

VOL. XXXVI. No. 2

FEBRUARY 1951

MECCANO

MAGAZINE



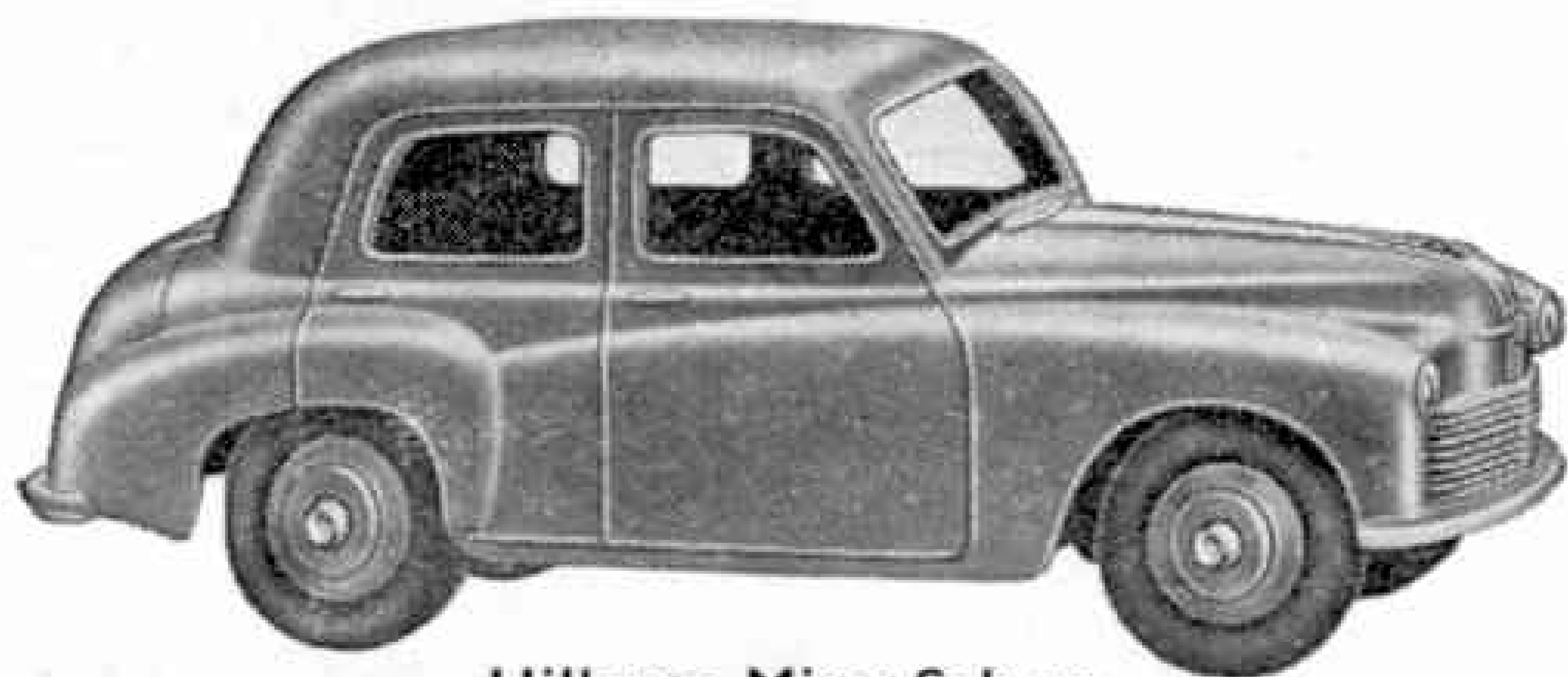
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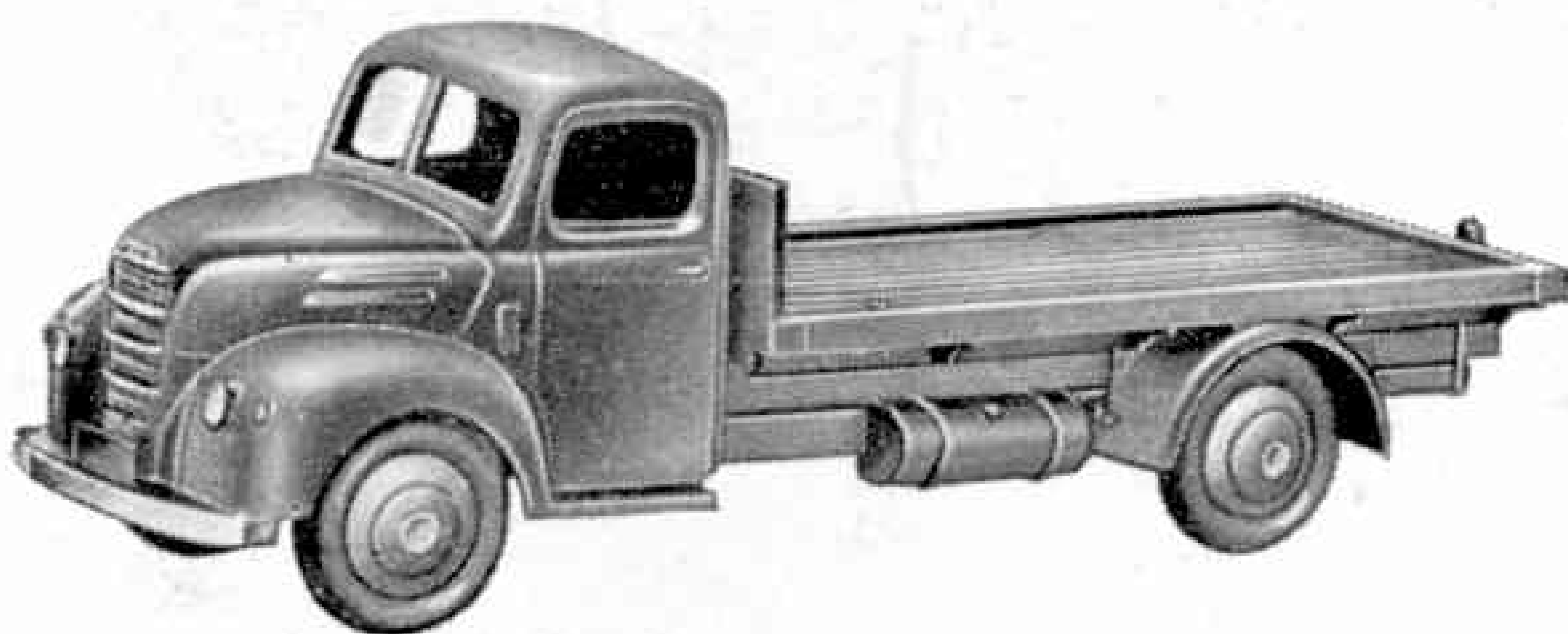
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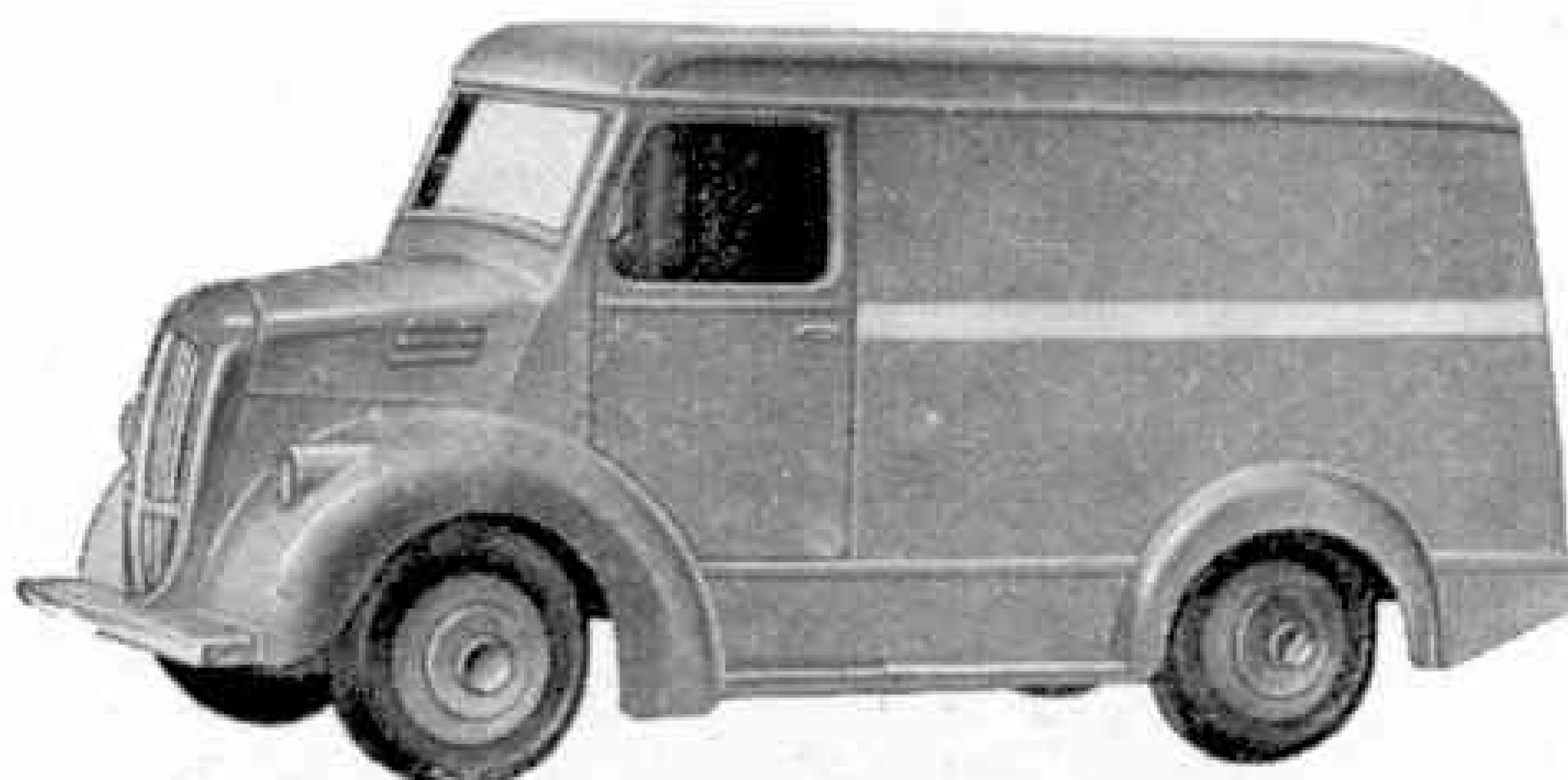
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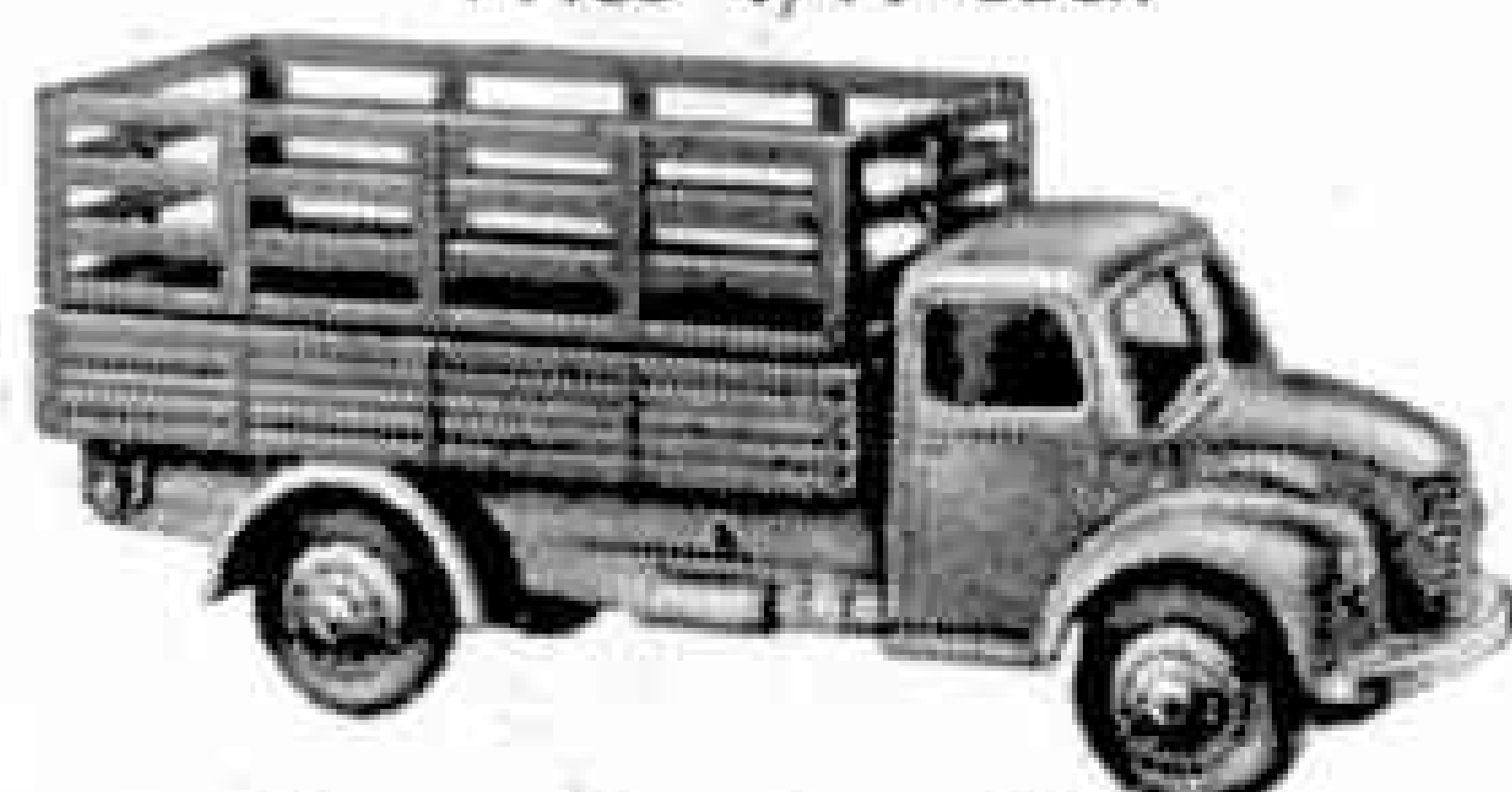
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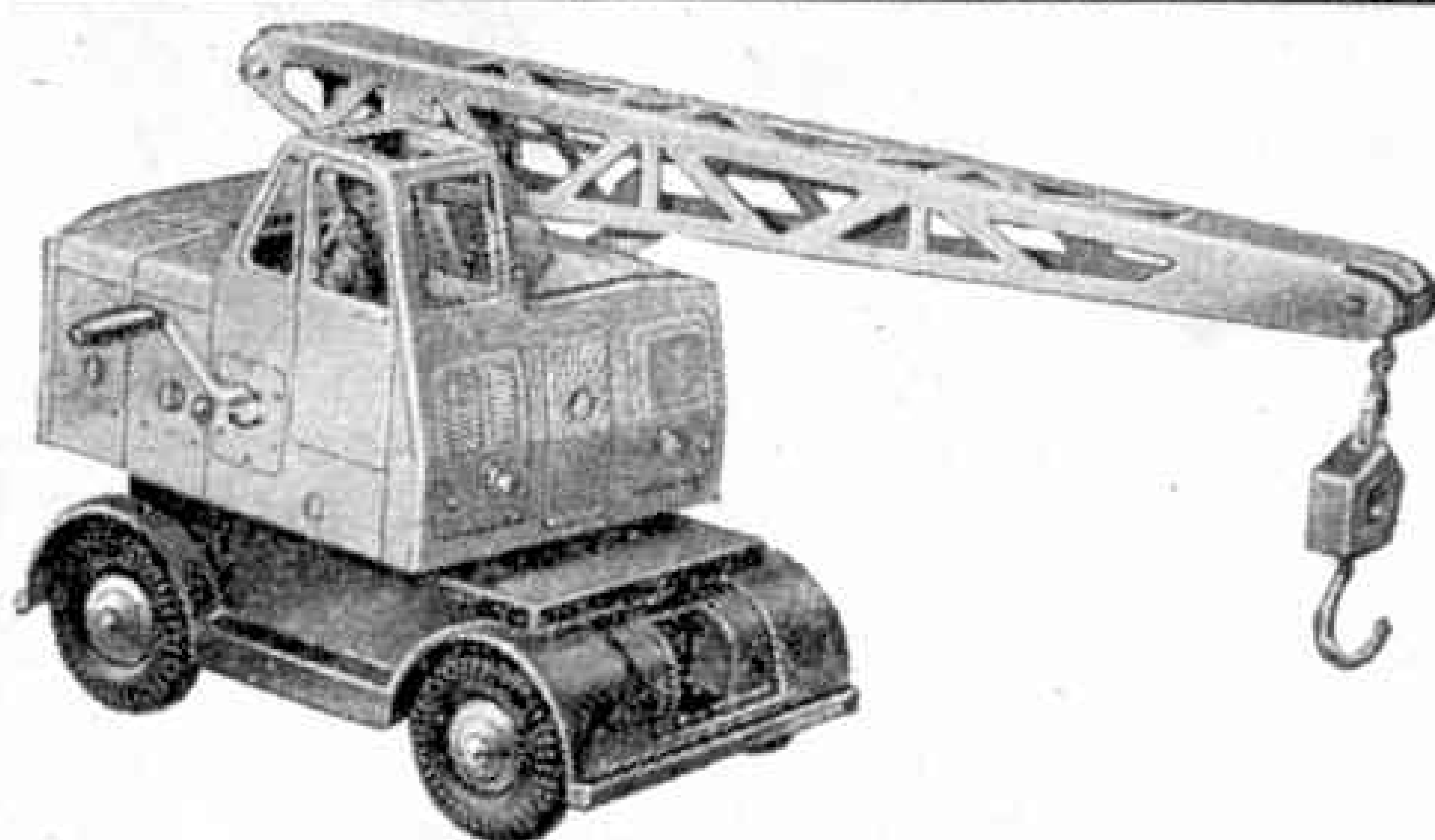


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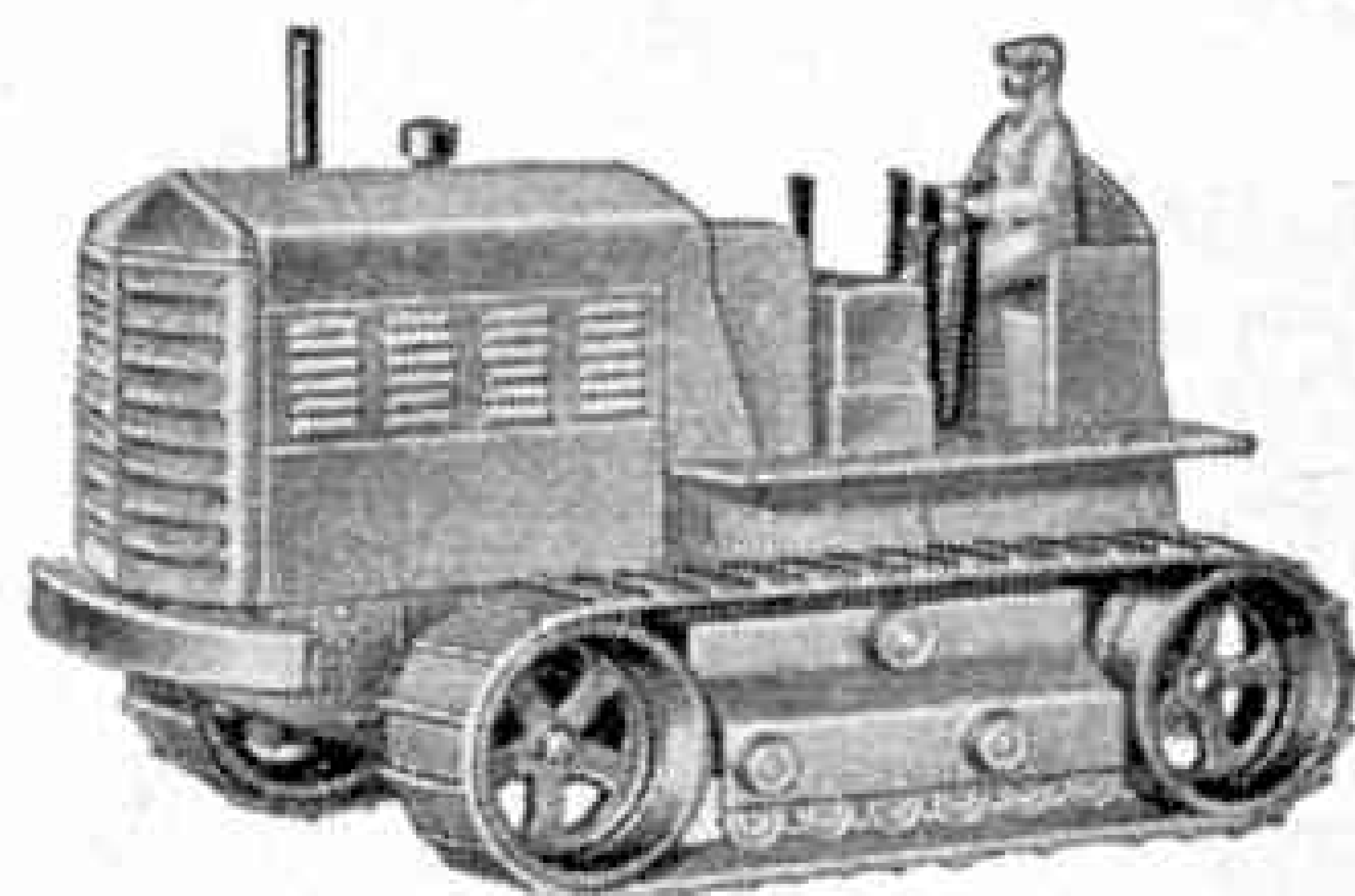
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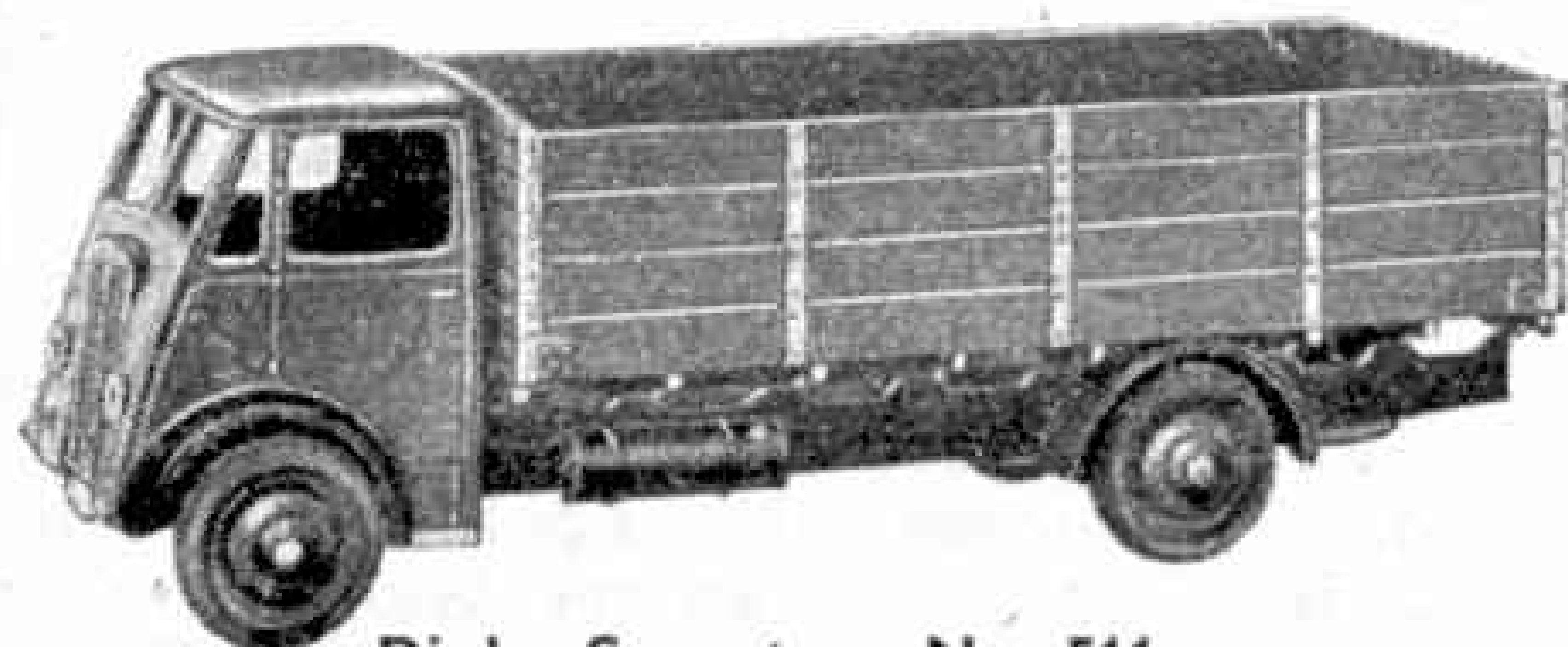
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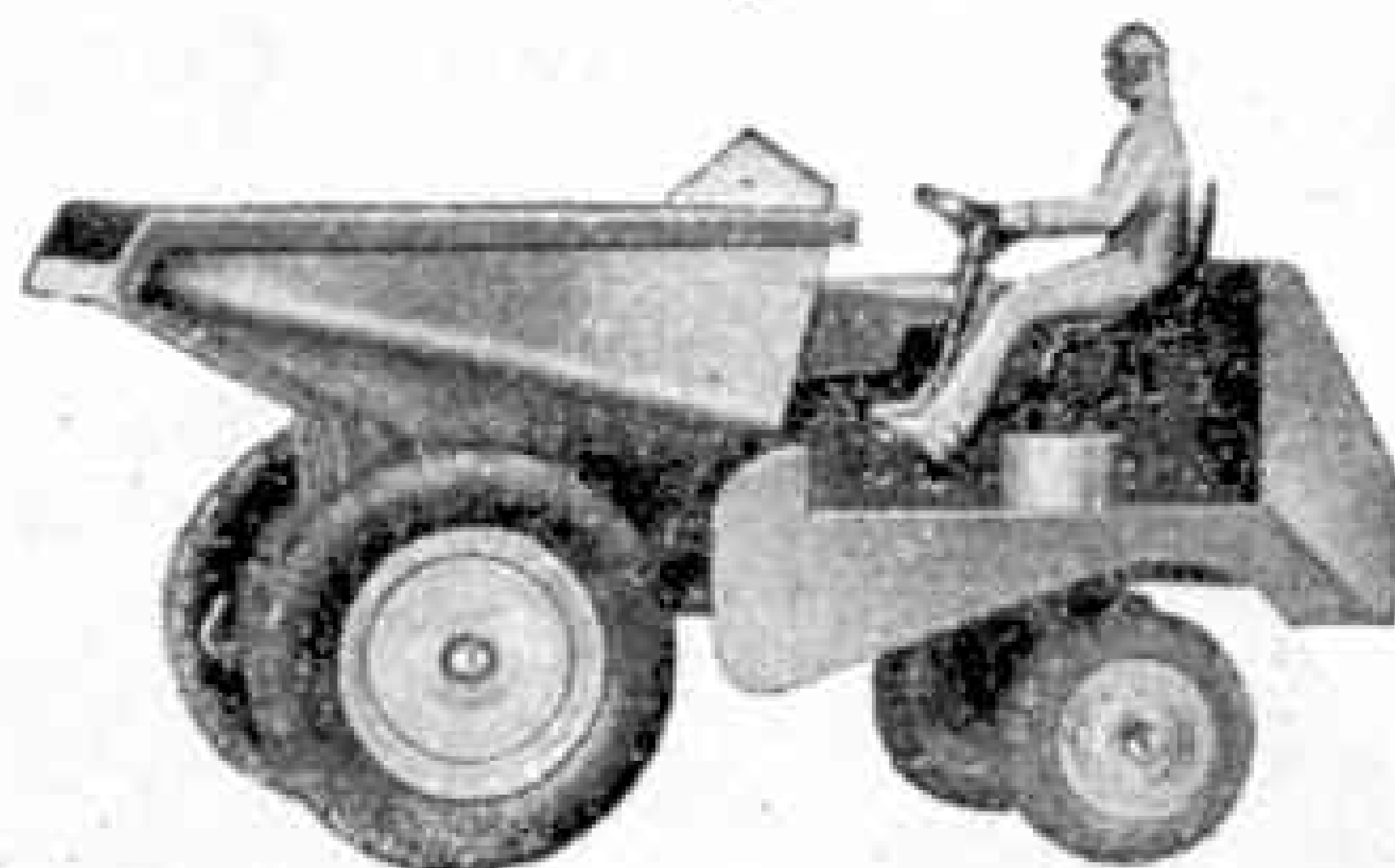
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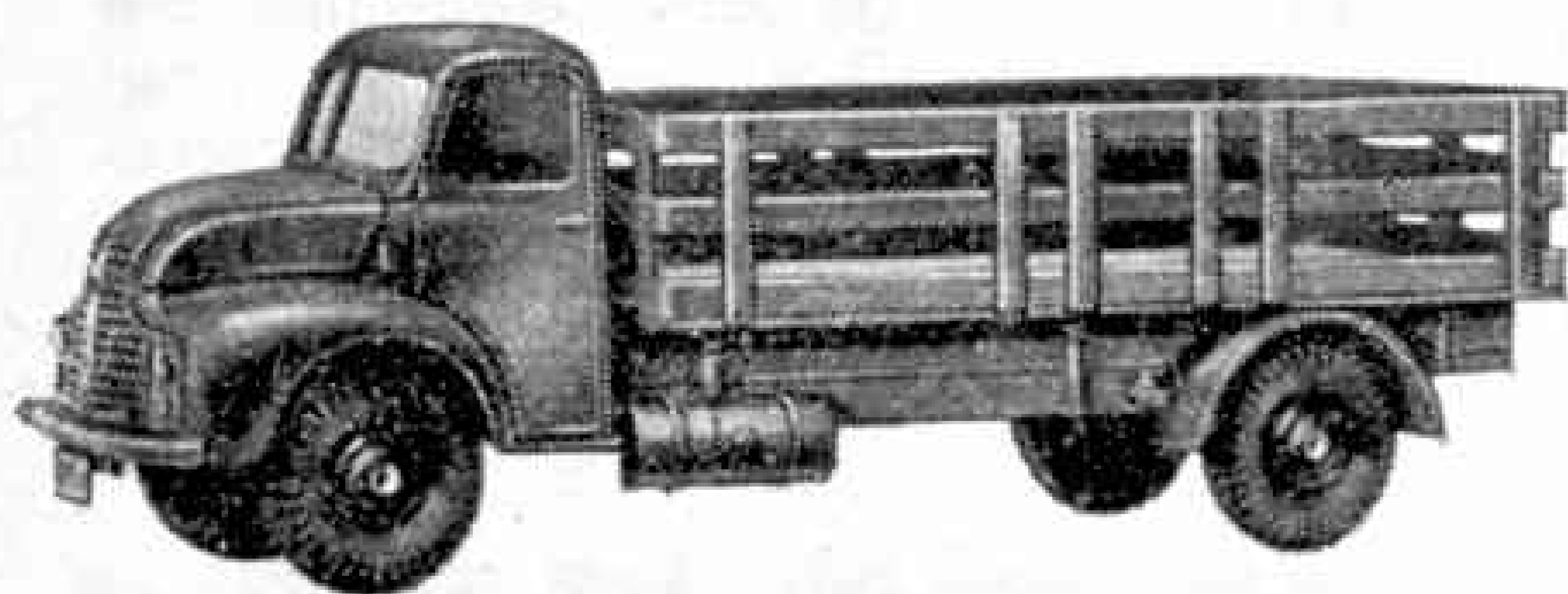
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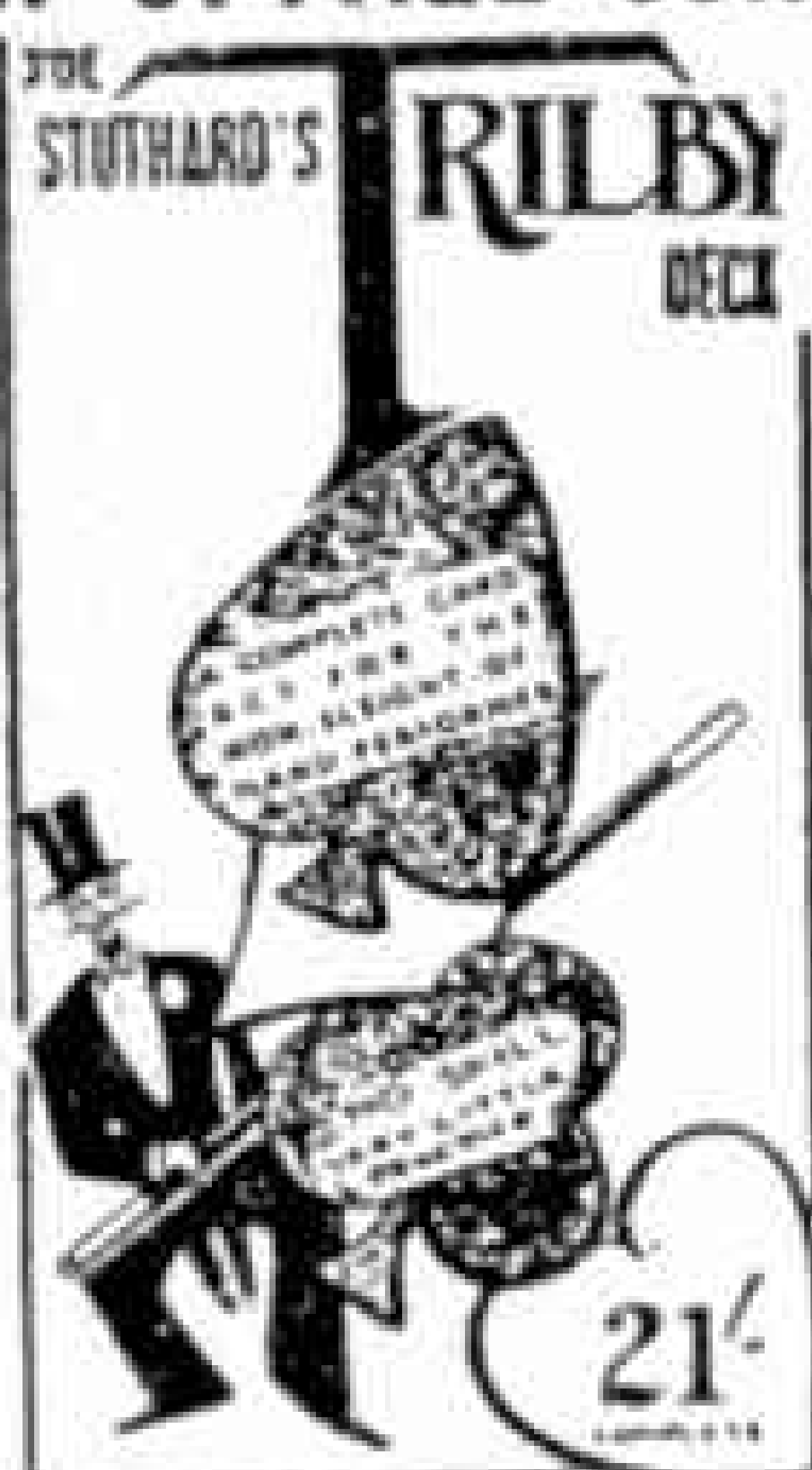
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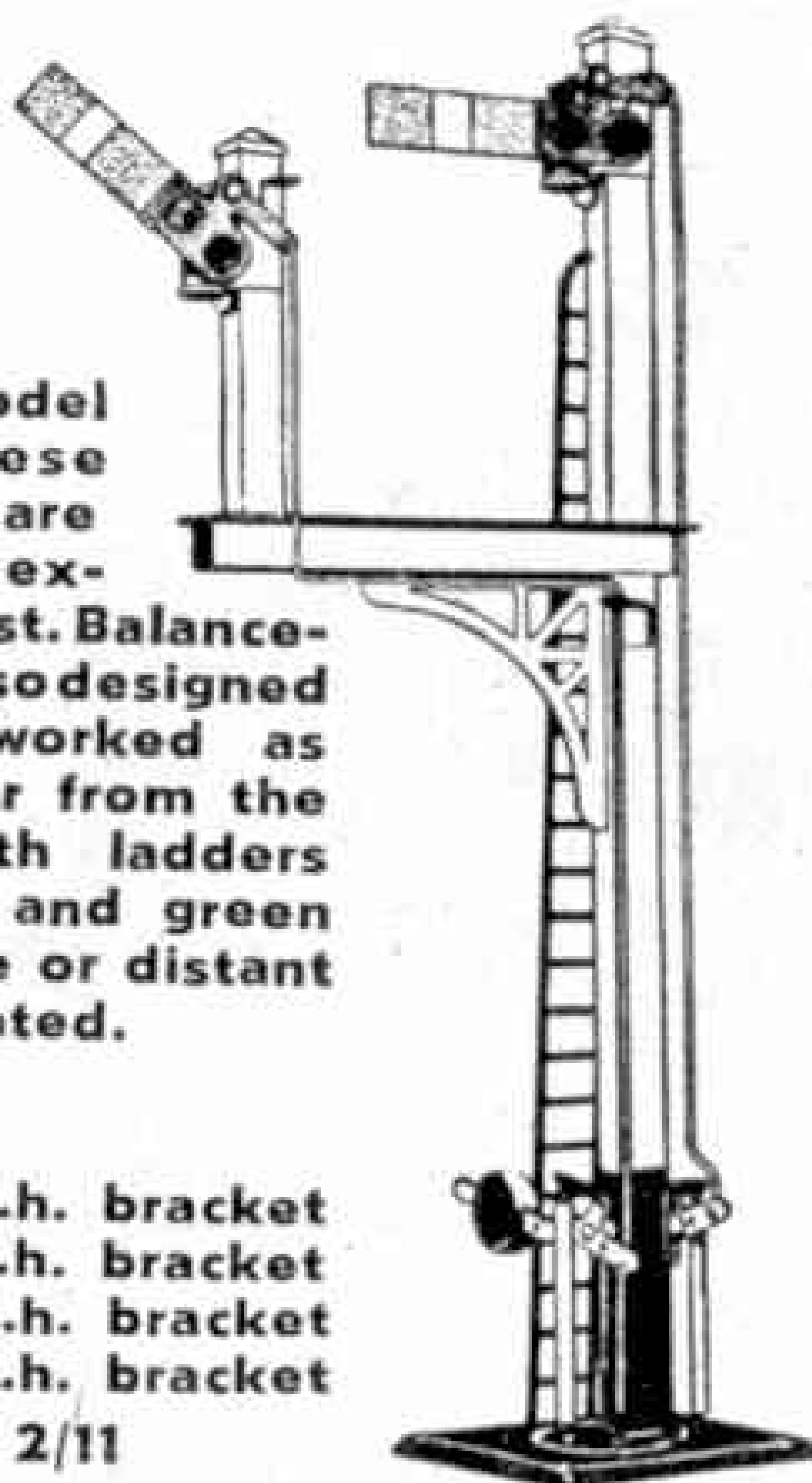
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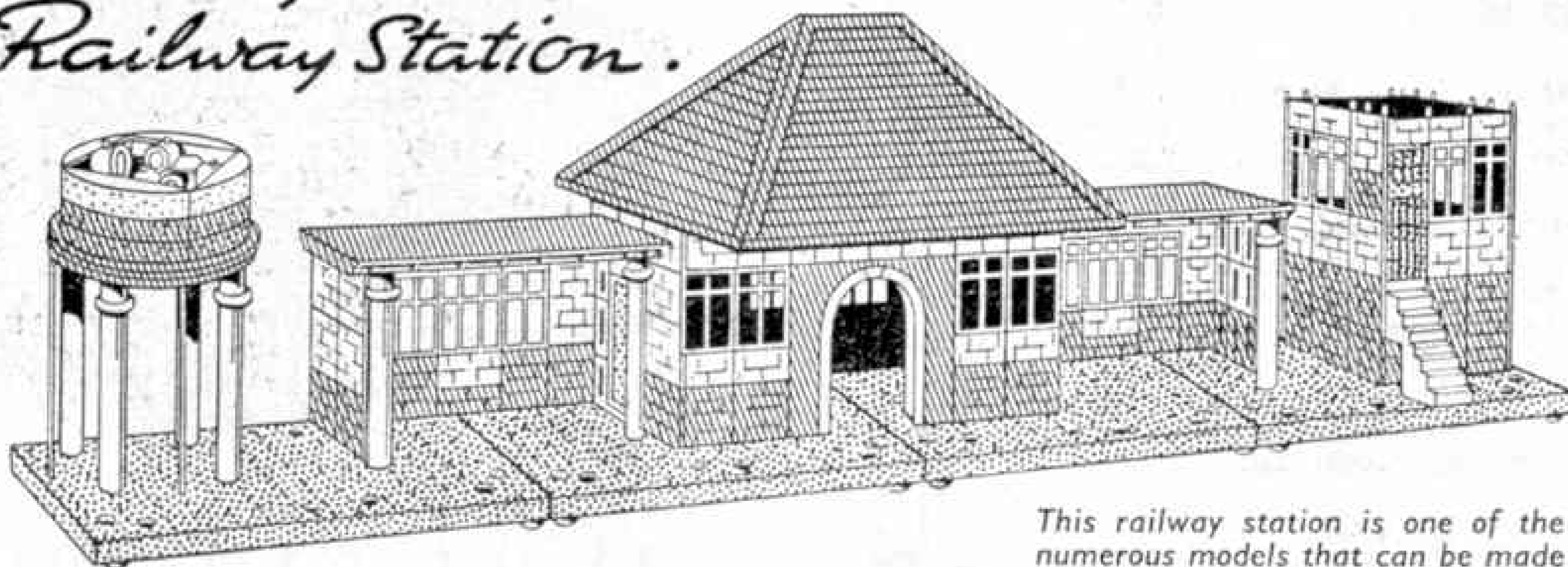
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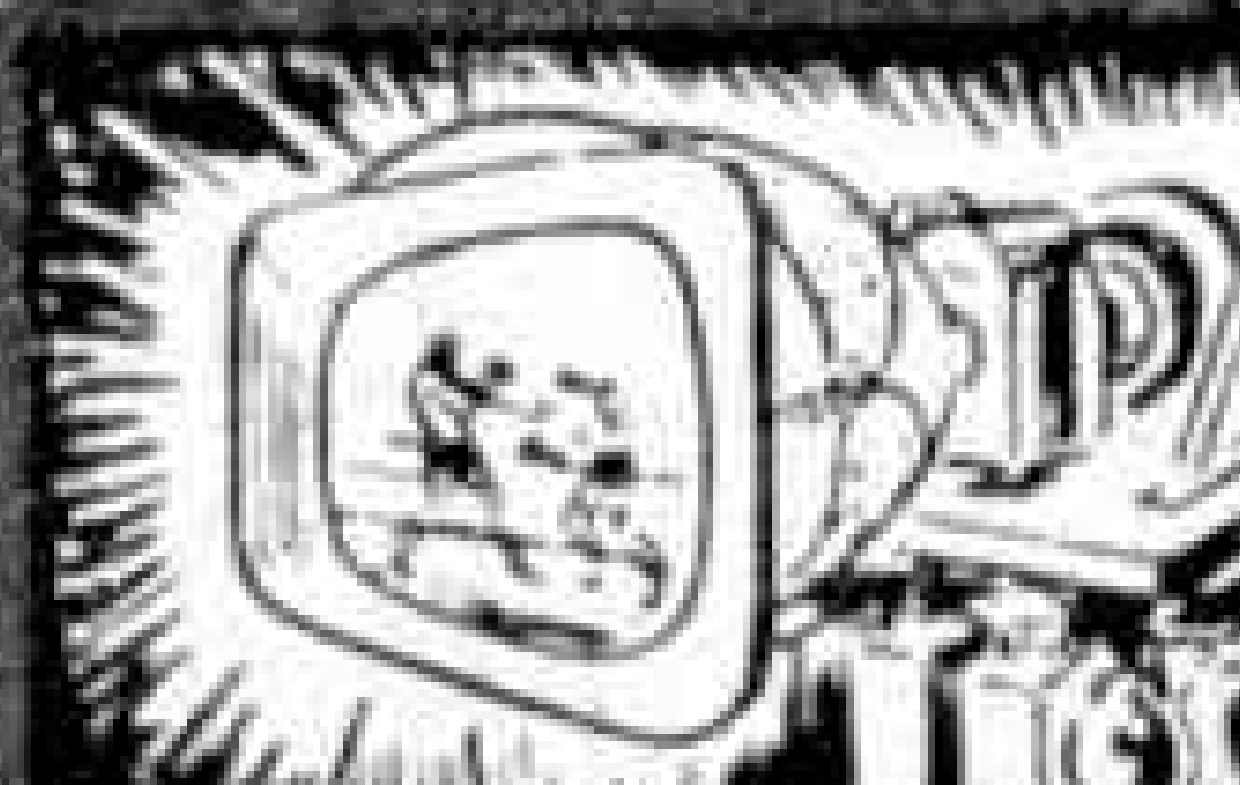
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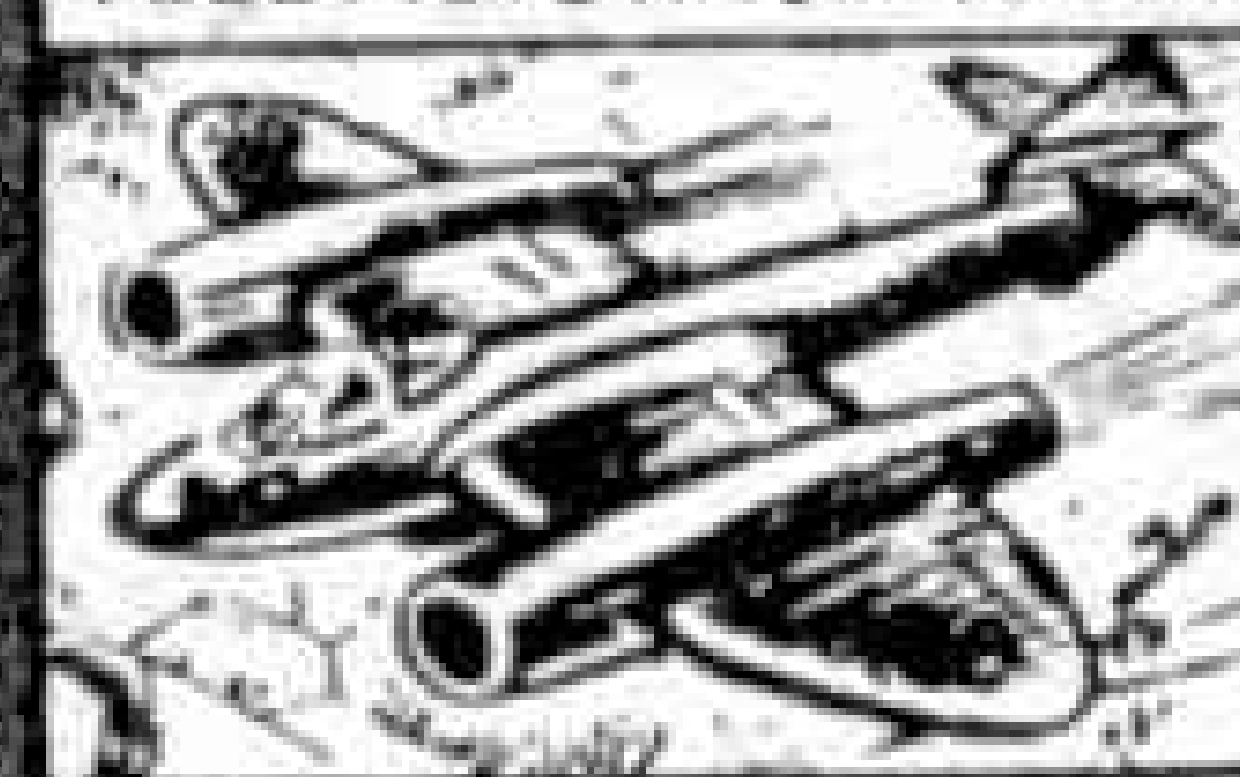
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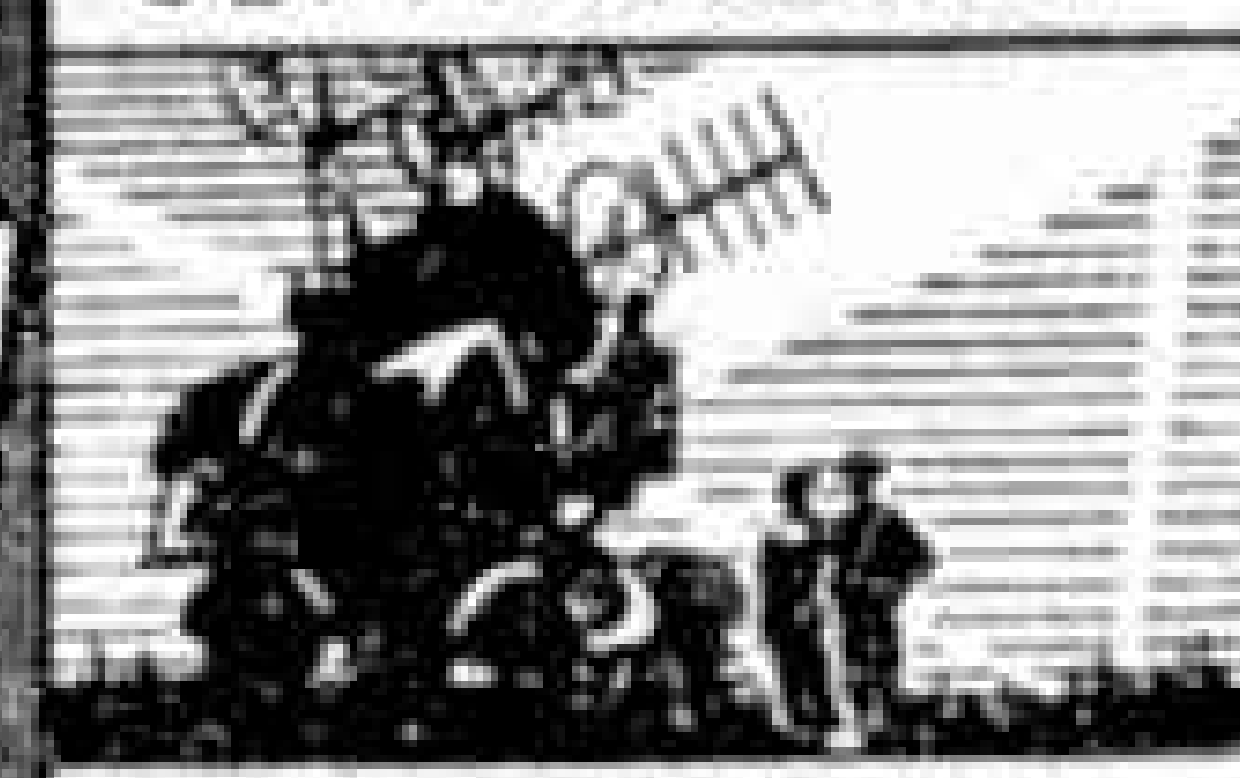
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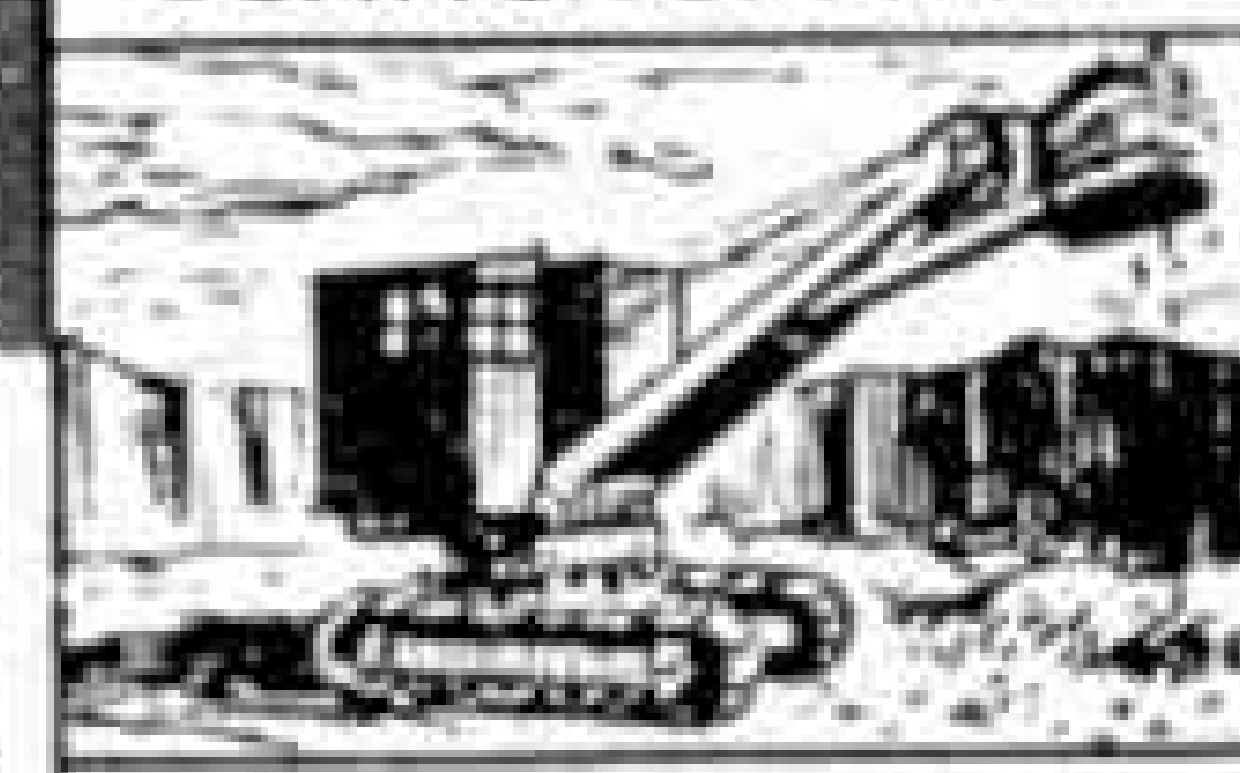
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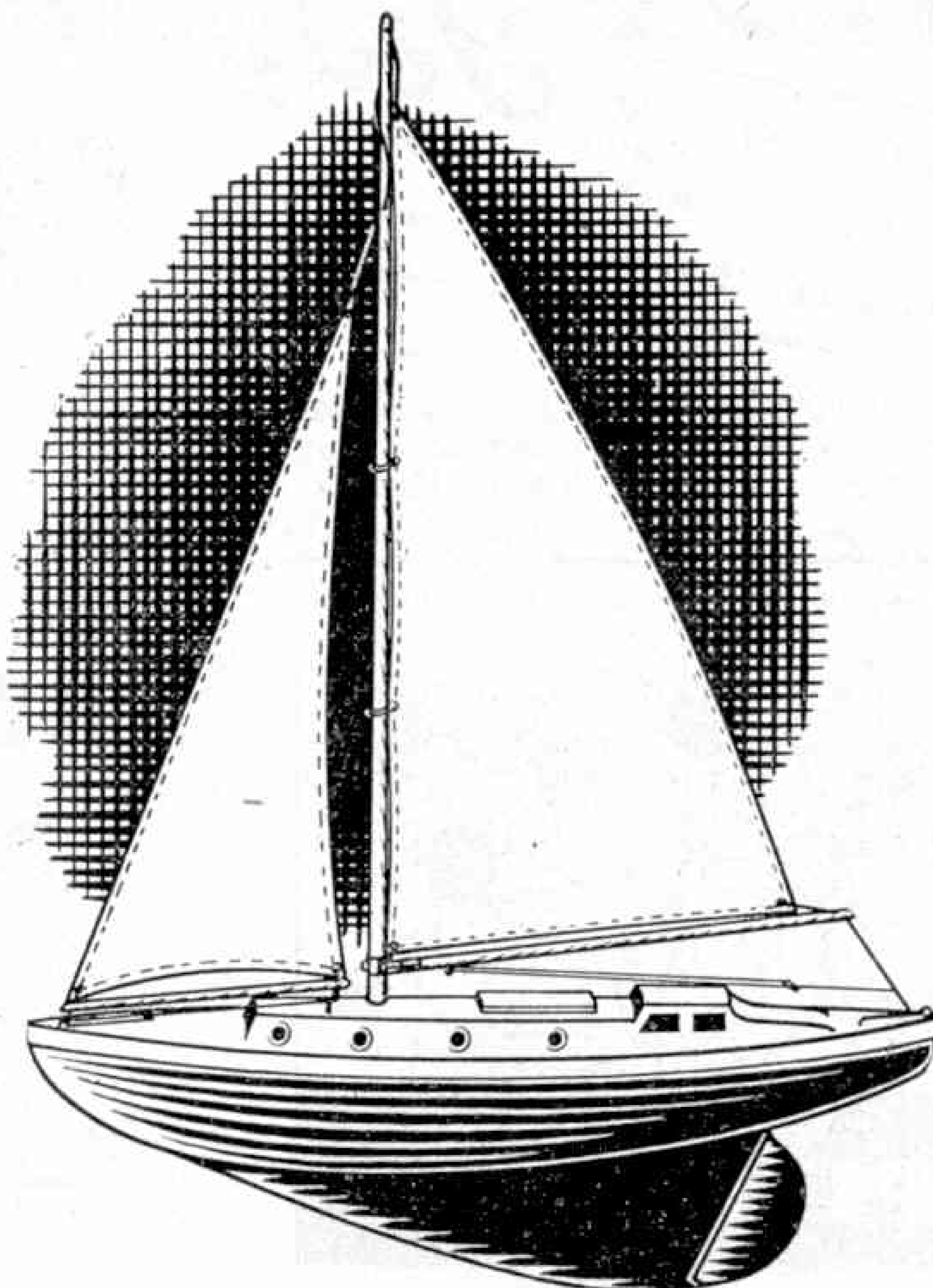
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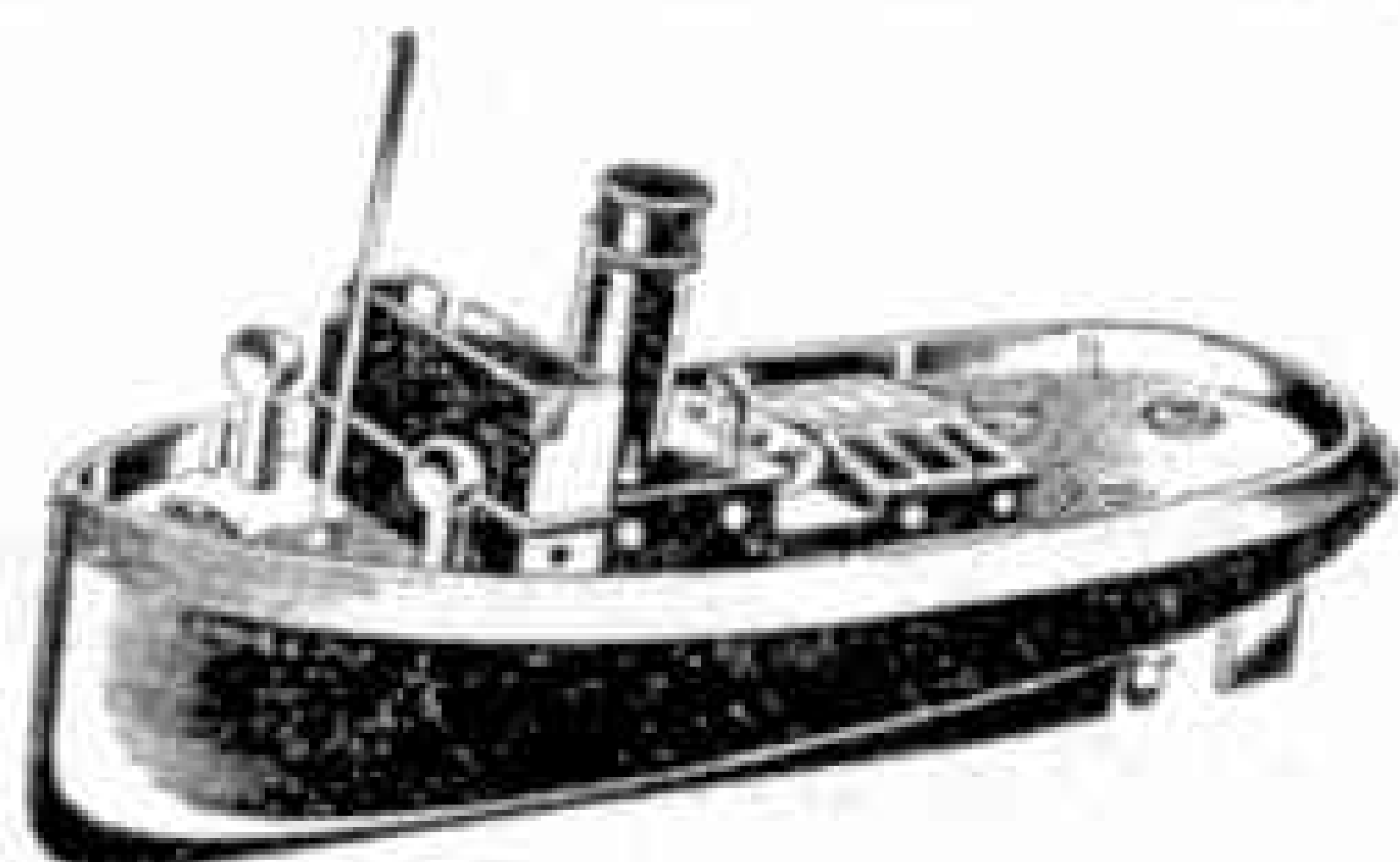
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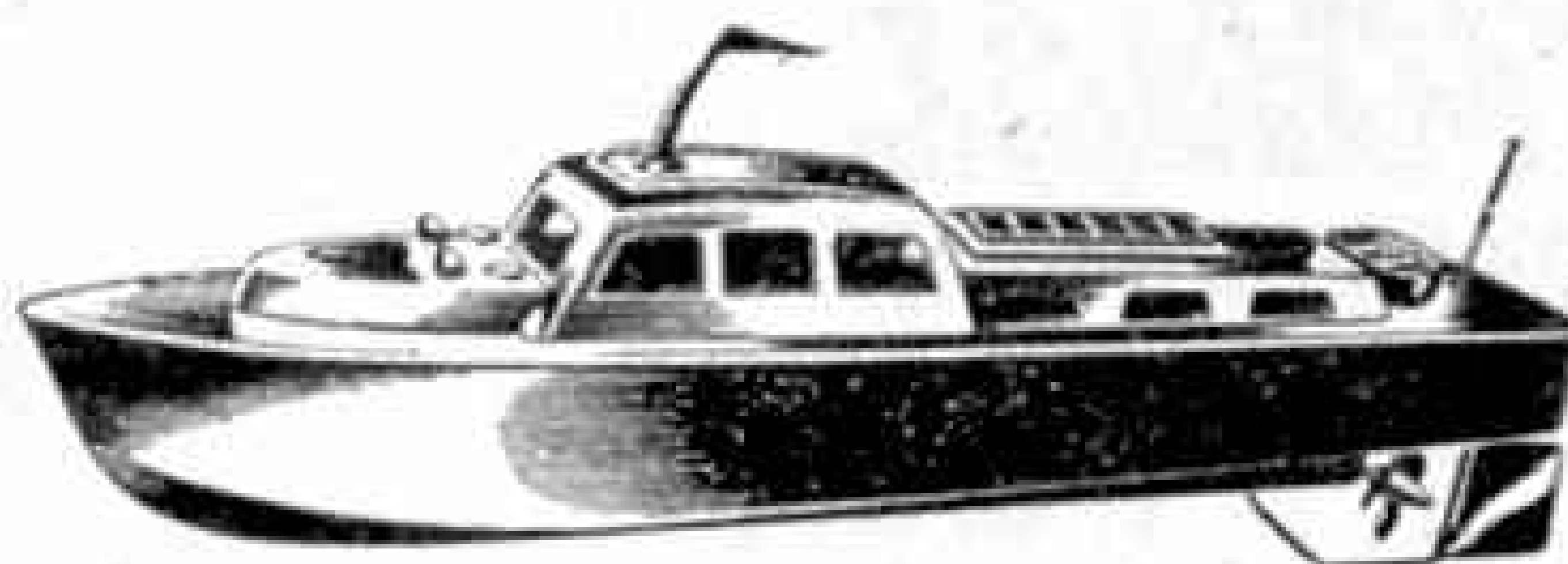
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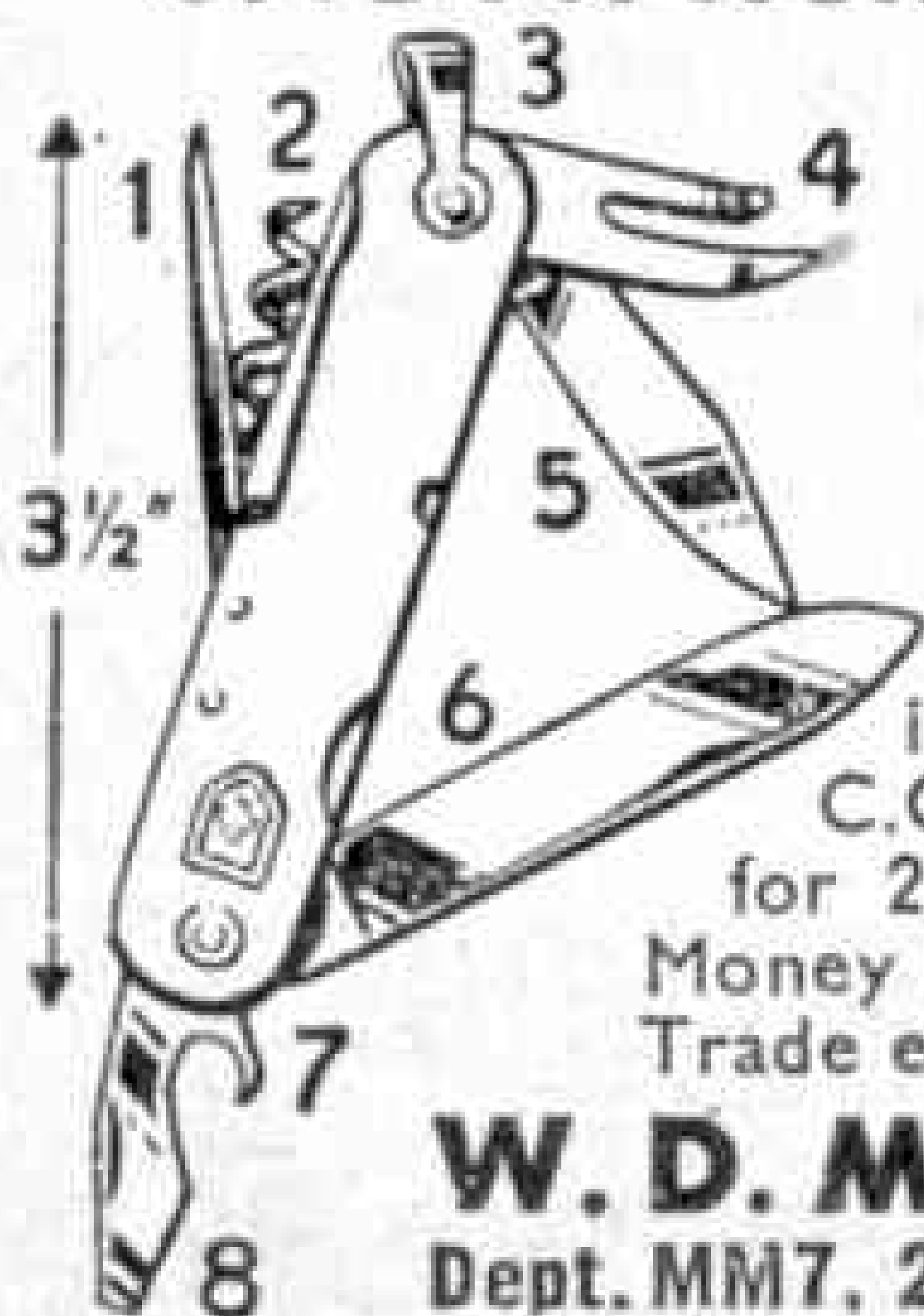
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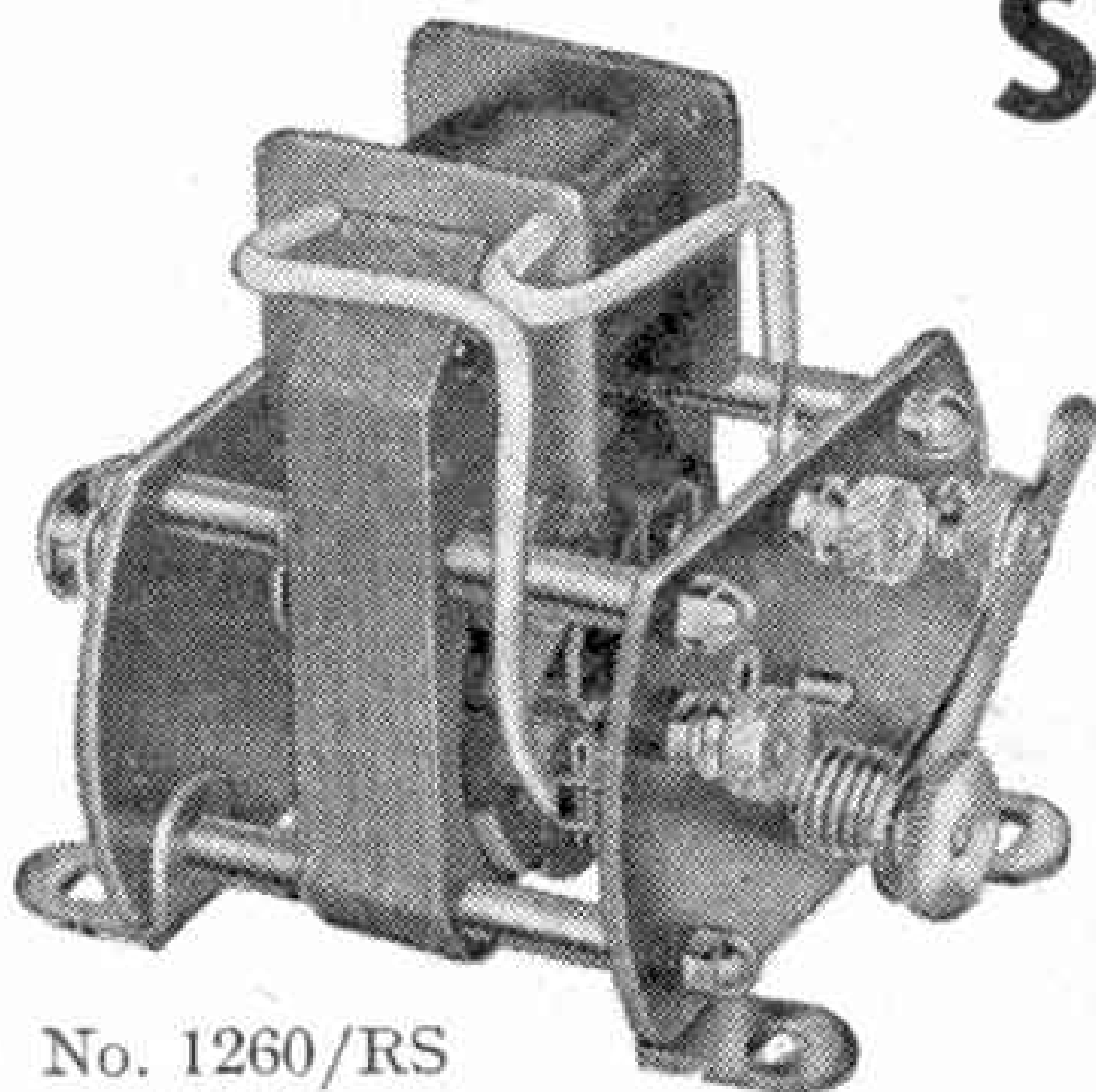
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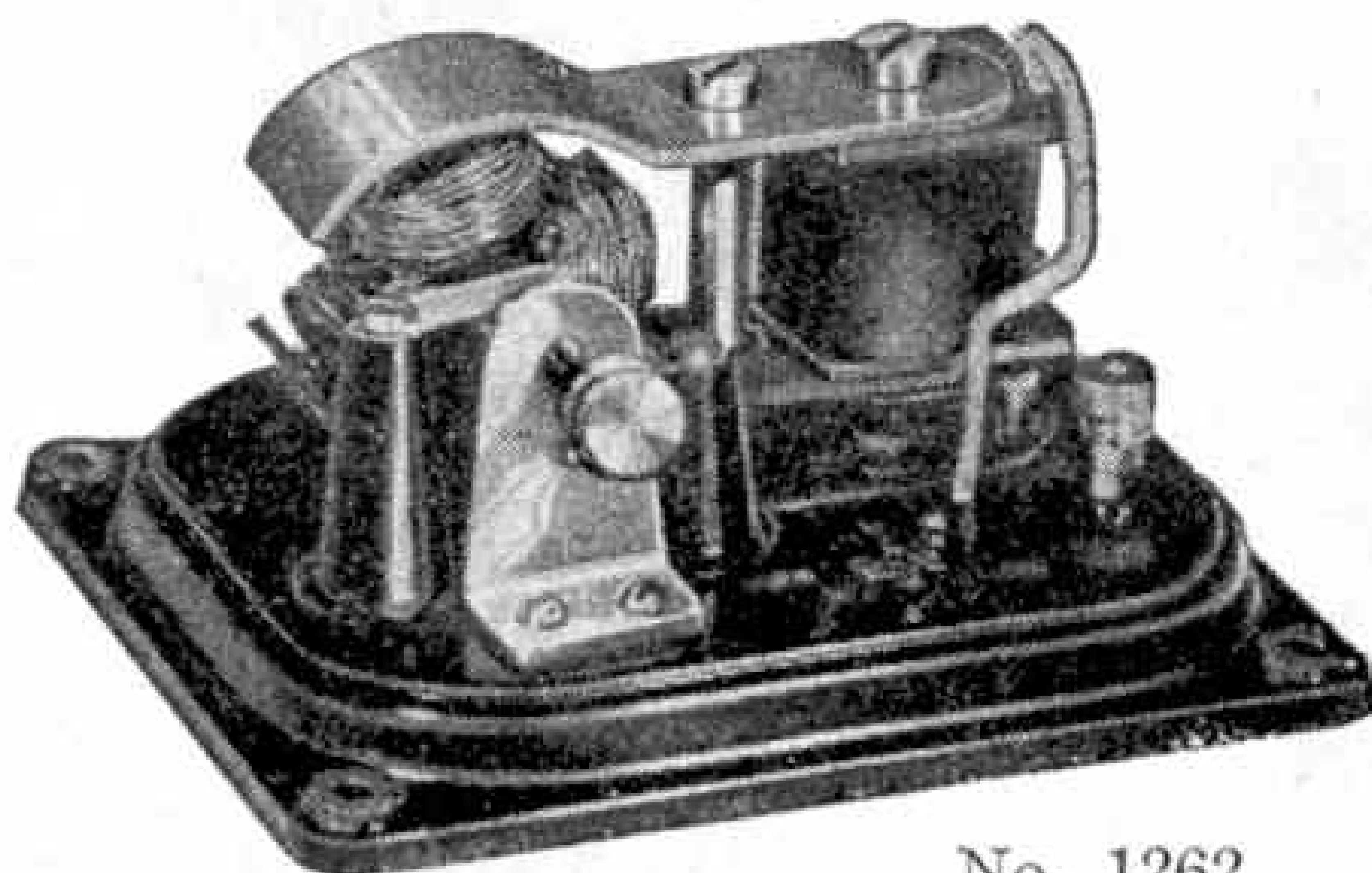


