VOL. XLVI. No. 1 JANUARY 1961

MECCANO MAGAZINE

1/3

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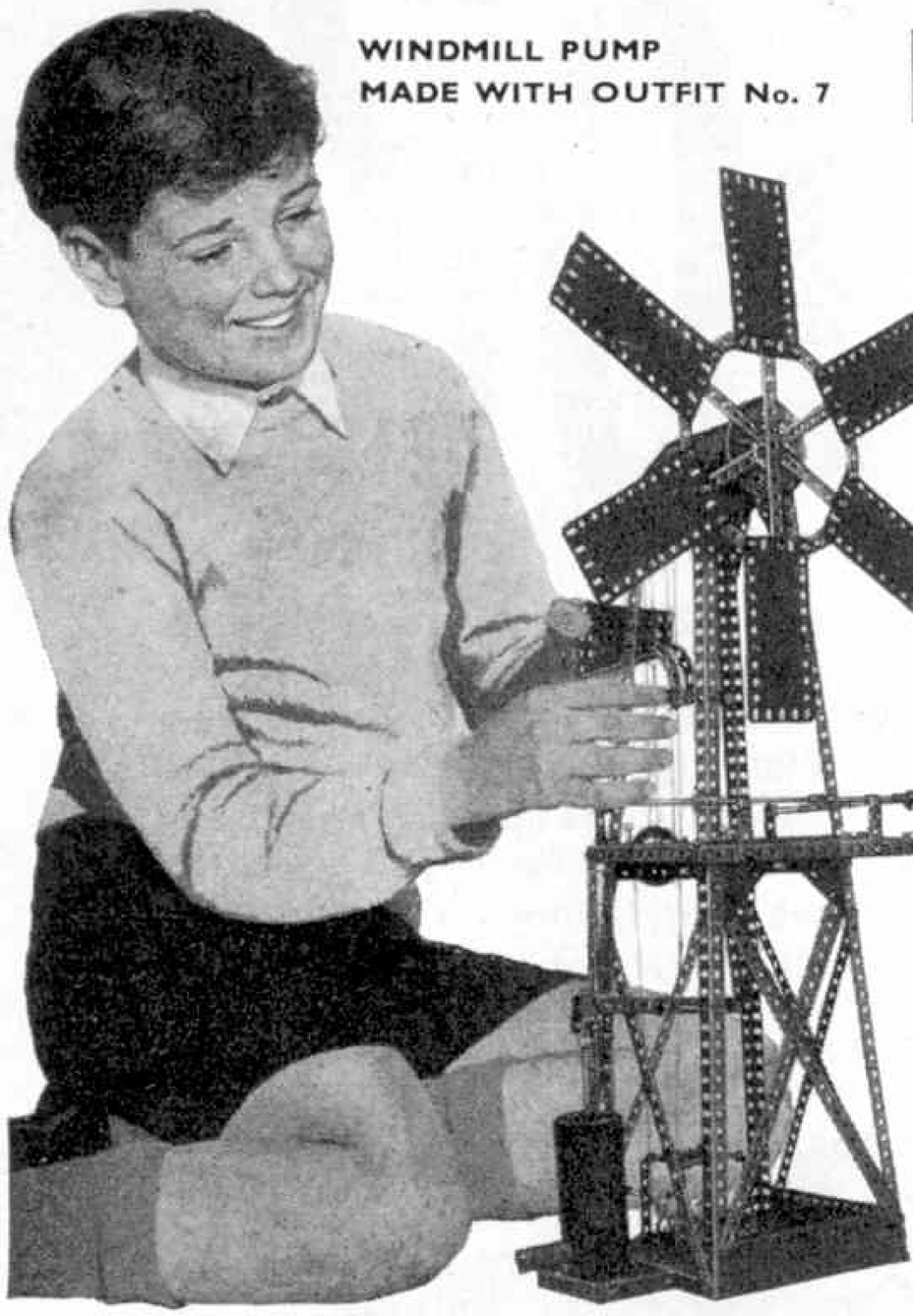

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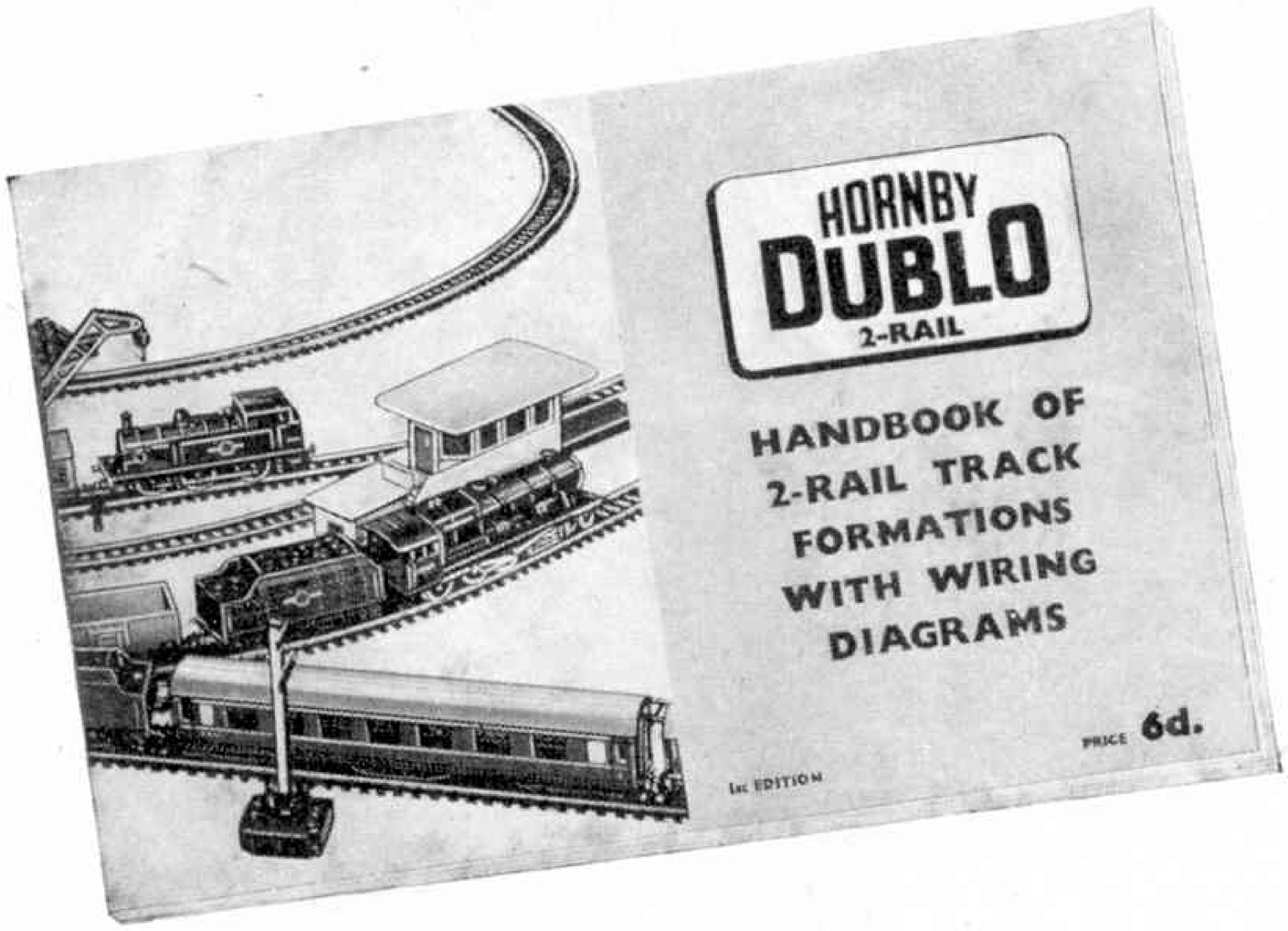

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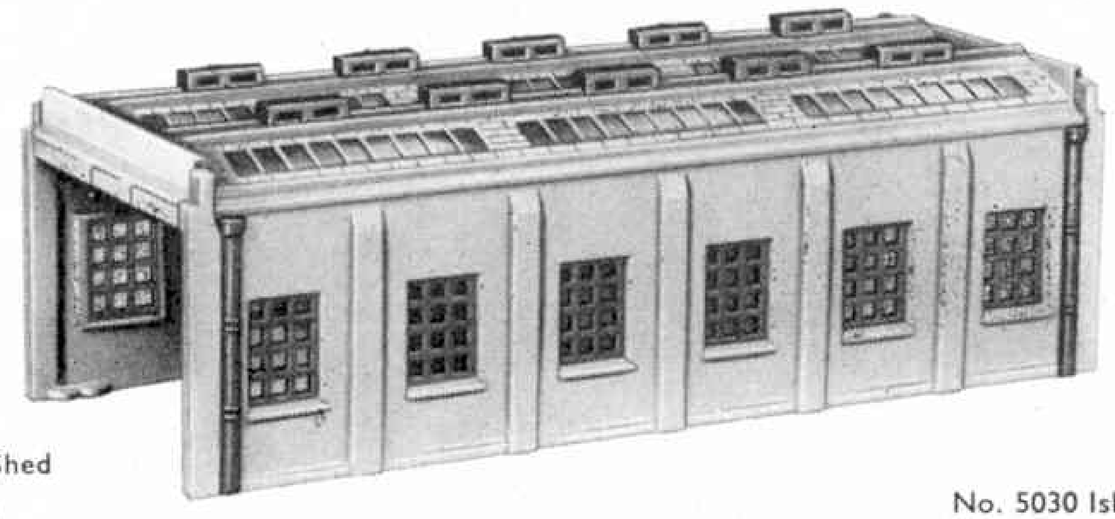

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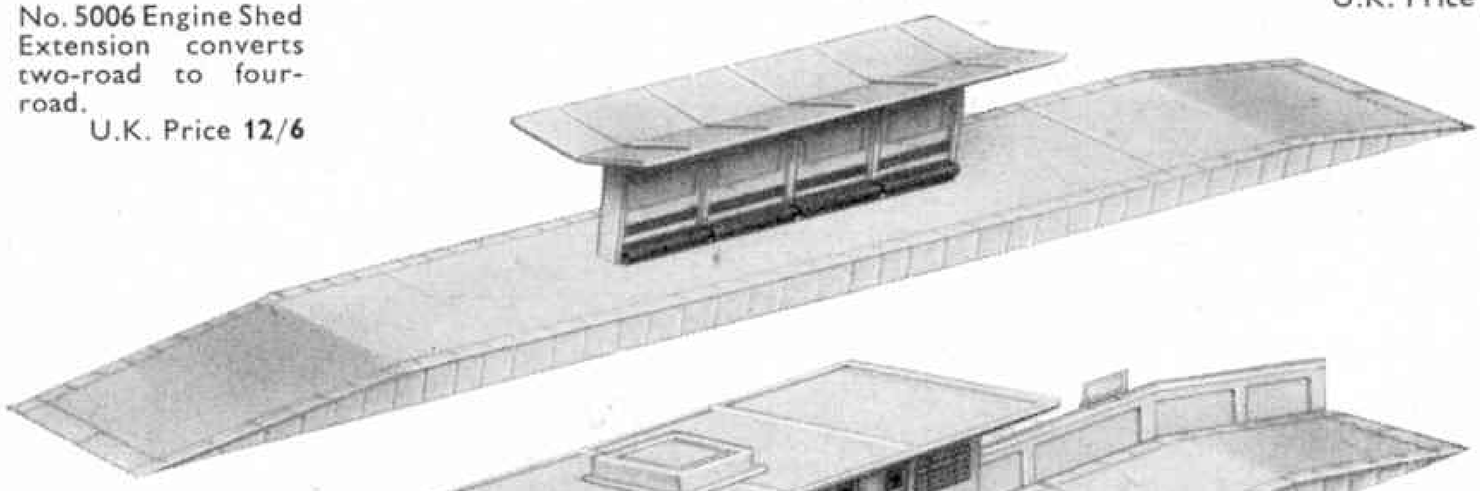

