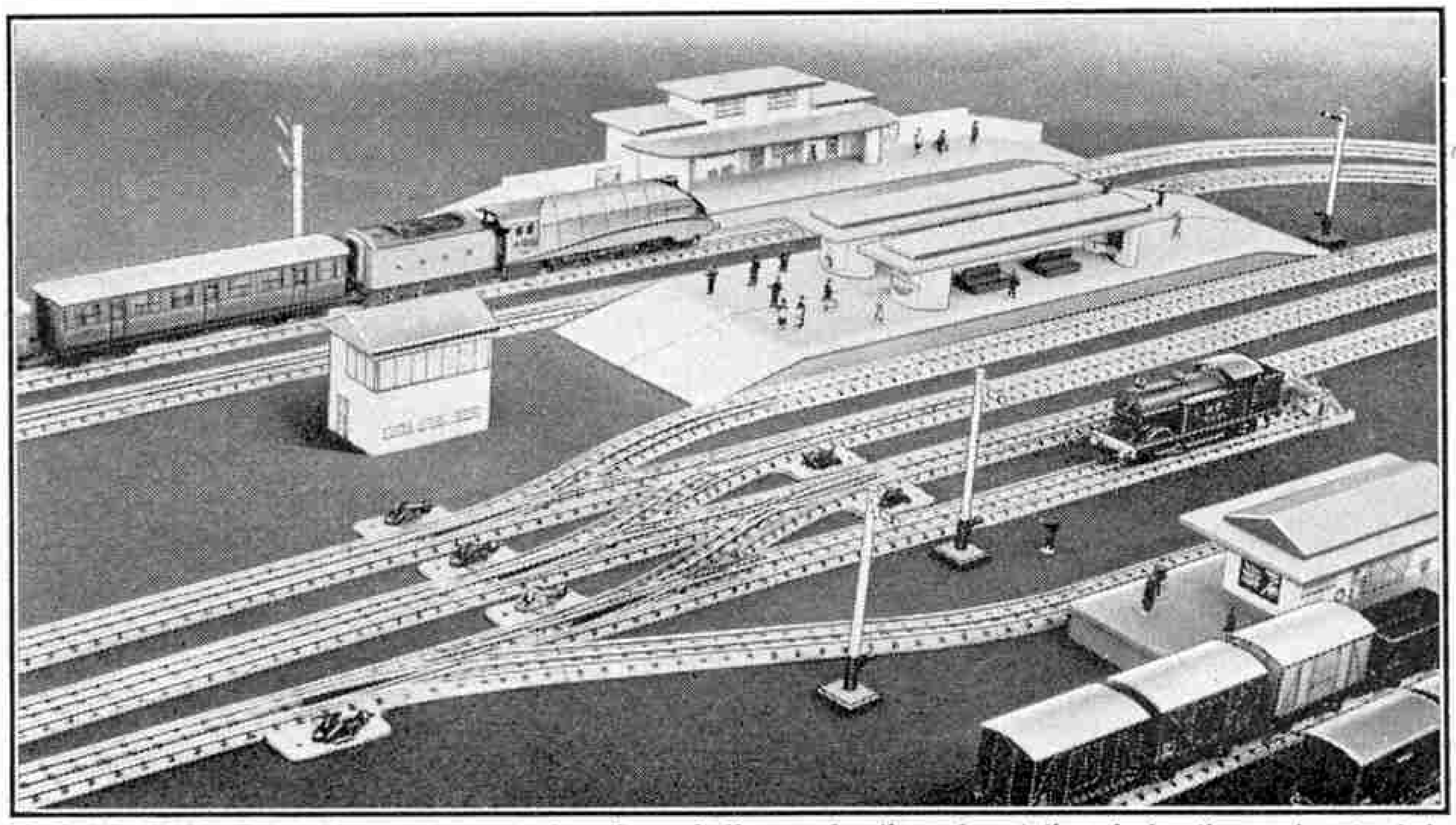
Buffer stops are familiar features of railway stations and sidings, and particularly realistic models of a type seen all over the British railway systems are included in the Hornby-Dublo range. The models are fixed to the track by means of a special spring arrangement, which engages slots provided at one end of the metal bases of the Hornby-Dublo full length and half Straight Rails. The springs engage from inside, so that there is no tendency to detach the Buffers from the track when rolling stock comes in contact with them.

It is a poor miniature railway that has no tunnel to give "passengers" a thrill as they plunge underground. The needs of enthusiasts who require tunnels on their Hornby-Dublo layouts have not been overlooked, as two useful Tunnels, one short and the other long, have been introduced. The smaller Tunnel can be used on both curved and straight track, but the larger one has been designed specially for straight track. Both are built up and finished off in a manner that cannot fail to please the most fastidious owner, and those who want longer tunnels can place two or more end to end.

Finally there must be miniature railway workers and passengers to give life to the line. Here again Hornby-Dublo owners have no difficulty, and the many figures available and how to use them were dealt with in the article "*Activity on the Line*" published in last month's issue of the "*M.M.*"

A model railway can be improved at little expense by the construction of suitable scenery to represent receding country and distant hills. This can be painted on a background or by the use of a material such as green felt representing fields or rolling plains.

Efficiency in Hornby-Dublo Train Control



A Hornby-Dublo Express travelling at speed on the main line passing through a station. A shunting engine stands in a siding, awaiting the signal to begin carrying out its duties.

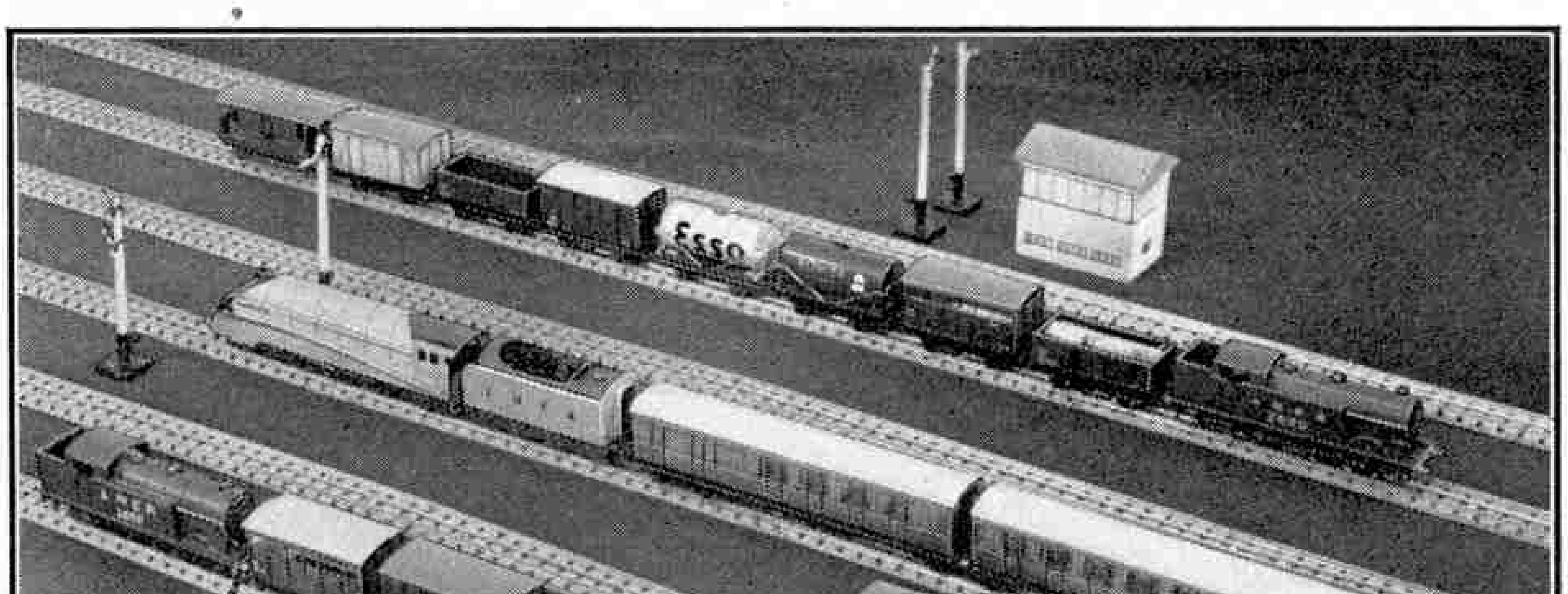
THE perfect control that is afforded with Hornby-Dublo Trains makes possible some very fascinating working. The locomotives can be made to behave just like real ones with enginemen in charge on their footplates. This is because they are instantly responsive to every movement of the Controller that is supplied with Hornby-Dublo Electric Train Sets. The running of the trains too is perfect. There is a real thrill in the control of a miniature express or a heavy goods train, when by correct management of the Controller handle all the movements of the train can be regulated to reproduce exactly the behaviour of those seen on real railways.

Assuming that the coaches are already alongside the platform of the station ready for departure, the backing of the engine on to its train is an attractive operation. The station of course is the scene of animated bustle as the Hornby-Dublo railwaymen go about their work. The locomotive scheduled to take the train is that famous speedster of the Hornby-Dublo range, No. 4498 "*Sir Nigel Gresley*," which is standing on a siding near by. When all is ready it is brought slowly on to the main line, feeling its way just as real locomotives do in similar circumstances. At a touch of the Controller handle the engine is stopped and then reversed, in order to back with slow dignity on to its train, which is rapidly filling up because departure time is drawing near. In real practice coupling up is a procedure of great interest to onlookers, and there is no reason why it should not be so on a Hornby-Dublo railway. The certainty with which the automatic couplings fitted to Hornby-Dublo stock engage is always fascinating and a great asset to the railway.

At the appointed time the train moves off in a remarkably realistic manner, the movement of the engine having the character of the getaway of a real locomotive. The start suggests great reserves of power. Perhaps there is an occasional slip of the driving wheels as the engine shows its eagerness to be off, but once the train is under way, its speed can be increased at the wish of the operator. The variations in speed that are effected with great ease at a touch of the Controller handle are remarkable and the thrill of perfect train control is realised.

The running of long non-stop trains is interesting from the operating point of view. Trains that make one or two stops during their journeys provide even greater enjoyment, however, because the operator can then exercise his skill in control, particularly in not overrunning the platform or stopping short of the correct position, faults that would spoil the whole effect of his operations. The splendid speed regulation that is afforded makes it possible to retard the train gradually, and so to bring it to a gentle stop alongside the platform.

When the train has made the final circuit of its journey it is a good idea to allow it to stand for a little while in the station so that "passengers" can alight. The engine and empty coaches can then be run out of the station, and into a siding allocated for empty stock and engines temporarily off duty.

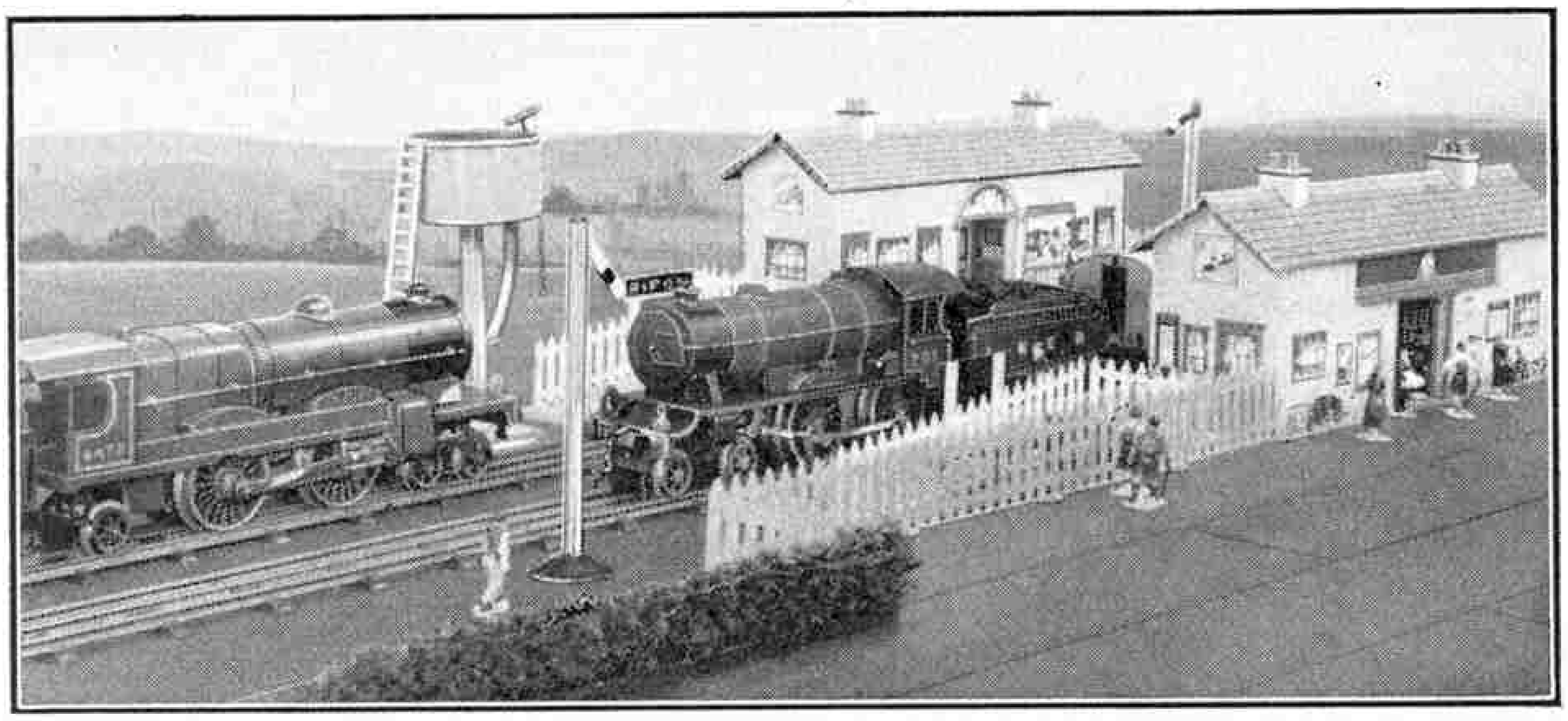


Passenger and Goods trains controlled independently on fast and slow lines.

Operations just as fascinating can be carried out with a goods train. Many enthusiasts consider that the shunting and marshalling of goods trains under the perfect remote control of a Dublo Controller is even more interesting than running a passenger express. This will be understood by all who have experienced the joy of marshalling a train of Hornby-Dublo Wagons. The running of the engine under complete control alone is great fun, but the collecting of wagons and coupling them up automatically is even more exciting. The wagons need only to be pushed together for the couplings to engage, and the engine runs backward and forward along the different sidings, putting its train together in exactly the same way as real engines do.

The Hornby-Dublo 0–6–2 Tank Locomotive, a sturdy representative of a type in use on all the main line systems, is a splendid engine for heavy goods services. In addition to the many goods traffic duties, it is useful in connection with passenger work. Thus it is ideal for bringing empty coaches from the siding to the station; for adding extra vehicles when required and detaching any that are surplus, and for carrying out the disposal of trains at the end of their journeys. It can in fact undertake all the duties that tank engines perform in actual practice. For instance, sometimes it is desired to run suburban trains, a duty on which "*Sir Nigel Gresley*" would be rather out of place. In instances of this kind the Hornby-Dublo Tank Locomotive is just the engine to employ. Tank engines also are widely used in actual practice for local trains and short-distance expresses, and this is a feature of real railway operation that can be faithfully reproduced on a model railway.

The running of complete trains of Fish or Meat Vans gives a most realistic effect and here it is possible to make use of either the streamlined "*Sir Nigel Gresley*" or, in the case of shorter trips, the Tank Engine. A good scheme is to run the perishable traffic to a junction, and there to break the train up ready for distribution to local and outlying stations. For these shorter journeys the 0–6–2 Tank Locomotive is ideal. In the same way it can be used on "trip" working whereby traffic from wayside stations is concentrated at the marshalling yard.



The "Flying Scotsman" passes an express hauled by a "Hunt." Both these engines are capable of continuous hard work.

Hornby Locomotives and their Duties

Choosing the Right Engine

AT this time of the year Hornby Railway owners are usually busy with overhauls and plans for improvement, and where more interesting and extensive operations are in view it is often decided that a new locomotive is necessary. The choice depends on many considerations, such as the radius of the curves of the layout; but the chief deciding factor must be the kind of work the engine will be expected to perform.

There are great differences between the kinds of work undertaken by passenger and goods locomotives, and by tender and tank types. It should be remembered, however, that on real railways different types of engines are not now restricted closely to particular duties. This is a great convenience to the owners of Hornby Trains, because it enables them to use all their engines for a variety of duties while following the course of actual practice.

The largest and most powerful engine in the Hornby Series, and one that every model railway enthusiast longs for, is the splendid L.M.S. 4-6-2 *"Princess Elizabeth."* This is a beautiful scale model built for power and reliability. It is fitted with a 20-volt automatic reversing motor of exceptional power. As this affords complete remote control the engine and its train can be operated from any convenient point, and there is no need for handling the engine. A finer locomotive for the fastest and heaviest passenger traffic on any layout can scarcely be imagined.

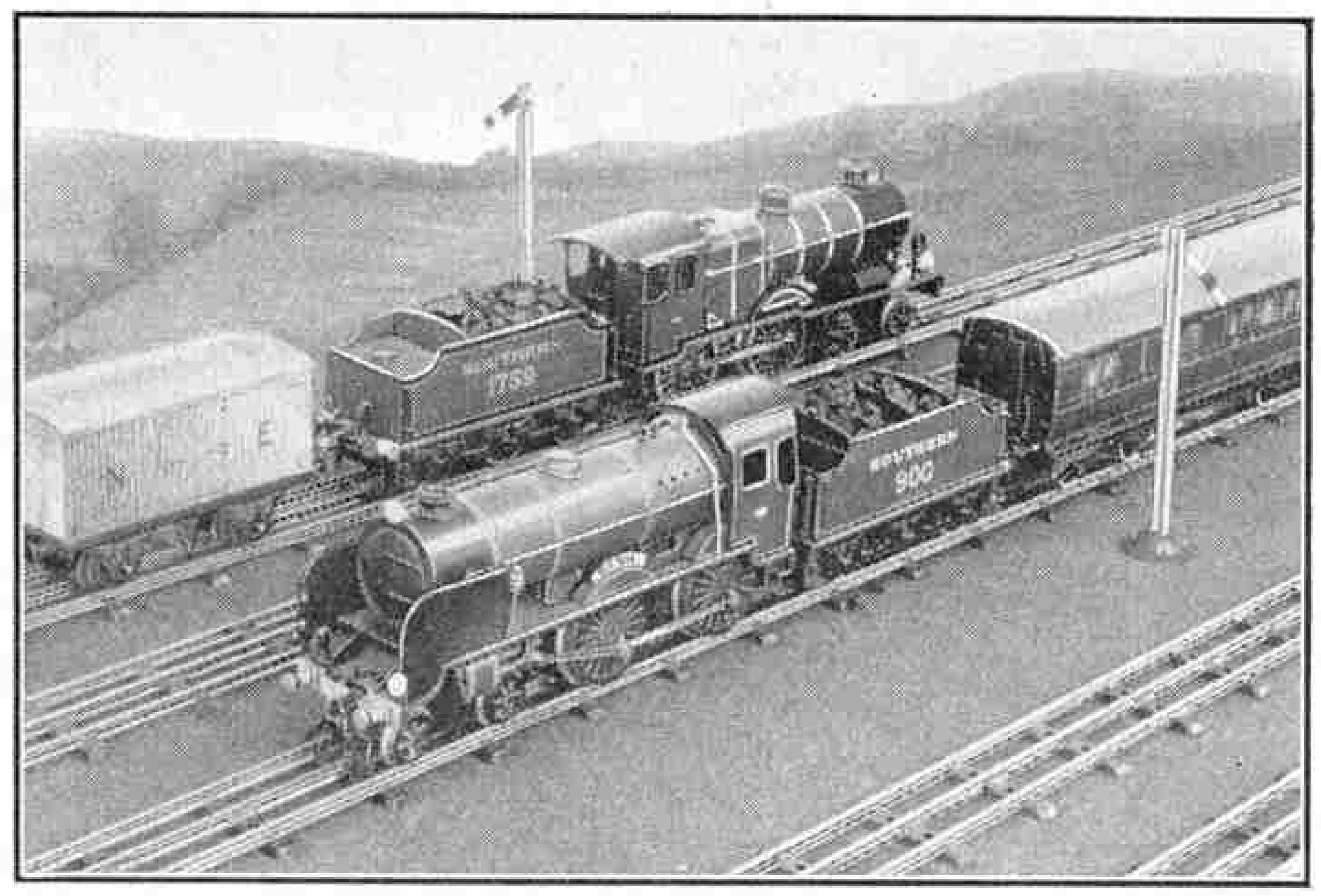
A surprising point to many is that *"Princess Elizabeth"* can be run on the standard Hornby 2 ft. radius curves and points. This is a very valuable feature. The engine is thoroughly at home on this type of track, although it shows its great power and speed to much better advantage on layouts arranged with Hornby Steel Track, the curves and points of which have a radius of 3 ft. 2 in. measured to the outside rail. This track is ideal for the Hornby *"Princess Elizabeth"* and indeed for all model railway purposes. It is just like real track laid on steel sleepers, and the rail section is of solid steel, thus ensuring the smooth riding of the engine and its train.

The No. 3 Locomotives are the next in size in the Hornby range, and they are available with either electric or clockwork mechanisms. The arrangement of the mechanism and bogies of these models is such that the engines can be run at speed over the standard Hornby 2 ft. radius curves and points, the leading bogie and trailing pony truck providing the necessary flexibility in the wheelbase.

The No. 3 engines are of the same general outward design, but they are coloured and lettered according to the styles of each of the four main railway companies, and a different true-to-type tender is available for each one. The L.M.S. and S.R. models are fitted with realistic smoke-deflectors of the patterns used on the real engines after which they are named.

Another member of the No. 3 class is the Hornby Riviera "Blue" Locomotive. This is a typical example of French locomotive practice, representing very well indeed the remarkable De Glehn compounds of the railways of France. Many Hornby Train enthusiasts use this engine in connection with the cross-channel services they organise on their layouts. On these English "passengers," after "making their way across the English Channel to France," board the French train in charge of the fine Hornby Riviera "Blue" model. This engine is supplied with a realistic eight-wheeled tender.

After the No. 3 models come the popular No. 2 Special 4-4-0 type, which comprises four engines, each a true-to-type reproduction of a real locomotive. The real engines modelled are the "Standard Compounds" of the L.M.S., the "Hunts" of the L.N.E.R., the former "Counties" of the G.W.R., and the unnamed "L1" class of the Southern Railway.



Two popular Hornby S.R. types, the useful "L1" class 4-4-0 and the more recent scale model of "Eton," the latter hauling a passenger express.

The L.M.S. "Compounds" are general utility passenger engines, and are to be found working all over the L.M.S. system. They are very capable engines and often work some very heavy and fast services. The "Hunts" are engines of similar character, and undertake similar duties on the L.N.E.R. system. The G.W.R. "Counties" are now obsolete, but Hornby Train enthusiasts are keen on the fine Hornby model of this class. The "L1s" of the S.R., although still undertaking arduous duties, have been superseded on many services by the "Schools" class 4-4-0s. This class is one of the most popular introduced by the S.R., and the Hornby miniature of it is named *"Eton,"* and has a special appeal for admirers of the Southern Railway. All these models have the powerful No. E220 Special mechanism, which is fitted with the Hornby automatic reversing gear.

Although the No. 2 Special types and the locomotive *"Eton"* just described are essentially passenger engines, they can be used quite well for the haulage of fast goods trains representing the important "fitted freights," or trains made up of vehicles fitted with automatic brakes, which are such a feature of modern railway operation.

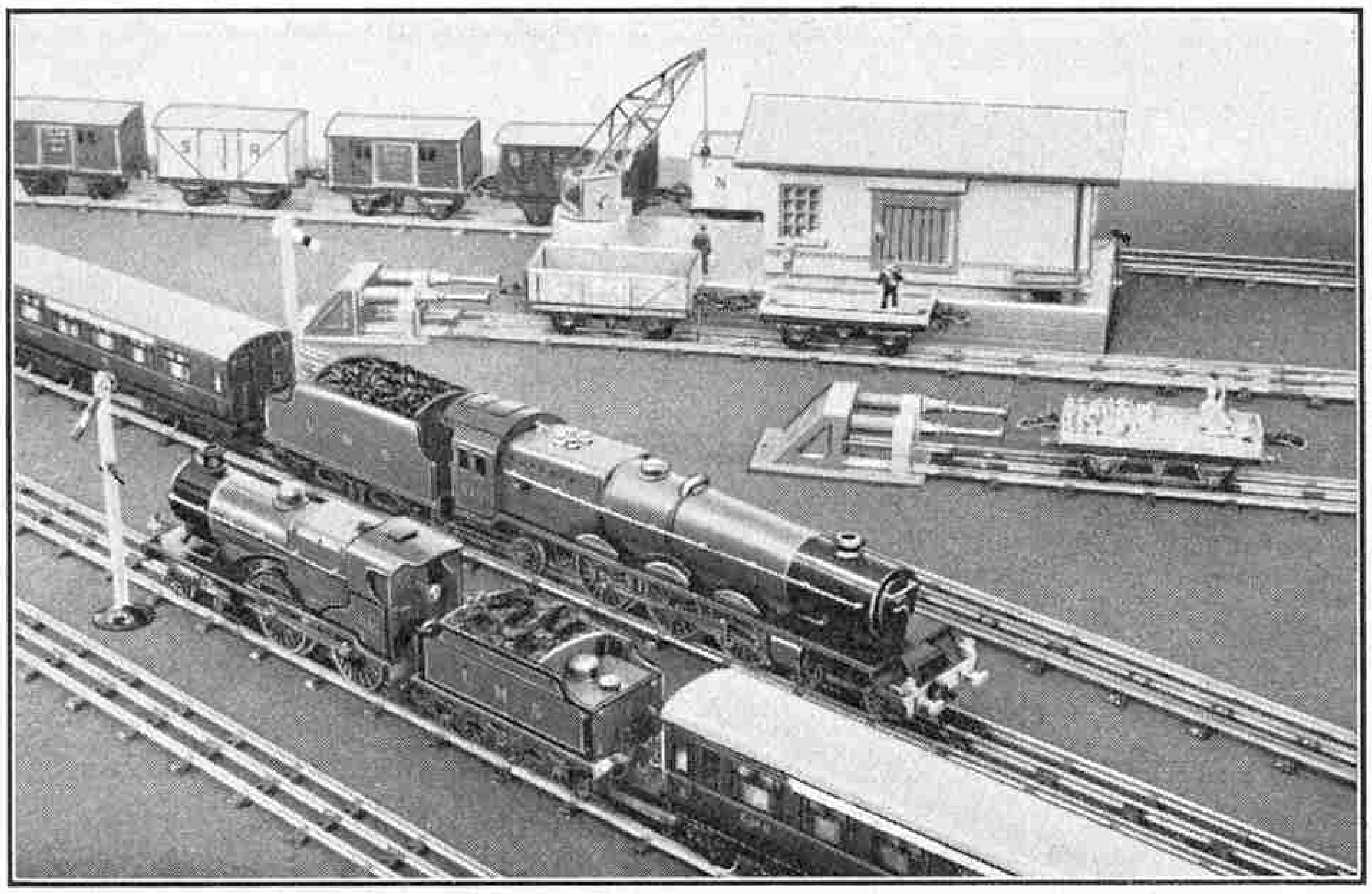
The Hornby tank engines are ideal for running on layouts on which traffic of a short-distance character is worked. These engines have the advantage that they take up less room than tender engines, and they do not require to be turned at terminal stations, for they can run equally well either forward or backward. They are in their element working suburban passenger trains, on local goods service or shunting.

The largest of the Hornby Tank Locomotives are the E220 Special Electric Tank and No. 2 Special Clockwork Tank types, both of which have the 4-4-2 wheel arrangement. These models make very effective engines for short-distance express work and fast heavy suburban services, as well as for many kinds of goods traffic.

The smaller engines of the Hornby Series, both tender and tank types, are four-wheelers. The largest of them are the E120 Special and the No. 1 Special, which are sturdily built and very imposing in design. They are ideal mixed traffic locomotives, and their outside cylinders and steam pipes, raised footplates and large boilers make them very attractive to model railway enthusiasts.

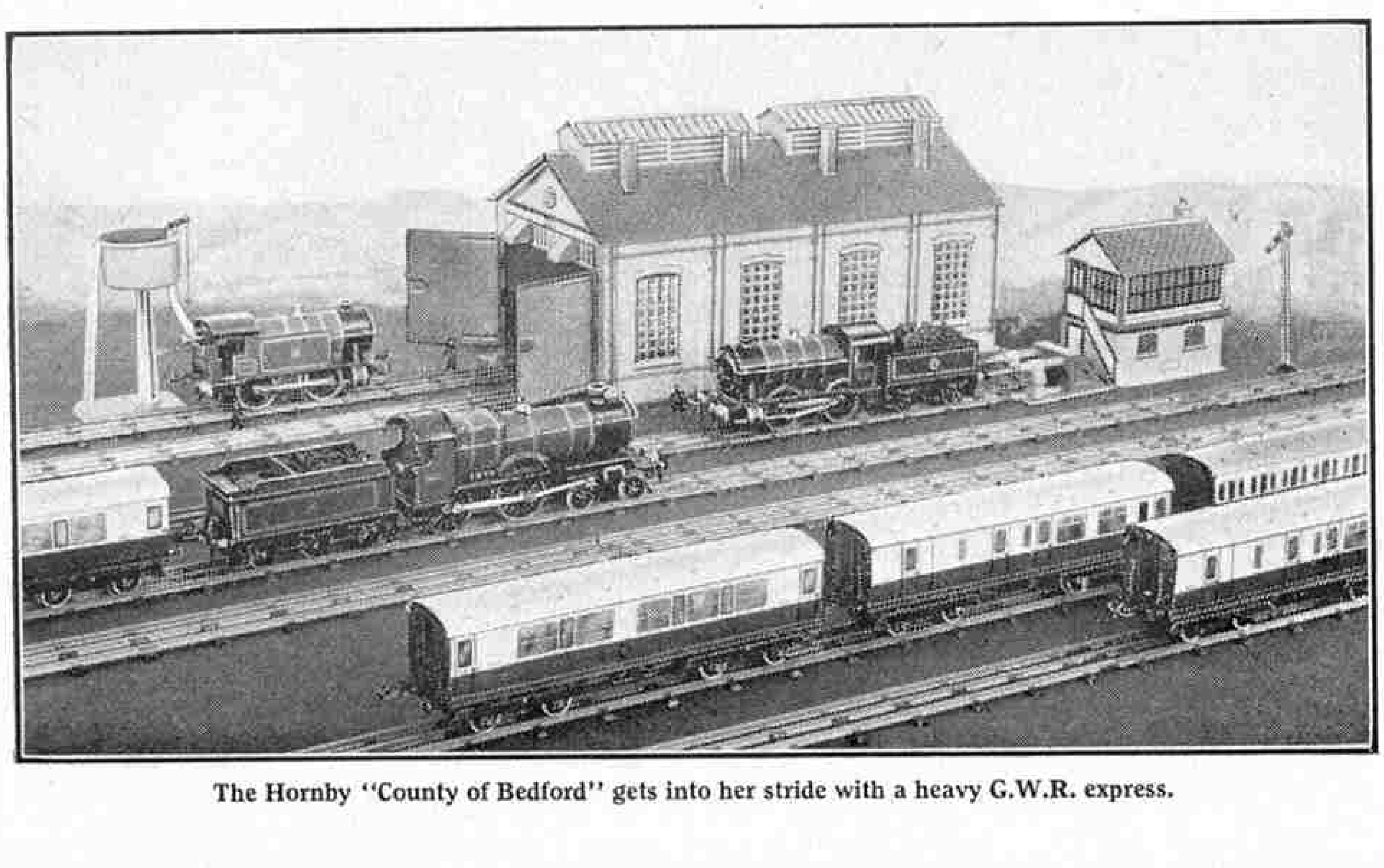
For the lighter duties of the line there are the E120 and No. 1 Tender Locomotives and the corresponding tank engines. The E120 and smaller Hornby Electric Locomotives are not fitted with the automatic reversing mechanism, but they can be reversed by hand from the cab.

Hornby locomotives are available also for very simple layouts. These are the No. 0 and M types, which are capable of performing all passenger and goods work, both main line and local, on such systems. They will run well on all Hornby rails, including curves of 1 ft. radius.



Power on the L.M.S. in miniature. The famous Hornby 4-6-2 "Princess Elizabeth" at the head of a long-distance express passing another express hauled by "Standard Compound" No. 1185.