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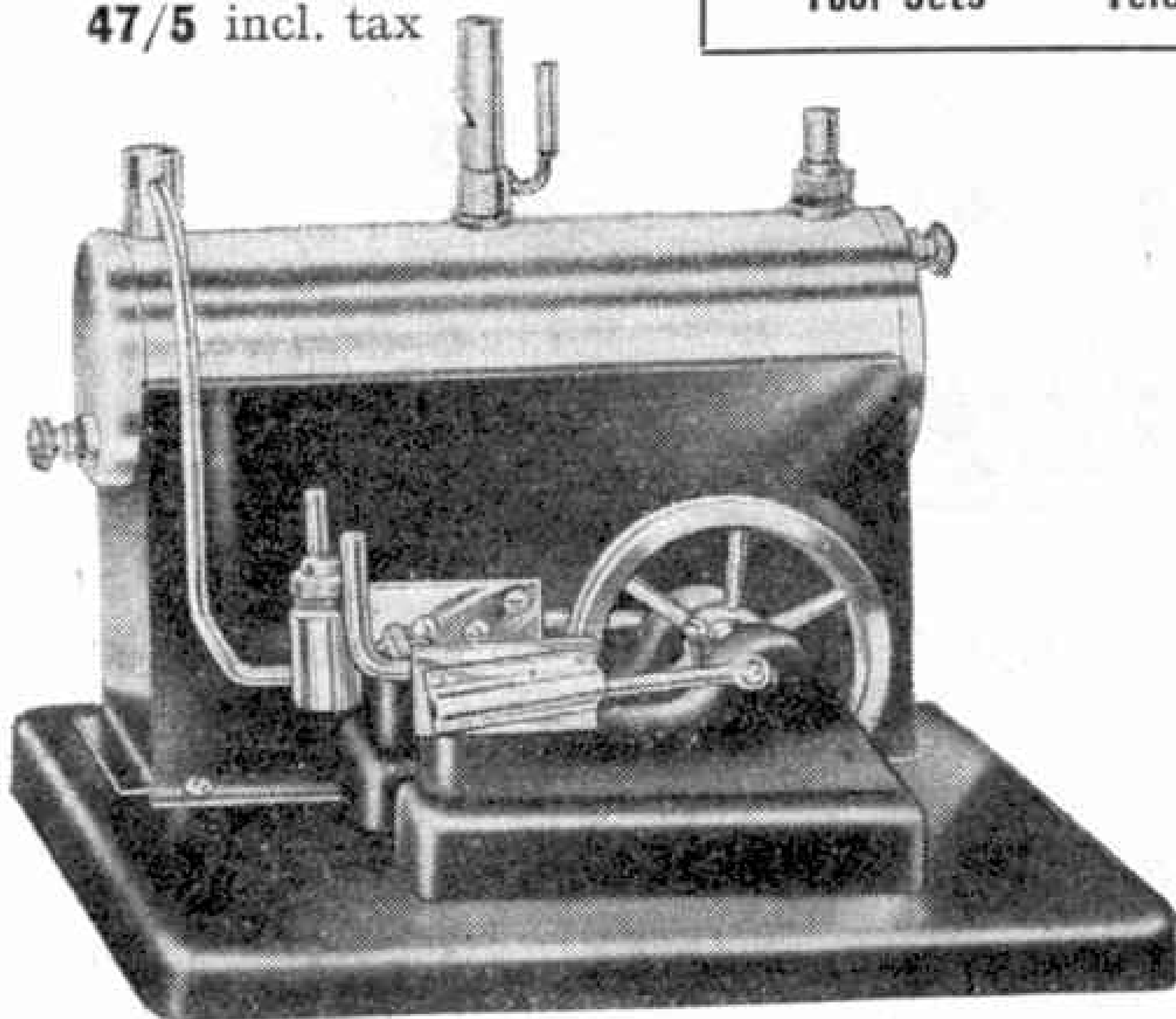
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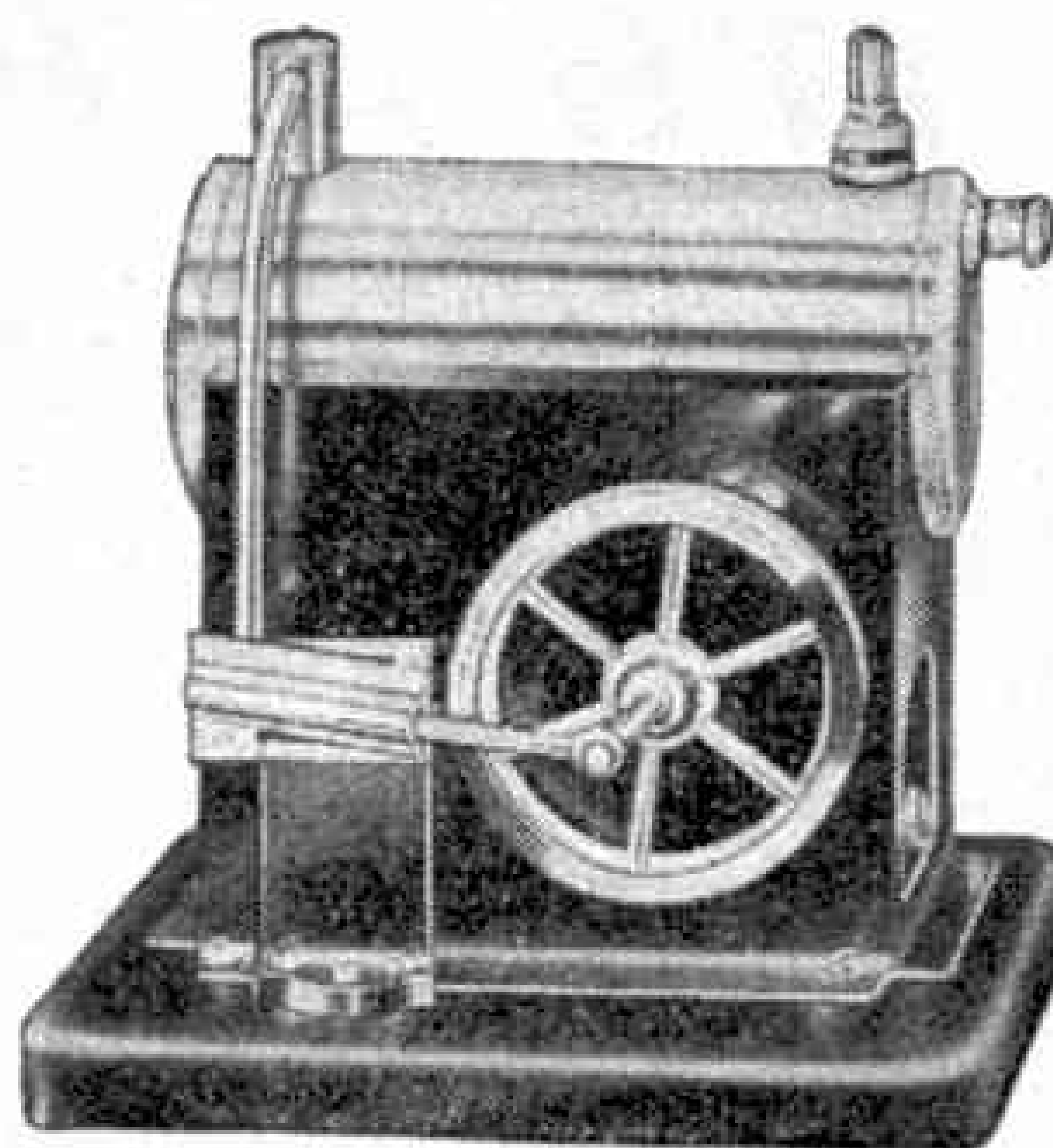
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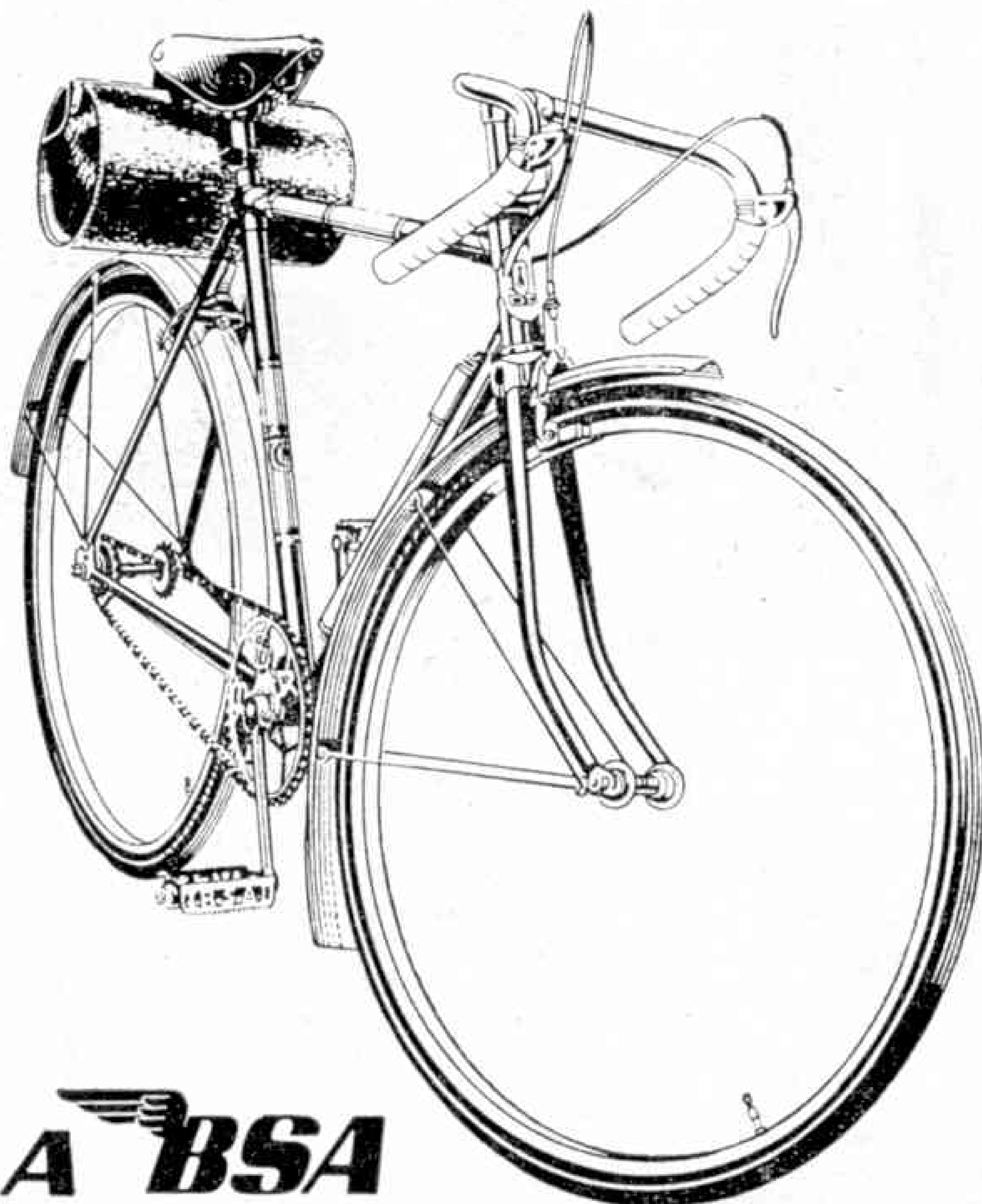
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MAGAZINE

Editorial Office:
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Vol. XXXVI
No. 2
February 1951

With the Editor

What can we do about the weather?

Mark Twain once pointed out that we all complain about the weather, but nobody does anything about it. That is not quite true to-day. We can't order a sunny summer season yet, but we can make rain—if there are any suitable clouds with which to make it—and we might even be able to break up hurricane clouds before these become dangerous.

Even this slight interference with the weather is sufficient to suggest that the question ought to be, not "What can we do about it?" but "What ought we to do?" Trials have shown us that clouds can be made to break up, and fall as rain or snow, by dropping on them from aeroplanes solid carbon dioxide, usually known as dry ice, or silver iodide, but for those who want more rain or snow there are always others who want less of them. For instance, water engineers, especially in the United States, like to see plenty of snow on the mountains, for from it come their water supplies, but less snow is wanted by others, for every fall causes dislocation of traffic and removing snow is costly. In a Rocky Mountain district snow may be wanted to form a ski-ing ground, but catching clouds as they pass over to provide this snow may mean less rain for crops in other areas over which they would have passed.

If the weather is to be controlled it seems certain that there will be disputes, and even with the most careful planning it would scarcely be possible to give all of us just what we want. On the whole it seems best to leave it alone, except in emergencies.

Vineyards in England

We often hear older people say that the weather is not what it was. Weather does change, but so slowly that those who

live in rainy areas cannot look forward to better times with any satisfaction, and in any case a change may be for the worse! Where records are available some surprising differences are revealed. For instance, in Egypt the summers are rainless, but over 2,000 years ago there were almost as many rainy days in summer as in winter.

A still more surprising example is provided by Great Britain. Over 800 years ago abundant crops of grapes were grown in the open air in the southern part of the country, and these yielded good sweet wine. The country must have been considerably warmer and mellowier than it is to-day, for now grapes grow well out of doors only in a few sheltered places.

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Power from the Glens

Hydro-Electric Schemes in the Highlands

By I. M. M. Maccallum

THE Highland region of Scotland has always been noted for its lochs and rushing torrents. More than 100 years ago Sir Walter Scott described it as a land of the "Mountain and the Flood." To-day these same mountains and floods are being harnessed to provide power to generate electricity, which will be used to light and heat Highland homes and to provide power for local industries. Surplus power will be exported on the National

plant at West of Scotland power stations during times of high demand. This station was dealt with in a special article in the "M.M." for October of last year.

In order that water may be used to drive turbines it has to be stored in sufficient quantity at a suitable "head" or height above the proposed station. This necessitates the building of dams behind which the water is stored. The head may be as great as 1,000 ft., as at the Lawers

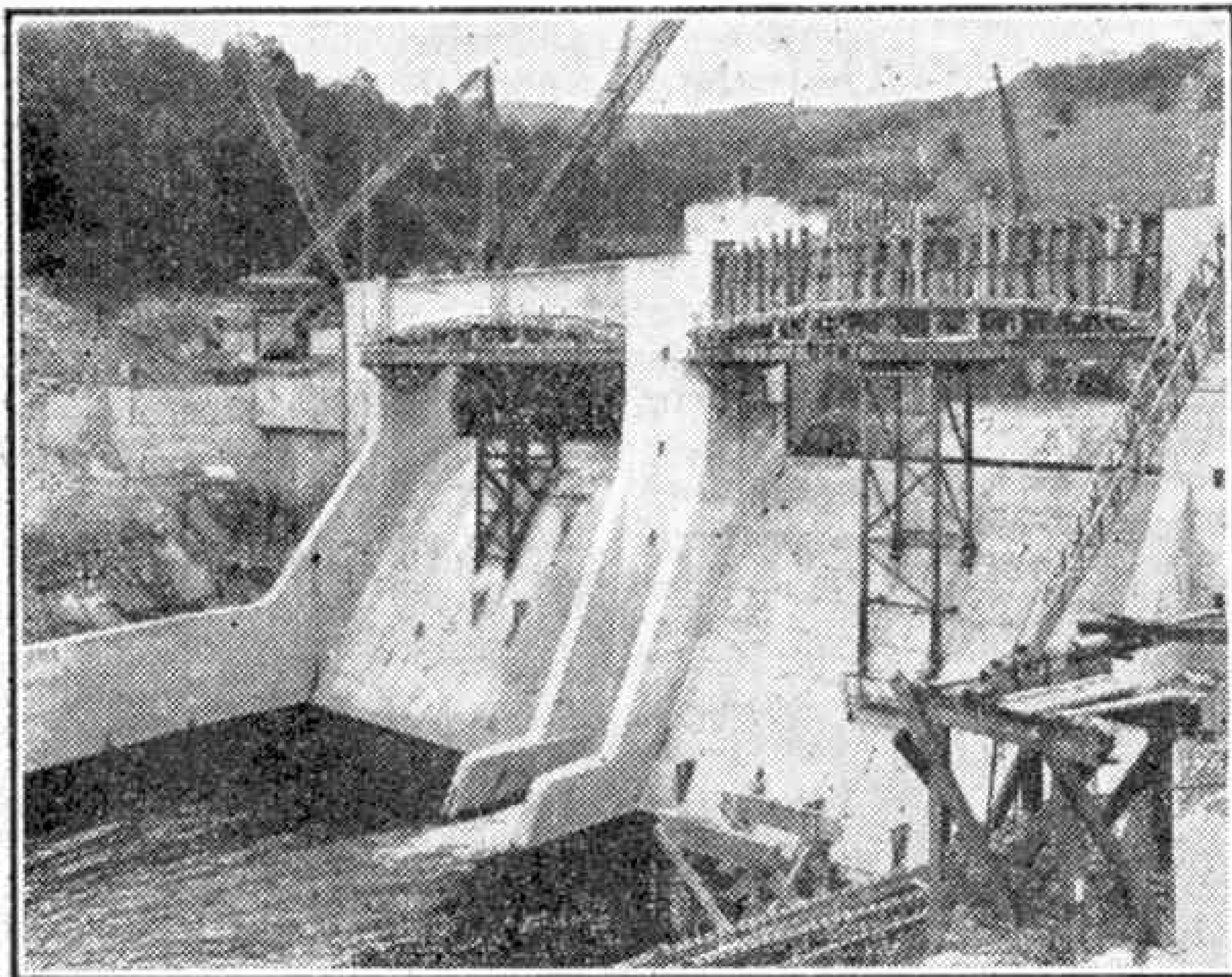
station on the banks of Loch Tay, where the water will be stored in a loch high up on the side of Ben Lawers; or it may be as low as 50 ft., as in the Pitlochry station, where the station is built into the dam itself.

The quantity of water available depends on the average rainfall, the size of the catchment area that drains into the reservoir and the storage capacity of the reservoir itself. At Loch Sloy the average annual rainfall is as high as 120 in., or about four times that of any Midland town. Several new lochs have been created to store water, including that produced by the flooding of the Tummel valley above Pitlochry. The catchment

area of the Tummel-Garry scheme is 706 sq. m., slightly larger than the area of Greater London.

Reservoirs discharge their waters to their power stations by various methods incorporating combinations of tunnels, pipes and aqueducts, or as at Pitlochry, directly through gates in the upstream side of the dam. Tummel Bridge is supplied by an aqueduct or open channel and pipeline from Dunalastair dam, while the waters of Loch Sloy are led by tunnel beneath Ben Vorlich and on emerging on the mountain's eastern slopes plunge down a quadruple pipeline to the generating station 900 ft. below.

Clunie power station, which is on the river Tummel three miles upstream from



Clunie Dam during construction. The illustrations to this article are reproduced by courtesy of The North of Scotland Hydro-electric Board.

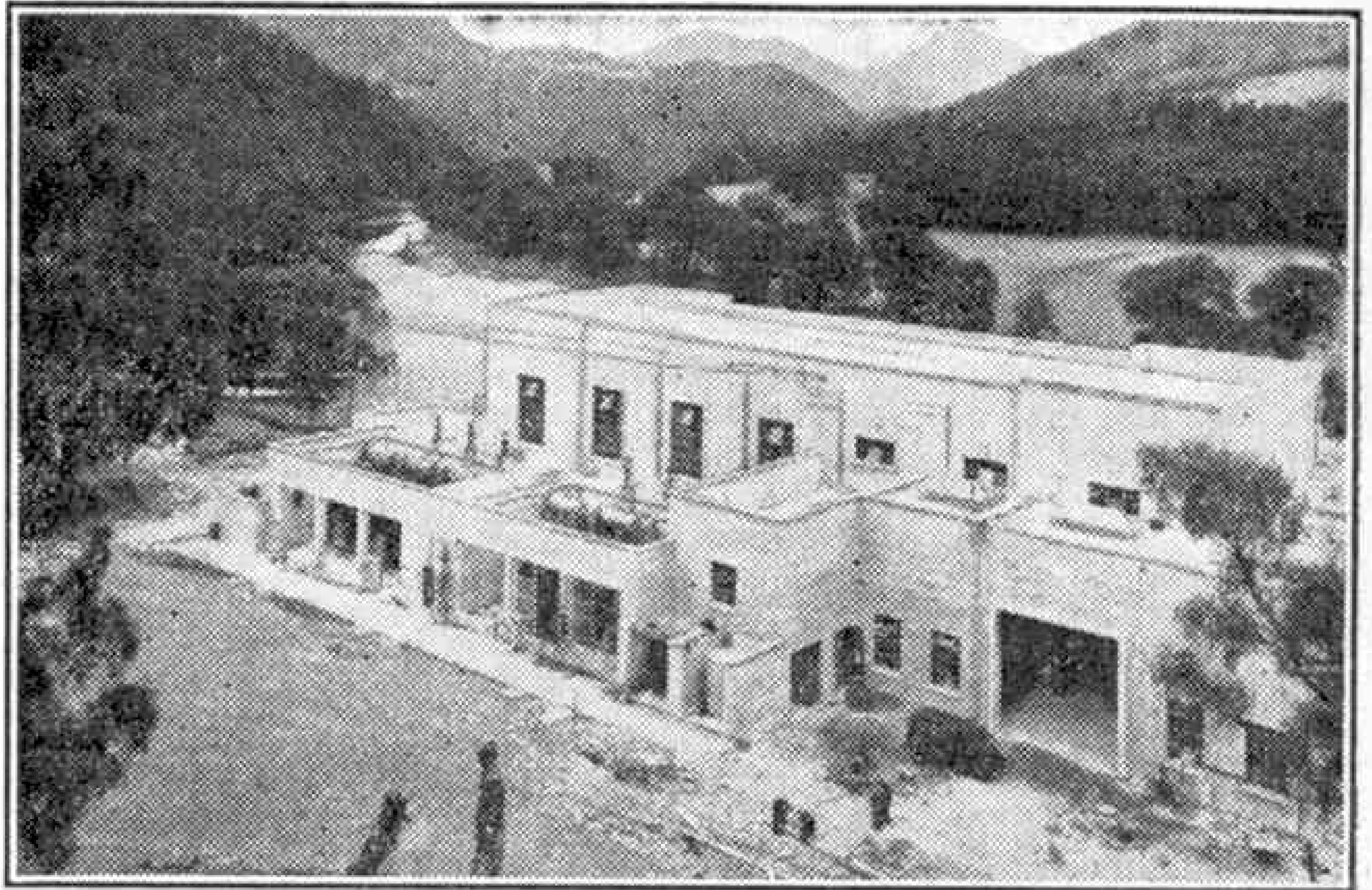
Grid to meet generating deficiencies in our big industrial cities.

Before the Second World War the Grampian Electricity Company operated two stations in the Tummel valley, one at Loch Rannoch and the other at Tummel Bridge. These have now been incorporated by the North of Scotland Hydro-Electric Board, set up in 1943, into the new Tummel-Garry project, the largest of the Board's schemes. When complete this will have a capacity of 233,000 kW. The new stations are at Errochty, Clunie and Pitlochry, and the two latter are already partially commissioned. In addition there is the Loch Sloy project, near the north end of Loch Lomond, which will act as a peak load station to relieve steam driven

Pitlochry, is a typical example of the Board's new power stations. It has had one set generating since April 1950, and when complete will have three generators with a total output of 68,000 kVA.

The power house, with its turbines, generators, switchgear and transformers, stands on the south bank of the river, and the dam has been built two miles upstream, with the whole of the waters of Loch Tummel behind it. The dam, which is seen in the illustration on the opposite page, is equipped with two drum gate spillways, one on either side of the central tower. These are so designed as to keep the level of the water above the dam constant, no matter how high the rate of flow of water may be.

From a position in the side of the loch near the dam a tunnel 21½ ft. in diameter has been driven in a direct line for the power station. Close to the power station it splits into three pipelines, each leading to one of the three turbines. In its journey from the loch the water falls through 150 ft. and on leaving the turbines is exhausted back into the river. Valves in the pipeline can isolate any turbine from its supply, and gates in the spiral casing control the turbine speed.

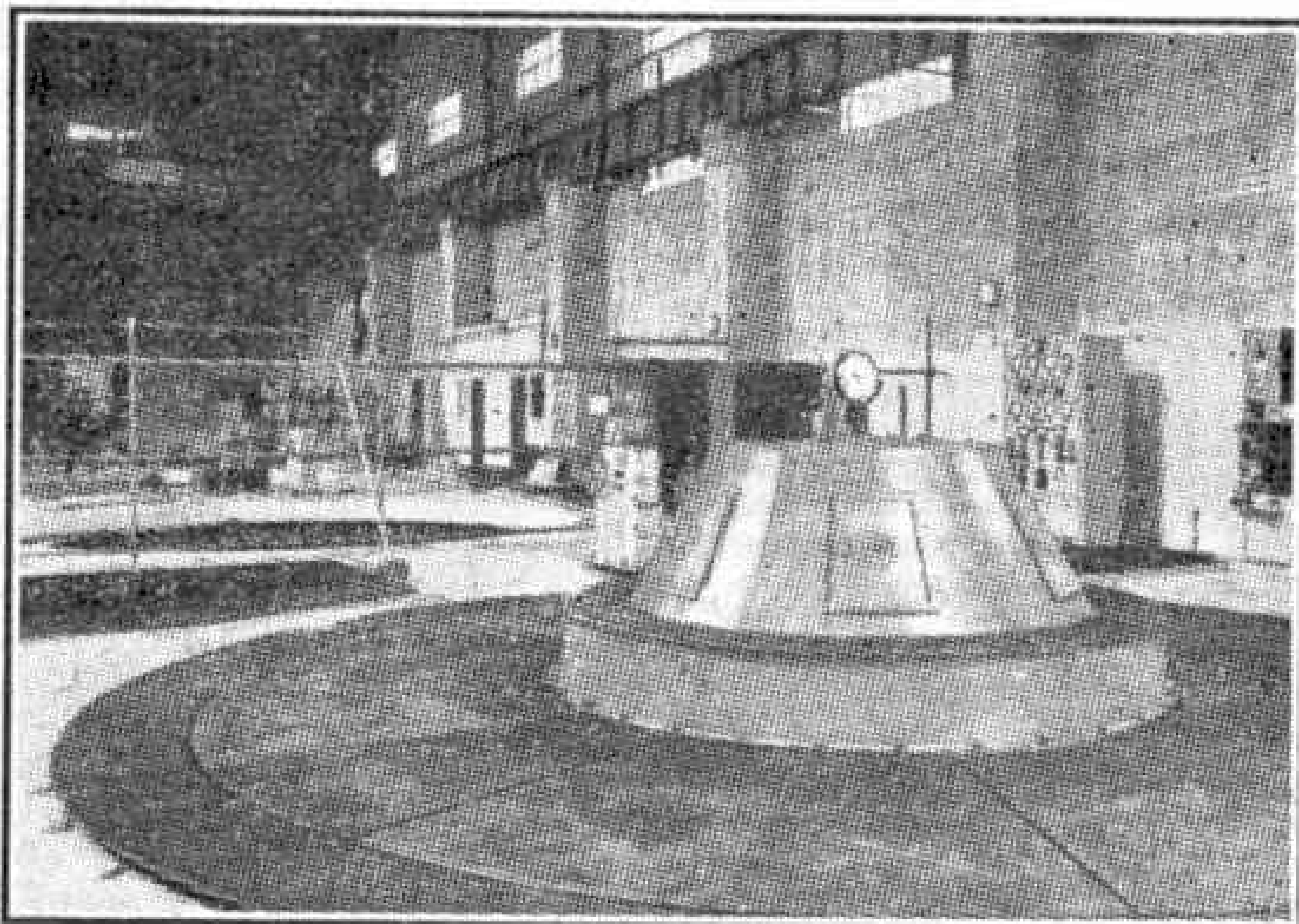


The rear of Clunie Power Station, with the transformers that step up the voltage of the current generated to 132,000 for transmission.

Each turbine drives its own alternator, located immediately above it and just below the level of the machine room floor, with the alternator's exciter mounted above the alternator itself to complete the set. One of these can be seen protruding above floor level in the foreground of the lower illustration on this page, with the turbine governor mechanism beside it and the indicator panel for the set against the wall. The control room for the station is situated at one end of the machine room.

The electrical output of the alternator passes through oil circuit breakers to the transformers behind the station, shown in the upper illustration on this page. These step up the voltage from 11,000 to 132,000 for transmission to Errochty switching station, from which power is distributed to various parts of the Highlands and to the National Grid.

Highland waters are famous for their salmon and trout. At certain seasons of the year they pass up the rivers to their spawning grounds, and "fish ladders" have been built to enable them to negotiate the dams at Pitlochry and Clunie. These consist of a succession of artificial pools arranged in the form of giant steps. The fish jump from one pool to the next until they have climbed to the level of the top of the dam, eventually reaching the higher stretch of water. The fish can be (Continued on page 94)



Interior view of the machine room at Clunie Power Station. The exciter of No. 1 set, the speed governing mechanism and indicator panels are seen.

Stage Coaching Days

By Arthur Gaunt, F.R.G.S.

ALL over Britain stand souvenirs of the days when stage coaching flourished. Many of our towns have inns dating from pre-railway days, where passengers awaited the arrival of these horse-drawn vehicles or spent the night, and where the horses were changed.

The halcyon period of this mode of travel was in the late 18th and early 19th centuries, when stage coach services linked London with Edinburgh, Glasgow, Holyhead, Bath, York, Manchester, Leeds, Chester, and other important centres. The coaches also ran on many cross-country routes, such as Hull-Liverpool and Lincoln-Chester, with connecting services to smaller places.

One of the fastest as well as one of the most important services was that which covered the 400-odd miles between London and Edinburgh. Timetables of 1832 reveal that the journey was being performed in 42 hr. 23 min. In view of the deplorable state of the roads in those days, this was a truly remarkable feat. At that date smooth surfaced roads were but a dream, yet the stage coaches managed to maintain an average speed of about 10 m.p.h. This meant driving at 20-25 m.p.h. over the better stretches, to make up the time lost on the worst sections of the route.

Many of the vehicles carried mails as well as passengers, and speed was a big recommendation when a stage coach proprietor was soliciting a contract for the conveyance of letters. In course of time, mail carrying became an important branch of stage coach operations, and many coaches were therefore named "Mail Coach." Early last century Leeds alone was served by at least a score of coaches bearing that name.

Other proprietors sought custom by giving their vehicles such names as "Quicksilver," "Flyer," and "Express," thus implying that the coaches were among the fastest on the road. Many of these services did indeed operate astonishingly fine-cut schedules, and despite the difficulties and dangers of the unlit roads, the vehicles ran by night as well as by day.

In 1836, an "Express" which left Leeds at 10 a.m. continued its journey through the following night and reached London

by 9 a.m. the following day. Such fast journeys were always fraught with danger, and in the winter of 1837 a serious accident befell this particular coach. Yet the mishap did not deter the owners from continuing to operate the service at night, and they even cut the timetable still further!

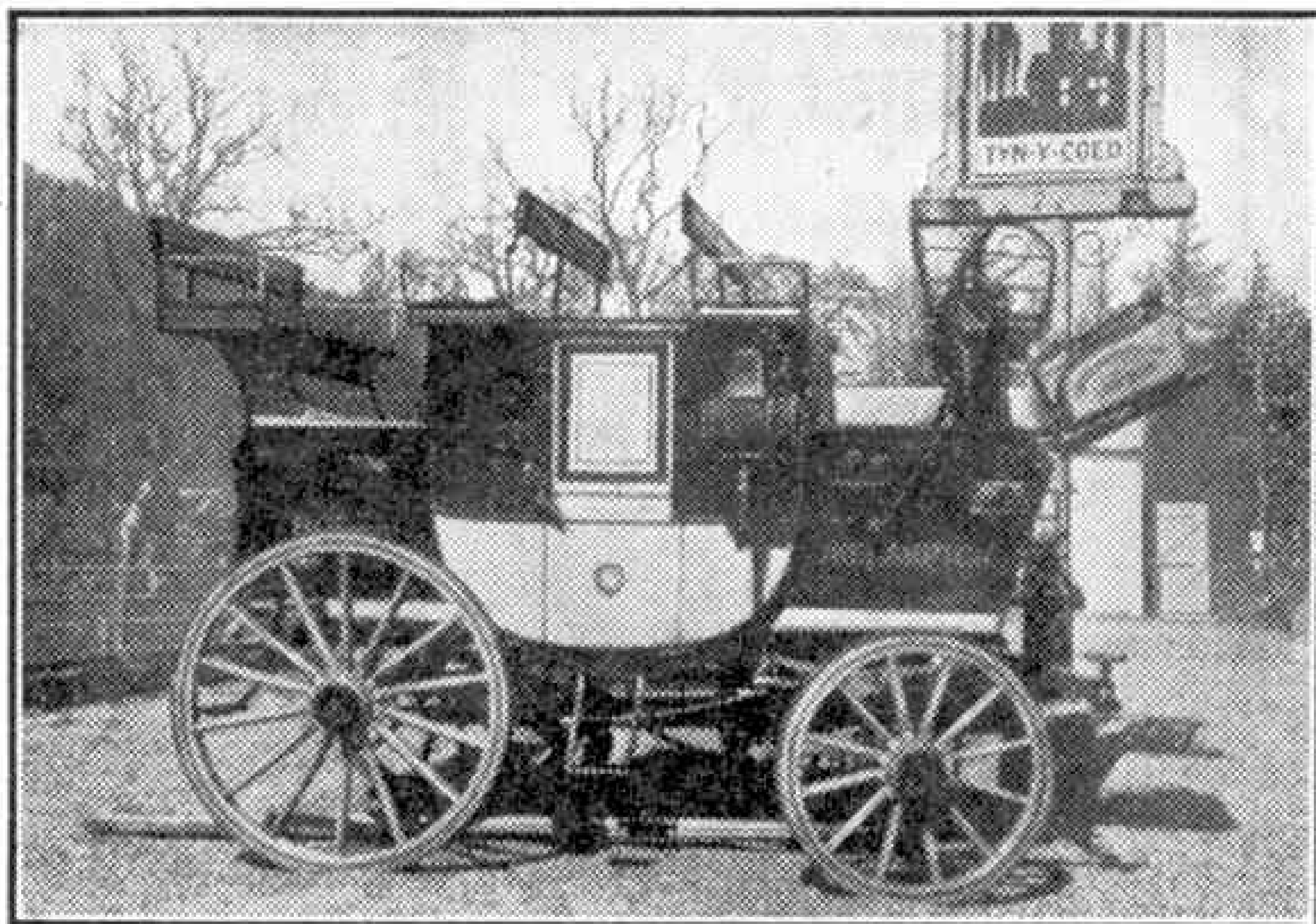
The "*Leeds Express*" indeed was one of the last stage coaches to be taken off the road as a result of the growth of railway competition. For several years, after most



The old "Black Swan" at York. This was a favourite stopping place for coach travellers 150 years ago.

other coaching services had been abandoned, this particular coach continued to run to and from London at an ever-increasing pace, in an attempt to compete with rail travel.