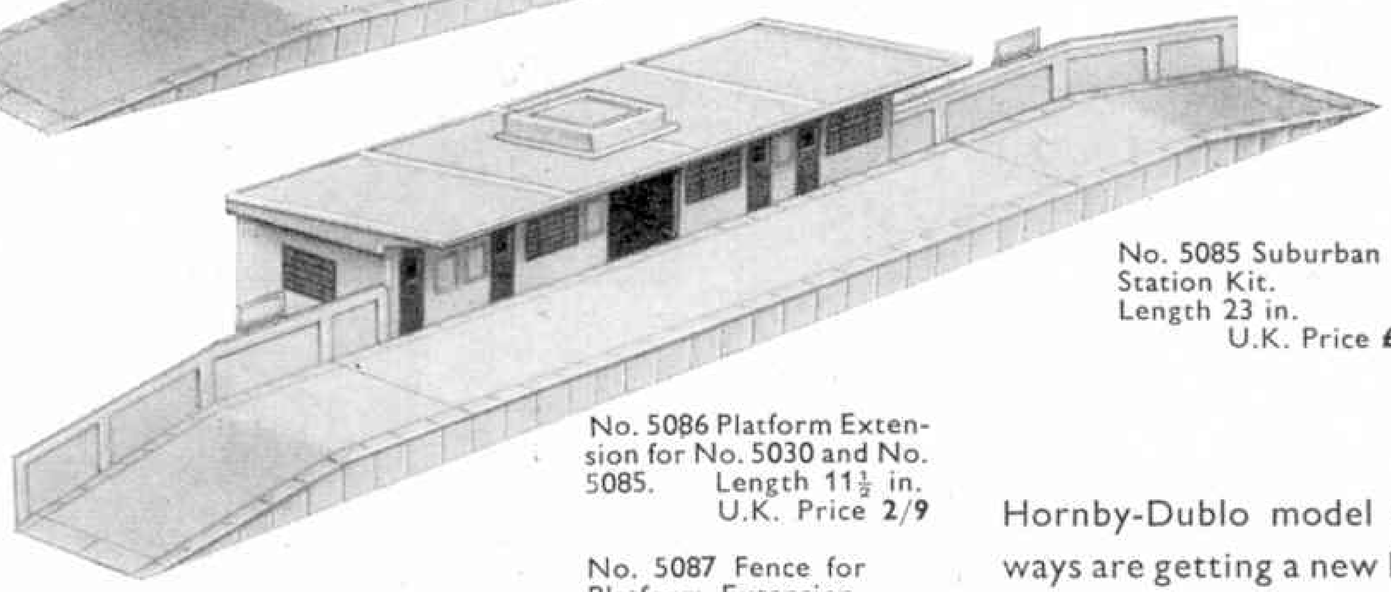

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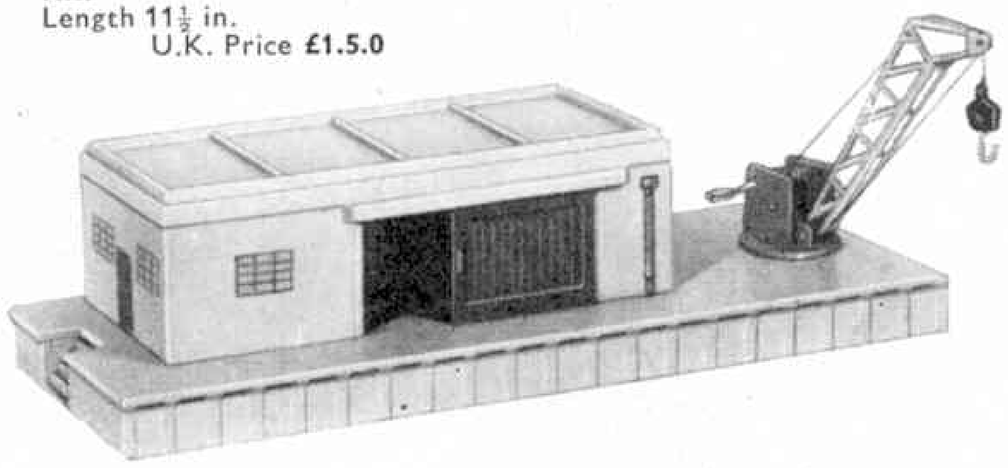

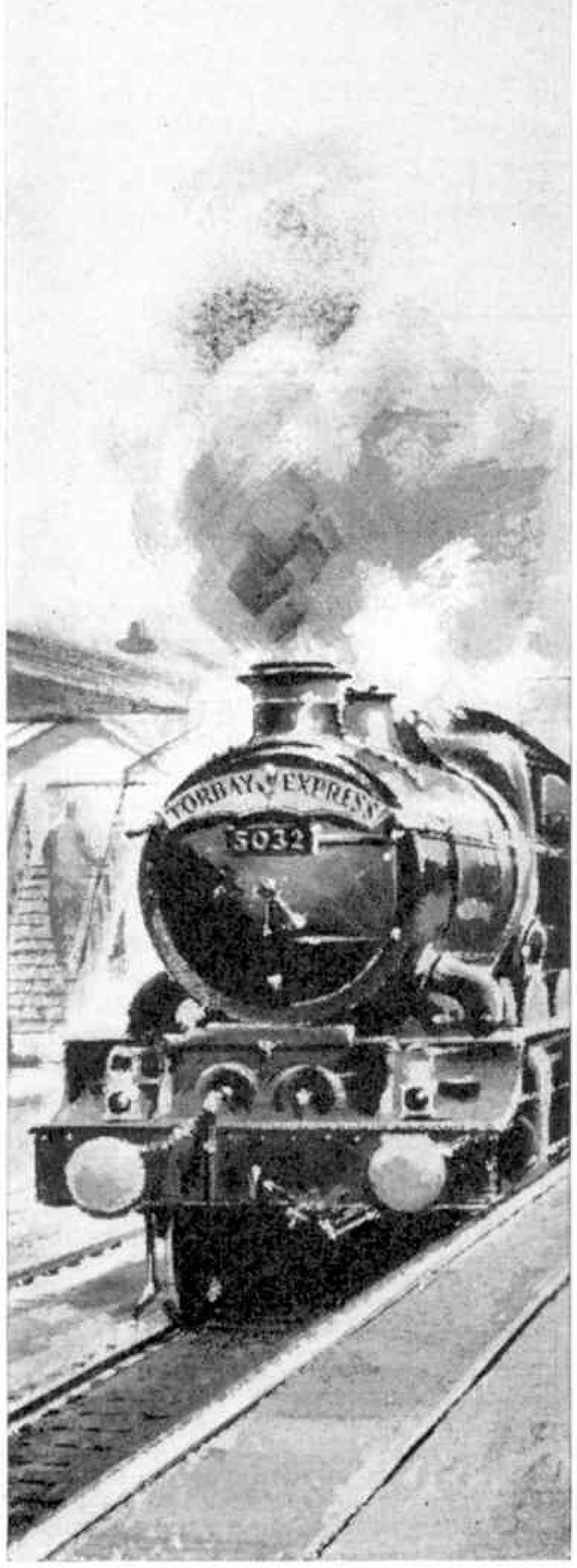

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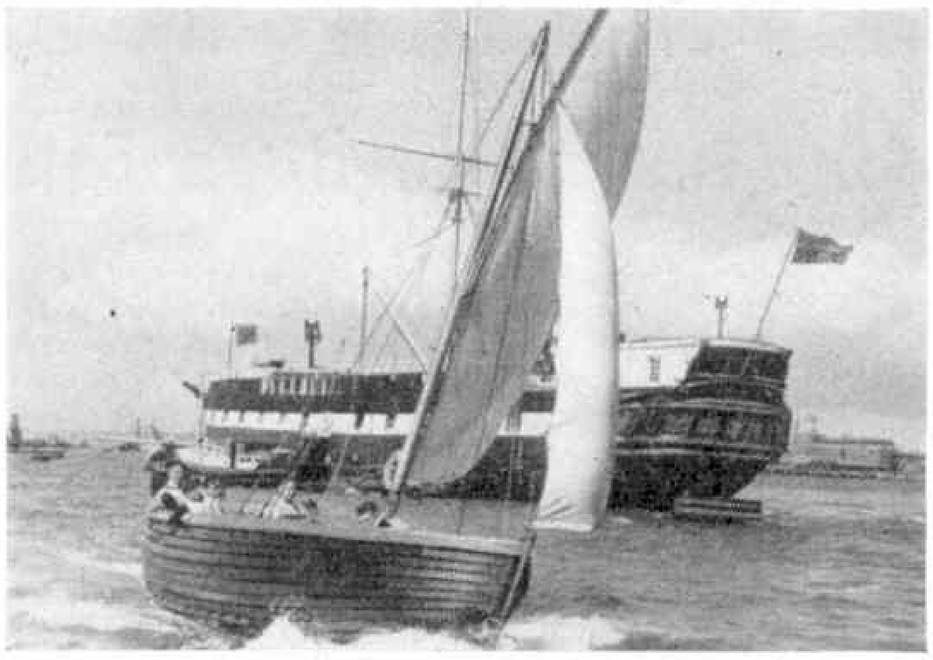

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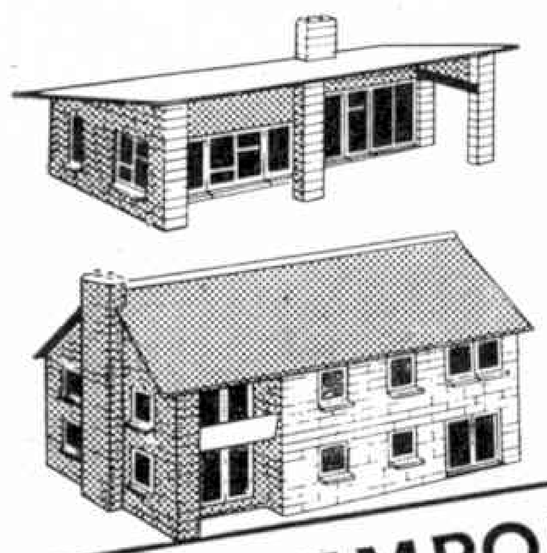

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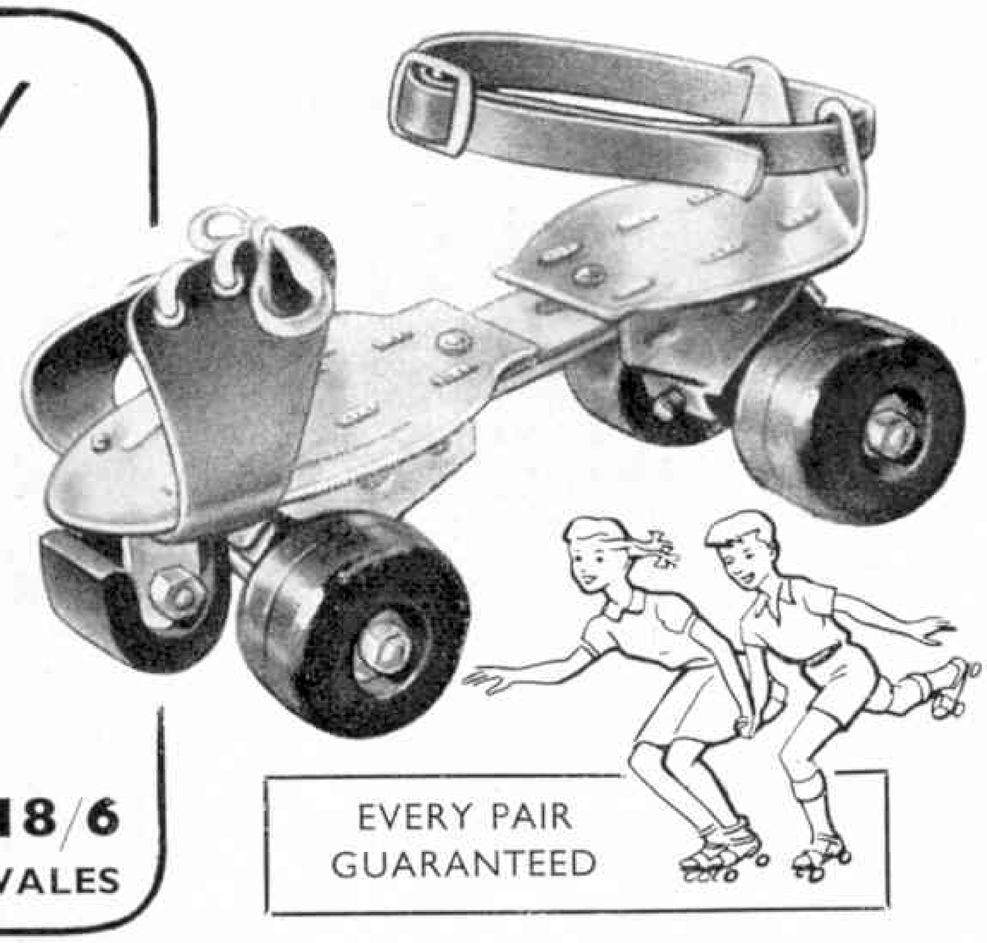

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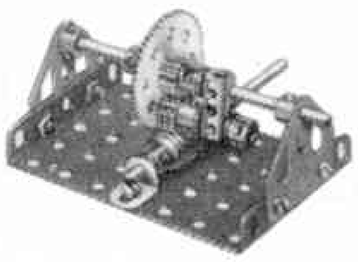

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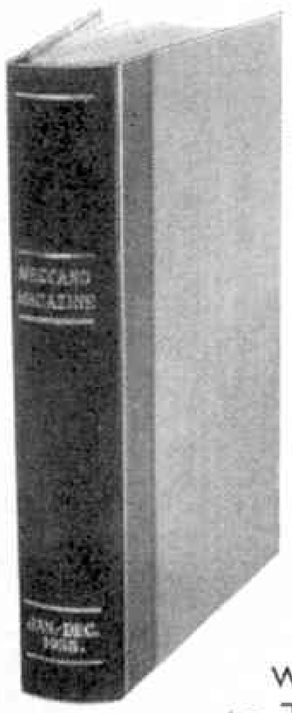

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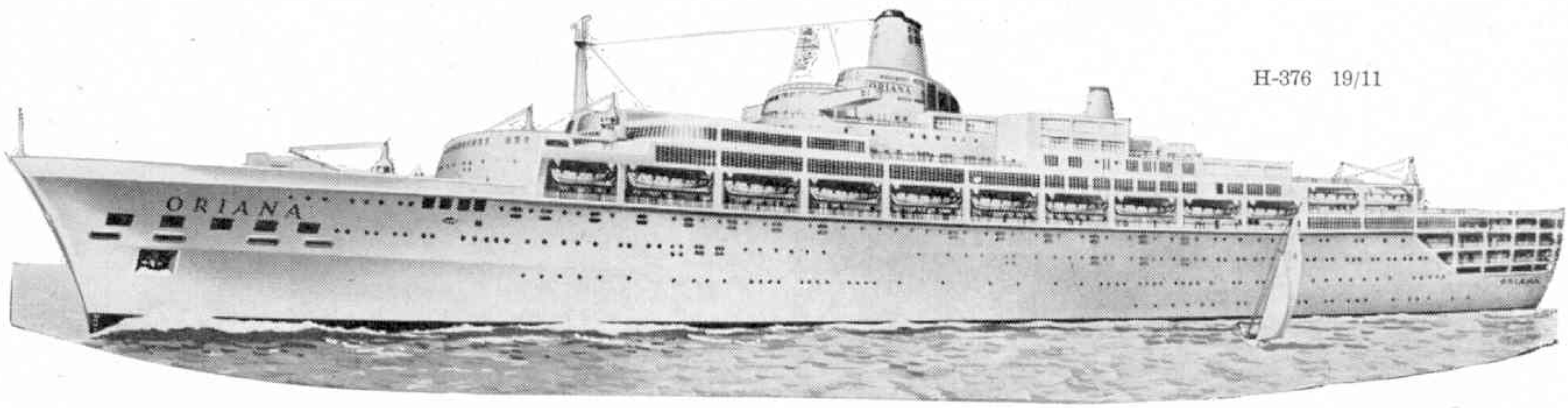