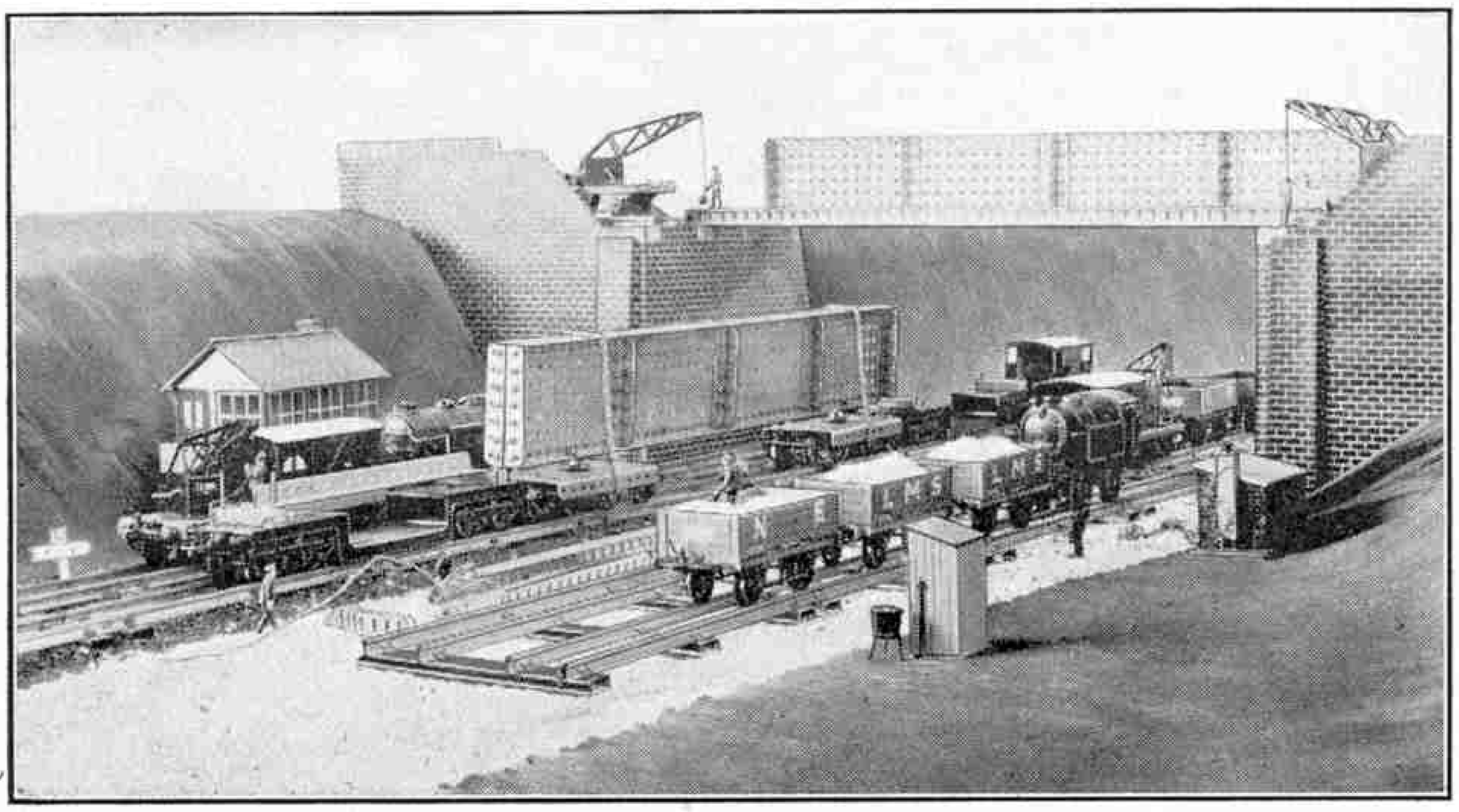
All Hornby Clockwork Locomotives can be braked from the track, and the larger engines, from the No. 1 Locomotive upwards, can also be reversed. There is the MB9 Curved Brake Rail for M0 Locomotives, and the AB1 Curved Brake Rail and BB1 Straight Brake Rails are designed for use with the M1, M3 Tank and No. 0 Locomotives. The reversing gear of these locomotives is operated by means of a lever in the cab of the engine. The Hornby No. 1 Tender and Tank Locomotives however can be reversed as well as braked by means of the AB2 Curved Brake Rail, while the BBR1 Straight Brake and Reverse Rail is intended for braking and reversing the No. 1 and No. 2 Specials, and the No. 3C and No. 4C engines. With the exception of the clockwork M1 and No. 0 *"Silver Link"* model, all Hornby Locomotives fitted with brake and reverse mechanism are controlled by pushing in or pulling out to their fullest extent the levers in the cab. The M1 model has levers that move up and down and the *"Silver Link"* model has a brake lever only operated through the cab roof.



The Hornby "County of Bedford" gets into her stride with a heavy G.W.R. express.

Little Things that Matter

Details that make Hornby Railways Realistic



Realistic Hornby railway construction in practice.

WHEN a layout has been planned, and even after it has been constructed and operations have begun, there are many little points to which the owner should give close attention if he is to be really satisfied. It is very easy to allow departures from real practice on the ground that the differences will not be noticed. This is a mistake, for a miniature system must both look real and be suitable for realistic working.

For instance, we may consider the position of a station. It is not sufficient to put down platforms and station buildings in the most convenient space along the lineside. They must not only fit properly into the general scheme of the layout, but also must be so placed that they can easily be reached by passengers. For this reason they must not be hemmed in with tracks, whether running lines or sidings.

With terminal stations this difficulty does not arise. With others, sidings should stop short of the station buildings so as to leave easy entrance to the platforms. The only exception to this rule comes with stations having only one entrance. Then tracks may be taken along the back of the station; but a footbridge should be provided for passengers wishing to cross the line to the platform on the opposite side to the entrance, or perhaps a subway could be indicated. It is of no use to provide miniature figures to liven up an island platform if it has to be supposed that they have had to scramble across the line to get there! A footbridge is best, since the whole of it can be seen and its purpose grasped. The Hornby No. 1 or No. 1a Footbridge is ideal, and with it in use the familiar notice of real practice, *"Passengers must not Cross the Line except by the Bridge,"* can be applied.

There need be no loss of realism in making these arrangements. In fact it is a good scheme to arrange sidings on one side of the line only, as is often done in real practice, for the yard can then be more easily worked by the operator. Trains passing one way round the main track will have direct access to the yard, and those going in the opposite direction will reach it by means of a Crossover. This is a common arrangement in real practice, and one that gives opportunities for skilful operating in miniature. The goods yard of course should be enclosed by means of Paled Fencing, and a realistic and self-contained station layout will be the result.

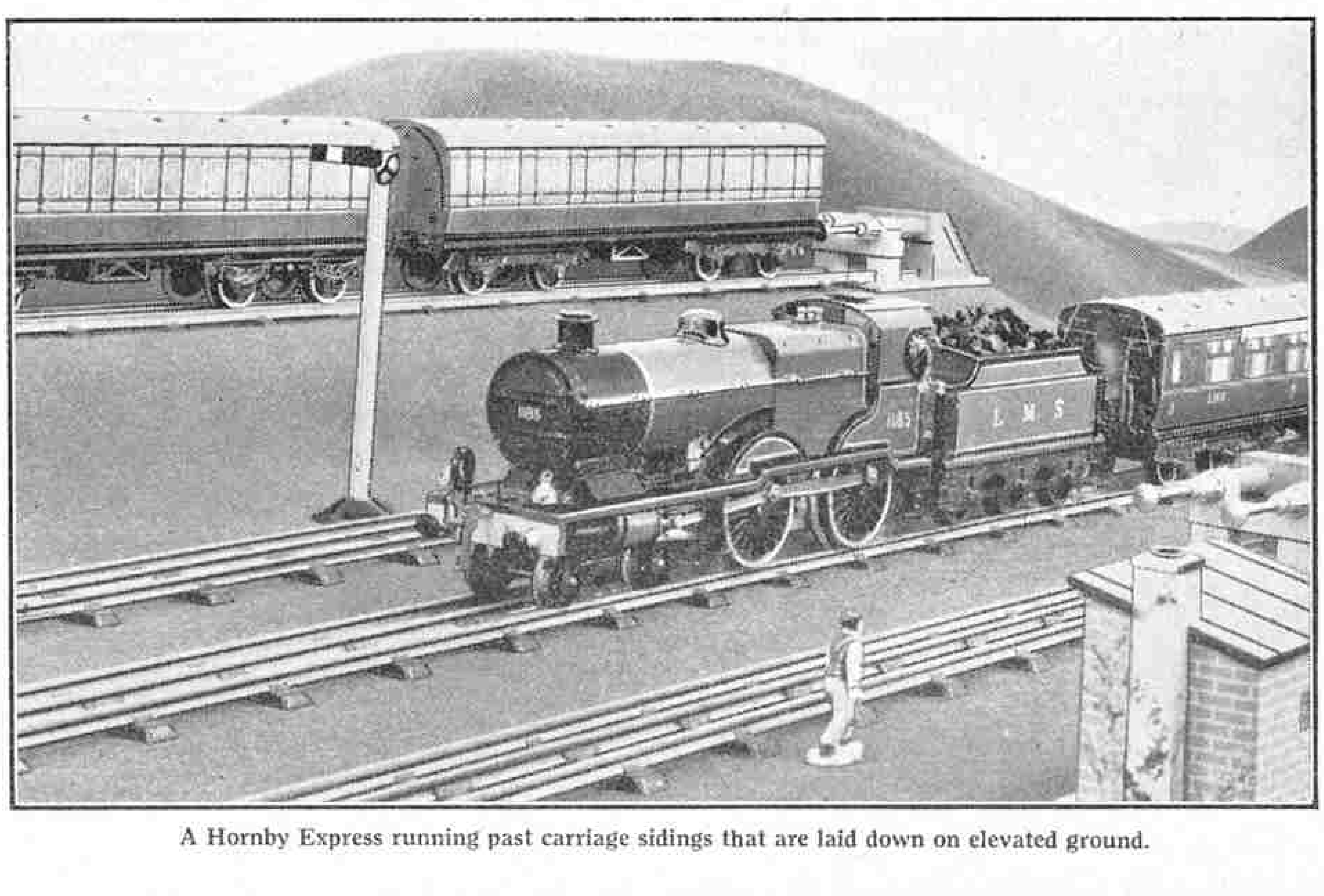
The appearance of a layout can be improved by the interesting scheme shown in the lower illustration on this page. In this the sidings are raised above the main track level. This arrangement may be made necessary in actual practice by local conditions, such as the slope of the ground, and when reproduced in miniature it certainly gives variety to the layout.

It is well worth while to take pains with the approach to the station buildings from the roadway. The ideal arrangement is to make a rising station approach, which can be constructed easily from fairly stout cardboard or thin plywood. An excellent plan that can be followed on portable layouts is to place a Hornby Passenger Platform at the back of the station building, with the Paled Fencing provided with the Platform on the "road" side. This can be reached from actual ground level by means of the ordinary platform ramps. Many variations are possible, according to the space available and the personal ideas of the owner of the layout.

Some evidence should be provided of the bustle and activity that is characteristic of railway premises. Plenty of "life" can be added by the use of the Dinky Toys Miniature Figures and the popular Dinky Toys road vehicles, which include many suitable types of private cars and lorries. The components of the various sets of Railway Accessories available in the Hornby Series add still further to the effects of the railway "surround." It is not difficult to find suitable positions for such items as Platform Seats and Automatic Machines, and also the Milk Cans and Miniature Luggage, including four different types of travelling cases, that can be obtained in the Hornby Railway Accessory Sets.

Attention to details makes a great difference also to the realism of the trains themselves. Small items such as the correct placing of the headlamps of course should be attended to. It is a great thrill to be able to run a miniature train hauled by an engine that carries the correct headlamp code according to the type of train being operated. The Standard Headlamp Code is not difficult to memorise, but for those who cannot keep in mind each lamp position the Code is dealt with in the H.R.C. Senior Booklet, which can be obtained for 3½d. post free from H.R.C. Headquarters.

Another detail that is frequently overlooked is the provision of train name or destination boards. The Hornby No. 2 Special Pullman and No. 2 Corridor Coaches are provided with brackets for this purpose.



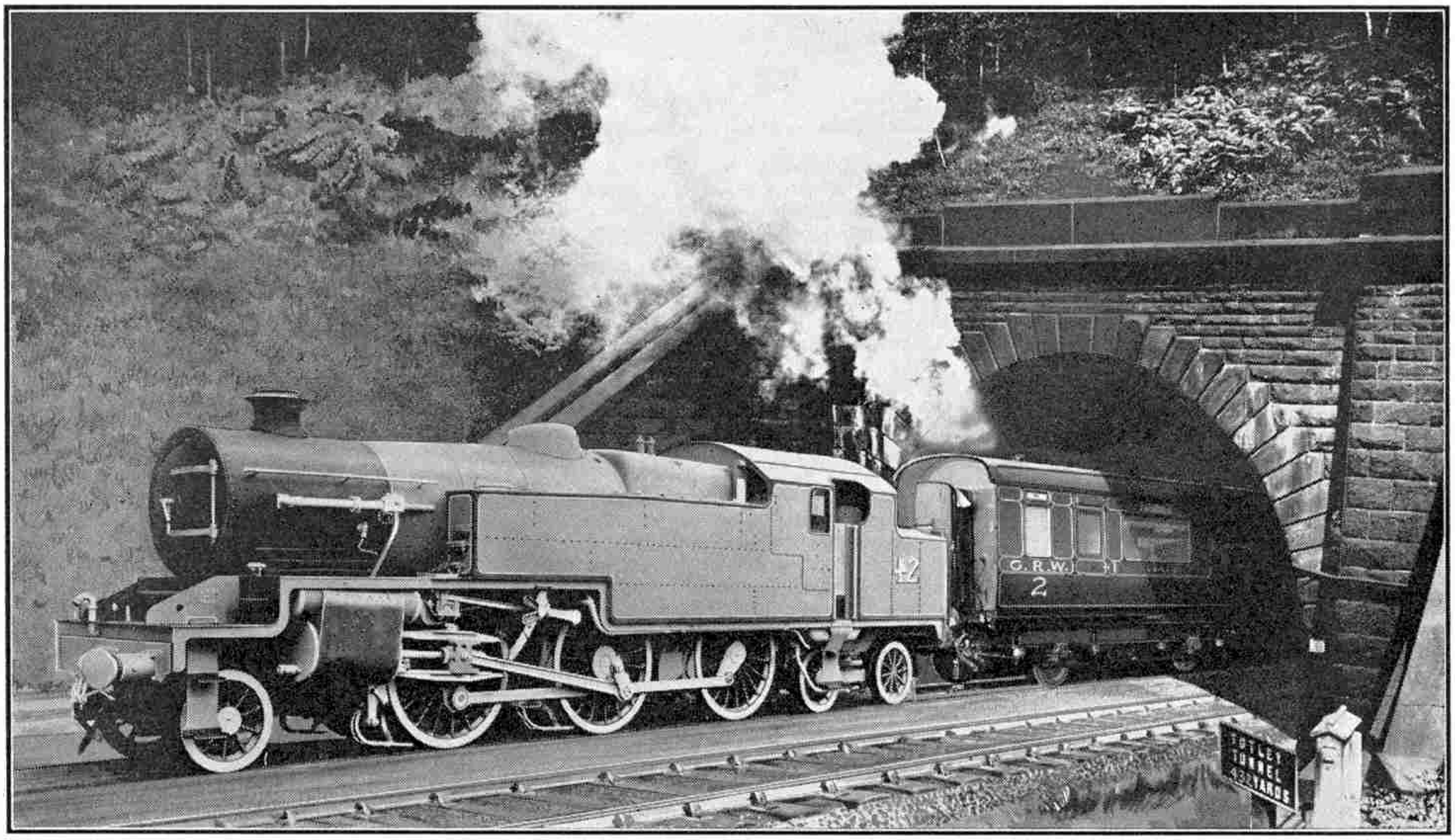
A Hornby Express running past carriage sidings that are laid down on elevated ground.

Join the Hornby Railway Company and become eligible for the competitions announced on this page.

HORNBY RAILWAY COMPANY COMPETITION PAGE

Join the Hornby Railway Company and become eligible for the competitions announced on this page.

CAN YOU SPOT ALL THE ERRORS IN THIS PICTURE?



The illustration on this page shows what appears to be an ordinary stopping train emerging from a tunnel. At first glance it is impressive, but a second look will show that something is wrong. Actually many things are wrong, and in this month's contest members are asked to discover the errors that have been introduced. All that is necessary is to make a list of them and to forward this to the address given in the next column.

In this contest there will be two sections, Home and Overseas, in each of which two sets of prizes will be awarded, one for Senior members and the other for Juniors. The prizes will consist of any Meccano products to the respective values of 15/–, 10/6 and 5/– and several consolation prizes also will be awarded.

Entries should be addressed *"H.R.C. November Errors Contest,"* Meccano Ltd., Binns Road, Liverpool 13. The closing date in the Home Section is 30th November, and that for Overseas entries is 29th February 1940.

It is important to note that each entry should bear the sender's name, full address and H.R.C. membership number, together with the section to which he belongs. The competitor's age should also be given.

Articles Suggestion Contest

Many H.R.C. members are now considering plans for developing their layouts. Some may intend re-laying the whole of their track, and others are thinking of new scenic effects or of improving actual train operations. We at Headquarters are always ready to help members who write to ask for advice and suggestions, and articles in these pages are designed to assist every Hornby Train enthusiast to get more fun from his hobby. We want readers to help us in our choice of topics, and this month therefore we offer prizes for the best sets of six suggestions for subjects for articles. In most cases a competitor will find that titles for the six articles he suggests will be sufficient, but a few words of explanation may be added where necessary. The judges will base their decisions on the practical value to all owners of Hornby Train layouts of the topics selected by competitors.

Prizes consisting of any products manufactured by Meccano Ltd. to the respective values of 21/–, 15/– and 10/6 will be awarded to senders of the most valuable entries in both the Home and Overseas Sections of this Contest, which of course is open to both Senior and Junior members of the H.R.C.

Envelopes containing entries should be addressed *"H.R.C. November Articles Contest,"* Meccano Ltd., Binns Road, Liverpool 13, and Home entries should be posted to reach Headquarters on or before 30th November. The Overseas closing date is 29th February 1940.

Competitors should make sure that their name, full postal address and H.R.C. membership number is clearly written on the back of their entries.

COMPETITION RESULTS

HOME

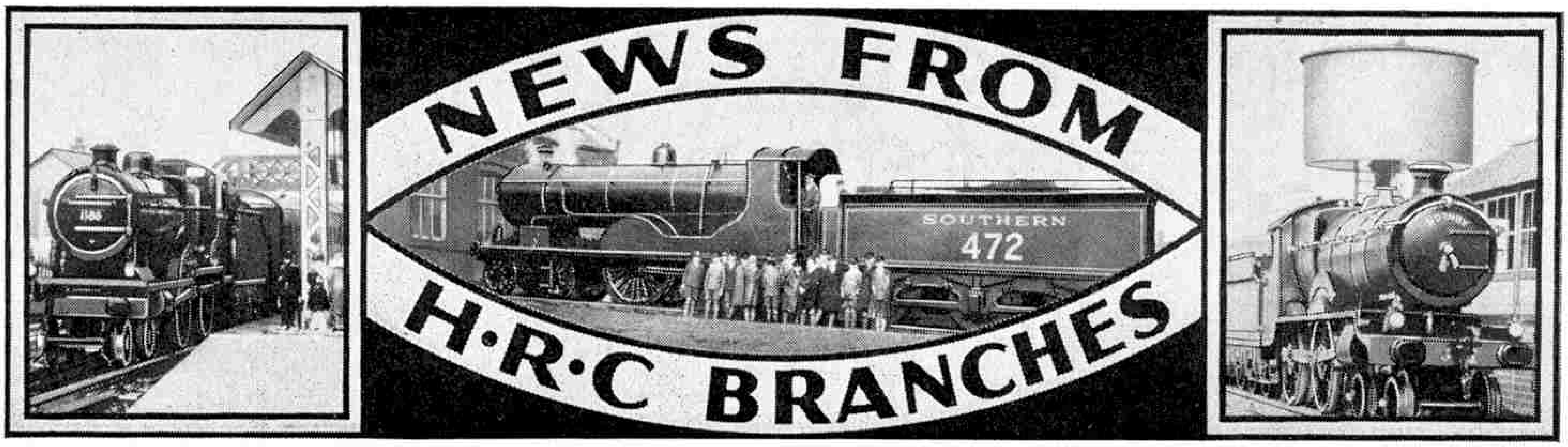
August "Word Building Contest" (Junior Section).—First: J. D. Baxter (49519), St. Giles, Lincoln. Second: T. Murphy (65559), Newcastle, Staffs. Third: P. J. Shepherd (65550), Ludlow, Shropshire. Consolation Prizes: L. Jones (59449), Wallasey, Cheshire; P. G. Blayney (64709), Sherwood, Nottingham; D. Jones (65631), Ellesmere, Shropshire.

August "Photo Contest No. 5."—First: J. A. Evans (56703), Clown, Derbyshire. Second: M. Worsfold (39482), Ashtead, Surrey. Third: A. F. Cook (218), Doncaster. Consolation Prizes: J. Turley (18853), Tunbridge Wells, Kent; P. W. Bryant (61850), Bath, Somerset; E. Oldham (43390), Hyde, Cheshire; L. K. M. Masters (55301), Bletchley, Bucks.

OVERSEAS

May "Mystery Photo Contest."—First: E. A. Hamilton (42512), New Zealand. Second: H. Yorke Maasch (23994), South Africa. Third: W. C. Coles (63881), South Australia.

May "Photo Contest No. 2."—First: G. C. Taylor (59265), Australia. Second: B. Schmidt (53854), New Zealand. Third: E. A. Bunt (24651), South Africa. Consolation Prizes: K. E. Lang (52901), New Zealand; K. R. Cassells (39510), New Zealand; B. Thornton (53097), Africa; P. F. Smith (54173), South Australia.



MILNGAVIE.—Meetings continue as usual, and there have been good attendances. Regular Track Meetings have been held, and interesting train running has been carried out on the Branch layout. Certain meetings are devoted to the construction of accessories, while at others Games are played. Secretary: W. Norris, 11, South Mains Road, Milngavie.

MONKSTOWN.—The first meeting of this recently-incorporated Branch was devoted to suggestions from members as to club activities. Track Meetings have been held, and timetable working has been experimented with satisfactorily. Secretary: R. D. Pierce, 20, Monkstown Road, Monkstown, Co. Dublin.

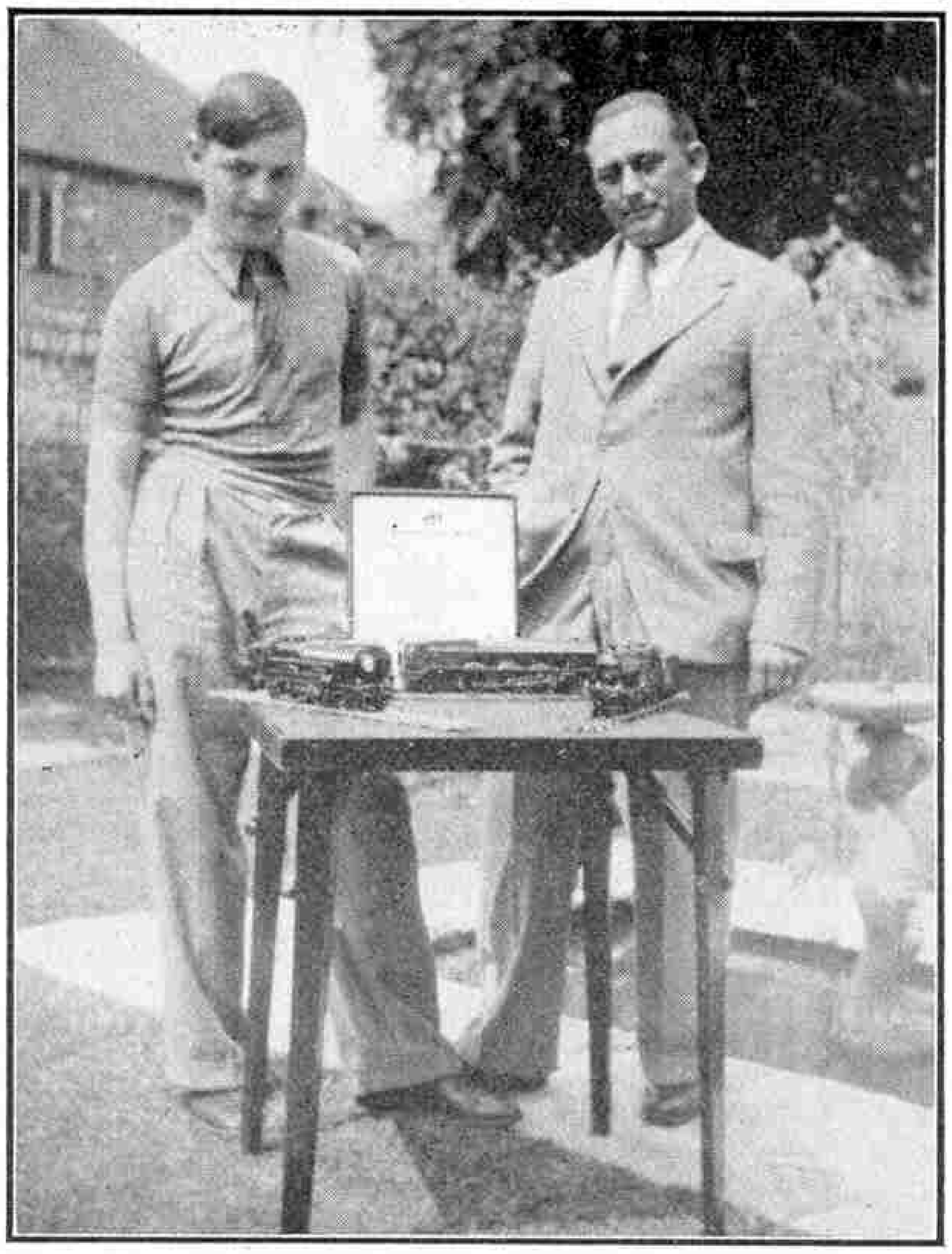
BLACKPOOL (NORTH SHORE).—A good start has been made by this new Branch, and meetings have been occupied by constructional work on the layout. There are 14 locomotives in service, together with over 50 items of rolling stock. A new station and an engine shed are being erected, and extensions are being made to the existing main station. Secretary: J. R. Irvine, 8, Dudley Avenue, Blackpool.

SALTASH MODEL ENGINEERING CLUB.—The Track Building Section have been very busy. Push-button switches have been installed to enable two platforms at "Millbay" Station to be cut out, thus facilitating shunting operations. Experiments with remotely-controlled points were successful, and the layout is being completely equipped in this manner. Progress has been made with track building, and additional stretches of line are now in service. Sectionalisation has been applied to additional parts of the track. Accessories are under construction, together with scenic effects. Regular Track Meetings have been held, and timetable working has been carried out. Secretary: B. R. J. Braund, 9, Homer Park, Saltash.

WATERLOO (DUBLIN).—Special services to meet the requirements of seasonal traffic during the summer sessions were completely successful. In addition to ordinary steam trains, railcar services also were worked. On one evening the mains electricity supply was cut off during the meeting, and an emergency service had eventually to be run when this was resumed. Secretary: S. B. Carse, 38, Oakley Road, Ranelagh, Dublin.

THE ABBEY (BURY ST. EDMUNDS).—A varied programme has been followed. Regular Track Meetings have been held, and the running of well-known trains has been reproduced. New rolling stock has been added to the layout, and the track has been increased by several lengths of rails. At a Debate on *"Steam v. Electricity for Trains,"* the former method was supported by the majority. Indoor games have included a Table Tennis Tournament, Chess, and a Darts match against the Bury St. Edmunds Branch. Outdoor activities have included Cricket and a Ramble. Secretary: M. D. Forster, 2, Crown Street, Bury St. Edmunds.

PLYMOUTH.—A full programme has been followed during the Summer Session. Enjoyable outdoor meetings have included visits to Millbay Docks and Devonport Gasworks, a ramble to Yelverton Moors, and a motor coach tour. Following the Annual General Meeting the programme for the present session was arranged, and this is now in full swing. At a well-attended Concert and Exhibition a large Hornby layout was operated and many models were on show. The entertainment was provided by members. Secretary: A. E. Miller, 21, Hamilton Gardens, Mutley, Plymouth.



Mr. W. H. Stuart, Chairman of the Everglades (Cosham) H.R.C. Branch No. 346, with P. Stuart, secretary. This Branch was incorporated in April 1938. Members operate a large model railway, and a special feature of track working is the reproduction of named trains. An outdoor layout also is in use during the Summer Session. Visits by members to places of interest have included one to the Model Railway Exhibition and inspection of a signal box.

WHITECRAIGS.—The Branch track has been relaid on a base of cork, and improvements have been made to the sidings. New rails and accessories have been introduced. Timetable running has been carried out at track meetings. A Canteen is to be started. Secretary: A. T. Henderson, "Studley," Treemain Road, Whitecraigs, Glasgow.

NEW ZEALAND

WELLINGTON WEST.—The usual Track Meetings have been continued, and timetable working has been enthusiastically carried out by members. New members have been enrolled, and one gave an interesting Talk on *"Motors."* Two welcome visitors at a recent "Monthly Supper Night" were a local Meccano dealer and a gentleman who is a keen Hornby enthusiast. Games Evenings have been held. An auction of obsolete railway equipment has been organised. A Visit is to be paid to the New Zealand Railway Workshops near Wellington. Secretary: K. R. Cassells, 26, Sugarloaf Road, Brooklyn, Wellington.

Proposed Branches

The following new Branches of the Hornby Railway Company are at present in process of formation, and any boys who are interested should communicate with the promoters, whose names and addresses are given below.

BRADFORD—G. Goodyear, 75, Harlow Road, Lidget Green.

CARMARTHEN—J. D. Lewis, 7, Spilman Street.

EAST BARNET—W. Thompson, 19, Albermarle Road.

EASTBOURNE—J. M. Cottingham, Willingdon College.

LEICESTER—B. Price, 25, Kirkdale Road, South Wigston.

LIVERSEDGE—L. B. Miller, Grove Cottage, Grove Street.

LLANDUDNO—W. Sweetenham, The Balmoral, Trinity Square.

LONDONDERRY—D. B. Hill, Enagh, Londonderry, N. Ireland.

NORTH BERWICK—M. I. Crichton, 3, Dundee Avenue.

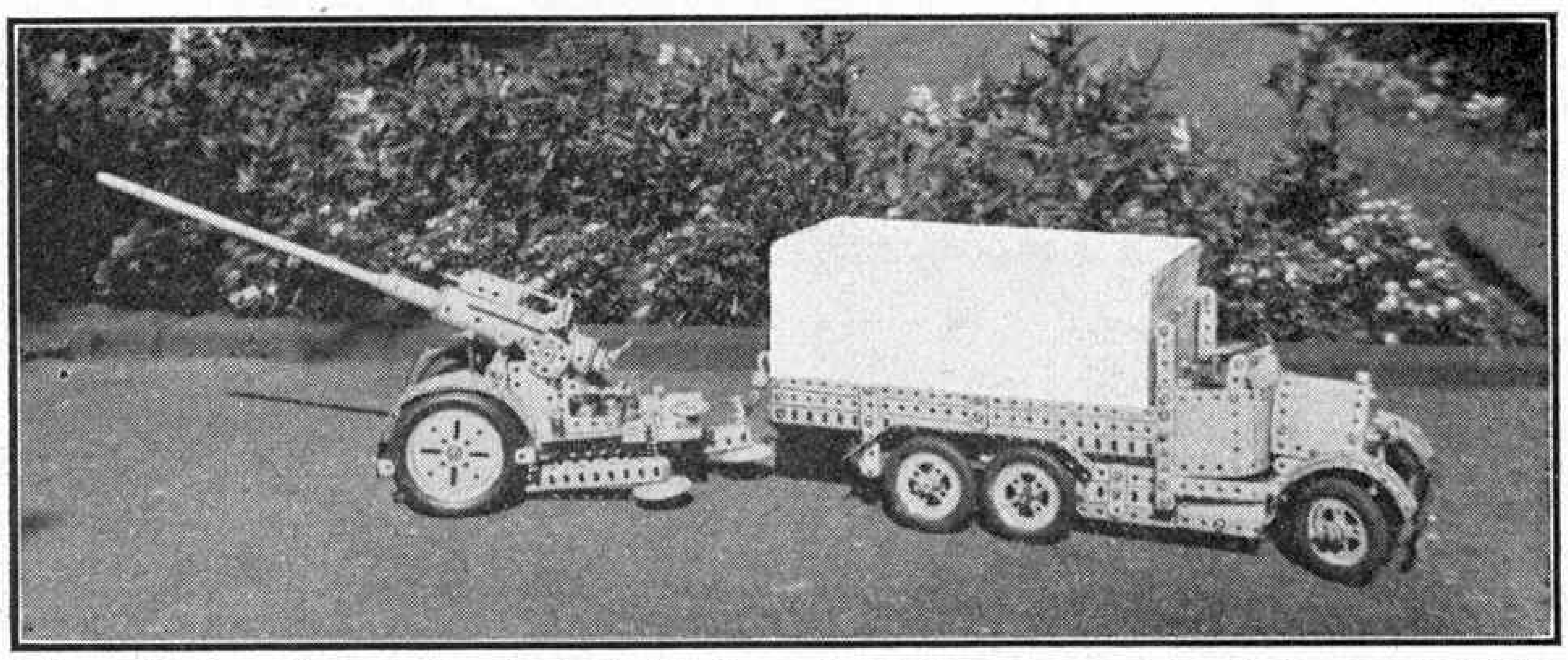
OLD COLWYN—N. J. Davidson' "Lleweni," Llysfaen Road.