Another "Express" is noteworthy because it was plainly the coach Dickens had in mind when he wrote his graphic description of Nicholas Nickleby's journey to Dotheboys Hall, at Bowes, Yorkshire. Bowes lies on the route of an "Express" stage coach which ran between London and Carlisle, passing through Stamford, Grantham, Doncaster, Catterick, Appleby and Penrith. The route and timetable coincide with Dickens' description in "*Nicholas Nickleby*."



The "Roebuck," a stage coach that ran between London and Falmouth. Photograph by C. R. Rowson.

For sheer speed the "*Wellington*," which ran between London and Newcastle, had few rivals. Its renown was attributable largely to one of its drivers, Ralph Soulsby, who is said to have killed three of his four horses in the short distance of seven miles, simply by over-driving them. This coach was another that continued running several years after the coming of the railway. It was the last to run on the Newcastle-Darlington road.

The "*Edinburgh Mail*," the coach which in 1832 was doing the London-Edinburgh journey in less than two days, was first introduced on that route in 1786. Its success arose chiefly because the service was operated by three separate companies, each of which was responsible for the safe conduct of the vehicle along one-third of the route. The 400 miles were divided into London-York, York-Newcastle, and Newcastle-Edinburgh sections.

The profits made by this "*Edinburgh Mail*" are revealed by receipt-accounts still preserved. They disclose that in a single month more than £1,000 was taken. The figures may be regarded as typical of the profits made by many of the coaching companies in the heyday of stage coaching, though it must also be noted that there were tolls to be paid at many points along the routes.

The last journey of the London-Edinburgh "*Express*," in 1842, after the service had been operating for no less than 56 years, was marked by a unique ceremony. Instead of following the usual road route between Doncaster and York, the coach was driven through Escrick Park, the property of Lord Wenlock.

His Lordship himself took the reins and drove the stage coach to York, and a big black flag decorated the vehicle on this final run.

Fine old coaching inns exist to-day at York, Boroughbridge, Chester and many other places. The "*Black Swan*" at York was originally a manor house, but was converted into an inn catering for coach travellers.

What is now the Hest Bank Hotel, at Hest Bank, between Carnforth and Morecambe, was a halting-place for coaches running between Lancaster and Barrow. The route led across the sands at the head of Morecambe Bay, and a light was kept burning in one of

the upper rooms of the inn, to guide the drivers and enable them to avoid the treacherous quicksands.

This crossing was established by the monks of Cartmel Priory, and was in use long before coaching times. The office of the guide still exists, and even to-day parties on foot are sometimes led across Morecambe Bay along the line followed by the coaches.



Another famous coaching inn, the "Three Greyhounds," on the Great North Road at Boroughbridge.

The New Esso Refinery at Fawley

ON Southampton Water, between Hythe and Calshot, the largest refinery in Europe has reached the peak period of its construction. Work began in the summer of 1949 and it is expected that the new refinery will go "on stream" early in 1952.

This new Esso Refinery, as it is called, is being built by the Anglo-American Oil Company Limited. It is costing £37,500,000, and when it has been completed it will produce five and a half million tons of petroleum products a year, including a million gallons of high quality motor spirit every day. It will be exceeded in size only by a few of the very largest United States refineries, Abadan in the Middle East and Aruba in Venezuela, each being about four times as big as Fawley. Abadan is the largest in the world with Aruba second.

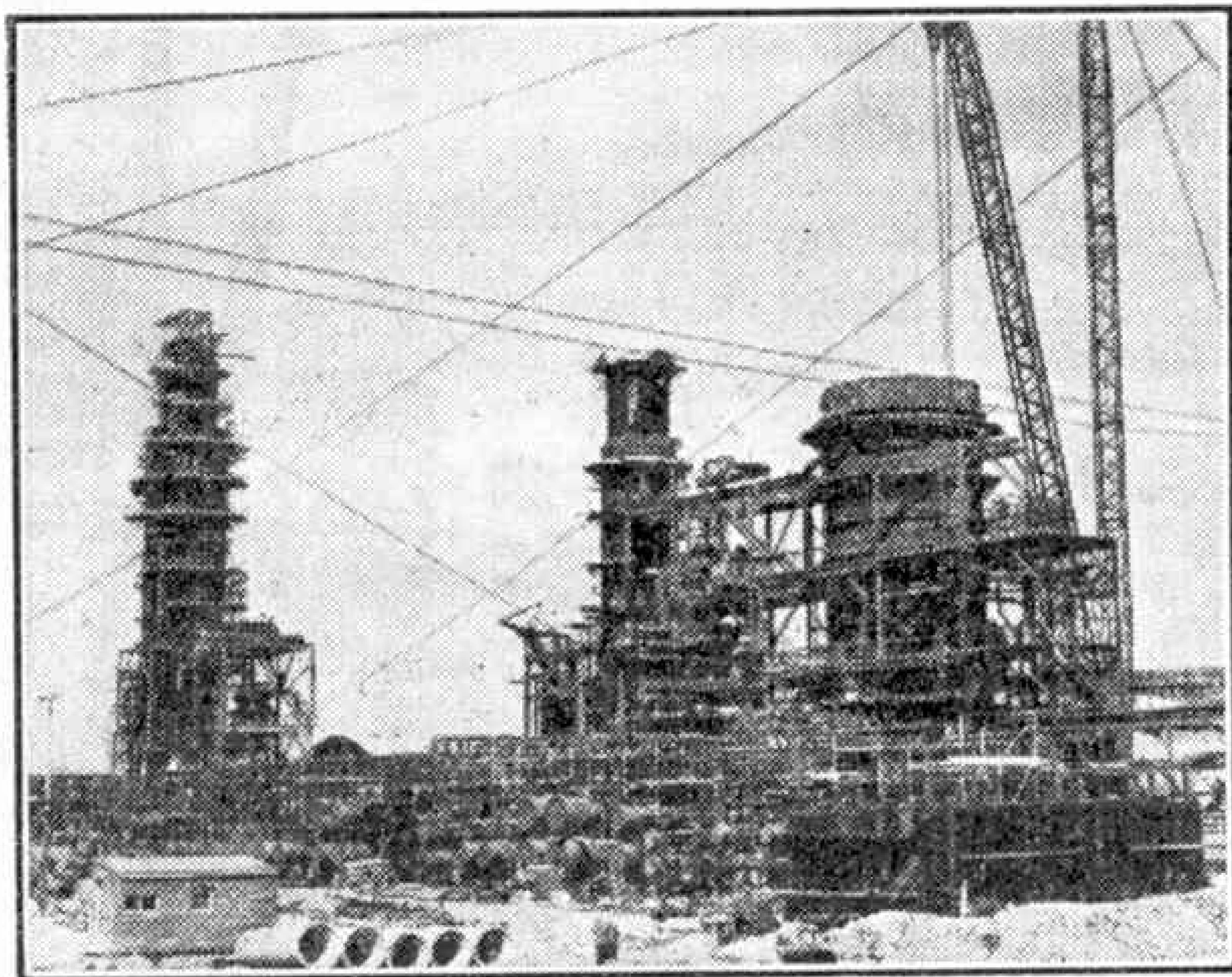
Over 2,000 British people will be permanently employed at the new refinery

on the assumption that the present rate of progress can be continued, it is the company's hope that some facilities will be available and some operations may be started during the last quarter of 1951.

The initial operation consisted mainly in land clearance, grading, digging preliminary excavations, erection of fencing, the installation of a field power plant and telephone system and the building of a large permanent steel-framed combined workshop and warehouse, 800 ft. long and 180 ft. wide. This will contain most up-to-date travelling cranes, latest types of machine tools, most modern systems of ventilation and lighting, all designed for the comfort of workmen and to give maximum efficiency. It will reduce to a minimum the necessity for unsightly huts and the temporary buildings on the site during the actual development period. All offices are centralised in this building.

The nature and elevation of the land afford the quickest and cheapest development for refinery construction. The land consists of sand and gravel and there is a gentle gradient from the sea to a maximum height of 100 ft. above Ordnance datum.

If the role which the new Esso Refinery will soon be playing in the petroleum economy of the United Kingdom is to be appreciated, certain fundamental factors which have dominated the world oil picture, particularly since the war, have to be considered. First of all, an enormous increase has taken place, during and since the war, in the world's total consumption of petroleum. This rose from 265 million metric tons a year in 1938 to 475 million metric tons



New Esso Refinery, Fawley, Hampshire. General view of some of the main units under construction. For the accompanying photographs and the painting on which our cover is based we are indebted to the Anglo-American Oil Co. Ltd.

as compared with 900 at present in the existing plant. A vast labour force of between 4,000 and 5,000 men is now engaged on construction and 98 per cent. of these are British.

Work in the field began in July 1949. It is expected that the refinery will be completed by the beginning of 1952 and

in 1949. In the United Kingdom petroleum consumption has constantly expanded until to-day it stands at over sixteen million tons a year, compared with about ten million tons in 1938. The United States alone are using more oil to-day than was the whole of the world twelve years ago.

In order that this great increase in world demand might be met, much larger quantities of crude oil have had to be produced from the earth, and more and bigger refineries have had to be called into play to provide the vast range of products derived from petroleum that are now essential everywhere to industrial progress and to the improvement of living standards generally.

Though both the production and refining of oil have expanded very considerably in the United States, so too has the demand; and it is to the Middle East that the rest of the world, and in particular Western Europe, has turned for additional crude oil.

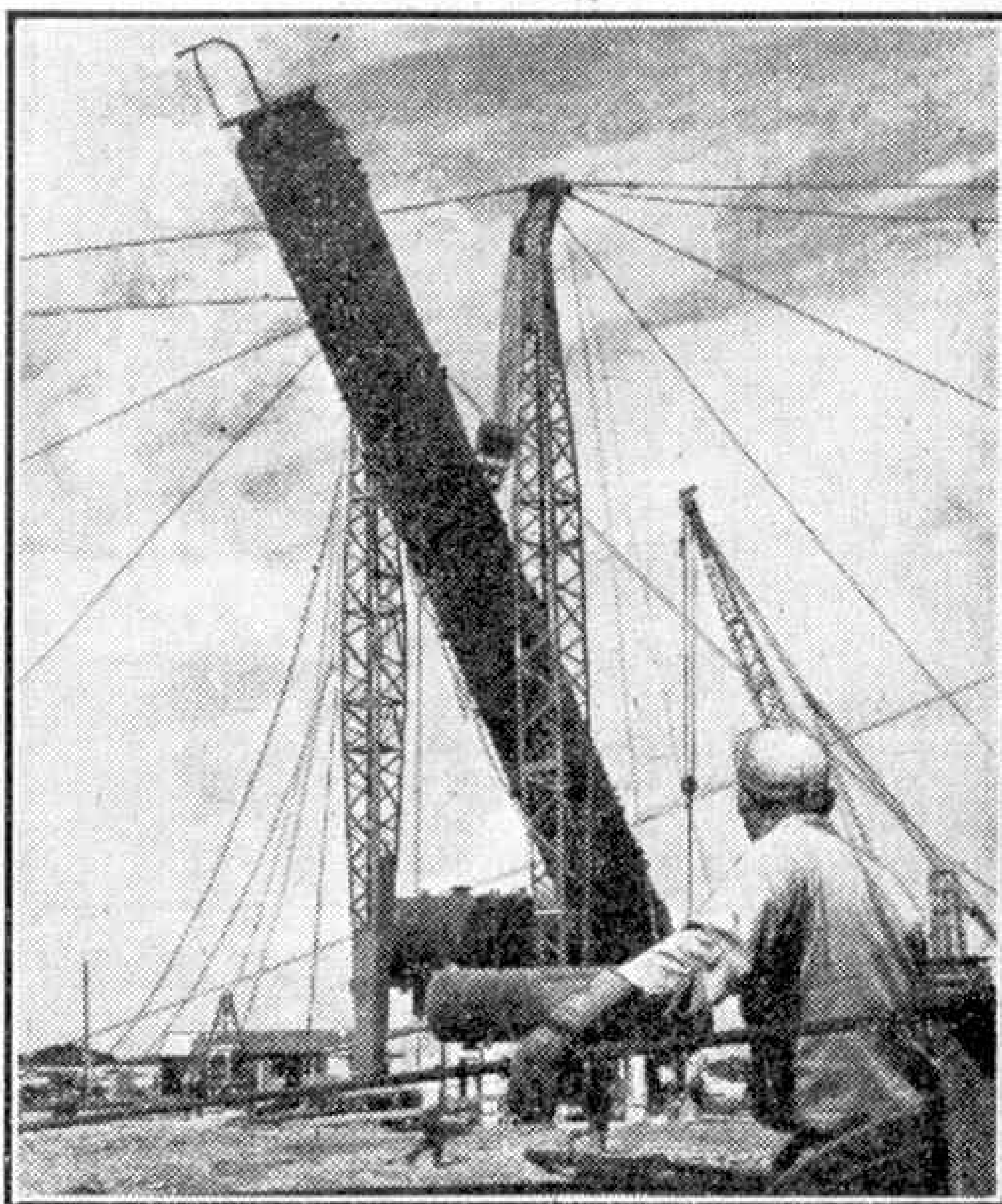
In the Middle East, around the Persian Gulf, developments have occurred at breath-taking speed, and it is now known to be the world's richest oil zone. Kuwait, for example, from which virtually no oil was obtained in 1938, produced in 1949 well over twelve million metric tons. And the corresponding figures for Saudi Arabia rose from 67 thousand tons in 1938 to 23 million tons in 1949. This, in an area where the local consumption rate is very low, means that virtually the whole of Middle East crude is available for export to oil-thirsty markets. But if the crude oil from the Middle East is to be of any use to mankind it must be refined, and this comes back once again to the need for greatly increased refinery capacity, not only in the United Kingdom, but on the Continent as well.

Furthermore, there is at the present time an urgent need for this country to save dollars. So far as oil is concerned, this means that we must obtain as much crude oil as possible from sterling sources in the Middle East and refine it in the United Kingdom.

At the present time several new oil refineries are being built in Britain which, when completed, will raise total production to about twenty million tons a year, as compared with three and a half million tons in 1948. Of these new refineries, Fawley will be the largest in Europe. It will supply the whole of the Anglo-American Oil Company's anticipated requirements in the United Kingdom and rather more than a quarter of the home market demand.

The selection of Fawley as the site for

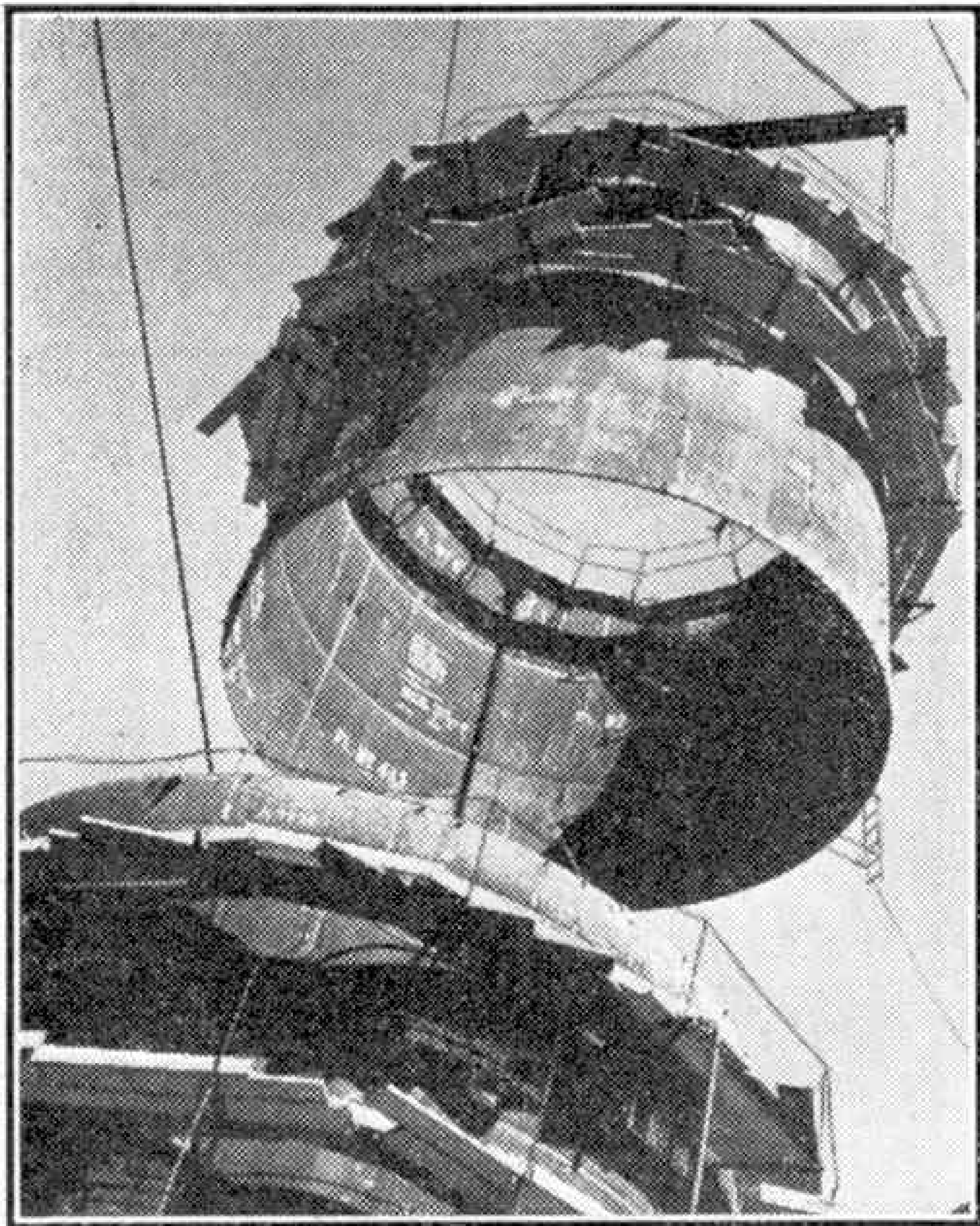
this vast project was prompted by the fact that it involved the extension of an existing refinery, thus permitting a progressive and comparatively rapid utilisation of the new facilities. Also, exhaustive studies have shown that, for the most economic distribution over the whole



This tower, 113 ft. long and weighing 135 tons, shown being hoisted into position, was delivered to the site in one piece, coming by road from Southampton.

Kingdom of such a large volume of petroleum products as Fawley will produce, the site on Southampton Water is the most advantageous. Southampton Water has excellent sheltered, deep water facilities for the big tankers which will berth alongside the refinery's massive installations. The unique double tides, which make it possible to berth or unberth tankers at any time of the day or night, are of course an additional advantage.

During the construction of the Fawley refinery over a million cubic yards of earth have been moved, and three and a half miles of permanent, full gauge railway track and a considerably greater length of roadways have been laid down. The refinery itself, tankage and associated buildings embody 100,000 tons of steel: 300 miles of steel, cast iron and concrete pipes; 200 miles of electrical wiring; 17 miles of copper tubing; 100,000 cubic



A heavy section of one of the main refinery units being lowered into place.

yards of concrete and no less than 1,600 lb. of mercury for instruments.

Docks will basically be designed for 28,000 ton tankers, although consideration is being given to so spacing berths that tankers up to 700 ft. long (37,000 tons) can be berthed there as and when they become available. The new jetty will be 3,200 ft. long and the approach to it 5,000 ft.

Navigational and berthing facilities at

Fawley are ideal for all ocean, coastal and local tanker operations associated with the refinery project. A safe and sheltered anchorage (60-70 ft. Low Water Ordinary Spring Tide) is available to tankers in Cowes Roads about $5\frac{1}{2}$ miles from Fawley. Any tankers at anchorage could therefore be readily contacted by launch. The normal minimum depth of water in the navigable channel between the anchorage and Fawley is 36 ft. Low Water Ordinary Spring Tide, and 38 ft. Low Water Ordinary Neap Tide. One ocean tanker jetty already exists at Fawley. It is suitable for the berthing of tankers up to 18,000 tons deadweight on 30 ft. draught Low Water Ordinary Spring Tide.

Ample foreshore space is available for erecting additional ocean tanker jetties and suitable berthing accommodation for coasters, local bunkering vessels and barges. The current in this area rarely exceeds two knots.

The site is isolated from all other shipping activities, and tanker operations would be unaffected by weather conditions and the movement of other shipping to and from Southampton. This isolation would provide an important safety factor in handling the large volume of concentrated tanker operations involved.

The latest devices to minimise air and water pollution will be installed. No sulphuric acid and its attendant fumes will be involved in refining processes. This represents a very big advance in petroleum refining technique. The plant, when completed, will be screened by a belt of trees 100 to 150 ft. wide.

How Long is an Inch?

TO begin with the inch may have been just the length of a joint of a man's first finger. To most of us it is now the distance between two marks on a ruler or a yard measure. This will do very well for measuring cloth or linoleum, but it is not very exact. A steel rule is better, but even this expands when it becomes warmer, and in any case the marks themselves have a definite thickness, so that it is not accurate enough for fine measurements such as are used to-day in science and engineering.

For well over a hundred years the standard of length has been the distance between two marks on a bar of some metal. For instance, the metre, the scientific unit of length, is the distance between two marks on a bar made of an alloy of platinum and a similar metal called iridium that is in a vault in Paris, when this bar is at the temperature of melting ice. Now a new standard is used. This is the length of a certain light wave.

The wave chosen is very interesting. Away back

in the Middle Ages alchemists spent a good deal of money and time trying to turn other metals into gold. Now a way has been discovered of reversing this process and turning gold itself into a particular kind of mercury or quicksilver. To do this the gold has to be bombarded with neutrons, the tiny particles that have become familiar to us by name since the first atom bomb was dropped on a Japanese city. A beginning was made by bombarding about 40 oz. of gold for a year or two in an atom-splitting machine at California University. The war interrupted this process, but the creation of huge atomic research stations in connection with the production of atom bombs unexpectedly provided a better and quicker way. With this special mercury lamps have been made and one particular green ray given out by them will probably become the standard on which to base all our measurements of length.

There are about $21\frac{1}{2}$ million of these wavelengths in an inch. They can be measured with great accuracy.

BOOKS TO READ

Here we review books of interest and of use to readers of the "M.M." With certain exceptions, which will be indicated, these should be ordered through a bookseller

"THE BOYS' BOOK OF ROCKETS"

By RAYMOND F. YATES
(Werner Laurie. 8/6)

In the last few years rockets have grown enormously and have found applications that were scarcely dreamed of but a short time ago. This remarkable development is the subject of Mr. Yates' book. It begins with the first efforts to escape from the surface of the Earth, which were made in balloons. The height record for such an ascent was the 72,395 ft., or nearly 13½ miles, reached by Anderson and Stevens just over 15 years ago, but it had already been realised that the rocket offered the only prospect of getting far away from the Earth. This subject provides the material for the greater part of the book. Readers are given some idea of what space travel must be like. Just why a rocket can travel through space also is clearly explained, after which we have practical details of rockets and their design, all told easily, and in such a way that older readers of the "M.M." at any rate will have no difficulty in understanding what is involved.

Next we have suggestions for a space ship, based on the trials and experiments already dealt with, and there is a discussion on the art of finding one's way in space. A brief account is then given of the pure jet engine, a development that has turned the aeroplane into a rocket. Interesting notes on pioneers of rocket flight bring the book to a close.

The book is well illustrated by means of photographs and explanatory drawings.

"THE GREENLAND ADVENTURE"

By GEORGE L. PROCTOR
(Harrap. 7/6 net)

Mr. Proctor's book is described as a junior adventure novel of the type that its owner will find difficult to keep out of his father's hands. This is correct. The story is full of excitement that would naturally follow the discovery, made here by four young men on an expedition to Greenland, that certain Nazi leaders with evil thoughts in mind are hiding in a lonely part of the country, especially as these young men set out to destroy their enemies. Adventure crowds on adventure throughout the yarn, and both younger and older readers will find it retaining their interest to the end.

"THE PECO PLATELAYER'S MANUAL"

By R. WATKINS PITCHFORD
(Pritchard Patent Products Co. Ltd. 6/9)

The first edition of this handy Manual was reviewed in the "M.M." in August 1949. Here now is a second edition, enlarged and revised to include the most recent "Peco" developments.

Reliable and realistic track is essential to a successful miniature railway and the book as a whole therefore is concerned with "the smooth and graceful passage at various speeds of a vehicle along a track way." We begin with the art of platelaying, both ancient and modern, and then pass on to the reproduction of full size practice in miniature. Special reference is made to scales and gauges and the standards to be observed in wheel and rail dimensions to ensure successful running. Next comes the planning of the layout, with instructions for the use of "Peco" components, and details of the different types of rails and track base materials.

The book is well illustrated, with many diagrams and there are tables providing a wealth of information useful to the miniature railway enthusiast. Copies are obtainable at shops where "Peco" products are sold.

"LOCOMOTIVES OF THE GREAT NORTH OF SCOTLAND RAILWAY"

By M. C. V. ALLCHIN
(Railway Hobbies Ltd. 2/6)

The Great North of Scotland Railway, one of the smaller lines of pre-1923 days, was fiercely independent, as befitted a Scottish line, and its engines had definite characteristics of their own. Here we are given details of all its locomotives, with renumbering that took place when it became part of the L.N.E.R., and on its inclusion in the Scottish Region of British Railways. Illustrations are plentiful, ranging from the quaint 2-4-0s of nearly a century ago to the sturdy 4-4-0s of different series that were the mainstay of Great North services for so long.

Copies of the booklet are available from bookstalls or hobby shops, or direct from Railway Hobbies Ltd., 86, Essex Road, Southsea, Hants., price 2/8.

"WE FOUR AND THE KING'S TREASURE" "WE FOUR ON MOUSE ISLAND"

By NOEL BARR (Harrap. 5/- each)

In these two delightful stories for our younger readers we are introduced to four children, two boys and two girls. In the first they get involved in a plot to steal the Crown Jewels, which they foil handsomely, and in the second, while on holiday in Ireland, they solve the long-standing mystery of the disappearance of lobsters from the fishermen's pots, exploding the story of a roaring monster that lives in a cave on Mouse Island in the process.

In both stories there are many interesting twists and turns that add to the excitement. The four children concerned are real in every sense, and even apart from the story itself it is a pleasure to read about them.

"THE SIGN OF THE ALPINE ROSE"

By MALCOLM SAVILLE
(Lutterworth Press. 7/6)

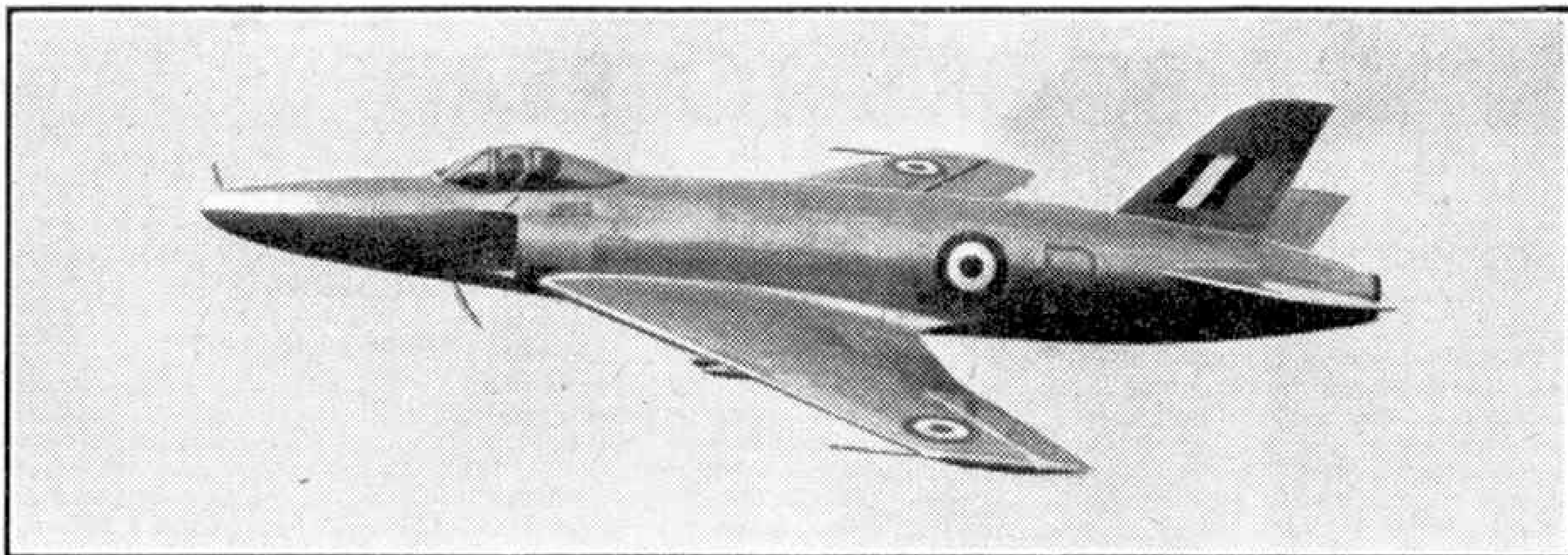
What had been planned as a peaceful family holiday by the Jillies suddenly becomes intensely serious and almost tragic. The scene is an Austrian village near the Communist Zone, and each member of the family becomes mixed up with plots to bring refugees through the mountains and the efforts of ruthless communists to stop them.

The Jillies are real people, as indeed are the Austrians and others they meet during their exciting adventures in the village and among the mountains of the frontier region. There are many surprises, as well as difficult situations and narrow escapes, and the whole forms an enjoyable story that leaves its readers with a well-satisfied feeling.

"THE RAILWAY PHOTOGRAPHER"

Railway photographers, and indeed most railway enthusiasts, will welcome this new publication. It is edited by Mr. J. D. Mills, many of whose photographs have been reproduced in the "M.M.", and its first issue is attractive. Its contents are nicely varied. They include an excellent selection of reproductions by well-known experts, but the magazine is by no means just a picture parade, for in it there are interesting and informative articles by Mr. Pursey C. Short, the assistant editor, Mr. Maurice Earley and Mr. W. S. Garth, another contributor to the "M.M." who here deals with railway photography off the beaten track.

Copies are available at most bookstalls and bookshops, price 1/6, and they may also be obtained from "The Railway Photographer," 28, Hill Road, Weston-super-Mare price 1/9, including postage.



Supermarine 535 swept-wing jet fighter. Photograph by courtesy of Vickers-Armstrongs Ltd.

Air News

By John W. R. Taylor

Supermarine's Latest

The Supermarine 535, illustrated above, is the latest, fastest and most powerful product of the company that gave Britain the world-beating S.5 and S.6 Schneider Trophy seaplanes and the immortal "Spitfire" fighter of World War II. Developed from the swept-wing Supermarine 510 research aeroplane, it is an experimental fighter, armed with four wing-mounted 20 mm. cannon, and powered by a Rolls-Royce "Nene" turbojet. Provision is made for an after-burner, and when this is fitted the Type 535 should be capable of flying at the speed of sound.

The most noticeable of its new features is the changeover to a tricycle undercarriage, although the twin tailwheels of the 510 have been retained for use as "bumpers" during extreme taildown landings. Its nose is longer than that of the 510, to accommodate the nosewheel, and it has bigger air intakes.

No production order for the Supermarine 535 has yet been announced. But the 510 recently completed successfully a series of decklanding trials on one of the Royal Navy's aircraft carriers, which seems to indicate that the Admiralty may be interested in the Type 535 as successor to the straight-wing Supermarine "Attacker," which is in squadron service.

B.E.A.'s Flying Workshop

When an air liner experiences serious engine trouble at an overseas airport the normal practice is to fly out a replacement engine for it. The impending debut into service of its new "Ambassador" fleet has, therefore, presented B.E.A. with a problem, as the "Centaurus" engines fitted to these aircraft are among the biggest of their type in the world.

Fortunately, even a "Centaurus" power plant can be carried by the versatile Bristol "Freighter," so B.E.A. are converting a "Freighter" into a "flying repair-shop," to carry aero engines, spares and repair personnel to any part of the Continent at short notice. It will be ready for service by the early Spring.

The Douglas "Skyknight"

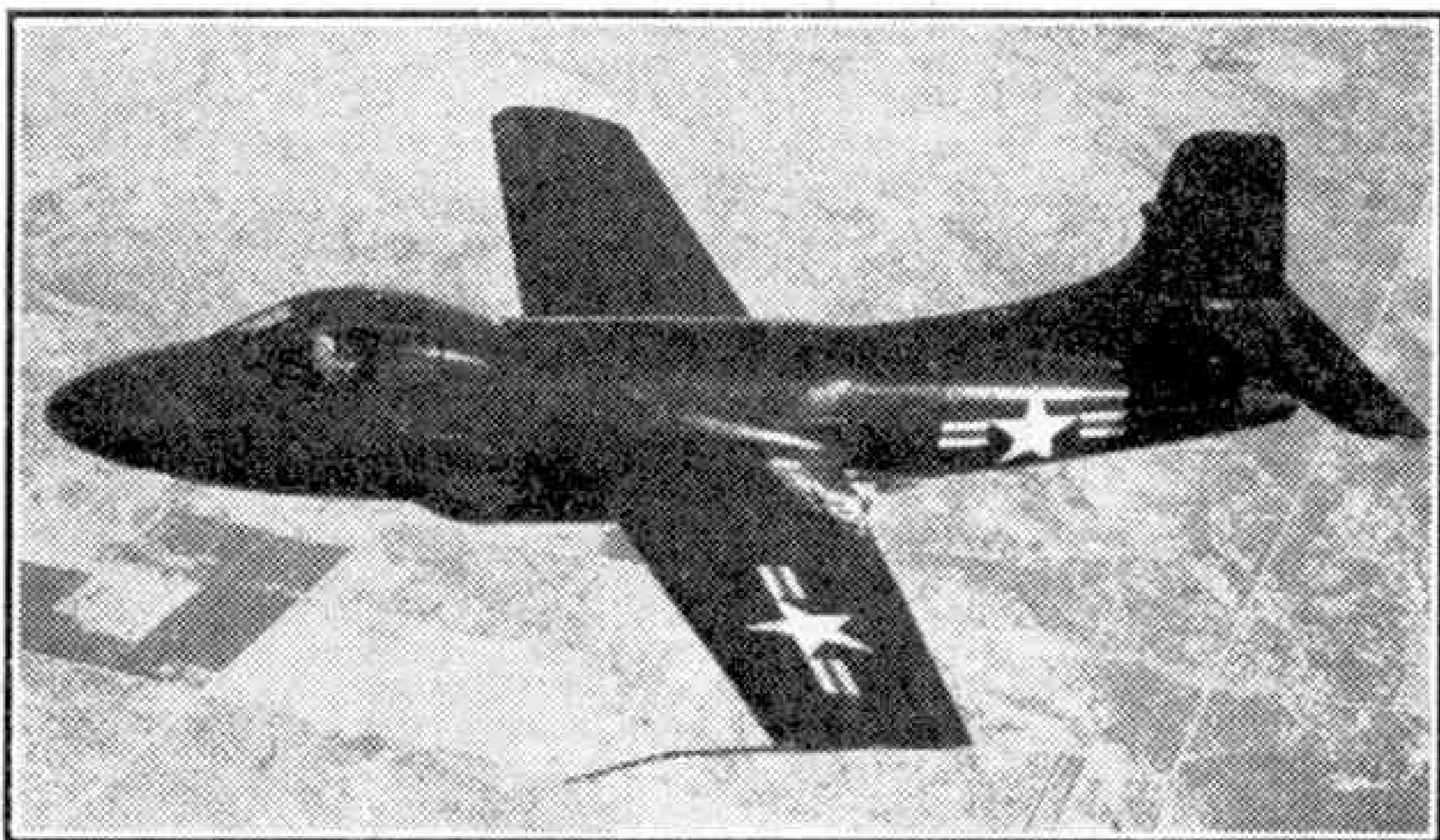
The Douglas XF3D "Skyknight," shown in the lower photograph on this page, is a powerful, high-speed, twin-jet naval attack fighter, designed to search out distant targets in all types of weather from carrier or shore bases. Powered by two Westinghouse jets, it carries a crew of two—pilot and radar-operator—and is fully equipped for day or night flying.

Few details of the "Skyknight's" construction or performance have been announced, but it is known to have a unique "bailout" emergency chute that opens on the underside of the fuselage, so that the crew can leave the 'plane safely even at high speed, without danger of hitting the tail. The "Skyknight" is also fitted with special speed brakes that can be extended outward from the fuselage just forward of the tail, to provide quick deceleration for carrier landings, greater manoeuvrability in combat and limitation to safe speeds in a dive.

Survey Task Force

Two "Dakota" aircraft of the Air Survey Company, a subsidiary of The Fairey Aviation Company, are engaged on one of the most exacting jobs ever undertaken by a civil air survey organisation. Involving initially the air photography of nearly 20,000 sq. miles of forest country in British Guiana, the work was originally scheduled to be done by a squadron of R.A.F. photo-reconnaissance aircraft, but was subsequently put out to tender.

When the "Dakotas" have completed the air photography in British Guiana, they will separate and tackle other areas in Trinidad, Jamaica, British Honduras, the Windward Islands, and Barbados. The aircraft are specially equipped for high flying. Each "Dakota" forms,



Douglas "Skyknight" all-weather jet fighter. Photograph by courtesy of Douglas Aircraft Company, U.S.A.

in effect, an independent survey "task force," carrying in addition to its cameras, navigational aids and crew, complete film processing and printing equipment and ground personnel.

Australian Pilotless Aircraft

The veil of secrecy cloaking experiments being carried out at the Australian Rocket Range at Woomera has been lifted to disclose details of a revolutionary high-speed pilotless aircraft now being flight-tested there. Designed to a joint British-Australian specification, the new machine is described as a very "clean" ground-controlled pilotless target aircraft, but has obvious possibilities as a guided robot interceptor fighter. It is powered by a 1,500 lb. thrust Armstrong-Siddeley "Viper" turbojet, a cheaply-produced "expendable" version of the "Adder," which is itself a pure-jet development of the well-known "Mamba" propjet.

During initial flight tests, the prototypes will carry a pilot in addition to their radio-control equipment.

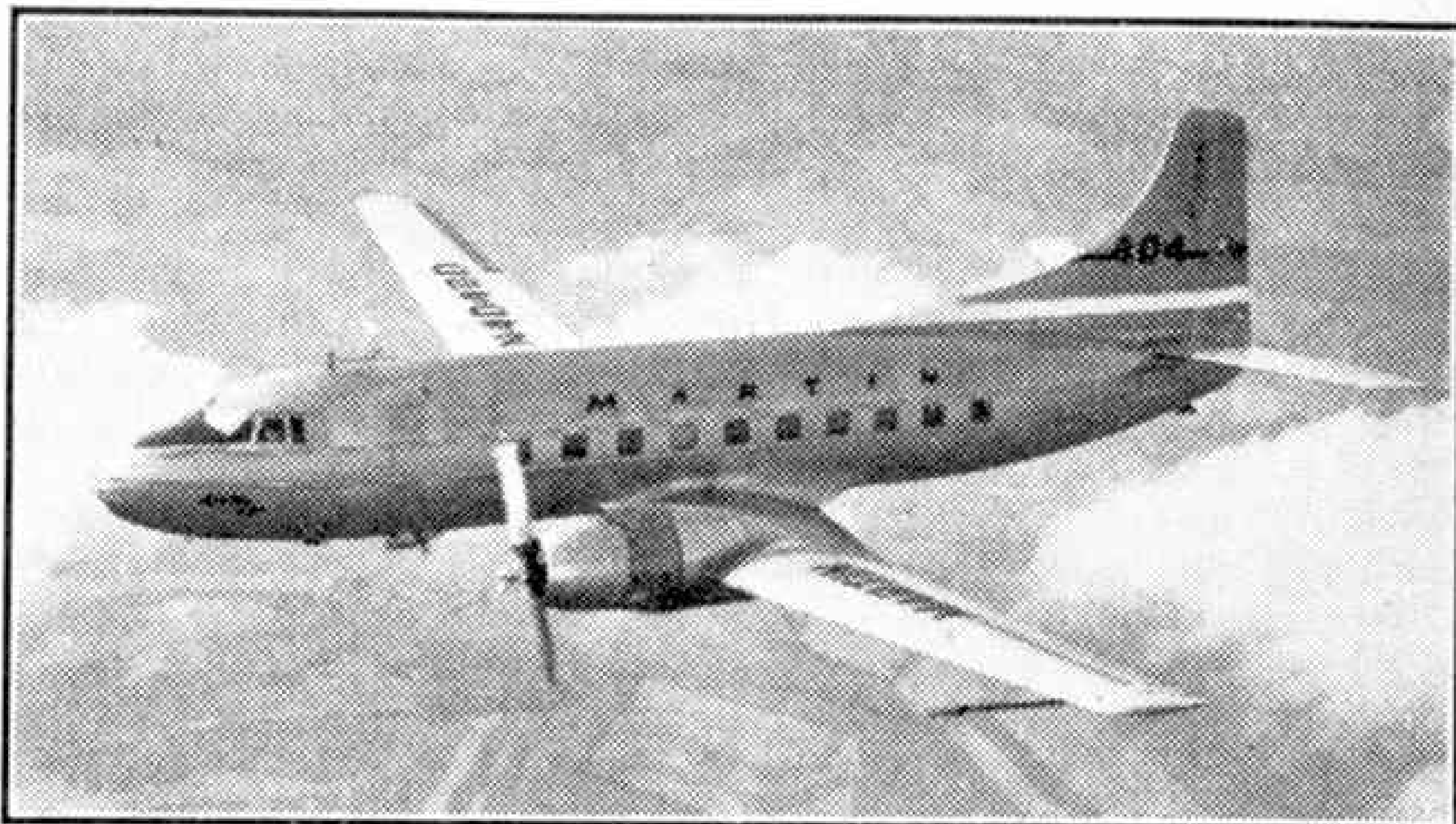
Increased Order for Martin 4-0-4

Following the recent announcement of the first flight of the Martin 4-0-4 air liner comes news that Trans World Airline have increased by 10 their original order for 30 of these aircraft. Martin thus have firm contracts for 75 Model 4-0-4s, as 35 have been ordered by Eastern Air Lines.

The prototype, illustrated on this page, has been modified from the very first Martin 2-0-2, by the addition of 39 in. to its fuselage length. Production machines will be powered by two 2,400 h.p. Pratt and Whitney R-2800 engines, and will have a top speed of 312 m.p.h., carrying 40 passengers. Delivery is due to begin shortly.

The "Sapphire" in the News

Within a month of the announcement of its existence, the Armstrong-Siddeley "Sapphire," the world's most powerful turbojet, was bought by the American Curtiss-Wright Corporation for production in the United States. Curtiss acquired at the same time the licence to build the Armstrong-Siddeley "Python" and "Double Mamba" propjets and an unspecified Bristol engine, believed to be the "Olympus," so the deal should contribute several millions of dollars to Britain's export drive.



The Martin 4-0-4 air liner on its first flight. Photograph by courtesy of The Glenn L. Martin Company, U.S.A.

Following their flight testing in a "Meteor," two "Sapphires" have now been fitted experimentally to a Handley Page "Hastings" transport, in place of its outer pair of "Hercules" piston engines. The "Sapphires" add the equivalent of 14,500 h.p. to the power of the "Hastings," whose four piston-engines normally total 6,360 h.p.

"Sealand" Tour

A Short "Sealand" 5-8 seat amphibian is making a 20,000 mile tour of North and South America, during which it will be demonstrated from land and water bases in 14 different countries. Named "*Festival of Britain*," it bears the Festival crest on its nose and will publicise the Festival at every port of call.

"Chipmunks" for Ceylon Air Force

De Havilland "Chipmunks" have been chosen to form the nucleus of Ceylon's new Air Force. Ceylon thus becomes the eighth country to buy this superb little trainer, which promises to carry on the tradition of reliability and popularity established by its predecessor the well-loved D.H. "Tiger Moth" biplane.

* * * *

The famous Australian Flying Doctor Service, which has saved countless lives since it was started 22 years ago, is to be extended to cover a wide area of New South Wales, by the establishment of a new base at Hay. The new service will be operated by Dr. J. McInerney, with a 4-seat Auster "Adventurer," specially modified as an ambulance plane.



Handley Page "Hastings" fitted experimentally with two Armstrong-Siddeley "Sapphires," the world's most powerful turbo-jets, in place of its outboard pair of "Hercules." Photograph by courtesy of Handley Page Ltd.

Trinity House To-day

By Morris Rodney

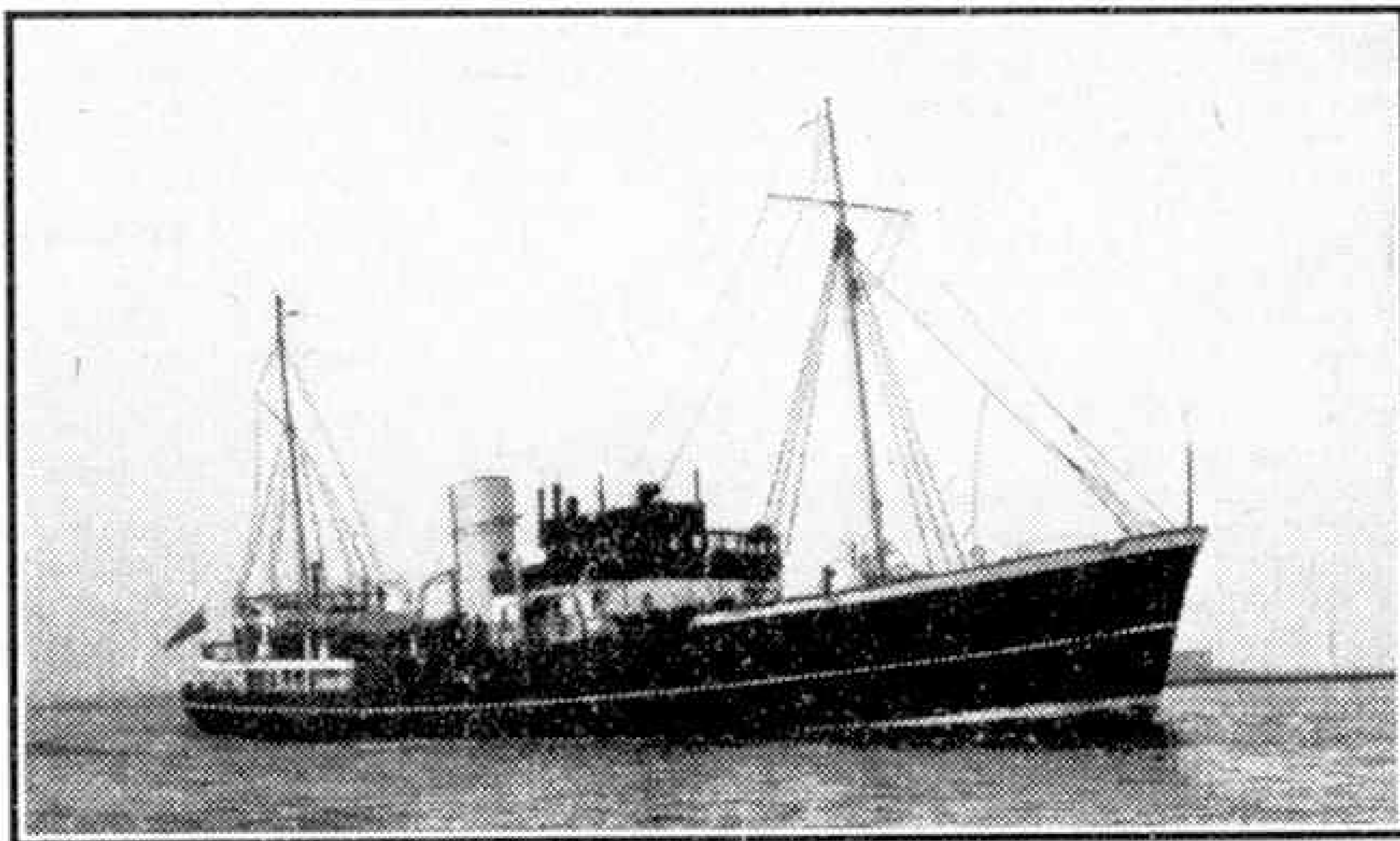
ALTHOUGH well known by name, the Corporation of Trinity House carries out its work with a minimum of publicity. Most people have a general impression that it deals with lights and pilotage, without any clear idea of the duties involved or how they are undertaken. Confusion also often arises over the terms Elder Brethren and Younger Brethren. Photographs of Mr. Winston Churchill in a nautical style of dress are explained by referring to him as an Elder Brother of Trinity House. Yet, despite his versatility, one is left to guess exactly where Mr. Churchill fits into the picture when it comes to controlling lights and pilots.

That Trinity House is a very ancient body goes without saying. Nobody has discovered exactly when it started, mainly because so many early records have been lost by fire. Certainly there was a guild of mariners back in the Middle Ages, gathered together mainly for religious and charitable activities; but not until 1514, when Henry VIII granted them a charter of incorporation, did they get any official recognition. The charter decreed that they should be styled the Guild or Fraternity of the Most Glorious and Undividable Trinity of St. Clement. That indeed is the full title of the Corporation to-day, with the motto *Trinitas in Unitate*. St. Clement, the third Bishop of Rome, was regarded as the patron saint of seafaring men.

The first charter empowered the Corporation to carry out a number of duties in providing ships and competent mariners, although it was so vaguely worded that there must have been many arguments between Trinity House and rival bodies. At one period the Trinity Brethren had considerable influence on naval affairs, but it waned when the Admiralty came into being on modern lines. Similarly they examined men in the art and science of navigation long before that important

duty was taken over by the present authorities. They also punished offenders against sea laws, especially deserters and mutineers, a power now wielded by other hands under the terms of the Merchant Shipping Acts.

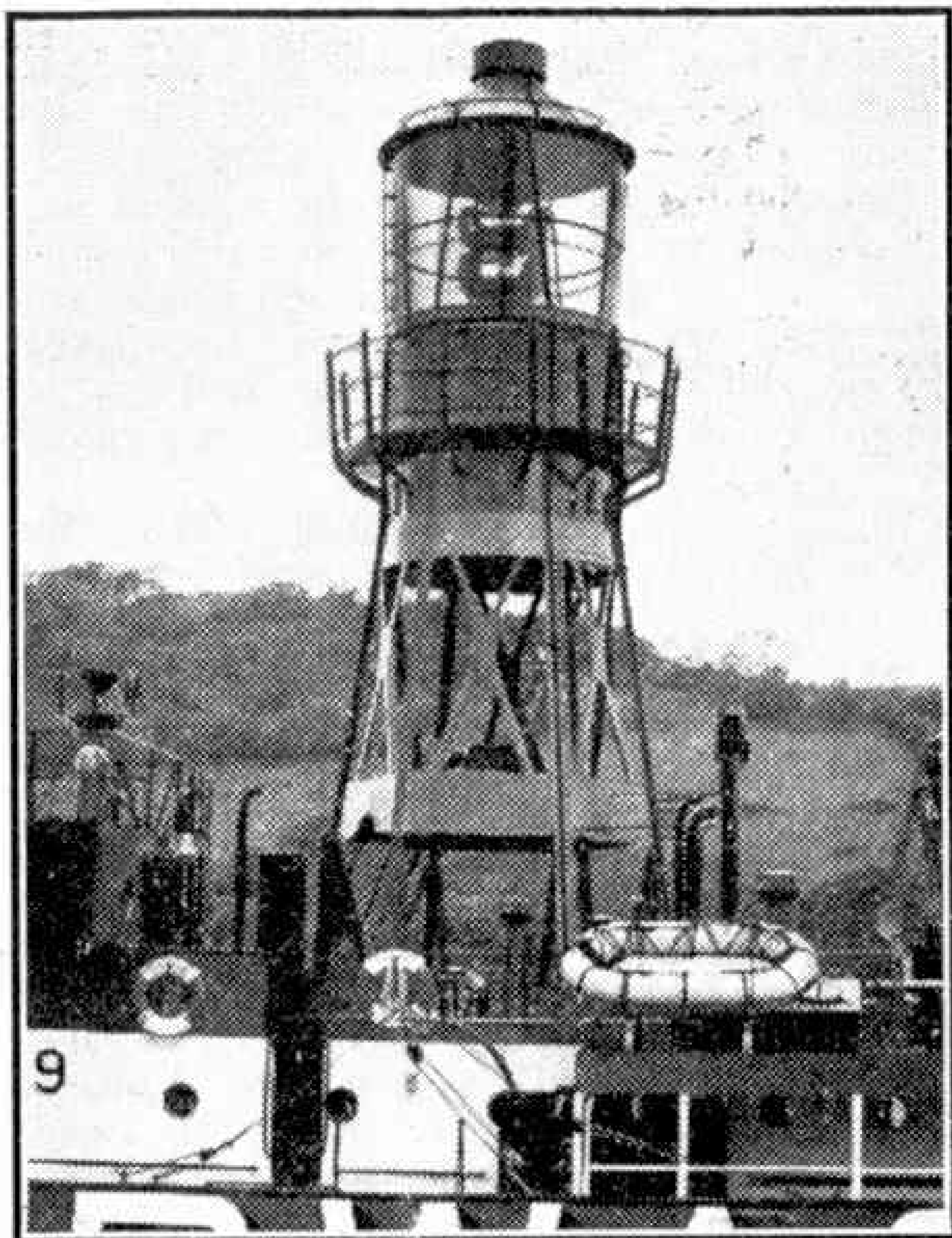
King Henry's charter laid down certain rules for the government of Trinity House, as did the charters granted by his successors. The Corporation was to be headed by a Master, who gave orders to officials known as Wardens and Assistants. All of these were elected by the Brethren. In early times one only had to be a seafarer to qualify as a Brother of Trinity House, while even this elementary test was not always observed. As the rules were tightened up in stages the ranks of the Brethren were thinned out and only properly qualified men admitted to the Corporation, but a number of honorary



The famous Trinity House yacht "Patricia," which leads the Royal Yacht at naval reviews and carries Elder Brethren on tours of inspection. Photograph by courtesy of Smith's Dock Company Ltd.

positions were retained for the benefit of distinguished persons in public life.

Trinity House now operates under the charter granted by James II in 1685, with minor amendments by means of supplementary charters up to 1939. This is the authority for its present constitution. Although the Master is still head of the Corporation, a post now held by the Duke of Gloucester, the actual duties are delegated to a Deputy Master with professional qualifications. He supervises all the activities of Trinity House, with two



A close-up of the lantern in a modern lightship. Photograph by courtesy of Philip and Son Ltd.

Wardens and seven Assistants as his executive officers. These ten men are collectively known as the active Elder Brethren. Mr. Churchill and other notabilities, including soldiers and sailors, are honorary Elder Brethren. Of these there are 13, because Trinity House is not superstitious, and they are not required to undertake any duties.