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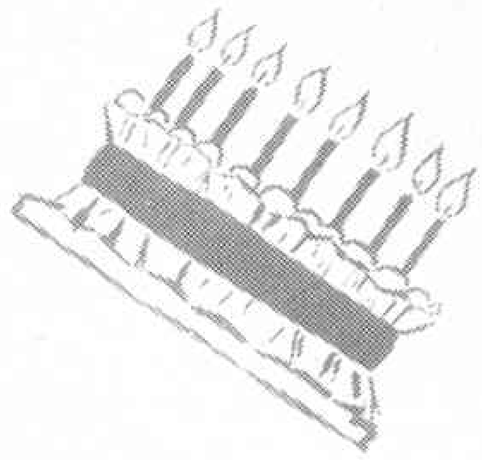

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MECCANO MAGAZINE

Volume XLVI **No. 1** **January 1961**

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Editor:
GEOFFREY BYROM

Asst. Editor:
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New M.M. Rings in the New Year

WELL, here we are at the start of another year, with the new-size *Meccano Magazine* presented to you for your observations. The last few weeks have been busier than usual for the staff of the Magazine and for our printers, since they have had to prepare the new-look periodical while the old-type Magazine was still in production—a far from easy task. However, they have done their stint well and I hope that what they have accomplished meets with the approval and goodwill of our many thousands of readers throughout the world. As I stated last month, new features are being introduced into the *Meccano Magazine* and you will find the first of these on page 33 of this issue. It is the series on thematic stamp collecting previously referred to in these Notes. Next month will see the start of a further illustrated series on "They Were Different Then" which deals with popular makes of cars as they are now and as they used to be many years ago.

There are other points about this month's Magazine to which I would draw your attention. From now onwards we shall try to present on this page, whenever possible, some details about the front cover, with the photograph on which the coloured cover is based reproduced in black and white, as you see it in this instance. For young readers, particularly those who show an interest in cars and cycles and everything that appertains to the road, we have introduced a series of notes by a Merseyside Road Safety Officer, and these will appear on alternate months. As one who believes that too much emphasis cannot be placed on road safety, I sincerely hope that all young readers of the Magazine will pay attention to the wise words of this most experienced official as he writes, for them, in the pages of this journal.

Australia's "Spirit of Progress"

And now I would like, for a moment, to draw your attention to the picture in the centre of this page which shows a tail end view of the Australian express train the "Spirit of Progress" as it thunders across an open level crossing at something over 60 miles an hour just outside Benalla. The "Spirit of Progress" is Australia's most famous train, but standardisation, some time this year, of the rail link between Melbourne and Sydney will see its withdrawal. In a forthcoming issue of the *Meccano Magazine* H. G. Forsythe will describe the development of this famous train and a journey in it.

Finally, my hearty good wishes to all our readers, wherever they may be, for a happy and successful time in the year that lies ahead. May I thank all who have sent good wishes to myself and the staff of the *M.M.* and assure them that their thoughts are warmly reciprocated.

—**THE EDITOR**

Next Month: FORTRESSES OF LAKE ONTARIO

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OUR FRONT COVER

Across a lake in Canada taxies one of the yellow-painted de Havilland Beaver seaplanes belonging to the Ontario Department of Lands and Forests. Its task is to pick up two forest rangers sent to inspect the telephone lines at a fire-spotting tower. The next trip might be to deliver a small tractor to an isolated settlement, or to drop water bombs on a forest fire, or to shower 8,000 tiny trout into a cluster of lakes where the fish population has become badly depleted. You can read more about the work of these aircraft on pages 2 and 3.

THE FLYING FIRE ENGINE...

A line of Beaver aircraft, with men who fly them, on Lake Opeongo in Algonquin Park. This photograph and those on page 3 are reproduced by courtesy of The Province of Ontario Department of Lands and Forests.

Ahmic Spas-ni-chiggin, the Cree Indians call it

IT is impossible for anyone who has not seen a big forest fire to realise how terrible it can be. Started by lightning, or a carelessly-dropped cigarette, a smoulder can grow quickly into a roaring inferno, devouring whole forests of trees at the speed of an express train. Temperatures up to 2,700 degrees Fahrenheit are not unusual and, even if there is no wind, the intense heat causes updraughts which hurl blazing twigs and bits of bark as much as five miles from the main fire, so that even lakes and rivers do not stop the spread.

By John W. R. Taylor

Fifty years ago a fire in Montana and Idaho, U.S.A., ravaged 3,000,000 acres of forest—an area threequarters the size of Yorkshire, the largest county in Britain. Eighty-seven people died in the flames, hundreds more were injured, and much valuable timber was lost. Since then, the acreage lost each year by fire in America, Canada and elsewhere has decreased enormously, and much of the credit for this goes to aeroplanes such as the little yellow and black Beaver seaplane shown on the cover of this month's *M.M.*

The stretch of water across which it is taxying is one of the 250,000 lakes in the Canadian province of Ontario. These lakes, too, have played a big part in forest fire control by providing natural "airfields" free of charge in places where surface travel is slow, difficult and often impossible in winter.

It was back in 1921 that officials of Ontario's Forest Service decided to find out if aeroplanes could be of any help in their daily work. The first experiments consisted of flying slowly over the vast timber-lands while a surveyor sketched the tree-covered areas on blank maps. Then, one day, a surveyor noticed a wisp of smoke curling up from the shore of a northern lake, asked the pilot to land and, with his help, put out the small fire that might soon have been a big one.

CONTINUAL PROGRESS

This was all the encouragement the air-minded foresters needed. During the following two years, mapping and fire-spotting from the air became accepted as a normal part of their work and, in 1924, the Ontario Provincial Air Service was formed to take over the jobs as a regular public service.

Since then the story has been one of continual steady progress and today the Air Service Branch of the Ontario Department of Lands and Forests has a fleet of 46 aircraft, made up of 39 Beaver and six Otter seaplanes, built by de Havilland Aircraft of Canada, and one American-built Grumman Widgeon amphibian. The Beavers and Otters can also be regarded as amphibious since their floats can be exchanged for skis in the winter months, enabling them to land on snow or ice in remote areas of the frozen north-land.

When de Havilland designed the Beaver, they worked closely with representatives of the Air Service to produce a sturdy, all-metal aircraft well-suited for hard work in the "bush" country of Ontario. Powerful flaps and a reliable 450 h.p. Pratt & Whitney Wasp Junior engine were fitted, so that the aircraft could take off and land in about 400 yards with a load of seven passengers or a cabin full of freight. The doors were made big enough for a 45-gallon petrol drum to be rolled aboard and for easy stretcher loading when the aircraft was used as an ambulance. A locker was provided at the back of the cabin for emergency rations, and the struts carrying the floats were so designed that a canoe could be lashed to them. Among items of special equipment were long-range radio to speed the reporting of fires, cameras for survey photography, and an aerial estimator that helps to determine the size of a fire, a lake or other feature on the ground.

The result is an aeroplane for which the pilots of the 1920's would have given half their pay-packets; but they did well with the machines they had. These consisted at first of 14 small single-engined Curtiss HS-2L biplane flying-boats, bought second-hand from the U.S. Navy. They were known usually as "squirrel cages" because it was reckoned that, if you put a squirrel between the wings and he escaped, there must have been a wire missing!

On July 31, 1925, while one of these old boats was ferrying some equipment from Bear Lake to Longlac, at 7.30 in the morning, its pilot spotted a fire—which

had clearly not been observed from the ground—in a region that was completely inaccessible by surface means, even by canoe. Within 35 minutes he had landed and reported the fire. He then flew on to Pine Ridge, collected the deputy chief ranger, a crew of men and some fire-fighting equipment and landed them near the fire at 10.30 a.m.

For eleven days the little aircraft kept up its work as a flying fire-engine, making a total of 35 flights and transporting nearly five tons of men, equipment, supplies and food to the site of the blaze. After the fire had been put out, with only 3,200 acres damaged, the aircraft flew the 27 men and one and a half tons of equipment back to base.

With the passing years, the Air Service was called upon more and more to do flying not connected directly with forestry work. Hydro-electric and Highway Department engineers were flown over the proposed sites for new dams or roads, to make quick surveys; treaty money was taken to Indians in the remote Patricia area and other northern wilderness regions near James and Hudson Bays; doctors and nurses were flown to remote places in the backwoods, even to the sub-Arctic tundras, to attend sick Indians and Eskimos. On many occasions, the patients were carried to the nearest hospitals, so that precious hours—and lives—were saved.

Because of this, the primitive peoples of the north have learned to look for and welcome the Air Service seaplanes, and they have their own pet name for the Beavers—*Ahmic spas-ni-chiggin. Ahmic* means "Beaver" in the Cree and Ojibway languages. The rest of the phrase refers to the sounds made by the aircraft when landing and taking off.

On its return from fighting a fire an aircraft unloads equipment at Mobert, White River District.

A young polio patient is placed comfortably aboard one of the Beaver aircraft before being flown from Kenora to hospital in Toronto.

The loads crammed into the comparatively small Beaver are staggering. One of the most useful is the pack-tractor, a tracked vehicle used for transporting fire-fighting equipment short distances in rough country, and which can be taken apart, put aboard the aircraft and re-assembled quickly on reaching its destination. Able to haul 700 lb. loads up a steep hill at walking pace, it helps to ensure that the modern fire-fighters arrive at a blaze in fit condition to start work immediately.

Many other kinds of techniques are employed to try to kill the fires before they can grow into forest-devouring monsters. Water is carried in rotating containers above the seaplanes' floats and sprayed over small fires. Another idea is to bomb the fire with paper or plastic bags each of which holds about five gallons of water. Twelve of these bags can be carried on a set of metal rollers on the floor of the aircraft's cabin and, simply by pushing, can be dropped through the survey camera hatch singly or in salvos of up to six at a time. After a little practice, it is possible to score direct hits with almost every bag.

Many kinds of things are, in fact, showered from the Beavers. Fire-pumps, hoses, equipment and supplies are parachuted to fire-fighters working away from lakes. More unusual are the loads of baby fish which are sprinkled regularly over lakes that need re-stocking.

For re-stocking to be successful, the hatchery-raised fish must be put into their new home in the right numbers at the right time of the year. Delivery by truck was often delayed by rough conditions. Now the work is done by Beaver. Sometimes the aircraft lands so that baby salmon can be "planted" through holes in the ice of frozen lakes; more frequently the fish are simply scattered from the air.

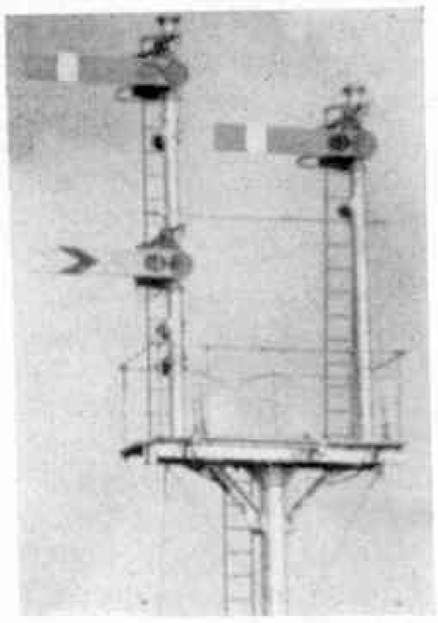
THROUGH CAMERA HATCH

As many as 8,000 speckled trout yearlings can be carried at a time on ten trays inside two water-filled tanks in the aircraft's cabin. They are dropped at a regulated rate through the camera hatch at low altitudes, by means of a funnel which curves towards the tail and releases the fish into the slipstream. They are kept constantly in water containing adequate oxygen except for the short time when they are falling through the air at about 15 m.p.h.

To ensure that the trout's brief experience as "flying fish" does them no harm, fish management officers have kept a close watch on the results of these operations. Of the fish that enter the water, scattered over an area 50 ft. wide and 200 ft. long, none have been found dead or injured. They usually swim around for a moment or two near the surface as if to get their bearings and then disappear into the depths.

In 1959, the Air Service flew 3,614 hours on this kind of fish and wildlife work, compared with 4,275 hours on fire detection and suppression, and 4,388 hours on other duties, including 22 ambulance and rescue flights. (*Continued on page 35*)

DIVERSIONS ON THE RAILWAYS ARE CAUSED BY MANY FACTORS. HERE SOME OF THE REASONS ARE DESCRIBED



Why Trains Take the Other Road

ALTHOUGH this article is about train diversions it does not refer to things you can do just to pass the time away on a train journey, because if you are interested in railways you will find plenty to occupy you in the course of a run. No, the subject is the diversion of trains from their normal routes, which can arise from a variety of causes.

BY
LESLIE NORMAN

Just at present train diversions to alternative routes are perhaps brought more widely to our notice because of the extensive engineering works in progress, in so many places, in connection with B.R. modernisation schemes. But we will come to this kind of diversion later.