REDDISH.—B. Longden, 79, Gorton Road, Reddish.

Branches Recently Incorporated

380. MILNGAVIE—Mr. C. Norris, Bressay, 11, South Mains Road, Milngavie, nr. Glasgow.

381. GRASSINGTON—Mrs. J. Scales, 1, The Avenue, Grassington, Yorks.



A fine model of a mobile gun unit constructed by C. D. Brown, Bradford, who was awarded a prize in a recent "M.M." Model-Building Competition.

Autumn Model-Building Contest

Constructing a Meccano model for entry in one of the "*M.M.*" Model-Building Competitions is a splendid means of whiling away the long dark evenings that we now have to face, for in addition to the pleasure obtained from the hobby itself, there is always the chance that the finished model will earn its builder a valuable prize. Readers who have not yet taken part in these monthly competitions therefore will find the present an ideal time to make a start.

The competition now open for entries is the "Autumn" Contest, and full details as to how entries should be prepared and submitted were announced in the September and October issues of the "*M.M.*" As the Contest does not close until 30th November, however, there is still time for readers who have not yet done so to prepare their entries.

All a competitor has to do is to build a Meccano model entirely from his own ideas. This may be of any type, and the only condition is that it must be his own unaided work.

Any size of Outfit may be used in building models, but neat and careful workmanship and constructional details that show a good knowledge of the best uses for Meccano parts will attract the attention of the judges far more than mere size. These qualities are often much easier to attain in a simple model than in a more complicated structure, so that readers who possess only small Outfits will have every chance of winning good prizes.

Competitors should try to find something really original for their subjects. Originality in an entry will weigh heavily in a competitor's favour, and there are thousands of interesting objects that have never yet been reproduced in Meccano.

A good photograph or a drawing of the model, preferably the former, should be forwarded, together with a brief description, in an envelope addressed "*Autumn General Model-building Contest,*" Meccano Ltd., Binns Road, Liverpool 13. The age, name and address of the competitor should be written on the back of the photograph or drawing. Entries for both Home and Overseas readers will be grouped into one section, but a competitor's age will be taken into consideration when assessing the merits of his work. The prizes to be awarded for the best and most interesting models received are: 1st, Cheque for £5/5/–. 2nd, Meccano or Hornby products value £3/3/–. 3rd, products value £2/2/–. Ten prizes of products value 10/6 and ten of products value 5/–. Certificates of Merit also will be awarded.

The closing date for entries from both Home and Overseas readers is 30th November, but entries should be posted as soon as they are ready and not kept until the closing date approaches.

A Novel "Short Story" Contest

Here is a fascinating and amusing competition in which every reader of the "*M.M.*" can take part. It is not necessary to possess a Meccano Outfit to be eligible for the Contest, and there is no model-building to do. A range of fine prizes is offered, and readers of any age are invited to send in entries.

Competitors are asked simply to write on a postcard a short humorous story incorporating the names of as many Meccano parts as possible, or terms used in connection with Meccano model-building. The following "eye-witness" account of a football match between Aston Bungalo and Bolt-Ham Squanderers indicates the lines on which intending competitors should work. "The Bungalo team were very rough and ultimately things got very exciting indeed. The Bolt-Ham Fans went Nutty when Sprocket, their centre forward was tripped by Rack Segment the opposing Pivot, and tore a Circular Strip from the seat of his pants! 'Washer do that for,' 'Play the game Bungalo!' and 'Cone Pulley's Nose,' they yelled in anger. There was an awful row, 'Man-u-al have to go off,' shouted the referee to the offending player in a voice with a Rubber Ring. 'Hook it!'

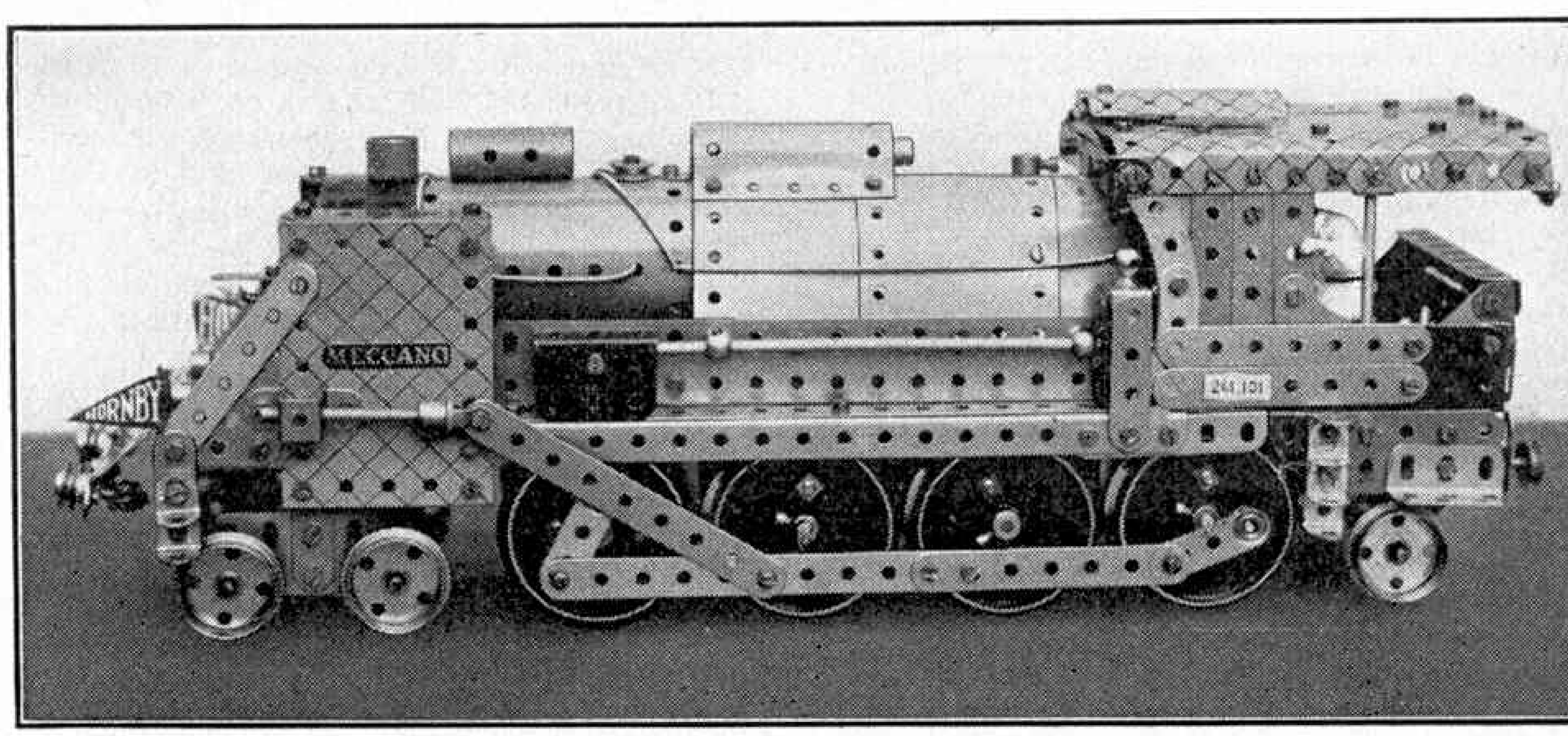
There are many Meccano parts with names that can easily be incorporated with amusing stories of this kind, and it is great fun to try one's skill in weaving a yarn around them. Each story submitted must be between 50 and 200 words in length, and it should be the competitor's aim to make his entry as humorous as possible, for the more amusing a story is, the greater will be its chance of winning a prize.

Competitors may send in as many different stories as they wish, provided that each story is within the required limits of length. No competitor will be awarded more than one prize, however, and if two or more stories are submitted they will be judged on their joint merits.

The prizes to be awarded for the most interesting and humorous entries are: First, Meccano or Hornby products value £2/2/–; Second, products value £1/1/–; Third, products value 10/6.

Entries should be addressed "*Meccano Short Story Contest,*" Meccano Ltd., Binns Road, Liverpool 13, and must reach Liverpool before 30th November.

In order to simplify the work of filing and judging entries competitors are asked to use postcards only and to write as neatly as possible.



This model of a French locomotive was one of the successful entries for a "M.M." competition. It was built by P. Gaillard, Nauteuil-le-Haudouin, France.

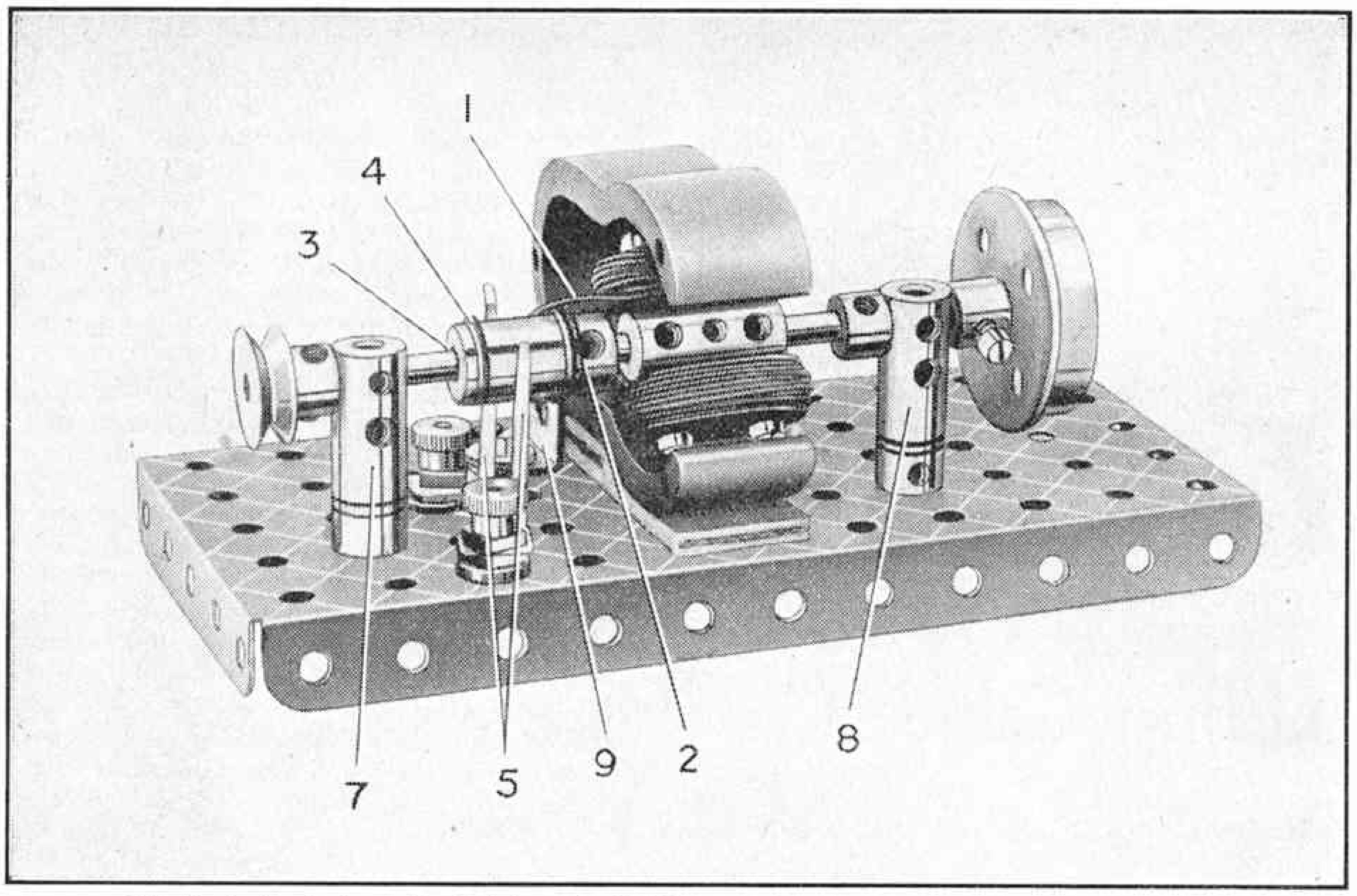


Fig. 1. A simple two-pole electric motor built from Meccano parts and a permanent magnet.

Build Your Own Electric Motors

Working Models Constructed from Meccano Parts

CONSTRUCTING from Meccano parts electric motors that really work is a fascinating branch of model-building. It is not difficult, and in this article we describe four simple working electric motors of different types that any reader can build quite easily. All that he requires are a few Meccano parts, a few yards of Nos. 23 and 26 Single Cotton Covered Wire, a small piece of sheet tin or brass, and one of the special permanent magnets referred to in an announcement on page ix of this issue.

All four motors are designed to run on direct current. This may be supplied from a 6-volt accumulator, or from alternating current mains through a Meccano Transformer-Rectifier. It should be noted particularly that the motors will not operate from a Meccano T6, T6M or T6A Transformer, as the output of these is alternating current.

The simplest motor of those illustrated is that shown in Fig. 1. This is of the two-pole type and is quite easy to build. It is best to commence by building up the armature, which rotates between the poles of the magnet. This consists entirely of Meccano parts, and is illustrated at A in Fig. 2. First two Collars are pressed on a 4" Rod. Four $\frac{3}{8}''$ Bolts are then fitted with two Flat Brackets spaced apart by five Washers, the Bolts being screwed tightly into the Collars, so as to fix them to the Rod. The Washers and Flat Brackets form the poles. A strip of thin paper is then wrapped around each pole and gummed in place.

The windings consist of two lengths of No. 26 S.W.G. S.C.C. Copper Wire each 7 ft. long. One length of wire is wound on each pole, but it should be noted that the winding on one pole is laid on in a clockwise direction while that on the other is wound in an anti-clockwise direction. The wire must be wound on evenly, and when winding is finished the coil should be tested to ensure that there is no short circuit between the wire and the Washers or Flat Brackets. The *inner* end of one coil and the *outer* end of the other should then be twisted together. The remaining ends of the two coils are later to be attached to the commutator and should be left free for the present.

The construction of the commutator is equally simple. It consists essentially of a Coupling 3 around which a strip of paper is wrapped and glued in place. Next, a piece of thin sheet tin measuring $\frac{5}{8}'' \times 1''$ is cut into halves across its width, and each half is bent to semi-circular shape so that it fits closely the circumference of the Coupling. The two pieces are fixed in position on the Coupling by wrapping pieces of wire or cotton round their ends as shown at 4, and when in place they must not touch each other, but must be separated by gaps about $\frac{1}{16}''$ wide.

The complete commutator is then pressed on the Rod forming the armature spindle, and the ends 1 and 2 of the pole windings are either soldered, or bound with cotton, one to each segment of the commutator. If cotton is used a thin layer of glue will prevent it from becoming loose or frayed. It will also be beneficial to file the surfaces of the commutator segments so that they provide smooth contacts for the brushes.

The bearings for the armature shaft are provided by the upper holes of two Threaded Couplings 7 and 8, each of which is held in place on the $5\frac{1}{2}'' \times 2\frac{1}{2}''$ Flanged Plate forming the base by a $\frac{3}{8}''$ Bolt. The Couplings are spaced from the base plate by Collars and Washers. The special permanent magnet is now fixed in place, and is spaced from the base plate by a strip of cardboard or thin wood. For clamping it in position two Reversed Angle Brackets are used, and one of these is shown at 9.

To complete the motor it is only necessary to fit the brushes. These consist of Commutator Contact Brushes (Elektron Part No. 1559) and they are fixed to the base, but insulated from it, by 6 B.A. Bolts, Insulating Bushes and Washers. Each Bolt is fitted with a Terminal.

The motor is now ready and to set it in operation the brush terminals are connected to the terminals of a 6-volt accumulator or a Meccano Transformer-Rectifier. As the motor is not self-starting it will be necessary to spin the armature to set it in motion, and the tension of the brushes is then carefully adjusted until the armature revolves at its highest speed.

The next motor to be described is that shown in Fig. 3 and is a little more elaborate and powerful than the one already described. It is fitted with a three-pole armature and is self-starting. In this case also it is best to commence by building the armature. This is shown at B (Fig. 2) and consists of 24 Flat Brackets, through the slotted holes of which is pushed a Rod. The Flat Brackets are then sorted out to form three separate groups spaced at 120 deg. to each other as shown. At their free ends they are spaced apart by Washers, and Pivot Bolts are then passed through the outer holes of the Flat Brackets and of the spacing washers, and held in place by nuts.

It is important that the Flat Brackets are pushed inwards towards the shaft as far as possible so as to provide sufficient clearance for the armature to rotate in the magnet. After each pole has been suitably insulated with paper in the manner described for the two-pole motor, the winding can be commenced. Each pole is

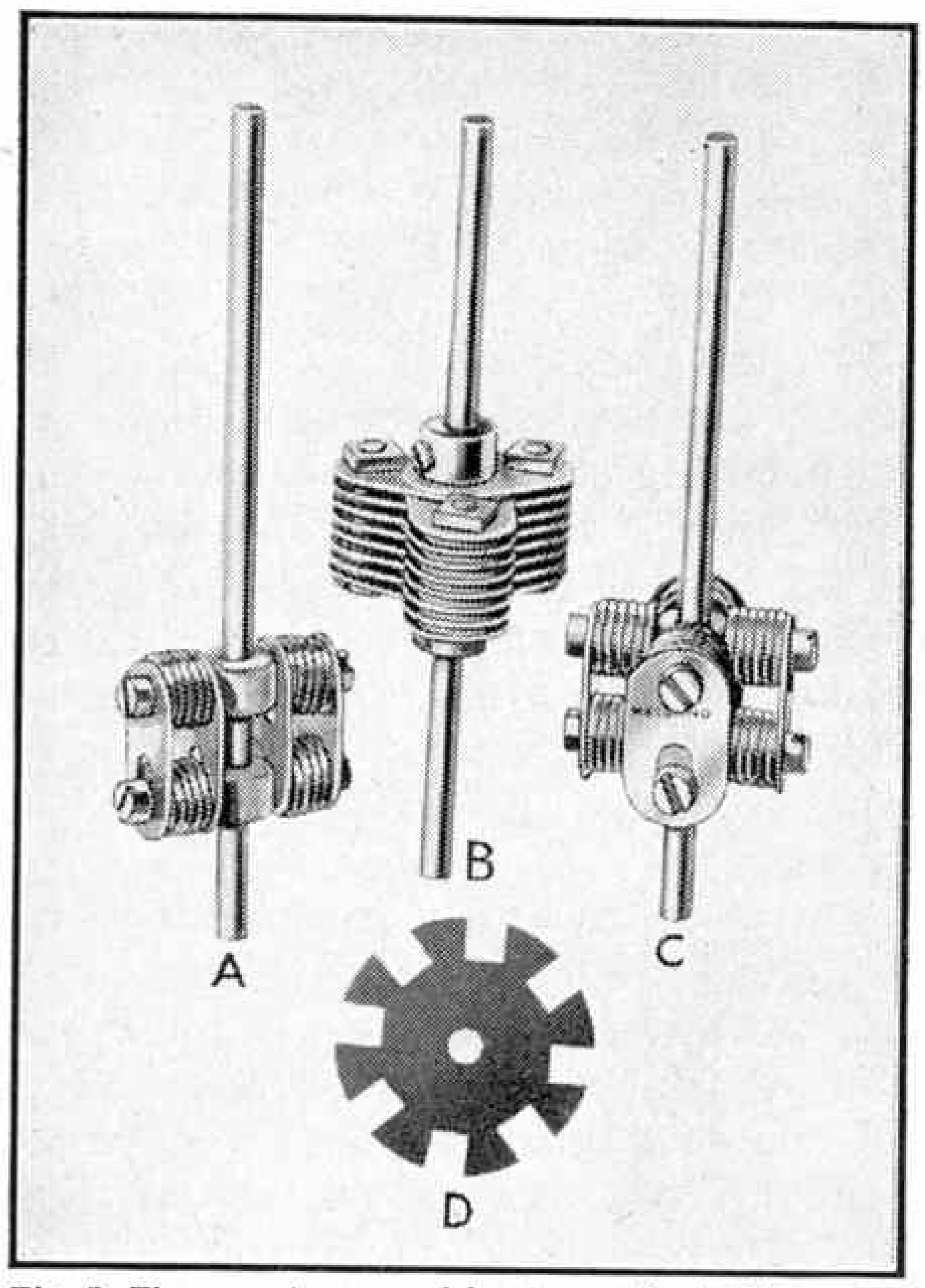


Fig. 2. The armatures used in the small electric motors described in the accompanying article.

wound with 7 ft. of No. 26 S.W.G. Copper Wire and all are wound in a clockwise direction, a little gum being applied to the finished windings to keep them in place. In connecting the coils, the bared outer end of the first is joined to the bared inner of the second and the outer end of this is connected to the inner end of the third. The remaining ends of the third and first coils are also connected together. In each case the bared ends of the wires must be twisted together as indicated at 1. The three leads thus provided are attached to the segments

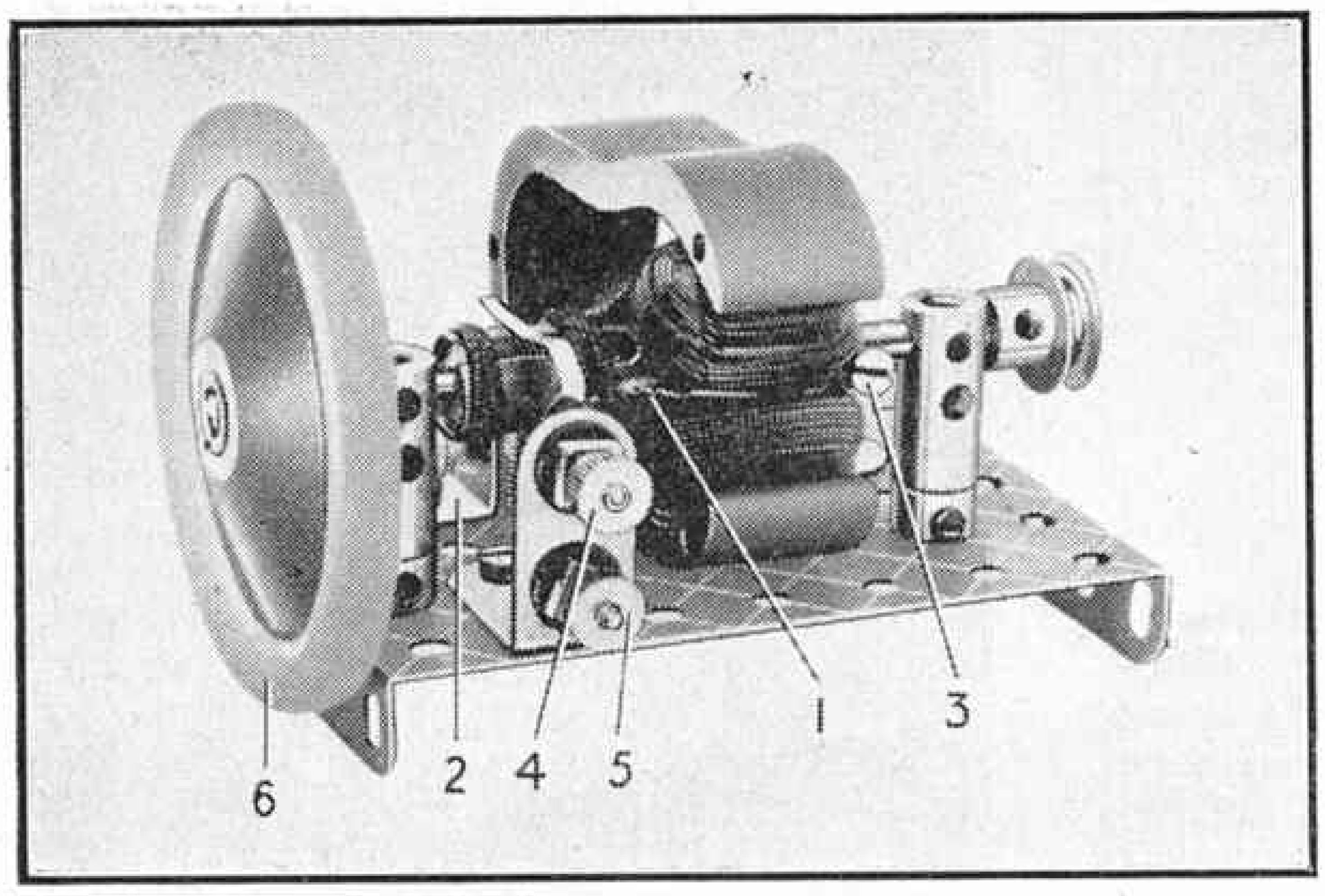


Fig. 3. A neat and compact three-pole motor.

of the commutator at a later stage of construction.

The commutator is built up in the same way as the one described for the two-pole motor except that it has three segments of tin or brass instead of two. When completed it must be fixed on the Rod so that each of the segments lies between two poles of the armature, the three coil leads are then attached to their respective segments. A bolt 3 screwed into a Collar is used to fix the armature to the shaft.

A $3\frac{1}{2}'' \times 2\frac{1}{2}''$ Flanged Plate forms a base for the motor, and the magnet is fixed to it by Reversed Angle Brackets 2, which are bolted to the base and connected by a $1\frac{1}{2}''$ Strip. The $\frac{3}{4}''$ Bolts connecting the latter to the Brackets pass also through the base plate. The brushes are fixed by Terminals 4 and 5 to a $1'' \times 1''$ Angle Bracket and are bent to a horizontal position. The Road Wheel 6 forms a flywheel.

The motor shown in Fig. 5 is more powerful than either of those already described and has a four-pole armature of the type shown at C in Fig. 2. This consists of two "spiders," removed from Swivel Bearings, into which are screwed $\frac{3}{8}''$ Bolts. Each Bolt carries six washers and is passed through one end of a Flat Bracket. Winding is done with 26 S.W.G. Copper Wire, 8 ft. being wound on each pole. The Cord 1 retains the wire in place. The winding of each pole is done in a clockwise direction, as in the case of the three-pole motor, and when winding is complete the inner ends of the four coils are bared and twisted together at 2 while their outer ends are led to the segments of the commutator.

The commutator has four segments so arranged that each is opposite one of the poles of the armature. The outer end 4 of coil 3 is fixed to segment 5; the outer end of the next coil is fixed to the segment opposite to it, and so on until all the connections have been made.

The bearings and magnet of this motor are set up in exactly the same way as those of the first motor. The Cone Pulley (part No. 123) fitted on the armature shaft acts both as a flywheel and a driving pulley.

To build the motor shown in Fig. 4 it is necessary for the constructor to possess a hacksaw and a flat file, preferably a coarse one. This motor has what is known as an eight-pole drum armature, but as it is wound in only four sections it is quite easy to assemble. It is built up from 22 $1\frac{1}{4}''$ Discs, which are cut to the shape of the Disc shown at D in Fig. 2. The slots are $\frac{1}{4}$ in. wide and $\frac{3}{16}$ in. deep, and the operation of cutting them can be carried out on each Disc separately, or all the Discs can be clamped on a Screwed Rod and cut together. The latter is the quicker and more accurate method. Saw cuts should first be made on each side of the holes in the Discs and the metal between them then removed. The slots thus made should then be finished by filing. Next insulation paper is applied, and this operation must be carried out very carefully. Discs of paper are glued over the ends of the armature and then narrow strips of paper are glued to the sides and bottoms of the slots. No metal edges should show when the job is completed.

Winding can now be commenced and reference to Fig. 4 will show how the coils are wound. It will be seen that the windings of each coil lie in two slots opposite each other. Each Coil consists of 12 feet of No.

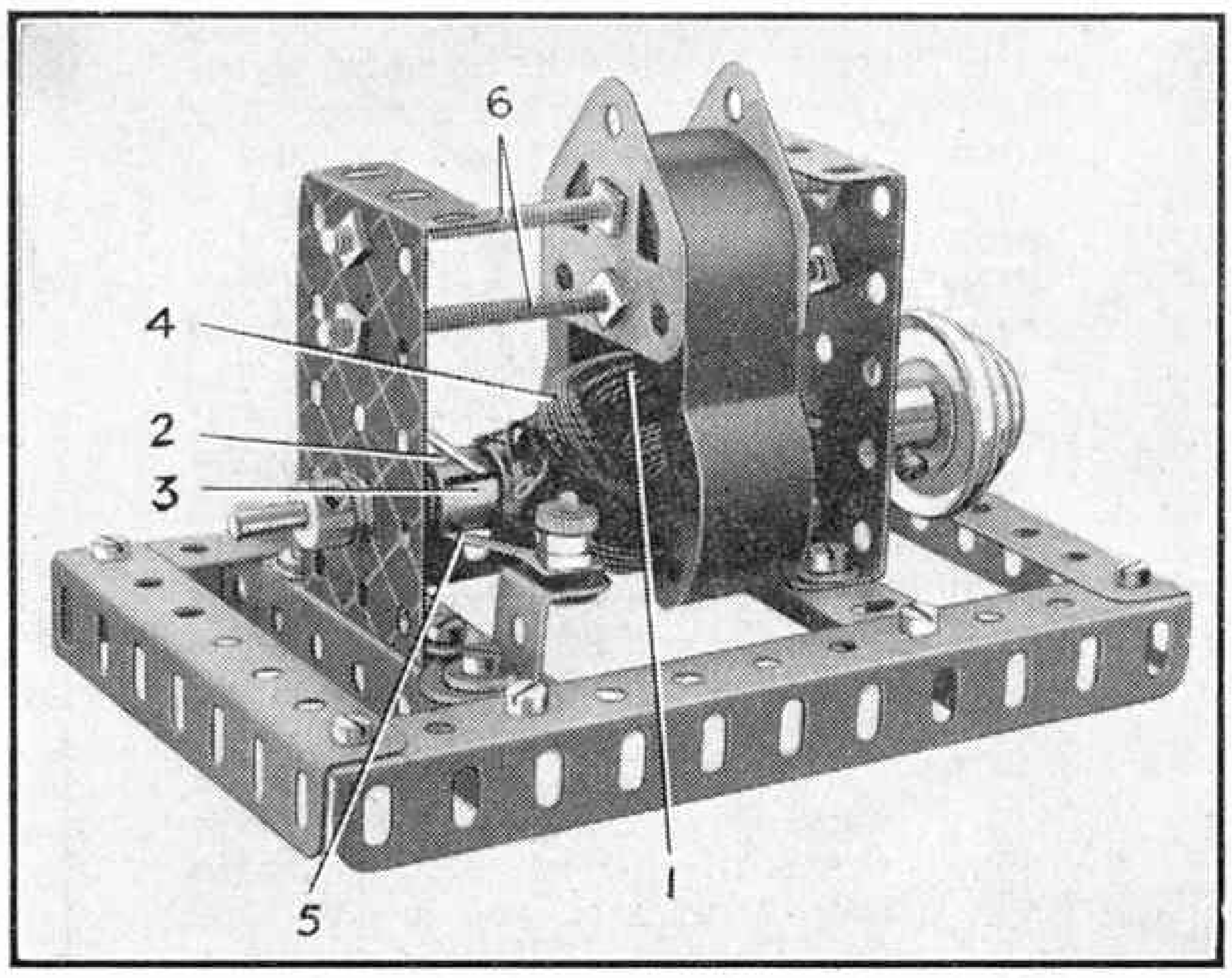


Fig. 4. A powerful motor with a cogged drum armature.

23 S.W.G. Single Cotton Covered Copper Wire, and this should be wound in the slots as evenly as possible. As each coil is completed it may be found that it projects out of the slot slightly and it must be gently tapped into place with a smooth piece of wood such as a hammer shaft. This treatment is necessary owing to the very small amount of clearance between the armature and the magnet.

A four-segment commutator is now built up and fixed to the armature shaft in such a position that the spaces between the segments coincide with the poles separating each coil. The connections to the commutator are made as follows. The inner end of coil 1, the numbers referring to Fig. 4, is fixed to segment 2 and its outer end is fixed to segment 3, similarly the inner end of coil 4 is fixed to segment 3 and its outer end to segment 5, while the next coil is wired to the next two segments and so on until the four coils are connected up.

The next step is to build the frame that carries the bearings for the armature shaft and the magnet. This is shown in Fig. 4 and consists of a rectangular frame made from $5\frac{1}{2}''$ and $3\frac{1}{2}''$ Angle Girders. Two of the four $3\frac{1}{2}''$ Angle Girders are bolted 4 holes apart and carry $2\frac{1}{2}'' \times 1\frac{1}{2}''$ Flanged Plates. The armature shaft must be journalled in these before bolting them down, and if desired the bearings can be reinforced by $1\frac{1}{2}''$ Strips. The magnet is now slid into position and the Screwed Rods 6, complete with Flat Trunnions and nuts, are fitted in position. The Screwed Rods are lock-nutted to the $2\frac{1}{2}'' \times 1\frac{1}{2}''$ Flanged Plates and the magnet is then adjusted until the armature spins freely. The nuts are then tightened securely. Collars prevent end play in the armature shaft, and a Cone Pulley forms a combined flywheel and driving pulley.