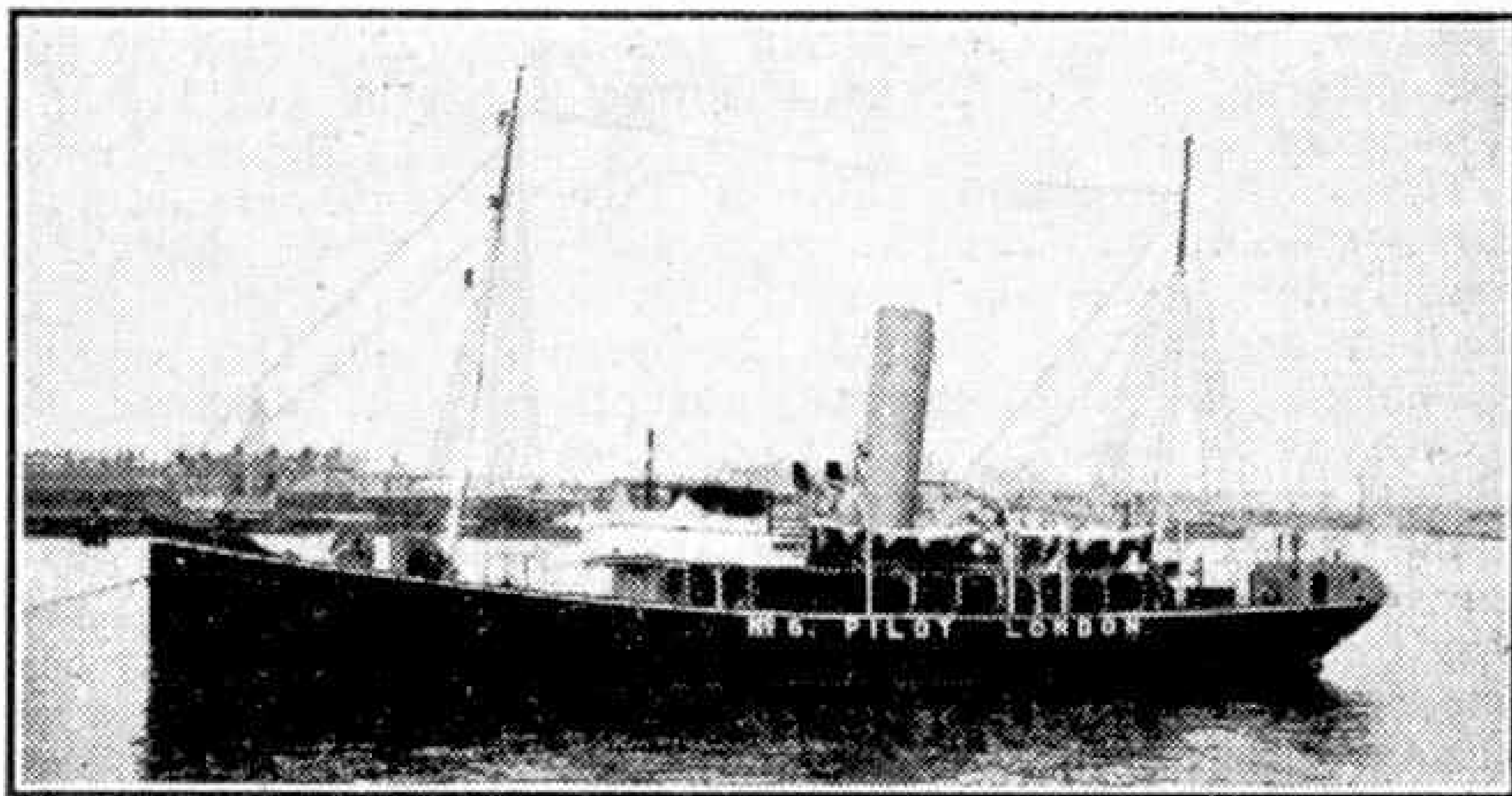
The Elder Brethren on the active list have a full-time job and are paid accordingly. Normally they are elected from the much larger body of Younger Brethren, each of whom must either be a master mariner or have served in the Navy with a rank not below that of Lieutenant Commander. These Younger Brethren total about 300 and form a reserve from which any vacancies are filled. But they are not elected just because their names happen to be at the top of the list. With so many on the waiting list the active Brothers can afford to

pick the most suitable man. Moreover, they have to consider age when making the choice. Since active Elder Brethren must retire at 70, it would be no use electing a man who is already near that age. So most of the Younger Brethren are doomed to remain on the list for the rest of their days.

In special cases, where it is desired to secure a naval officer to fill a vacancy—at least one of the active Brothers is always supplied by the Navy—Trinity House might go outside the list altogether. In such an event the procedure is first to swear in the choice as a Younger Brother, and to follow this by electing him an Elder Brother. The Younger Brethren have no duties to perform, apart from attending at headquarters to re-elect the senior officers once a year; but their position, although unpaid, is one of great prestige in shipping circles. It also carries the doubtful privilege of claiming exemption from serving on a jury.

The duties of Trinity House, as undertaken by the active Elder Brethren, are partly laid down in the charter, but mainly authorised by various Acts of Parliament. By means of ancient funds it carries out a vast amount of charitable work among seafarers and their dependents. Two of the Elder Brethren attend at the Admiralty Court during its sittings to serve as nautical assessors. Their task is to study the evidence and advise the judge on any technical point. As disinterested parties, fully qualified to detect any fault in navigation, their presence ensures a just decision, fair to all concerned. When serving in this capacity they are officially known as Trinity Masters.

So far as pilotage is concerned, Trinity



The pilot cutter "Pioneer," one of the fleet which supplies ships with pilots licensed by Trinity House. Photograph by courtesy of John I. Thornycroft and Co. Ltd.

House is responsible for the examination and licensing of all pilots in the London District, which extends from London Bridge to the Sunk Sand off Felixstowe in the North, and to Dungeness in the South. In addition, pilots in many other ports

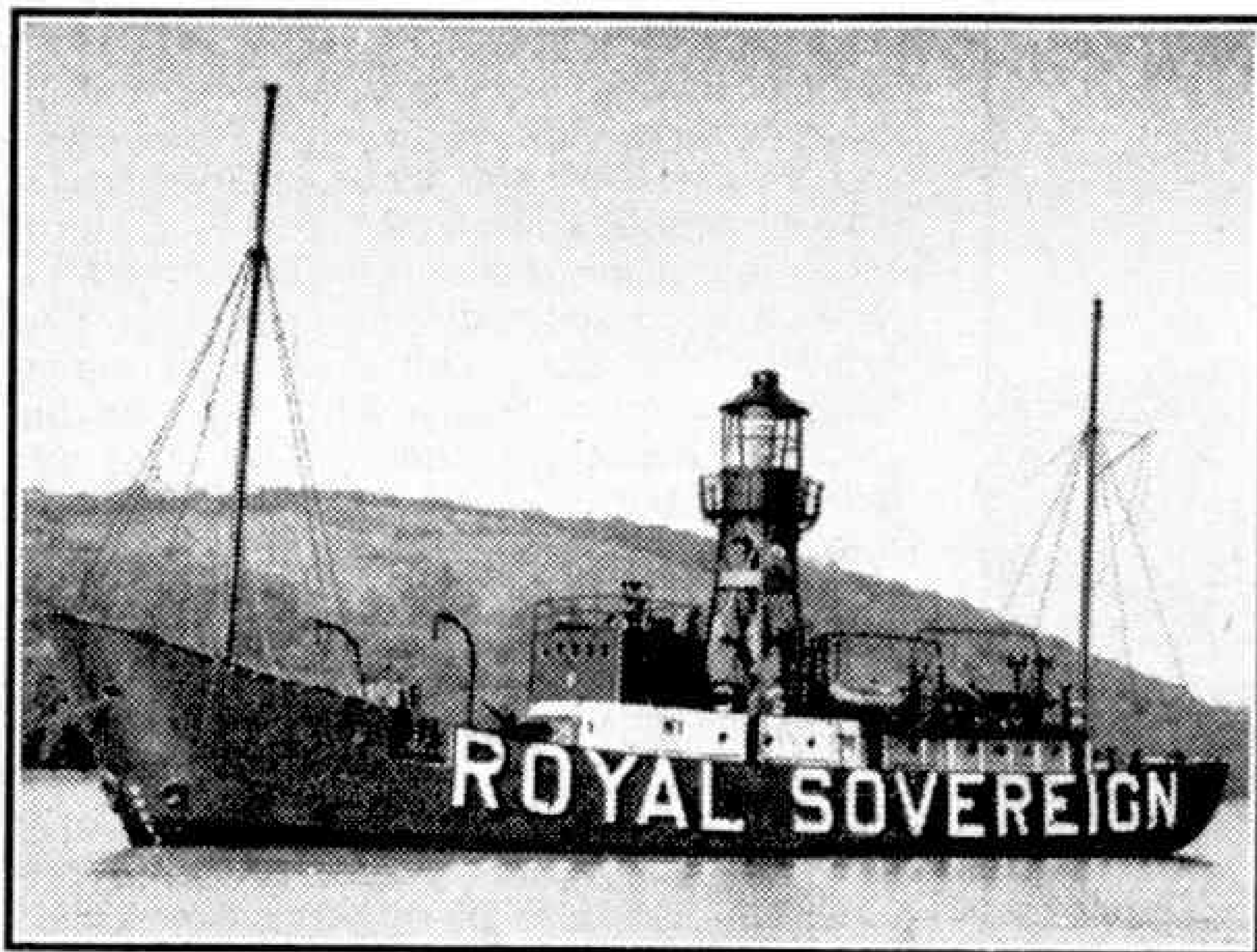
out the surviving private lights in England and Wales. Some of them were hard bargains; one lighthouse which had cost only £3,000 to erect in 1708 realised £450,000 for its owner, while another was reckoned to be worth £300,000. Trinity

House secured these and others with borrowed money, which had to be paid off from subsequent revenue.

Since that time the Corporation has been the General Lighthouse Authority for England and Wales, including the Channel Islands. Similar powers are wielded in Ireland by the Commissioners of Irish Lights, and in Scotland and the Isle of Man by the Commissioners of Northern Lighthouses. Both of these bodies, although working independently of Trinity House, are subject to its approval when it comes to erecting new lights or altering existing ones. All three derive their incomes from

the light dues, which must be paid by all ships, British and foreign, visiting our shores. The payment is based on the size of the ship, with limits on the number of voyages for which the dues can be demanded. The money is paid into the General Lighthouse Fund, controlled by the Ministry of Transport, and shared out between Trinity House and its contemporary bodies according to their needs. The total sum raised by light dues was £2,212,824 for the last year recorded.

For its lighthouse work—a term covering all forms of navigation marks, including the buoying of dangerous wrecks, as well as lights—Trinity House divides its area into six districts, each with a shore depot. These depots are at Great Yarmouth, Harwich, East Cowes, Penzance, Swansea and Holyhead. There is also a sub-depot at Blackwall, on the Thames. Until a recent decision, all repair and maintenance on lighting and fog signal equipment for lighthouse and light vessels, the overhauling of buoys and similar work, was concentrated at Blackwall, employing a staff of about 150 skilled hands. In future these activities will be based on Harwich, with the existing depot there enlarged for the purpose. Blackwall is being retained as a site for stores. (Continued on page 94)



The "Royal Sovereign" Lightship, one of the latest to enter service. Photograph by courtesy of Philip and Son Ltd.

are examined and licensed. Altogether, nearly 600 pilots are at work under the authority of Trinity House, but they are not servants of the Corporation once they have obtained their licences. Each is employed by the master of the ship, acting on behalf of his owner. Pilotage may either be compulsory, as required by law for certain areas, or it may be voluntary, as a safety precaution. Trinity House is mainly concerned with selecting qualified men to do the work. During the late war its licensed pilots rendered valuable services, especially in handling the passage of the invasion forces to Normandy.

The most important duty of Trinity House concerns lights and buoys. Although from Tudor days it was charged with such work it had a long struggle to become recognised as the general authority. Strange as it seems, private persons were allowed to erect lighthouses by permission of the Crown. Often they were speculators hoping to make a steady income from their outlay by levying charges on passing ships. These private lights varied in efficiency according to the people who owned them, yet the unsatisfactory system was not finally ended until 1836. In that year Trinity House was empowered to buy

HOW THINGS ARE MADE:

Toughened Glass

By T. R. Robinson

THE production of "toughened" glass, the second kind of safety glass made in the factory of Triplex Safety Glass Ltd., is entirely different from that of the laminated form described last month. The rough beginning of its manufacture was discovered by Prince Rupert, nephew of King Charles the First. He found that molten glass poured into cold water formed pear-shaped drops that had long thin

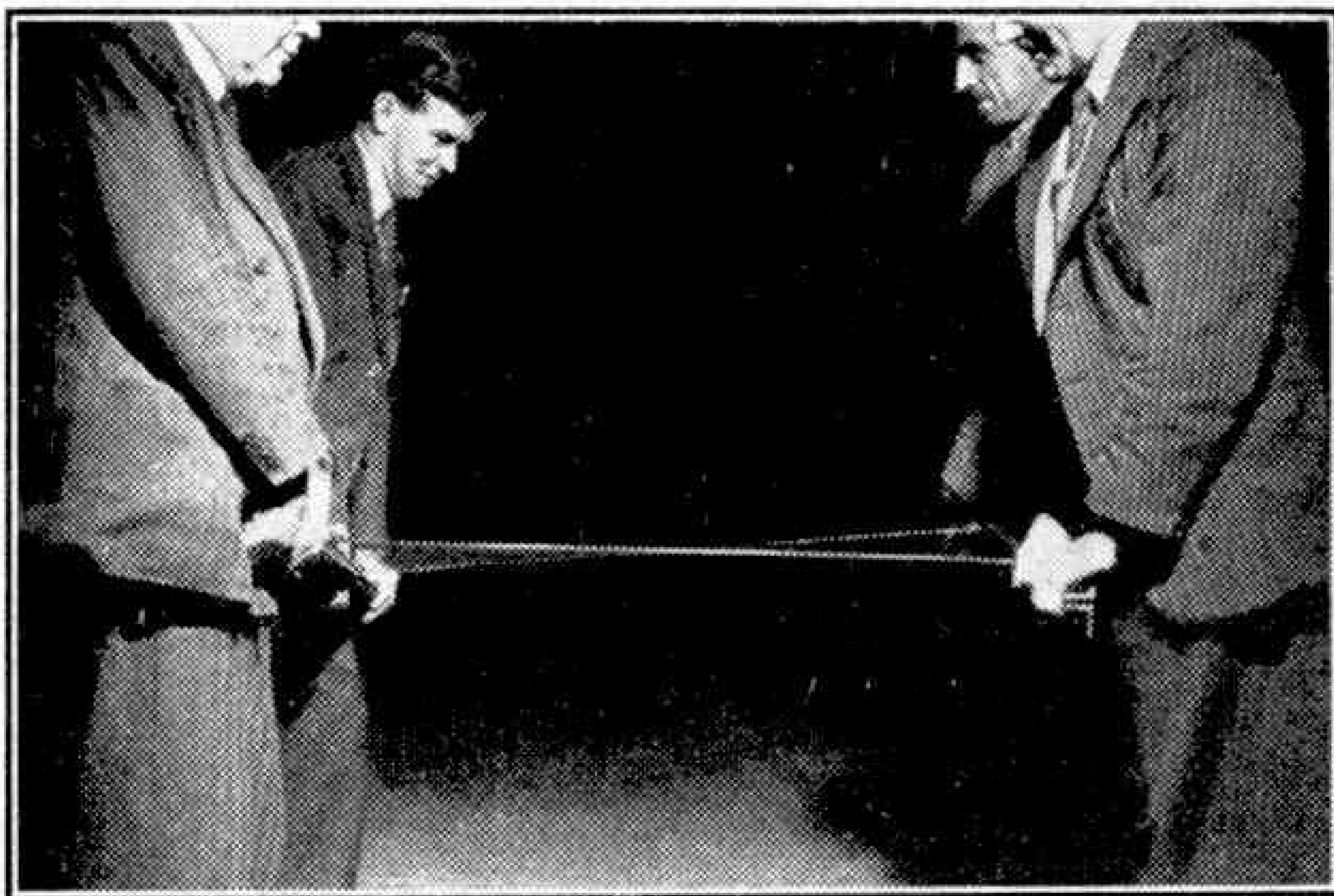
for such purposes as car windows calls for very accurate production control. Not only must the glass be toughened, but it must also retain its perfectly flat surfaces and its high light-transmitting qualities. It must also be certain that if it is broken, every fragment will be of such a form that it is incapable of causing serious injury. Then, too, the very principle of the process makes it impossible to cut

or shape the glass after toughening, and so each piece must be shaped and finish-ground to exact size beforehand. Any attempt to cut or work the toughened glass would immediately result in the shattering of the whole panel.

The first process is the cutting and shaping of the panels from the raw glass. As with laminated safety glass, templates are used to obtain the exact form, and after cutting the edges are ground smooth. Then, after thorough cleansing and inspection, the glass is passed to the toughening shop.

The actual toughening process is carried out in very special and ingenious machines, working on the conveyor principle. The glass panels are hung from tongs attached to small four-wheeled carriages, and as these move along they are lowered into an electrically heated furnace. As the glasses travel through this they are heated to the point at which they begin to soften throughout, and as soon as they have attained this temperature they are withdrawn from the furnace and subjected to powerful blasts of compressed air. This is delivered by a battery of jets arranged on both sides of the glass, and as the air falls on the panels the jets move with a rapid reciprocating motion, so that the cooling is even over all parts of the surfaces.

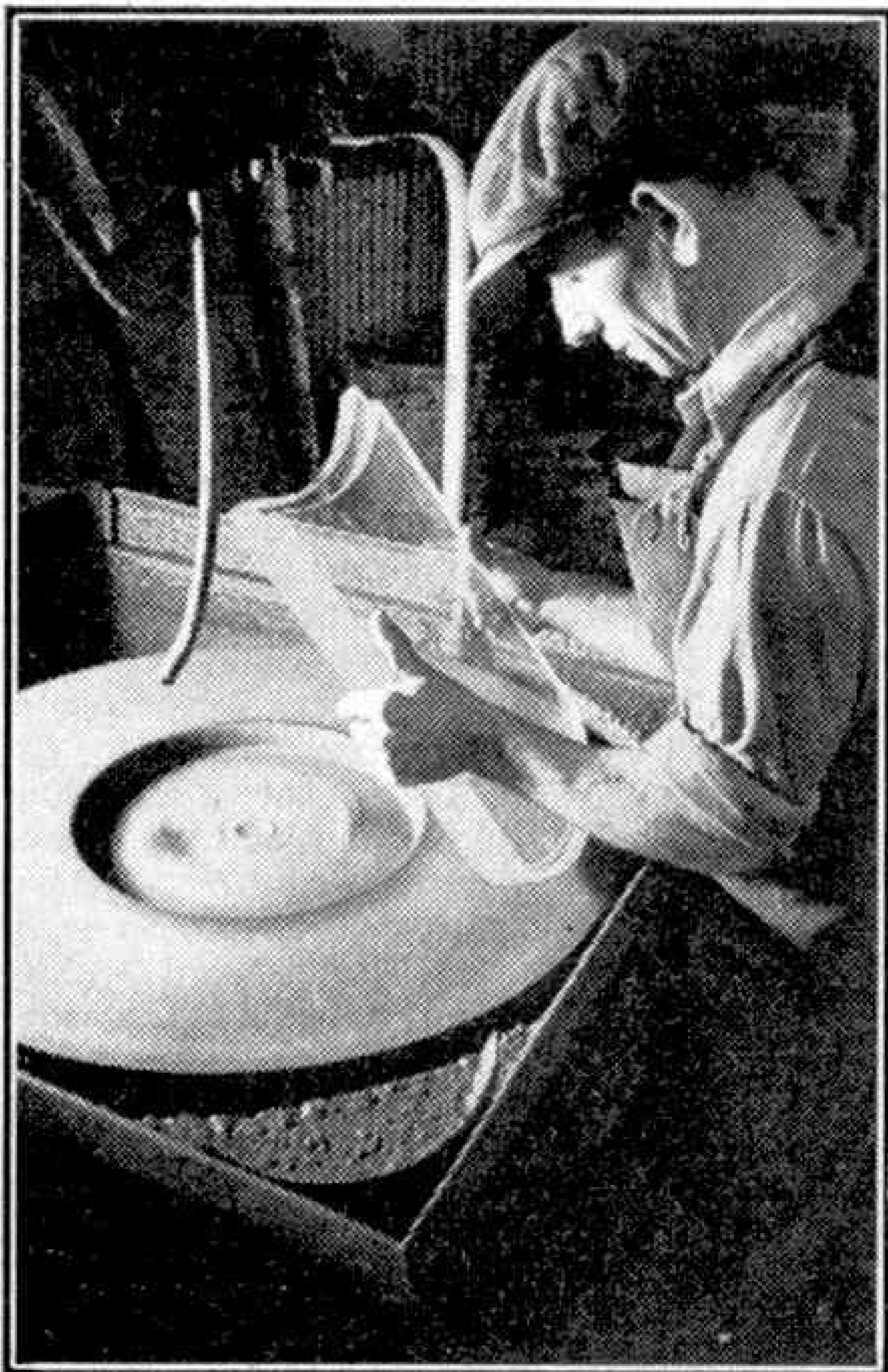
When the cooling process is complete, the glass travels on to the point where it is removed from the tongs and passed to



Toughened glass can be bent and twisted. A sheet under test has been twisted 12 deg. in each direction more than 100,000 times without breaking. Photographs by courtesy of the Triplex Safety Glass Company Ltd.

tails. The bulb-shaped part of a drop made in this way is tremendously strong, and can even be hammered without breakage; but if the thin tail is fractured the whole drop shatters into a fine powder. The reason for this strange happening is that the sudden cooling of the glass hardens the outer surface of the drop. As glass is a poor conductor of heat the inner part hardens and contracts more slowly, so creating compression in the outer layer.

"Prince Rupert's Drops," as these early examples of toughened glass were called, were only regarded as novelties, and it was not until comparatively recent times that the principle was developed for flat glass, using compressed air for cooling instead of water, and the highly complex manufacturing technique mastered. To apply the method to panels of glass used



Grinding the edges of Triplex multi-layer laminated glass, the bullet proof material referred to in last month's article on laminated safety glass.

the inspection benches. It is the tongs that hold the glass during the toughening process that cause the small "pip" marks that can be found along one edge of toughened glass panels, for their pointed ends bite slightly into the surfaces of the panels when they are in a softened state. As the toughened panels are removed from the tongs the empty carriages are re-loaded with more untreated panels.

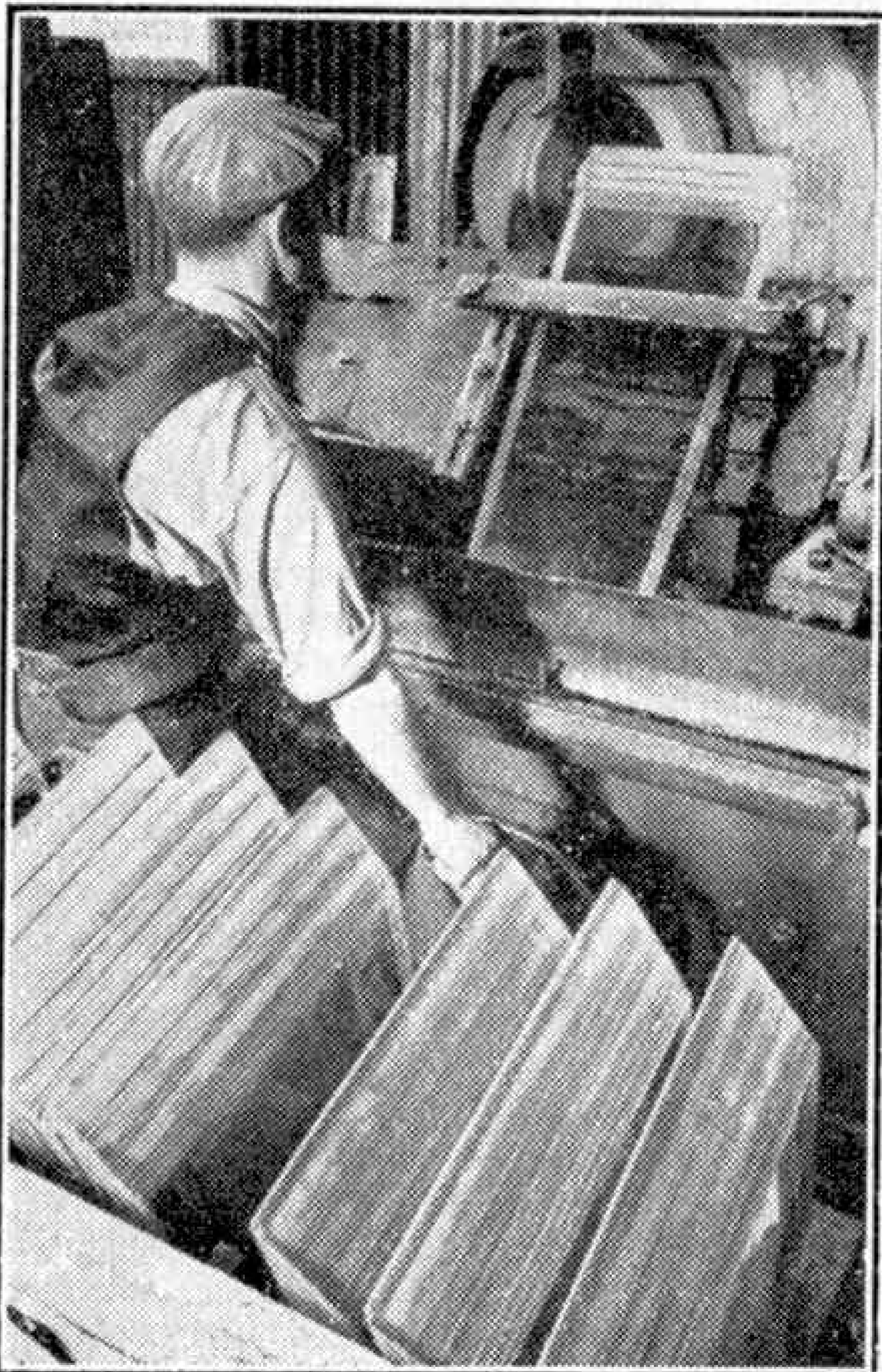
An interesting point about the toughening process is that different temperatures and times of heating are required for varying thicknesses and size of glass, so the temperature control of the machine must be very accurate. For instance, the time cycle used for a windscreen is different from that used for a body light. This also applies to the cooling process, in which air pressure and duration of the blast must be under exact control.

The inspection of the toughened glass includes some very exacting tests. The finished panels have to conform to certain standards laid down by the British Standards Institution, but the requirements of the Triplex Company are even

more stringent. For example, the windscreen of a normal car must withstand the impact of a steel ball weighing 1.68 lb. dropped from a height of 6 ft. Windscreen panels, taken at random from production, are regularly subjected to this test. In practice Triplex toughened glass usually withstands a blow from the ball when dropped from 12 or even 18 ft., so there is an ample margin for safety.

This special test is not given to every panel, but as the panels pass along the inspection conveyor each is tested by the descent of a loaded hammer head, which falls on the glass with a force equal to the impact of a 1.68 lb. ball dropping from a height of 4 ft. 6 in. After this hammer blow test, every piece of glass is inspected through a polariscope, whose beam of polarised light reveals any weakness in the finished panel.

Each panel is marked with the "Triplex" trade-mark after passing all its tests. The method of doing this is quite interesting, for the mark is sand-blasted through a small celluloid stencil pierced with the required wording and the familiar "Triple X" symbol. A spool of celluloid strip,



Larger panels of bullet proof glass are mounted in jigs for edge grinding.

pierced at intervals with this marking, is fed through slots which hold it in its correct position in the sand-blasting head, and all that the operator has to do is to place the panels in the proper position and touch a lever with her foot. A blast of sand then etches the glass where it is not protected by the celluloid. After a certain amount of use the stencil begins to wear, but it is a simple matter to replace it with a fresh one by advancing the celluloid strip one space.

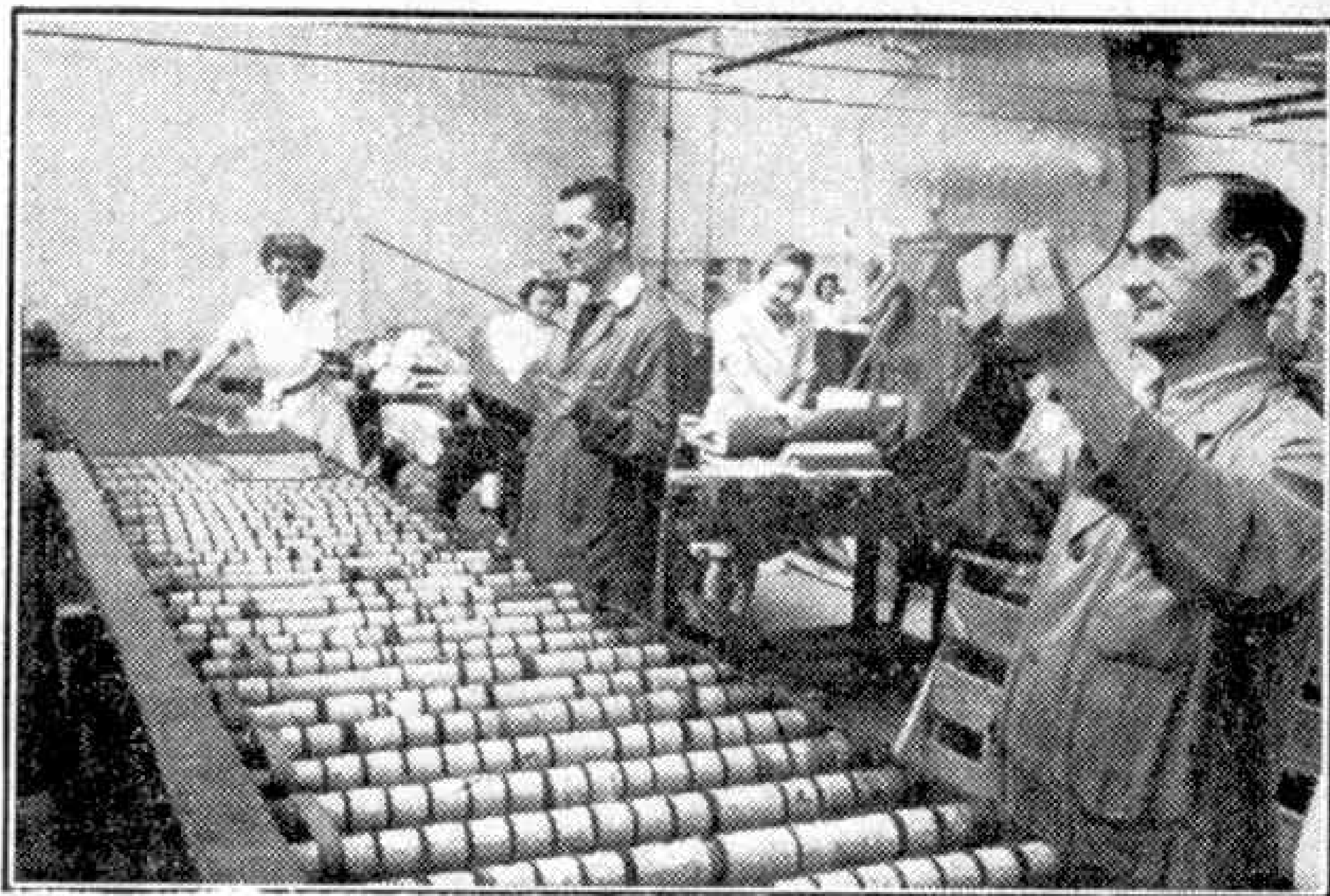
In addition to being strongly resistant to blows, toughened glass has a number of other properties not possessed by untreated glass. It can be bent and twisted to a considerable amount without breakage, and under test a piece has been twisted 12 degrees from its normal plane in each direction over 100,000 times without fracture. It has also successfully withstood molten metal being poured on one side while the other side is cooled by ice-cold water!

During recent years, car designers have set new problems for the makers of safety glass by introducing body styles which call for curved windscreens and window panels. Until quite recently the manufacture of curved safety glass of either the laminated or toughened forms was not a commercial proposition, but wartime experience, coupled with improvements in the technique of making both kinds of safety glass, have enabled curved panels to be made to suit most of the demands of modern car design.

In making curved panels, many differing methods of production are necessary, depending on the degree of curvature and other requirements. In laminated safety glass, the glass components are usually curved by the use of jigs, and are then fitted together with their interlayer in the usual way. The point where the difficulty lies of course is that the outer glass of a curved panel must have a larger radius than the inner one, and if the shape is at all complex, extremely accurate shaping is required if the panel glasses are to fit together with the interlayer.

Curved toughened glass does not present this problem, but has others of its own.

Usually, when a curved toughened panel is made, the glass is heated until plastic in the usual way, and then, as soon as it is removed from the furnace, it is inserted in a mould, pressed to the required shape, and then subjected to the cooling air blast. When it is remembered that even for flat glass the timing and temperature have to be carefully controlled, the difficulties of including a moulding operation

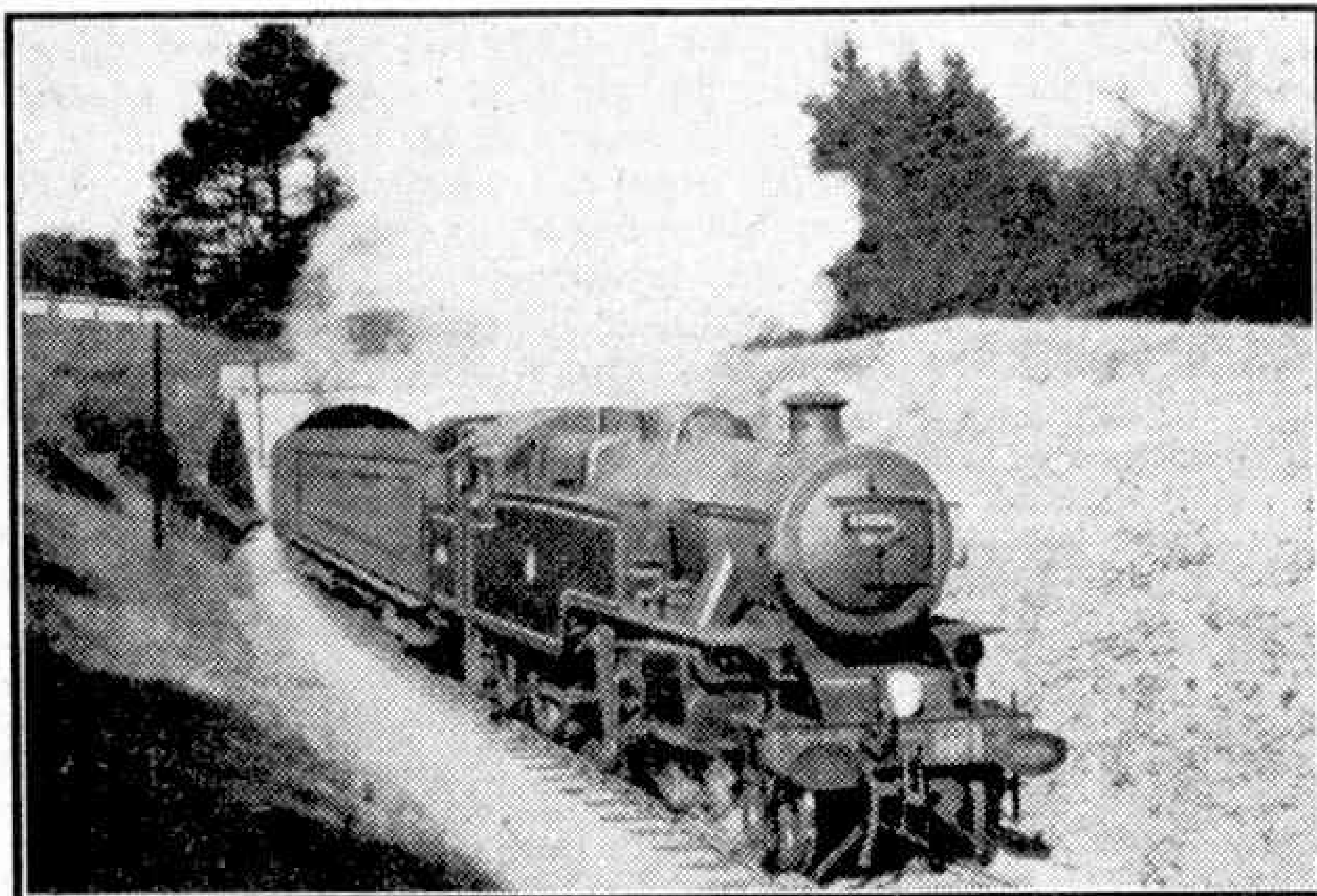


Final inspection and packing of Triplex toughened glass.

in the processes will be understood. That such a great measure of success has already been achieved is a triumph of manufacturing technique.

The final stage in safety glass manufacture is the packing of the finished panels. Although laminated and toughened glass are far more resistant to shock than ordinary glass, they are still liable to scratches and other blemishes, and must be packed with extreme care if they are to arrive ready for assembly in the car in perfect condition. As with the raw glass, special crates and packing cases designed to prevent any accidental movement of the panels during transit are used. And as one sees the finished panels being packed ready for use in cars, buses and motor coaches, it is good to realise that, through the commercial adaptation of the discoveries of a French chemist and an English prince, travellers may enjoy the scenes that surround them without fearing the injury that comes from jagged broken glass.

In conclusion, we wish to acknowledge the kind assistance given by the Triplex Safety Glass Company Ltd., in the preparation of this article and of that on laminated glass included in last month's "M.M."



No. 42096, one of the London Midland type 2-6-4T built at Brighton for S.R. duties, on an Eastbourne train near Mayfield, Sussex. Photograph by S. C. Nash, Eastbourne.

Railway Notes

By R. A. H. Weight

Historic Engine Preserved in Eire

A remarkable little locomotive built over 100 years ago and still practically in original condition has recently been removed from Inchicore Works, Dublin, to what is hoped will be a permanent resting place, on a pedestal under the glass roof of Glanmire Road Station, Cork. There it is mounted on a length of 5 ft. 3 in. gauge track of early type.

The engine has the 2-2-2 wheel arrangement and is of the very small proportions customary in 1848. It is what is known as a "Bury Single," a type constructed by Messrs. Bury, Curtis and Kennedy, Liverpool, about that period for various British railways, but adapted in this case for the wider Irish gauge. The large "Haycock" copper firebox is a distinctive feature. The total weight in working order was about 19½ tons. This ancient engine has been exhibited publicly on various occasions by the former Great Southern and Western Railway, and others, and it is gratifying to know that through the efforts of the Irish Railway Record Society, with other interested bodies in conjunction with C.I.E., it will now be permanently on view.

The preserved "Coppernob" locomotive of the former Furness Railway is another example of a Bury class which has been extinct for more than 50 years as regards active locomotive lists.

New "Festival of Britain" Train Names

Five more expresses are to be named next summer, in connection with the Festival of Britain celebrations. They will be: "*The Red Rose*" from Euston to Liverpool in the afternoon, returning in the evening; "*The Heart of Midlothian*" forming the 2.0 p.m. East Coast express service between King's Cross and Edinburgh, calling at York; "*The Merchant Venturer*" from Paddington to Bath and Bristol at 11.15 a.m., returning at 5.25 p.m.; "*The William Shakespeare*" through morning service from Paddington to Leamington Spa and Stratford-on-Avon, this section returning at night as part of a London-Wolverhampton express; and "*The Royal Wessex*" breakfast car train from Weymouth and Bournemouth to Waterloo, returning from London at 4.35 p.m. These trains will be

formed of new British Railways standard corridor coaches and dining cars now under construction as described later in these notes.

In addition, "*The Royal Scot*" Euston-Glasgow and the "*The Norfolkman*" Liverpool Street-Norwich expresses will be formed of the new stock. A modernised "*Golden Arrow*" train, including new Pullman cars now being built in the Company's works at Brighton, will operate in the London-Dover Continental service. The "*Thanet Belle*" Pullman car express next summer will be renamed "*Kentish Belle*," then also serving Canterbury. In order to cater for Festival visitors living or staying at various coast towns midnight trains will be run to Sussex and Kent resorts every night or on certain nights of the week, at times similar to those applying up to 1939.

New British Standard Passenger Coaches

Railway workshops at Derby, Doncaster, Eastleigh, Swindon, Wolverton, and York, are busy preparing to construct 826 main line passenger train vehicles while another 363 are to be supplied by contractors. Many of these will be of a new British Railways standard type capable of running over most routes, having all-steel bodies and a length of 63 ft. 6 in. They will be carried on two four-wheel bogies and, for greater steadiness and security, will be equipped with buck-eye automatic couplers and Pullman-type gangways as customary on the former L.N.E.R. and Southern Railways. There will be compartment type; also open, central gangway, first and third class carriages.

The new third class side corridor coaches, will have eight compartments each seating six persons, with arm rests and fully sprung seating. There will be three outside doors on each side. First class coaches will have seven compartments. There will also be composite first and third compartment vehicles, together with two varieties of open coaches with tables which are so popular in these days. In addition, compartment vehicles incorporating brake vans with guard's and parcel accommodation will all feature the latest ideas for comfort and safety.

The new restaurant cars will have movable chairs, with tables for two on one side of the gangway, and for four on the other. Some will include 15 ft. 6 in. long kitchens which are a model of compactness. For busier trains on which relays of meals can be served, the kitchen cars will be of full coach length, larger than any hitherto employed. They will include a 20 ft. long kitchen containing anthracite as well as electric cooking stoves, heaters or grills; two pantries, a larder with refrigerator, attendants' compartment, etc. Some bogie brake vans also are to be built.

Southern Tidings

The experimental double-deck, electric, passenger train has been operating in the London suburban area of the Southern Region for nearly 12 months under varied conditions of traffic and weather. It seats just over 1,000 passengers in 8 cars, compared with the 772-capacity of a normal 8-coach set, but experience during the past year has shewn that the advantage of extra seating accommodation is more than outweighed by the longer time required for entraining and detraining at stations. Some 22 persons may have to use one door compared with, say, 12 when ordinary compartment stock is used.

There are other difficulties regarding seating space, which is necessarily rather cramped, as well as with ventilation, as it is not considered safe to have

open windows on the upper deck. The double-deck vehicles too could only be used on certain routes where clearances are adequate. Nevertheless it has been an ingenious experiment worth trying. The Executive have decided that longer one-deck, 10-car trains for peak hour services will be the better solution; so these will be introduced as circumstances permit.

Diesel-electric main line locomotive No. 10201 has been on trial runs from Ashford. No. 11001, the diesel-mechanical freight engine, was lately noted on shunting as well as local goods duty round about Feltham. Class "4" 2-6-4Ts numbered 42073 upward were coming into service from Brighton Works during November-December. They are working between Ramsgate, Canterbury, Dover, Ashford and Maidstone as well as on various Central Division lines. Nos. 42070-4 are stationed at Stewarts Lane, London (73A).

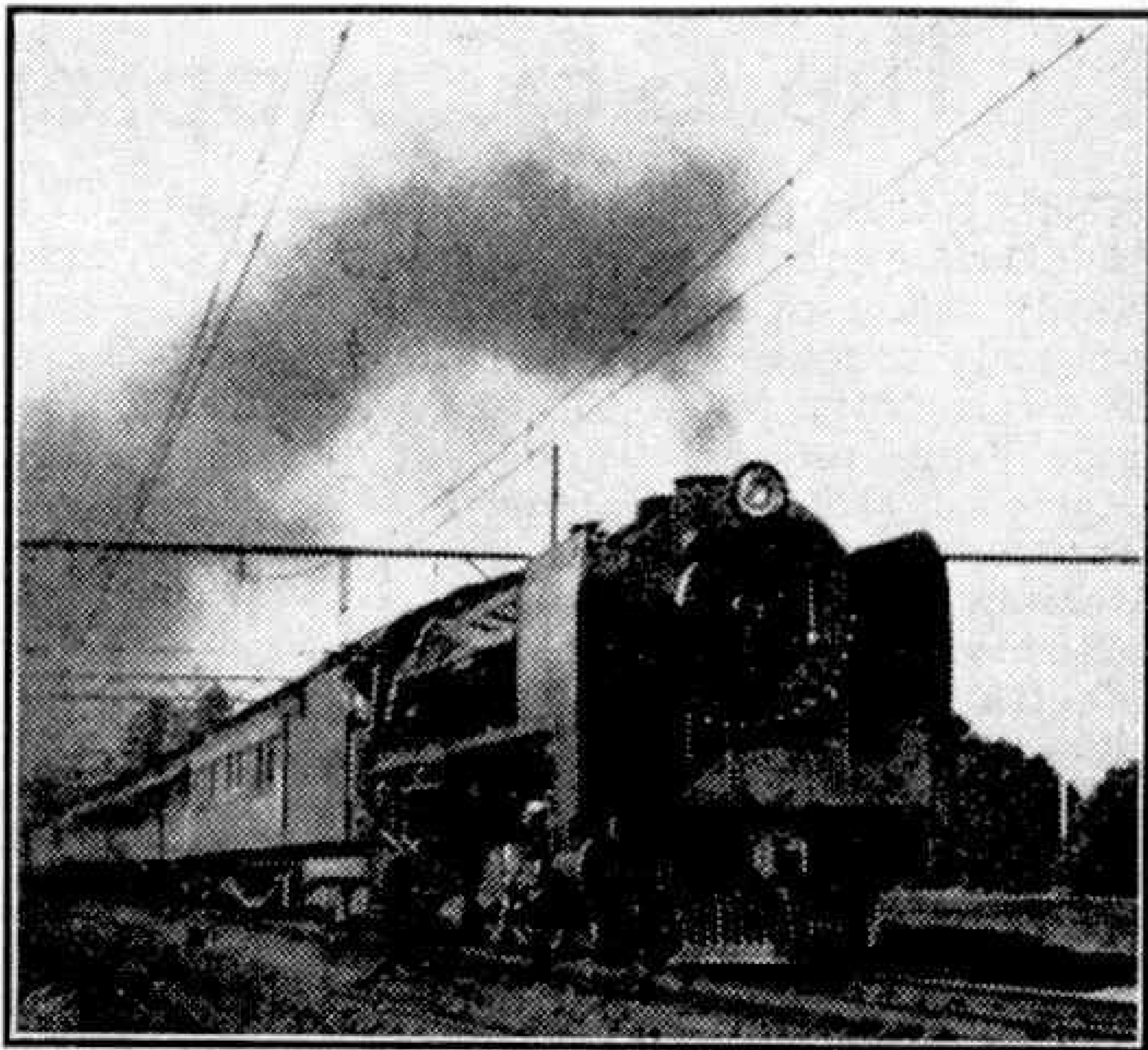
Former L.B.S.C. "13" class 4-4-2 passenger tanks lately withdrawn for scrapping were Nos. 32079, 32087-8, 32090, Class "J" 0-6-4T No. 31597 is also withdrawn, together with several "L11" 4-4-0s, and "G6" 0-6-0T engines. Shed number plates are now carried on the smoke-boxes of the majority of locomotives. Small plates may also be noticed on various engines, worded "Test No." which indicates that some trial is taking place with certain equipment or an unusual type of metal, though there may not necessarily be anything else visible to indicate the fact.

The 74-year old "A1x" or "Terrier" 0-6-0T, No. 2647, still lettered and numbered in Southern style, recently proceeded from a long period on shunting duty at Newhaven, via Hastings, to Ashford Works for overhaul. On arrival there it presented a striking contrast when close to the blue "Merchant Navy" 4-6-2 No. 35027 "*Port Line*" which was also in for repair.

The outward and return special trains between Dover and London (Victoria) on the occasion of the recent visit of the Queen and Prince of the Netherlands, consisting of five Pullman cars and a van, were hauled by No. 35004 "*Cunard White Star*." Polished "Schools" class locomotives standing in reserve respectively at Tonbridge and Ashford were No. 30903 "*Charterhouse*" and No. 30939 "*Leatherhead*."

Eastern and N.E. Regions

New main line electric locomotives Nos. 26001-3 were noted in December last on trial between Ilford



A Capetown - Johannesburg express headed by a typical modern locomotive of the South African Railways. Photograph by H. Paul Boyce, Benoni, Transvaal.

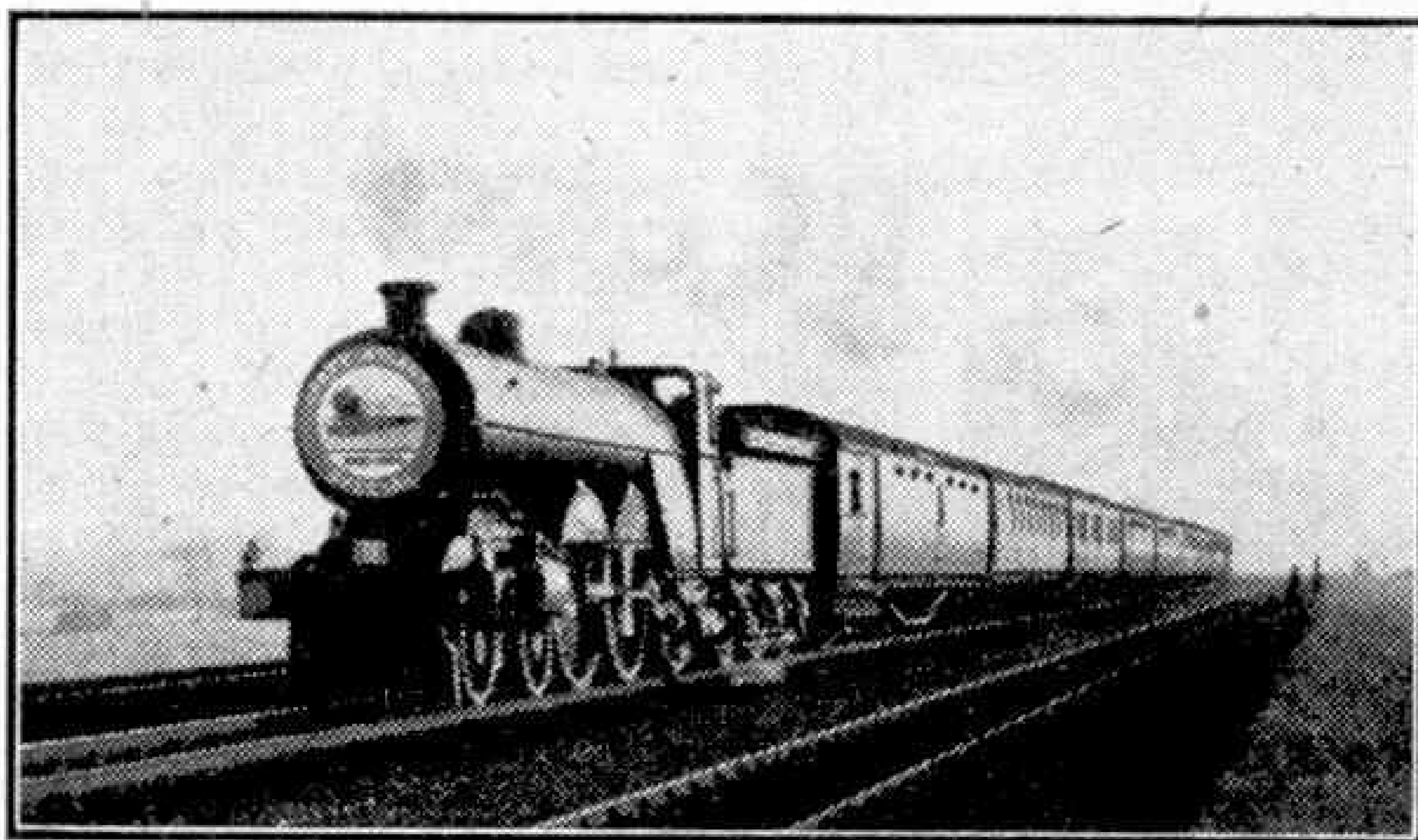
and Shenfield. They are intended for the Sheffield-Manchester service when the overhead traction, electric operation is brought into use. The last Great Central 4-6-0 No. 61482 of class "B4," named "*Immingham*," has been withdrawn, as have the final L.N.E.R. "Atlantics," also of G.C. origin.

The Last Ivatt "Atlantic" Run

On 26th November 1950 the last of the famous Ivatt large "Atlantics," hauling a 9-coach special train non-stop from King's Cross to Doncaster on her final run before being broken-up, gave an excellent performance considering fog and the engine's mechanical condition. Although this engine, No. 62822, was 45 years old and in a somewhat run-down state, arrival at Doncaster was almost punctual, and would have been easily so but for a slowing due to track repair 2-2½ miles out. About 15 min. were lost by out-of-course slacks and diversions to slow line where the main tracks were being repaired. About 9 min. recovery time had been allowed, so schedule was actually improved upon. The 156

miles took just over 195 min. gross, or barely 180 min. net. Maximum speed was nearly 75 m.p.h., and the minimum after the long climb to Stoke summit, 100 miles from King's Cross, was no less than 42 m.p.h. The difficult 29 miles between Peterborough and Grantham occupied only 34 min.

Hauling the return special, "A1" 4-6-2 No. 60123 "*H. A. Ivatt*" was scheduled to make the fastest run of its kind since 1939, at almost a mile-a-minute average throughout, two ordinary expresses being side-tracked for it to pass. Again fog as well as permanent way repair slowings were a considerable hindrance. Before an overheated axle box on one of the kitchen cars caused an unexpected stop and delay at Biggleswade, some very high speeds had been logged, including 86 near Little Bytham and 80 after Huntingdon, with considerable distances covered at a mean speed of well over 70 m.p.h.



Her last journey. Ivatt "Atlantic" No. 62822 tackles the climb to Stoke Summit in characteristic manner. Photograph by T. G. Hepburn, Nottingham.

The G.E.C. Apprentices' Hostel

THE trained engineers of to-morrow are the apprentices of to-day, and a steady inflow of boys and young men is necessary to make sure that the reputation of this country for engineering work of a wide range and of the highest possible degree of skill is maintained.

A noteworthy scheme for the training of recruits to the industry is that of the General Electric Company Ltd. In this scheme the magnificent old building in our upper illustration plays an important part. It is Castle Bromwich Hall, near Birmingham, standing in 11 acres of ground, which has been leased by the Company from Viscount Newport. The building has been converted into a hostel for the Company's apprentices. It was opened towards the end of 1948, and to-day it houses about 70 of the Company's apprentices.

This historic structure was built almost 400 years ago, and many of its magnificent internal fittings give evidence of its antiquity. Its gardens include shrubberies and a fine holly walk, reputed to be the oldest in the country, and there is also an 18th century maze, a replica of that at Hampton Court. The modernisation of the Hall for its new role has been carried out without detracting from its old-world splendour.