The simplest form of train diversion occurs when a train is simply switched from its normal running track to a siding. Diversion to a siding is as old as the railway itself. We read in "*Timothy Hackworth and the Locomotive*" by Robert Young, M.I.MECH.E., published many years ago, that the Stockton and Darlington Railway had sidings arranged at quarter-mile intervals where one train could be refuged while another, in the opposite direction, passed along the single main line.

ARGUMENTS AND FIGHTS

Many arguments, and even fights, appear to have taken place between the respective drivers when up and down trains happened to approach one another in between the sidings. And, of course, there were delays. Hackworth is reported to have appealed to the directors thus: "*Gentlemen, I only wish you to know that it would make you cry to see how they knock each other's brains out. The line must be doubled*".

Wisely, this was done, to the benefit of the traffic and of all concerned.

Nowadays, a refuge siding is usually a loop connected at each end with the running track by means of crossover points so that ready entrance or exit as required is afforded. Additional running lines in the form of long loops or relief lines extending over a considerable mileage have been a feature of our railways for very many years. Diversions may be regularly booked on routes when there are fast and relief lines for traffic in both directions. Naturally speed reductions are called for when negotiating the crossover points involved, and speed is restricted sometimes on the relief lines to a lower figure than that which is standard on the main line tracks.

One of our pictures gives an instance of the diversion, commonly practised, of a freight train to a loop line where it waits until faster traffic has passed. Here No. 4907 *Broughton Hall* is waiting in the loop at Bathampton, while diesel-hydraulic D 806 *Cambrian* speeds by with a Bristol-Paddington express.

On occasions, the diversion of a train to another track may involve what is known as "wrong line working". This means that the train travels over a track in the opposite direction to that for which it is normally used; in other words a down train may travel over the up track, or vice-versa. This can happen if a mishap makes emergency single line operation necessary in order to keep traffic moving past the site of the incident. In other cases engineering work, track repairs or any one of the thousand-and-one jobs that need to be done from time to time in the course of railway maintenance may be the cause.

SPECIAL REGULATIONS

If the diversion is pre-arranged, the operation takes place according to a plan made known to the staff in advance notices. A definite stopping point will be laid down where each train must halt before it is transferred through trailing crossover points to the other track. Then

The Newcastle Express Crosses Over

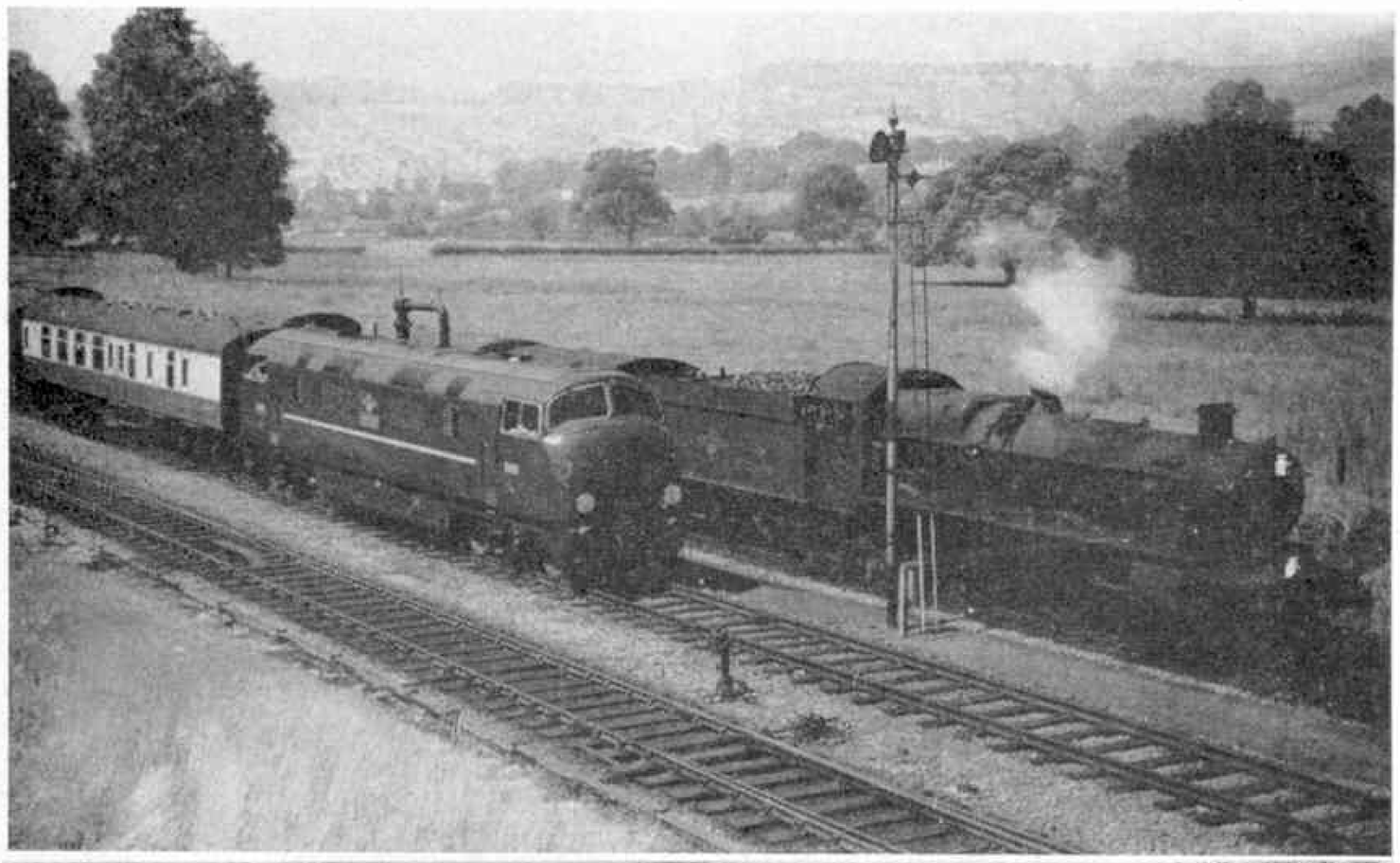
D 208 bound for Newcastle, leaves the relief line to rejoin the fast track near Potters Bar. The train had been diverted because of engineering work at Hadley Wood. Photograph: J. A. Fleming.

the points are restored to normal and the train moves forward, usually at a speed reduced according to the circumstances, until it can regain its correct line. Safety in such working is hedged about by important special regulations. For instance, a pilotman is on duty to ride the engine footplate of any train over the single line section. His presence ensures safe conduct and, in fact, he acts literally as a human substitute for the staff or tablet regularly used in normal single line working. Only one staff or tablet for a given section can be issued at one time. There is only one pilotman.

Wrong line working is also the subject of one of the illustrations. A W.R. up train has been diverted to the down track because a defective rail in the up track requires attention. When photographed, the train was just clear of Sodbury Troughs, where normally speed would be sufficient to allow water to be picked up on the run. This diversion may well have caused a shortage of water later in the run, so that perhaps a special stop may have been necessary to allow the tender tank to be filled. This would add to delay already occasioned by the wrong line working and is just another instance of the difficulties which, at times, can confront the engineman and possibly affect good timekeeping.

Apart from isolated small-scale operations, engineering works of some magnitude, such as bridge strengthening or reconstruction, may cause traffic to be diverted altogether from its normal route. Engineering works of various kinds are in hand in connection with B.R. electrification schemes and although it is sometimes possible to suspend the running of trains over a particular section for a temporary period, this sort of thing cannot be done on a wholesale scale. Clearly then, the railways have to try to build their new and improved system on and around the existing one. Thus the need arises for an alternative route to be used if one is available, perhaps on Sundays only, or for a period during which some particular bridge replacement, track re-alignment or other big job is carried out. In that case the use of an alternative route, which may possibly be somewhat devious in character, may well cause loss of time. Such diversions have tended to be in the news more since the B.R. modernisation plan got under way, and it is interesting at times to study the routes used by diverted services. In some instances they may revive through running over sections used in earlier times by the traffic concerned, but replaced long since by newer and shorter alternatives.

For instance, for a period during 1959 some of the trains between Liverpool (Lime Street) and Crewe, and Liverpool and Chester, were diverted by way of Earlestown and Warrington because of engineering operations on Runcorn Bridge, a fine structure brought into use in 1869 as part of a cut-off to avoid Warrington and reduce the distance between Liverpool and the South. These diversions reduced train occupation of the bridge section in order to compensate for the longer time taken in the single-line working over the bridge instituted for trains that continued to work across it on weekdays. On Sundays, the engineers were in complete possession.



(Above) A through freight train waits in the loop at Bathampton while a Bristol-Paddington express passes on the main line. Photograph: A. F. Wright.
(Below) The down "Golden Arrow", diverted via Maidstone East, passes Bearsted signal box. Picture: S. Creer.

TRACK REPLACEMENTS

This attention to the bridge and track was undertaken in view of the electrification of the Liverpool–Crewe–Euston route now in progress. During the occupation of the bridge by the engineers, 700 yards of track were taken up and replaced and, at the same time, the steel floor of the bridge was given special weatherproofing treatment.

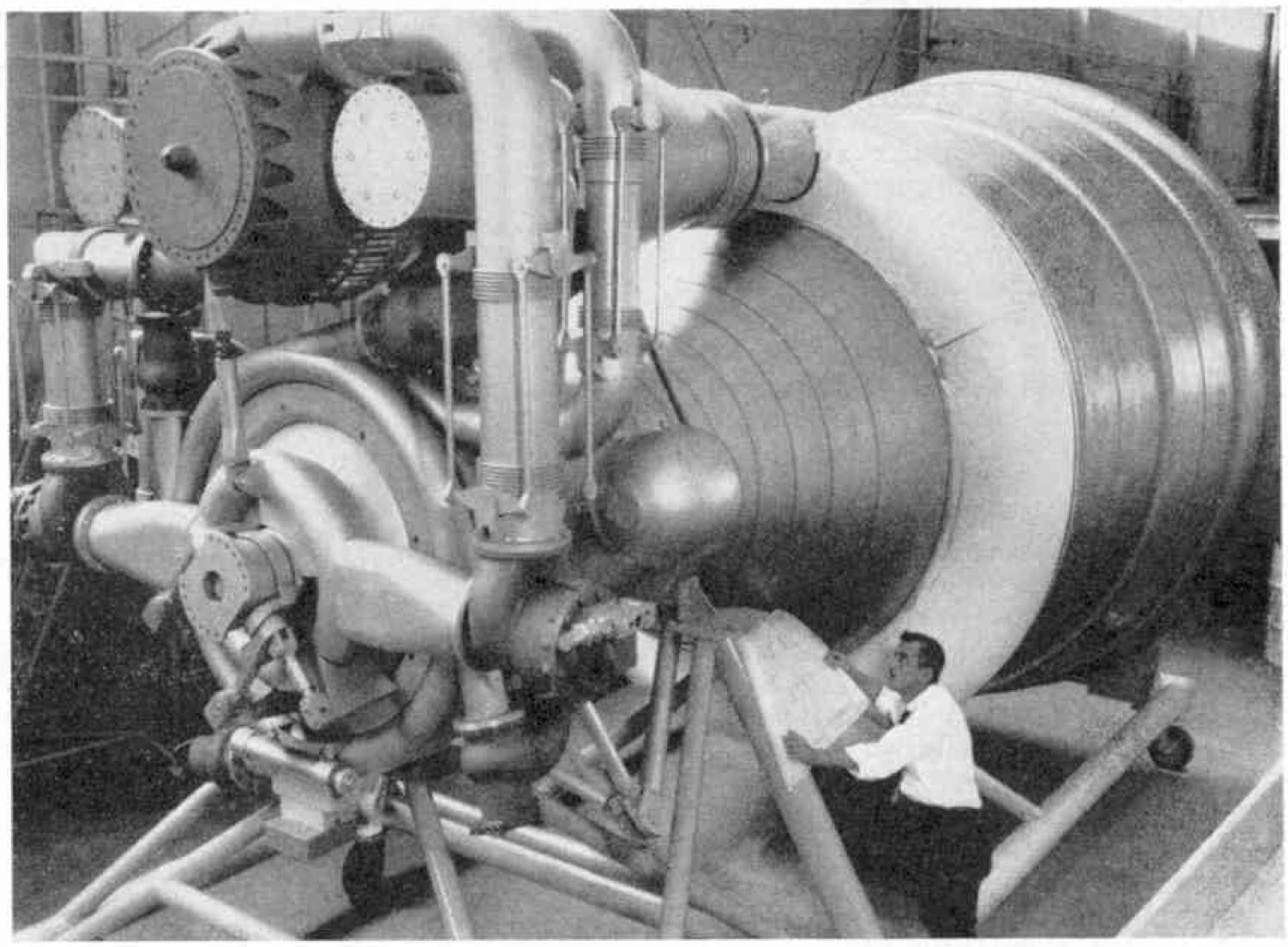
Another electrification scheme, and the track alternations and improvements that formed part of the engineering work required, was that completed in 1959 by the

(*Continued on page 35*)

Wrong line working is in operation here. An up express, Castle headed, running on the down track near Sodbury Troughs W.R. Photograph by R. Russell.

SPACE NOTES

Rocket Engine With Immense Thrust



A mock-up of the Rocketdyne F-1 rocket engine now being developed in America. Picture by courtesy of Rocketdyne.

LOOK closely at the picture on the right, which may well have historical value. It is a wooden mock-up of the Rocketdyne F-1 rocket engine, which is the highest thrust engine of any type now being developed in the United States. It will, in fact, produce up to one and a half million pounds of thrust.

The rocket engine is a conventional one in principle but is highly simplified in design. The turbo-pump can pump the propellents—liquid oxygen and kerosene—into the combustion chamber at a rate of almost three tons a second.