The brushes are arranged in a horizontal position and are mounted on $1''$ and $\frac{1}{2}''$ Reversed Angle Brackets. Each brush is fitted with a Terminal.

The following suggestions will be found helpful in adjusting the motors to obtain the best possible running. First, the bearings of the motor should be examined to ensure that they are in line and the armature turns quite freely. The commutator segments should be carefully smoothed, especially at the edges and this can be done with a small piece of fine emery cloth. A good plan is to roll the segment around a Coupling before fitting them in place.

Another important point to watch is the position of the brushes in relation to the armature poles. Before bolting the brushes to the base they must be adjusted so that the maximum speed is obtained.

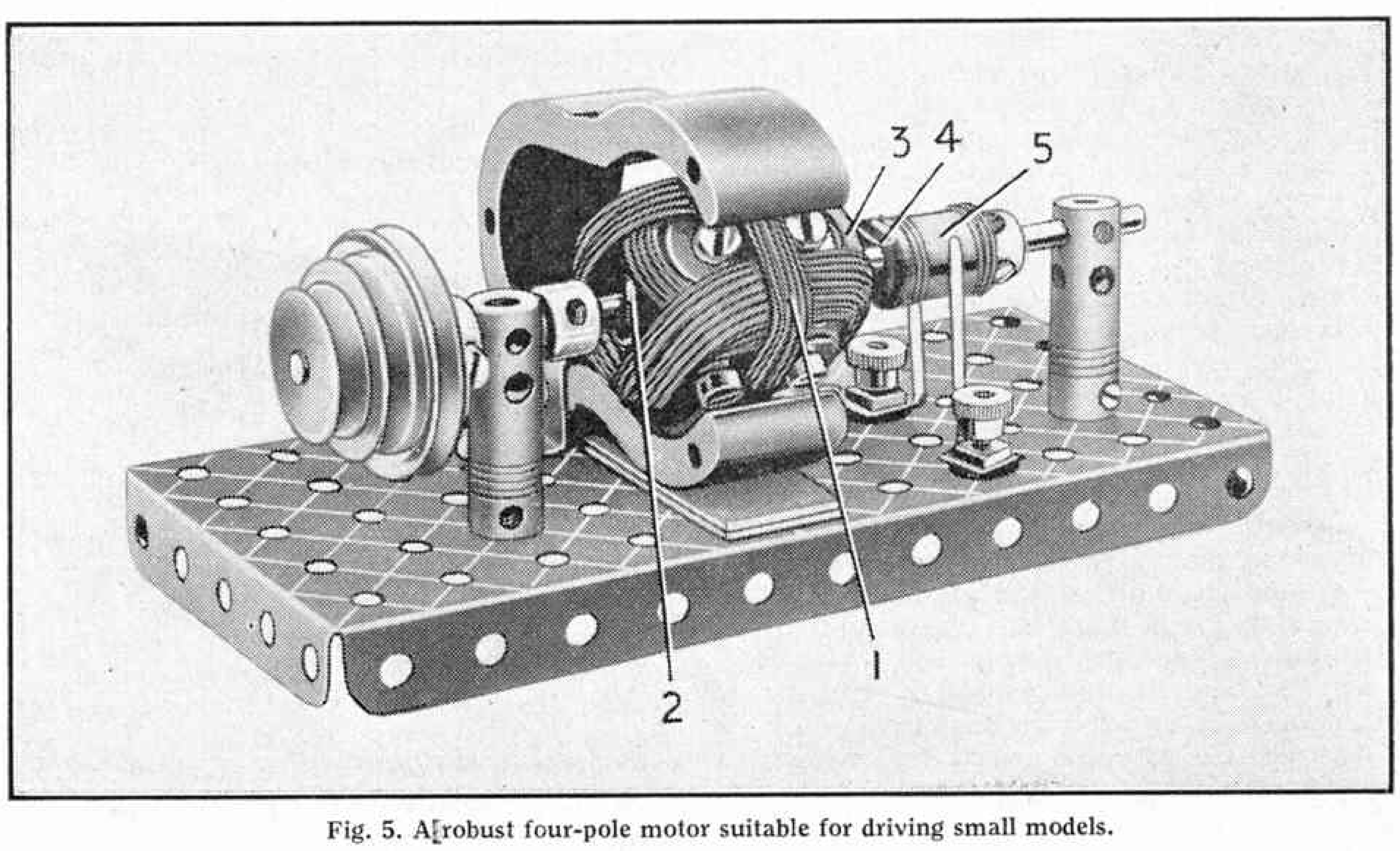


Fig. 5. A robust four-pole motor suitable for driving small models.

Meccano Suggestions Section

By "Spanner"

(452) A Unique Drive

(Gian Singh, Innitsar, India)

An ingenious scheme for connecting shafts that are placed out of line is shown in Fig. 452. This is suitable for use in almost every case where lack of space prevents Universal Couplings or Flexible Coupling Units from being employed.

The driving shaft 1 is approximately $\frac{1}{2}$ in. out of line with the Rod 2, and each Rod carries at its end a Face Plate. Four Flat Brackets are pivotally attached to the Plates by means of $\frac{3}{8}''$ Bolts, each of which carries two nuts for holding the Brackets in place. Washers are used for spacing purposes, and when in position the Bolts should be sufficiently loose to allow the Flat Brackets to move freely.

As the Rod 1 rotates, the movement of

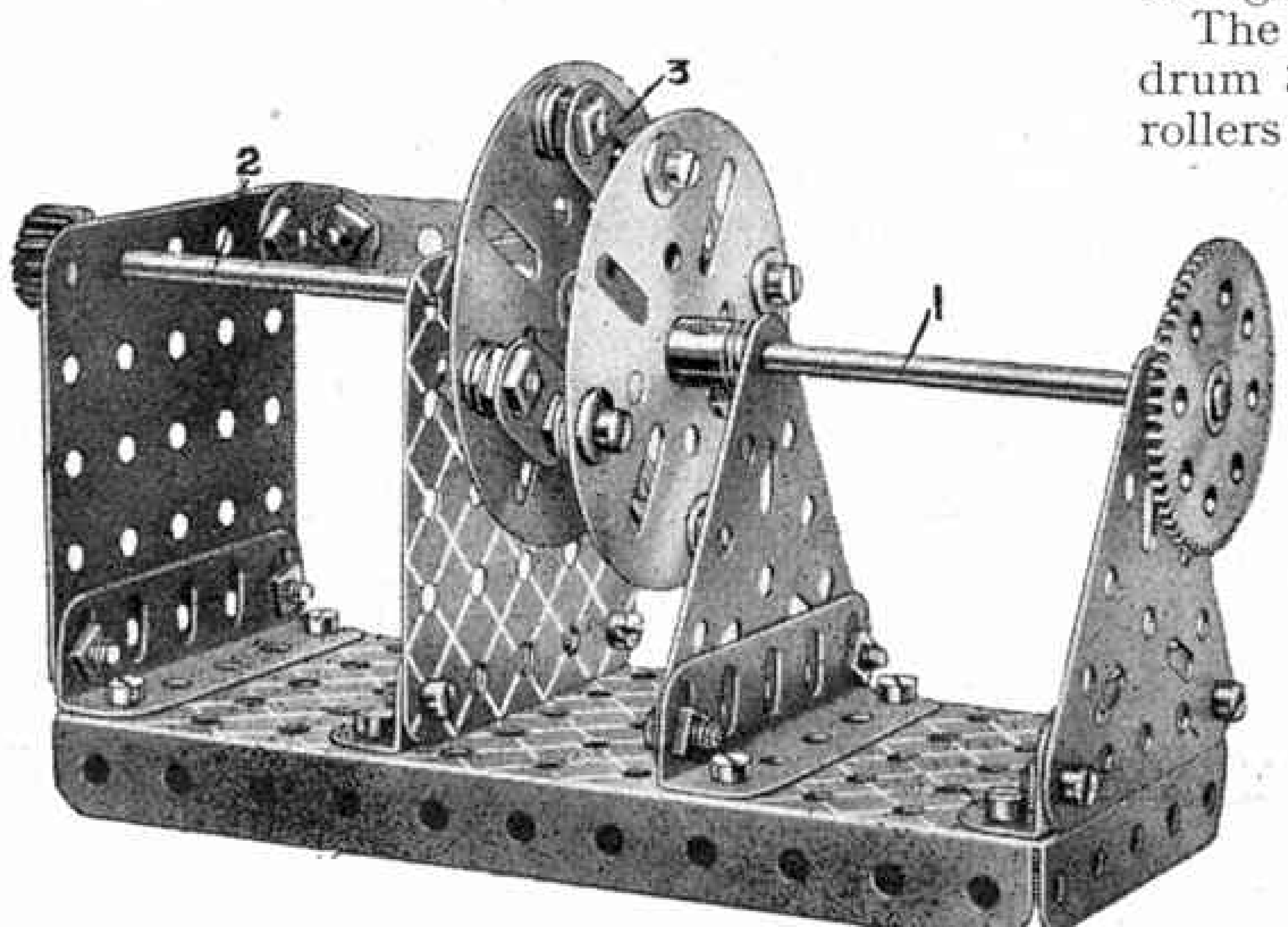


Fig. 452

the one Face Plate is imparted to the other by means of the Flat Brackets.

(453) A Meccano Morse Code Recorder

(G. Hooper, Wallasey)

The novel apparatus shown in Fig. 453 will help readers interested in telegraphy to improve their knowledge of the Morse Code and give them good practice in tapping out correctly spaced signals.

The apparatus consists essentially of a pen actuated by an electro-magnet in such a manner that it may be made to press lightly on a travelling strip of paper when the magnet is energised. As the ribbon is in continual motion the pen makes long or short marks on the paper, according to the time that the key controlling the energising current of the magnet is held down. The aid of a friend may be sought to read the messages as they come through on the tape, and it is advisable that the partners be in separate rooms so that the temptation to communicate verbally is removed.

Two Meccano Bobbins wound to capacity with 26 D.C.C. copper wire, are mounted on $2''$ Screwed Rods, which are secured to two $1\frac{1}{2}''$ Strips placed face to face. The Strips are attached by a $\frac{1}{2}''\times\frac{1}{2}''$ Angle Bracket to the base of the model in the position shown, and are inclined at a slight angle to the horizontal. The end of the winding of one Bobbin is connected to the commencement of the winding of the other, and the two remaining free ends are secured to terminals, one of which is insulated from the frame by Insulating Bushes and Washers.

The fountain pen is clamped rigidly between two Bush Wheels on a Rod journalled in two vertical Strips. The Rod carries a Coupling in which is secured a short Rod 2 that forms the armature for the electro-magnets. The latter projects over, and a short distance above, the pole faces of the electro-magnets. A short piece of Spring Cord, attached to the Coupling and to the frame, serves to maintain the pen normally raised clear of the tape, but on passing current through the electro-magnets it is brought into contact with the moving tape.

The ribbon of paper is wound off the drum 3 by being pulled through a pair of rollers at the other end of the device. The top roller 5 consists of a pair of $1''$ fast Pulleys shod with $1''$ Rubber Tyres and secured to a Rod that is driven by the Electric Motor. The second roller consists of a $\frac{1}{2}''$ Pinion, and it is immediately below the first, so that it makes light contact with the tyres.

The tape passes over a smooth piece of cardboard, at the point where the nib of the pen makes contact with it, and it also runs under two Rods that form guides. One of the Rods is journalled in the bottom holes of the vertical Strips carrying the pen Rod, and the other is mounted in Flat Brackets that are attached to the Motor end of the base. Care should be taken to see that when the Rod 2 is attracted by the magnets, the pen rests only lightly on the tape. Also the ink must flow freely from the pen when the recorder is in operation.

It will be found a great advantage to incorporate a Resistance Controller in the Motor circuit, so that the speed of the tape may be varied to suit the speed at which the message is transmitted, for this is liable to

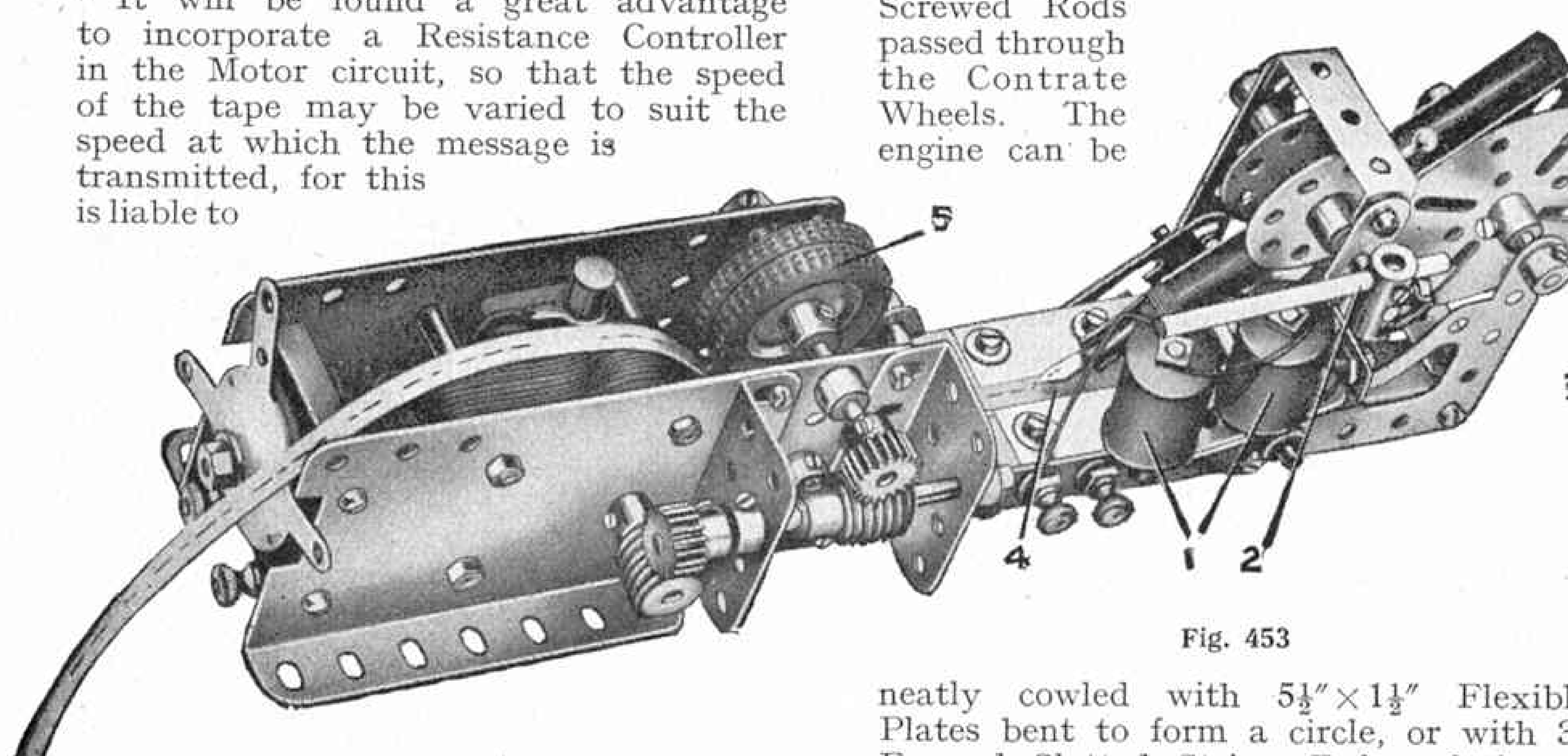


Fig. 453

considerable variation when beginners get busy! The instrument is also useful for recording Morse signals heard on the wireless.

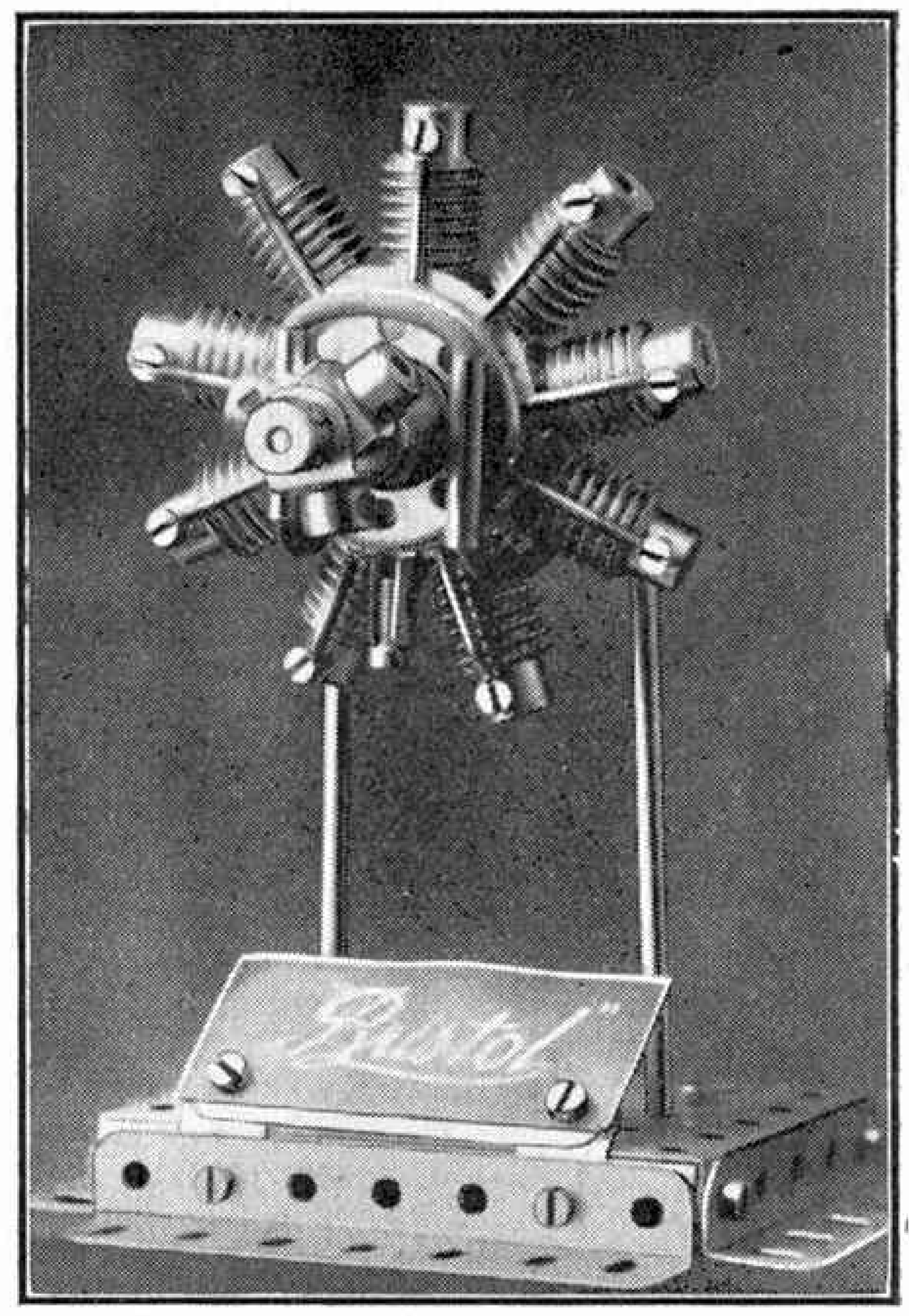


Fig. 454

(454) Bristol "Mercury" Aeroplane Engine

(A. Spring, Cainscross)

In reply to the large number of enquiries I have received I illustrate in Fig. 454 a dummy model of an aeroplane engine that can be fitted in Meccano aeroplanes. In the illustration the engine is shown mounted on a demonstration stand just as the real engine would be if it were on exhibition, and it is complete with a variable pitch propeller hub. The engine was designed by A. Spring, Cainscross, and was awarded a prize in a recent competition.

The crank-case of the model is made from two $1\frac{1}{2}''$ Contrate Wheels, between which are clamped nine Worms, disposed radially in the manner shown. The Worms are fitted with bolts and lengths of Spring Cord to represent the rocker arm casings and push rod casings respectively. The reduction gear housing is a Chimney Adaptor, and three Large Fork Pieces form the variable pitch propeller hub. The complete engine can be mounted in a model aeroplane by Screwed Rods passed through the Contrate Wheels. The engine can be neatly cowled with $5\frac{1}{2}''\times1\frac{1}{2}''$ Flexible Plates bent to form a circle, or with $3''$ Formed Slotted Strips. Before fitting a cowling, the engine should first be mounted on a back-plate formed by a Face Plate or Pulley.

(455) Pre-selector Self-changing Epicyclic Gear-Box (R. Cooper, Ringmer)

Pre-selector gear-boxes are very attractive to keen Meccano enthusiasts. Perhaps the best known of these is the Wilson self-change gear-box installed in Armstrong Siddeley cars, and a Meccano version of this, which will appeal strongly to advanced model-builders, is shown in Figs. 455 and 455a. The model provides four forward speeds and reverse, and these are obtained by means of a series of epicyclic gear trains consisting of a Gear Ring attached to a 3" Pulley by four Reversed Angle Brackets. The reverse gear Pulley R (Fig. 455) is fitted with two planetary $\frac{1}{2}$" Pinions 1, which revolve freely on lock-nutted $\frac{3}{4}$" Bolts. The Pinions mesh with the 1st-speed Gear Ring as shown. The 1st-speed Pulley carries two 1" Gears 2 also rotating on $\frac{3}{4}$" Bolts, and these in turn mesh with the 2nd-speed Gear Ring. Finally the 2nd-speed Pulley is fitted with $\frac{1}{2}$" Pinions 3.

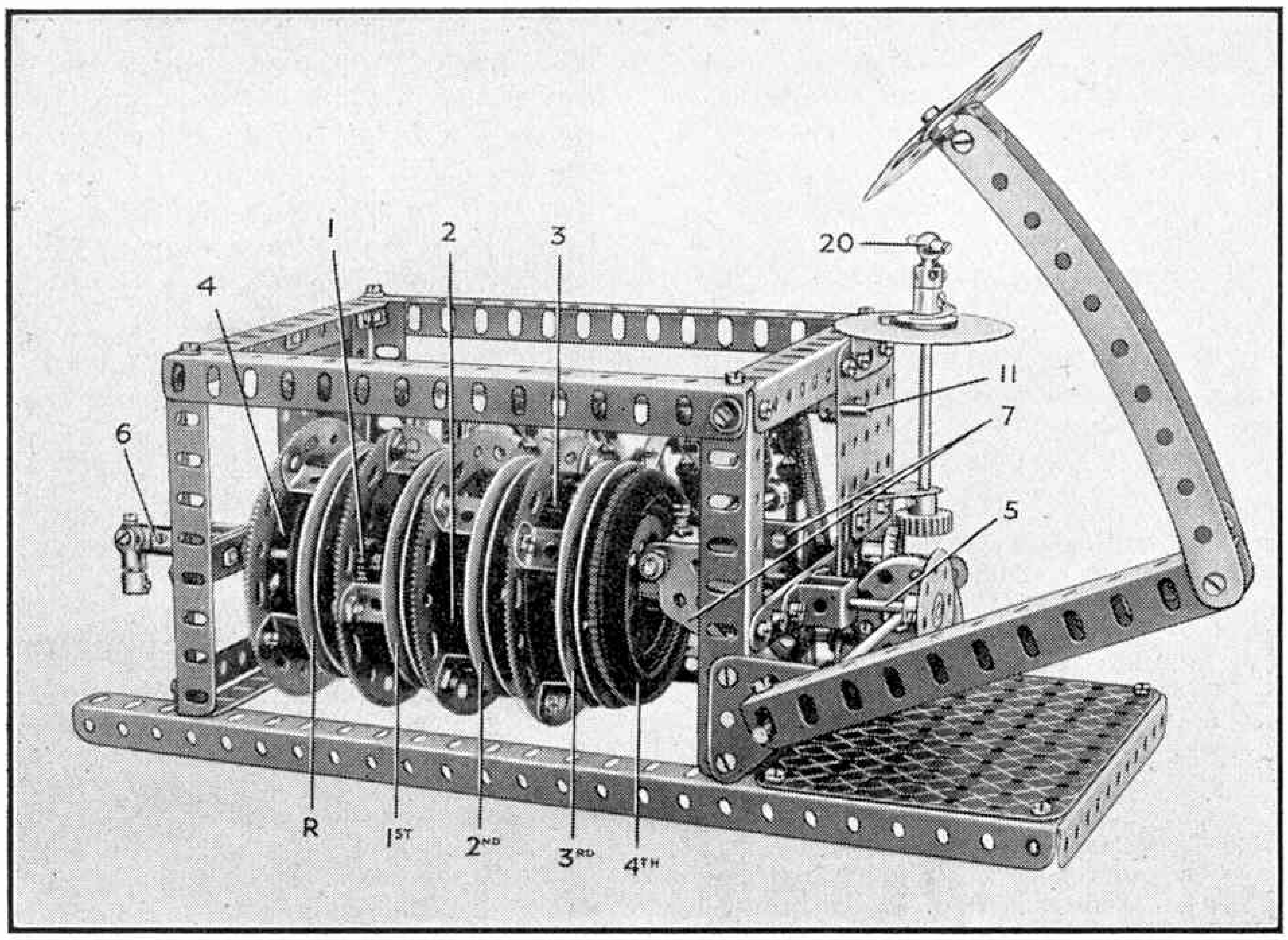


Fig. 455

Inside the reverse speed Gear Ring is a casing 4 made from two Face Plates connected by $\frac{3}{4}$" Bolts. Between them are carried five $\frac{1}{2}$" Pinions meshing with each other, four of the Pinions being mounted on 1" Rods and spaced from one Face Plate by washers. The fifth Pinion, which is the central one, is fixed on the 8" Rod 5, which passes through the boss of the 3" Pulley and one of the Face Plates, and projects halfway into the bore of the Pinion. Rod 6 is fixed in the boss of the remaining Face Plate and projects into the unoccupied half of the Pinion boss.

A 57-teeth Gear is next fixed on Rod 5 but spaced from Pulley R by three washers. It is followed by the 1st-speed Pulley, which is free on the Rod. Next a $\frac{1}{2}$" Pinion is fixed in place and the 2nd-speed Pulley added, then a 57-teeth Gear and the 3rd-speed Pulley, washers being used for spacing purposes. Finally the boss of a 2" Pulley fitted with a Rubber Tyre is gripped in a Socket Coupling and the complete unit is passed on to the Rod. This forms a clutch that provides fourth gear. It is held out of engagement by a Compression Spring.

The Flanged Brackets 7 serve to carry the clutch operating gear. This consists of a Coupling fitted with a $\frac{3}{4}$" Bolt. The latter engages with the neck of the Socket Coupling, and the Coupling is mounted in the Bracket 7 by passing 1" Rods into its longitudinal bore. A second coupling 8, Fig. 455a, fixed to one of the 1" Rods carries a $1\frac{1}{2}$" Rod 9 fitted at the end with a Collar.

The next step is to assemble the operating mechanism. First the 8" Rods 10 and 11 are inserted and Rod 10 (Fig. 455a) carries five simple Bell Cranks each free to swivel between two Collars. To each Bell Crank is pivoted an End Bearing 12 fitted with a $1\frac{1}{2}$" Rod and a Rod and Strip Connector. A short length of Spring Cord 13 keeps the Rods in contact with their respective cams. The four 3" Pulleys are fitted with cord band brakes, which are anchored to Rod 14 and to the ends of the Bell Cranks. These are brought into operation by the movement of the Bell Cranks, the brakes being "off" when the Bell Cranks are in contact with Rod 11.

The last Bell Crank controlling 4th gear is fitted with a roller 15 consisting of four $\frac{3}{4}$" Discs free to turn on a lock nutted Bolt. This roller depresses Rod 9, which in turn slides the clutch into engagement. Rod 16 is fitted with five Collars, each of which carries a $1" \times \frac{1}{2}"$ Angle Bracket secured to the Collars by a bolt and nut. The ends of the Angle Brackets are bent up in the manner shown. A Collar fitted with a bolt is fixed at each end of the Rod, the bolt passing through the loop of a Spring. The ends of the Springs are anchored to Rod 11. Rod 16 is journalled at one end in a Double Arm Crank and at the other end is a $\frac{1}{2}$" Pinion. This meshes with the $1\frac{1}{2}$" Contrate on the shaft carrying the foot pedal.

The selector mechanism consists of a Rod 18 fitted with five cams, each of which is a Collar with a flat filed on it as shown. These are passed on to the Rod, which is fitted with a $\frac{3}{4}$" Contrate at one end. The Contrate meshes with a $\frac{3}{4}$" Pinion on Rod 19, which passes through the centre of the cardboard disc bolted to a $1\frac{1}{4}$" Disc and Trunnion. The Rod is fitted with a Pawl and a knob 20. The disc is marked around its circumference at 60° intervals, the marks being allotted the symbols R (reverse), N (neutral), 1st, 2nd, 3rd and 4th respectively. The pointer is set at reverse and the reverse gear cam is fixed with its flat face in contact with its Rod and Strip Connector. The pointer is then moved from R to 1st, the corresponding cam being similarly dealt with, as are the others in their turn.

Normally the cams hold the Rod and Strip Connectors clear of the $1" \times \frac{1}{2}"$ Angle Brackets, but on selecting a gear, the appropriate arm is allowed to move forward. On depressing and releasing the pedal a Bracket raises this arm and contracts the band brake.

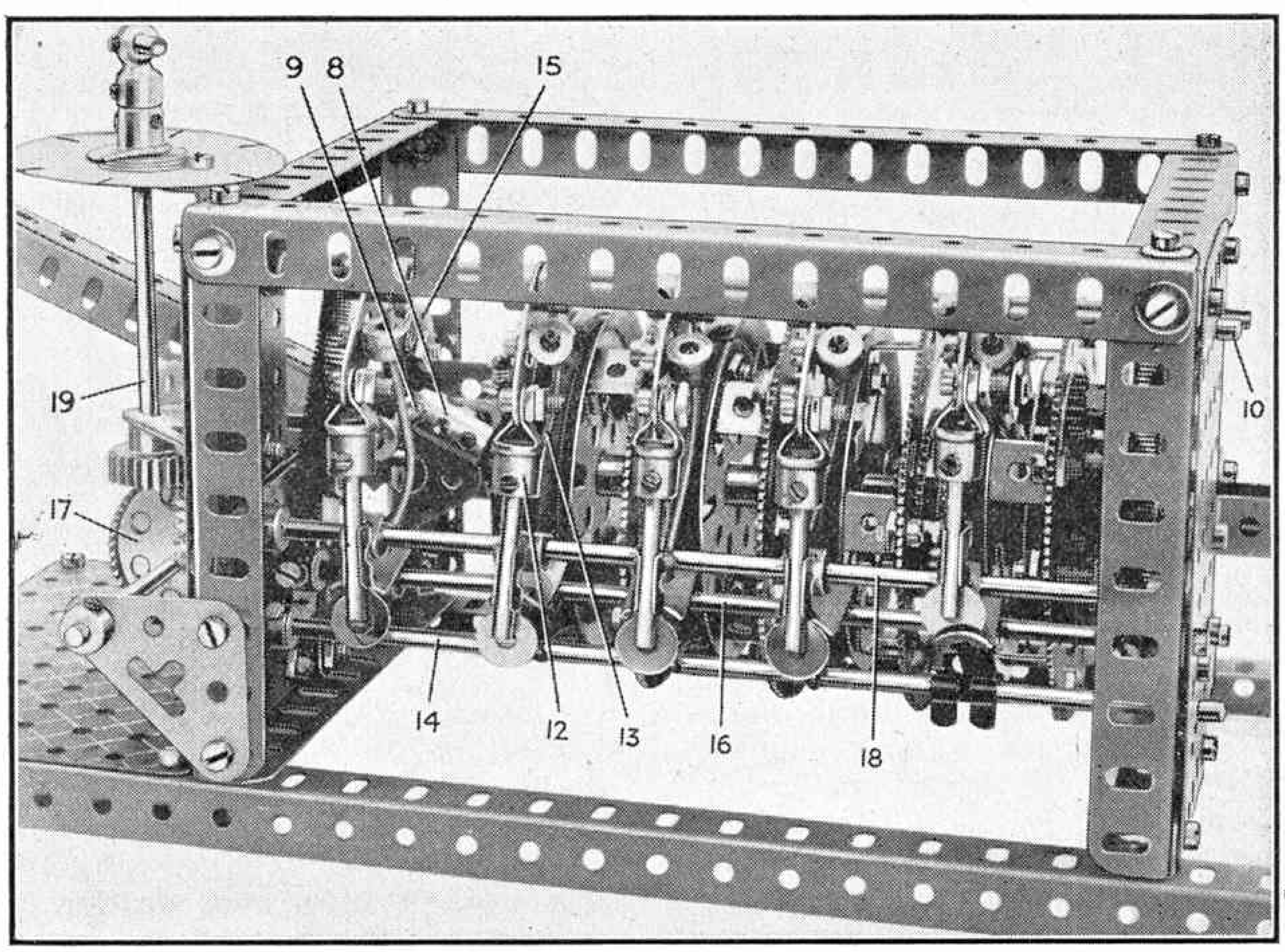


Fig. 455a

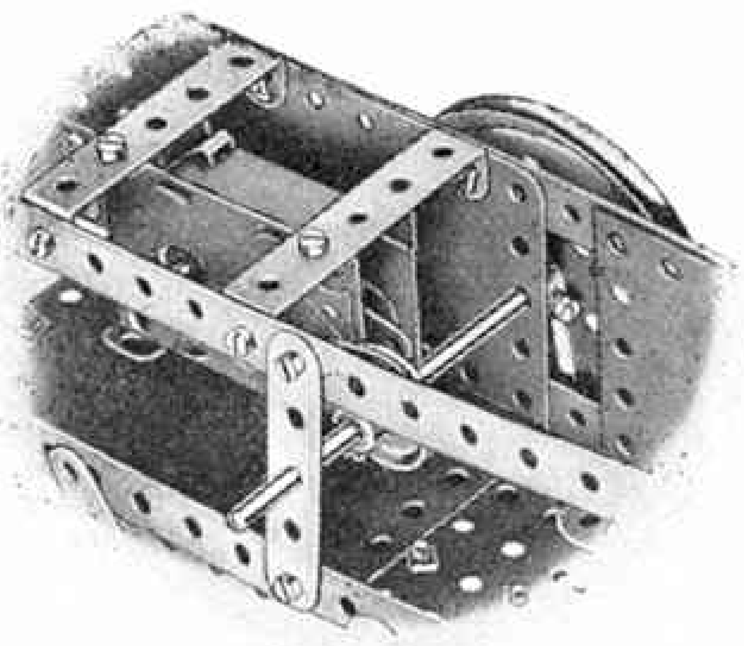


Fig. 1. The Mechanism of the model paddle steamer described in this article.