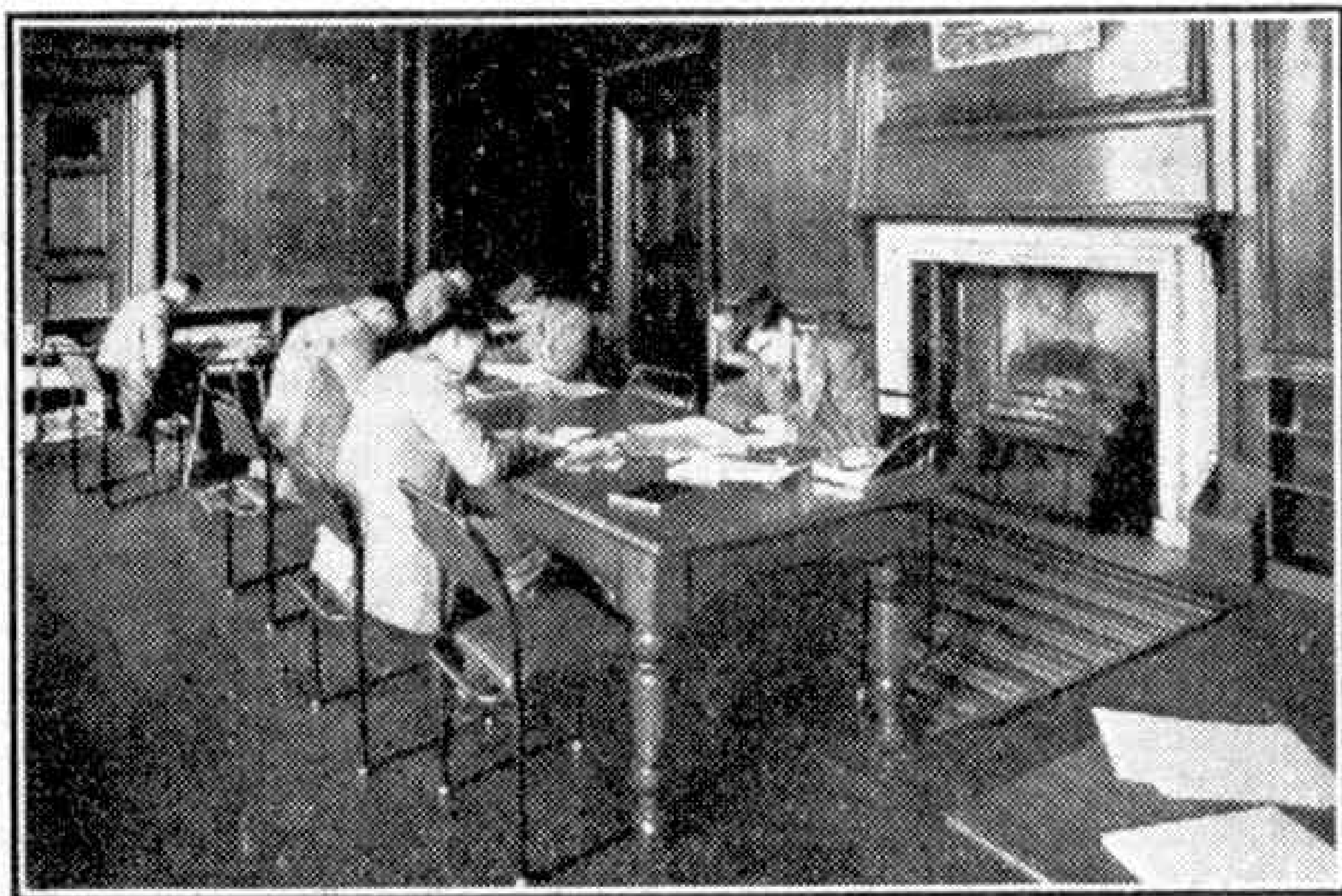
All apprentices who normally live outside Birmingham are accommodated in the hostel for the first twelve months of their apprenticeship. Then they move into other quarters, usually found by the Company, in order to make room for newcomers.



Castle Bromwich Hall, now a hostel for engineering apprentices. Illustrations by courtesy of the General Electric Co. Ltd.

It is believed that the period spent in these surroundings will instil into the new apprentices an appreciation of the sense of beauty and fine workmanship possessed by a craftsman of earlier days, and will instil in them a corporate spirit and a pride in their own profession. With this in mind, the Hall is the headquarters of the Apprentices' Association, which is administered by a committee of senior apprentices. It provides for the exchange of ideas by means of discussion groups and lectures, arranges visits to works and places of engineering interest and organises sporting and social functions.

The Company selects students from all parts of the country as well as from abroad in order to obtain the best possible candidates. At its Witton Works there are six classes of apprenticeship, ranging from trade and drawing office apprenticeships to the graduate apprenticeships, open to young men with an engineering degree.



The study of the hostel was formerly a well appointed lounge.

Photography

February Flood

By E. E. Steele

JANUARY'S snow is usually followed by February's flood, hence the old saying "February fill-dyke." More efficient draining systems have greatly minimised the extent of flooding, but in a bad year of heavy snowfall, with quick thawing, the floods soon gain the upper hand and a breach in a river bank may plunge large areas into a watery waste.

When this flooding makes headlines in the newspapers it is worthwhile to get out the camera and make some records. In low-lying areas in the towns, roads may become impassable, and in some cases the population may have to take temporary refuge in the bedrooms, and food and other necessities be delivered by boat. At these times there is plenty of enthusiasm for relief work and no lack of willing workers to ferry supplies to the unfortunate residents.

In one's own neighbourhood there may be opportunities to make saleable pictures to pay for the cost of films and papers. Most people like to have some record of an event which will live long in their memories. Where specially interesting scenes are photographed it is best to make more than one exposure if one is in any

doubt about how long to give, and it is always better to err on the generous side, as under exposure will result in poor prints, especially if a box camera is used in a dull light. In this case a faster film may be used.

The flooded countryside offers more scope for pictures, but avoid taking a dreary waste of flooded fields without foreground interest. Water, like snow, looks monotonous in large unbroken areas,

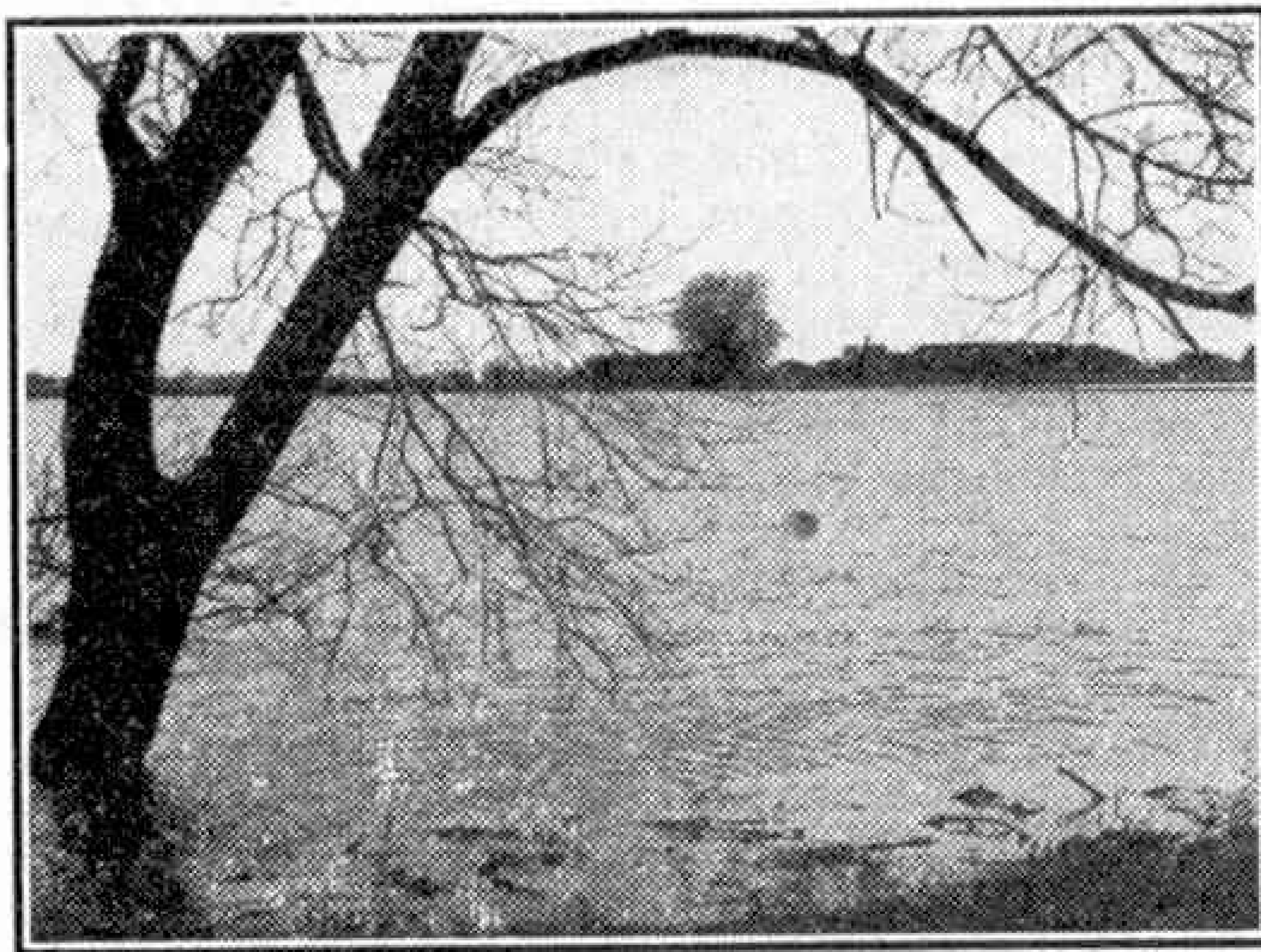


A flooded street. The photographs on this page are by the author.

and it is not difficult to find a vantage point where a tree or other object breaks the foreground and provides a sharp contrast to the even tone of the water. If a breeze is blowing, the rippled surface of the water will look much more impressive than the flatness of stagnant flood-water.

In hilly country the rippling stream of summer may quickly become a roaring torrent with waters lashed to creamy foam. The amateur photographer who lives in such a locality will know the best viewpoints for obtaining pictures of Nature in her wilder moods. One tip for photographing moving water is to arrange for a rather slow shutter speed to be used. The use of a really high speed is apt to give a "frozen" appearance to the water. In any case care must be used not to move the camera at the moment of exposure, as "camera shake" is probably responsible for more spoilt pictures than errors in exposure.

If exposures are made in the middle of the day there should be sufficient light to suit most cameras.



Low-lying farmland submerged by flood.

On the Roads of China

Highways Scraped from the Hillsides

By Bernard Llewellyn

THE words "Wild West" usually bring to mind Indians and runaway stage coaches, men in buckskin, and all the other trimmings we associate with the Hollywood films we call "Westerns." But America is not the only country with a "Wild West." China has one too; and during the war years China's West was as colourful and exciting as that technicolor world you find on the screen of

city of West China to another. But this is costly, and beyond the means of most.

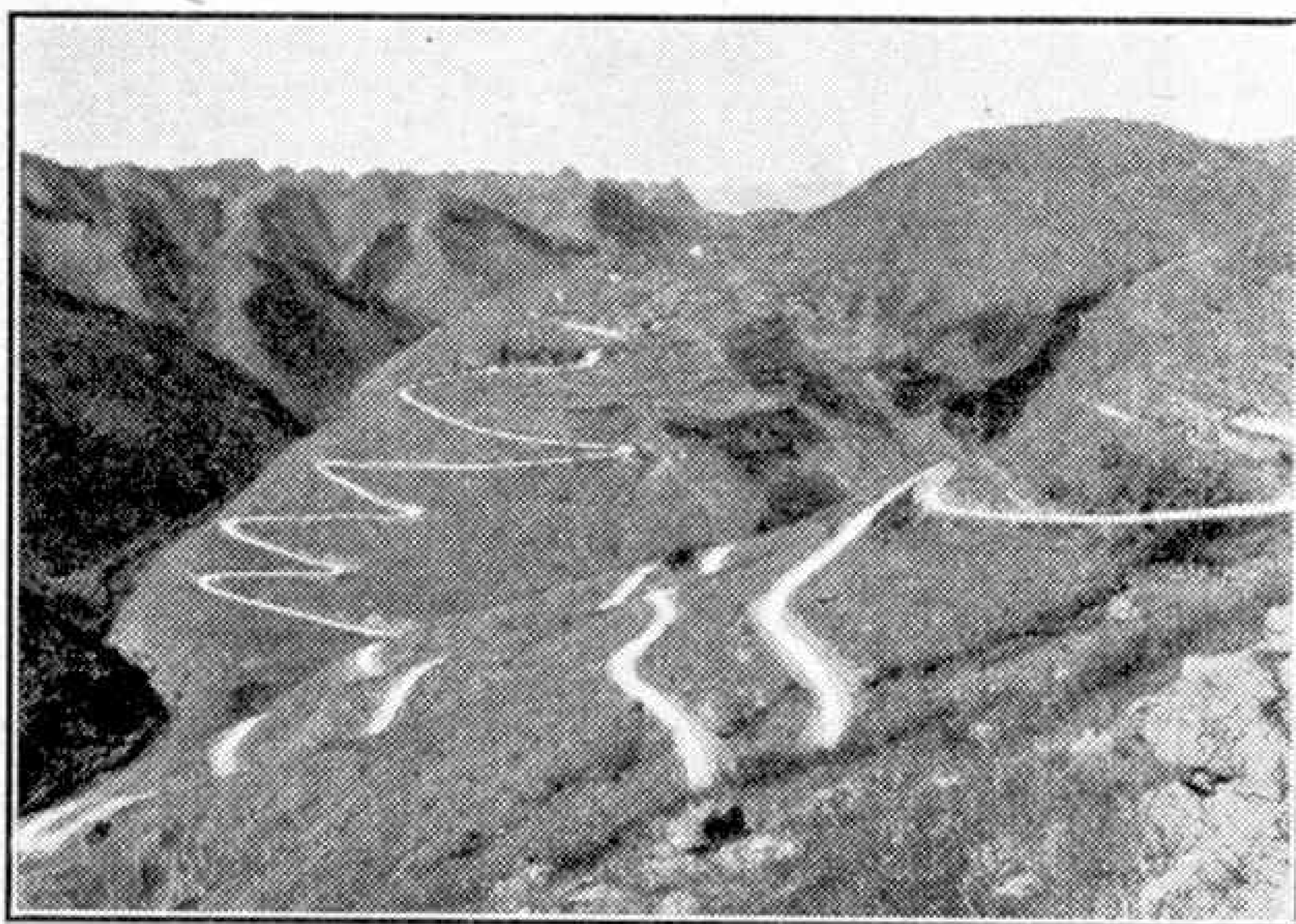
We are left with the land routes, once little more than mule-paths, and to-day dusty roads that criss-cross this Oriental Wild West and link together the lonely villages and old walled cities. They have been called the worst roads in the world. They coil themselves about the mountains like an endless length of spaghetti. In the

wilder parts of the landscape they attract bandits, recruited from impoverished peasants or reluctant soldiery, who watch from afar the dust spurting from the wheels of approaching lorries.

Of the many roads in China's West, one in particular has gained an international reputation, even though it is now on the way to being forgotten. This is the Burma Road. I still feel as if I know that highway better than I know most in this country. I drove my Chevrolet lorry along its 600-mile length many times, both by day and by night; and if I shut my eyes certain stretches of

it come vividly to mind. I remember the feel of the steering wheel while rounding the hairpins; the freshness of the mountain air just before dawn; and the way the road spiralled among the mountain peaks and left the ragged white clouds in the valley below.

For years the idea of a Burma-China road had seemed hopelessly impracticable. There were no great bulldozers or cranes for the job. There was little but a few sticks of dynamite, thousands of picks, mattocks, hammers and crude basket shovels, and the strength and sweat of tens of thousands of Chinese peasants. Yet these proved to be enough when the invading Japanese armies had secured possession of the China ports. Supplies were still desperately needed; and now they could only come overland. There *had* to be a road!

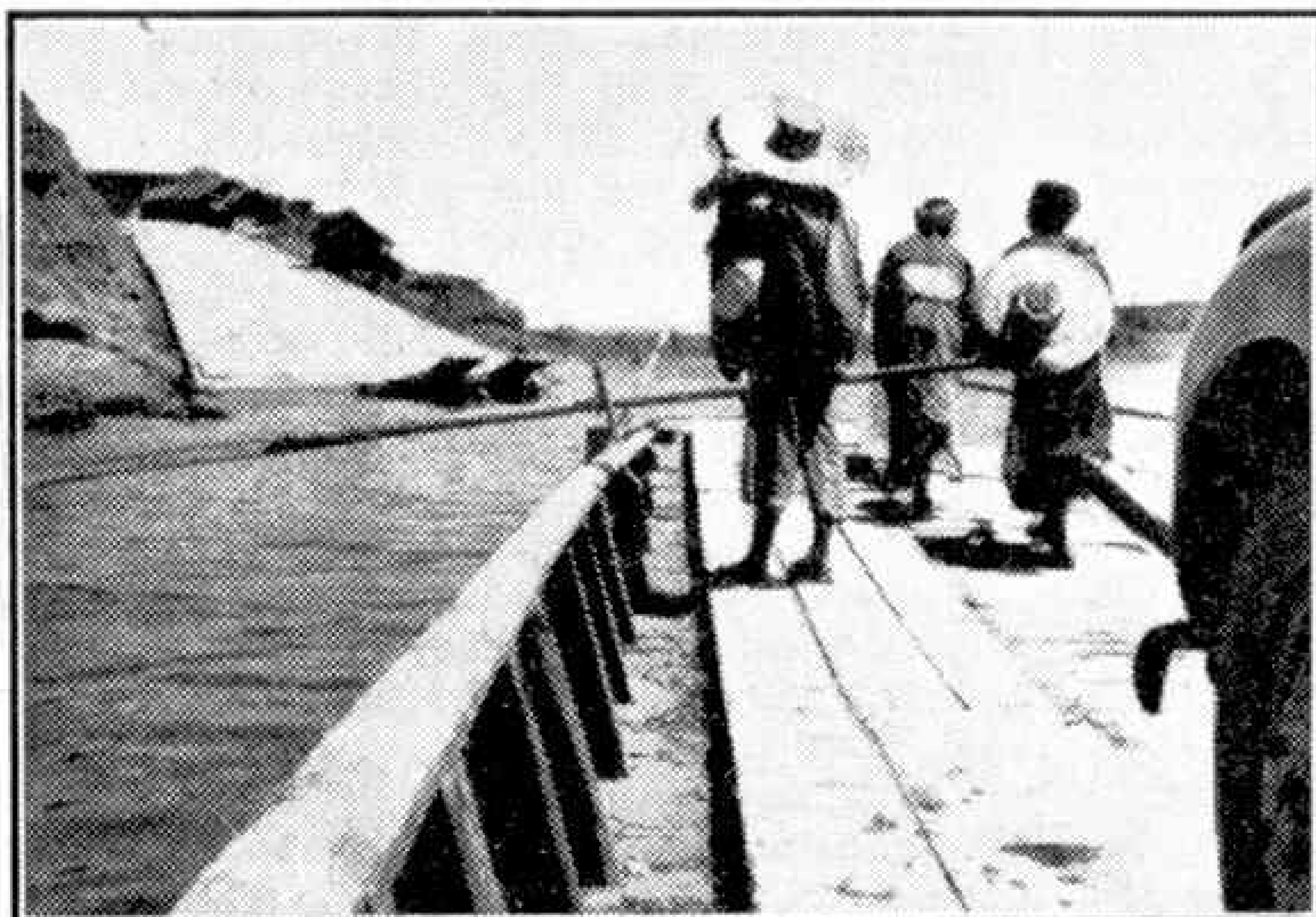


From one horizon to the other a white road wriggles over the mountains of China's Wild West, through some of the finest scenery in the world.

your local cinema.

If you look at a contour map of China, you will see that West China is a land of mountains ranging from 3,000 to over 10,000 ft. in height. The main rivers, such as the Yangtse, Hwang Ho and the Si Kiang, flow east and west; and even when they are not too swift and dangerous to be used for transporting goods and people, they are of little use in maintaining communications between north and south. Supplies coming to West China from Burma and India cannot make use of rivers. For such cargoes as these the rivers run the wrong way.

Nor can the railways help much. Beyond Kunming, capital of Yunnan Province, they are virtually non-existent until you get into Central China. There is of course air transport, which is much favoured by travellers wishing to get from one main



Where a river is too wide for a bridge lorries are driven on to a ferry such as this in Szechwan and floated across to the opposite bank. This photograph and the one on the previous page are by Jack Skeel.

And by the end of 1938 that road, stretching from Kunming westward into Burma, was open to traffic—a road that an American engineer once said had been scraped by Chinese labour out of the mountains with little more equipment than their finger nails.

The story of its building is too long to be told here; it is an epic of the courage and endurance of the common people. It took something like 160,000 ordinary men, women and children, conscripted from the villages of Yunnan, to build the twisting ribbon of this land route across the mountains and rivers of South West China. Two out of every three who worked on the road died during its construction.

The technique was primitive. First, coolies would prise from the mountain sides huge boulders, which they carried or rolled to the road site to act as a foundation. Between these large rocks they wedged smaller stones, and then built up the road level with yet smaller and smaller stones. The surface was mud-moistened earth beaten hard.

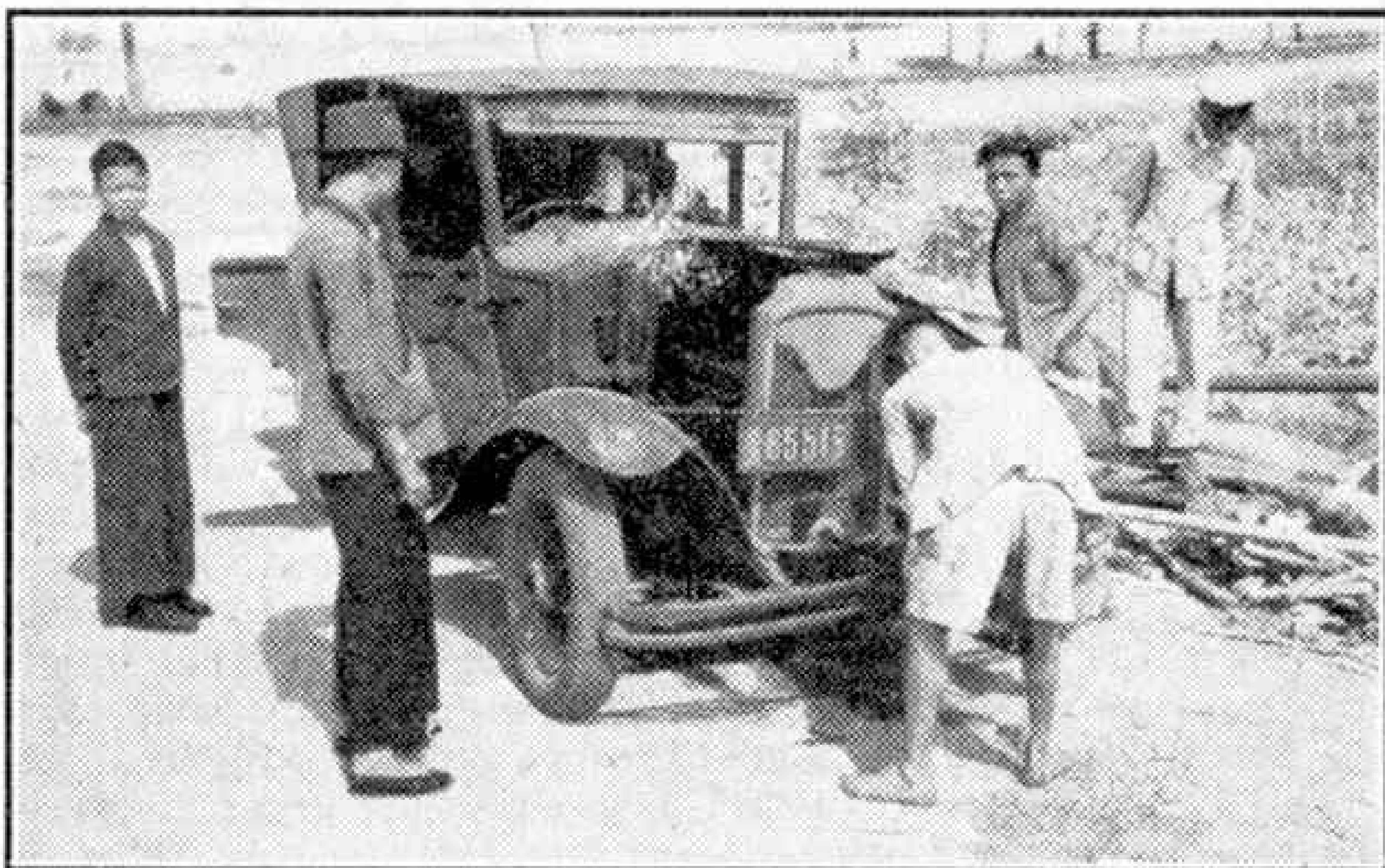
But the completion of the road did not mean that the work of these peasant "road engineers" was finished. I first travelled along the Burma Road in 1942, and used to see women and children seated

on heaps of stones with hammers in their hands, breaking the rocks into smaller pieces and piling them into little pyramids by the roadside. Meanwhile the men, in between the passing of the lorries, carried baskets of them to the worst holes in the road surface and filled them in.

They were everlastingly busy on road repairs. When torrential rain washed away the edges of the cliffs where the road ran, turning it into a strip no wider than a mule-path, they turned it into a road again by hacking into the cliff on the other side. When the road skirted the brink of a precipice they drove in wooden stakes to strengthen the edge.

Swollen mountain streams and bad driving wrecked many of the 400-odd bridges which the highway crossed. While these were being repaired, lorries frequently forded streams on crude stone causeways built on the river bed.

One of the most beautiful and dangerous sections of the Burma Road, and one of the most difficult to build, was the stretch that crossed the great gorge of the Salween River. The thin road was almost lost in this vast hollow in the earth's crust. From the summit of the mountains, over



A taxi is a rare sight in West China and this old wreck has seen better days.

7,000 ft. above the sea, it wound its tortuous way down to the bridge over the river, and then climbed again in hairpin loops up the mountains on the other side.

The Salween runs through what used to

be called Fever Valley, which was dreaded by the neighbouring tribes. It was haunted by malarial mosquitoes that took enormous toll of the road-builders who worked along this part of the route. Even when adequate precautions came to check the worst ravages of the mosquito, care did not always prevent accidents along the narrow ledge which was the Burma Road. Often there was no room for more than one vehicle. If two vehicles met, one of them would have to reverse to where the road widened. Scrapings and bumpings were common, and there were more serious accidents which left behind crumpled steel wrecks on the lower slopes of the gorge.

Some of the Chinese army vehicles should never have been on the road at all. One huge lorry filled with soldiers once ran into my radiator on a sharp corner. It had no brakes to speak of, and if I hadn't been there it would have gone over the edge.

What I have written about the Burma Road applies more or less to China's other roads. Except for stretches within city confines, they are mostly unpaved. Heavy rain will coat them with a film of mud, making the lorry drivers fit chains to the rear wheels. But they remain all-weather roads, and traffic flows incessantly over them except for temporary stoppages caused by landslide or flood.

There is the famous "Red Route" stretching from China's wartime capital of Chungking through the North West into Russia.

I travelled that road as far as the Tsing Ling Mountains and talked to many who had been farther, who had driven their lorries through the Jade Gate to the oil wells on the fringe of the Gobi Desert. On this route, during the winter months, snow and ice and intense cold added to the drivers' problems. Sometimes lorries would be half-buried in ten-foot drifts, and the drivers were never as warm as the long-haired, twin-humped camels from Sinkiang that shared the road with them.

A road I got to know very well was the one winding northward from Kunming to the Yangtse River, through a mountainous country inhabited largely by Chinese aboriginal tribes. The highest pass was around 10,000 ft. in height, near the crest

of a mountain which the Chinese aptly called the "Hill that Claws its way to Heaven." When you managed to get your lorry to the top, you had the illusion that you were driving over the roof of the world.

Villages were sometimes a score of miles apart along this road, and the country afforded good cover for bandits, who were on the look out for single lorries crawling slowly up mountain roads or stranded by the roadside. Occasionally a friendly innkeeper would warn us that we should not travel on after dark in case we should be attacked.

Mechanical breakdowns were common enough on such roads as those which crossed China's Wild West. During the war years and immediately afterwards vehicles were being worn out without chance of replacement. Spare parts were



A typical group of idlers in a Yunnan street waiting for something to happen. Photograph by Jack Skeel.

hard to come by, and drivers had to make do with vehicles that in this country would long ago have found their way to the scrap heap. The roads took a tremendous toll.

To those who know no roads but those of Great Britain it is hard to convey a picture of these West China highways which conquered the mountains and crossed great rivers by bridge or ferry. To drive along them was to know both loneliness and exhilaration. It was no ordinary adventure.

The roads are still there, and one day they may even be paved like roads in the West. But whether they are paved or not, their existence will be a lasting tribute to the common people who, with their crude tools, scratched them from the China hills.

Some Railway Signal Curiosities

By W. S. Garth

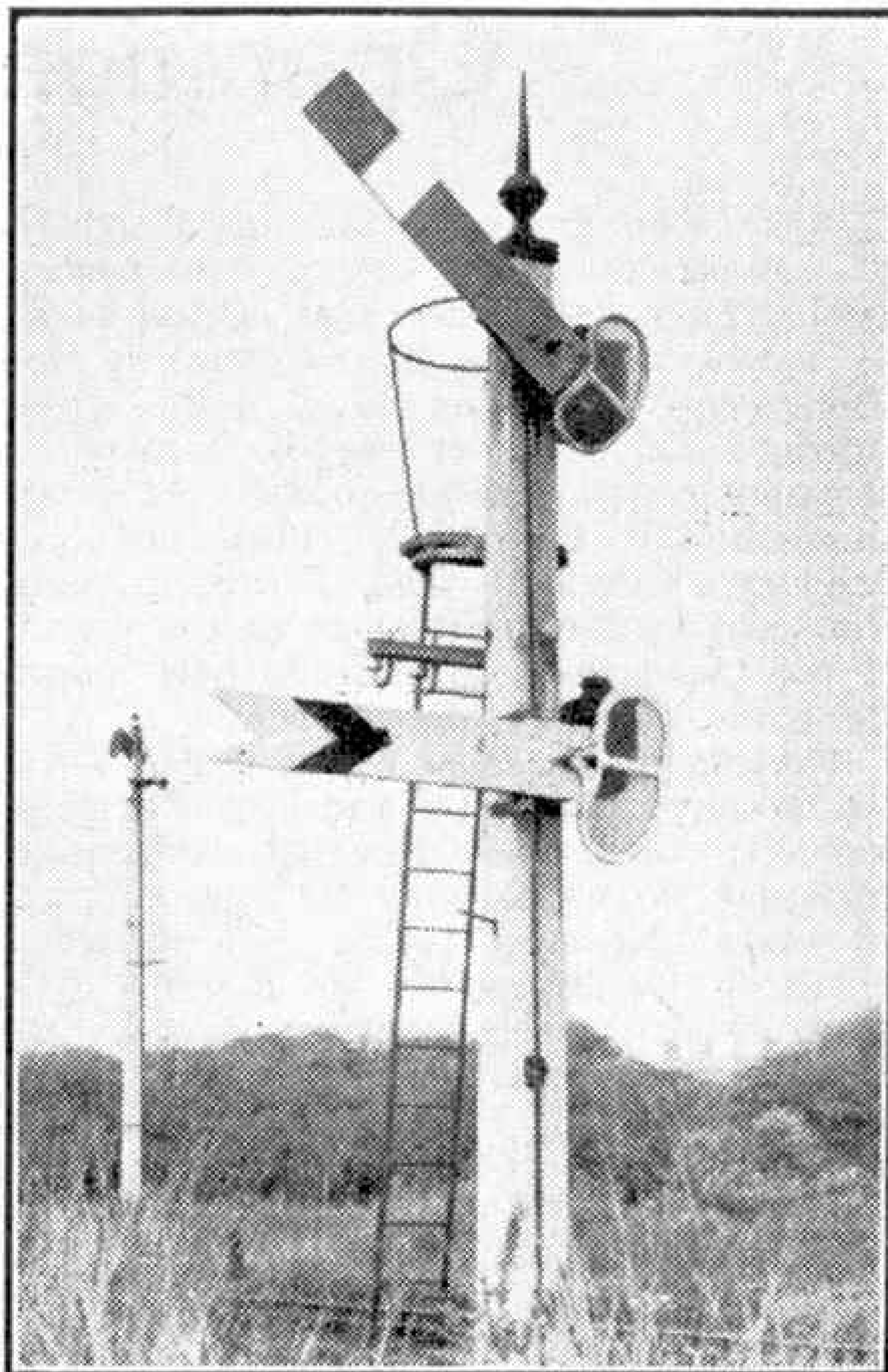
IN the course of a recent camera expedition by road and rail I really thought I had made a discovery between York and Harrogate in the shape of a revolving board signal. This was at a level crossing that was not a block post, nor was it protected by the usual semaphore signals, but there was a gatekeeper in attendance. The board could be rotated just like those of the early days of railways and, according to its position, it formed a "stop" signal for either road or rail traffic. It was intended, I was told, for emergencies, as the crossing was normally closed to road traffic.

Later, to my disillusion, I noticed several more similar signals and counted eight between Pickering and the main line.

The former Cheshire Lines, or rather the Southport and Cheshire Lines Extension Railway, to quote the original



One lamp serves the spectacles for both semaphores on this old-type signal in which the arms move inside the slotted post.



An upper-quadrant semaphore apparently made by reversing a lower-quadrant one. The fixed distant arm below it is of the latter type.

title of the route that terminates at Southport (Lord Street), provided the subject for the upper picture on this page. This shows a double arm home and distant signal having an unusual type of upper-quadrant arm. There are others of the same kind on the Cheshire Lines proper and I caught sight of one at Hunts Cross, near Liverpool. It would seem that the Cheshire Lines wanted to install upper-quadrant working at little expense so they ingeniously turned the lower-quadrant arms upside down and repainted them. The lower arm shown in the photograph is of the ordinary lower-quadrant type. It is a fixed or non-working distant, permanently at "caution."

It is not often that one can see such an old-fashioned signal as that in the lower picture. This type appears in many old railway books, and has two semaphores, one for each direction, working in a slot at the top of the post. The one shown I photographed on a colliery line at Haydock, Lancashire. Strangely enough this old signal appears to have the lamp lit by electricity.

Operation "Air Beef"

By John W. R. Taylor

THE Kimberley district of Northern Australia would make the perfect setting for a "Western" film. Great herds of cattle roam its plains, waiting for "round-up" and the long, hard drive through 300 miles of rugged country to shipping centres on the coast. At least, that's how it used to be, until the local "cowboys" decided that, Australia being the most airminded country in the world, it was time they exchanged their horses for some airborne horse-power.

They found an eager helper in Mr. I. H. Grabowsky, Planning and Development Manager of privately-owned Australian National Airways, who for more than 15 years had been toying with the idea of using air transport to make North Australia one of the richest meat-exporting areas of the world.

It was obvious from the start that his scheme had tremendous possibilities; but it was equally obvious that a lot of money would be needed to get it going, and there was neither the money nor the aircraft available in those days. So, for 14 more years, the herds had to make the arduous cross-country journey to the abattoirs and shipping centre of Wyndham. Even in the best of seasons this took a tragic toll. Cattle coming from properties free of disease suffered heavy losses when they entered tick-infested areas along the route. All lost weight during the drive, often as much as 100 lb. or more, with an average of at least 80-90 lb. When this was multiplied by the number of beasts in one herd, and then by the number of herds converging on Wyndham in a season, the result represented an awful lot of meat rations!

Unfortunately, to develop even a rudimentary road system in the Kimberleys would cost millions of pounds, while a railway system would be even more costly.

To bring either to peak efficiency would be a vast undertaking, demanding many years of work. But no such difficulties hamper the introduction of an air network even in a district like the Kimberleys. Natural obstacles present no boundaries, and even where landing strips do not already exist they can usually be built quickly and cheaply.

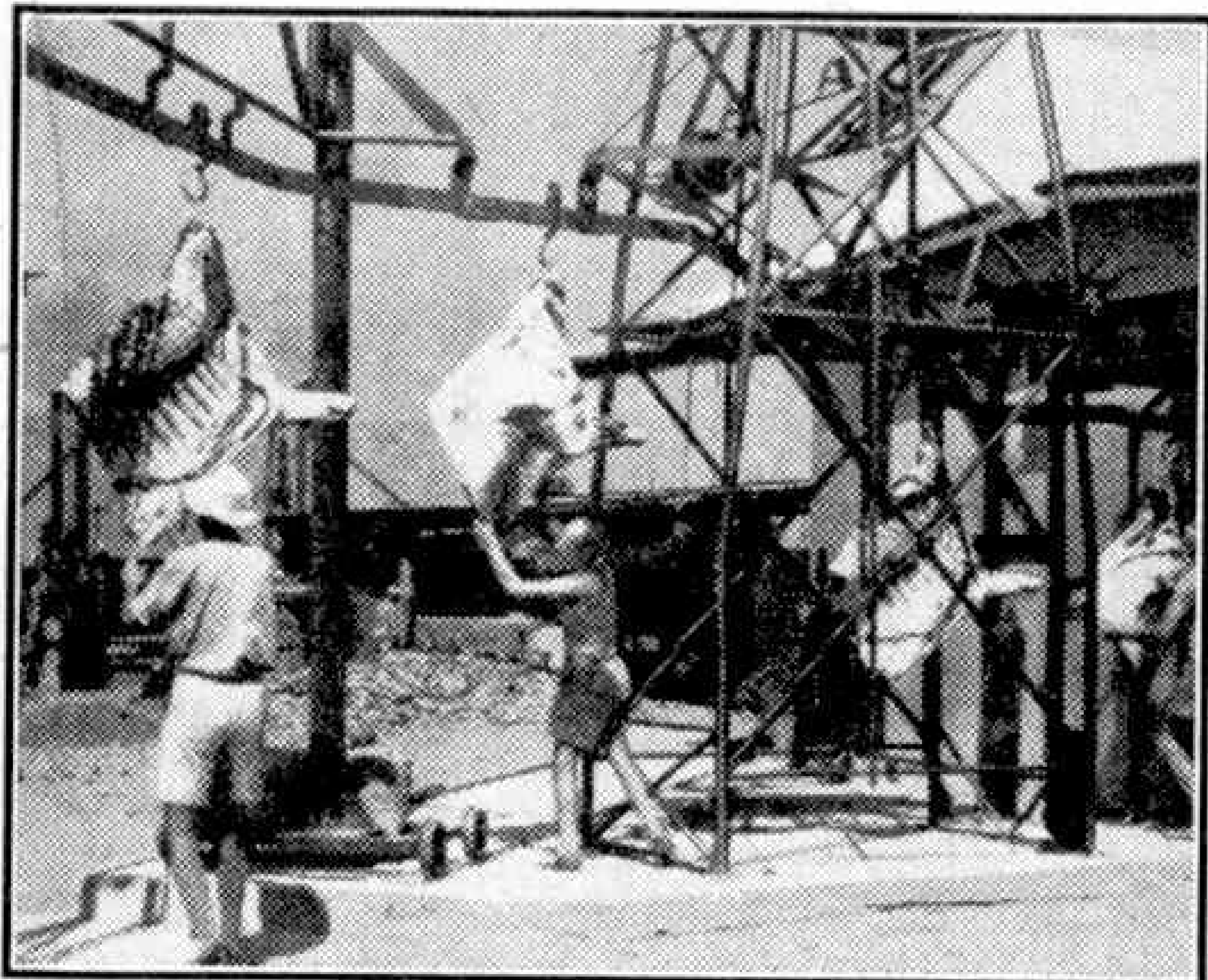
Not until 1947, however, was Mr. Grabowsky's project given a trial. Even then no more than a half-hearted experiment was made, four beasts being killed near the airstrip at Mount House cattle station and the meat flown to Perth in a MacRobertson-Miller "Dakota." But it proved that the scheme was practical, and within two years sufficient interest and financial support had been obtained to justify the formation of a company named Air Beef Pty. Ltd., to tackle the



"Mannana," the Bristol "Freighter" of Australian National Airways employed on the "Air Beef" scheme. The illustrations to this article are by courtesy of the Bristol Aeroplane Co. Ltd.

venture on a full-scale commercial basis. Principal shareholders were Australian National Airways, the MacRobertson-Miller Aviation Company, Mr. Gordon Blythe, who with his brothers owns the Mount House property, and a number of farmers in the Glenroy district of the Kimberleys.

Glenroy was chosen as the company's operating base, and the first essential was to lengthen the airstrip there. It cost only £100, the 8,000 ft. runway being simply scraped out of the flat land. After that, all the machinery, plant and buildings needed for the abattoir, chilling chambers



Transferring the quartered carcasses from the cold store to the "Freighter" by a Monorail conveyor that raises them to a convenient height for loading into the aircraft.

and living quarters were flown into Glenroy, and "Air Beef" actually got under way that same year, 1,800 beasts being killed, quartered, chilled and flown to Wyndham, 180 air miles away.

As one would expect, there were many setbacks and difficulties, not the least being the unsuitability of the "Dak" for such work. What was needed was an aeroplane with a large, easy-to-load fuselage able to accommodate bulky loads, and with a minimum of "things to go wrong." The answer was, obviously, a Bristol "Freighter," and when one became available in Australia last year it permitted an enormous expansion of the scheme.

Meanwhile, the Government had recognised the potential importance of "Air Beef" as a means of developing the sparsely-populated Kimberleys, and had decided to award a subsidy of 1d. for each pound of meat delivered to cool stores at Wyndham. Plans were at once made to step up the 1950 target to a total of 5,000 head of cattle, and the equipment and buildings at Glenroy were considerably extended to deal with them.

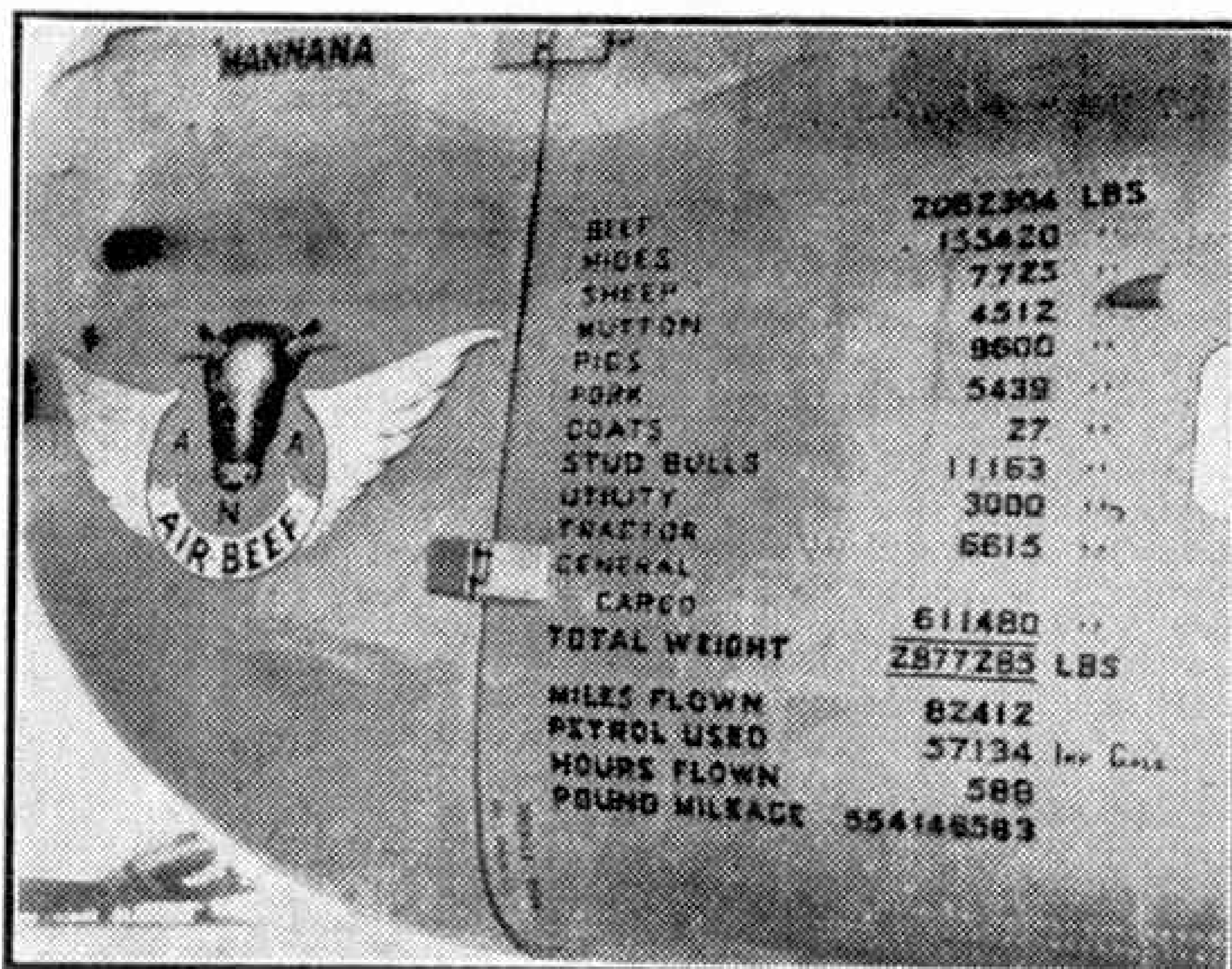
The herds began to arrive in May, from seven cattle stations within a 90-mile radius of Glenroy; first of all 100 head a week, then 300, some of them old or "soft" animals which would never have survived the overland journey to Wyndham. After killing, each quarter of

beef was individually graded by a Government meat inspector, so that a forequarter might be graded as Air Beef first quality, while a rear quarter on the same side, bruised perhaps by the horns of other cattle, would be judged suitable only for the sausage-factory!

The meat was next chilled, and conveyed by a special motorised Monorail system to the "Freighter", which carried nearly six tons of payload on each flight, consisting of about 20 carcasses on the outward journey, and supplies from Wyndham on the return trip.

It was feared at first that the meat might deteriorate in appearance or quality if it were transported in an unrefrigerated aircraft, but a few flights by the "Freighter" soon dispelled all doubts. In fact, on many occasions Glenroy beef was up-graded by the second Government inspector who checked all meat on arrival at Wyndham.

During the 1950 season, Glenroy worked a five-day week, the "Freighter" making two round trips a day. An additional flight was made to Wyndham on Saturday mornings, and once a week a cargo of hides was flown to Derby for shipment to Fremantle. The season ended early because of a shortage of horses and stockmen. Nevertheless, the "Freighter" carried a total of 2,877,285 lb. of freight in five months, including 2,062,304 lb of beef, 155,420 lb. of hides, and a wide variety of general cargo comprising (Cont. on page 94)



Statistics of the 5-month's period of "Air Beef" operations painted on the side of the aircraft.

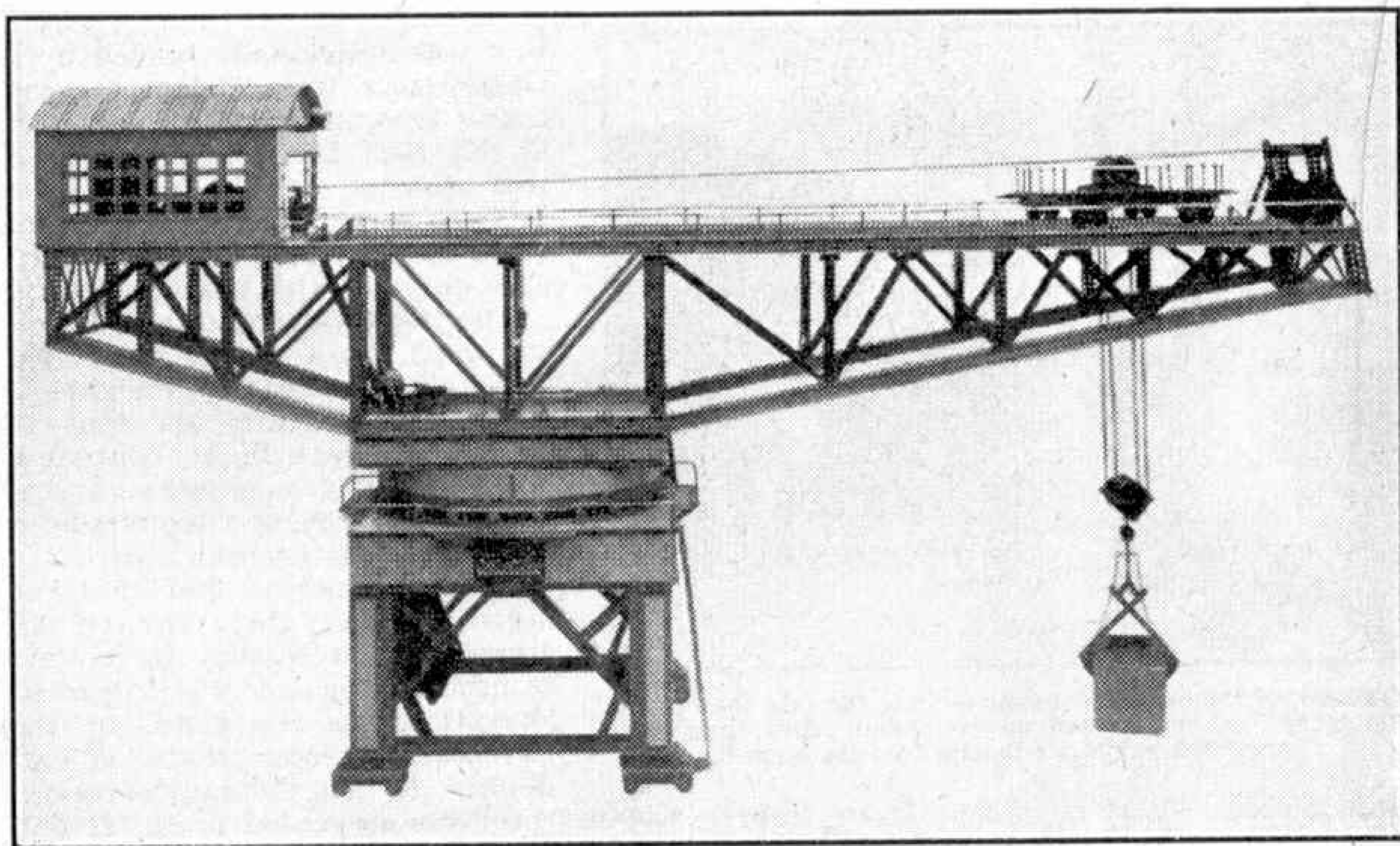


Fig. 1. A giant block-setting crane built by F. G. Rich, Orpington.

Cranes and their Work

Fine Subjects for Meccano Models

By "Spanner"

CRANES have always been among the most popular subjects for Meccano models, for their variety of types, and the ease with which their details can be reproduced realistically, provide the model-builder with a very wide field for his activities. Many of the cranes in use to-day, such as the giant block-setters and floating cranes, are so large and impressive, however, that there is perhaps a danger of overlooking altogether the smaller but equally useful members of the crane family that are to be found in large engineering works, railway sidings and docks and warehouses.

Among the small cranes some of the most interesting are the mobile types, which are manufactured in a wide variety, each specially designed for the kind of work it has to do and the conditions in which it has to operate. Real cranes of this kind are sometimes used in dockyards, where they run on rails laid along the quays and handle light loads from railway wagons. Some of them are able to revolve completely on their base structures.

Mobile cranes are also used very largely in industry for the high-speed handling and transportation of materials and merchandise. For this work they generally have an entirely self-contained power unit, mounted in a chassis that runs on rubber-tyred wheels, and they combine the stability and efficiency of a stationary crane with extreme mobility. As their travel is not confined to a set of rails, or hindered by trailing electric cables from an external power supply, their range of use is well-nigh unlimited.

A simple Meccano model of one of these small mobile cranes is shown in Fig. 2. The power unit usually consists of a petrol or diesel engine, which drives a generator that in turn supplies current to the luffing and hoist motors, and to wheel

traction motors incorporated in a caster unit pivoted at the rear of the chassis. The crane is slewed by rotation of the caster, which is connected to an ordinary

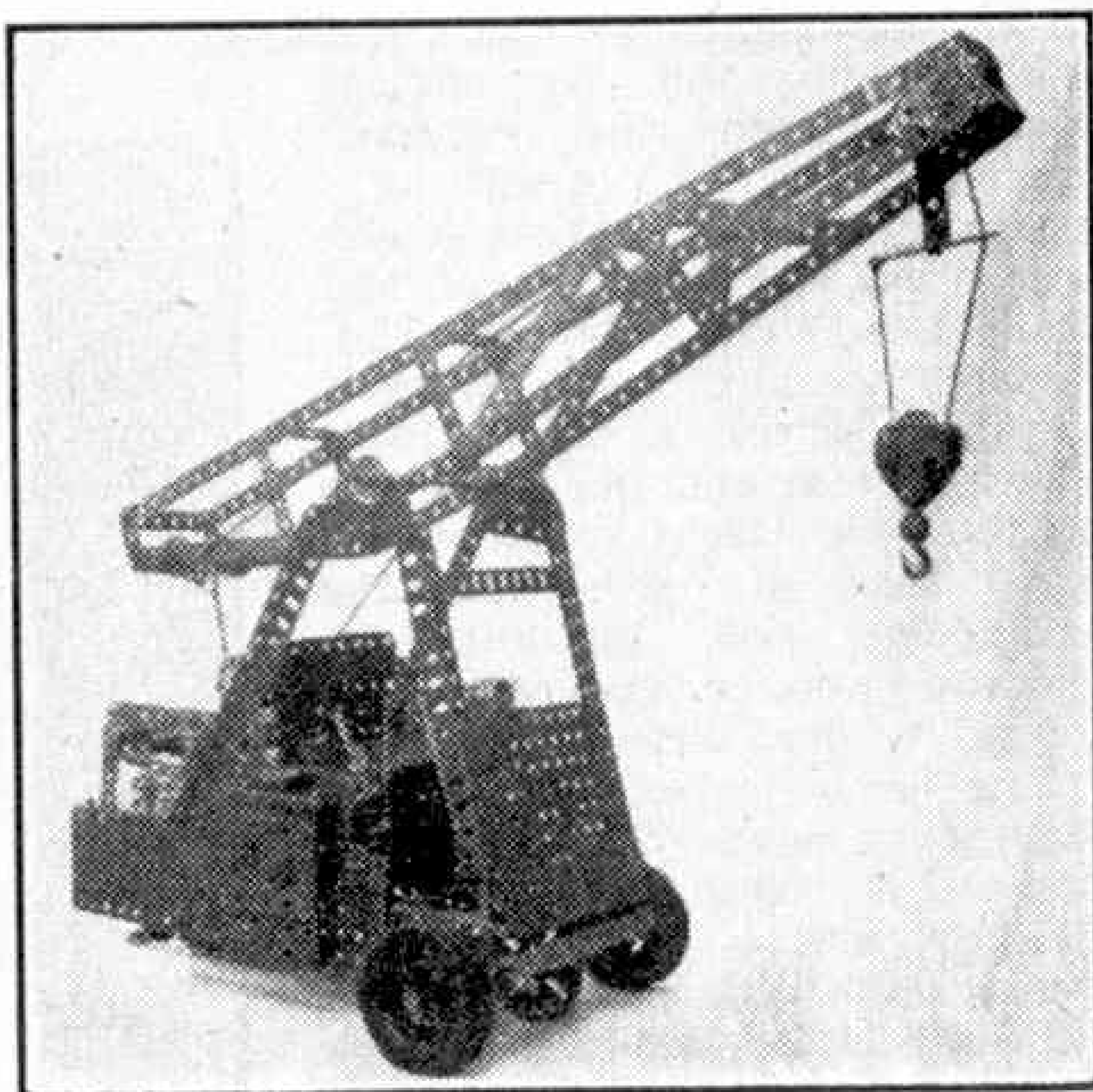


Fig. 2. C. S. Bassett, Old Coulsdon, is the builder of this typical light mobile crane.

steering wheel placed in front of the operator's seat, while the luffing, hoisting and travelling operations can each be brought into play by the movement of levers placed within easy reach. Operating one of these cranes therefore is very much like driving a motor car.