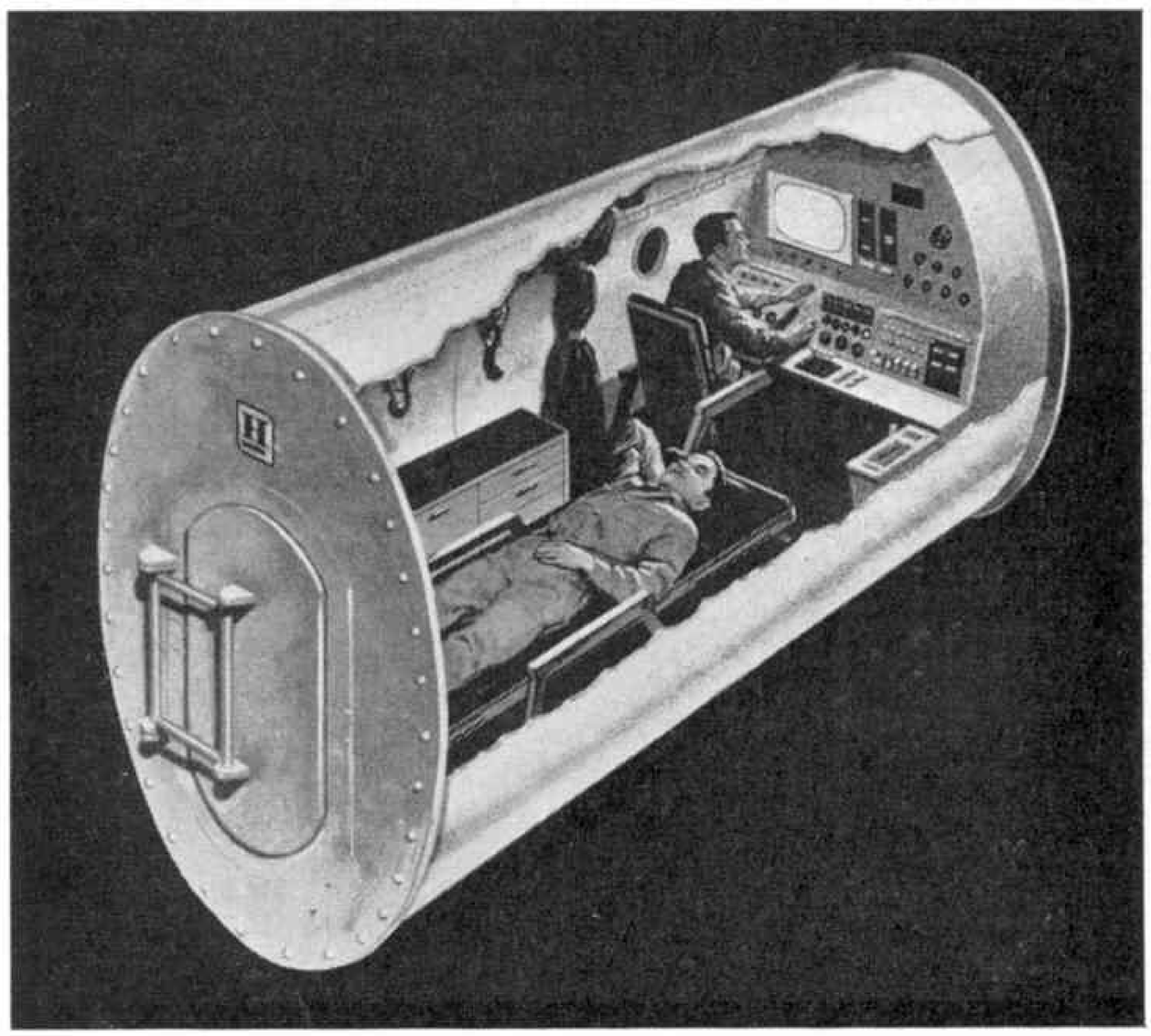
The National Aeronautics and Space Administration is expecting to cluster a number of these engines to obtain thrusts up to 12,000,000 lbs. A space vehicle with such a thrust could put payloads of more than 75 tons into orbit, or send manned vehicles to the Moon and return them to Earth. Short firings with a full-scale, uncooled engine achieved more than 1,000,000 lbs. thrust a year ago, and the complete engine should be ready for operational use in 1963.

"GROUND-BORNE" SPACE CABIN

As a result of studies conducted with two men living in a seven-ton simulated space cabin, in complete isolation from the world, the U.S. Air Force is gaining knowledge that will be used in the design of living and working quarters in space ships of the future. In comparison with Project Mercury, which is intended to put a man in orbit for a few hours, the simulator, which has been designed and built by Minneapolis-Honeywell, creates a space-like environment to explore man's reaction to 30 days of isolation from the world.

The simulator is eight feet high and twelve feet long. Within its elliptical steel walls are contained most of the comforts of home, plus a maze of scientific instruments to control environment and record the reactions of the occupants. To give a close approximation to conditions imposed by space travel, the space cabin was designed to be virtually self-sustaining. For instance, the astronauts in the cabin will breathe and re-breathe the same air.

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



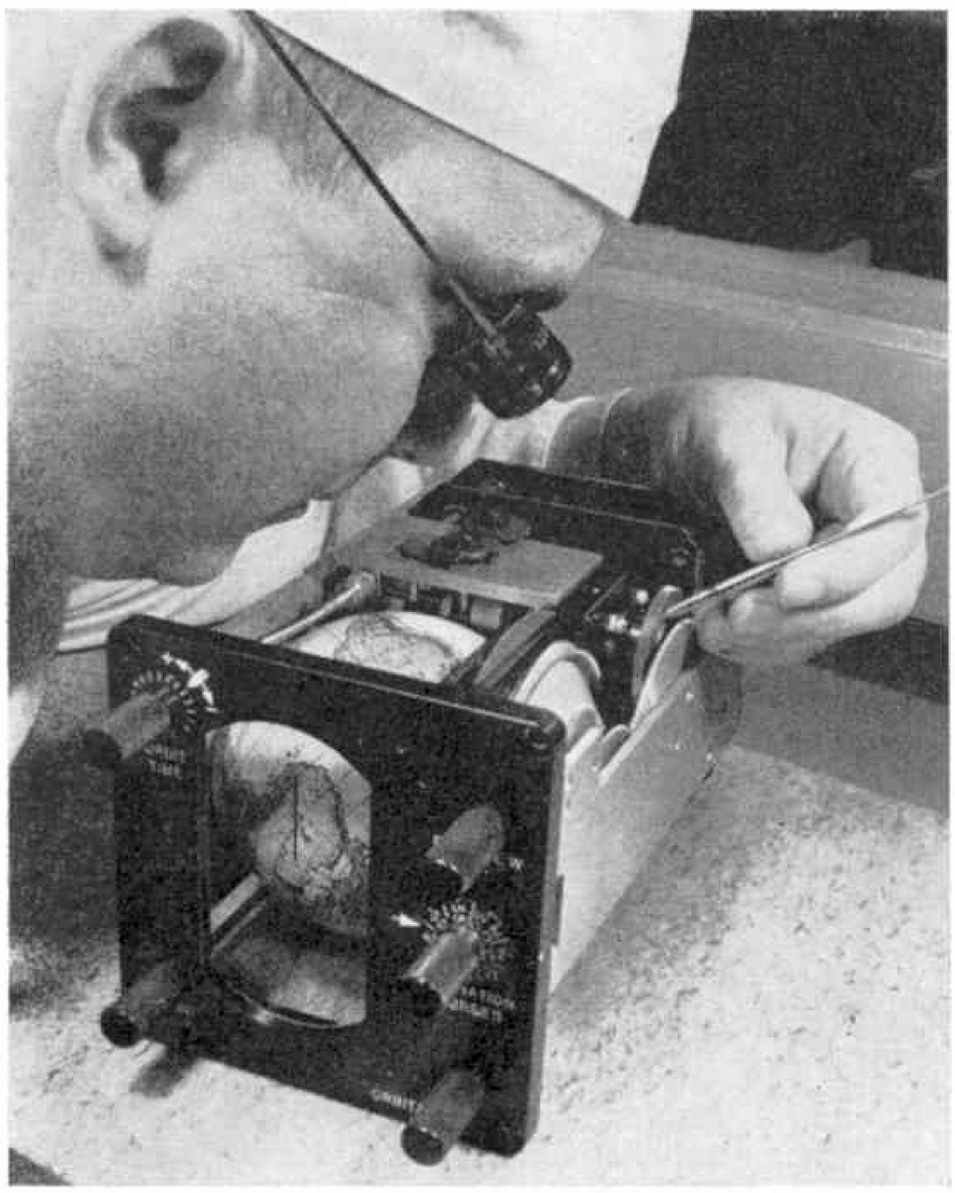
Living quarters and control panel of the Minneapolis-Honeywell space cabin simulator.

* * *

Another feature of the simulator is a built-in atmosphere control system with delicate sensing equipment to measure oxygen, carbon dioxide, nitrogen and carbon monoxide. A complex system of controls automatically pumps in oxygen, if required, and catalytically filters carbon monoxide. Provision is even made for astronauts to enjoy a smoke. The system includes a high voltage electrostatic filter to ionise and trap dust and smoke particles. The space capsule is provided with heating and cooling elements for temperature control, and a humidity control device that can pull moisture from the air and store it along with the water supply.

Food for the simulated trip is non-perishable so refrigeration is not required, but a heating element is provided to warm up soup and coffee. The space capsule includes a panel with instruments which

record environmental conditions and controls to alter these conditions. Also included are simulated space navigational controls for "flying" the capsule. Information from the space capsule is piped outside to a highly-instrumented console which records environmental conditions and occupant reaction for study by space medical researchers.



This new space compass will tell America's first astronaut just where he is as he circles the Earth. This photograph and that of the space cabin simulator are reproduced by courtesy of Minneapolis-Honeywell.

EARTH PATH INDICATOR

A small black box that contains a revolving replica of the world may help America's first astronaut to return safely to Earth.

The new device, called an Earth Path Indicator, will enable the astronaut to know just where he is over the Earth at all times as he orbits at 18,000 miles an hour. Space engineers of Minneapolis-Honeywell, who developed this unique instrument for Project Mercury, said it would be the major source of position information for landing if the astronaut were to lose contact with ground tracking stations.

The position of the orbiting capsule becomes critical at the time the astronaut fires the rockets that will return him to Earth. The capsule is designed to land safely in water. A miscalculation of positions could cause the astronaut to hit land instead. The Earth Path Indicator is designed to supplement electronic navigation equipment on the ground and in the orbiting space capsule. It is mechanically powered so that it will operate independently of the capsule's electrical system.

The globe inside the shoebox-sized Earth Path Indicator revolves slowly to duplicate the position of the Earth under the orbiting capsule.

The astronaut will view the globe through a window on his instrument panel as if he were actually seeing the Earth below him through a window in his capsule. Markings on the globe show longitude and latitude, the continents, topography and the major cities. A bull's-eye sight on the window of the instrument pinpoints the capsule's location and other markings indicate the place where the capsule would land when ejected from orbit.

The instrument will be set by the astronaut after he reaches orbit, using information relayed to him from ground tracking stations. The device has four adjustments to correspond to the capsule's orbit path and speed. The globe revolves, just as the Earth does, around a north-south axis, while at the same time revolving around a second axis to duplicate the capsule's travel. In effect, the globe revolves in two directions simultaneously. This movement in two directions, plus the fact that the indicator can be adjusted to any orbit path, made development of the device extremely difficult. It is, despite its appearance, a highly complex instrument.

ROMANCE OF THE PENNY

TODAY in Britain, shopping or travelling, we carry coins or paper notes. These are much more convenient than some of the currency still used in many markets of the world.

It would seem strange to take a cluster of dogs' teeth, a collection of shells, a piece of iron, a bar of salt—which has had some furtive licking—or a lump of beeswax for our week-end joint or groceries. Neither would we care for the time-wasting method of exchanging goods by barter, a primitive system which would not appeal now.

In spite of the fact that the humble penny has, within its sombre outward appearance, an epitome of English history, it is mostly held in small esteem. More than 500 millions are missing from the total minted since 1860. Some are out of general circulation through hoarding, 25,000 new ones were recently brought to a bank; many are tied up in automatic machines, amusement arcades, gas meters or hidden in drawers, arm-chairs, dropped in sand on the sea-shore, carried into other lands by emigrants or visitors. But tons have simply disappeared, no one knows where.

In itself, a lost penny does not arouse much emotional regret, yet it can tell a story or surpassing interest. That story begins with Offa, ruler of Mercia, who, unifying the kingdom, was called King of the English. He issued the first penny—a silver one—in A.D. 774. This continued in general use for five centuries. With its copper and bronze successors, the penny illustrates most of our monarchs from that time until now, with the exception of the kingless Commonwealth, and records many of the ups and downs of our island saga.

William the Conqueror found the English coin of better quality than his own, and continued its use; Henry III coined a gold penny worth 20 silver ones in 1258, but it proved unpopular. In 1730, the silver penny ceased to be coined except for Maundy Money. Towards the end of George III's reign, the cartwheel penny weighed one ounce—our present pennies weigh three to the ounce. Very clumsy, it was reduced in size and finally, in 1860, made of bronze instead of copper, it became very like the present day coin.

Anyone hopeful of collecting a complete set of bronze coinage for each year since 1860 will be doomed to disappointment. There was an unbroken series from that date to 1922, but none were minted 1923–1925, 1941–1943, 1949, and 1951.

Legends of the fabulous value of certain issues are without foundation. In 1862, few were minted owing to the previous year's over-plus. Their rarity encouraged a rumour that a disgruntled employee wilfully threw ingots of gold into the cauldron of copper.