New Meccano Models

Four Fine Motor-driven Subjects

THE simple models described in these articles are always realistic and attractive in construction, and most of them are made more fascinating by the inclusion of motors to give them life and movement. This month's models are excellent examples of this. Two of them are specially designed for owners of No. 2 Outfit, while the others are more ambitious efforts, which require however only the parts that are included in Nos. 3 and 4 Outfits respectively. All four are working models driven by Meccano Motors. For three of them the *Magic* Motor is used with excellent effect, while the fourth is fitted with the Enclosed Electric Motor, which may be of either the 6v. or 20v. type.

The simplest of the four models is the horse and dray shown in Fig. 2. This can be assembled from the contents of an Outfit No. 2 with the addition of a few extra parts. The dray is first constructed. It is based on a $5\frac{1}{2}'' \times 2\frac{1}{2}''$ Flanged Plate, to the flanges of which two $5\frac{1}{2}'' \times 1\frac{1}{2}''$ and two $2\frac{1}{2}'' \times 1\frac{1}{2}''$ Flexible Plates are bolted, the bolts in the longer flanges holding also two $5\frac{1}{2}''$ Strips. The Flat Trunnions that form bearings for the rear axle are bolted direct to the flanges, while Trunnions are attached to the front by Angle Brackets.

Two $2\frac{1}{2}'' \times \frac{1}{2}''$ Double Angle Strips are then fixed to the bottom of the dray and a $2\frac{1}{2}'' \times 2\frac{1}{2}''$ Flexible Plate is bolted between them. The ends of the Double Angle Strips are joined by a $2\frac{1}{2}''$ Strip, which is fixed in place by $\frac{3}{8}''$ Bolts and lock-nuts as shown. This structure forms the driver's seat. The wheels are 1″ Pulleys fixed on the ends of $3\frac{1}{2}''$ Rods, which pass through the ends of the Trunnions and Flat Trunnions.

The *Magic* Motor can now be fixed to the underside of the Flanged Plate, and the small pulley is arranged to drive the $\frac{1}{2}''$ fast Pulley on the rear axle through a short Driving Band. At the front of the dray is the shaft to which the horses are harnessed. This consists of two $5\frac{1}{2}''$ Strips, which are attached to the Flanged Plate by a Double Bracket.

The two horses are constructed in the same manner and the description of one will suffice. The body is a U-Section Curved Plate, to the corners of which are bolted four $2\frac{1}{2}''$ Strips. The bolts that hold the $2\frac{1}{2}''$ Curved Strips forming the neck carry also Angle Brackets that join the sides of the body. Flat Brackets form the head and ears. A 2″ Rod pushed through the $2\frac{1}{2}''$ Strips and Curved Plates forming both horses couples them to the shaft.

To allow the horses to travel smoothly over the ground a further 2″ Rod is pushed through holes in their hind legs and is held in place by Spring Clips. The Rod carries at its centre a $\frac{1}{2}''$ loose Pulley. A finishing touch is given by the addition of the reins.

Parts required to build the horse and dray: 2 of No. 2; 9 of No. 5; 4 of No. 10; 2 of No. 11; 8 of No. 12; 2 of No. 16; 2 of No. 17; 4 of No. 22; 6 of No. 35; 37 of No. 37a; 29 of No. 37b; 1 of No. 40; 2 of No. 48a; 1 of No. 52; 4 of No. 90a; 4 of No. 111c; 2 of No. 126; 2 of No. 126a; 1 of No. 191; 2 of No. 199; 1 *Magic* Motor.

The model shown in Fig. 3 is a particularly fine one to build, and its operation when completed will give its builders great fun. It is a small electric hoist built from the parts in Outfit No. 3 and incorporates an Enclosed Electric Motor.

Construction is commenced by bolting two $2\frac{1}{2}''$ and two $5\frac{1}{2}''$ Strips to the feet of the Motor, the ends of the $5\frac{1}{2}''$ Strips being joined by a $2\frac{1}{2}'' \times \frac{1}{2}''$ Double Angle Strip 2. Trunnions are then bolted to the $5\frac{1}{2}''$ Strips, and are connected by a further $2\frac{1}{2}''$ Strip bolted in the position indicated by bolt 1. A $5\frac{1}{2}''$ Strip is next fitted midway between the first two $5\frac{1}{2}''$ Strips, the bolt at the end holding also a Double Bracket 2. These three $5\frac{1}{2}''$ Strips are horizontally placed, and $5\frac{1}{2}''$ Strips are now bolted to the sides of the framework to form supports for the rest of the mechanism. Each bolt also holds a $2\frac{1}{2}''$ Strip placed vertically. Bolt 4 and a bolt in a similar position on the opposite side of the model secure a Double Angle Strip and a $5\frac{1}{2}''$ Strip bent to form a semi-circle. The other $2\frac{1}{2}''$ Strips form a support for a circle composed of four Formed Slotted Strips, and two Semi-Circular Plates 3.

Rod 5 is 4″ long and forms the hoisting drum. It is journalled as shown and carries at its inner end a 1″ Pulley.

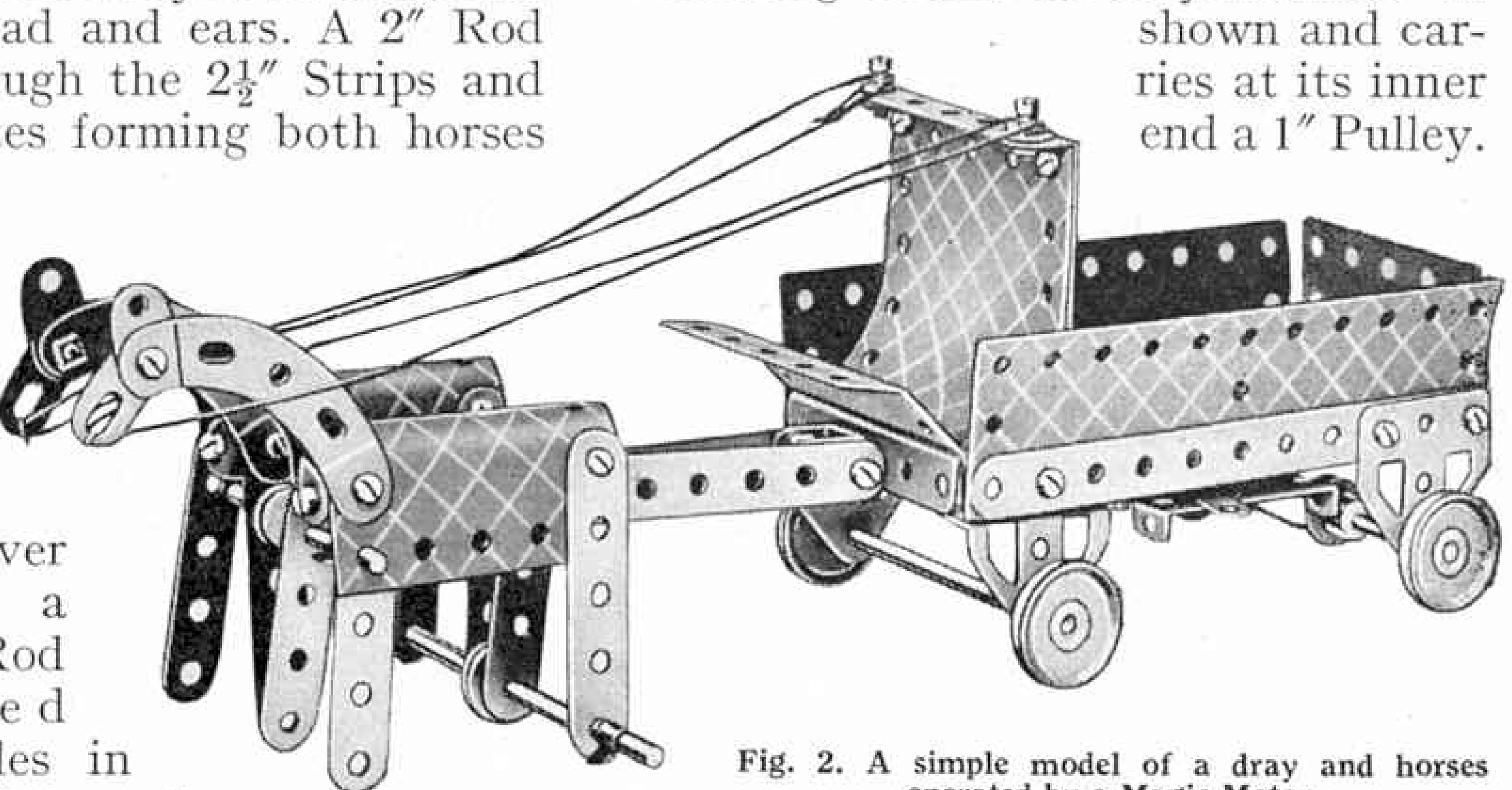


Fig. 2. A simple model of a dray and horses operated by a Magic Motor.

This is driven direct from the armature shaft of the Motor by a small Driving Band. Two Road Wheels are fixed on the Rod 5 and between them is a Cord Anchoring Spring, to which the hoisting Cord is tied. The hoisting Cord is wound a number of times around Rod 5 and

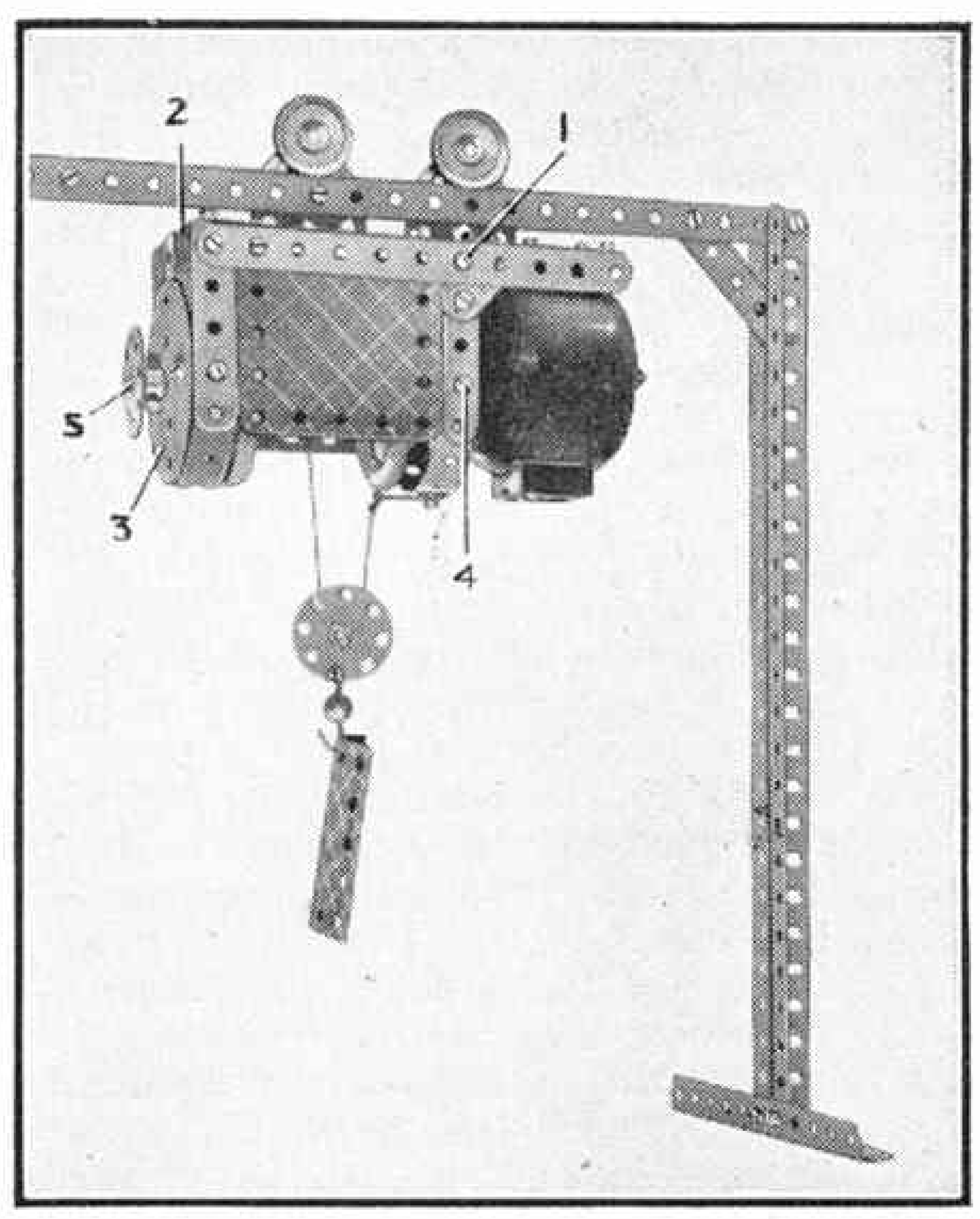


Fig. 3. This fine electric hoist is driven by the Enclosed Electric Motor. The model is built from the parts in No. 3 Outfit.

after passing through the pulley block is tied to a Flat Bracket as shown. The mechanism is enclosed by $2\frac{1}{2}'' \times 2\frac{1}{2}''$ Flexible Plates bolted to the $5\frac{1}{2}''$ Strips forming the sides of the hoist.

To complete the model Flat Trunnions are attached by Angle Brackets to the central $5\frac{1}{2}''$ Strip at the top of the hoist and 1″ Pulleys are fitted to them as shown. These run on rails made from $12\frac{1}{2}''$ Strips, which should be supported by suitably constructed posts.

Parts required to build the model electric hoist: 2 of No. 1; 6 of No. 2; 7 of No. 5; 1 of No. 10; 1 of No. 11; 4 of No. 12; 1 of No. 15b; 3 of No. 22; 1 of No. 23; 1 of No. 24; 39 of No. 37; 1 of No. 37a; 5 of No. 38; 1 of No. 40; 2 of No. 48a; 1 of No. 57c; 4 of No. 111c; 2 of No. 126; 2 of No. 126a; 1 of No. 176; 1 of No. 186; 2 of No. 187; 2 of No. 190; 1 of No. 200; 2 of No. 214; 4 of No. 215; 2 of No. 217a; 1 E06 or E020 Electric Motor (not included in Outfit).

The model paddle steamer shown in Fig. 4 can be built from the parts contained in Outfit No. 4. It is fitted with paddle wheels driven by a *Magic* Motor and therefore can be made to move over the ground. In building it the sides of the hull are assembled first. The starboard side, shown in Fig. 4, consists of a $5\frac{1}{2}'' \times 2\frac{1}{2}''$ and a $2\frac{1}{2}'' \times 2\frac{1}{2}''$ Flexible Plate forward of the paddle wheel, with a Hinged Flat Plate 1, which also forms the deck, and a $4\frac{1}{2}'' \times 2\frac{1}{2}''$ Flexible Plate to complete it. The port side consists of a $4\frac{1}{2}'' \times 2\frac{1}{2}''$ and a $5\frac{1}{2}'' \times 2\frac{1}{2}''$ Flexible Plate, and three $2\frac{1}{2}'' \times 2\frac{1}{2}''$ Flexible Plates, which are bolted amidships.

The sides are strengthened by $12\frac{1}{2}''$ and $2\frac{1}{2}''$ Strips bolted to the upper and lower edges of the Plates and are then

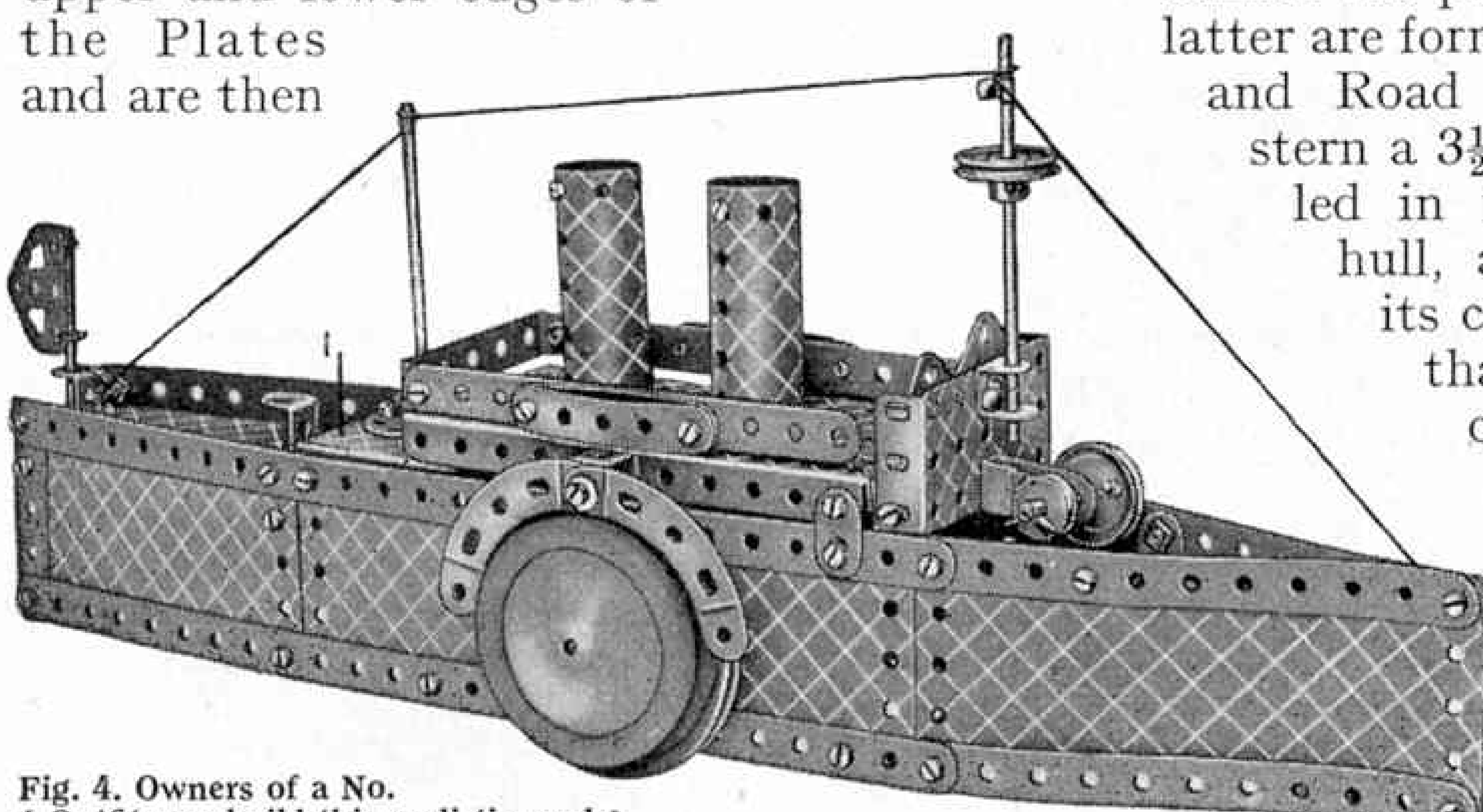


Fig. 4. Owners of a No. 4 Outfit can build this realistic model paddle steamer, which is driven by a Magic Motor.

bolted together at the bows and connected by a Flanged Sector Plate at the stern. The Flanged Sector Plate forms the after deck. The Hinged Flat Plate 1 is connected to the port side of the hull by Angle Brackets, and the hull is strengthened underneath by $2\frac{1}{2}'' \times \frac{1}{2}''$ Double Angle Strips as shown in Fig. 1.

A $5\frac{1}{2}'' \times 2\frac{1}{2}''$ Flanged Plate forms the upper deck, and a $2\frac{1}{2}'' \times \frac{1}{2}''$ Double Angle Strip bolted across its centre supports rails formed by $5\frac{1}{2}''$ Strips. The bolts hold also two boats formed from $2\frac{1}{2}''$ Strips curved slightly and bolted together at each end. A Trunnion is then bolted to the forward end of the Flanged Plate.

The bridge is formed by a Trunnion bolted to a $2\frac{1}{2}'' \times 1\frac{1}{2}''$ Flanged Plate, which is attached to the end of the $5\frac{1}{2}'' \times 2\frac{1}{2}''$ Flanged Plate by a $2\frac{1}{2}'' \times \frac{1}{2}''$ Double Angle Strip.

The paddle wheel covers are formed of two $2\frac{1}{2}''$ Curved Strips, and they are attached to the $5\frac{1}{2}'' \times 2\frac{1}{2}''$ Flanged Plate by Double Brackets. Funnels are formed by U-Section Curved Plates bent to form cylinders, their edges being joined together by Obtuse Angle Brackets. They are attached to the deck by Angle Brackets, and this unit is now attached to the hull by Flat Brackets.

The fitting of the *Magic* Motor is illustrated in Fig. 1. The Motor is bolted to the two $2\frac{1}{2}'' \times \frac{1}{2}''$ Double Angle Strips, and is arranged to drive a 1″ Pulley on the 4″ Rod that carries the paddle wheels. The latter are formed by 3″ Pulleys and Road Wheels. At the stern a $3\frac{1}{2}''$ Rod is journalled in the sides of the hull, and it carries at its centre a 1″ Pulley that holds the stern clear of the ground.

To complete the model masts and fittings are to be added. The foremast is a 4″ Rod fixed by Spring Clips in two Angle Brackets bolted to the bridge. The Rod carries a 1″ Pulley to form the crow's nest. The aft mast is a $3\frac{1}{2}''$ Rod stepped in the boss of a Bush Wheel bolted to the Hinged Flat Plate 1, while at the stern is a Flat Trunnion fitted on a 2″ Rod to form a flag. Finally, a winch formed by a Cranked Bent Strip, a $1\frac{1}{2}''$ Rod, a $\frac{1}{2}''$ and a 1″ Pulley is fitted in front of the bridge.

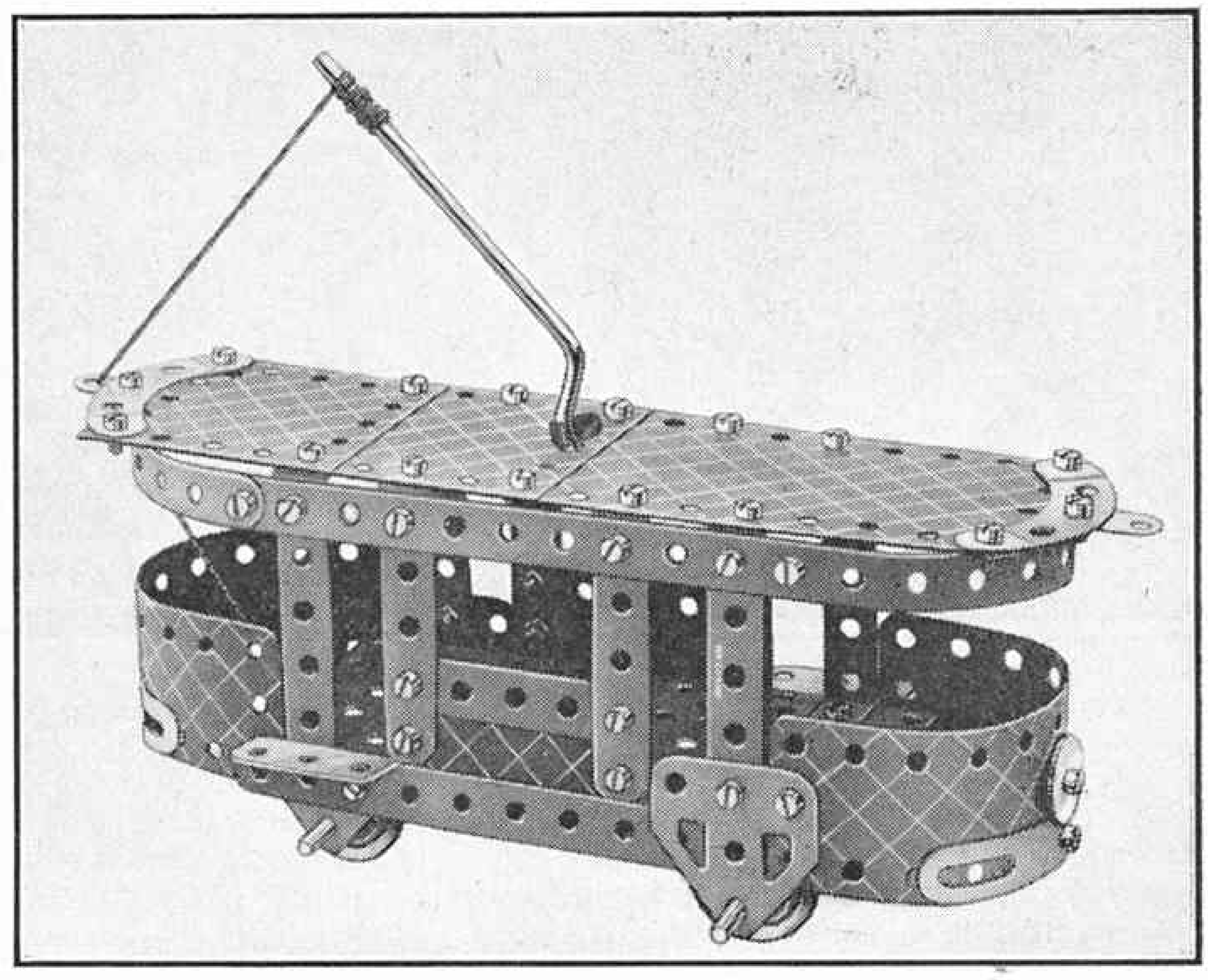


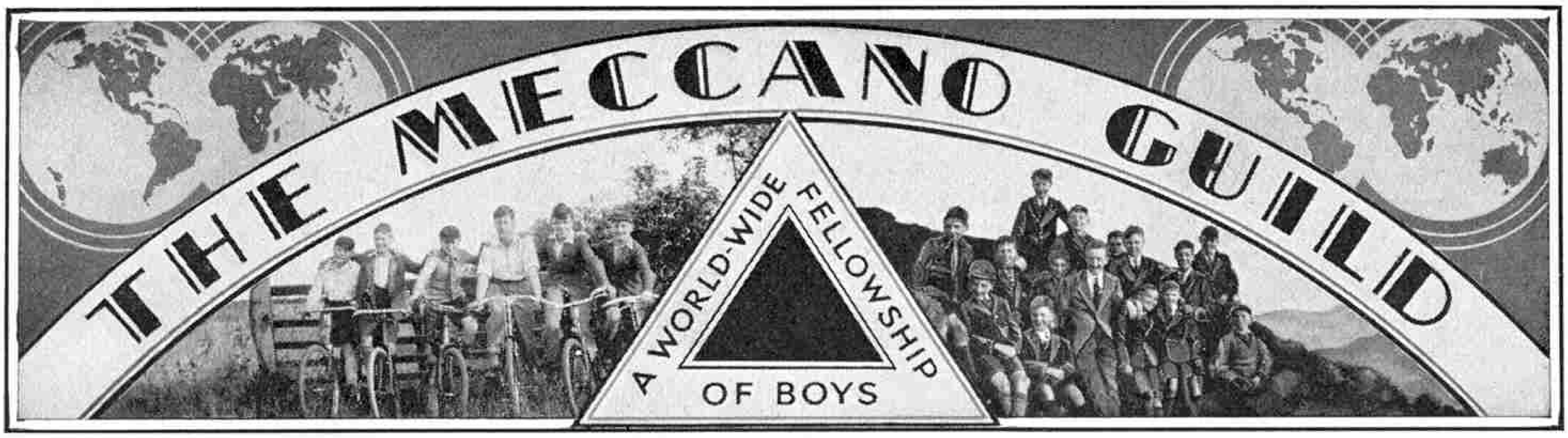
Fig. 5. A single-decker tramcar built from the contents of Outfit No. 2 and a few extra parts.

Parts required to build the model paddle steamer: 4 of No. 1; 7 of No. 2; 1 of No. 3; 9 of No. 5; 2 of No. 10; 2 of No. 11; 7 of No. 12; 4 of No. 12c; 2 of No. 15b; 2 of No. 16; 1 of No. 17; 1 of No. 18a; 2 of No. 19b; 4 of No. 22; 1 of No. 23; 1 of No. 24; 8 of No. 35; 72 of No. 37a; 66 of No. 37b; 7 of No. 38; 1 of No. 40; 1 of No. 44; 1 of No. 48; 5 of No. 48a; 1 of No. 51; 1 of No. 52; 1 of No. 54a; 4 of No. 90a; 6 of No. 111c; 2 of No. 125; 2 of No. 126; 1 of No. 126a; 1 of No. 176; 2 of No. 187; 4 of No. 190; 2 of No. 191; 2 of No. 192; 1 of No. 198; 2 of No. 199; 1 *Magic* Motor (not included in Outfit).

Our last model is a small single-deck tramcar, which can be built from Outfit No. 2 and a few extra parts. First $2\frac{1}{2}'' \times 1\frac{1}{2}''$ Flanged Plates and $5\frac{1}{2}''$ Strips are clamped to the long flanges of a $5\frac{1}{2}'' \times 2\frac{1}{2}''$ Flanged Plate. Two $2\frac{1}{2}'' \times \frac{1}{2}''$ Double Angle Strips and two $2\frac{1}{2}''$ Strips are attached to the Plate, and their upper ends are joined by further $5\frac{1}{2}''$ Strips. The $2\frac{1}{2}'' \times 1\frac{1}{2}''$ Flexible Plates and upper $5\frac{1}{2}''$ Strips are then connected by $2\frac{1}{2}''$ Strips. Flat Trunnions and Trunnions are next bolted in place to form the axle bearings, and $5\frac{1}{2}'' \times 1\frac{1}{2}''$ Flexible Plates are curved round to form the front and rear ends of the model. To these Plates are fixed 3″ Formed Slotted Strips and $\frac{3}{4}''$ Discs to represent the bumpers and headlamps respectively. The roof consists of two $2\frac{1}{2}'' \times 2\frac{1}{2}''$ Flexible Plates and a $4\frac{1}{2}'' \times 2\frac{1}{2}''$ Flexible Plate, bolted end to end and attached to the body of the model by Angle Brackets. A $2\frac{1}{2}''$ Curved Strip rounds off each end of the roof. The trolley is a Crank Handle held in place by a Spring Clip.

Two $3\frac{1}{2}''$ Rods carry the wheels on which the model runs, and between them is fastened the *Magic* Motor that drives the rear pair of wheels.

Parts required to build the model tramcar: 6 of No. 2; 8 of No. 5; 2 of No. 10; 8 of No. 12; 2 of No. 16; 1 of No. 19g; 4 of No. 22; 1 of No. 35; 54 of No. 37a; 54 of No. 37b; 6 of No. 38; 1 of No. 40; 2 of No. 48a; 1 of No. 52; 2 of No. 90a; 2 of No. 126; 2 of No. 126a; 4 of No. 155a; 1 of No. 176; 2 of No. 188; 2 of No. 189; 2 of No. 190; 1 of No. 191; 2 of No. 215; 2 of No. 217b. 1 *Magic* Motor.



The Guild in War Time

The outbreak of the war has brought with it many disturbances, but there is a determination among Meccano clubs generally to carry on. This determination is well expressed in the words of Mr. W. J. Ellis, Leader of the Plymouth M.C., who writes to me that the members of his club "have resolved that it will take more than Hitler to stop them."

This is the right spirit. Difficulties have arisen in many cases, but these are being overcome. For instance, some clubs in large centres of population have lost members because of the evacuation; but the officials are continuing undaunted, looking for new members among older boys, or re-arranging their programmes to make them specially attractive to the members who are left to them.