A very different but immensely useful group of cranes comprises various derrick types, which are used mainly in the construction of large buildings and civil engineering works. Most readers will have seen such cranes at work on building sites. Derricks are stationary cranes, and they consist of a vertical pivoted kingpost supported by tension members at the rear. The jib is pivoted to the foot of the kingpost, and the hoisting and luffing cords pass over pulleys at its head. Generally the power unit is mounted on a platform or in a housing attached to the foot of the vertical post, so that it swivels with the post when it is rotated. Meccano is ideal for producing realistic models of this kind, and as their mechanism is usually quite simple, they form good subjects for the younger crane enthusiast.

In engineering works, metal yards and stockyards, considerable use is made of travelling gantry cranes of the kind represented by the Meccano model shown in Fig. 4. This consists of a strong gantry supported at each end by towers fitted with wheeled bogies, on which it runs to and fro on rails laid along each side of the storage area. The crane hook is suspended from a traveller that runs transversely across the area along rails on the gantry. It will be seen therefore that a crane of this type can pick up or deposit a load at any point over the area it serves, and its movements do not interfere with workmen engaged on the ground.

Another form of gantry crane is used in large engineering machine shops such as those in shipyards. In this type the gantry runs on rails attached to the walls of the shop near the roof, and the supporting towers at each end therefore are not required.

We now come to a quite different group of cranes known as "hammerheads." These are much larger and more powerful than the mobile and derrick cranes, and many of them are capable of handling loads of over 200 tons. Some of them are stationary, but others travel on wheeled bogies running on rails, and they are generally to be seen in shipbuilding yards and fitting-out basins.

In a hammerhead crane the jib or boom is horizontal and is not luffable. It is mounted on a heavy roller bearing on top of a short and very sturdy tower, or alternatively on a strong platform supported by

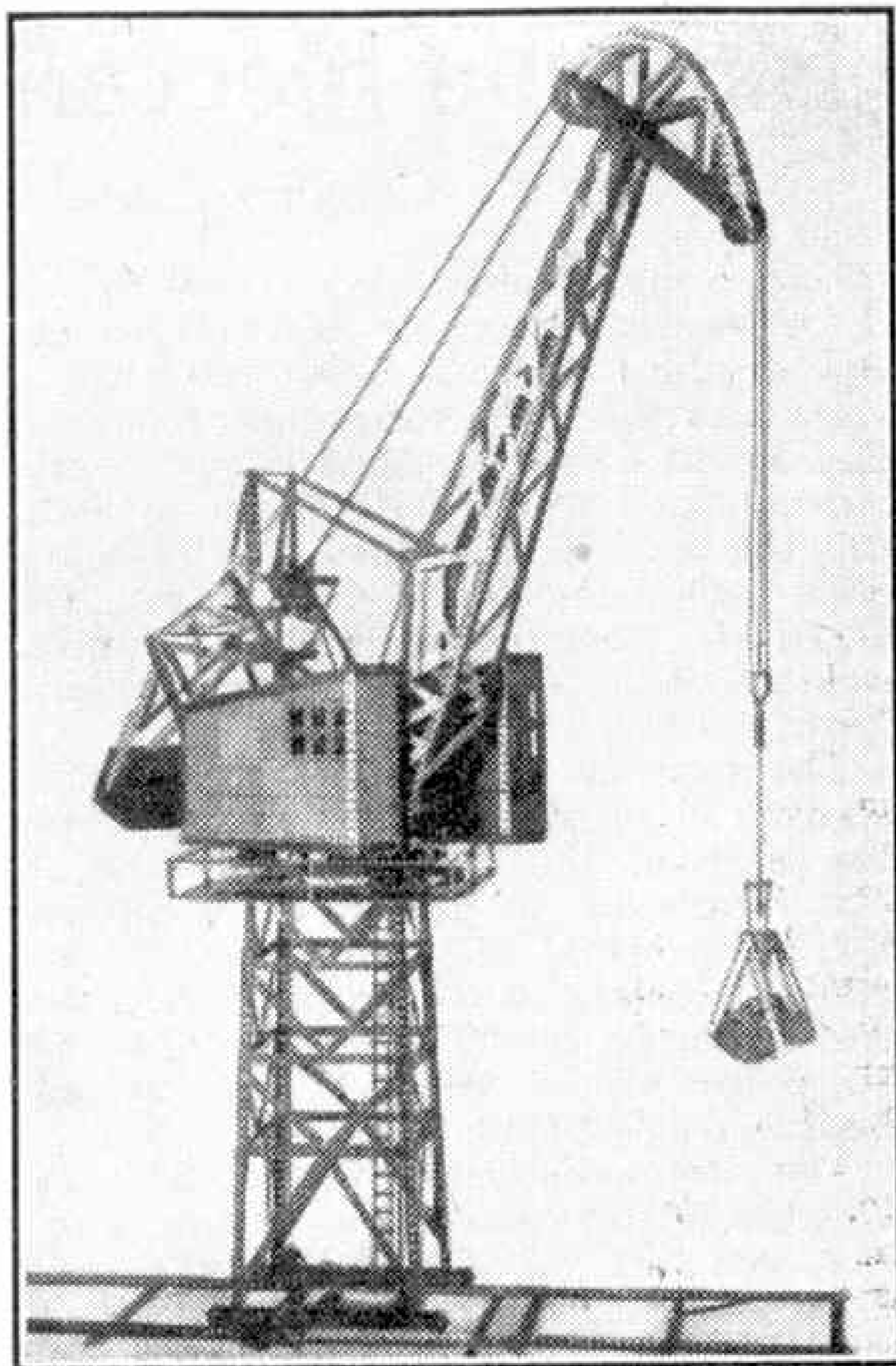


Fig. 3. A good example of a level-luffing crane. It is the work of N. C. Ta'Bois, Woodford Green.

four heavily-built steel legs. In the latter kind the bottom of each leg is set in a mass of concrete weighing many tons.

The boom carries at its rear end an engine house, from which power is obtained for all the movements of the crane. The main hoist consists of pulley blocks suspended from a traveller that runs to and fro along rails laid along the top of the boom. There is sometimes also an auxiliary block for handling light loads. The boom can be swung in a circle on its huge roller bearing, so that a load can be picked up or deposited over a wide area.

There is a mass of interesting mechanism in a large crane of this kind, and even experienced model-builders will find plenty to occupy their skill and ingenuity in working out suitable gear-boxes and controls for transmitting the drives to the various movements.

Closely related to the hammerhead cranes in type are the giant block-setting cranes. These are probably the most impressive and exciting of all cranes to watch in action, but unfortunately opportunities to see them at work are rare, unless one

(Continued on page 94)

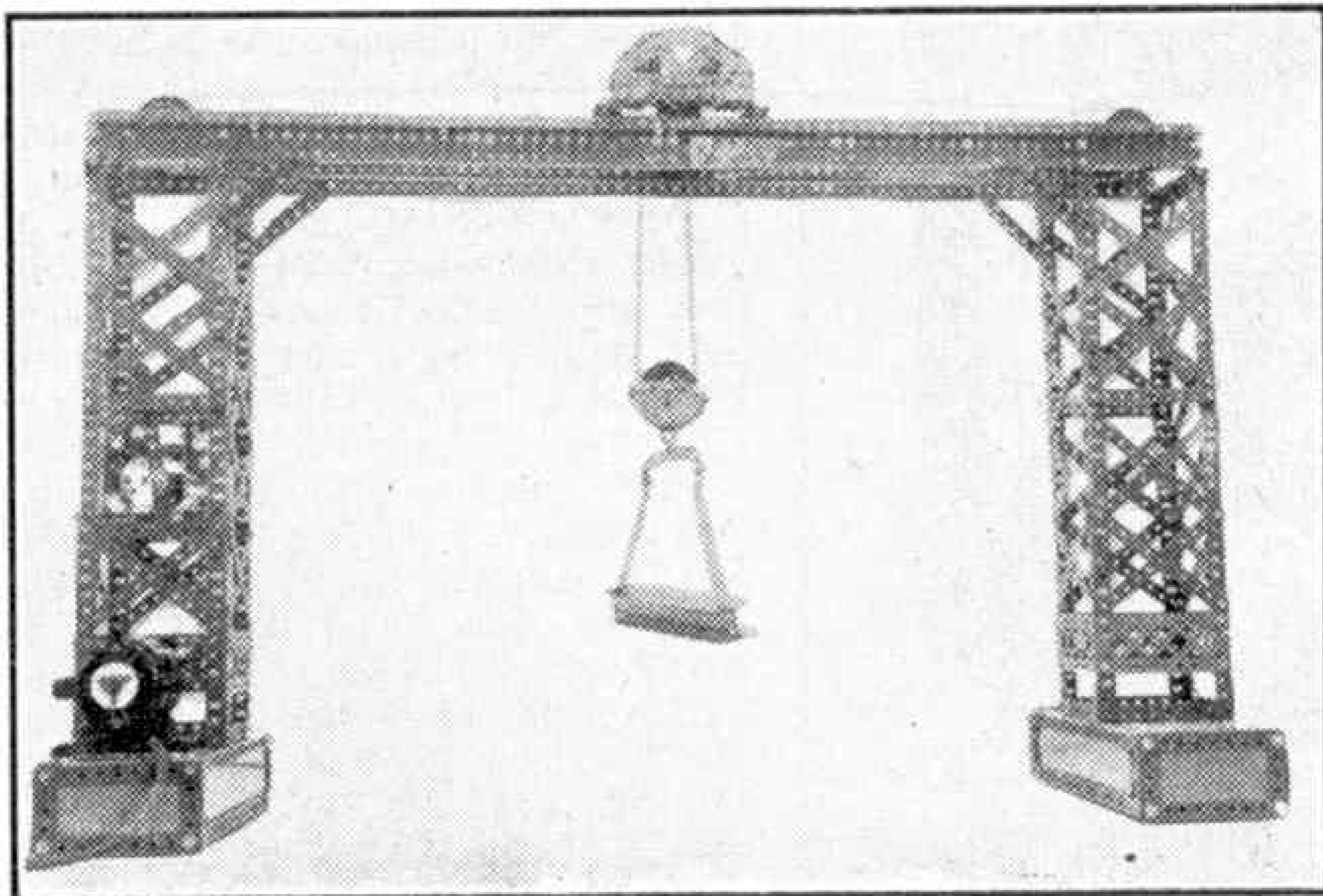


Fig. 4. One type of gantry crane used often in stockyards. It is fitted with automatic reversing mechanism to the trolley and load hoist.

Using the Meccano Gears Outfit "A"

Crushing and Grinding Machine

THE simple model shown in Fig. 1 represents a machine used for crushing and grinding ores and other materials to a size convenient for processing or handling. The material to be crushed is loaded into a drum fixed to the base of the machine and the crushing is carried out by heavy rollers revolving inside the drum. The model is constructed with the parts included in a No. 3 Outfit and a Gears Outfit "A."

The base of the model is a $5\frac{1}{2}" \times 2\frac{1}{2}"$ Flanged Plate, and a framework supporting the drive to the rollers is bolted to it. The framework is formed by a vertical $5\frac{1}{2}"$ Strip bolted to each corner of the Flanged Plate, and the Strips on each side are connected by $5\frac{1}{2}"$ Strips 8. The $5\frac{1}{2}"$ Strips are braced across by two $2\frac{1}{2}" \times \frac{1}{2}"$ Double Angle Strips 9.

The drum consists of two $5\frac{1}{2}" \times 1\frac{1}{2}"$ Flexible Plates curved to form a circle and attached by Angle Brackets to a circular base. The base is made by bolting together two Semi-Circular Plates, and

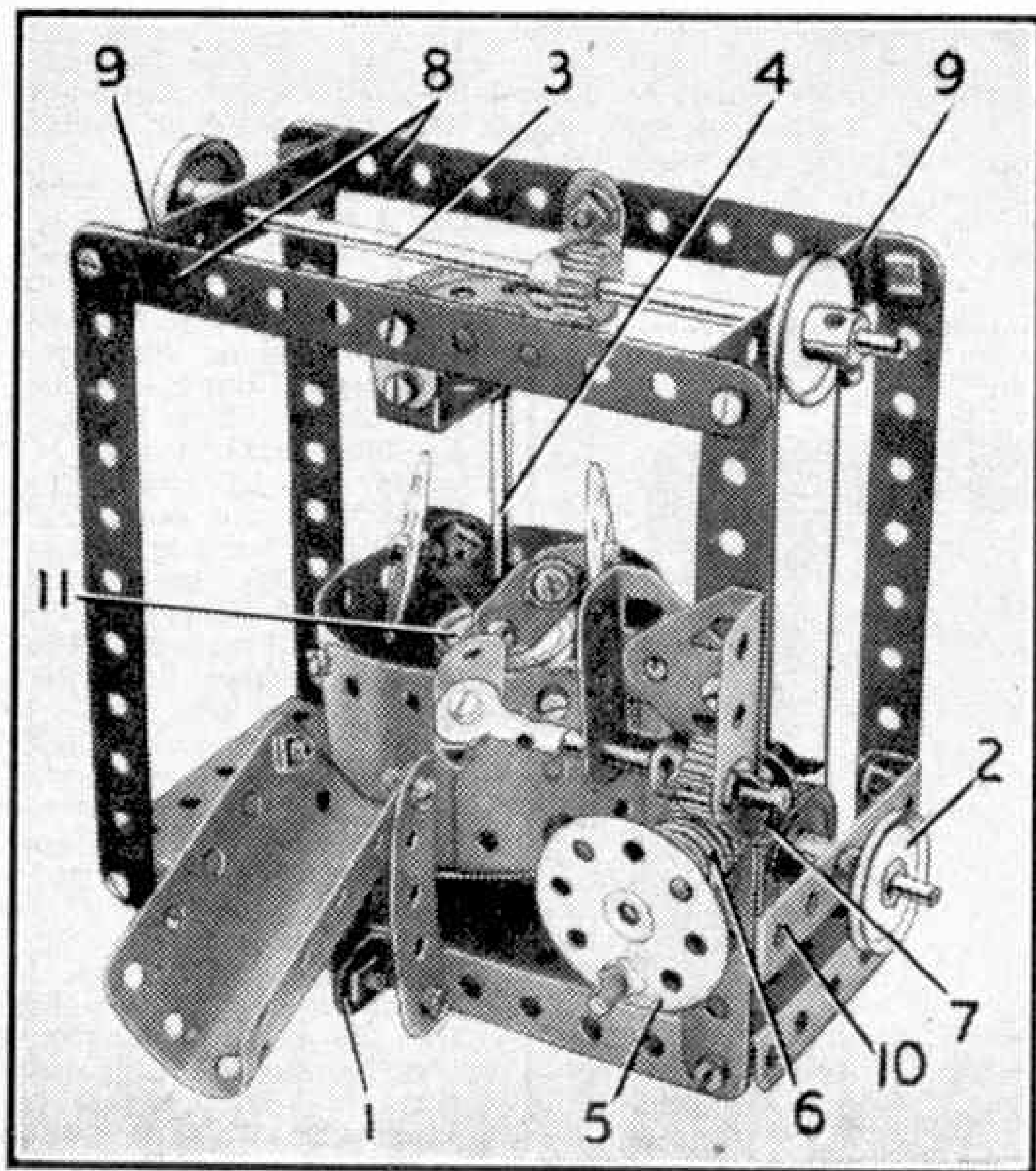
it is attached to Reversed Angle Brackets fixed to the $5\frac{1}{2}" \times 2\frac{1}{2}"$ Flanged Plate.

In actual practice the drum can be tilted for unloading, and although this cannot be carried out with the model the mechanism for discharging the drum is reproduced. It consists of a Bush Wheel 5 fixed on a Rod mounted in one of the vertical $5\frac{1}{2}"$ Strips and in an Angle Bracket 7 bolted to a Double Bracket attached to the $5\frac{1}{2}"$ Strip. The Rod carries a Worm 6 that meshes with a $\frac{1}{2}"$ Pinion on a 2" Rod. This Rod is mounted in Trunnions bolted to the $5\frac{1}{2}"$ Strip, and is fitted at its inner end with a Rod and Strip Connector extended by a Fishplate. The discharging chute is represented by a U-section Curved Plate attached to $2\frac{1}{2}"$ Strips bolted to a Double Bracket 1.

The model can be driven by a Magic Clockwork Motor by a Driving Band passed round the Motor pulley and a 1" Pulley 2. Pulley 2 is fixed on a 2" Rod mounted in a $2\frac{1}{2}" \times \frac{1}{2}"$ Double Angle Strip 10 and in a Flat Trunnion attached to the base by an Angle Bracket. The Rod carries also a second 1" Pulley, and the drive from this is taken by a Cord belt to a 1" Pulley on a compound rod 3. Rod 3 is made by a 4" and a $1\frac{1}{2}"$ Rod joined by a Rod Connector, and it carries a $\frac{1}{2}"$ Pinion that meshes with a $1\frac{1}{2}"$ Contrate on a 4" Rod 4. This Rod is journalled in a $2\frac{1}{2}" \times \frac{1}{2}"$ Double Angle Strip and in the bottom of the drum. The Double Angle Strip is attached by means of Fishplates to Strips 8.

The rollers are Wheel Discs and they are attached to Angle Brackets held tightly by a nut and bolt to Fishplates bolted to the boss of a 1" Pulley 11 fixed on Rod 4.

Parts required to build model Ore Crusher: 4 of No. 2; 2 of No. 5; 5 of No. 10; 2 of No. 11; 7 of No. 12; 2 of No. 15b; 3 of No. 17; 5 of No. 22; 1 of No. 24; 2 of No. 24a; 2 of No. 35; 44 of No. 37; 1 of No. 37a; 6 of No. 38; 4 of No. 48a; 1 of No. 52; 1 of No. 111c; 2 of No. 125; 2 of No. 126; 1 of No. 126a; 2 of No. 189; 1 of No. 199; 1 of No. 212; 1 of No. 213; 2 of No. 214; 1 Gears Outfit "A."



Outfit No. 3 and a Gears Outfit "A" are used in building this model crushing and grinding machine.

Meccano Competitions

A Chance to Win a Cheque

A "Winter" Model-Building Contest

We are now in the busiest months of the model-building year, and this therefore is a fine opportunity for a great general model-building competition. With this in mind we are offering splendid prizes, in the form of cheques and postal orders, in a contest in which *models of any size and type can be entered*. Simple cranes built with small Outfits, giant locomotives constructed from the largest ones, bridges, motor vehicles and machines of all kinds are all eligible. Every model-builder should join in this grand contest, even if his Outfit is a small one and he is a beginner, for the judges will take these points into consideration in making their awards.

Preparing an entry for this contest is very easy. The model itself must not be sent; all that is required is a photograph or drawing, with any notes required to explain special constructional features. On the back of each photograph or drawing sent in the competitor must write his name, address and age, and his entry should be forwarded to "*Winter Model-Building Contest, Meccano Ltd., Binns Road, Liverpool 13.*"

The competition is open to readers of all ages and is divided into two Sections, "A," for competitors in the British Isles, and "B," for Overseas competitors.

The following prizes will be awarded in each Section of the Contest to the builders of the most interesting models received. *First, Cheque for £3/3/-. Second and Third prizes will consist respectively of Cheques for £2/2/- and £1/1/-.* There will be also five prizes each of a Postal Order for 10/6, and five of Postal Orders for 5/-.

Closing Dates: Section A, 31st March; Section B, 31st May.

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.

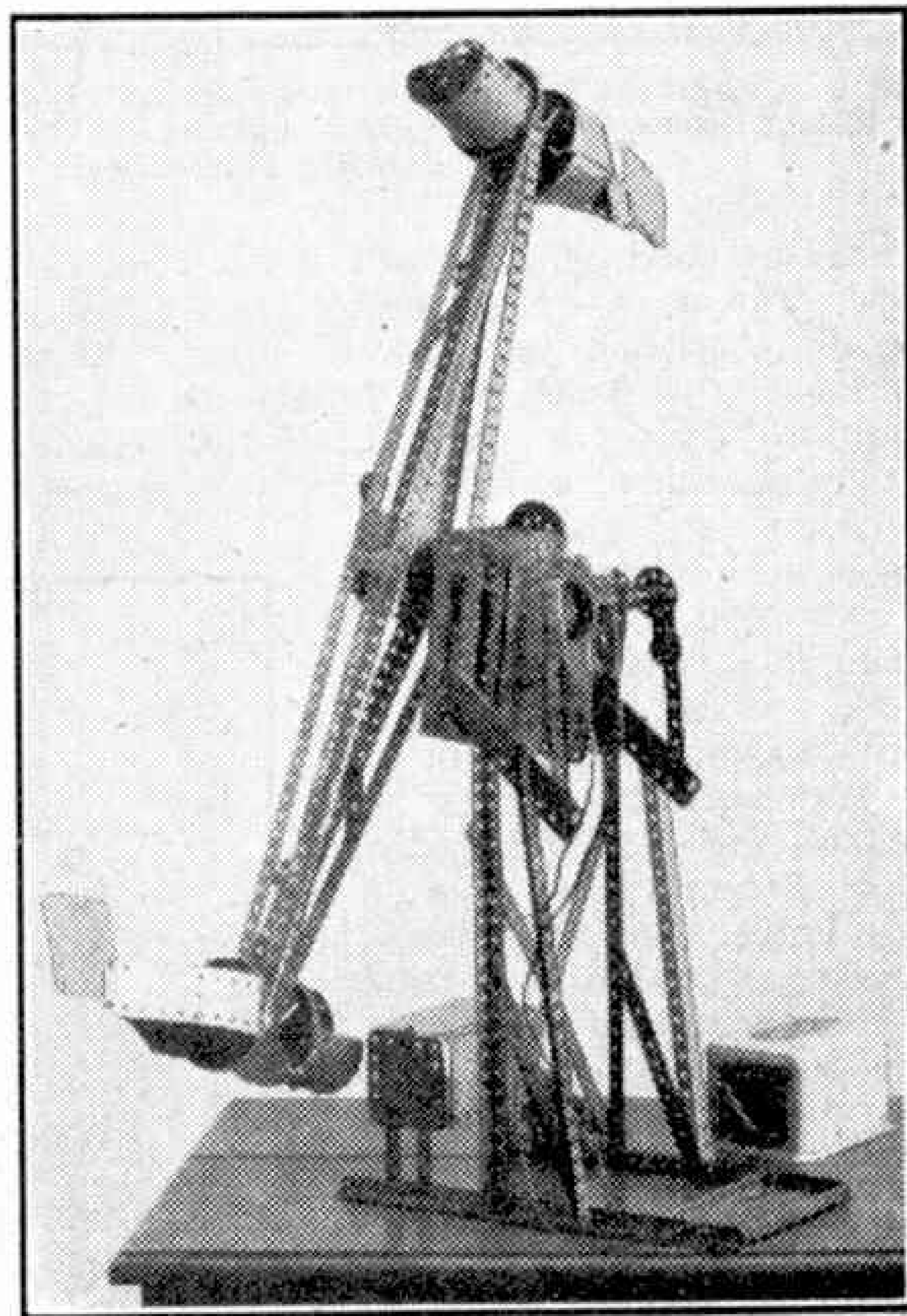
Competitors are asked simply to write on a postcard a *short humorous story* incorporating the names of as many

Meccano parts as possible, or terms used in connection with Meccano model-building.

There are many Meccano parts with names that can easily be incorporated in 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 a prize.*

The prizes to be awarded for the most interesting and humorous entries are: First, Cheque for £2/2/-; Second, Cheque for £1/1/-; Third, Postal Order for 10/6. There will be also five prizes each of 5/-.

Entries should be addressed "*Meccano Short Story*" Competition, Meccano Ltd., Binns Road, Liverpool 13. Closing date for entries, 28th February.



"The Dive Bomber." A most interesting model of the fairground's biggest thriller. It won First Prize for its originality in a recent Competition and was built by A. D. Craven, Bradford. Originality of subject is a great asset in a competition entry.

"October" Model-Building Competition Results (Home Section)

By "Spanner"

JUDGING from the freshness of ideas and the workmanlike appearance of many of the models entered in the October General Model-Building Competition, Meccano enthusiasts are now rapidly

Birkenhead; B. Dennis, Rayleigh, Essex; C. Draper, East Stanley, Co. Durham; G. C. Bassett, Old Coulsdon, Surrey.

CERTIFICATES OF MERIT:

R. J. Holloway, Arnside, Westmorland; A. Vincent, Horsham; R. Driver, Bishop Auckland; B. Smith, Grimsby; R. A. Armstrong, Lytham St. Annes; R. G. Burgess, Sedgley, nr. Dudley; W. Lees, Selkirk; R. F. Bailey, Southampton; M. Carlsson, West Harrow; T. Fryers, Hest Bank, nr. Lancaster; G. Wickens, High Hurstwood, nr. Uckfield; M. S. P. Eastham, Cheadle Hulme; A. Abbott, Norwich; R. H. Frost, Swineshead Bridge, nr. Boston; B. Davis, Blackpool; R. J. Grover, New Haw, nr. Weybridge; J. G. Thomas, Liverpool 4; K. Dain, Hyde, Cheshire; P. Jordan, Liverpool 22; J. Smith, Sutton Coldfield; I. D. Rose, Chelmsford; R. Cocking, Wolverhampton; R. Rose, Wallington, Surrey; E. Boothroyd, Southport; L. Edwards, Ely; J. Greenman, Kingston-on-Thames; P. French, St. Leonards-on-Sea; M. V. Barry, West Kirby, Wirral; D. Higgins, Leeds 8; D. McRae, Maybole, Ayrshire; J. Heward, Weybridge; M. Smith, Lowestoft; G. Burnham, Chalfont St. Peter, Bucks.; T. Latlow, St. Albans.

The success of Roland Brown in winning First Prize is due partly to his wise selection of subject and the fact that he coupled this with excellent workmanship. His

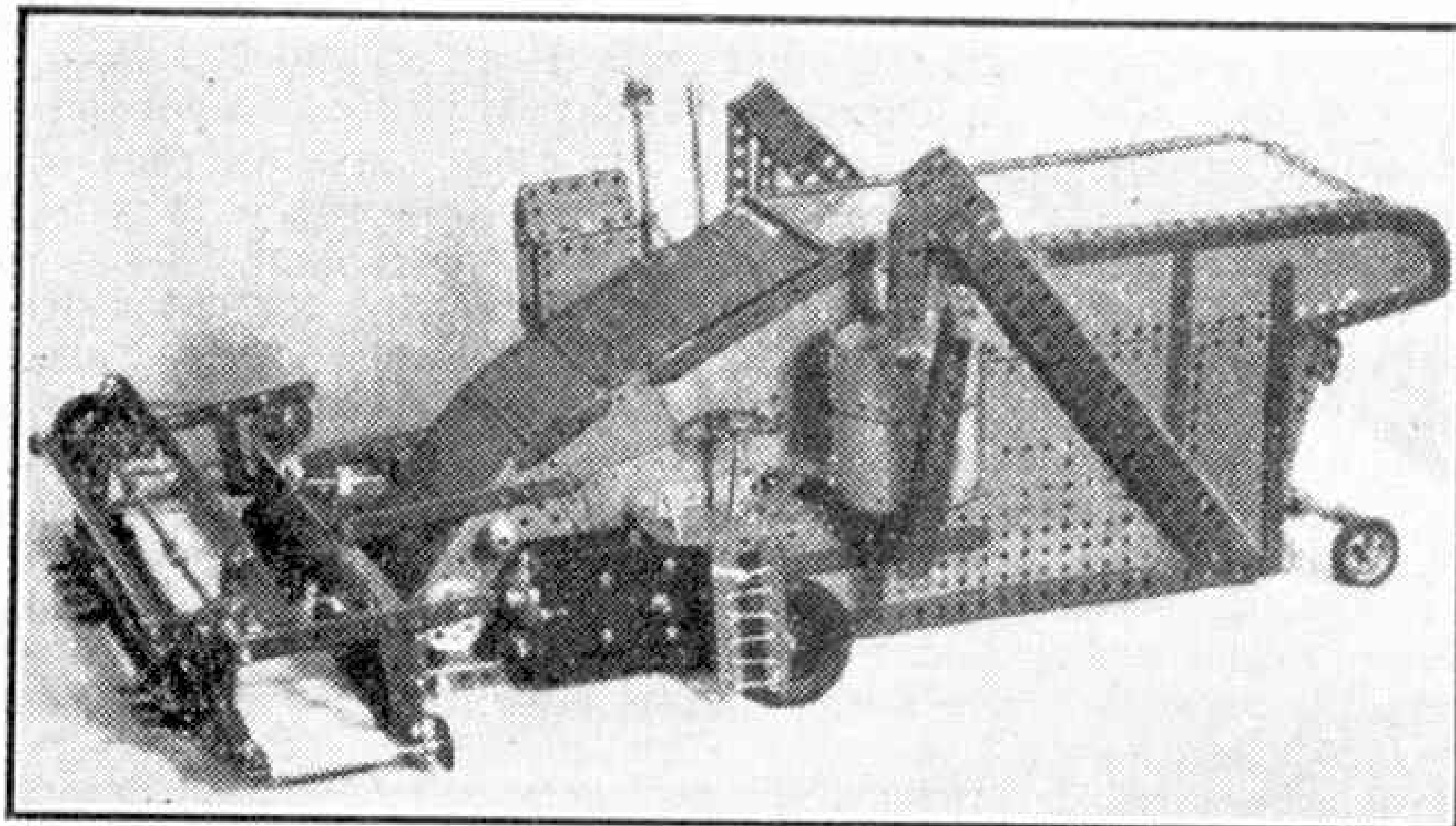


Fig. 1. A model of a Massey-Harris self-propelled combine harvester. It was built by Roland Brown, Oakham, Rutland, and won First Prize in the October Model-Building Competition.

attaining the high standard of construction that was so very apparent among competition entries in pre-war years. This is no doubt partly due to the fact that supplies of extra parts are more easily obtainable now, so that really keen model-builders are able to give their work just that finishing touch that makes all the difference between a merely good model and one of outstanding distinction.

The work of judging the entries was most interesting and I am now able to announce the full list of awards in the Home Section, which were as follows:

First Prize, Cheque for £3/3/-: R. Brown, Oakham, Rutland. Second Prize, Cheque for £2/2/-: D. Wright, Lincoln. Third Prize, Cheque for £1/1/-: D. C. E. de Wit, Blackburn.

Five Prizes each of 10/6: E. Howell, Dronfield, nr. Sheffield; D. C. Whitehead, Worcester; J. Ellerington, Sheffield 10; J. A. Heywood, Macclesfield, W. M. Dodds, Wolverhampton.

Five Prizes each of 5/-: R. Burbidge, Bletchley; C. Lee,

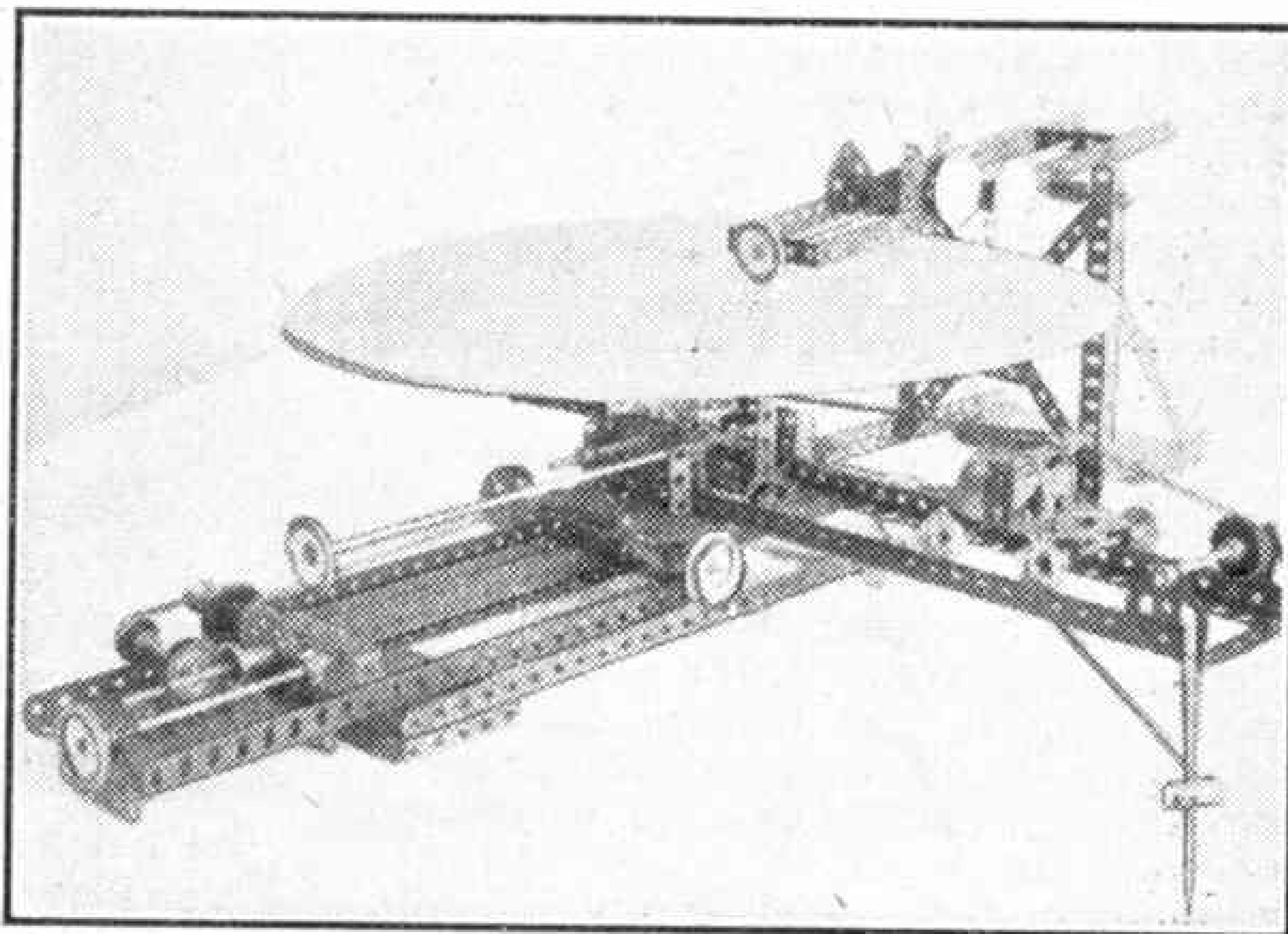


Fig. 2. This cleverly built planimeter won Second Prize for David Wright, Lincoln.

model represented a Massey-Harris self-propelled combine harvester and is shown in Fig. 1 on the previous page. The motive power of the model is obtained from an E20R type Electric Motor, and suitable gearing and clutch mechanism is provided to allow the model to travel without the conveyor and other harvesting mechanisms being driven. In conformity with the real machine, the model steers through the rear wheels, and although not capable of doing actual harvesting, it can reproduce most of the essential operations.

Scientific apparatus has provided subjects for many interesting Meccano models in the past, and I was very pleased to find another model of this kind among the entries in this contest. It is a planimeter or area measuring machine (Fig. 2) and was sent by David Wright, who was placed Second in the prize list. As will be seen from the illustration, the model consists of two trolleys that move along two sets of rails arranged at right

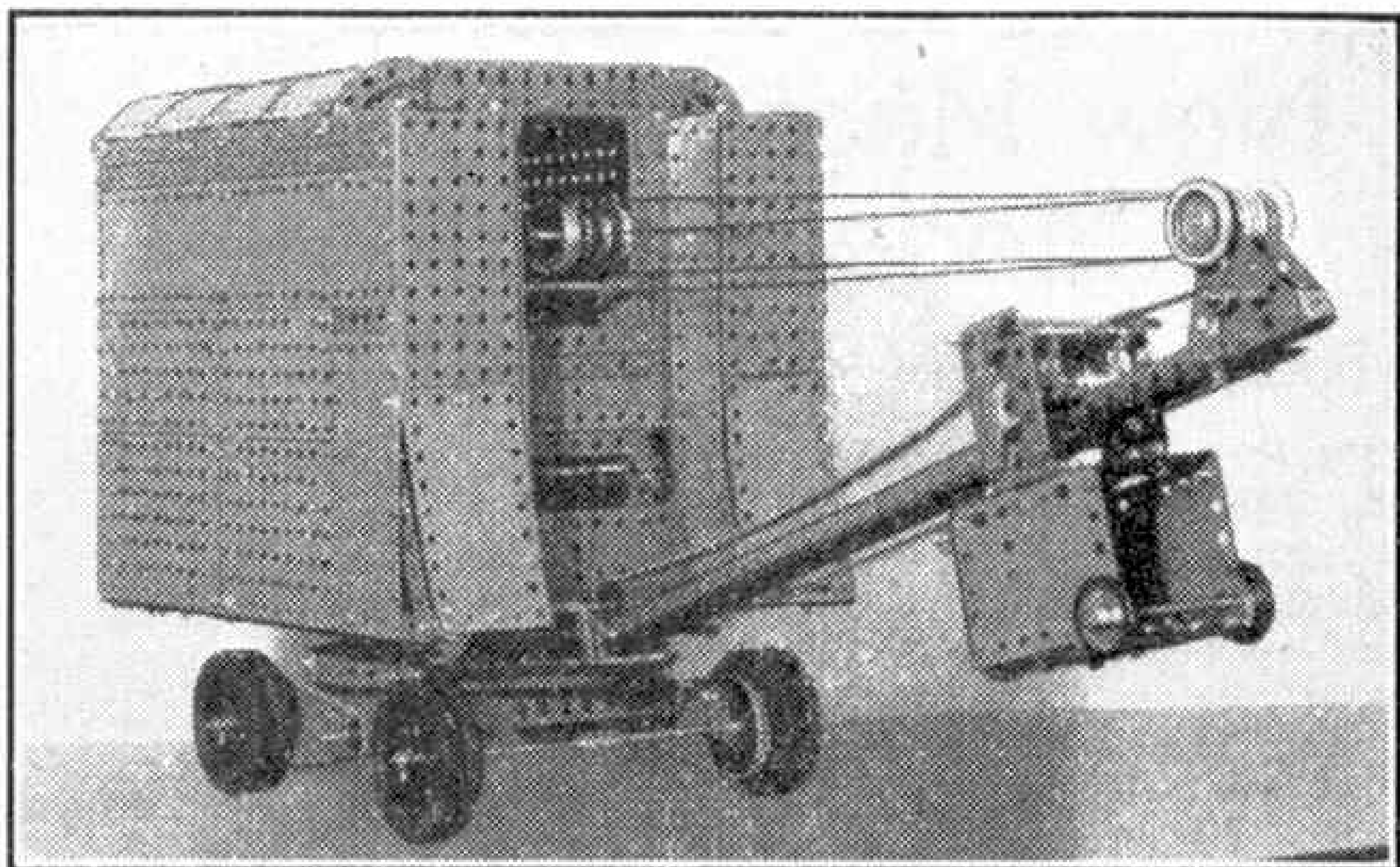


Fig. 4. A mechanical digger built by David C. Whitehead, Worcester.

that carries a Worm and a small Contrate Wheel. Each is connected to a small Pinion fastened to the spindles to which Bush Wheels carrying paper indicator discs are fastened. These discs are calibrated as follows. The disc connected to the Pinion that engages the Contrate Wheel is divided into eight segments numbered 0 to 8. Each segment in turn is divided into quarters. A wire pointer is fastened to the frame and the wheel is turned until the pointer is opposite the 0. The 1" Pulley Wheel is then rotated so that the

marked disc makes one complete revolution. A mark is then made on the second paper disc at the position indicated by the pointer. As the distance between the "0" on the second disc and this mark equals one revolution of the first disc the number 8 is placed against this mark.

The dial numbers now have to be converted so as to show the result in square inches, which is done by following squares on inch graph paper

and then drawing a graph showing the relationship between square inches and the numbers on the scale. The units indicated on the scale can then easily be converted to square inches.

Unfortunately space is too limited to mention the other interesting models.

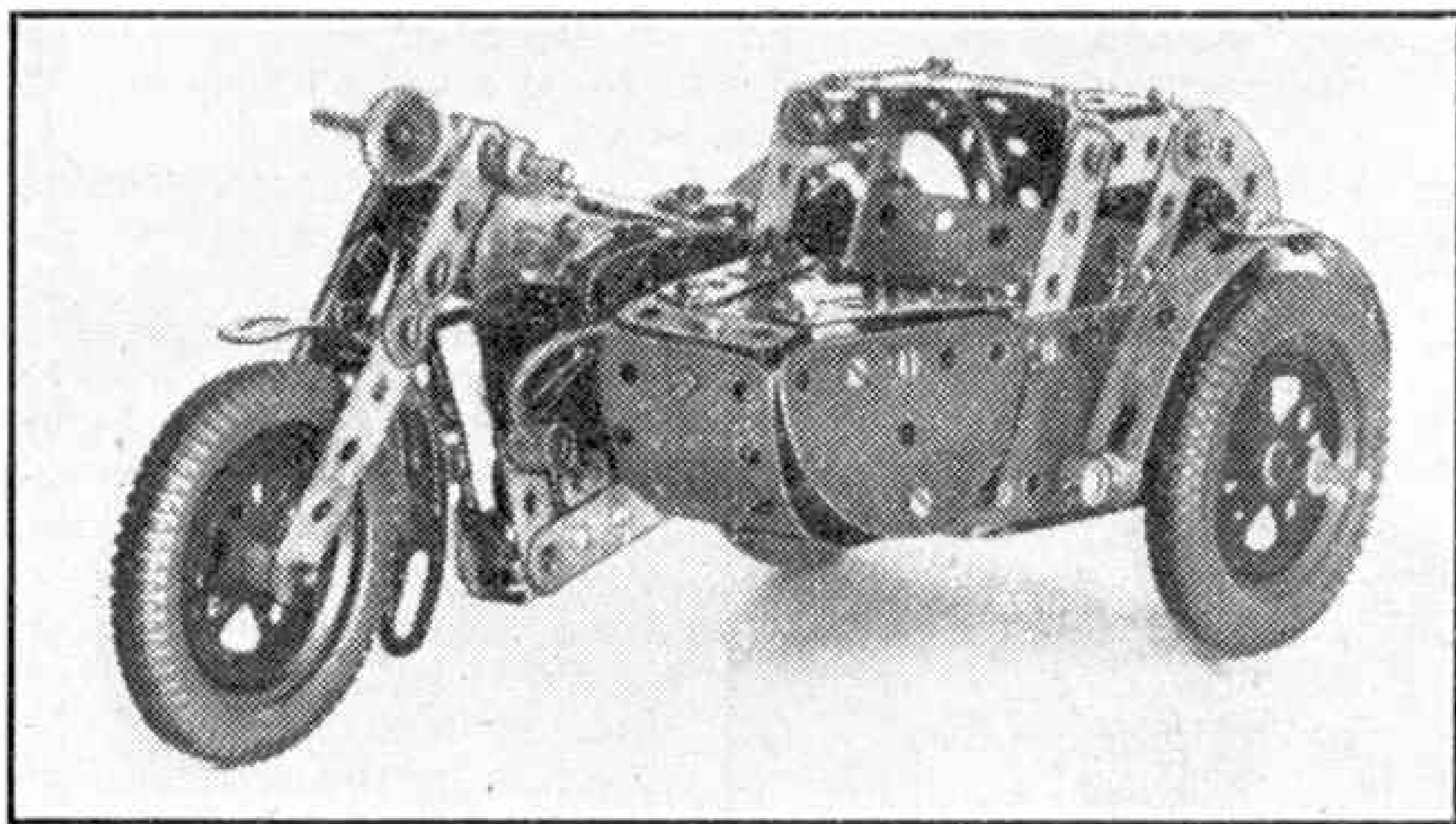


Fig. 3. Eric Howell, Dronfield, Sheffield, won a place in the prize list with this neat model motor cycle combination.

angles to each other, a mechanically rotated table and an arm carrying a tracer wheel that follows the perimeter of the area to be measured. The trolleys are driven by endless belts.

A 1" Pulley Wheel fitted with Tyre is fastened to the end of an 11½" spindle

New Meccano Models

Ballista—Tug-of-War Game

THE model illustrated in Fig. 1 represents a ballista similar to those used by the Roman armies. These war weapons were the ancient counterpart of heavy artillery, and were used for hurling large stones or other missiles at the enemy.

The base of the model consists of two $12\frac{1}{2}$ " Angle Girders joined at one end by a $3\frac{1}{2} \times 2\frac{1}{2}$ " Flanged Plate 1 and at the other by a $3\frac{1}{2}$ " Angle Girder 2. Two Flanged Sector Plates are bolted direct to the Angle Girders immediately behind the Flanged Plate 1, and these serve as supports for the throwing arm. The arm consists of two $12\frac{1}{2}$ " Strips 3, extended by $3\frac{1}{2}$ " Strips overlapped three holes. These Strips are connected at their lower ends by a $1\frac{1}{2} \times \frac{1}{2}$ " Double Angle Strip 4, by a similar part 5 at the centre, and by a Double Bracket at the top. The arm is completed by bolting the $5\frac{1}{2}$ " Strips 6 and 7 to each $12\frac{1}{2}$ " Strip as shown. Strips 7 are connected together at their free ends by a Double Bracket, and an Obtuse Angle Bracket 8 is fixed to the Double Bracket. A 10" heavy Driving Band is fastened to Double Angle Strip 4, and passed over a Rod 11 at the rear of the base.

The operating mechanism is carried by two $3\frac{1}{2} \times 2\frac{1}{2}$ " Flanged Plates bolted to

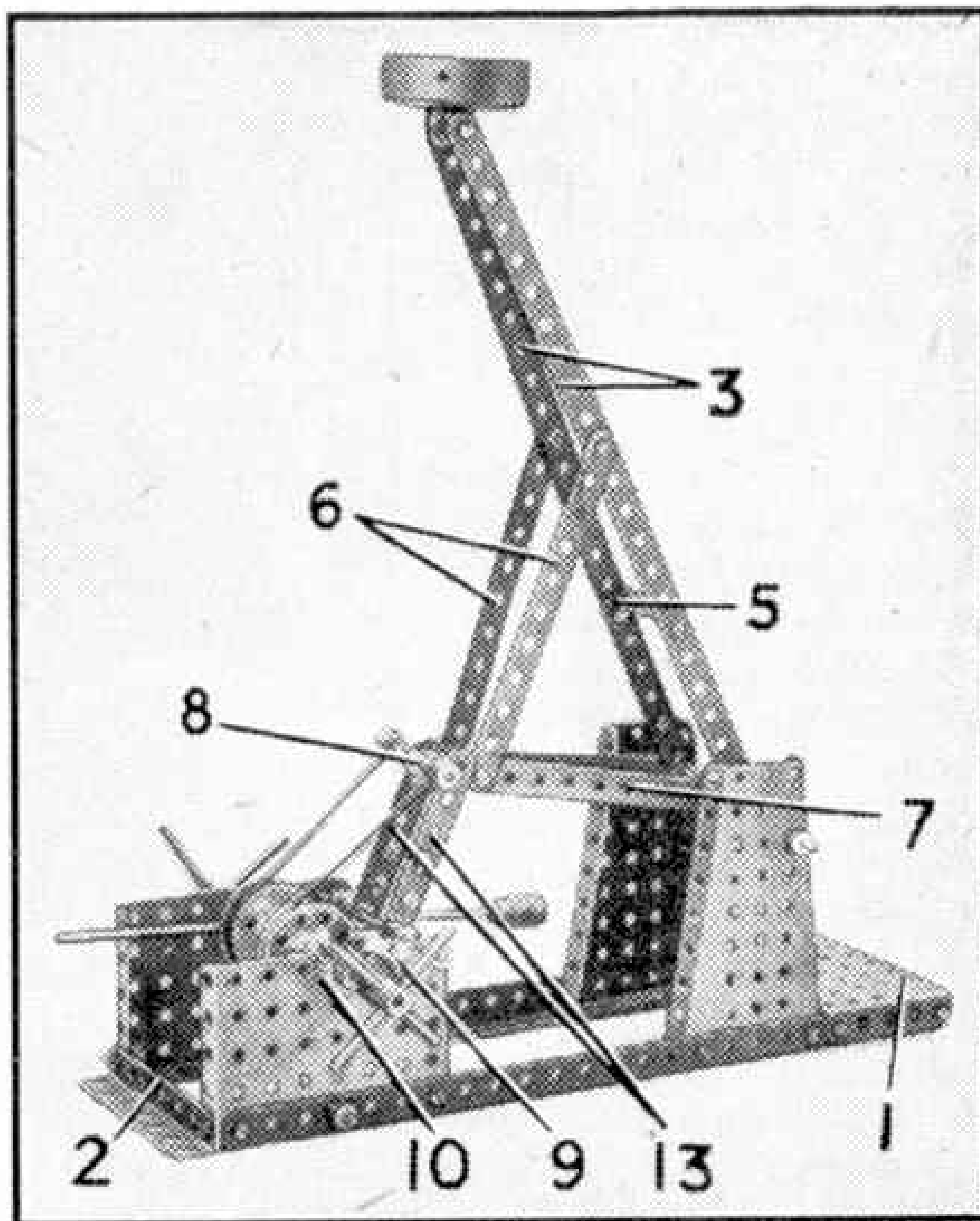


Fig. 1. A model of an early military weapon used by the Roman armies. It is based on the ballista, a kind of catapult designed for hurling stones and rocks at the enemy.

the base. The winding drums are $1\frac{1}{8}$ " Flanged Wheels butted against Bush Wheels, and they are carried on a cross shaft fitted at each end with a handle formed by two $2\frac{1}{2}$ " Rods held in a Coupling. A Pawl 9 is attached by a Pivot Bolt to one of the Flanged Plates, and engages the teeth of a Ratchet Wheel 10 on the cross shaft.

A length of Cord is tied to each winding drum, and fastened at its other end to a 2" Rod 12.

The machine is prepared for firing by passing Rod 12 over the Obtuse Angle Bracket 8. The Cord is then wound in so that the throwing arm is hauled back against the tension of the Driving Band. The arm is held in the firing position by the action of the Pawl and Ratchet Wheel.

The release mechanism is formed by two Cranks extended by $2\frac{1}{2}$ " Strips 13. The Cranks are fixed on a Rod mounted in the Flanged Plates, and arranged so that they can be pressed against Collars on the ends of Rod 12. The Rod carrying the Cranks is fitted

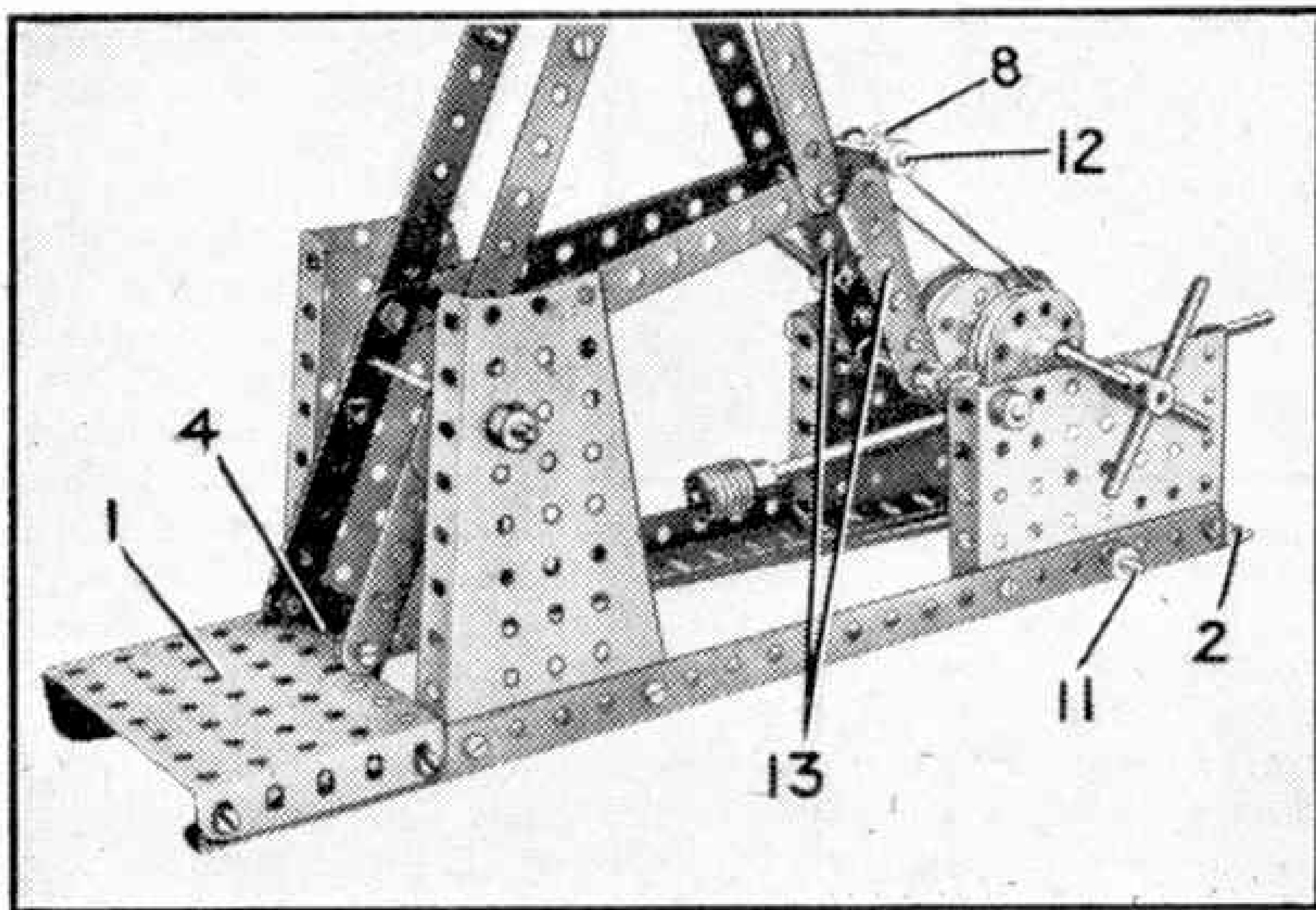


Fig. 2. The operating mechanism of the ballista.

with a Coupling, and the release arm, an 8" Rod weighted at one end by a Worm, is held in the Coupling. When the release arm is depressed the Strips 13 force the Rod 12 away from Obtuse Angle Bracket 8, thus freeing the throwing arm.

In Fig. 3 is shown a simple tug-of-war

12½" Strips. The 12½" Strips are arranged to leave a gap in the centre of the base, and they are bolted at one end to Strip 2 and at the other to a 3½" Flat Girder.