Said to be worth the fabulous sum of £30,000, six token pennies only were minted in 1933, owing to a glut of those in circulation. All are in the safe custody of museums, or beneath foundation stones, and never likely to get into private hands.

Britannia on the British penny is popularly supposed to have been modelled from Frances Stuart, a court favourite of Charles II. Coming to England in 1662, she is believed to have played as the character of Britannia in charades. Painted by Lely, she was used by the famous engraver Roettier on the Restoration medal, and afterwards on two medals struck in 1667 to commemorate our naval victories, and the subsequent peace of Breda. A critical chronicler of that day comments, "No woman could have less wit or more beauty."

This likeness appeared on the coinage of 1672, and by then had been generally accepted as the ideal human symbol of Britain's greatness. In 1797, Britannia grasped the trident instead of the spear —an allusion to the victorious British Navy—and held out the olive branch of peace which was dropped in 1825.

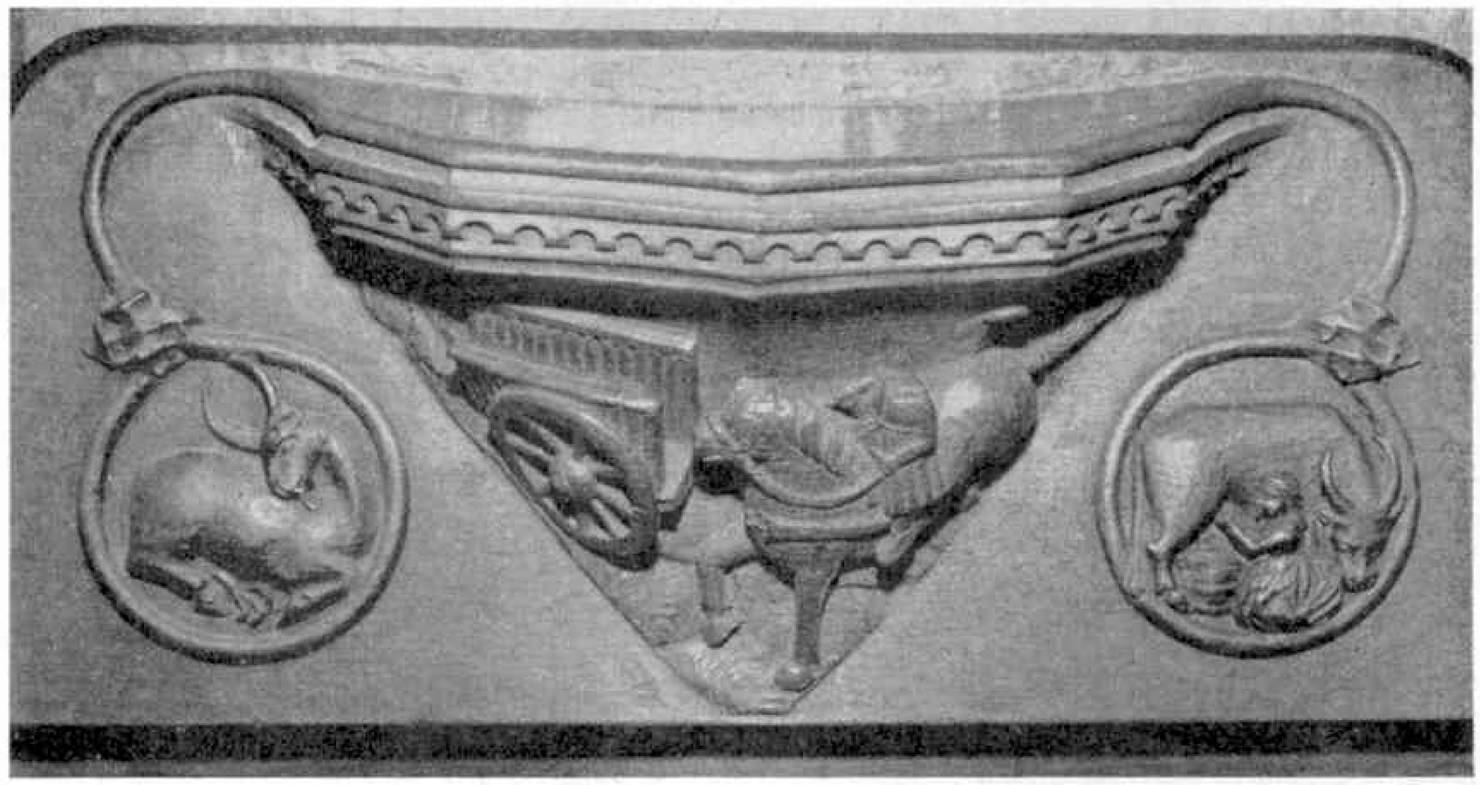
Proposals to change over to decimal coinage have often been mooted, but our penny has had an almost unbroken life of a thousand years with 240 to the pound from its beginnings until now.—**F. P. GENT**

J. C. D. Smith Relates

The Story of

Medieval Mercy Seats

WONDERFUL WOODCARVINGS THAT ARE PART OF OUR HERITAGE



Putting the Cart Before the Horse.

OUR history books are full of the lives of kings and queens and the aristocracy but we seldom have an opportunity of learning very much about the lives of ordinary people who lived in the Middle Ages. Wouldn't you like to know more about the ordinary common man and about his everyday tasks, his games, and the stories and fables he used to tell? If so, then a very pleasant way of doing this is by studying misericords.

It is a pity that most people hardly know of the existence of this medieval heritage of woodcarving. Most of us have visited some ancient cathedral or some large and beautiful parish church and we have probably noticed the intricate woodcarving in the choir stalls; but how many people have taken the trouble to look under the lift-up seats in the choir? If you have never done so, then next time you visit a cathedral or other fine old church look on the underside of these seats and you will probably see a small ledge. This ledge is called a misericord and under it you will probably find a wonderful piece of woodcarving.

THE PURPOSE

It is these carving which will probably interest us most, but first of all we should ask ourselves what is the purpose of the ledge. To understand this we must know something about the life of monks and other religious orders. The life of a monk is essentially the service of God through work and prayer and meditation. Monks live a communal life in a monastery and much of their divine worship is communal worship at which they sing the divine offices together. At various times throughout the day they are called to sing the various offices of the day—Lauds, Prime, Tierce, Sext, Nones, Vespers and, finally, Compline. Right from the very early days of the Church the normal posture for singing the office was standing and this, for the younger monks, must have been a mild penance. But for the older ones, and for the infirm, all this standing was too much and so the rule was gradually relaxed and permission was granted for the fixing of small ledges under the seats, so that the occupants could adopt a half-sitting, half-standing posture. Thus they were able to take a little weight off their legs.

A Woodcarver at Work

The word "misericord" is derived from the Latin word "*miserere*" which means "mercy". The misericords are sometimes called "misereres" or "mercy seats".

AMONG THE EARLIEST

The ledge itself is usually quite plain but the wooden support underneath is carved, and to those who are acquainted with the lavish use of decoration during the Gothic period—and it was during the Gothic centuries (the three of four centuries before the Reformation) that these seats were made—it is no surprise to see them elaborately decorated.

Most of the monastic seats disappeared during the Reformation years but the singing of the Divine Office was also performed in our beautiful cathedrals and in many larger collegiate chuches, and it is in these places that we can still see the art of the medieval woodcarvers.

Some of the earliest misericords in England can be seen in Exeter Cathedral, and at Christchurch, Hants., they date back to the thirteenth century. However, most of the seats that have survived are of a later date—fourteenth to early sixteenth century. In some churches at the present time there are modern misericords, but these are often copies of ancient work.

Some of the woodcarving, particularly in small parish churches, may be a little crude in its workmanship but most of the misericords in large cathedrals are exquisite pieces of wood sculpture. What will probably interest the reader far more than the skill with which the carving has been carried out is the subject matter itself. This causes a lot of people to be more than mildly surprised for the subjects dealt with are by no means all religious ones. In fact, most of them have little direct bearing on the religion of the carvers.

The craftsmen chose almost anything for the misericords, including representations of all kinds of animals and birds; some recognisable, some imaginary. They illustrated their fables, romantic tales and legends and, indeed, their jokes. Domestic scenes and squabbles were popular subjects, as were men and women at their daily work.

MYTHOLOGICAL SUBJECTS

Even a casual observer would soon notice how frequently animals are represented on the misericords, but this is hardly surprising when we remember how much closer to Mother Nature our an-

cestors lived than we do, and how much more familiar with all kinds of wild animals they must have been. Yet, this cannot be the full explanation for many of the animals portrayed are foreign to this country—camels, elephants, lions and tigers. Others are mythological animals such as dragons, wyverns and double-headed, or double-bodied, monsters. The source of many of these animals was the Physiologus or the Bestiaries. The Physiologus was a medieval, illustrated encyclopædia of animals which attempted to explain their habits, sometimes accurately but very often fictitiously, and the symbolic significance of these beasts.

A very popular subject of medieval woodcarvers was the Pious Pelican restoring her fledglings to life with the blood of a self-inflicted wound on her breast. This is, of course, symbolic of the Redemption through the shedding of the blood of Christ.

The medieval fables of Reynard the Fox, Bruin the Bear, Tybert the Cat and many others are very common. A wonderful series illustrating the stories of the sly and cunning misdeeds of Reynard exists in the choir stalls of Bristol Cathedral. In spite of his cunning, Reynard had to answer for his crimes, and the hanging scene was one often portrayed by the carvers.

In the many scenes of men and women squabbling, more often than not it is the poor, unfortunate husband who is being beaten over the head with a frying-pan by his wife, rather than vice versa. A good example of this can be seen at Whalley, in Lancashire.

Most misericords have some amusing characteristic, especially those depicting absurdities or topsy-turvy subjects. Men riding horses backwards, and animals trying to eat their tails, are not uncommon. Everyone has heard of the saying "Putting the cart before the horse." This is illustrated at Beverley Minster. At Malvern, mice are shown hanging a big fat cat. There are many scenes of men doing women's work; at Ely, for instance, it is the husband who pounds the corn in a mortar while his wife does the looking-on.

A Domestic Squabble.

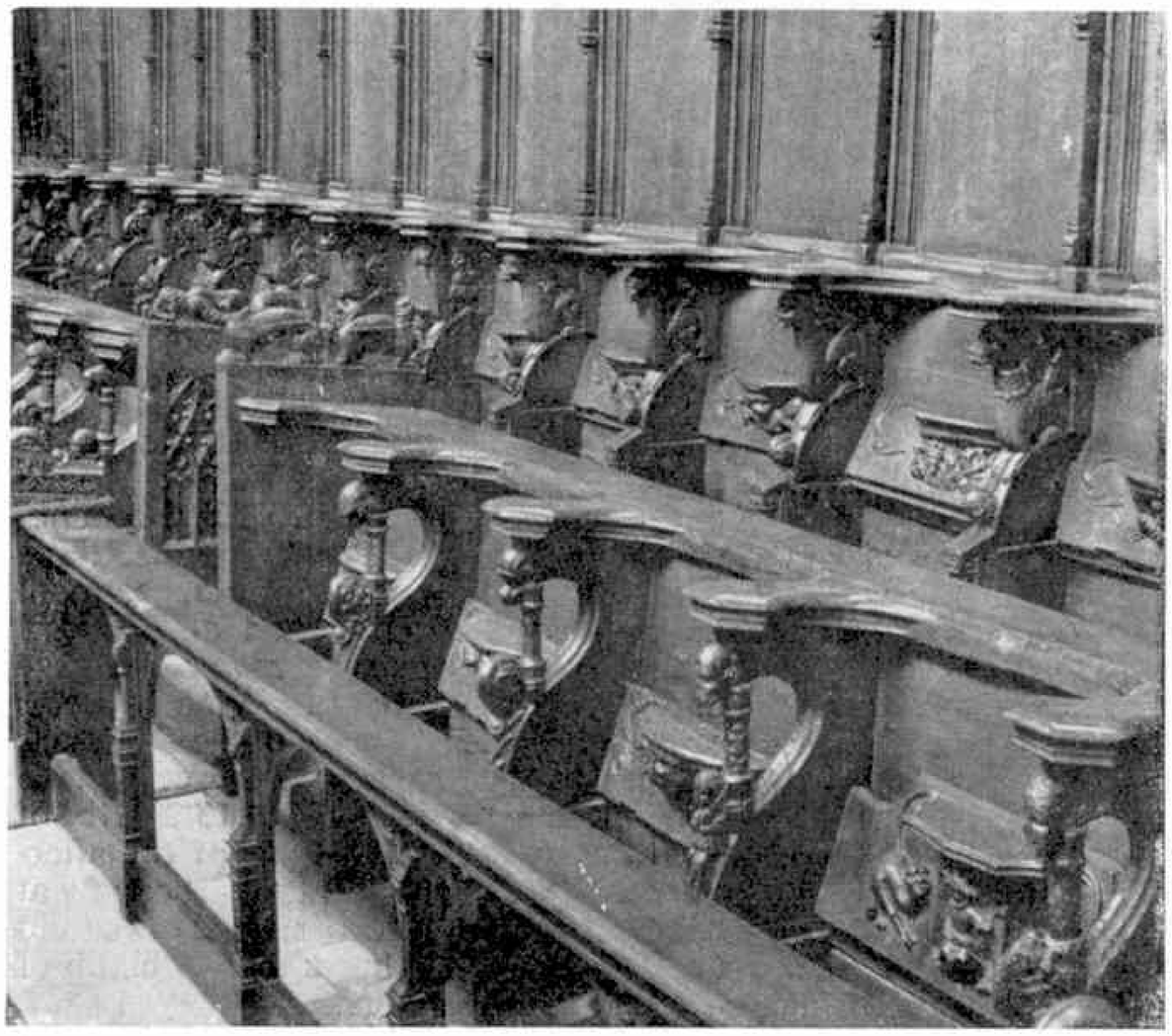
DATES AND INITIALS

The dating of misericords can provide a most interesing item of research. In several cases the date is an integral part of the design of the carving. Often one comes across initials and these are frequently those of an abbot or bishop, or other important person. Dates of some misericords may often be traced through examination of heraldry carved on them.