In other cases there is a reluctance to hold meetings at nights because of the lighting restrictions. There the situation is being met by arranging meetings for afternoon or early evenings, or by gathering in small groups at the homes of different officials or members in turn for model-building, games and discussion. Model-building competitions can be arranged with little difficulty, for there should be ample opportunity of bringing the entries together somewhere for the special occasions when they are to be judged, and Leaders should make every effort to keep the competitive spirit going, whatever the circumstances.

Emergency Meetings Planned

This reminds me of an excellent instance of foresight in planning, for which the Plymouth M.C. officials are responsible. Club work was continued after the outbreak of war, but prompt measures were taken to meet any situation that would arise. For instance, there was a prospect that it would be impossible to continue meetings at headquarters, and arrangements therefore were made for dividing the club into three sections, to meet in different parts of the city. Emergency meetings of this kind were carefully rehearsed, and now every member knows exactly what he will do if it becomes impossible to continue at the usual meeting place. Plymouth is one of the places where the difficulties due to darkness have been avoided by holding afternoon meetings, and so far this is the only change that has been made.

Clubs Must Carry On

This is undoubtedly going to be an indoor winter. Meccano can play a very great part in keeping boys occupied in a very profitable manner during the dark days, and clubs must take their share in promoting this if they are to justify their existence. If all members determine to carry on then, "however low the flame of club life may be burned, it will not be extinguished," to use another phrase that expresses the views of the Plymouth M.C.

Meccano Club Secretaries

No. 50 H. Dubras

H. Dubras, secretary of the Beeches (Jersey) M.C., which was founded by the Rev. Brother Stephen, Leader, for the boys of De La Salle College. The club was affiliated in December 1936. Keen interest is taken in model-building. Model railway working also is arranged, and the programme is attractively varied by games and outings. Several successful exhibitions also have been held. A splendid club magazine is published.

It is interesting to realise that good may actually come of all this disturbance in unexpected quarters. For instance, new clubs may spring up in districts where evacuated schoolboys are gathered together. In practically all these cases the boys are in charge of a master who naturally is eager to find occupation for them when school work is impossible. There are sure to be Meccano boys among such groups, and the formation of a club would be a solution to many little troubles. I shall be glad to help, and urge everybody interested in such plans to write to me.

Write to the Secretary

This brings me to the share of the Meccano Guild itself in keeping things running in war conditions. As I have already suggested, I shall be as ready as ever to give members advice and assistance in pursuing their hobbies and in any of the problems that they come up against. Members should keep this in mind and should seize every opportunity of writing to me, to tell me something of what they are doing in the strange circumstances in which we are all finding ourselves, as well as to give me news of their model-building and Guild and other activities. In particular I should like to hear from members who have not written to me since they received their badges and certificates. By not writing they are refusing one of the greatest advantages membership of the Guild can give them, for they are not sharing in the friendly exchanges that are a true expression of the Guild spirit. We must get closer together, especially in difficult times such as these.

I have already been asked such questions as "Will the "*M.M.*" be continued" and "Will Meccano and Hornby Trains continue to be produced?" Members may be fully assured that everything will go on, as far as possible. As the Editor explained in last month's issue, the Magazine certainly will continue, and it will be as valuable and attractive as ever, although some reduction in size may be necessary, owing to the difficulties of obtaining paper. Everything will continue as far as possible as far as Meccano and Hornby Train products also are concerned, but the introduction of new lines at present is doubtful. The reason for this is that it is not easy to obtain all the necessary materials. This has already accounted for the small rise in the price of Dinky Toys, for which it is the sole reason.

Proposed Clubs

Attempts are being made to establish Meccano clubs in the following places, and boys interested should communicate with the promoters, whose names and addresses are given below.

DENTON—J. Leamy, 23, Vaudrey Lane, Denton, nr. Manchester.

EXMOUTH—P. Vickers, 50, Egremont Road, Exmouth.

HIGH WYCOMBE—R. Rance, "Ilona," Totteridge Hill, High Wycombe.

KENTON—F. Violett, 34, Brancker Road, Kenton, Middlesex.

LLANDUDNO—W. Sweetenham, The Balmoral, Trinity Square, Llandudno.

LOUGHTON—D. Elliott, 22, Lower Park Road, Loughton, Essex.

MALVERN—E. F. Haines, Evendine House, Colwall Green, Malvern.

CLUB NOTES

Acton M.C.—At a recent monthly business meeting special regulations were brought into force in view of the international situation. These included the suspension of subscriptions of members evacuated and on active service, and the replacement of the original programme with one more suited to the lighting restrictions. The remaining members are employing meetings for the purpose of thoroughly overhauling model railway equipment ready for future use, and the decorating of the club rooms is being continued. The club Magazine will continue to appear. Club roll: 13. *Secretary:* S. W. Simmons, 7, Alfred Road, Acton, London W.3.

Barnard Castle School M.C.—Meetings were begun again after the school holiday with model-building and other preparations for the Autumn Exhibition. Members are very enthusiastic. They were delighted with the appearance in the September "*M.M.*" of a group photograph of the club's officials and members. Club roll: 15. *Secretary:* A. Coates, The School, Barnard Castle.

Exeter M.C.—The Winter session promises to be an enjoyable one, despite numerous difficulties. Four football teams are being run, these being known respectively as Elmside Rangers A and B teams, Riverton Rangers and Elmside Rovers. The Exeter club is now affiliated to the Football Association, the first to be so distinguished. Several practice games have been held, and the various teams are expected to give a good account of themselves in their respective leagues. Recommendations for the session's two Merit Medallions have been forwarded to Headquarters. The Corinthian Football League organised by the club has been re-commenced, and some exciting games have already been played. Models built on Meccano model-building evenings have included a realistic suspension bridge and a swing bridge that reproduced all the main features of its prototype. The Board of Directors has been dissolved and a special "War-time Committee" has been formed to supervise the programme until conditions return to normal. Attendances have been excellent and have improved each week. Club roll: 65. *Secretary:* E. Edworthy, 23, May Street, Elmside, Exeter, S. Devon.

Folkestone M.C.—Owing to lighting restrictions meetings are being held during the afternoons, and have been reduced to three a month, a number that will be greatly increased as Christmas approaches. Plans have been made to curtail operations in the event of air raid warnings during a meeting, and members are being exercised in wearing gas masks. More Model-building Contests than usual are being arranged for the present winter session. There has been a satisfactory increase in membership. Club roll: 9. *Secretary:* W. F. Cotter, 68, Linden Crescent, Folkestone.

Islandmagee M.C.—Since the commencement of the Winter Session members' interests have been divided between Model-building and miniature railway working. Alterations have been made in the design of the club's Hornby layout, and this has made possible more realistic track operations. Each member enjoys a specified period of time at each of the major control points, thus gaining practical all-round experience. Darts has proved popular among members, and occasional meetings have been devoted to this game. Merit Medallions for good work during the Summer Session have been presented to I. Forsythe and T. Hunter. The presentation was made at a special meeting for light refreshments and games. A well-stocked library is now available and is being well used. A Hallow'een party has been held, when Vice-Presidents of the club were present. Several matches have been played by the Senior and Junior Football Teams, the latter acquitting themselves extremely well. Club roll: 22. *Secretary:* S. McCready, "Hillmount," Islandmagee, Co. Antrim.

Islington M.C.—Most club members have been evacuated, but Mr. V. Miller, Leader, is keeping the club room open for those still in the district. Improvements are being made to the club's Hornby Train layout. Efforts are being made to recruit new members to aid those who are left to keep the flag flying. Readers of the "*M.M.*" in the Islington district can help in this good work, and those who wish to do so should get into touch with the Leader at 25, Bewdley Street, London N.1. Club roll: 12. *Secretary:* F. Warren, 48, Leigh Road, Highbury N.5.

York M.C.—Meetings during the present session have been devoted to model railway working. Further centralisation of control has been effected, several points being connected to the main lever frame. Six additional lights have been installed at various points, and signals also have been provided with lights and connected to the lever frame. Automatic switches prevent a train passing a signal at danger. A considerable amount of stock has recently been added, and extensions have been made to the track. Club roll: 16. *Secretary:* G. Hodgson, 1, Sunnyside, Heslington Lane, Fulford, York.

Middlesbrough M.C.—Reviewing the past 12 months' work, there is room for congratulation on the re-establishment of this club. Members have worked well together, and Merit Medallions awarded for general club work and model-building have been thoroughly earned. The prospects for the present Winter Sessions are very bright, if war conditions allow the club to continue its normal activities. Club roll: 34. *Secretary:* Mr. G. Brockhurst, 49, Heythrop Drive, Acklam, Middlesbrough.

St. Oswalds M.C.—A special meeting was held to decide what steps to take in the present conditions. It was decided to hold meetings at the house of Mr. J. F. Jaques, acting secretary, and members of the associated Branch of the H.R.C. are taking part in these. Model-building and other activities are being pursued. Several members of the club have been evacuated, and a circular letter is to be sent to them once a month in order to maintain contact. Club roll: 25. *Secretary:* Mr. J. F. Jaques, El Molino, 5, Ingram Road, Thornton Heath, Surrey.

Hornsea M.C.—Prior to the outbreak of hostilities a number of special outdoor meetings were held and games were played. These included bowls, cricket, miniature golf and hockey. The woodwork sections, both Senior and Junior, met regularly, and among articles produced were useful accessories for the model railway and tooth-brush racks. A visit was paid to a local L.N.E.R. engine shed, where members enjoyed rides on three engines. Two very enjoyable picnics were held, one to Skipsea and the other to Albrough. Several afternoon meetings have been held since the blackout was instituted. Club roll: 19. *Secretary:* P. Richardson, Summerleigh, Esplanade N., Hornsea.

Ryford Hall M.C.—Excellent progress was being made with general work, and during the present Winter Sessions a special room was to be set aside for the club's Hornby Railway. Unfortunately the coming of war has made removal necessary. The Hornby Train material was packed ready for transference and it is hoped to continue work in the School's new quarters. Club roll: 20. *Secretary:* Mr. C. G. V. Taylor, "The Pines," Southrop, Lechlade, Gloucestershire.

Plymouth M.C.—Meetings are being continued, but are held in the afternoon instead of in the evening. In emergency the club will be divided into three sections, to meet in different parts of the city, and rehearsals of this arrangement have ensured that members know exactly what they will have to do. Membership is now higher than ever, and work is even more varied than it has been in the past. Club roll: 95. *Secretary:* A. E. Miller, 21, Hamilton Gardens, Mutley, Plymouth.

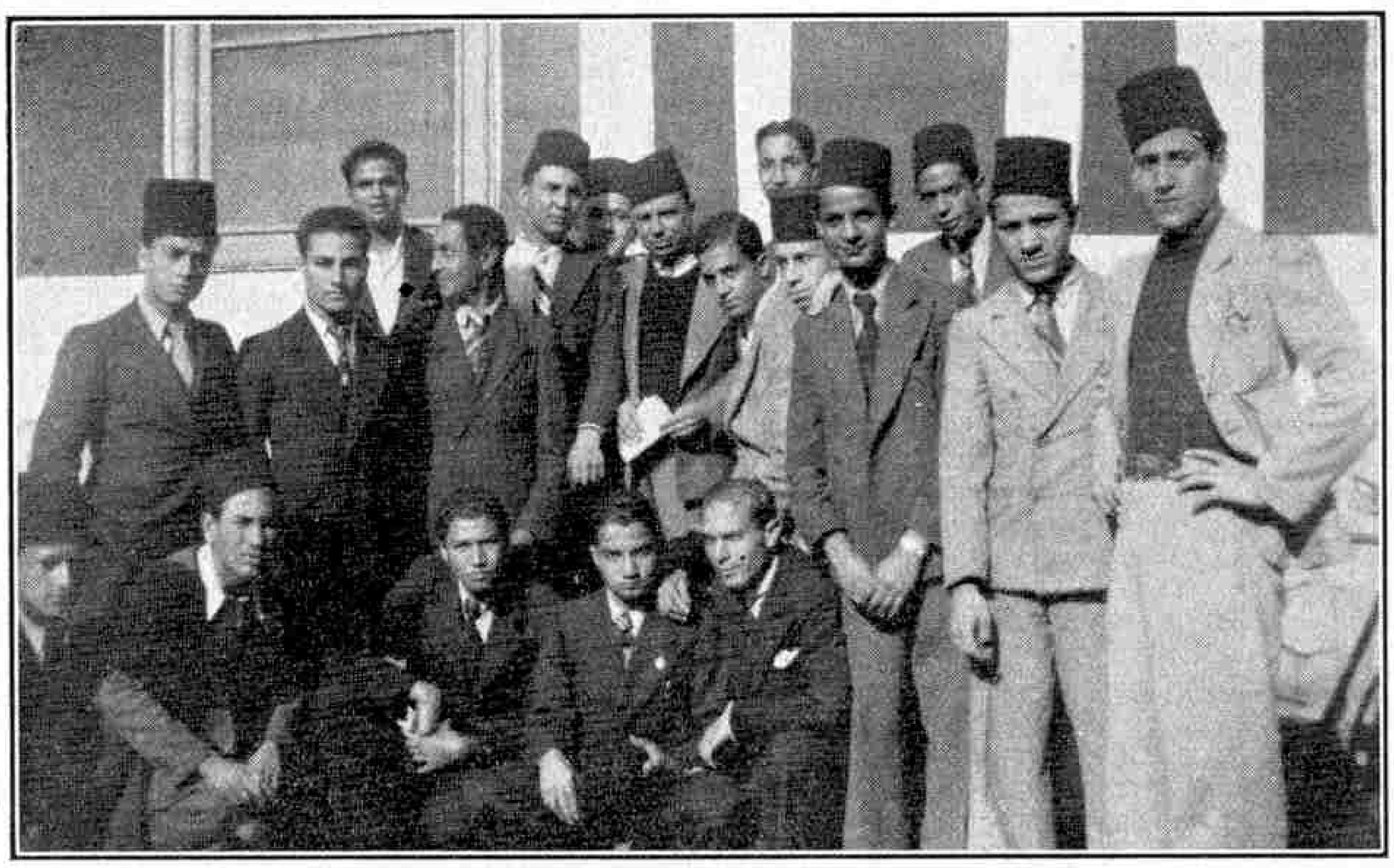
Mount Senior School (Newark) M.C.—The cost of making the two club rooms suitable for use during the blackout is being defrayed by Mr. Wolley, a generous friend of the club. Immediately the work is completed the club will start their winter programme. Model-building and model railway operations will be the principal activities of the members. Club roll: 55. Secretary: D. Aryto, 18, North Street, Newark, Notts.

AUSTRALIA

Melbourne M.C.—The regular meetings have been devoted to track operations on the club's realistic electric model railway. At one meeting a new metal rectifier was demonstrated. This was capable of transmitting sufficient power to run a single permanent magnet type locomotive. Two new station platforms have been built and placed in position. On one evening the "Visitors" schedule of train movements was run through, after which a member operated a Meccano lathe that he had built from a clockwork motor. Regular tests have been conducted with buzzer, relay and telephone systems, which make possible the extensive automatic and remote control now in use on the layout. A party of members cycled to South Yarra, and there saw trains hauling the new steel air-conditioned buffet cars. Club roll: 10. *Secretary:* L. Ison, 8, Hayes Street, Northcote N.16, Victoria, Australia.

MALTA

Lasallian M.C.—In a very interesting motor car building competition some excellent Meccano models were built in the two hours allotted for construction. This competition proved so popular that others are to be held shortly. Many creditable models are shown at most meetings. Two Football Teams have been formed and named "Screwdrivers" and "Spanners" respectively, and several exciting matches have been played. New officials have been elected, and further activities introduced are woodwork and stamp collecting. A Harmonica Band is being formed. An Exhibition is to be held shortly, and is expected to attract more members. Club roll: 23. *Secretary:* A. Caruana, "Floria," Victory Street, Gzira, Malta.

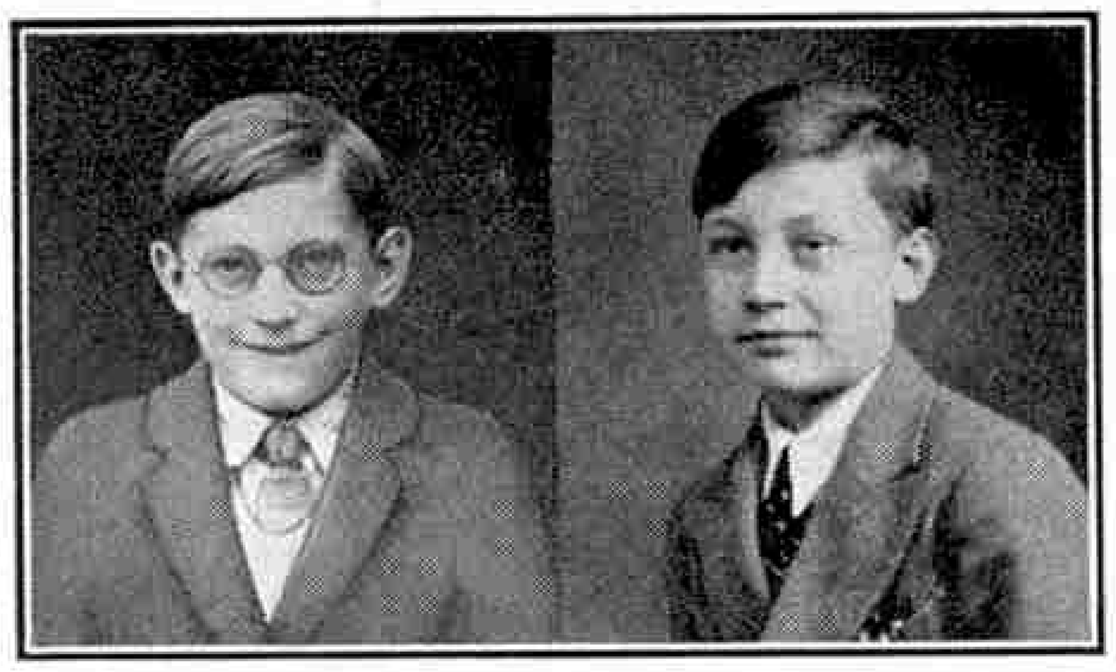


Members of the Zagazig and Misr M.C., Leader, A. M. Mangourie; secretary, A. S. Mangourie. This thriving Egyptian club was affiliated in October 1935. Meetings are devoted chiefly to model-building, stamp collecting and debates. Games and competitions also are arranged, and a feature is made of sport and outings.

Model-Building Competition Results

By "Spanner"

"Engineering of the Past" Contest Results



Smiles of success! G. Richards, Mitcham (left) and M. Turner, Barnes, two prize-winners in recent "M.M." model-building competitions.

The complete list of prize-winners in the "Engineering of the Past" Competition is as follows:

1st Prize, Cheque for £5/5/–: L. W. Chitty, London S.W.20. 2nd, Cheque for £3/3/–: P. R. Wickham, Leicester. 3rd, Cheque for £2/2/–: J. Matthews, Fillongley.

Meccano or Hornby products value 10/6: B. Stott, Dundas, Ontario; L. Masters, Bletchley; J. Usher, Dundee; D. Holden, Reading; R. Heathcote, Dordon; L. Furmedge, Basingstoke; M. Orphan, Durban, S. Africa; W. Finlayson, Edinburgh; K. Pritchard, Brook's Green; R. Finlayson, Edinburgh.

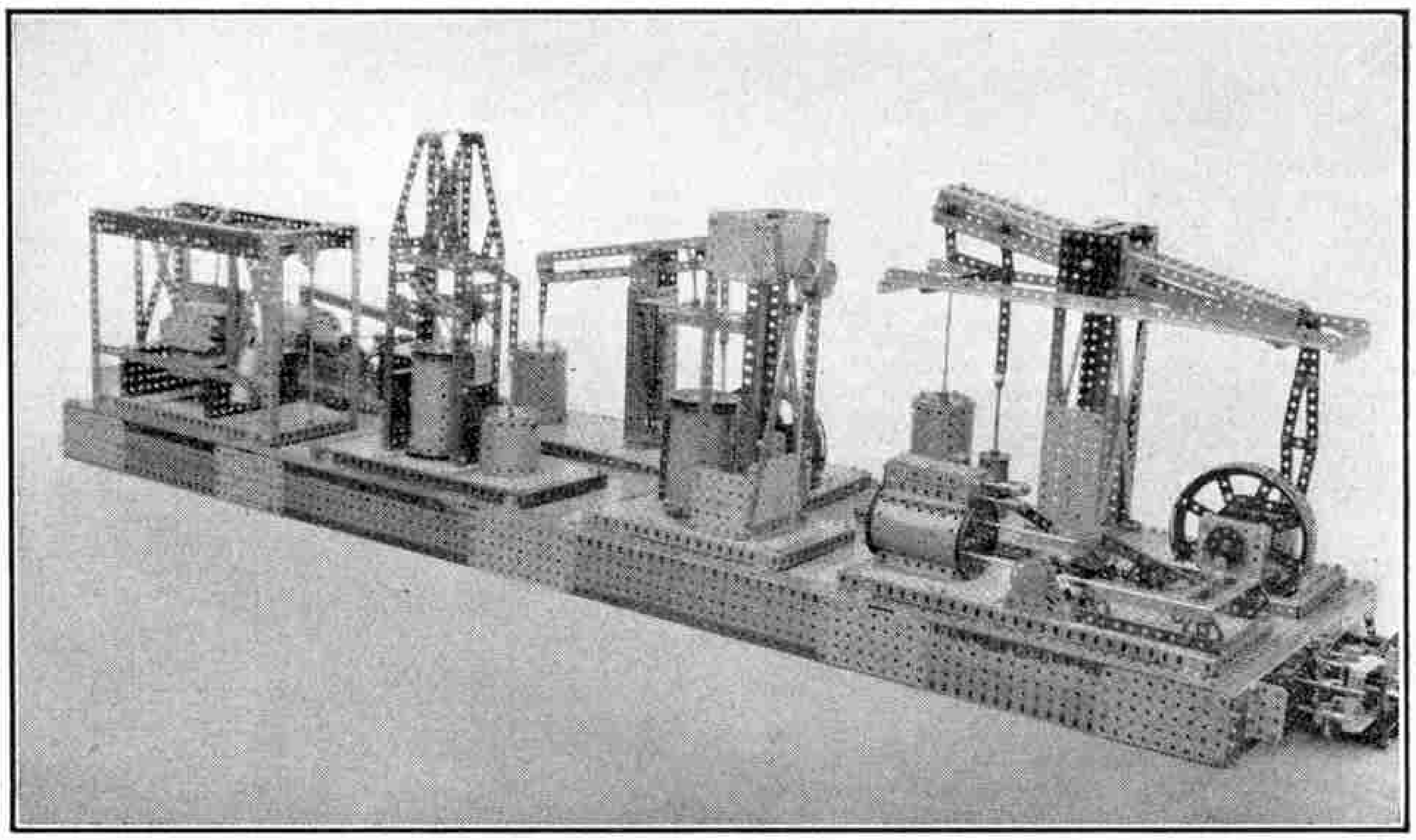
Meccano or Hornby products value 5/–: H. Sansome, Nottingham; J. Pemberton, Canterbury, New Zealand; W. Williams, Dover; E. Friis, Johannesburg; J. Alexander, Howden; V. Clarke, Walsall; B. Thompson, Sheffield; R. Lowe, Stocksbridge; C. Owen, Hale; H. Coleman, Leicester; E. Barker, Eastbourne.

The most outstanding entry submitted for this competition was a group of several models of early types of steam engines. This was the work of L. W. Chitty, London S.W.20, and readers will be able to judge the excellence of this competitor's workmanship from the illustration on the right, which shows the complete group. All the models actually work, and are driven from a single Electric Motor placed at the right-hand end of the base. They include models of Boulton and Watt's rotative beam engine and M'Naught's compound beam engine. These are shown on the back row in the illustration. The others are engines of various types that were used for propelling early paddle and screw steamers. On the extreme left at the rear is a fine model of the trunk engine patented by John Penn and made by John Penn and Sons, Greenwich, and in front of this is a model of an oscillating engine also designed by Penn. Next to the latter are examples of the "steeple" and inverted vertical engines of Maudslay, and at the end of the row is a fine model of Bourne's return connecting rod engine.

These engines had many interesting features that make them excellent subjects for Meccano models. The trunk engine was designed to take up as little transverse space as possible in the hull, and derived its name from a large tube or "trunk" that passed right through the cylinder and was attached to the piston. The connecting rod was pivoted to the middle of the tube and thus eliminated the necessity for a piston rod. This system was patented by John Penn in 1845 and engines based on it were used in both paddle and screw steamers.

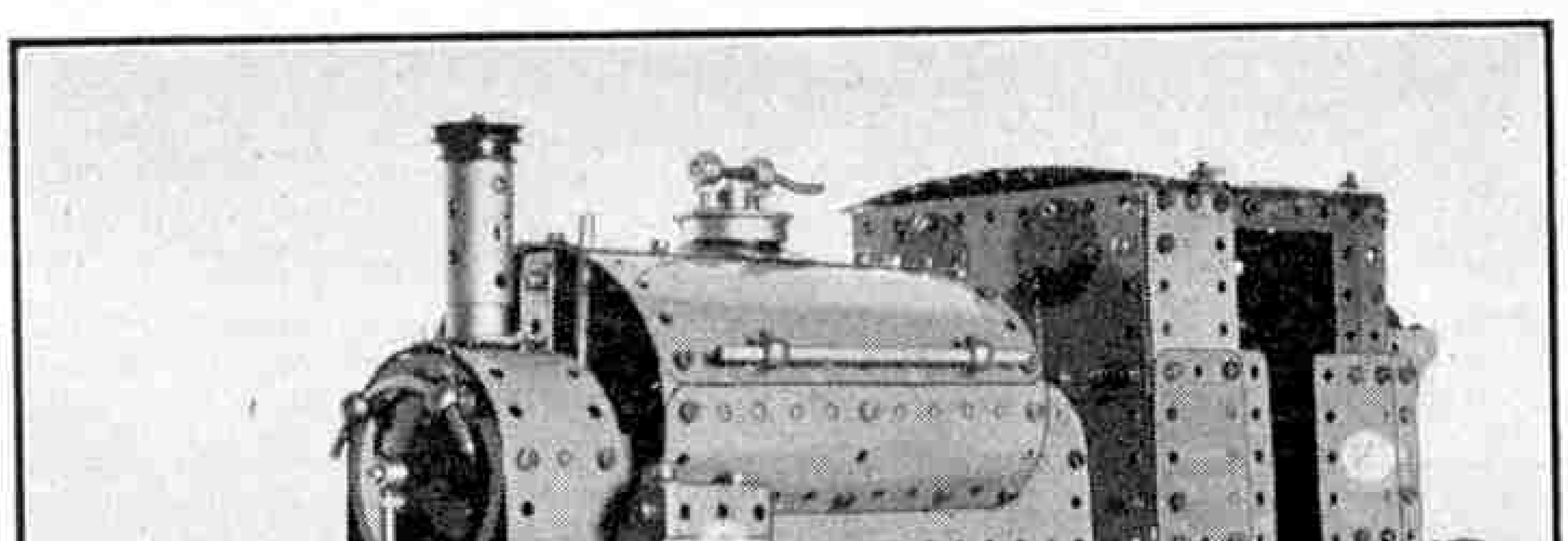
In the "steeple" engine, which derived its name from a tall framework or "steeple" above the crankshaft, the cylinder was set vertically below the crank. The particular engine of this type on which Chitty based his model was designed by Joseph Maudsley in 1839. It had a divided piston rod connected by rods to a crosshead sliding in vertical guides in the "steeple." A connecting rod coupled the crosshead to the crankshaft, which was just above the top of the cylinder. The Meccano model is very accurately built and includes a circulating pump for the condenser, which can be seen on the right-hand side of the model in the illustration.

The return connecting rod engine represented in this group of models is rather like a steeple engine laid on its side, and study of the illustration will show the similarity of these two types. In all the models Flexible Plates are used for the cylinders and the end covers are 3″ Pulleys or Face Plates. Girders form the supporting frames and bedplates and give the massive appearance that was so prominent a feature of these old-time engines.



A group of well-built working models of famous early steam engines. They were constructed by L. W. Chitty, London S.W.20, who was awarded First Prize in the "Engineering of the Past" Competition.

Second Prize in this competition went to P. R. Wickham, Leicester, for the fine scale model of a saddle tank locomotive shown in the illustration at the foot of this page. The model is built to a scale of $\frac{5}{8}$″ to the foot, and represents a 0–4–2 locomotive built in 1885 for working on the Killin section of the Caledonian Railway. The model has a length of 18 in. and is $8\frac{1}{2}$ in. high. It is driven by a Clockwork Motor housed in the boiler. The contents of an Outfit No. 8 and a few extra parts were used in the construction of this model, and a glance at the illustration will show several really good constructional features particularly in the construction of the safety valve, chimney, buffers and the cab.



This neat model 0-4-2 saddle-tank locomotive won Second Prize in the "Engineering of the Past" Contest for P. R. Wickham, Leicester.

An exceptionally fine model of Stephenson's "*Rocket*" secured Third Prize for our old friend J. Matthews, Fillongley. It is one of the most realistic models of this engine that I have yet seen and I shall endeavour to illustrate it in next month's "*M.M.*" The boiler is built from Flexible Plates, and Strips bolted around them at intervals represent the metal bands that on the actual locomotive secured the wooden insulation lagging in place. The safety valve and steam dome are represented by a Sleeve Piece and Flanged Wheels respectively. The cylinders are each made from two Sleeve Pieces capped by $\frac{3}{4}$″ Flanged Wheels, and are attached to the crosshead slides by $1\frac{1}{2}$″ Strips. The same attention to detail has also been given to the construction of the tender.

Competition Corner

A Simple Price Codes Contest

Practically all *"M.M."* readers are interested in the solving of cryptograms and secret messages of all kinds, and we are sure they will welcome the opportunity we give them this month of trying their skill in this direction. This month therefore we have arranged a simple competition of a type that we introduced in February 1937 and which proved remarkably popular.

This is concerned with the use of price codes in shops and stores. Codes of this kind are based on some easily memorised word or phrase consisting of 10 different letters, which represent the numbers one to nine and the cipher 0. The assistants make themselves familiar with the code and are able to read off the letters as figures without delay.

Readers are asked to imagine that they are in the radio department of a large store where this system is in use, and that the articles named in the panel on this page are marked with code prices. The numerical values of some of the letters can be found quite easily, and those of others can be discovered by suitable detective methods. Thus step by step the code word is revealed, and competitors are asked to find this. When submitting solutions, they should give also the actual prices of the articles and explain briefly the steps by which they reached their solution of this interesting puzzle.

Television Receiver ...	**ANW/–/–**
Mains Rectifying Valve ...	**AU/L**
Radiogram	**DR/AW/–**
5-valve, all wave Mains Set	**AD/AD/–**
Coil of Insulating Tape ...	**–/L**
Copper Earth, with connections	**N/L**
Two-way Plug	**–/T**
High Tension Battery ...	**U/L**
Mains Transformer ...	**A/E/–**
75 ft. Aerial Wire ...	**A/D**
Loudspeaker	**A/AW/–**
Low Frequency Transformer	**S/T**

There will be two sections in this contest, for Home and Overseas readers respectively, and in each prizes of Meccano products value 21/–, 15/–, 10/6 and 5/– respectively will be awarded to the best solutions in order of merit. In addition there will be a number of consolation prizes for the next best entries in each section. In the event of a tie for any of the prizes, the judges will give preference to competitors displaying the neatest or most novel presentation.

Entries should be addressed *"Price Codes, Meccano Magazine, Binns Road, Liverpool 13."* Those in the Home Section should be posted to reach this office not later than 30th November. The closing date in the Overseas Section is 29th February 1940.

November Drawing Contest

As announced in the October *"M.M.,"* we are again holding a Drawing Contest each month throughout the winter. There are no restrictions as to subject, size or treatment. Readers may submit as many entries as they wish, but each competitor may receive only one prize in any one contest. Paintings as well as drawings in pencil or ink are eligible, so that every reader will have full scope to show his abilities. It should be noted that the prizes will be awarded solely on drawing merits, however, so that those who for any reason cannot submit coloured entries need have no hesitation in entering. Their efforts will be given as much consideration as elaborate paintings and will have every chance of winning a prize.

Entries will be divided into the usual two sections, "A" for readers age 16 and over, and "B" for readers under 16, and prizes of Meccano products to the value of 21/– and 10/6 respectively will be awarded in each section. There will be special sections, with the same age groupings, for Overseas readers, and in these prizes of the same value as in the Home sections will be awarded.

The entries in this month's contest must be addressed *"November Drawing Contest, Meccano Magazine, Binns Road, Liverpool 13."* Those submitted in the Home section must arrive not later than 30th November, and the Overseas closing date is 29th February 1940.

Intending competitors are reminded that each drawing submitted must bear the competitor's name, age and address on the back. Unsuccessful entries will be returned if a suitable stamped addressed cover is sent with the drawing, but successful entries become the property of the Editor and are not returnable.