The figures of the two "men" are both constructed similarly, and their legs and arms are posed so as to give the effect

of a hotly contested struggle. The body of each figure is a Coupling 3, and the legs are 2" Strips held tightly by bolts in the Coupling. A 1" Rod fixed in the longitudinal bore of the Coupling carries a Collar 4, to which the 1½" Strips representing the arms are attached by Bolts. The head

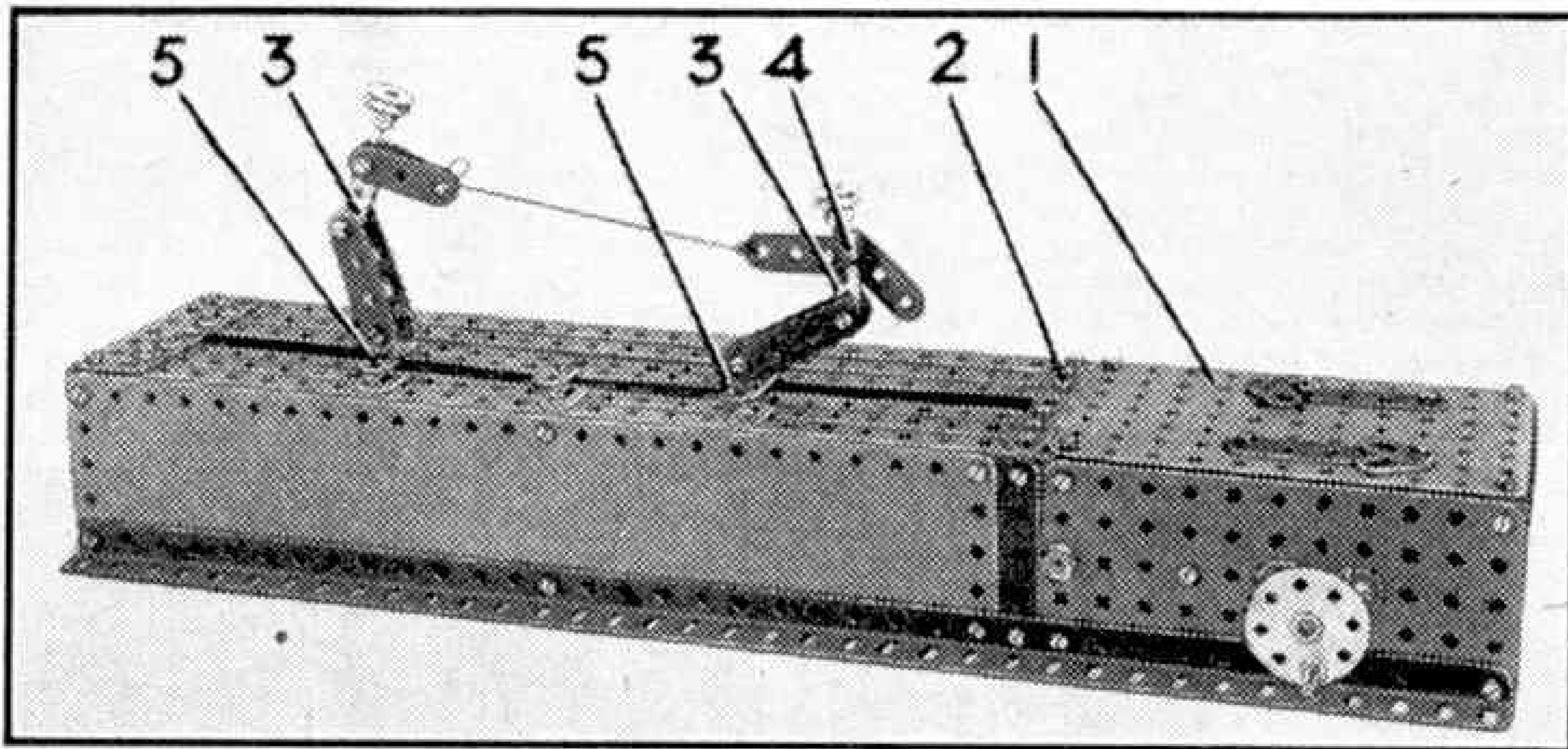


Fig. 3. An amusing "tug-of-war" game that will create a lot of fun.

game for two players that will provide endless amusement for the younger members of the family. The main feature of its design is a differential mechanism, of the kind usually included in the rear axle unit of a motor vehicle. The game is carried out by the players turning, in opposite directions, handles fixed on the ends of the differential axles. This action causes the two opposing figures to move to and fro, and the player turning his handle fastest eventually pulls his opponent's "man" over the line. Speed alone does not always result in a win, however, for in attempting to turn the handle too quickly a player often loses his grip, resulting in a run-away victory for his opponent!

The base of the model is assembled by joining two 18½" Angle Girders at each end by a 3½"×2½" Flanged Plate. The sides are filled in by a 12½"×2½" Strip Plate, a 2½" Strip bolted vertically, and a 5½"×2½" Flat Plate. The upper edge of each side is braced by an 18½" Angle Girder, and the top is completed by a 5½"×3½" Flat Plate 1, a 3½" Strip 2, and four

is a ½" fast Pulley.

Each figure is attached to a Double Bracket bolted tightly to the end hole of a 5½" Strip. The ¾" Bolt fixing the Double Bracket in position carries also a 1½" Strip 5 and a similar Strip 6. Strips 5 and 6 are separated by two Washers, however, and arranged so that Strip 5 is above the 12½" Strips of the base and Strip 6 below them. This allows the assembly carrying the figures to slide freely along the top of the base.

The operating shafts of the differential are mounted in the sides of the base and in Double Bent Strips fixed to the 5½"×2½" Flat Plates. The inner ends of the shafts are free to turn in a Coupling 7, and on one of them a 1½" Bevel Gear 8 is loosely mounted. Two 1"×½" Angle Brackets are attached by ½" Bolts to the Bevel Gear, but are

(Continued on page 94)

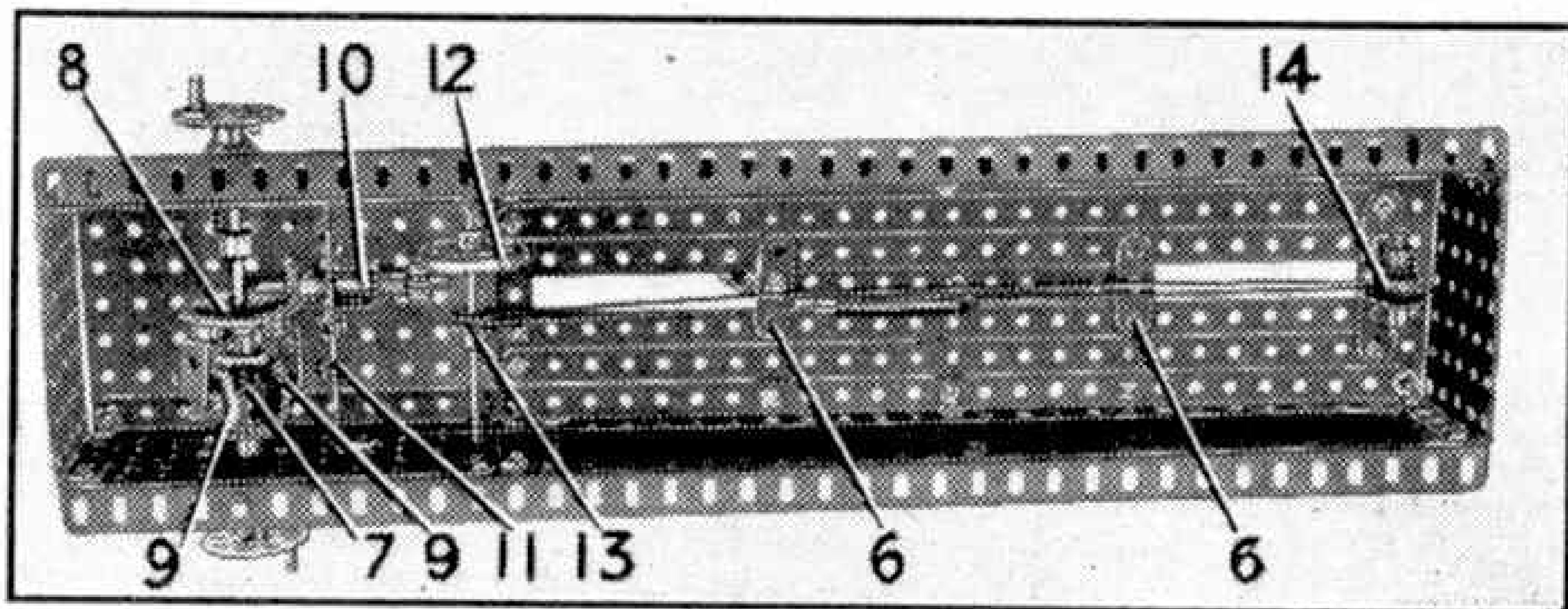


Fig. 4. An inside view of the base of the "tug-of-war" game.



Club and Branch News



WITH THE SECRETARY

New members who have joined since the Christmas Season should now be getting accustomed to Club proceedings. Their advent is a source of strength, but they need encouragement in their earlier days if they are to be of full service. If their number is not large it is a good plan to ask an older member to take a special interest in each of them. Each pair then takes part in Model-building Competitions, Games and other Club pursuits, the older member giving explanations and guidance. When each new member has a Club friend of this kind, he does not take long to grasp the general idea of Club work and soon is ready to take his own part in all Club activities.

If the number of new members is too great for this system to be put into operation a special Junior Section should be formed. An experienced senior makes the best Leader of this Section, and it is a good plan to give him as assistants two or even three members. A special programme is arranged, but this should not differ too greatly from the general programme of the Club, and joint meetings of Seniors and Juniors should be arranged at frequent intervals.

MERIT MEDALLIONS

I am very glad to find that increasing use is being made of the Merit Medallion as a Club Award. With the increase in the number of Clubs, and the greater activity in these organisations generally, there should be more opportunities for presenting the award during 1951 than there have been in any year since the war ended. Members who have won the Medallion treasure it highly, and Leaders will find that full use of the award will help greatly to develop enthusiasm and enterprise.

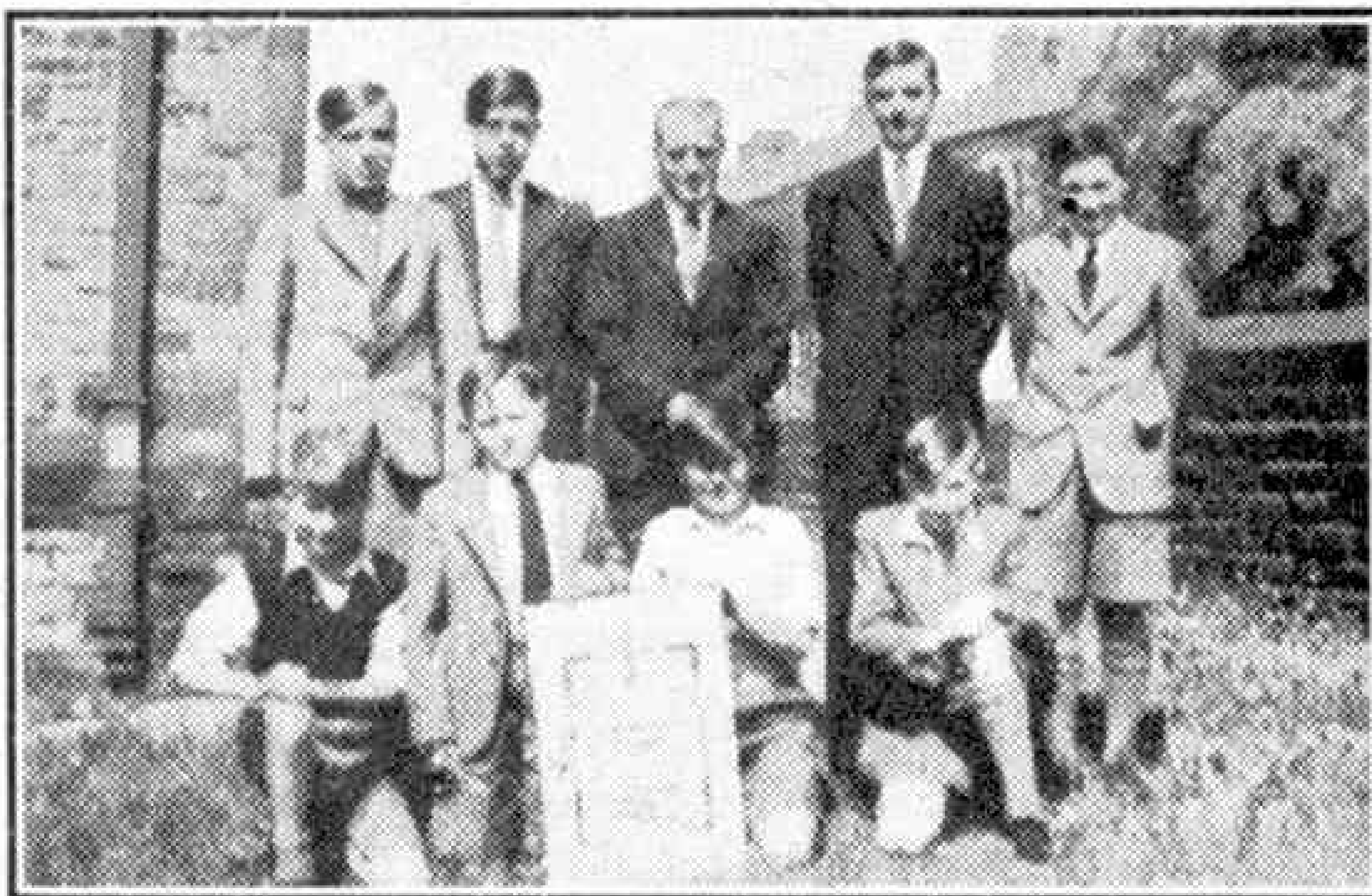
The following are the members whom I have had the pleasure of congratulating on winning the award during the past two years: CRYPT SCHOOL M.C.—C. Candy; D. H. Gettings. GREAVES METHODIST M.C.—G. Ingleby; T. Starr. HASLEMERE AND GODALMING M.C.—S. Fullick; J. Whitmarsh. HORNSEA M.C.—R. W. Harris; D. Hitching. JUNCTION ROAD SCHOOL M.C.—J. Clark; G. Ladell, R. Jordan; K. Wood. MALVERN (JOHANNESBURG) M.C.—D. Menhennet; J. Weaver; MAYLANDS (WESTERN AUSTRALIA) M.C.—E. Bentley; K. Carlson; A. Davies; M. Fallen; C. Hill; B. Lee; B. MacFarlane; A. Payne; J. Stephens; A. Tollos; D. Tyers; R. Tyers; W. Whitney. MORDEN M.C.—G. R. Siviour; G. Viney. NORBURY M.C.—C. W. E. Hall; J. White. SOUTH BIRMINGHAM M.C.—P. Jones; Fred Endsor. THATCHAM M.C.—B. M. J. Ambrose; P. Chapman; E. Smith. THORNTON GRAMMAR SCHOOL M.C.—M. H. Reynard.

CLUB NOTES

LLANDRINDOD WELLS M.C.—Three groups have been formed, for Meccano Model-building, Hornby Railway layout work and making scenery, etc. An excellent model railway has been built up, and work on it is in full swing. Games Night is a weekly event, members enjoying Table Tennis, Darts, Bagatelle, Draughts and Chess. Club roll: 13. *Secretary:* Mr. A. C. W. Carr, Wynsbury, Middleton Street, Llandrindod Wells, Rads.

BURY GRAMMAR SCHOOL M.C.—At a special meeting new members were initiated and the programme settled. On one Model-building Evening reproductions of Dinky Toys and Supertoys were called for, with interesting results. Model aircraft have been constructed and one of these has been flown in the open. Club roll: 36. *Secretary:* Mr. John C. Hart, "Hilldrop," 2, Belgrave Road, Hr. Crumsall, Manchester 8.

EASTWOOD SCHOOL (GLASGOW) M.C.—This newly-affiliated Club has made a good start. Model-building is the chief item in the programme, and at one meeting an excellent range of cranes was on show. A Model-building Competition is held monthly. The Club has



A group of members of the Greaves Methodist Church (Lancaster) M.C., President, Rev. L. Marsden Allen. Mr. H. V. Shackleton, Leader, is seen in the middle of the back row, with T. Starr, Secretary, on his left. This enterprising Club was affiliated in December 1949. Its programme has been distinguished by excellent Meccano Model-building, Talks by members, and well varied Visits and Excursions. Great success also has been achieved in Exhibitions.

a good Library. Club roll: 17. *Secretary:* Mr. James Wright, Holmwood Cottage, Netherlee Road, Cathcart, Glasgow S.4.

BRANCH NEWS

SOUTH CHINGFORD—For a period train operations were suspended to allow track repair to be carried on. Constructional work has included the building of a new station and an engine shed. The new Secretary has built a switchboard for the layout. *Secretary:* Mr. Keith R. White, 136, Westward Road, South Chingford, London E4.

SHEPshed SECONDARY MODERN SCHOOL—During holidays members have made individual trips for train observation on the Leicester-Trent line. Members of the Club helped a local farmer with the potato crop. Intensive work was carried on in preparation for an Exhibition. *Secretary:* Mr. K. Wortley, 2, Brook Street, Shepshed.

WATERLOO (DUBLIN)—Excellent work continues on the usual lines, all operations on the Branch track being carried out in accordance with the timetable and train orders. A very careful working timetable is followed. On one night in the week visitors are welcome, and operations on the layout arouse great interest, particularly since the introduction of railcar services. *Secretary:* Mr. S. J. Carse, 38, Oakley Road, Ranelagh, Dublin.

Fun with Hornby Freight Traffic

HORNBY railway owners scarcely need telling that the running of goods trains in miniature can provide an almost endless amount of fun. One of the first things that the owner of a Hornby goods train set does is to place little oddments in his wagons to imitate loads. With the addition of further stock the scheme develops and by degrees a reasonably realistic freight traffic is built up.

Layout extensions or improvements usually go hand in hand with rolling stock additions so that a siding reserved for goods traffic is invariably an early layout development. On a simple system the siding may have to serve several purposes. In addition to accommodating goods vehicles that are out of use for the time being, as well as those that are being loaded or unloaded, it may sometimes have to act as a refuge for a complete train. In such conditions it will be better to have a loop line connected to the main line so that trains can run straight in or out as required without reversing.

A scheme that can be used with advantage is to have a loop line and to extend this beyond the Points joining the main line. The projecting "spur" formed by extending the straight part of the Points should be finished off by means of Buffer Stops. When this is done the loop is there for running purposes when required, and the end spur can accommodate standing vehicles.

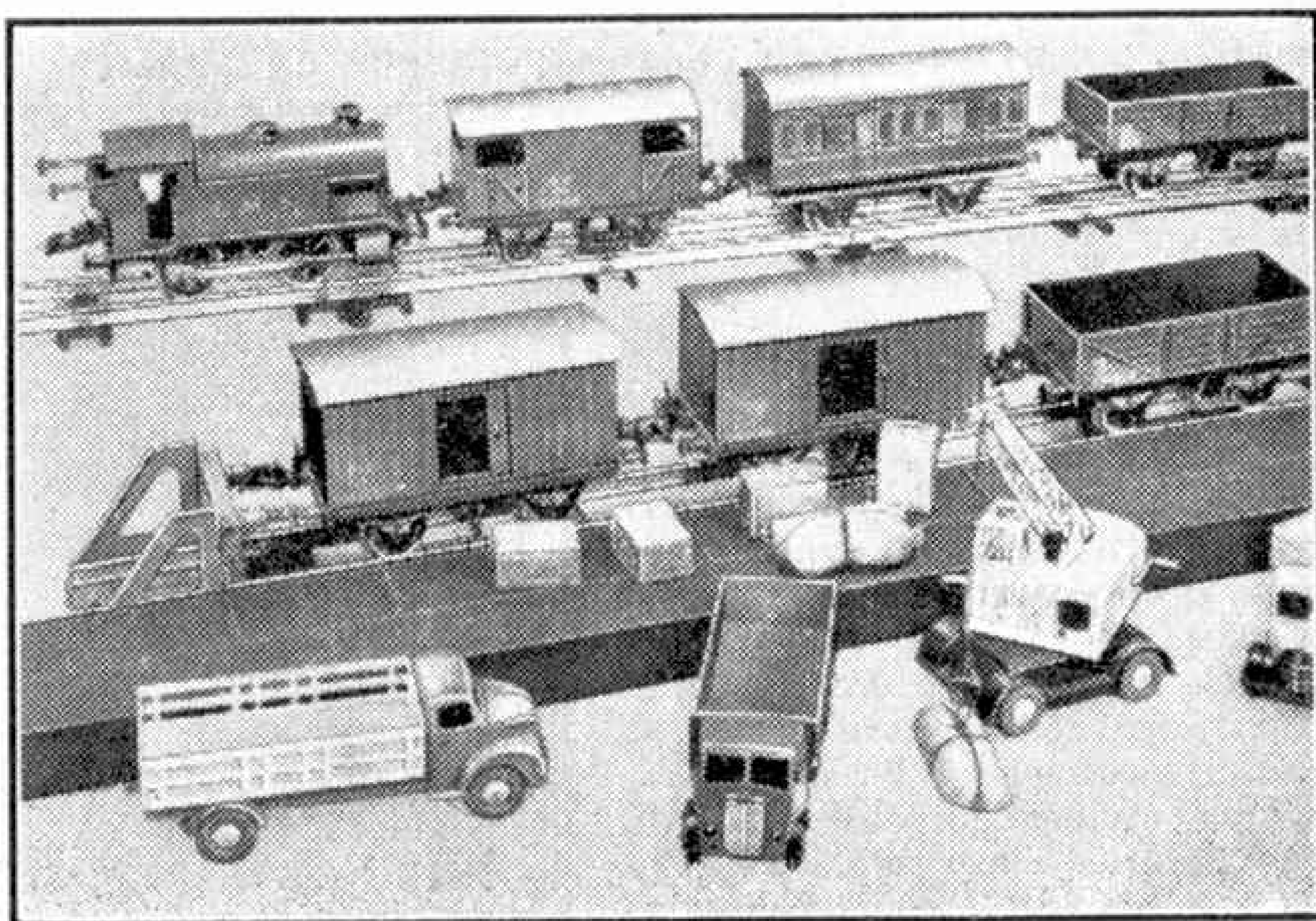
Where the loop can be placed outside the main oval track it is not a bad plan to run such spurs into the corners of the space occupied by the system.

When the track arrangements have been settled the Hornby railway owner will usually endeavour to provide some sort of loading platform where the wagons can be loaded or unloaded. This need not be long and it can be merely a platform alongside the track. Some of the platforms of this kind in actual practice

are of the simplest nature and some will only allow two or three railway vans to come alongside. This is just the situation we have on a miniature railway as shown in the picture on this page.

Here we have next to the Buffer Stops a couple of Hornby Goods Vans. A point that will be noted is that they have sliding doors, these being in the open position in the picture. These sliding doors make an attractive feature for a miniature railway vehicle. They make it possible to place actual loads inside the vans and even if we do not do this frequently, it is fun to be able to open or close the doors. A van standing alongside the platform with its doors open does suggest that something is going on, either loading or unloading. On the other hand the vehicles may be standing empty for the time being. Putting things into a Van is simple enough but it is sometimes a teasing operation to get them out again; here a length of wire with a hooked end can be very useful for fishing out small loads that cannot be reached with the fingers.

Dinky Toys vehicles can be brought up to the road side of the platform to help handle the loads. Typical vehicles are shown in the illustration. Note the Coles Mobile Crane (Dinky Supertoys No. 571) which is busily engaged in lifting a loaded sack from the road to the platform.



[An interesting scene at the loading platform at a Hornby siding. Good use is made of Dinky Toys to help handle the miniature merchandise,

Using Hornby-Dublo Points

POINTS form an essential part of any track layout if interesting working is to be obtained. Hornby-Dublo Points have various features of interest and it is

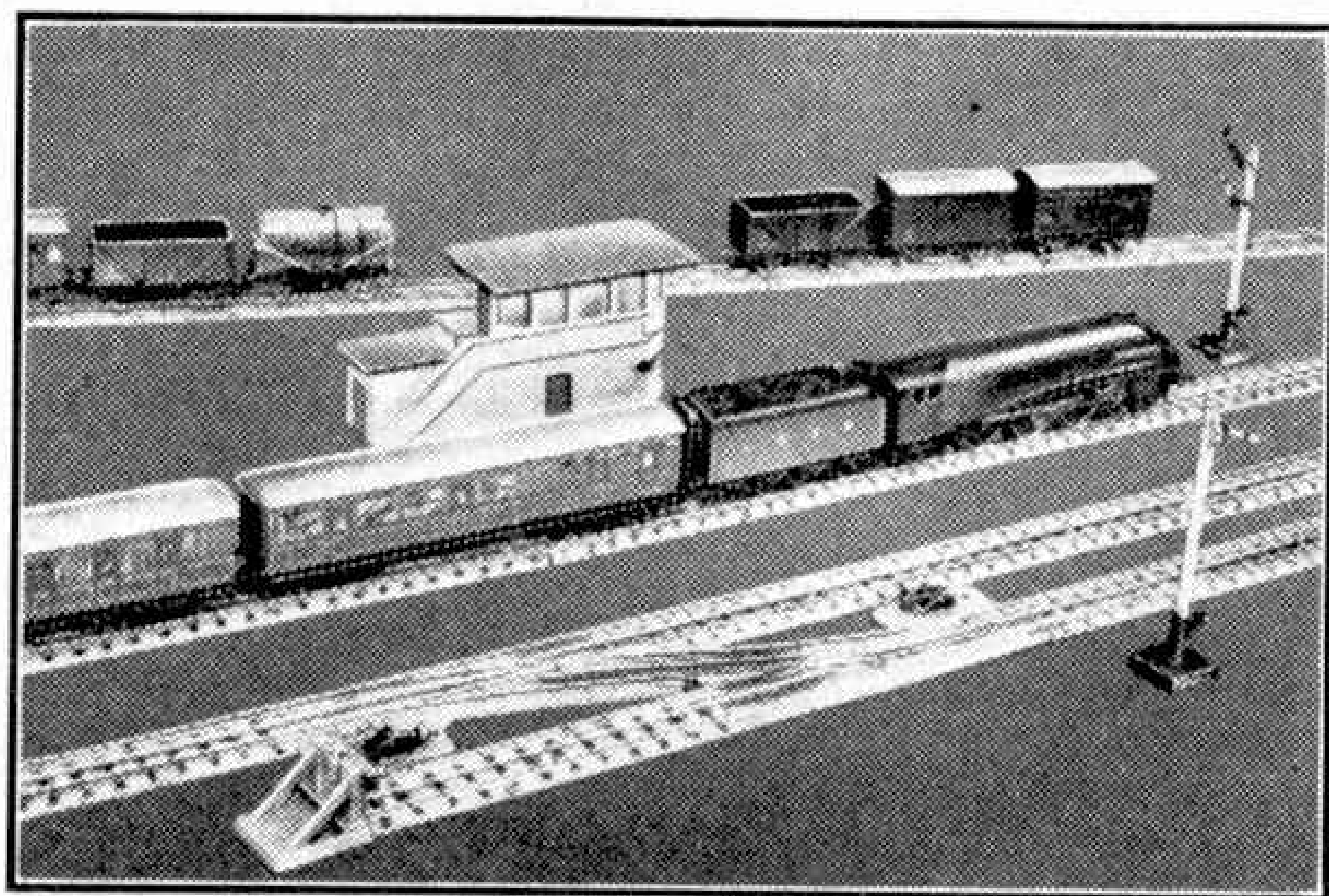
When arranging for the inclusion of Points in a Hornby-Dublo layout it is well to remember that the straight section of the Points is equal in length to a standard

Straight Half Rail. Similarly the length and radius of the curved section of the Points corresponds with that of a standard Curved Half Rail. When two Points of the same "hand" are used together to form a crossover between two tracks the addition of a Straight Half Rail to each of the Points brings the ends of the whole unit opposite one another and makes it equal in length to a standard Straight Rail. This makes it easy to insert a crossover into an existing layout.

When two Points are used together in this way the tracks that they connect

are set apart by the standard distance adopted for double track in Hornby-Dublo, the centre to centre measurement being $2\frac{1}{2}$ in. This dimension is worth while remembering when planning additions or extensions to a single-track system.

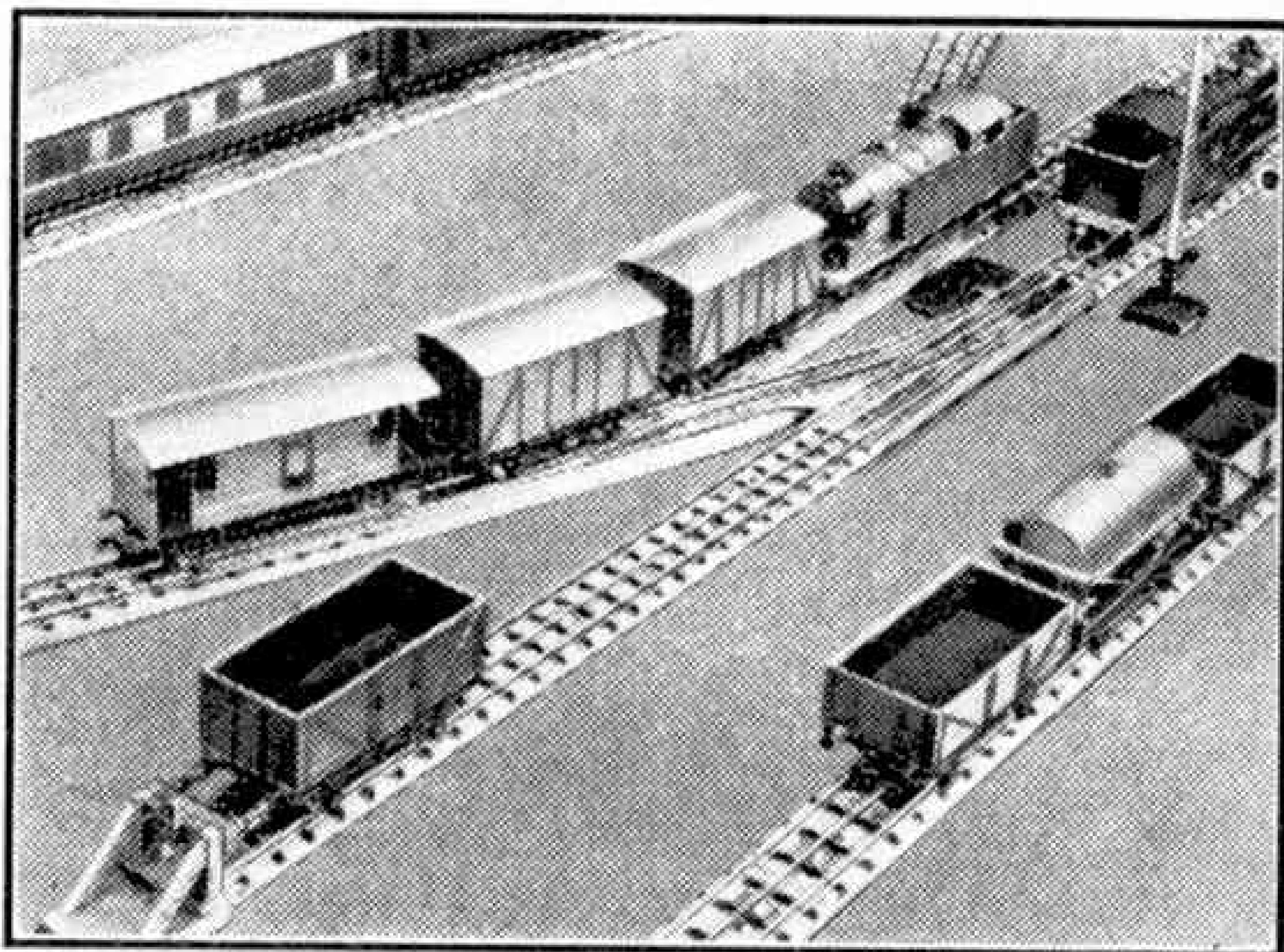
An interesting instance of the use of Points forming a crossover is shown in the upper illustration. The crossover connects a running loop with a main line.



A crossover formed of two Hornby-Dublo Points connecting a loop line with the main line. Note the short spur terminated by a Buffer Stop.

well that those using them should be acquainted with their characteristics. At present Hornby-Dublo Points of the plain turnout kind only are available; that is to say a curved branch diverges from the straight main line. Points are known as Right-Hand or Left-Hand according to the direction that the branch takes when seen from an approaching train to which the Points offer a choice of routes. When traffic normally approaches points in this direction they are said to be facing points; when traffic approaches in the opposite direction they are known as trailing points.

Those who are just starting their Hornby-Dublo careers are sometimes puzzled as to how current is fed to the branch line or siding to which the Points lead. The centre conductor rail is necessarily interrupted because of the presence of the switch rails at the Points, but these separate sections of centre rail are connected by insulated wiring underneath the base of the Points. The current supply to the branch line or siding is thus automatic when Points are included in the layout.



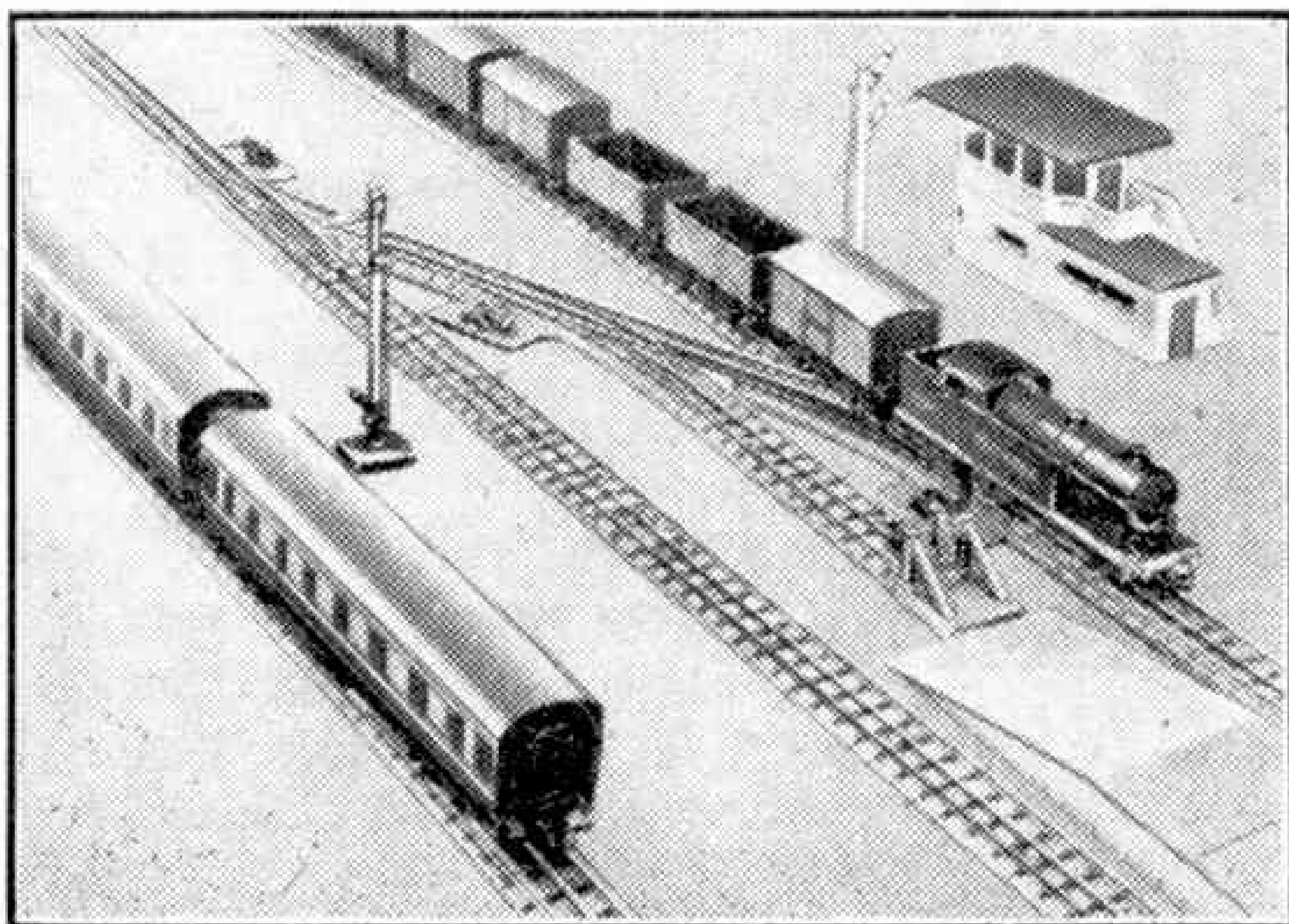
An unusual combination of Points in the sidings of a Hornby-Dublo layout.

Stations and Sidings in Hornby-Dublo

WHEN the Hornby-Dublo beginner has become used to the running of his train he usually endeavours to extend his simple oval track. The layout is made longer and possibly wider, and points are added to provide sidings and loops, so that the track as a whole becomes more suitable for varied operations.

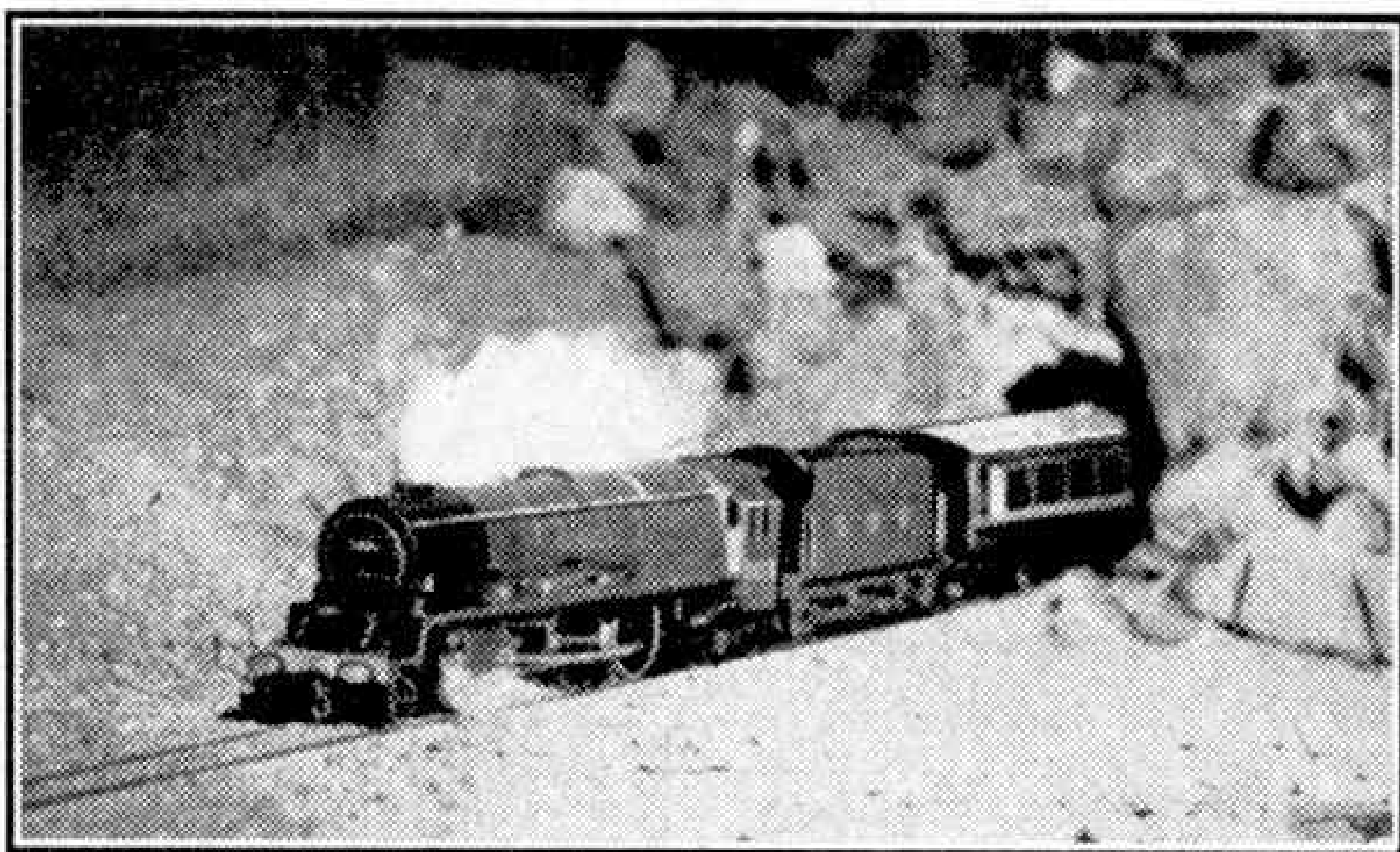
By the time this stage is reached it is realised that the railway does not "go anywhere"; there is no station where the trains can stop or start. So if possible either the Hornby-Dublo Through Station or the Island Platform is added to the layout. The trains now have somewhere to serve and the railway has some purpose. The special features of the Hornby-Dublo station and Island Platform were described in the "M.M." in September last year, and readers will remember that the overall length of the platforms of these accessories is equal to two standard EDB1 Straight Rails. This makes it easily possible to see how either component will fit into a given layout scheme.

A point that crops up in connection with the Island Platform, when it is used between two tracks, is the distance apart of the tracks serving the platform faces.



A short siding between the two main tracks served by the Hornby-Dublo Island Platform.

If it is intended to connect the tracks by means of a crossover it will be found that a Straight Half Rail used between the Points forming the crossover gives a suitable setting to the tracks. If instead of a Half Rail we use the straight portion



This tunnel scene by "M.M." reader H. A. Probin is an interesting example of table-top photography applied to a Hornby-Dublo Train.

of another set of Points, as shown in our lower illustration, this would make no difference to the up and down roads, but the curved portion of this third set could be made to give access to a useful siding between the main lines. Such a siding will be valuable for the storage of rolling stock. Vehicles that stand there can quickly be moved to either main line, and they can just as easily be stowed away in the siding when their running is over.

Occasionally it is useful to have a short section of this kind just long enough to hold a Hornby-Dublo tank locomotive. An engine can wait there in between turns of duty. An Isolating Rail is then included in the siding so that the engine can stand there while traffic is passing on the main line.

If an Uncoupling Rail can be included in the short section the operator can detach odd vehicles from trains stopping at the station and leave them in the sidings. Such vehicles can be taken away again as a regular practice later in the operations.

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Stamp Collecting

The Canterbury Centennial Issue

By F. Riley, B.Sc.

NEW ZEALAND, a country popular with "M.M." stamp collecting readers, has already produced many interesting commemorative stamps, and now has issued a fine set of five values celebrating the 100th anniversary of the foundation of the province of Canterbury, in the South Island. The designs are good, and the engraving and printing are excellent. Each stamp is in two colours, and altogether the set is really attractive; while each of these designs is of outstanding interest in itself and as a reminder of the events of 100 years ago.



For the beginning of the story it is best to turn to the 2d. value, which marks a dramatic moment in the settlement

of Canterbury province. The pioneers of this event arrived in four ships in 1850, landing at the site where the port of Lyttleton now stands. From there they climbed a hill, from the summit of which they saw for the first time the great plains where immense numbers of splendid sheep were to be reared in the years to come. On the track they followed, at the summit of the hill, there is now a stone memorial bearing the words "They passed this way."

This memorial forms the principal feature of the design of the 2d. stamp, on which are to be seen pioneer women and children looking out over the new land they had come to occupy. The scene itself is in deep carmine, and the women and children are in orange.

The settlement of the new colony was brought about by Edward Gibbon Wakefield, who had already played an important part in colonising South Australia. In 1837 he became Managing Director of the New Zealand Association, and it was largely through his efforts that Britain forestalled France in annexing New Zealand. Later he became associated with a church scheme for the settlement of colonists in South Island, and he was among those who sailed in the four ships that reached Lyttleton in 1850. With him was John Robert Godley, whose work as Governor from 1850 till 1852 ensured the future progress of the colony.

The design of the 3d. stamp of the Centennial issue celebrates the work of this first Governor of Canterbury by reproducing his statue in



Cathedral Square, Christchurch, the capital city of the province. The greater part of the stamp is in dark blue, but in pale blue behind the figure of Godley is a representation of the "Cressy," one of the four pioneer ships, with a native canoe approaching it.

The city of Christchurch, often described as the most beautiful in New Zealand, became the centre and capital of the rich and fertile province of Canterbury created by the settlers from the empty plains. The first secondary school in New Zealand was founded there in 1850, and the first train in the country ran between Christchurch and Ferrymead, in the direction of Lyttleton, in 1863. This line was just under three miles long and was of 5ft. 3 in. gauge, like that of the tracks of South Australia and Victoria. The next step was to bore a tunnel under the hill over which the pioneers had come in order to reach Lyttleton. This was New Zealand's first railway tunnel. It was a mile and a half long and remained the longest in the country until the opening of the Otira Tunnel, about 5½ miles in length, under the mountains in the west of the South Island. The Lyttleton tunnel was not opened until 1867,

by which time the railway had been extended southward from Christchurch itself. This extension now forms part of the main line to Dunedin. The gauge of these lines was changed to 3 ft. 6 in. when the Federal Government took over the railways.

Christchurch is directly concerned with the 1d. and 6d. stamps of the Centennial issue, which illustrate Christchurch Cathedral and the buildings of Canterbury University College.

The Cathedral, with its beautiful spire, is the most impressive memorial to the pioneers of Canterbury. Its foundation stone was laid in 1864, but the building was not completed until 1904. The city of Christchurch itself is famous for its many large and beautiful English trees, and there is an indication of these in the design of the 6d. stamp, which shows the Memorial Hall of the University College. The colours of the 1d. and 6d.

stamps are grey-green and chocolate-brown respectively, with the sky in light blue in each case.

Finally comes the 1/- value.

For the design of this the artist has used an aerial view of Timaru, the city and port of South Canterbury. Timaru has a splendid harbour, and is famous also for Caroline Bay, which has helped to make the city one of the best known holiday resorts of the South Island. An aeroplane is seen flying over the harbour and the coat of arms of Timaru is shown in the centre of the base of the design. This stamp shows the city in deep maroon, with sea and sky in light blue.



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Stamp Gossip and Notes on New Issues

By F. E. Metcalfe

COLLECTORS of K.G. VI stamps have had a grand innings lately, for they have been able to add a number of attractive sets to their collections. Better still, most of these sets have been well within the reach of collectors whose pockets are rather shallow, which means most of us these days.

Pride of place among these recent additions must be given to the set of these issued by Malta in honour of Princess Elizabeth. The stamps came out on 1st December. There were three in the set, and the occasions commemorated were the visits the Princess has made to the island. Collectors will note the George Cross incorporated in the design; but the usual Maltese Cross, which has figured in designs of previous sets from the island, is missing. This has probably been omitted to leave the portrait as the unchallenged motif of the design, but this has perhaps been rather overdone and the portrait itself could have shown more character. One thing is certain, it's a long time since any set has proved so popular, and dealers report record sales.

Another British Colonial commemorative set of a very different complexion was that released on 1st November to commemorate the tercentenary of British settlement in Anguilla. Probably because there was not time to design a new set—in Europe they can and do produce magnificent sets in a month, but we don't work like that at home—six of the existing stamps were overprinted, as shown on the 3d. stamp illustrated. Apparently there had been a special printing, for the perforation of the 3d., 6d. and 1/- stamps has changed from 14 to $13\frac{1}{2} \times 12\frac{1}{2}$, so as these overprinted stamps went off sale in January it will be interesting to see if stamps of the same



perforation replace them. Collectors as a rule do not like overprinted stamps, so it is not surprising that these "Anguilla" overprints are not selling anything like as well as the Malta set. Recently reference was made to the stamps of Canada, and how a cheap and attractive collection could be formed of this country if only used copies were gathered. Apparently Canada intends to go on issuing interesting stamps, for the Post Office has invited designs depicting the following: "Secondary Industries of Canada," "Canadian Wild Flowers"—how popular these flower designs are nowadays—"Wild Canadian Animals," "Portraits of Canadian Indians or Esquimaux," and "Outdoor Activities and Scenes." If all that does not give scope to artists, nothing could.

Speaking of Canadian stamps, a reader wants to

know just what the status is of the imperforate stamps issued during the past few years. He says that he saw an auction catalogue that was half full of illustrations of these stamps. The writer of these notes rather thinks that he once mentioned the subject before, but anyhow Canada is a very popular country with collectors and there may be some who would also like to hear the answer.



The truth is that these imperforate stamps are quite bona fide, unlike those Australian stamps that recently appeared on the market, and until recently five sheets of each value were left imperforate. One sheet was given to the King and another placed in the archives of the Post Office; the other three, 150 stamps, were distributed among officials and it is these that

get on to the market and into the stamp auctions. They are interesting varieties, of a specific philatelic category, and some are worth up to £50 each. Alas, one is never likely to find any in a sixpenny packet.

The new Commonwealth Catalogue of K.G. VI Stamps is proving exceedingly popular, and the number sold to America alone is as big as was expected would be sold altogether. This is rather significant, for when the Crown Agents in London, who have a philatelic bureau there for the sale of current colonial stamps to registered dealers, announced that they were willing to sell the same stamps to American dealers via the Washington bureau, it was thought that this step might even be harmful to the sale of the stamps. It seems obvious that quite the contrary is the case, and collectors of stamps of the present reign must feel very happy that their cousins in the U.S.A. are joining them in collecting the same group of stamps. Recently a big stamp exhibition was held in Johannesburg and a collector was able to win there a silver gilt medal, a high award indeed, with his collection of K.G. VI stamps. Quite a change from the London Exhibition held a few months ago. There a collection of that group would not have stood much chance, but then South Africa always was a progressive philatelic country.

Australia too has had its exhibition and more than 12,000 people visited it. More than a million stamps were said to be on display—we wonder who had the job of counting them—and they were supposed to be worth £500,000. It would appear that due regard had been paid to the propaganda value of such an affair, though of course the work of Australia's well known philatelists did not go unrewarded as far as awards were concerned. The King himself sent a number of sheets from his collection, and apparently these had been greatly admired and the gesture much appreciated. Perhaps now they will not be so hard on our team in Tests!

The final illustration is of a stamp from Israel. Who can guess the kind of "animal" depicted? Israel is emitting a lot of stamps, but most of them are interesting as well as handsome, and a beautiful collection can be made from them. Apparently there are some very good stamp designers out there. Their products are exceedingly popular in the U.S.A., and the cult is growing rapidly in Great Britain. If you are interested in taking up a new country, which is certain to produce some very good stamps, you would be well advised to consider Israel.

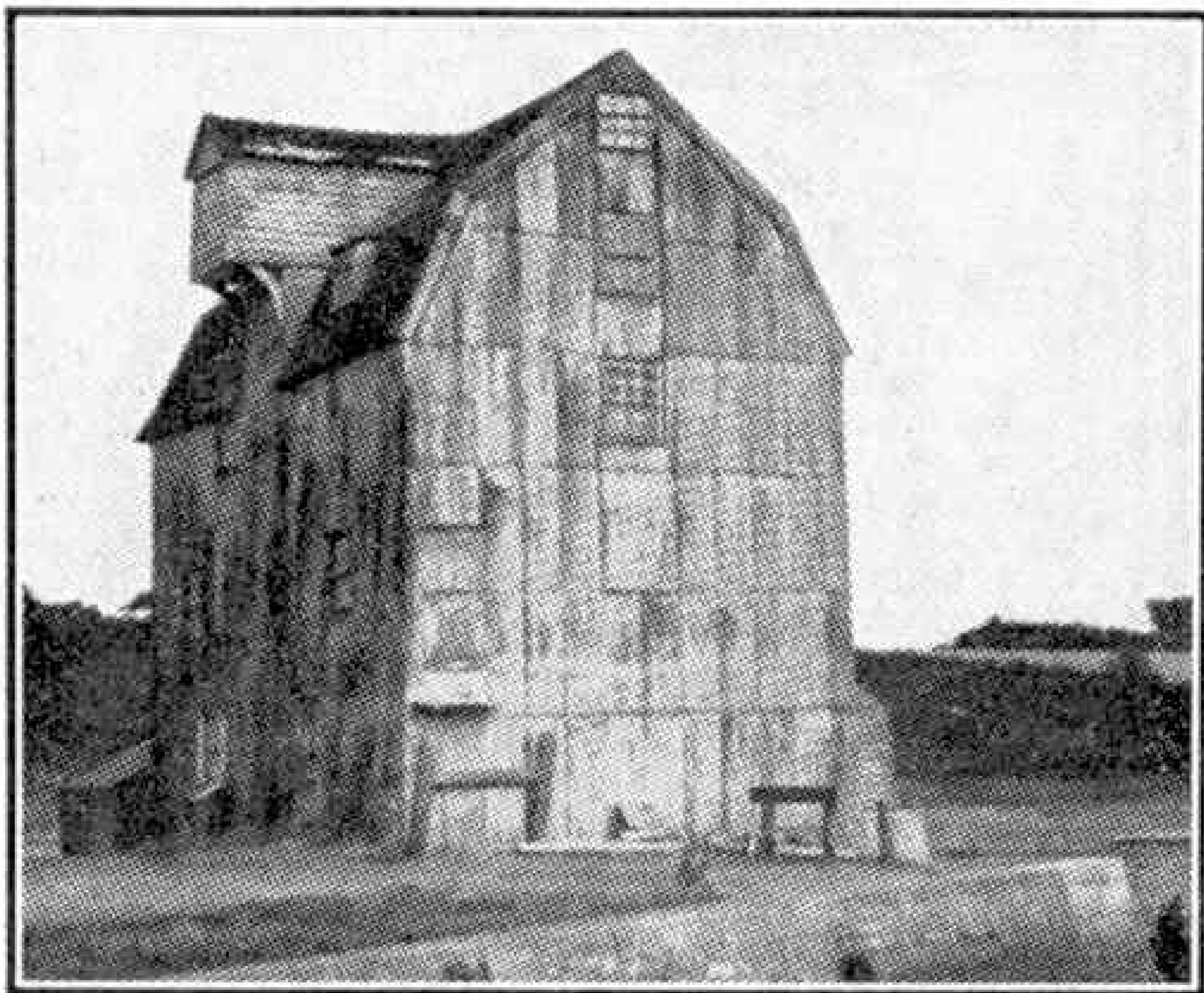


From Our Readers

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

THE TIDAL MILL AT WOODBRIDGE

One of the oldest and most interesting mills in Britain to-day is the Tidal Mill at Woodbridge, Suffolk, by the estuary of the River Deben. This is still in use. Its site was first mentioned in 1170,



The tidal mill at Woodbridge, Suffolk. Photograph by E. Emrys Jones, Old Colwyn.

when the Canons of Woodbridge Priory gave some land to a Baldwin de Ufford so that he could have easier access to his mill. After the dissolution of the monasteries by Henry VIII, the mill passed into various hands. Between 1854 and 1874 one Alfred Hayward bought it, and it is still referred to locally as Hayward's Mill.

The mill is served by a pond whose area is $7\frac{1}{2}$ acres, with a 6 ft. head, which fills when the tide rises. A post is used to indicate the height of the tide and the head of water available. The wooden wheel, which is in a small wheel-house outside the mill, is 20 ft. in diameter and 5 ft. 10 in. wide, with wooden buckets, and is mounted on an oak shaft.