Misericords are seldom mentioned in church records but there is frequent mention of money spent on the choir stalls. A study of the armour and clothing can very often give is a clue. For example, the horned headdress or "hennin" worn by ladies, carved at Ludlow and Tansor, was in fashion between 1430 and 1440 and therefore these misericords cannot have been created before that time. Even such details as the length of hair worn by men, and whether or not they are depicted as clean shaven or wearing moustaches, sometimes provides useful evidence. The style of the seat is, of course, significant and one would expect the later examples to be more complex than the earlier ones.

If any reader decides to visit a cathedral or other large church to study the misericords he should take a pocket torch with him, as most choir stalls are dimly lit at the best of times. He must also be prepared for a great deal of back bending, as the misericords are near the floor and in a confined space. There is little doubt, however, that anyone who makes such a visit will be well rewarded for his pains.

Left: Choirstalls at Christchurch. Right: Man trying to shoe a goose.



Russia's New Airbus

AIR NEWS

By JOHN W. R. TAYLOR

DIRECT from Moscow comes the photograph on page 11 of Russia's new twin-turboprop Antonov An–24 airliner. Intended for use on Aeroflot's local services in remote areas of the Soviet Union, it is a modern counterpart of the wonderful old Douglas DC–3, able to operate from small grass airfields, but offering a cruising speed nearly twice as fast as the aircraft it will replace.

No dimensions or weights have been released, but the An–24 is powered by two 2,000 h.p. Ivchenko engines and must be smaller than the Handley Page Herald or Fokker Friendship. Its roomy cabin seats from 32 to 42 passengers in four-abreast seats, arranged in pairs on each side of a central gangway. The interior is pressurised, air-conditioned and sound-proofed, and the standard version has a galley, cloakroom, toilets and baggage and freight compartments.

The An–24 cruises at 310 m.p.h. at 19,700–26,250 feet on 500–750 mile stage lengths. It will take off with a full load in under 1,500 feet and land in less than 1,300 feet. Full radio, instruments and radio navigation aids are carried for day and night operation in all weather conditions.

Spotters will notice that it has slightly downswept wingtips, like its bigger brother the four-turboprop Antonov An–10A Ukraina.

JET MERCY FLIGHT

The Royal Air Force and the Royal Rhodesian Air Force recently pooled resources to win a dramatic 5,000–mile relay race against time, by rushing a special breathing apparatus from Britain to Southern Rhodesia in 24 hours.

A newly-developed Swedish apparatus was needed urgently for a child patient in the Red Cross Polio Centre, at Salisbury; so the Red Cross sent out an S.O.S. to the Rhodesian Air Force who, in turn, contacted the R.A.F.

The R.A.F. agreed to help, and alerted the crew of a Canberra jet-bomber of No. 58 Squadron of Wyton (Hunts.). When the breathing apparatus was delivered there in the early hours of the morning the Canberra took off immediately. It refuelled at El Adem, near Tobruk, and touched down at Nairobi, Kenya, late that night. There, the Royal Rhodesian Air Force took up the running. The breathing apparatus was transferred to a Canberra of No. 5 Squadron R.R.A.F., and by eight o'clock the following morning had been delivered to the polio centre in Salisbury.

HERCULES HUNTS TYPHOONS

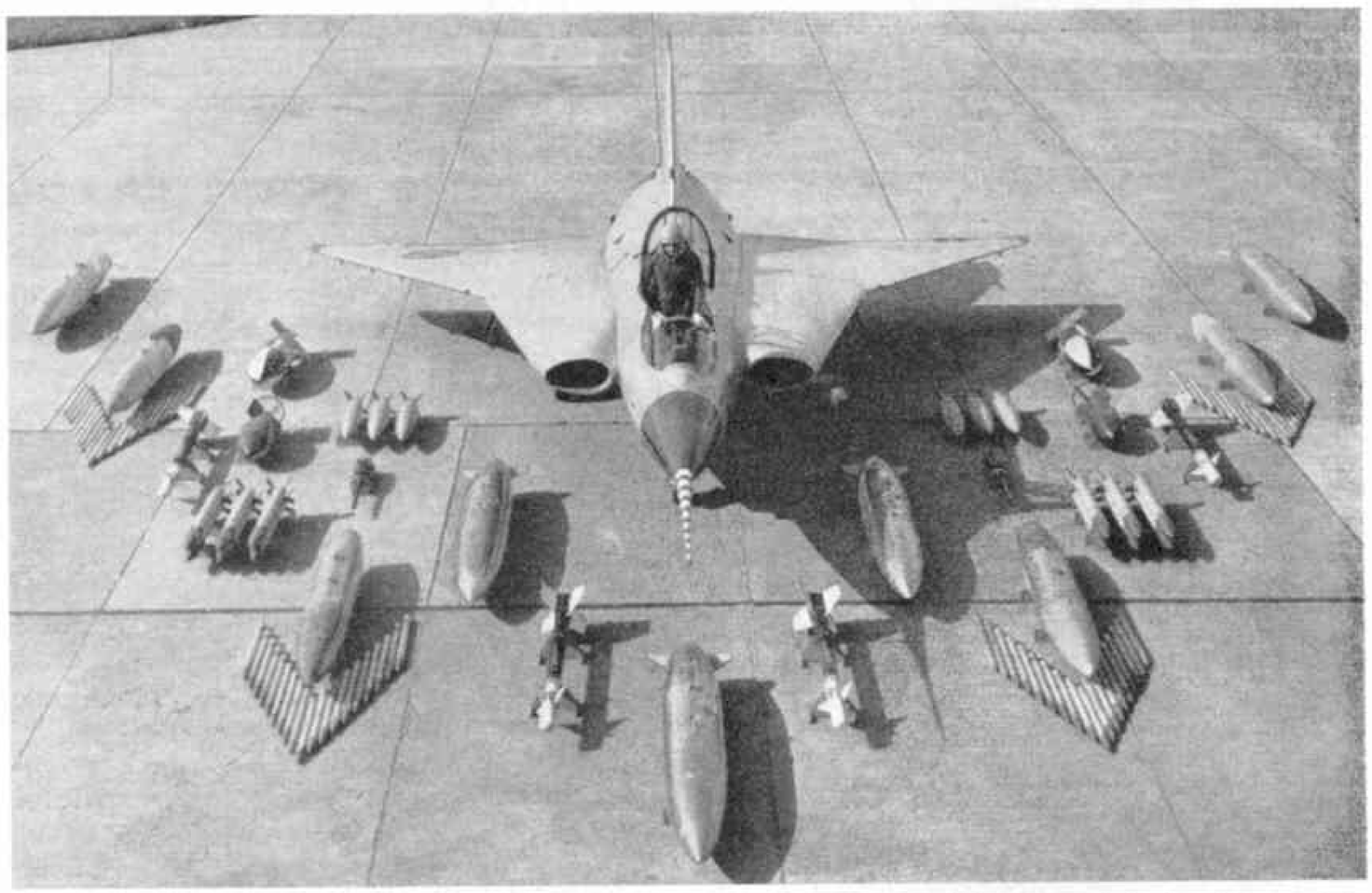
Latest job being done by Lockheed C–130 Hercules transports of the U.S.A.F. is to find and keep track of typhoons in the area around Japan. Operating from Tachikawa Air Base and from the island of Okinawa, these 62-ton turboprop aircraft had flown well over 200 hours on this work by the end of last summer. It is expected that their advance warning of the approach of future typhoons will save many lives.

The Hercules is fast becoming one of the most versatile aircraft in the world. Its main job is to carry troops and equipment and it is operated in this role by the U.S.A.F., Royal Australian, Royal Canadian and Indonesian Air Forces. It is used for photo-mapping by the U.S.A.F., as a ski transport in the Arctic and Antarctic by both the U.S.A.F. and the U.S. Navy, and as a search and rescue aircraft by the U.S. Coast Guard. Soon it will become an in-flight refuelling tanker with the U.S. Marine Corps, and it is being tested as a launch aircraft for target drones.

All versions of the Hercules are powered by four Allison T56 turboprop engines of 3,750–4,050 h.p. each. Normal load is 92 troops, 74 stretcher cases and two attendants, or 20 tons of freight. More than 350 have been ordered, of which 300 are already in service.

THE DRAGON'S TEETH

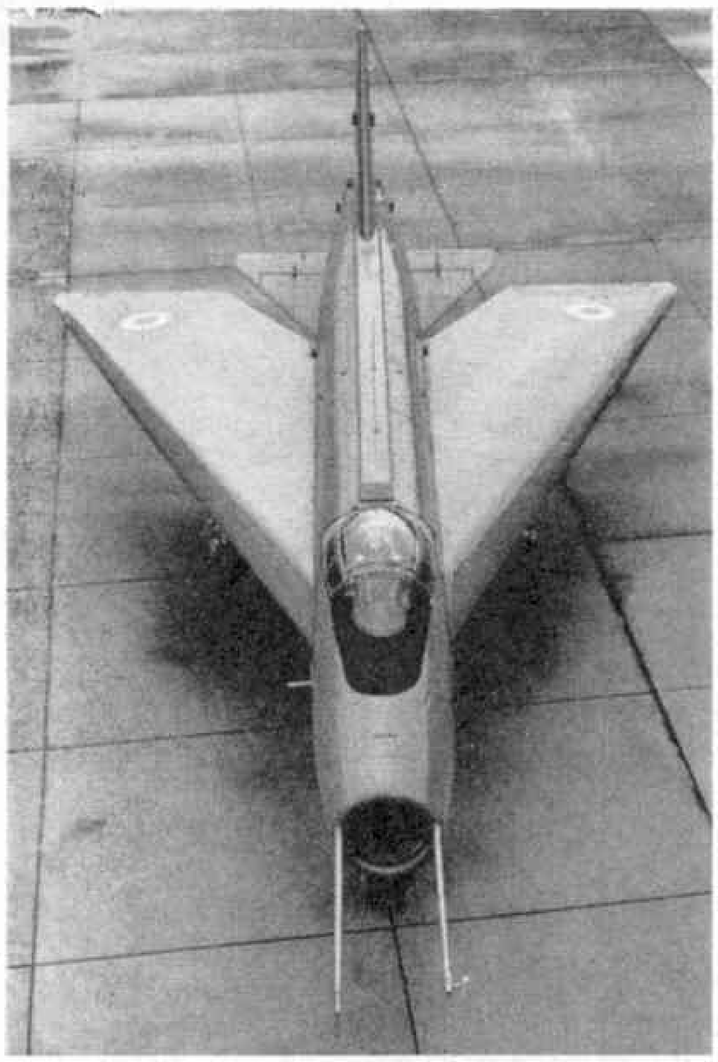
Although the Saab J35 Draken (Dragon) single-seat fighter is fairly small by present-day standards, with a span of only 30 ft. 10 in. and loaded weight of 17,600–19,800 lb., it packs a mighty punch.



Alternative armament for the Saab J35 Draken is displayed here around the aircraft itself. The variety of arms which it can carry are referred to in this article.

Some of the alternative loads it can carry are shown in the photograph on this page. Starting on the left, they include an 880 lb. underwing fuel tank, a rocket pod containing nineteen 3-in. air-to-air rockets, a Sidewinder air-to-air guided missile, a 1,100 lb. bomb, a 550 lb. bomb, six 5.3-in. ground attack rockets, three 175 lb. flash-bombs, a 30 mm. cannon, another air-to-air rocket pod, another fuel tank, another Sidewinder and a large under-fuselage fuel tank.

The latest J35B version of the Draken is powered by the new Rolls-Royce RB.146 version of the Avon, giving 13,220 lb. of thrust even without the use of the afterburner with which it is fitted. It can fly at more than twice the speed of sound (1,320 m.p.h.) and has a rate of climb of 49,000 feet per minute.



The 'plane that made history—the SB.5 seen from above.

THE FINAL TRIP

An important milestone in British air transport was reached on October 31, when the B.E.A. Pionair (Dakota) G-AGHS *Horace Short* flew the Corporation's last scheduled passenger service by a piston-engined airliner from London Airport. It took off at 9.35 a.m. for its last passenger flight to Birmingham. Since then, all B.E.A. trunk routes, both within Britain and international, have been operated by turbine-powered Viscounts and Comets.

At the time this was written, it was expected that the first of the big turboprop Vanguards would help out during the Christmas rush, but this fine new airliner is not due to enter regular service until April.

Readers who are interested in history might like to know that G-AGHS was the 10,099th aircraft of the DC-3/C-47/-Dakota series built by Douglas. It came off the assembly line in California on August 20, 1943, and was delivered to B.O.A.C. on September 6 that year. During the war it flew many operations to Lisbon and Gibraltar and along the North African coast to Cairo. It joined B.E.A. on August 1, 1946, and had logged altogether 23,047 flying hours by the end of October last year—equivalent to two years, seven months and 20 days in the air.

SUPER-SWEPT SB.5

The Short SB.5 adjustable-wing research aircraft, which was used to flight test at low speeds the wing shape chosen for the English Electric Lightning fighter, made history on October 18 when it flew for the first time with its wings swept back at an angle of 69 degrees. This is a greater continuous sweepback than that of any other aeroplane in the world.