Competition Closing Dates

HOME

Price Codes	30th November
November Drawing Contest ...	30th November

OVERSEAS

August Crossword Puzzle ...	30th November
August Photo Contest ...	30th November
September Sketchogram Contest	30th December
September Photo Contest ...	30th December
Sports Voting Contest ...	31st January
October Drawing Contest ...	31st January
Price Codes	29th February
November Drawing Contest ...	29th February

Watch the Closing Dates:

Competitors, both Home and Overseas, are particularly requested to make a careful note of the closing dates of the competitions.

In sending entries to competitions that are divided into age groups, competitors should take particular care to mark their ages clearly on the back of the entry. It is not sufficient merely to indicate the age group.

COMPETITION RESULTS

HOME

August Photo Contest.—First Prizes: Section A, N. Thompson (Neston); Section B, J. C. Needham (Enfield, Middx.). Second Prizes: Section A, R. Perry-Keene (Birmingham); Section B, A. Stubbs (Sheffield). Consolation Prizes: R. L. Coulthard (Newcastle-on-Tyne 4); A. G. Dolton (Bedford); D. Hadfield (Farnham); W. B. Hudson (Shrewsbury); A. M. H. Lewin (Portsmouth); R. Naisbitt (Sunderland).

August Crossword Puzzle.—1. P. D. Ede (Calne, Wilts.). 2. T. D. Tasker (Barnsley). 3. F. Newson (Luton, Beds.). 4. D. Goodman (Hertford, Herts.). Consolation Prizes: J. Adams (Seaford); P. L. Baldwin (New Malden).

September Sketchograms Contest.—First Prizes: Section A, D. W. Griffiths (Bexhill-on-Sea); Section B, L. J. Johnston (Liverpool). Second Prizes: Section A, S. Robertson (Manchester); Section B, L. Oliver (Redruth). Consolation Prizes: D. Bennett (London S.E.19); P. M. Kellond (Grantham).

September Photo Contest.—First Prizes: Section A, R. Green (Leeds); Section B, J. C. Needham (Enfield). Second Prizes: Section A, F. L. Atkins (St. Leonards-on-Sea); Section B, Miss A. Durnford (Kelso). Consolation Prizes: Miss D. A. Attrill (Bristol); G. Balfour (Upminster); B. Bramall (Manchester).

OVERSEAS

May Photo Contest.—First Prize: Section A, J. S. Manduca (Sliema, Malta); Section B, K. Donaldson (Whakatane, N.Z.). Second Prizes: Section A, F. H. Early (Vaucluse, N.S.W.); Section B, W. L. Tsun (Potchefstroom, S. Africa). Consolation Prize: K. J. Milne (Hastings, N.Z.).

May Code Puzzle.—1. J. R. Hurst (Olivos, Argentine). 2. E. A. Hamilton (Dunedin, N.Z.). 3. C. P. Barnard (Johannesburg). 4. S. W. Toomath (Petone, N.Z.). Consolation Prize: E. Riseborough (Capetown).

June Sketchograms Contest.—First Prizes: Section A, S. V. Nilakanta (Madras); Section B, C. J. Frost (Mowbray, S. Africa). Second Prizes: Section A, G. W. Simmonds (Melbourne); Section B, G. Milling (Ontario). Consolation Prizes: C. S. Fook (Singapore); E. P. Tapper (South Perth, Australia).

June Photo Contest.—First Prizes: Section A, J. M. Demanuele (Malta); Section B, H. O. Salmon (Nairobi). Second Prizes: Section A, E. Jones (Auckland); Section B, T. Allen (Capetown). Consolation Prizes: E. E. Delagrammaticas (Umtali, S. Rhodesia); S. M. Ghatak (Calcutta).

STAMP COLLECTING

Postmarks and Slogans

JUST recently there have come into our possession fragments from envelopes, one illustrated on page 668, bearing postmarks that showed the letters to have been among the last to have left Poland and Germany for Britain prior to the outbreak of war. This led us to wonder how many of our readers collect "entires," which means complete envelopes, and pieces bearing postmarks. Probably the number is not big, for most young collectors concentrate upon specimen stamps, except perhaps for air-mail covers, and overlook the wealth of interest that is to be found among postmarks. The study of postmarks is a very important branch of philately, which involves the study of the whole sphere of postal service as distinct from the mere acquisition of stamps. It may therefore be helpful to devote our space to the subject this month.

Postmarks existed long before postage stamps. In their earliest days they were used to denote payment of the post office fee for the carriage of letters, and recently there was a long discussion in the philatelic press concerning a claim to describe such early postmarks as stamps. Those in favour based their argument upon the fact that the postmarks were *stamped* on the covers. We need not deal with those marks, however, since they are rare and few readers can hope to acquire specimens. Our interest can be limited to postmarks in the form we know to-day.

The original objects of the postmark were to obliterate the stamp, thus preventing its further use, and to indicate the place and time of posting at the departure office. To begin with the early date stamp was retained and a second mark was used for obliterating. A red Maltese cross was the first obliterator used in Britain, but Sir Rowland Hill, the originator of cheap postage, soon discovered that all trace of the red colour could be removed easily from the face of a black stamp. A black obliteration on a black stamp proved equally undesirable, as it was barely perceptible, and thus it came about that the famous "Penny Black" went out of existence in favour of the "Penny Red." The first stamp in fact was "killed" to meet the need for a perfect obliteration.

An amusing story is told that the boys of Eton College stoutly refused to use postage stamps when they were introduced. It was the postmark that troubled them. To their minds, it smacked of disloyalty to be parties to the deliberate defacement of a portrait of their beloved Queen!

About the same time, King Ferdinand II of Sicily was strenuously refusing to permit the introduction of cheap postage. Ultimately he was obliged to give way under pressure of public opinion. But Ferdinand was a man of dignity and he first banned the use of red and green colours, because they were the Italian national colours. That problem overcome, he flatly refused to permit the defacement of his portrait on the stamps. His Postmaster got over the difficulty by devising an obliterator that actually formed a scroll-like frame on the sides and bottom of the royal portrait, and the King had the last word by insisting on the dismissal of any postal employee who was so careless as to misplace the frame.

The early British obliterators consisted of a heavily barred oval with a number, representing the town, in the centre. The British Post Offices overseas used English stamps and similar obliterators, and thus it is worth while to look among stamps cancelled in this way for marks with numbers preceded by the letters A to G and M and S. For example, A25 represents Malta. A complete index of such letters and numbers, with their offices of use, is given in Gibbons' Catalogue, but we will gladly assist in an identification in case of doubt.

Dual markings continued in use for more than 30 years, but gradually they tended to be combined into one mark to serve all purposes. Almost every country adopted the simple circle bearing the name of the town or office, the date and, in most cases, the time of posting, that is so well known to us all.

The philatelist finds in the postmark the evidence he desires as to the first use of a stamp, the places where it was used, and so on. These points are of paramount importance in the study of early stamps. It is not quite so important with modern issues, which are usually so well heralded by advance publicity that there has grown up a popular practice of collecting first day covers, that is covers bearing stamps postmarked on the first day of issue of the stamp. There is interest too in such a postmark as that on the Polish stamp reproduced on page 668, for the date shows that this cover was despatched from Katowice only a few days before the storm of war burst over Poland.

The fashion of collecting first day covers, which reached crazy heights at the time of issue of the stamps commemorating the Coronation of King George and Queen Elizabeth, has in fact created an industry, for there are many dealers specialising in providing such covers for the issues of any country as they are emitted. At the time of the Coronation, many of these dealers found themselves unable to fulfil their undertakings, because the demand was so terrific. The smaller Colonial post offices were overwhelmed and even with the aid of additional staff found themselves obliged to go on stamping the first day's date for four or five days! An interesting development of the "first day" fashion is to be observed in the United States, where the first day sale of a commemorative stamp usually is confined to the office of the town upon which the commemorated incident is centred.

The demands of modern methods inevitably have left their mark upon current styles of obliteration. Thus we find such interesting forms as the "precancels," or ready cancelled stamps, issued by the United States Post Office to business houses for use on printed matter, thus saving time that would be involved in cancelling each stamp individually on its packet and wrapper. A specimen, issued in Brooklyn, New York, is illustrated on this page. Actually this stamp was cancelled subsequently in the ordinary course because other stamps, not pre-cancelled, were used on the wrapper. The ends of two bars on the obliterator can be noted on the right.

Another modern development, one that really deserves a complete article to itself, is the meter mark. This takes the place of the ordinary postage stamp, and is used by many business houses to avoid the heavy clerical labour involved in stamping a big daily mail and recording the amount spent on stamps.

The mark is applied (Con. on page 668)

Postmarks and Slogans—(Con. from page 667)

by a machine that has previously been set by the Post Office to print meter marks up to a certain pre-paid value. That is why the name "meter" is used. Each individual firm is licensed to use such a machine by the Post Office, and in Britain separate registers of machines are maintained at each Head Post Office throughout the country. The number on the register is incorporated in the franking device, and thus the same numbers will be found on franks from different towns. For example, the Liverpool mark for Meccano Ltd. is N6, which is also the mark of Messrs. Wickman of Coventry. The L.M.S. Railway use N25 on the London North-Western District register, as can plainly be seen in the illustration on page 667.

There are three types of franking machines commonly in use in Britain. These are the Neopost, identified by the symbol N, the Universal (U), and the Pitney-Bowes (P.B.).

The practice in other countries varies only in the manner of maintaining the register, which is usually kept at the central Postal Administration instead of locally.

It will be noticed that the meter cancellation also incorporates a simple advertising message. The use of this idea is not confined to business houses, however. Almost every country in the world now uses postmark propaganda. There is indeed a vast field for anyone who cares to undertake the collection of slogan postmarks, as such pieces are termed. Most countries use a simple message in words, but others have used pictorial devices such as the Swiss and Netherlands specimens shown here. Our illustration on page 667 of the Netherlands postmark shows the artist's finished sketch. The slogans read "*Send by the night mail train*" and "*Posted at night—delivered in the morning.*" For this illustration we are indebted to the Netherlands Post Office.

In one recent morning's mail we encountered specimens from no less than seven different countries. Canada exhorted us to "*Save time. Use Air Mail,*" the United States urged "*Buy U.S. Savings Bonds. Ask your Postmaster.*" Newfoundland pleaded for help for its fishing industry. South Africa suggested "*Post Early for Quick Delivery.*" France pressed the attractions of Rheims Cathedral; Belgium stressed the advantages of the speedy crossing from Dover to Ostend, and Finland strove to awaken interest in the 12th Olympic Games, to be held at Helsinki next summer.

Stamp Gossip

and Notes on New Issues

Stamp Centenary Exhibition Souvenirs

All collectors will be interested in the handsome souvenir label, illustrated here, which has been issued in connection with the Stamp Centenary Exhibition. Unlike most labels of the sort, it has a direct philatelic appeal.

In the first place the head and shoulders of the portrait are familiar to all collectors as that used on the early stamps of many British colonies; and in the second place the souvenirs are printed by the firm that produced, a century ago, the penny black and twopenny blue stamps whose centenary they commemorate. The labels are available in black and blue, the colours of the world's first adhesive postage stamps.

The souvenirs, which are gummed but not perforated, are printed in miniature sheets of four, bearing the imprint of Perkins, Bacon and Co. at the foot of each sheet. They can be obtained from stamp dealers, or direct from the Stamp Centenary Exhibition, Executive Committee, 41, Devonshire Place, London W.1, at the price of 1/- per sheet of four in either colour. If ordered direct remittances, together with the cost of postage, must accompany the order.

"All-Up" Mails Suspended

The Postmaster-General has announced the suspension of the system under which all mail for places on the routes of the Empire air services was carried by air at ordinary postal rates. The air mail services are still available, but a fee of 1/3 per half-ounce for letters (7d. for postcards) must be pre-paid, instead of 1½d. per half-ounce, and a blue air mail "etiquette" must be placed on all covers. All other mail will be carried by surface transport.

No German Stamps for Enemy

British collectors will be unable to acquire specimens of new German stamp issues, even if they want them! Under the Trading with the Enemy Act, introduced immediately on the outbreak of war, it is an offence to purchase unused German stamps, except of course from stocks already in this country.

Used stamps can be purchased. The only specimens available will be those used to frank mail from Germany to neutral countries, however, since there is no mail service between Britain and the enemy state.

The object of the ban is to prevent British money from finding its way to Germany and assisting her to prolong the war.

* * * *

Panama and the United States have issued stamps commemorating the 25th anniversary of the opening of the Panama Canal. The issues include postage and air mail stamps, and the majority of the designs show views of the Canal. The Panama 50c. air mail stamp has a portrait of Gen. Goethals, the engineer who completed the Canal.

The War and Stamp Collecting

The outbreak of the last war, in 1914, came as a terrible shock, and stamp collecting, in common with almost every other activity, was badly hit. The values of stamps slumped almost to nothing, and even rare stamps could be purchased for fantastically small sums. The recovery did not come until 1915 brought a whole series of special "War" issues, and from that point stamps boomed.

This new war has seemed almost inevitable for many months and its coming found the country calm and steady. There has been no slump; indeed prices at the big London stamp sales have ruled amazingly high.

An interesting new factor is the "black out," which is compelling the choice of indoor occupations in the evenings. Inevitably stamp collecting will benefit from that because many thousands will become collectors for the first time solely as a means of filling in evenings that otherwise would be tedious. Stamp collecting is a wonderful tonic.

Later on there will be "war" issues, for special taxation or for wartime charities such as the Red Cross, and readers should be ready for these. Almost all of the 1914–18 war stamps have since increased tremendously in value and among the forthcoming stamps there are certain to be some that will be well worth preserving.

Netherlands Railway Centenary Commemoration

We illustrate on this page the two special stamps issued in Holland to commemorate the centenary of the Netherlands Railways. The 5c. value shows the "*Arend,*" one of the two first locomotives used on Holland's first rail-

way; the 12½c. shows a "head-on" view of a modern electric locomotive.

We are indebted to our reader C. Donker, Jr., Rotterdam, for these early specimens of this interesting issue.

* * * *

A set of five stamps has been issued in Soviet Russia in connection with Aviation Day, 1939. The designs are as follows: 10k., a glider in flight; 30k., a parachutist; 40k., a seaplane; 50k., a balloon in flight; and 1r., a transport aeroplane.

A CHOICE OF TOOLS

Two navvies were enviously gazing at a glittering display in a jeweller's window.

"Wouldn't you like to 'ave yer pick among that lot?" said one.

"I'd sooner 'ave me shovel," was the reply.

* * * *

It was Bill's first morning as an apprentice in a shipyard. The foreman gave him a two-foot rule and told him to go and measure a large steel plate.

"Well," said the foreman when Bill returned, "what is the size of the plate?"

"It's just the length of this rule," Bill replied, "and two thumbs over, with this brick, the breadth of my hand, and my arm from here to there, bar the finger."

* * * *

Caller (at farmer's house): "I want to see Farmer Brown."

Farm-Hand: "He's down among the pigs. You'll recognise him easily—he's got a hat on."

* * * *

Scot: "Do you know the difference between a taxicab and a tramcar?"

Friend: "No."

Scot: "Good! Then we'll take a tramcar."

* * * *

"The Forty Thieves" was being played at a small theatre. The company numbered only eight, so the robbers passed out at the back of the stage and entered again at the front.

Unfortunately one of the robbers walked with a limp, and when he entered five times in succession a voice from the gallery cried: "Stick it, Hoppy; last lap!"

* * * *

A famous boxer, fearing his coat might be stolen, attached a ticket "Owned by a champion boxer." When he returned he found no coat and on his ticket the added note: "Taken by a champion sprinter."

* * * *

Teacher: "Can anyone tell me what happened after Cæsar mustered his army?"

Boy: "Yes, sir, he peppered the enemy and took the citadel by assault."

Teacher: "Sit down, my lad, I'll have no sauce from you."

* * * *

The following notice was once shown on the screen of a certain cinema: "A £5 note has been found in the stalls. Will the owner please form a queue outside the box-office to-morrow night."

* * * *

Irish Groom: "Send up two sacks of oats."

Voice from Telephone: "Who for?"

Irish Groom: "The horse, ye fool!"

* * * *

SAFETY FIRST!

A tough-looking Italian was shaving a little cockney. The Italian leaned over his client, glared into his eyes and asked: "What you t'ink of da international seetuation, eh?"

"Same as you, mate," said the Londoner, cheerfully.

The Italian looked puzzled. "How do you know what I t'ink?" he demanded.

"I don't," said the native, "but you've got the razor."

A NARROW ESCAPE

Diner: "Look here, miss, I only had a portion of trout, and here I'm charged for the whole fish."

Waitress: "Sorry, sir, but it's the custom of the establishment."

Diner: "Then it's a good job I didn't order beef steak."

* * * *

Scoutmaster: "Have you done your good turn to-day?"

Scout: "Well, sir, there was one dose of castor oil left, and I gave it to my younger brother."

* * * *

SILENCE PLEASE!

"And here, ladies," said the guide, "we have the famous falls. If you will stop talking for a moment you will be able to hear the mighty roar."

* * * *

Father: "Have you seen my shaving-brush, Willie?"

Willie: "No, father; but Jimmy's wooden horse has got a new tail this morning."

* * * *

They were on the barrack square, going through musketry drill.

"I told you to take a fine sight," said the sergeant to a new recruit. "You ought to know by now what a fine sight is. What is it?"

"A big boat full of sergeants sinking in mid-ocean," answered the recruit.

* * * *

Tailor: "When your father sent you for samples of cloth didn't he say what colour and material he wanted?"

Small Boy: "I don't think it matters, sir. He wants them for pen-wipers?"

* * * *

"Your new overcoat is rather loud."

"It's all right when I put on a muffler."

* * * *

Mr. Jones (proudly): "They made me foreman of the jury to-day."

Mrs. Jones: "That's a bit of comedown, isn't it, for a works manager?"

* * * *

First Student (in aeroplane): "The plane's in a spin! What do I do now, instructor?"

Second Ditto: "Good heavens! I thought you were the instructor."

* * * *

"Why are telephone girls called 'operators'?"

"Because they 'cut' you off in the middle of your talk."

* * * *

The teacher was testing the knowledge of her young pupils. Clapping a coin on the desk, she said sharply, "What is that?"

Voice from the back row: "Tails!"

* * * *

Boy: "Have your chickens got wishbones?"

Farmer: "No, my lad, they're so happy they've nothing to wish for."

* * * *

THIS MONTH'S HOWLER

"Marquis is the French for a big tent."

A BIPED!

Sportsman: "What was the name of the animal I just shot?"

Ghillie: "I've already investigated, sir, and he says he's called Johnson."

* * * *

Professor's Son: "I say, mother, father is getting more absent-minded every day."

Mother: "Why do you say that?"

Son: "Well, he stopped me on my way to school yesterday, and said he thought he had seen me somewhere before and hoped my father was keeping well!"

* * * *

Magistrate: "What induced you to steal this thing from the store?"

Accused: "Well, your worship, there was a notice, 'No obligation to buy'."

* * * *

Passenger in aeroplane (to pilot): "I read in this newspaper that there's a madman at large."

Pilot: "Hee, hee, hee! They'll never think of looking for me up here!"

* * * *

Customer: "But surely you don't sell these watches for five shillings each?"

Jeweller: "Oh, yes, madam."

Customer: "But they must cost that to make!"

Jeweller: "They do, madam."

Customer: "Then how do you make a profit?"

Jeweller: "By repairing them."

* * * *

Admirer: "Tell me all about your fight, Bruiser."

Dud Boxer: "Well, I led with my left and missed. Then I gave him another and missed again. After that I pulled out a vicious right hook but he feinted. Then he gave me one and I fainted."

* * * *

Uncle (giving a shilling to his nephew): "Now, Johnny, don't let this turn your head."

Johnny: "Oh, it won't do that, Uncle. I've got a stiff neck."

* * * *

Insurance Agent: "My dear sir, have you made any provision for those who come after you?"

Harduppe: "Yes; I put the dog at the door, and told the servant to say I'm out of town."

* * * *

The old gentleman returned to the Lost Property Office.

"Excuse me," he said, "but when I came to inquire about the umbrella I'd lost did I happen to leave my walking-stick?"

* * * *

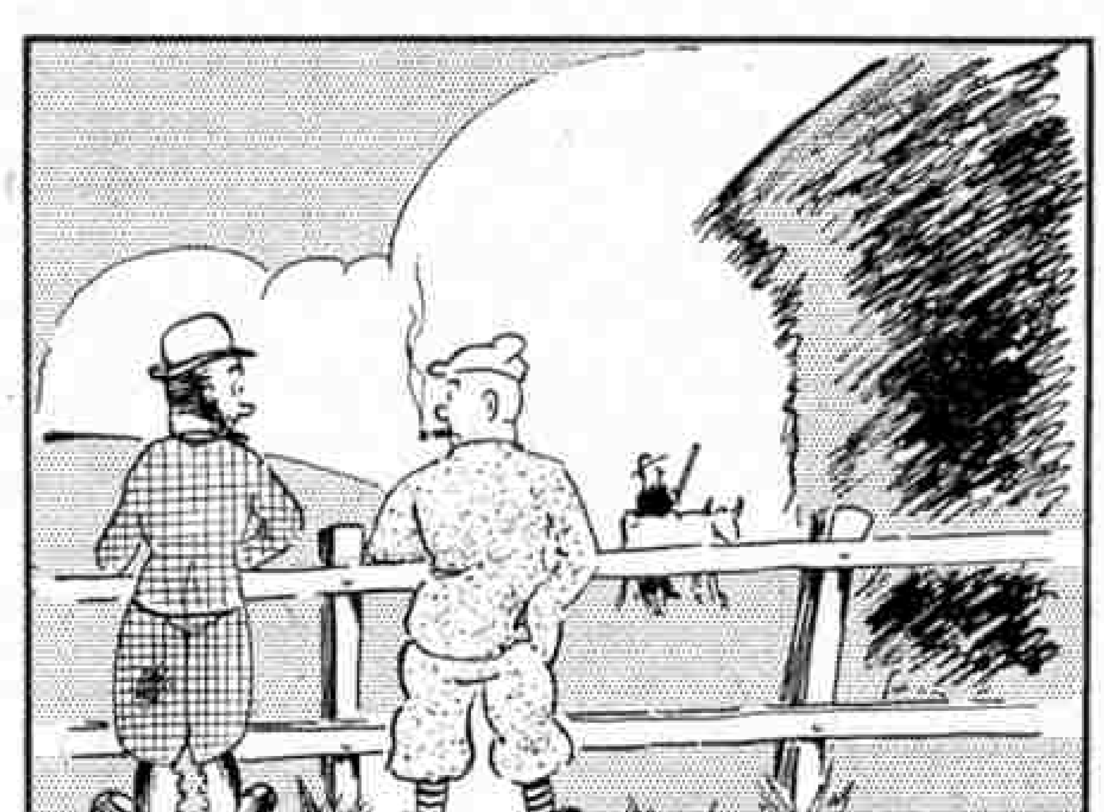
"Where did you learn to sing?"

"In a correspondence school."

"Well, some of your lessons must have been lost in the post."

* * * *

CITY STYLE



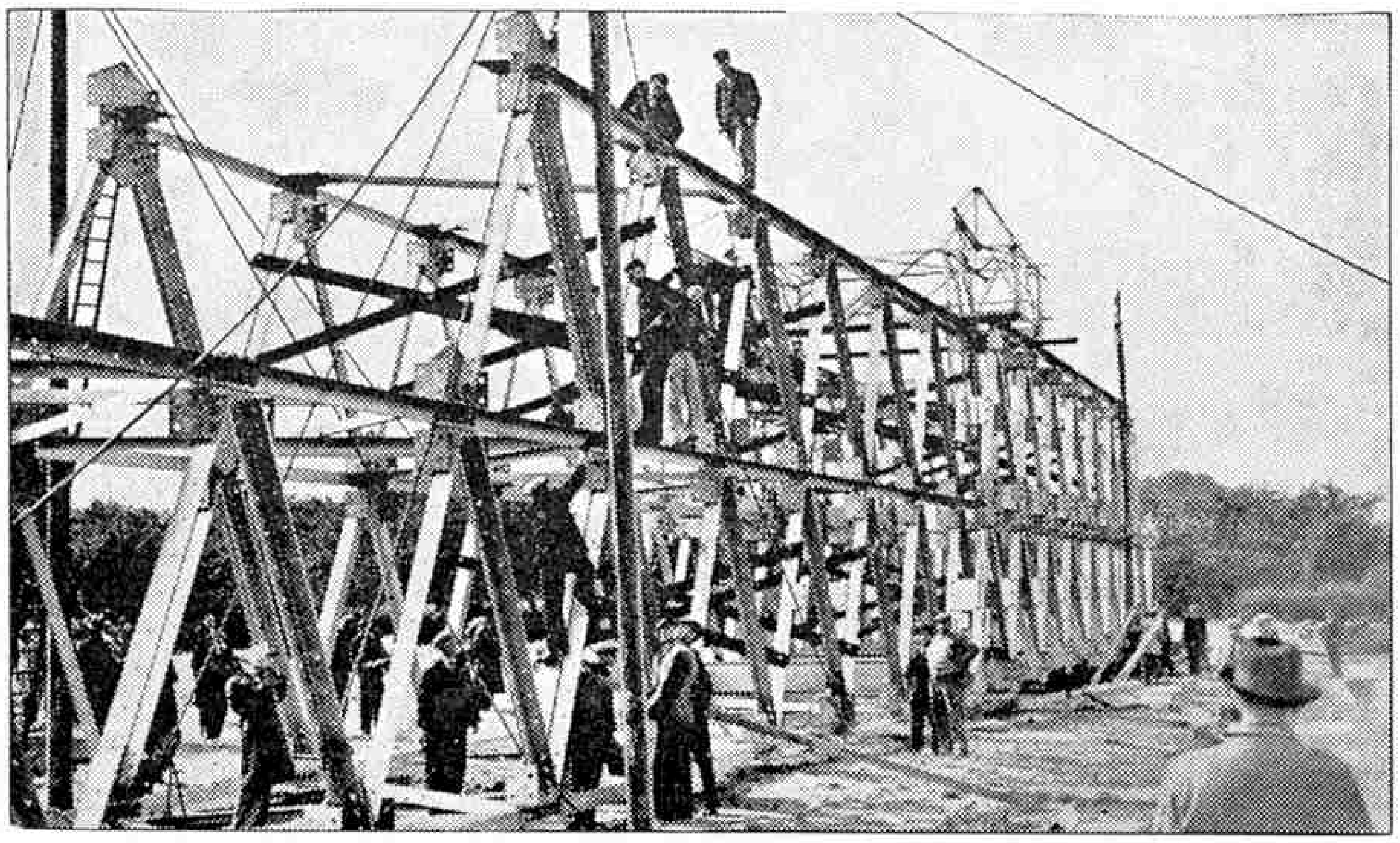
City Banker (visiting the farm): "I suppose that's the hired man."

Farmer (who has visited banks): "No, that's the first vice-president in charge of the cows."

Bridge Built like a Meccano Model

The busy scene shown in the illustration on this page occurred during a demonstration of bridge-building by a new method that resembles on a larger scale the construction of a Meccano model. All the parts used are standard units, and bridges can be built up in panels, or sections, to give structures of varying lengths, according to requirements. As can be seen from the illustration, holes spaced along the steel members allow these to be bolted together at the most suitable points. Erection work is simple and can be carried out quickly, so that bridges 60 ft. or more in length can be built in a few weeks.

Bridge building of this kind may become very important if the war proceeds, for this inevitably will mean the destruction of important railway and road bridges, especially in the areas in which actual fighting is taking place. The erection of a unit construction bridge would solve the problem of providing the necessary communications.



Erecting a bridge Meccano-wise, by the unit construction method, in which standard parts are used. Photograph by courtesy of "The London Evening News."

Ships of the British Navy—

(*Continued from page 627*)

may be discharged from either submerged or above-water tubes. The tubes of a submarine are of course submerged, and battleships and battle cruisers also use submerged tubes. Cruisers make use of both kinds of tubes, whereas destroyers are fitted only with above-water tubes. The measurements in inches given in describing torpedoes refer to their diameter.

The aircraft carrier is one of the most recent naval developments. The earliest carriers were conversions of liners, cruisers and other vessels. More recently ships have been designed exclusively as carriers, and they are now marvels of specialised mechanism, which cannot be described here.

It is impossible in the space available to deal with the many other types of ships that make up the organisation of the Navy. Mention must be made, however, of the high-speed motor torpedo boats that came into prominence during the last war. They were then known as C.M.Bs, and they did very valuable work in many directions. The most recent vessels of this type are of enormous speed, and at the same time are able to keep the sea in very bad weather.

A.R.P. Lamp Bulbs for Cyclists

Our advertisers Vitality Bulbs Ltd. have produced a splendid range of bulbs for head and rear lamps that will satisfy the special requirements of cyclists now that bright lights are forbidden and supplies of batteries are scarce. These are the Vita Battery-Saver Bulbs, and it is claimed that they give each battery the life of 10 large twin cells. Other economical bulbs have been introduced for use in places where brighter lights are permitted.

Readers interested should write to Vitality Bulbs Ltd., Neville Place, Wood Green, London N.22, for a leaflet giving particulars, mentioning the "*M.M.*"

Strange Facts about Metals

Although camphor is almost as soft as butter it can be used to polish the hard metal known as Wood's alloy. On the other hand, it cannot be employed for polishing tin. The explanation seems to lie in the fact that the melting point of camphor, 178 deg. C., is higher than that of Wood's alloy, which melts in hot water, but is lower than that of tin, which becomes liquid only when heated to a temperature of 232 deg. C.

Hardness seems to have nothing whatever to do with the polishing process. It is the temperatures at which the solids melt that are concerned, because the points where they rub against each other become very hot and the polishing is due, not to wearing away, but to the actual melting or softening of projecting bits of the surface. For instance, a chemical called oxamide, which melts at 417 deg. C., can be used for polishing tin, lead and bismuth, all of which melt at lower temperatures than the oxamide, but not for polishing speculum metal, the melting point of which is 745 deg. C.

"Hobbies 1940 Handbook"

The 1940 edition of the well-known catalogue of Hobbies Ltd. is as full as ever of invaluable guidance to all handymen. Fretwork is covered fully, with details of outfits and apparatus from the simplest sets to elaborate motor-driven machinery used by workers on a large scale. There is a large gift design sheet of a model of Buckingham Palace, and by merely sending up a coupon purchasers of the catalogue can obtain full-size patterns of an electrically-propelled miniature, 2 ft. 6 in. in length, of H.M.S. "*Hood*."

The Handbook contains a splendid new range of articles on things to make and do in almost every type of woodwork. Instructions are given for constructing old time ships, a model fort, a modern clock, a child's pedal car and a waterline model of the "*Mauretania*." Besides these there are working models to be driven by a steam engine, screens, tables, cabinets and fancy boxes of all kinds, and details are given of every form of tool and fitting needed for these and hundreds of other models.

The price of the Handbook, with its 284 pages and gift designs, is 6d. It can be obtained from any newsagent or Hobbies dealer, or direct from Hobbies Ltd., Dereham, Norfolk, for 9d., post free.

Photography in the Home

Home photography is great fun, for to watch a photograph growing mysteriously from nothing on a blank film is one of the most fascinating sights imaginable. Developing and printing are easy, and any reader who wishes to know the simplest ways of dealing with his own films throughout, and so of getting the greatest satisfaction from his hobby, will find excellent advice in a booklet entitled "*Home Photography*" that has been published by Johnson and Sons, Hendon. We can recommend this book particularly to secretaries of photographic societies, and of photographic sections of Meccano Clubs or Branches of the H.R.C.

The booklet is divided into five sections, each written by an expert on the branch of photographic work with which he deals. The first describes developing in the simplest but most efficient manner. Next comes the making of gas-light prints, an entertaining way of spending an evening at home as well as a fascinating branch of photographic work. Flashlight photography and bromide prints are the subjects of two further articles, and finally enlarging is dealt with.

Copies of the booklet can be obtained on writing to Johnson and Sons, Manufacturing Chemists Ltd., Hendon Way, Hendon, London N.W.4. Secretaries of photographic societies and sections should ask for supplies of the booklets and price lists. Mention should be made of the "*M.M.*" when writing.

● THE UNIQUE OPPORTUNITY to make a WORKING SCALE MODEL of the well-known L.M.S. 2-6-0 STEAM MOGUL in Gauge "O."

● "With this Set of Parts," says a well-known Engineering Expert, "a beginner can build a 'live steam' model in under 30 hours with the simplest of Tools."