A rear vertical penstock is raised and allows the water to run over a sluice to flow into the buckets about half way up the wheel. The wheel then is said to be breast-shot. The sluice is in two horizontal sections and is independently controlled. When the level of the water has sunk sufficiently, the top half is raised about 13 in., and the sluice is raised completely. Then the wheel becomes undershot, the water flowing into the buckets as they near their lowest positions. The mill can only work for the comparatively brief periods when the tide serves.

Four pairs of stones are driven on the first floor. These are controlled by a single pair of governors driven from the 22 in. diameter oak upright shaft.

E. EMRYS JONES (Old Colwyn).

SWEETHEART ABBEY

A few miles outside the border town of Dumfries stands the small village of New Abbey. This is named after the red-stoned New Abbey, more commonly called Sweetheart Abbey, which is near it. Sweetheart Abbey is rather a strange name. I discovered that it was so called because John Baliol's heart was buried there. Apparently when he died his widow, Devorguilla, had his heart cut out and embalmed, and until her death she carried it around with her.

The Abbey, which is shown in the accompanying illustration, is a 13th Century Cistercian house founded by Devorguilla. After a long widowhood with the heart, which she called her "silent sweet companion," she was laid to rest to the right of the pulpit in the Abbey. John Baliol, her husband, who died in 1269, endowed several scholarships in Oxford and was the founder of Balliol College, which was completed by Devorguilla.

T. HUNTER (Edinburgh).

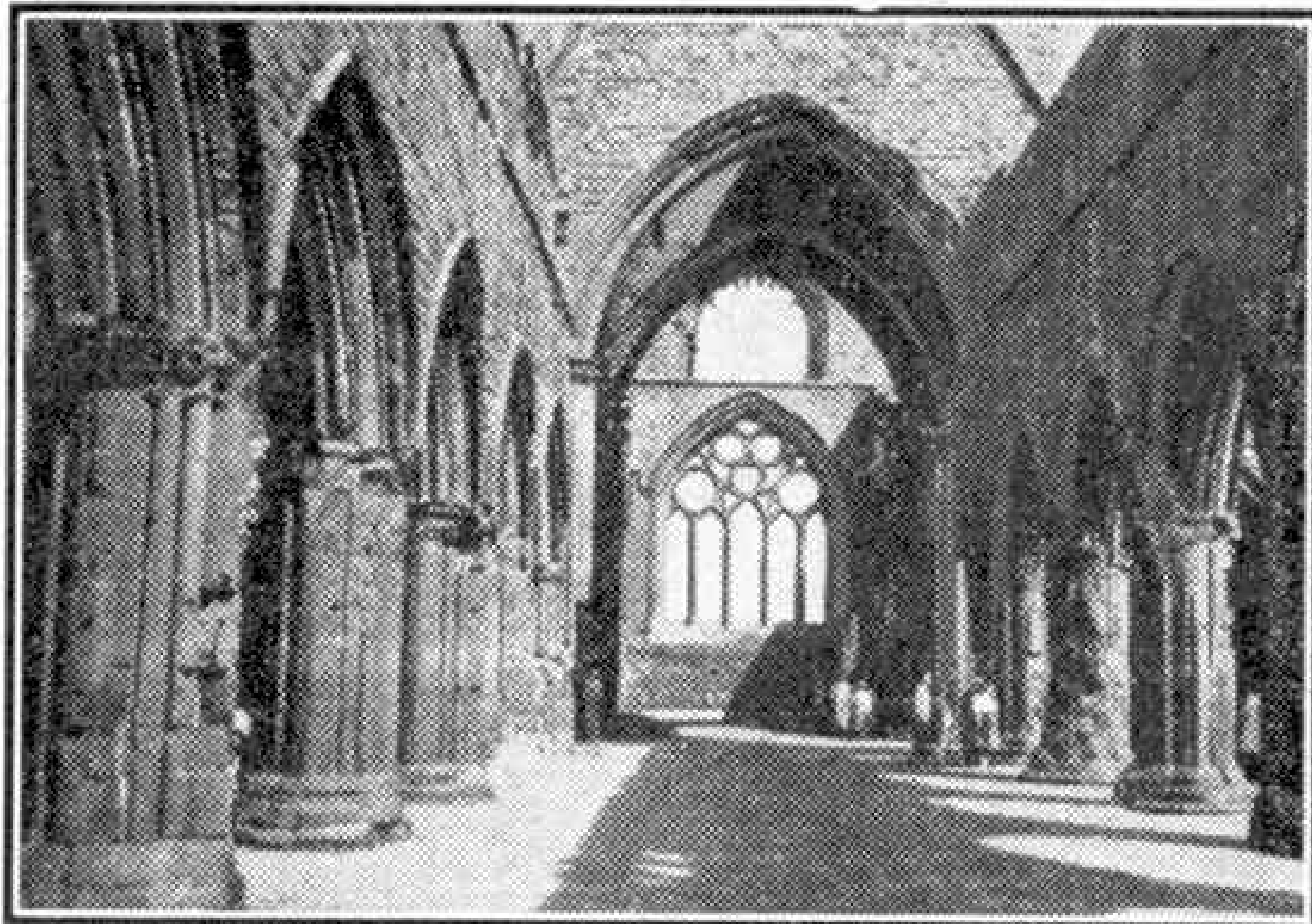
CLIMBING TABLE MOUNTAIN

When with two friends I climbed Table Mountain, we followed the Pipe Track, along which runs the metal pipe from reservoirs that supply part of Cape Town's water. This path, on the Camps Bay side of the mountain, facing the Atlantic, is a convenient start for many climbs. There are various ravines and buttresses. We climbed up Slangolie Ravine, the last one to be reached along the Pipe Track, and then walked back along the top of the mountain.

Standing near the cable station, the upper end of the cableway, we gazed out over the Atlantic Ocean and down into Cape Town, 3,500 ft. almost vertically below us.

The highest point on Table Mountain is Maclear's Beacon, 3,566 ft. above sea level. On our way back we descended Platteklip Gorge, a deep cut that divides the mountain into the Eastern and Western tables.

G. KENCK (Bellville, Cape).



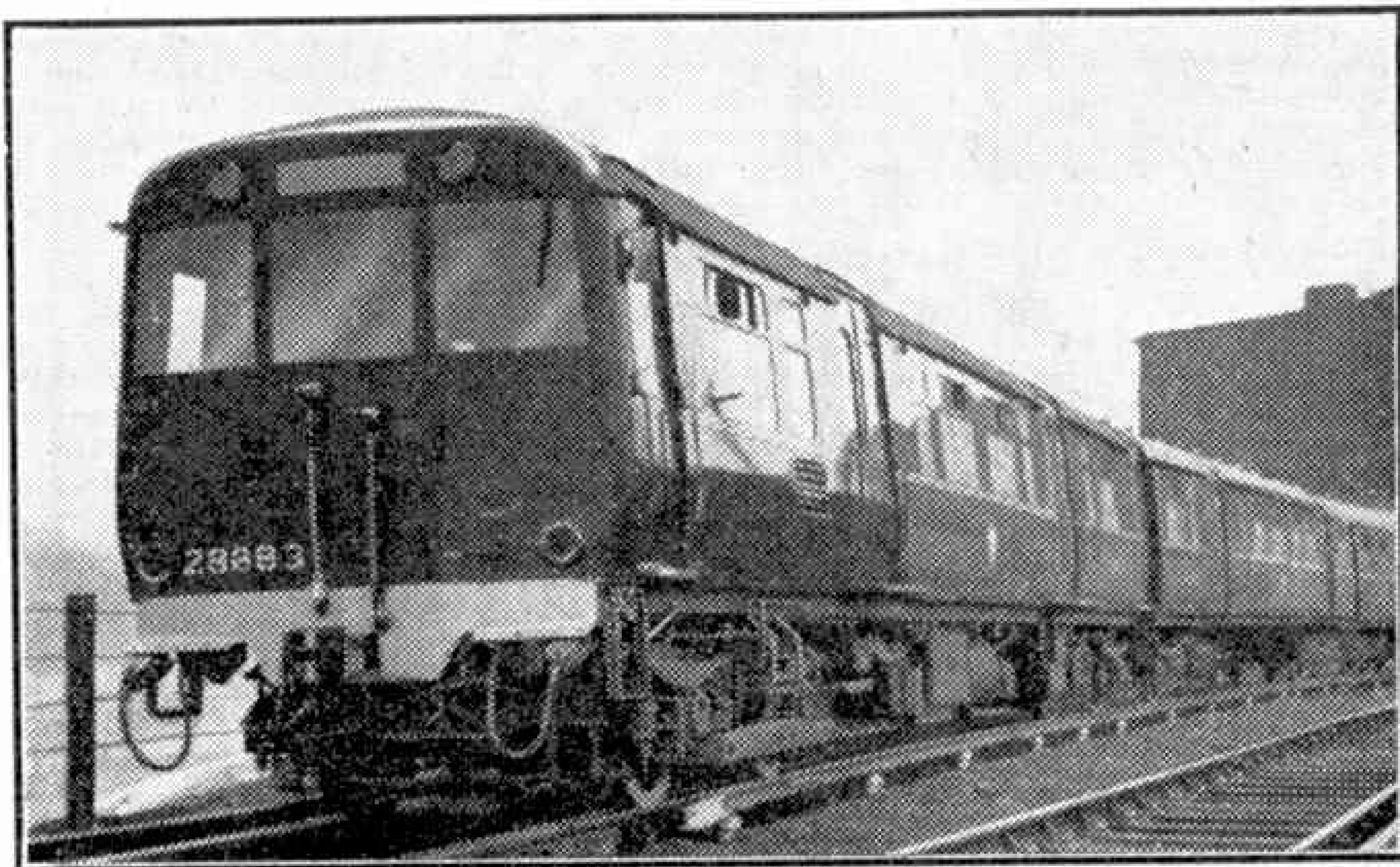
Sweetheart Abbey, Dumfriesshire.

Competitions! Open To All Readers

Prize-winning entries in "M.M." competitions become the property of Meccano Ltd. Unsuccessful entries in photographic, drawing and similar contests will be returned if suitable stamped addressed envelopes or wrappers are enclosed with them.

An "All-Electric" Railway Quiz

This month we are breaking away from our usual type of "quiz," which covers railways in general, to present an "all-electric" contest. Below are 10 questions, all relating to electric railways in Britain, and we have no doubt that many readers will soon be busy supplying the answers to these and will find the task a pleasant one. The picture on this page shows an electric train of recent times and provides a clue to the solution to the first problem. So, keen-eyed readers, here is your chance to make a good start!



1. Name three lines of British Railways—more if you can—where electric trains of two or more former systems can be seen together.
2. Which electric lines have special cars for the conveyance of miscellaneous goods?
3. Where are ex-Lancashire and Yorkshire electric trains still in service?
4. There was an electric express locomotive built by a pre-grouping railway company. What was its wheel arrangement, number, and the name of its designer?
5. Which railway was known as the "Twopenny Tube"? In which line of railways is it included to-day?
6. Which British electric railway runs partly overhead and partly underground?
7. A British Railways electric locomotive has been

at work in another country. Which is it and where has it been running?

8. Where are tramcars operated on British Railways?
9. What is the name of the only all-Pullman electric train running in Britain? Between which points does it operate?
10. Which city operates its own underground electric railway?

The competition will be divided into the usual two sections, for Home and Overseas readers respectively, and in each there will be prizes to the value of 21/-, 15/- and 10/6, with consolation prizes for other deserving efforts. Entries should be addressed "February Railway Quiz, Meccano Magazine, Binns Road, Liverpool 13." Closing dates: Home Section, 31st March; Overseas Section, 30th June.

"Go As You Please" Drawing Contest

Last month we had a painting competition with a locomotive as its subject. This of course appealed specially to colour enthusiasts and to railway fans, so this month we introduce a drawing competition, in which colour is not required and every entrant can choose his own subject. It is in fact a "Go as you please" drawing competition in which every reader can join.

Entrants in this competition are simply asked to submit drawings, either in pencil or in pen and ink, of some scene or subject they feel they would like to reproduce on paper. On the back of his entry the competitor must write his name and address, with a short note or title stating exactly what the drawing represents. To give our younger readers every chance of winning prizes there will be two sections, one for readers of 15 years of age or more, and the other for those under 15, so entrants also must state their ages.

There will be separate contests for Home and Overseas readers, with the two age sections already mentioned in each. The prizes to be awarded in each

of the different sections of the Contest will be 21/-, 15/- and 10/6, and there will be Consolation Prizes for other drawings that are deserving of recognition. The closing dates in this Contest are 31st March in the Home Section, and 30th June in the Overseas Section.

February Photographic Contest

The second of our 1951 series of photographic contests is a general one, in which we invite readers to send in prints of any subject. There are only two conditions—1, that the photograph must have been taken by the competitor, and 2, that on the back of each print must be stated exactly what the photograph represents.

The Competition will be in two sections, A for readers aged 16 and over, and B for those under 16. Each competitor must state in which section his photograph is entered. There will be separate Overseas Sections, and in each section prizes of 21/-, 15/- and 10/6 will be awarded. Entries should be addressed "February Photographic Contest, Meccano Magazine, Binns Road, Liverpool 13." Closing dates: Home Section: 28th February; Overseas Section: 31st May.

Power from the Glens—(Continued from page 51)

observed on their way upstream through windows let into the wall of one of the pools.

Other stations completed or under construction are Morar, Lochalsh, Glen Affric and Glen Shira. The total capacity of the 13 stations at present building will be 428,450 kW. Although the initial costs of such stations as these are very high compared with those of steam generating stations, the operation costs are very much lower, since no coal will have to be handled or paid for.

The Hydro-Electric Board's plan is a long term one, the object of which is to bring prosperity to the now sadly depopulated Highlands. In remote parts to which it will be impossible to transmit electricity, auxiliary diesel generators are being installed.

Trinity House To-Day—(Continued from page 62)

Each district is in charge of a Superintendent, using the depot as his headquarters. He is assisted by a staff of clerks and storekeepers who look after the spare buoys, chain cables for light vessels and other gear needed to maintain the service. The depot staffs, apart from the skilled repair hands, number about 100 men. Trinity House is responsible for the upkeep and efficiency of nearly 100 lighthouses and more than 40 light vessels, in addition to 600 buoys and about 50 unlighted beacons. All of these need attention at regular intervals. A fleet of nine tenders carries out service work, with such duties as relieving crews, attending to the lights of buoys, replacing damaged buoys, marking wrecks, and surveying sandbanks that appear to be extending so that the changes will not be dangers to navigation.

Four of the tenders are based on the depot at Harwich and one on each of the other five depots. The best known of the fleet is the "*Patricia*," a diesel-electric ship of just over 1,000 tons gross, which has a dual purpose. In between her routine work she carries a committee of Elder Brethren on tours of inspection, so that her accommodation is more extensive than that of the other tenders. Normally, a tender has room for between 30 and 40 lights officers and ratings, as well as her own crew. But the "*Patricia*" is fitted with staterooms, bath-rooms, and other facilities for the committee. From ancient days Trinity House has enjoyed the privilege of piloting the Sovereign whenever he goes afloat. For this reason the "*Patricia*" now leads the Royal Yacht during naval reviews and other important ceremonies.

Trinity House felt the weight of enemy attack during the late war. Its historic headquarters on Tower Hill, dating from 1796, were reduced to a shell by an incendiary raid in December 1940. Rebuilding has now been taken in hand and it is hoped to complete the work in three years. Four of the tenders were sunk by mines and many of the light vessels became casualties. Although the tenders have now been replaced, the renewal of light vessels, lost during the war or worn out from long service, is still in progress. The new light vessels are a big advance on those in use before hostilities. They are fully up to date in lighting and signal equipment, and special attention has been given to the comfort of their crews. Each light vessel is manned on station by a Master and six ratings, who spend a month at sea before being relieved by a reserve Master and ratings ashore.

Operation "Air Beef"—(Continued from page 75)

mail, food, equipment and a three-ton tractor.

Nor was the "meat business" restricted to beef, for it has been possible to start pig-farming at Glenroy as a result of "Air Beef." A total of 172 pigs were flown into the area in 1950, of which 5,439 lb. made the return journey as pork. Next season, one farmer plans to deliver 1,000 pigs to Glenroy as well as 2,000 cattle.

Most outstanding example of livestock transport

was a cargo of 20 bulls flown by Air Beef "Freighter" from Fossil Downs to Glenroy. The whole operation of loading, transport to Glenroy over 100 miles away, and unloading, took less than two hours, compared with the overland delivery time of three weeks. Furthermore, as the "Freighter" had previously flown a load of hides to Derby and brought five tons of fuel to Fossil Downs, the cost of transporting the cattle as back-load was only 30/- a head. So, by reducing transport costs, "Air Beef" will help farmers to improve their herds with new stock.

There is, in fact, little doubt that "Air Beef" has come to stay in Northern Australia, for it has not only improved the quality and quantity of beef produced by existing properties, but has shown that there is ample scope for new settlers. As a comparison, in Europe there are 6,340 people to the square mile; in the vast grazing lands of the Kimberleys there is only one white man to every 100 square miles. With "Air Beef" to fly out their cattle, new settlers are assured of success, for Australia's own home market and the needs of this country ensure a ready sale for all the meat that the Kimberleys can produce. Following last year's success, it is already planned to open seven new "Air Beef" centres; they may well make Northern Australia in time the most important meat-producing area in the world.

Cranes and their Work—(Continued from page 77)

lives close to the sea coast where a breakwater or harbour is under construction or repair, for it is this work that block-setters are specially designed to do. A magnificent Meccano model of a block-setting crane is shown in Fig. 1 on page 76. These monsters are capable of lifting and placing in position huge blocks of concrete or granite weighing 50 or more tons, and some of them are among the largest cranes in existence. There is no finer subject for the model-builder who owns a large Outfit.

Sometimes these cranes are fitted with a special lifting gear known as Fidler's block-setting tackle, which is specially designed to set the blocks at an angle in building a sea wall, or on an "inclined bond" as it is technically known, but others are fitted with ordinary Lewis bars.

In an ordinary type of luffing crane, such as those with which we have already dealt, a considerable amount of power is necessary to raise the jib on account of its weight and the effect of the load. If the jib is luffed in and out with the hoisting barrel braked, the load rises and falls also, so that power is used in lifting the load as well as in hoisting the jib. In order to eliminate some of this waste, many cranes are fitted with balanced jibs and what is known as "level-luffing" gear. This ingenious gear counteracts the effect of the load by making the crane hook remain always at the same height from the ground whilst the jib is being raised. Hence the motor has only to deal with friction, assuming the jib to be of the balanced type. There are many different level-luffing systems, all attaining the same object, and one of the most popular is the "Toplis" system. I intend to describe this system fully in the "*M.M.*" in the near future.

New Meccano Models—(Continued from page 83)

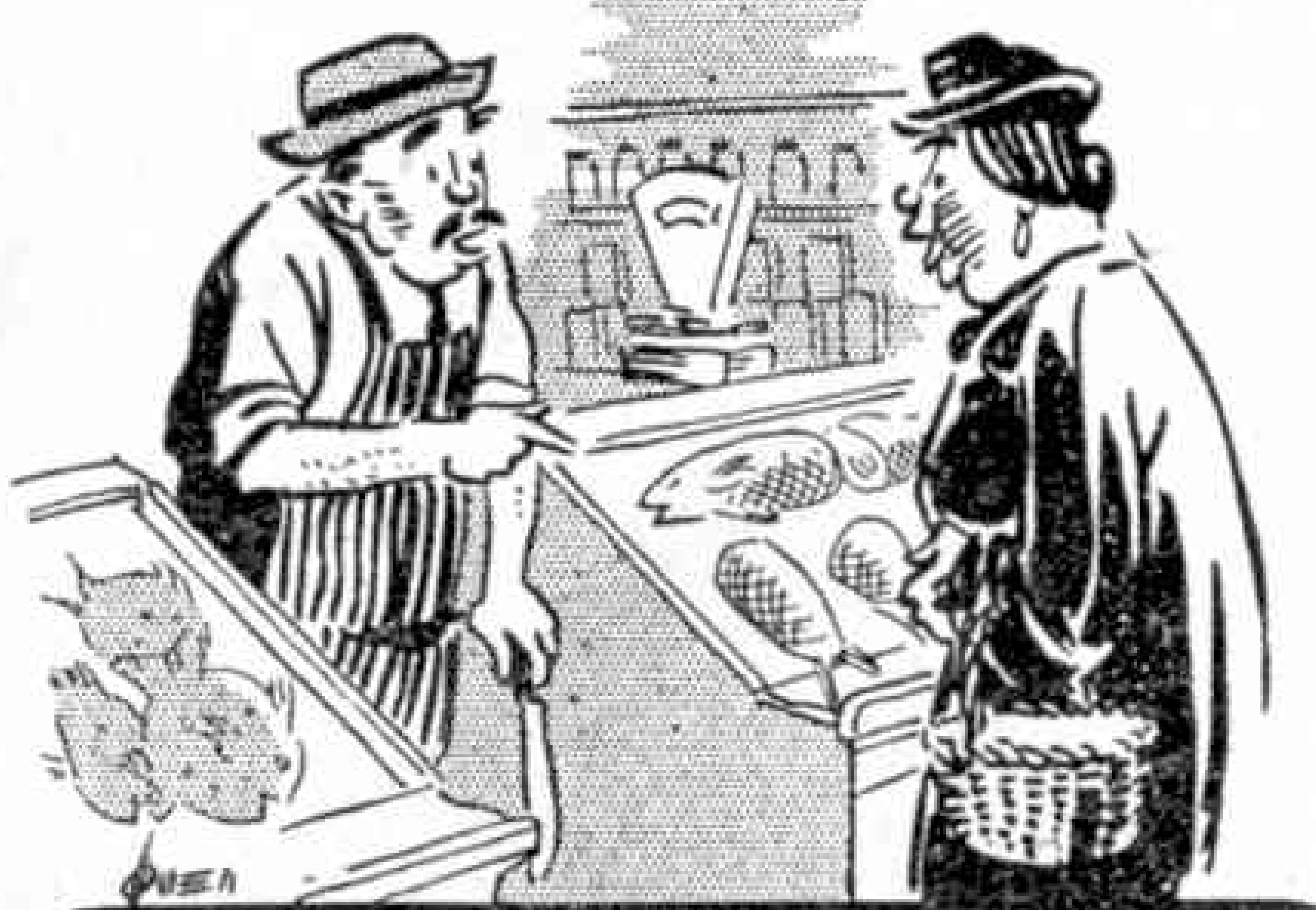
separated from it by a Collar on each Bolt. A $1\frac{1}{2}$ " Rod is mounted in the end holes of the Angle Brackets, and is passed through and fixed in the centre transverse bore of Coupling 7. The $\frac{7}{8}$ " Bevel Gears 9 are free to turn on the $1\frac{1}{2}$ " Rod, and mesh with similar Bevels fixed on the ends of the differential axles.

Bevel Gear 8 drives a $\frac{1}{2}$ " Bevel fixed on a Rod 10, which is mounted in a $3\frac{1}{2}$ " $\times$ $\frac{1}{2}$ " Double Angle Strip 11 and a Double Bent Strip, and carries a $\frac{1}{2}$ " Pinion meshed with a $1\frac{1}{2}$ " Contrate 12. The Contrate is fixed on a Rod fitted with a $\frac{1}{2}$ " Pulley 13. A length of Cord is tied to one of the Strips 6, passed round $\frac{1}{2}$ " Pulleys 13 and 14, and finally is tied to the second Strip 6.

Fireside Fun

"I understand your brother is a real big gun in his business."

"Rather! He's been fired at least half a dozen times."



"Are you sure they're fresh?"

"Bless you lady, I've just cut 'em up to stop 'em jumping at the flies!"

"My wife's been miserable since her budgie flew out of the window and got lost."

"Too bad. Have you advertised for it?"

"What's the use. It did talk, but it can't read."

"Is there a word that contains all the vowels?"

"Unquestionably."

"Well, what is it?"

"I've just told you."

"Why should all artists sign their names to their pictures?"

"So that we'll know which way to look at them."

"Did your watch stop when you dropped it on the floor?"

"Of course it did. You don't think it was heavy enough to go through the floor boards, do you?"

"A'h, now they've dropped the anchor."

"I was afraid that would happen. The thing's too heavy to be dangling outside as they had it."



"These are good wearing, sir!"

"I don't want wearing socks. I want a pair that'll last."

BRAIN TEASERS IT'S EASY REALLY

Here is a delightful puzzle from the "*Norfolk and Western Magazine*," published in the U.S.A. by the Norfolk and Western Railway.

A business man going home each day reached a certain station at 5.0 p.m. There he was met by his chauffeur, who immediately drove him home, the car speed never varying. One day he reached the station at 4.0 p.m. and set off to walk. His chauffeur met him on the way, and immediately turned back, arriving home 20 min. earlier than usual. At what time did the two meet?

MONEY FOR NOTHING

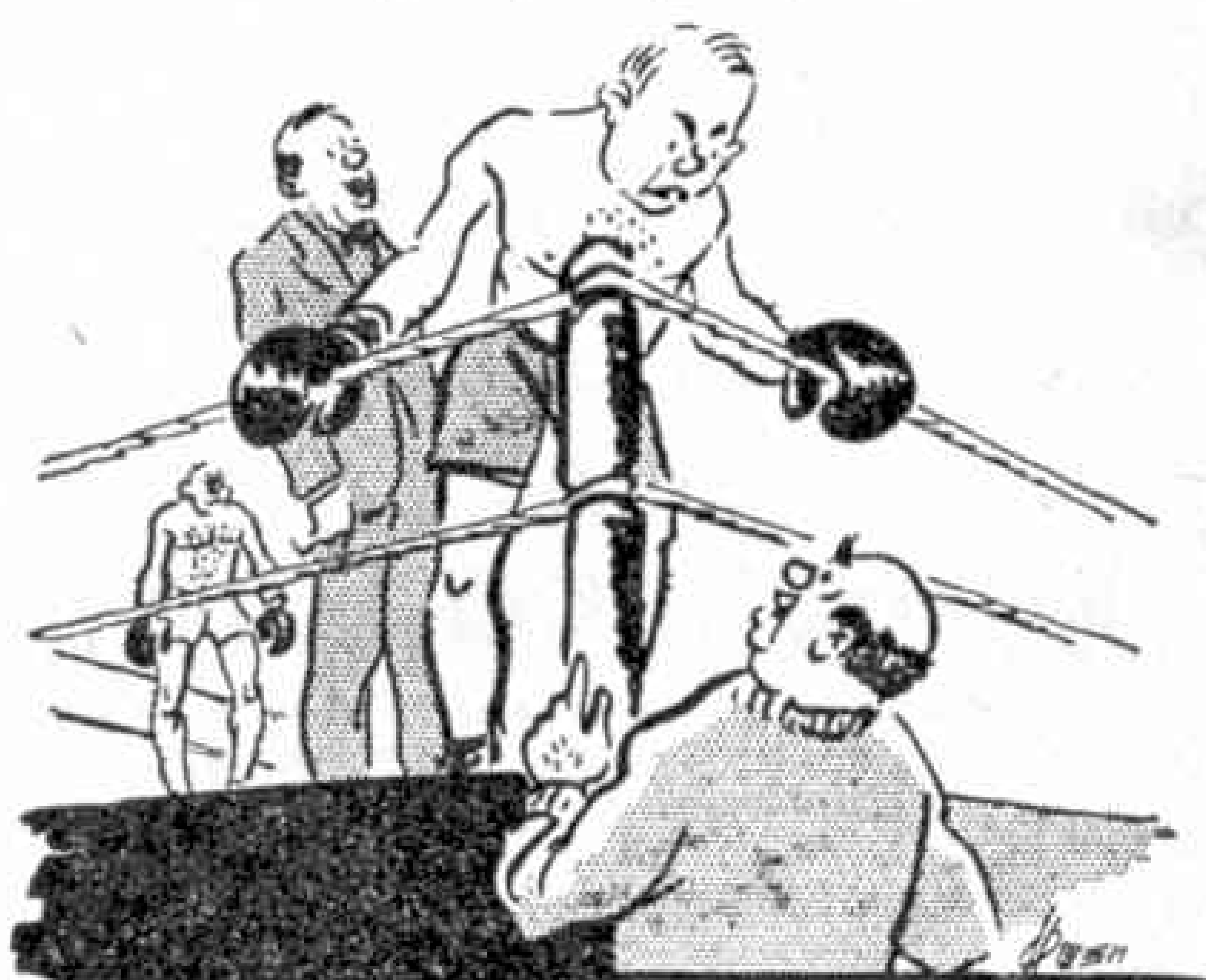
The Sultan placed a bag of gold in the centre of a carpet 12 ft. square, and said that he would give it to any man who could pick it up without treading on the carpet or resting on it in any way. To beat any Meccano boys who happened to be around he barred the use of cranes or other mechanical devices.

Dozens of people tried to pick up the gold, but all fell face downward on the carpet until the Sultan's Jester tried. He performed the task very easily. How?

S.W.C.

CRAZY IDENTIFICATION

The Professor had been knocked down by a motor car, and the police asked him if he knew the number. He said that there were two figures in it, and that if the number were halved, and the result multiplied by itself, the figures would be reversed. What was the number of the car?



"I'm going to be rich after this scrap."

"Why, are you insured?"

BACK TO HIS STARTING POINT

A word chain is a series of words in which say the last two letters of each form the first two letters of the next. Thus the words raise, sever and erode would form the beginning of such a chain. How short a word chain can you make, beginning with the word NECTAR and ending with it? Each word must have six letters in it.

Let us stretch the chain a bit. Try to find one of 13 six-letter words, also beginning and ending with NECTAR, and with the word ESTEEM in the middle.

A.S.

SOLUTIONS TO LAST MONTH'S PUZZLES

The words of our first puzzle last month were HOB0, USED, TIDE, TASK, OVER and NARD. The cricketers' names will be seen to be HUTTON and BEDSER.

In our second puzzle TINGLE'S score was 13 and that of his partner was 26.

Taking IX from SIX leaves S; taking X from IX leaves I; taking L from XL leaves X. S, I and X make half a dozen.

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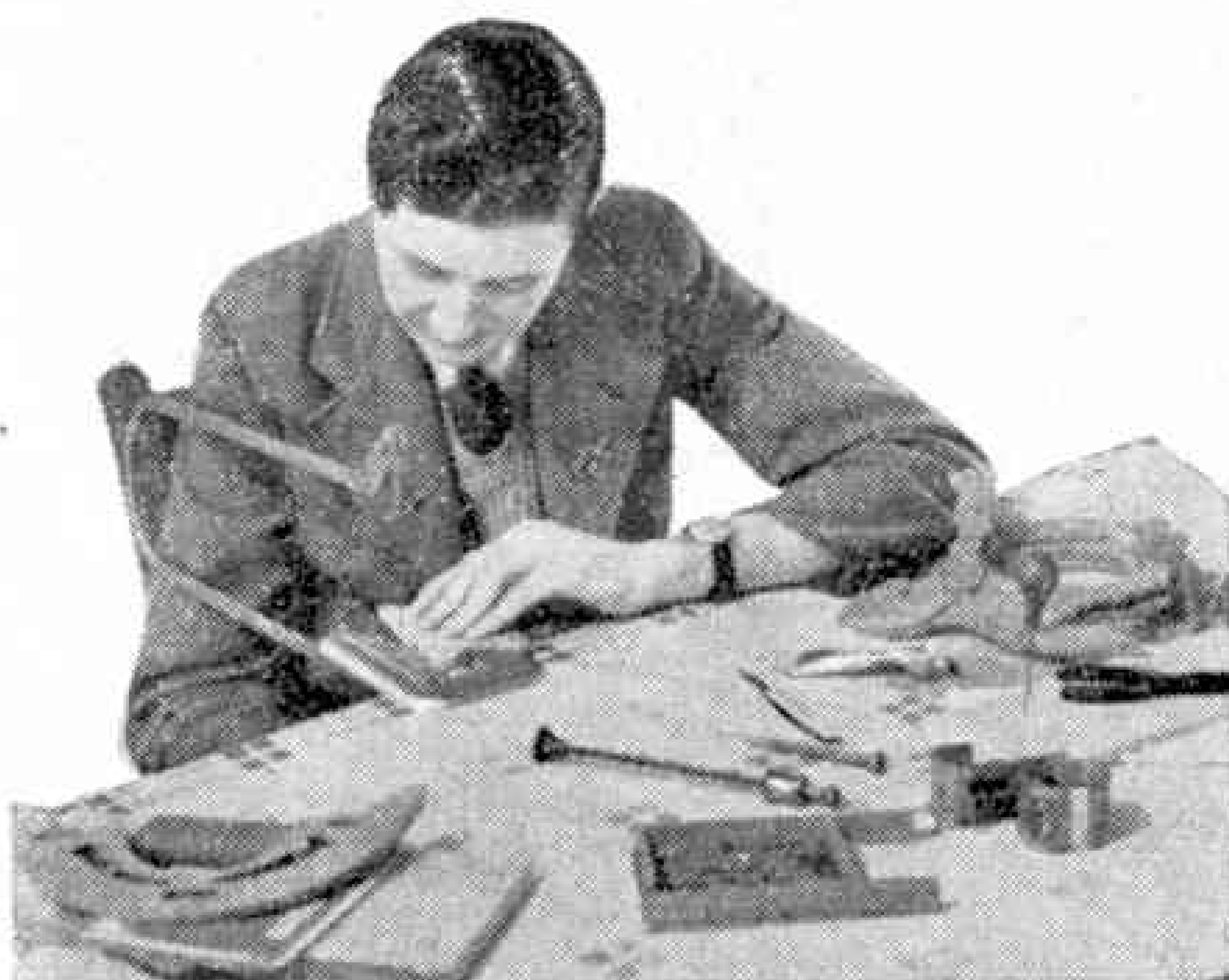
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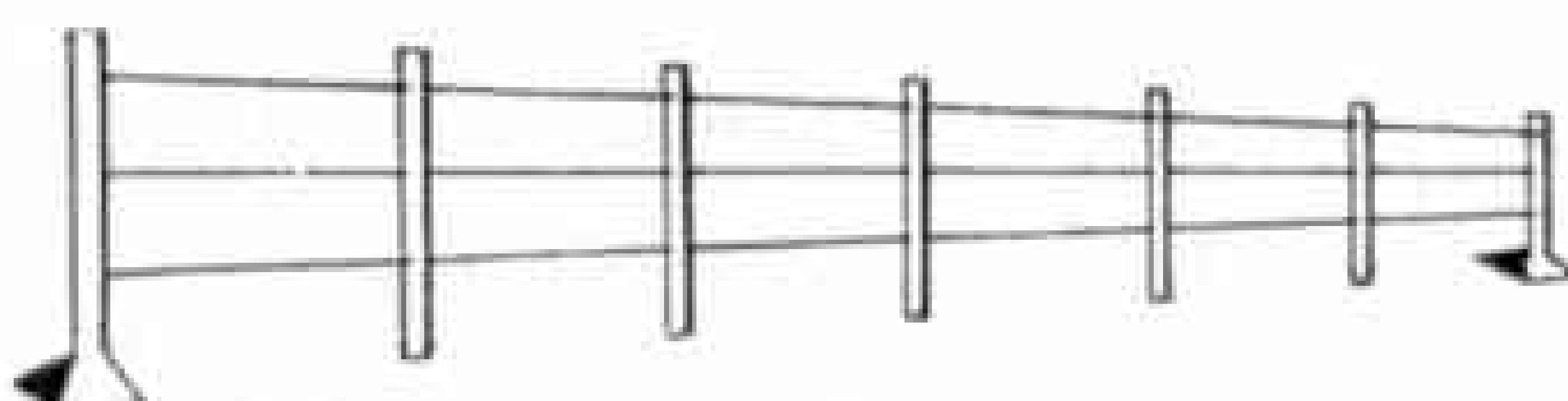
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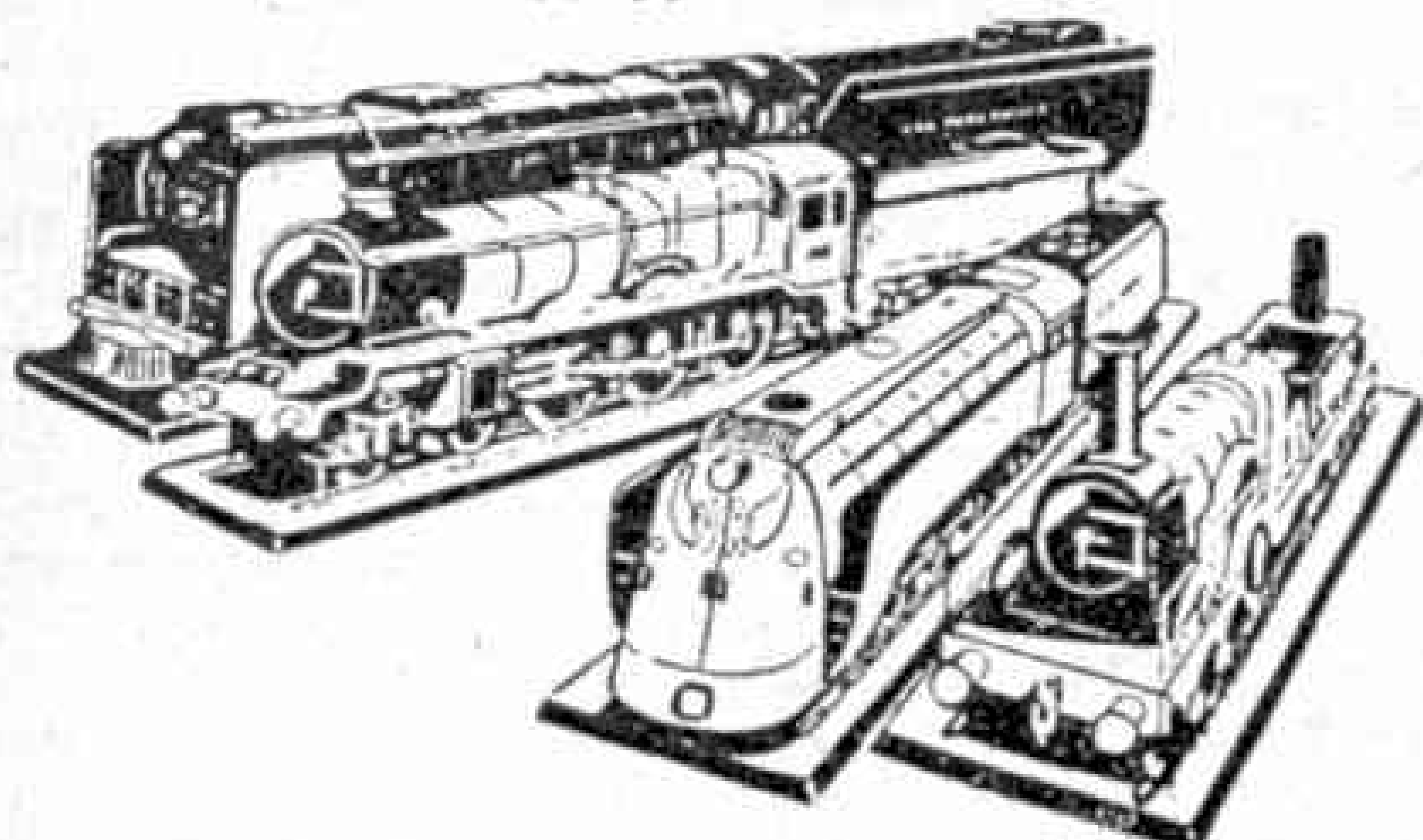
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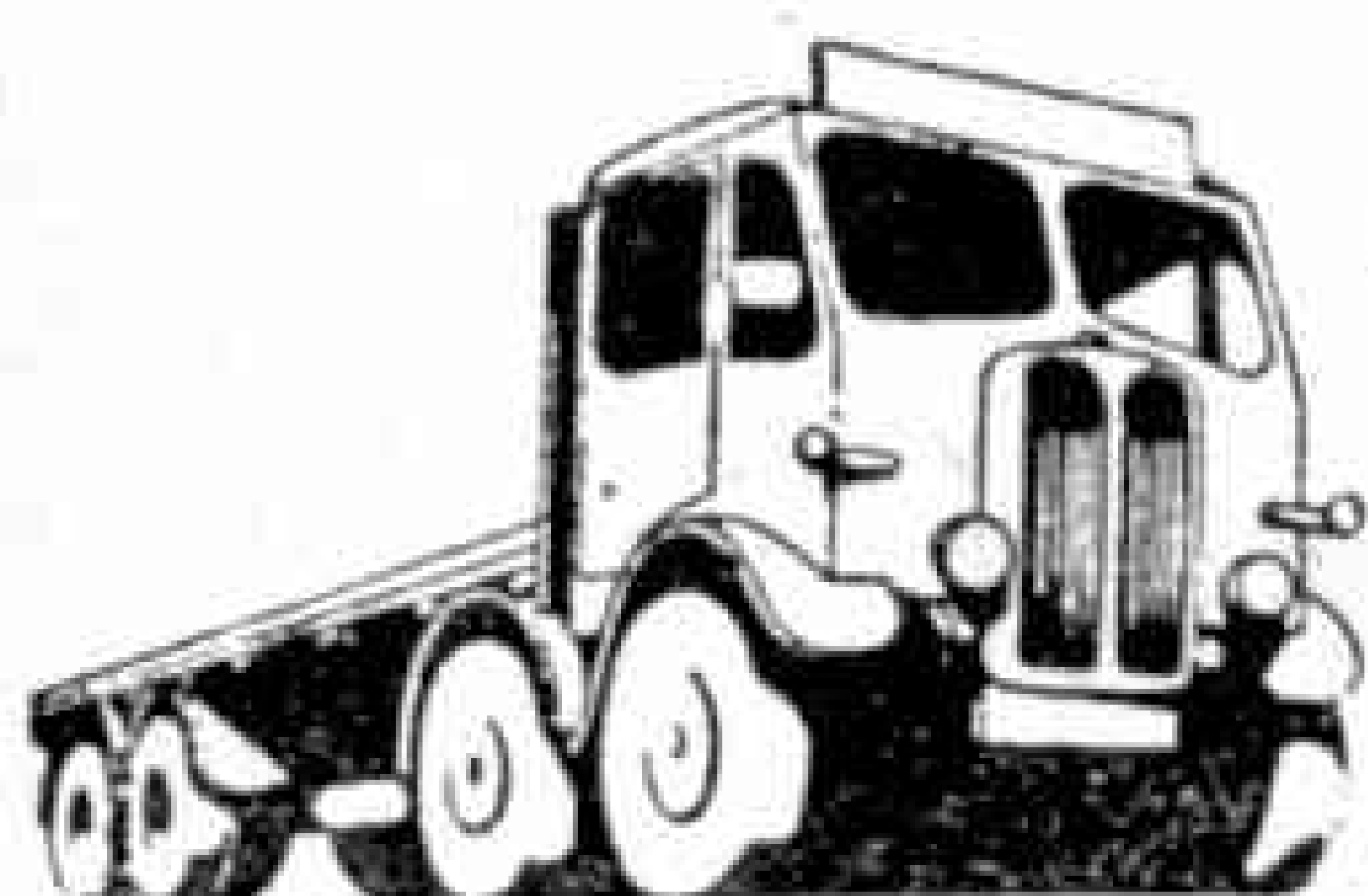


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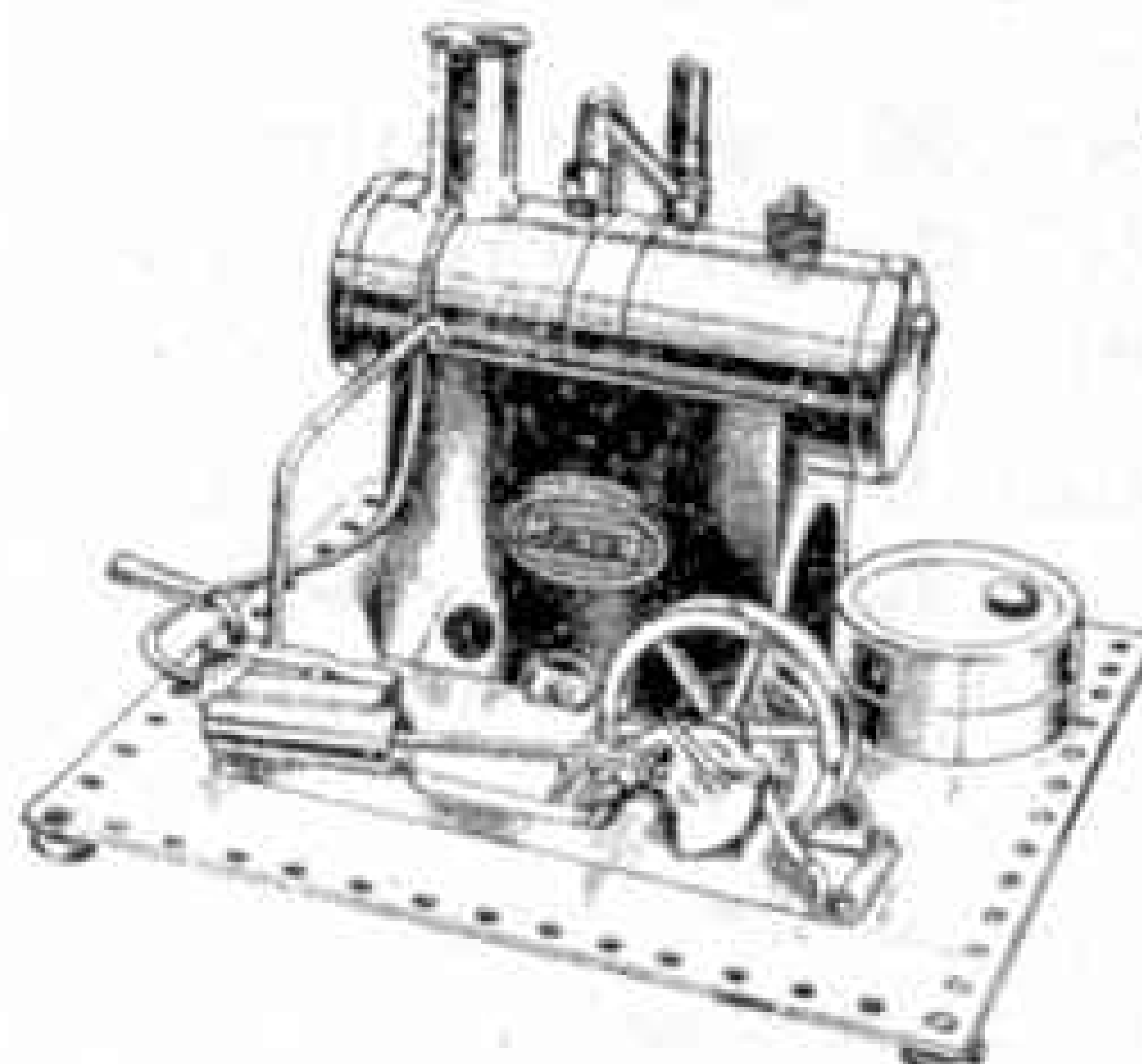
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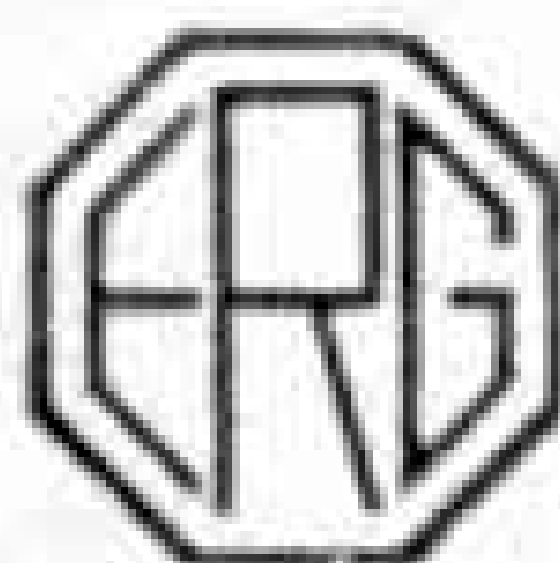
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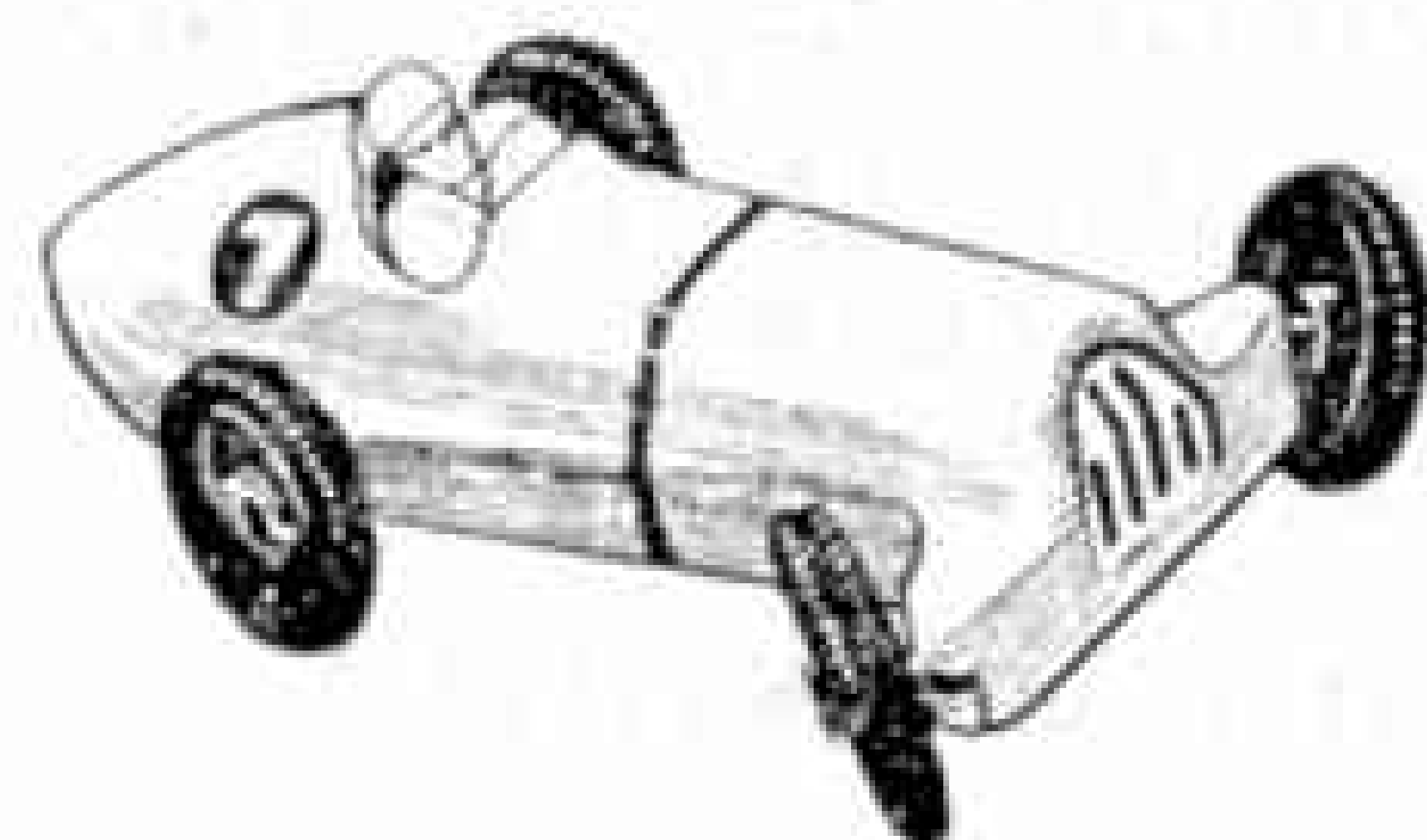
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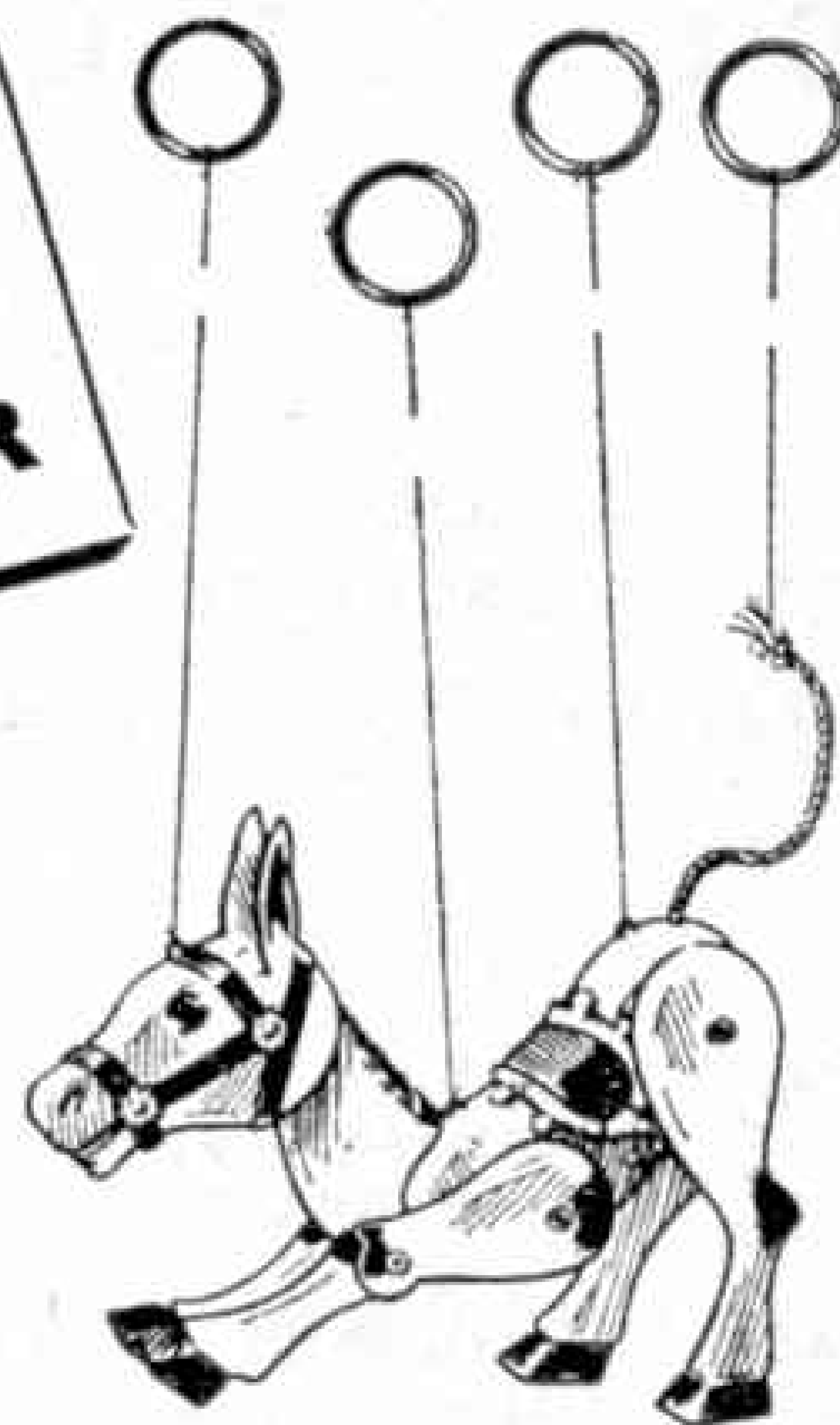
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