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Finished L.M.S. MOGUL, AND *set of parts (gauge "0") . . . small scale permanent way parts (sample parts 3d.) . . . first-class electric mechs. . . . road tractor parts.* **in** **AB.17** New list entitled "Steam Locomotives, Stationary Engines and Everything for the Model Constructor." 160 pages. **Price 8d. post free**

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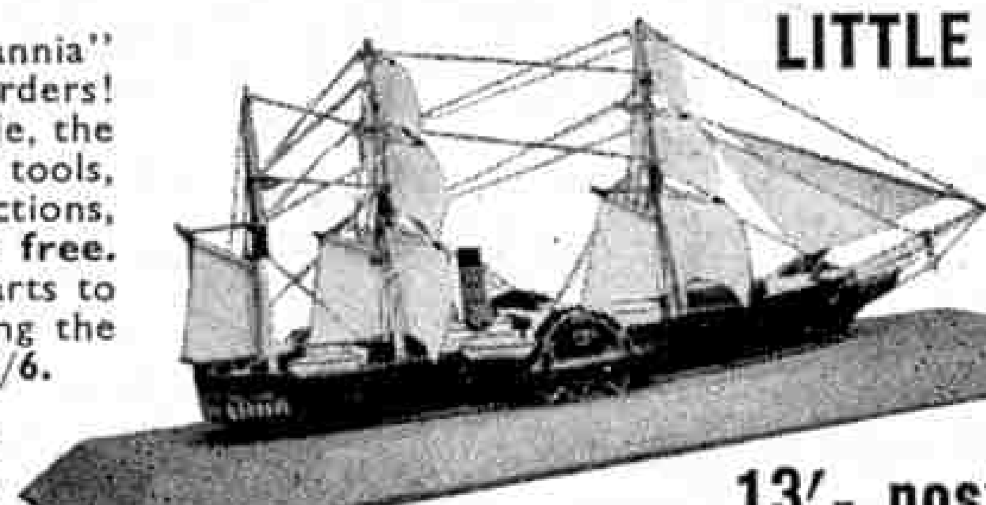
Gauge "00" scale model locomotives, rolling stock, wagons, etc. . . . scenery . . . blue print layouts . . . the "Lowko" gradients for high and low level tracks. **in** **TT.17** Latest catalogue of BASSETT-LOWKE Gauge "00" Railways. **Price 2d. post free**

SHIP LOVERS CAN BUILD THIS SPLENDID LITTLE SHIP for

Here is the "Britannia"—pioneer of Cunarders! 50 ft. to 1 inch scale, the set, complete with tools, plans and instructions, costs **13/- post free.** Glass Show-case parts to build up for housing the model cost only **5/6.**

● Details of this ship and others are to be found in



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S.17 Complete Model Ship Catalogue **Price 6d.**

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OBTAINABLE FROM YOUR USUAL DEALER OR FROM

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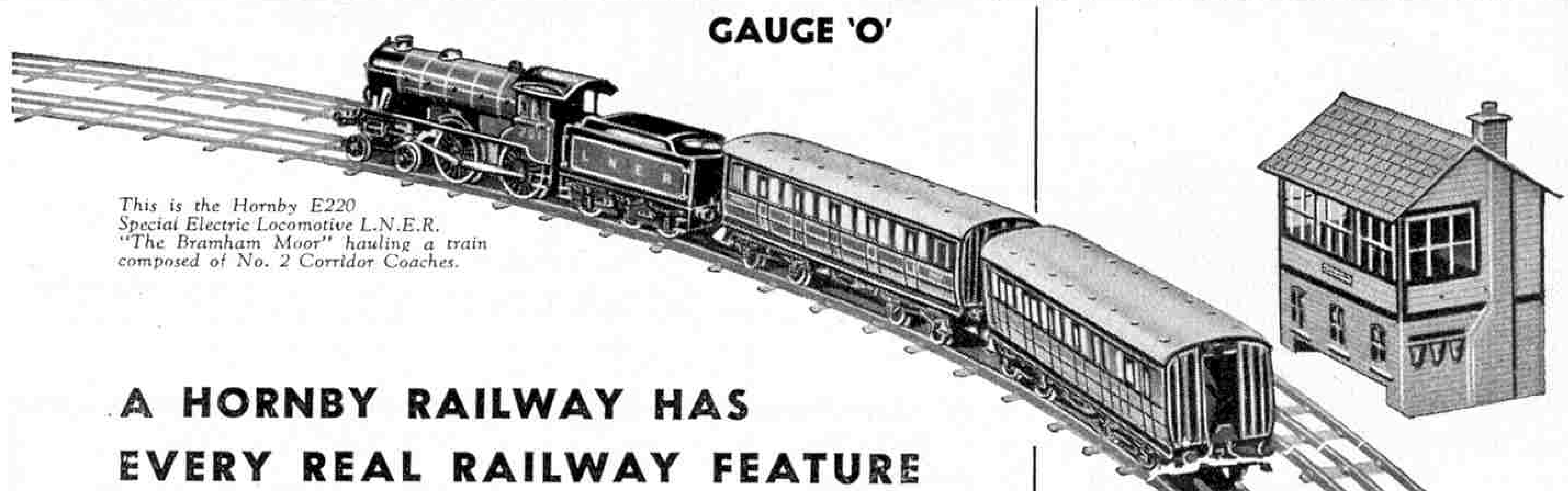
HORNBY TRAINS

GAUGE 'O'



This is the Hornby E220 Special Electric Locomotive L.N.E.R. "The Bramham Moor" hauling a train composed of No. 2 Corridor Coaches.

A HORNBY RAILWAY HAS EVERY REAL RAILWAY FEATURE

Boys! Everything you see on a real railway you'll find, in perfect miniature, in the Hornby Train System. That is why there is nothing to touch Hornby models for realism and thrills. You can start your Hornby Railway with a passenger locomotive, a few coaches and a guard's van. You can add a goods train made up of all kinds of wagons and vans. You can then put on a crack passenger service with a wonderful model of a famous express, such as "The Flying Scotsman" or "The Bournemouth Limited." To make the realism of your railway complete you can keep adding Hornby signals, stations, engine sheds, level crossings, turntables and many other wonderful accessories that are included in the Hornby system—the most perfect miniature railway system in the world.

If you would like to see these wonderful Hornby Trains and Accessories, just visit your dealer. And while you are there, ask him for a copy of the 1938/9 catalogue that contains full details of the Hornby Railway System and other Meccano Products.

PRICE LIST

CLOCKWORK TRAIN SETS

M1 Passenger Train Set (reversing). Price **9/11**
M3 Tank Goods Train Set (reversing). Price **16/6**
No. 0 Passenger Train Set (reversing). Price **17/3**
No. 1 Tank Goods Train Set (reversing). Price **22/6**
No. 1 Special Passenger Train Set (reversing). Price **32/6**
No. 2 Tank Mixed Goods Train Set (reversing). Price **32/6**
No. 2 Special Passenger Train Set (reversing). Price **55/-**

ELECTRIC TRAIN SETS

E020 Passenger Train Set (20-volt) reversing. Price **28/6**
E120 Tank Goods Train Set (20-volt) reversing. Price **32/6**
E120 Special Passenger Train Set (20-volt) automatic reversing ... ... Price **45/-**
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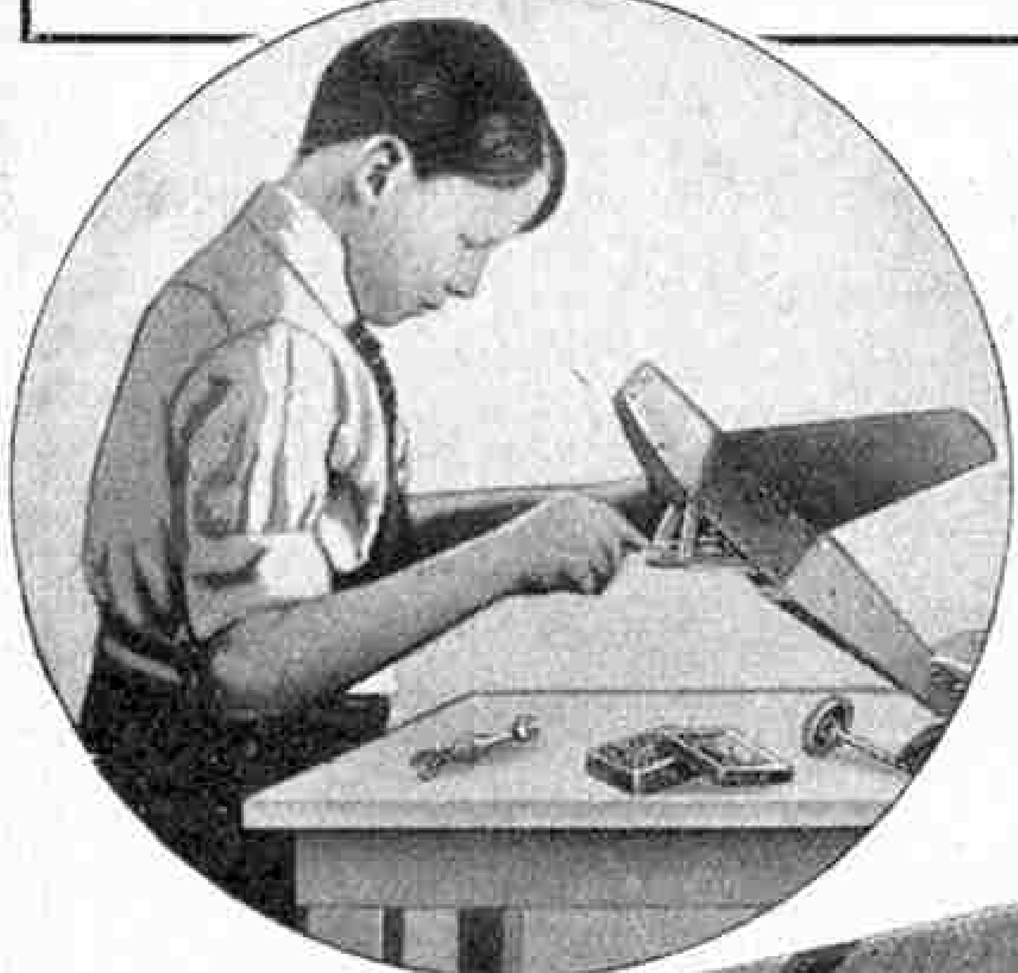
E220 Special Passenger Train Set (20-volt) automatic reversing ... ... Price **75/-**
E320 Riviera "Blue" Passenger Train Set (20-volt) automatic reversing ... ... Price **67/6**

A sturdy tank engine with a "mixed goods" train of fascinating variety and realism.

Manufactured by
MECCANO LTD., LIVERPOOL 13.

MECCANO AEROPLANE CONSTRUCTOR OUTFITS



The parts in these Outfits are all interchangeable on the famous Meccano principle, and splendid miniature aircraft (non-flying) can be built with them. The instruction manuals included in the outfits show clearly how to construct a number of interesting models.

PRICES OF OUTFITS

*No. 00 Outfit. Price 3/6
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No. 1 " " 7/6
No. 2 " " 12/6
No. 1 Special Outfit. Price 13/6
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Revised prices

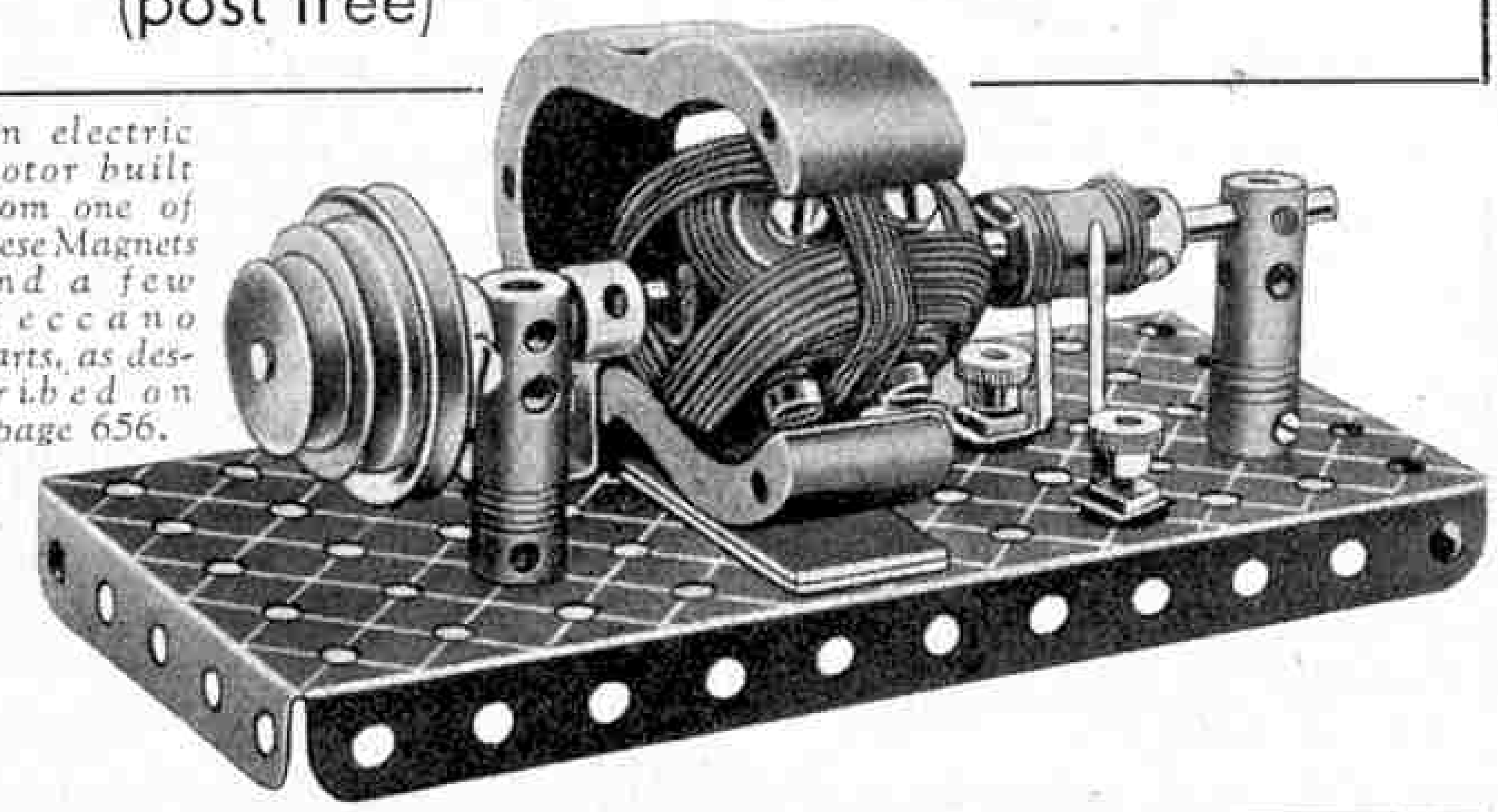
MECCANO LTD. - BINNS ROAD - LIVERPOOL 13

★ Build your own Electric Motors!

Cobalt Steel Magnets 2/9 each (post free)

We have a limited supply of surplus permanent magnets suitable for use in building up small dynamos, electric motors and other experimental electric apparatus. These magnets are made from high-grade cobalt steel and are exceptionally powerful for their size. They can be obtained only from Meccano Ltd., Binns Road, Liverpool 13.

This offer cannot be repeated when the present stock is disposed of, and readers should send in their orders immediately.



An electric motor built from one of these Magnets and a few Meccano parts, as described on page 656.

NOW IS THE TIME TO JOIN A MECCANO CHRISTMAS CLUB

Join a Meccano Christmas Club now if you wish to make certain of being the proud possessor of the Meccano Outfit, Hornby Train or other Meccano Product that you are so keen on. All you have to do is to visit your local dealer and ask him to enrol you in his Club. Nearly every Meccano dealer runs a Christmas Club Scheme, so that you are not likely to meet with difficulty in this direction. You pay a small sum weekly, and this is entered by your dealer on a special Christmas Club Card that he gives you.

Make your choice from this splendid range of quality toys

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ALL BRITISH MADE

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SKYBIRDS

new model is one of the latest

FRENCH FIGHTERS— THE MORANE S. 406

present price 3/-

Every accessory to make the complete Hobby

THESE MODELS HAVE ACHIEVED A WORLD-WIDE REPUTATION

Send stamps 1½d. for Free 4-page illustrated Price List and specimen copy of the SKYBIRD LEAGUE monthly BULLETIN. Address:

SKYBIRDS (Desk B.)

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This Space is set to ½ inch s.c. and costs 8/- per month. The sum is the 50th of £20, the price of a whole page advertisement. Over 200,000 boys and parents read the "*Meccano Magazine*" each month. You can therefore reach this exclusive public for less than a half-penny a thousand.

WHEN WRITING TO ADVERTISERS

Readers are urged to observe the following points when writing to advertisers:

1. **Mention the "M.M." and any special reference number quoted in the advertisement. This helps the advertisers to give prompt attention.**
2. **See that the full amount of the price and any postage is included. It is unfair to expect advertisers to fulfil their undertakings promptly if short remittances are sent.**
3. **GIVE YOUR FULL ADDRESS.**

THE ADVERTISEMENT MANAGER
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CHEMISTRY EXPERIMENTS FOR BLACK-OUT EVENINGS

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Write also for PRICE LIST of other Sets

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Send 4½d. for our train catalogue and save money.
Georges', 11, Friars Street, Ipswich.

ABOVE ALL OTHERS!

AN "ELITE" PRODUCT "NIPPY"

Wingspan 30 ins. Length 24 ins.
Average Duration 90-120 secs.

A COMPLETE KIT FOR BUILDING THIS FINE MODEL

Contains: Finished Prop. Free-wheeling Shaft, Balloon Wheels, Rib Outlines clearly printed on M.A.T.A. Balsa, Balsa Strip, Wire, Tissue, Brass Brush, Cement, Dope, Tissue-paste, semi-finished Nose Block, FULL SIZE PLAN Instruction Sheet, Aluminium Tube, Washers, 8 strands Rubber. UNBEATABLE VALUE.
Only **5/6,** post free.

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30 in. wingspan – Mr. Mulligan; Boeing P.26.A; Aeronca C70; 1936 Stinson, etc., **3/3** each, post free.
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Send **2d.** for our large 1939 catalogue, illustrating a full range of Kits from **1/3** to **21/-**. Every type of accessory is also listed.

Elite Model Airplane Supplies
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LEVER SELF-FILLING

2/9 Post Free

A SUPERIOR PEN

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GOLDEN BEE 5/6

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This is Fighting Talk

If You're Lazy you won't read far in this talk. If you're not—if you have the courage to face facts—you will want to know what special effort on your part will enable you to get on.

If You're a Shirker you'll always wish for success but never do anything about it. The earth is cluttered with that kind of man.

But, if You're a Fighter you *will* set about doing something. You'll get the special *necessary* training that fits you for a good position and good pay. The I.C.S.—International Correspondence Schools—offers you that training. There is none better, none more convenient for the student. Let us tell you all about it. Just fill in the coupon below or write to us in any other way.

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I.C.S.

READERS' SALES AND WANTS

Readers should note that all advertisements of Hornby Trains and other Meccano products included in this column relate to items no longer featured in the catalogue. Advertisements of current products cannot be accepted for this column.

10 Years' "Meccano Magazines," 1928–38, complete and perfect (loose bound); must sell, would consider exchange. Particulars—McKnight, 6, Gosta Green, Birmingham 4.

For Sale or will exchange Red/Green Meccano Parts; Model Railway Accessories; Boy's Books; 5,000 Cigarette Cards; "Meccano Magazines"; "B.O.P's"; Microscope.—Write for list.—Cattle, Royal Oak, Pocklington, Yorkshire.

Stuart Turner Compound Reversing Launch Engine, with extras (cost £35), brand new; exchange for Model Traction engine or best Miniature Camera offered, or will sell for £15.—17, Lingfield Grove, Broadgreen, Liverpool.

Bellows (Postcard Camera), Suit Copying; Making Enlarger; small 16 mm. and 9.5 mm. Films. List.—Box No. 1101.

16 mm. Unexposed Colour Film (Sealed); quantity Wireless Valves. Particulars.—Hobbs, 83, Curling Crescent, King's Park, Glasgow.

Sale. 3-Valve Short Wave Wireless Set and Components; Lott's No. 6 Chemistry Set, complete, little used, 15/–; Chemicals, Apparatus; also Stamps; Construments Electrical Set, cheap.—Gilchrist, 30, Clincarthill, Rutherglen.

Wanted. Clean, perfect copies of September and October 1935, September, October and November 1936 "M.M.'s." State price to—Box No. 1102.

For Sale. Complete Trix Twin Railway. Cost over £10 new. Good condition. Going for £5. Apply—Deburiatte, Glenmoor, Beach Road, Emsworth, Hants.

Sale. 2,500 Stamps (cat. over £17), 40/–. Particulars—Balfour, 13, Ashburnham Gardens, Upminster, Essex.

Sale. "M.M.'s," August 1924 to December 1938 inclusive. 40/– or nearest.—Burton, 10, St. Barnabas Street, Wellingborough, Northants.

Ready to print Christmas Cards. Adana 8"×5" Printing Machine as new, suitable types, chase, furniture, etc. Value over £3. Offers!—P. Wiseman, 85, Beehive Lane, Ilford, Essex.

This Month's Special Articles

MECCANO MAGAZINE

Registered at G.P.O., London, for transmission by Canadian Magazine Post.

EDITORIAL AND ADVERTISING OFFICE:—
LIVERPOOL 13, ENGLAND.
Telegrams: "Meccano, Liverpool."

Publication Date. The "*M.M.*" is published on the 1st of each month and may be ordered from any Meccano dealer, or from any bookstall or newsagent, price 6d. per copy. It will be mailed direct from this office, 4/– for six issues and 8/– for twelve issues.

To Contributors. The Editor will consider articles and photographs of general interest and payment will be made for those published. Whilst every care will be taken of articles, etc., submitted, the Editor cannot accept responsibility for any loss or damage. A stamped addressed envelope of the requisite size should be sent where the contribution is to be returned if unacceptable.

Readers' Sales and Wants. Private advertisements (i.e., not trade) are charged 1d. per word, minimum 1/–. Cash with order. Editorial and Advertising matters should not be dealt with on the same sheet of paper.

Small Advertisements. 1/6 per line (average seven words to the line), or 16/– per inch (average 12 lines to the inch). Cash with order.

Display. Quotations for space bookings, and latest net sale figures, will be sent on request.

Press Day, etc. Copy should be sent as early in the month as possible for insertion in following issue. We usually close for press on or before 6th of each month for following issue. Half-tone blocks up to 100 screen.

Proofs of advertisements will be sent when possible for space bookings of not less than half-an-inch.

Voucher copies. Sent free to advertisers booking one inch or over. Other advertisers desiring vouchers should add 8d. to their remittance and should order voucher copy at same time.

Remittances. Postal Orders and Cheques should be made payable to Meccano Ltd.

Ordering the "M.M." Overseas

Readers Overseas may order the "*Meccano Magazine*" from regular Meccano dealers or direct from this office. The price and subscription rates are as above, except in the cases of Australia, where the price is 1/2 per copy (postage extra), and the subscription rates 8/– for six months and 16/– for 12 months (post free), Canada, where the price is 10c. per copy, and the subscription rates 65c. for six months, and $1.25 for 12 months (post paid).

The U.S.A. price is 15c. per copy, and the subscription rates $1 and $2 for 6 and 12 months respectively (post free).

Overseas readers are reminded that the prices shown throughout the "*M.M.*" are those relating to the United Kingdom and Northern Ireland. Current Overseas Price Lists of Meccano Products will be mailed free on request to any of the undermentioned agencies. Prices of other goods advertised may be obtained direct from the firms concerned.

CANADA: Meccano Ltd., 187-189, Church St., Toronto.
UNITED STATES: Meccano Co. of America Inc., New Haven, Conn., Meccano Co. of America Inc., 200, Fifth Av., New York.
AUSTRALIA: Messrs. E. G. Page & Co., 52, Clarence Street, Sydney, N.S.W.
NEW ZEALAND: Models Limited, Third Floor, Paykel's Buildings, 9, Anzac Avenue (P.O. Box 129), Auckland. C.1.
SOUTH AFRICA: Mr. A. E. Harris (P.O. Box 1199), 142, Market Street, Johannesburg.
INDIA: Karachi: Daryanamal and Bros., Elphinstone Street. Bombay: Bombay Sports Depot, Dhobi Talao. Calcutta: Bombay Sports Depot, 2, Lindsay Street. Madras: Bombay Sports Depot, 162, Mount Road.

Cut along here

HORNBY LOCOMOTIVE PART-EXCHANGE COUPON

Complete this Coupon, and hand it, with your old Locomotive, to your Meccano dealer, who will allow you from the price of a new Hornby Locomotive, or Hornby-Dublo Locomotive and Controller, the amount shown in the official list published in the June "*Meccano Magazine.*"

Type of Hornby Locomotive Returned:— *New Hornby Locomotive Purchased:—*

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Please register my name to receive details of future Hornby and Hornby-Dublo developments.

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Address..

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CERTIFICATE

The above exchange has been effected in accordance with the terms of the Hornby Part-Exchange Scheme.

(Signed).. *Meccano Dealer*

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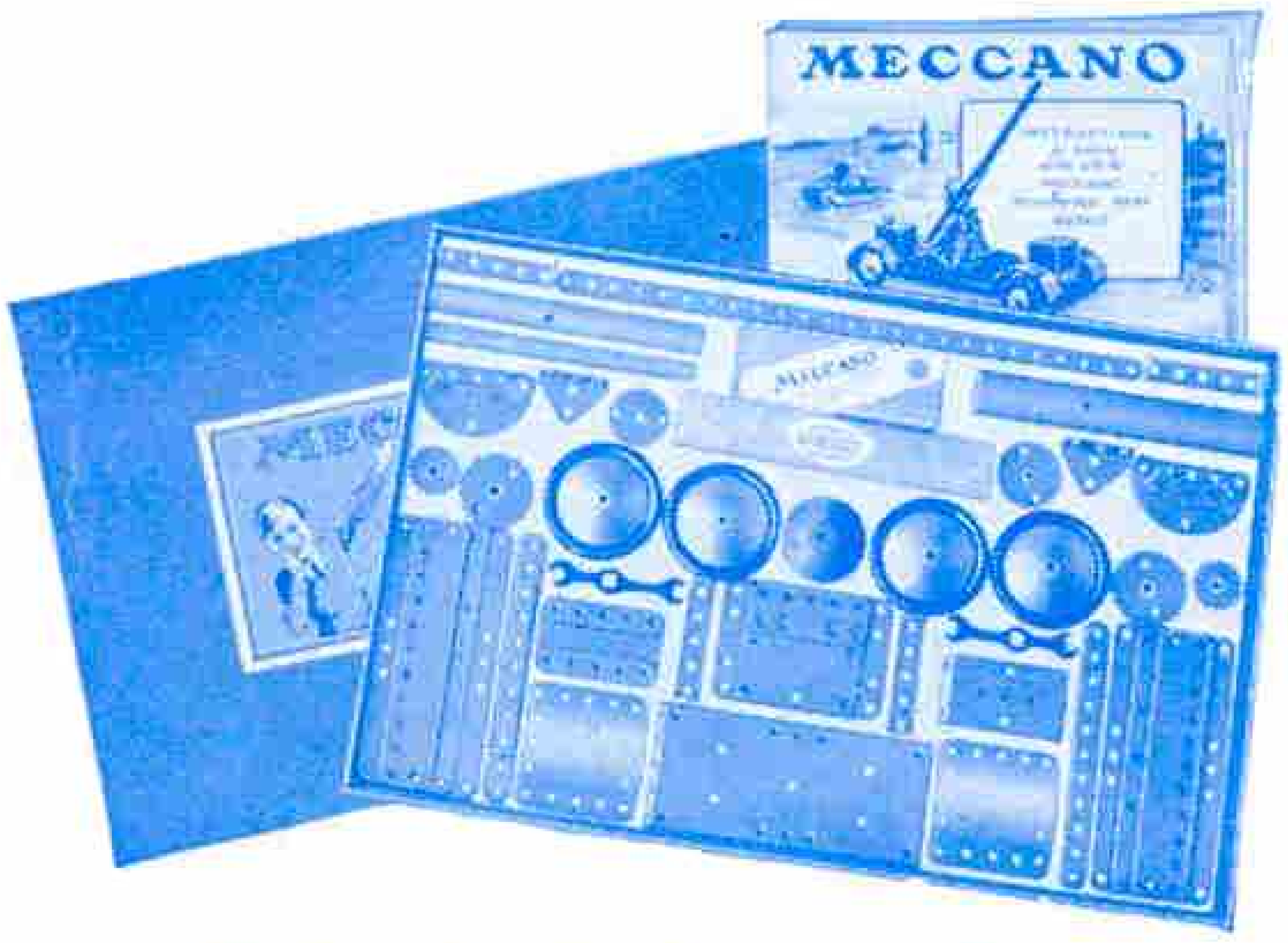
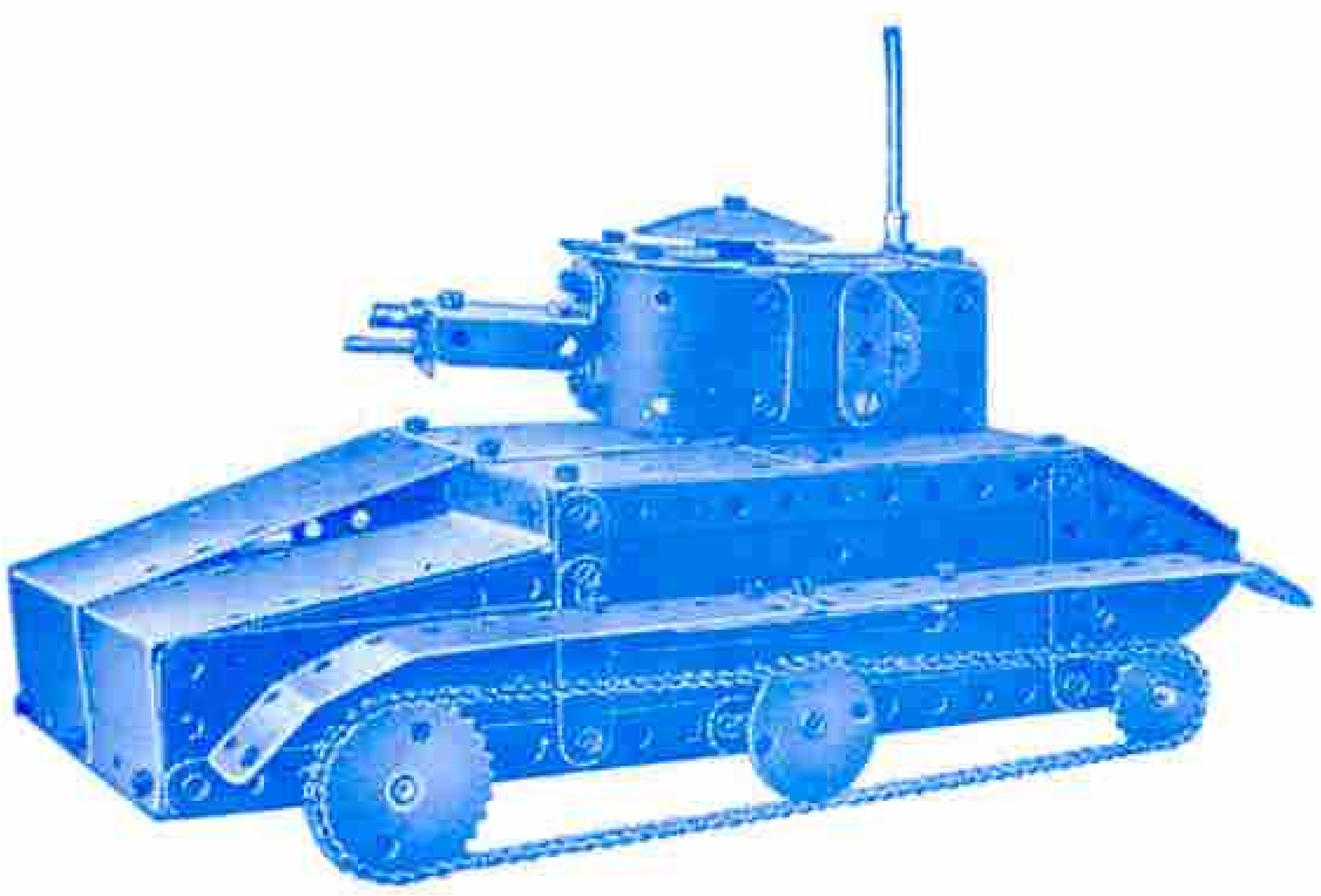
MECCANO



The above illustration shows the new Meccano Mechanised Army Outfit. This consists of parts specially designed to construct models of the British Mechanised Army. The parts are enamelled in Service green and black and are interchangeable.



Typical Light Tank, with swivelling turret

MECHANISED ARMY OUTFIT

The rapid development of tanks, anti-aircraft guns, and mechanical transport of all kinds has revolutionised the Army of to-day.

All boys are interested in the British Mechanised Units, and they will welcome the new Meccano Mechanised Army Outfit, with which can be built magnificent models of tanks, anti-aircraft and field guns, searchlights and transport vehicles, with a greater degree of realism than has ever before been possible.

The Outfit consists of a big assortment of specially designed parts, including Gun Barrels of different diameters, which can be used either singly or in combination.

The fine models shown in the accompanying illustrations are two of those described in the splendidly illustrated Manual of Instructions packed with the Outfit.

Price of Outfit 10/6

MECCANO LIMITED
BINNS ROAD
LIVERPOOL 13

Mobile Anti-Aircraft Gun, with traversing and elevating movements

Published by MECCANO Ltd., Binns Road, Liverpool 13, England
Printed by John Waddington Ltd., Leeds and London