When the SB.5 first flew in December 1952, very little was known about the performance of highly-swept wings, so it was built in such a way that its wings could be set at 50, 60 and 69 degrees, with its tailplane either on top of the fin or below the rear fuselage. Powered by a Rolls-Royce Derwent engine, it was test flown extensively with the wing in the two lower-angle configurations, as a result of which English Electric knew they were safe in putting a 60° wing on the Lightning.

Now, the SB.5 is going one stage further. To give it more power, its original engine has been replaced by a Bristol Orpheus turbojet. The wing has a drooped leading-edge of the kind being used increasingly on very fast aeroplanes. Other changes include modifications to the undercarriage to suit the altered centre of gravity, revision of the cockpit layout and instruments, and the installation of a Martin Baker ejection seat of the type that can be used safely at ground level.

A RECORD YEAR

A total of 90,332 cars, representing an increase of 22,880 in twelve months, crossed the Channel on board Silver City Airways' Bristol Superfreighter ferry planes in the year ended September 30, 1960. Passengers accompanying their cars totalled nearly 220,000, compared with 190,000 in 1958–59, and the number of Channel crossings made by the Superfreighters rose from 29,000 to 40,000.

In the same period, the total weight of freight, including cars, carried by Silver City jumped by approximately 35 per cent. to 135,607 tons, which is probably a record for any airline in the world.

THREE-COUNTRY AEROPLANE

A small aeroplane which may look quite ordinary, but which is, in fact, pointing the way to an entirely new kind of international co-operation in aircraft design and production, is the LASA-60. Its story began in 1959 when Lockheed Aircraft and some local businessmen formed a company known as Lockheed-Azcarate S.A. to build a sturdy 4–6 seat aeroplane for passenger and freight use in undeveloped areas of Mexico.

The design work was done at Lockheed's factory in Marietta, Georgia, and the prototype LASA-60 was also built there. It flew for the first time on September 15, 1959, and has since undergone a very successful test programme. In fact, it looks so promising that it is now being built in at least two more countries, as well as in Mexico. It is being manufactured in the Argentine by a new company named Aviones Lockheed-Kaiser Argentina. In Italy, production is already well under way at the Milan works of Aeronautica Macchi, in which Lockheed have a financial interest.

In its production form, the LASA-60 is an all-metal high-wing monoplane, powered by a 260 h.p. Continental TSIO-470 engine. It spans 39 ft. 4 in., is 28 ft. 1 in. long and has a normal loaded weight of 3,532 lb. Top speed is 167 m.p.h. and it will carry a full payload for 250 miles at 150 m.p.h.

BUILDING BENSENS

Production of the Bensen Gyro-Glider and Gyro-Copter is well under way at Campbell's Hungerford factory, and the first machines off the line should have flown by the time this issue of *M.M.* is published.

As most readers will know, the Gyro-Glider is a simple rotor-kite which is lifted into the air by its windmilling rotor when towed behind a car. As it is unpowered, no licence is required to fly it and it would make a fine birthday present for air-minded boys with wealthy dads!

The Gyro-Copter is much the same thing, except that it is fitted with a 70 h.p. McCulloch engine, driving a pusher propeller and is, therefore, an autogyro. It can provide a lot of fun for a more experienced pilot and it will be interesting to see if these little rotorcraft become as popular here as they are in America.

* * * *

Aeroflot has been using helicopters to unload ships in Amur Bay, Vladivostok in the far east of Russia. They have cut unloading time very considerably, and the idea is to be tried out next in northern Soviet ports, where ice prevents ships from pulling close to the shore in winter.

This picture from Russia shows the Soviet's new twin-turboprop Antonov An-24 airliner.

Farmlands From The Sea Bed

FOR many centuries the Dutch have been waging a continuous battle against their oldest enemy—the sea. In modern times they have been victorious, since great areas of land, engulfed at earlier periods, have been reclaimed for agriculture and building. Nevertheless, the watch on the waters dare not be relaxed by day or night.

An elaborate system of dykes and pumping stations extends for more than 1,000 miles along the open coast and around the numerous river deltas. Without this protection, nearly half the entire surface of Holland would be under water, for in many of the drained areas, where millions of people live and work, the ground is as much as sixteen feet *below* the level of the North Sea.

Now, Dutch engineers are steadily completing the biggest land-winning scheme they have ever undertaken. This is the drainage of a large part of the former Zuider Zee — nowadays called the IJsselmeer—which will add one-tenth to the total land area and vastly increase the productive capacity of Holland. The task is obviously a gigantic one. It was begun just forty years ago and is not expected to be completed until about 1980.

* * *

Already, however, thousands of farmers and their families are getting a good living from the rich soil of the reclaimed polders. (These are former sea areas which were enclosed by dykes and pumped dry.) Many villages have been built and a network of good roads links these and more than 2,000 new farms which are under cultivation. More farms are being established every year and a town for five or six thousand inhabitants which, one day, will be the capital of the new Dutch province, is now taking shape above the waters and the mud. This town is to be called Lelystad in memory of Dr. Cornelius Lely, the brilliant engineer who devised the first successful plan for draining the Zuider Zee about 70 years ago.

By W. H. Owens

All kinds of schemes for getting rid of this deep arm of the North Sea, which penetrates into the heart of Holland, had been suggested before that of Dr. Lely, but not one had been practicable. His own proposal included the construction of a mighty barrier dyke or dam against the open sea, thereby converting the Zuider Zee into a freshwater lake. Behind the dam, five large polders were to be drained, while a part of the water area would be left as a reservoir for water supply and irrigation.

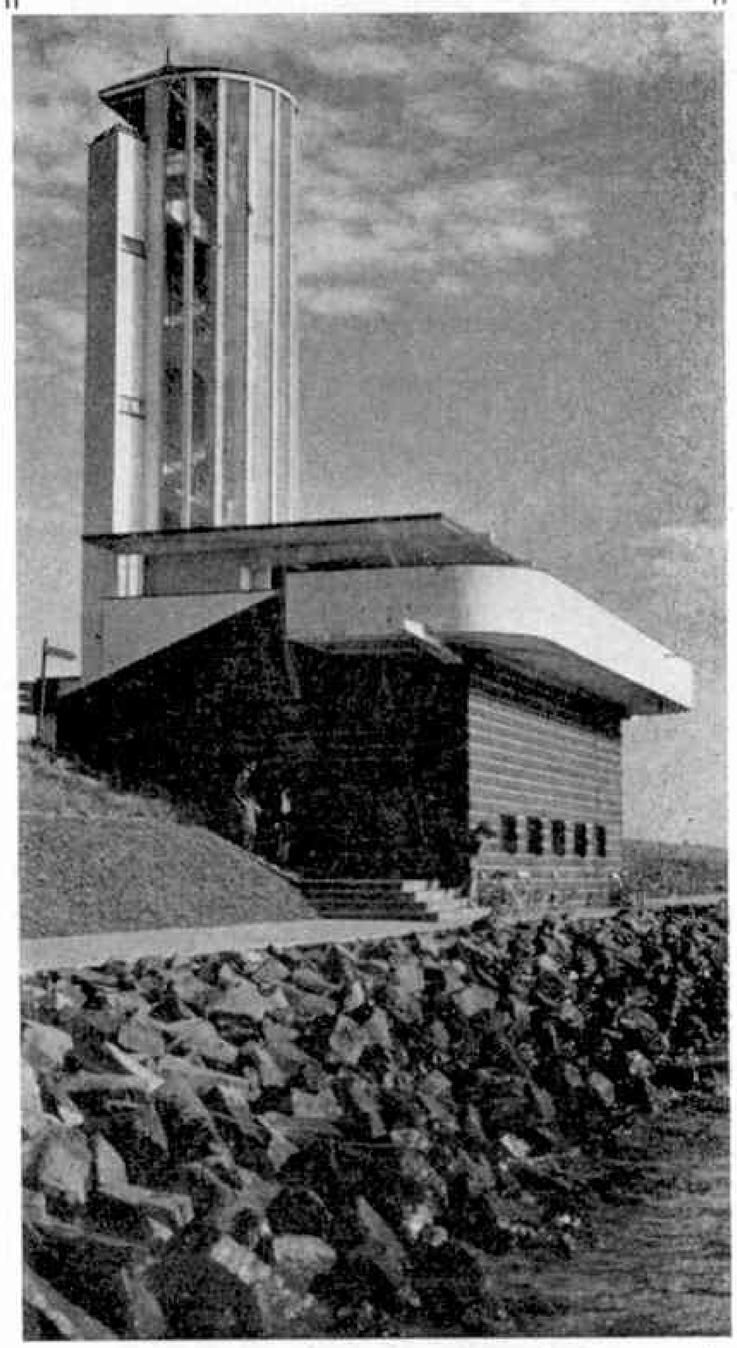
The great barrier dyke is one of the world's outstanding achievements of its kind, and a striking tribute to the skill of Dutch hydraulic engineers. It stretches for just over twenty miles from North Holland to Friesland, and a fine motor road along the top provides a short cut for traffic between the two provinces. Driving on this straight and level embankment, which is lapped all the way by the North Sea tides, is a most unusual experience, especially when you get beyond sight of all other land.

It was not until 1918 that the Lely plan was finally approved by the Netherlands Government, a series of flood disasters around the shores of the Zuider Zee finally prompting official action. Two years later, work began on the barrier dyke. This was constructed in two stages —from the mainland of North Holland to the island of Wieringen (1½ miles), and from there on to the shore of Friesland Province (19 miles). When, in May 1932, the last gap in the long dyke was closed, the centuries-old sea threat to Amsterdam and the centre of Holland was removed for good.

The barrier dyke, like the smaller dykes now protecting the new land areas behind it, was built up mainly of boulder clay, sand, clay, brushwood and stones. Boulder clay, a material highly resistant to flowing water, conveniently occurs in large deposits on the bed of the IJsselmeer, from which it is recovered by powerful dredgers. The material offers sufficient resistance to strong currents to enable a dam to be built up, without any covering, to a height above water level. Brushwood mattresses, sunk and fixed below the water level, protect the sides of the dykes against the scouring action of the tides, and above the water line is a protective overlay of stones.

Closing this great inlet by the 20-mile dyke brought lasting advantages to

Where The Gap Was Closed



This monument marks the spot where the last gap in the 20-mile barrier dyke was closed on May 28, 1932. It bears the inscription, "A nation that lives builds for the future".

An aerial view of one of the many floating cranes used in the huge reclamation scheme.

Holland. It stopped the salting-up of the surrounding farmlands, created new fresh-water supplies for towns in Western Holland and, not least, greatly reduced the distance by road between the two coastal regions of the country. Furthermore, the subsequent construction of the new polder dykes was made much less difficult and less costly through not being exposed to tidal movements.

In damming up the Zuider Zee, of course, there was the big problem of the outflow of rivers such as the IJssel, and the overflow from drainage channels of neighbouring polders. All this excess water drained out by way of the Zuider Zee to the North Sea before the barrier dyke was built. The problem was overcome by constructing sets of sluice gates at both ends of the dyke, and these gates control the level of the IJsselmeer at all times. The excess water is discharged regularly at ebb tide periods when the North Sea, on the outer side, is at the lower level.

Meanwhile, in 1927, a small trial polder of about 100 acres was drained on the western side of the Zuider Zee. Over a period of seven years many experiments were carried out there relating to methods of drainage, soil treatment and the selection and cultivation of suitable crops. The results of these trials proved of tremendous value and saved costly mistakes when the full-scale polder construction began.

* * *

So far, two out of the five polders in the Zuider Zee project have been reclaimed, built upon and settled with farms and villages. These are the Wieringermeer Polder, which is today a thriving agricultural area of 50,000 acres, and the considerably larger Noordoost Polder of 119,000 acres, which was reclaimed during the last war. Work is now well advanced on East Flevoland (133,000 acres), one of the three remaining polders which will occupy practically the whole of the southern half of the former Zuider Zee.

At strategic points on the enclosing dykes, powerful pumping stations are built to drain the polders dry and subsequently maintain the drainage canals at the required level. Two pumping stations drained the Wieringermeer Polder dry in about six to seven months. Then the heavy, salt-laden land, which for long centuries had been the sea bed, was gradually salted out and so transformed into workable agricultural soil and building land. This was achieved by making the water-table in the polder four or five feet lower than the lowest ground level, and drawing off the salt water by means of long, deep ditches and land drains. This is, in fact, the process followed in the making of each new polder.

It was the Wieringermeer Polder which the Germans flooded again just before their wartime retreat from Holland in April, 1945. Gaps were blown in the protective dykes against the IJsselmeer, but as it took about two days to fill the polder all the inhabitants were able to get away to safety. Very great damage, however, was caused to homes and farm buildings, many of which collapsed against the heavy, oncoming swell of water.

Most fortunately, the Germans never breached the long barrier dyke against the North Sea to flood all the hard-won lands with salt water all over again. That, indeed, would have been a tragic catastrophe for the brave Dutch people. As it was, the priority task of pumping out and drying the polder was completed in only seven months—a record undertaking—and Wieringermeer was able to be restored to its pre-war fertility and prosperity in a reasonable time.

The Noordoost Polder, which was reclaimed in spite of tremendous difficulties during the German Occupation of Holland, is actually fourteen feet below sea level. When it was pumped dry, in 1942, some 330,000 million gallons of water had to be removed, and three big diesel-driven pumping stations were built for the task. *There is now a town at the centre, a ring of villages, roads and canals lined with trees, and a local inn with the fitting name of "The Hotel Beneath the Sea". It is difficult to realise that nothing at all stood or grew on this now well-cultivated area eighteen years ago—nothing but water and mud.*

Work began on East Flevoland, the biggest polder so far, in 1950. A 56-mile dyke was constructed in the IJsselmeer, starting from the town of Harderwijk, on the mainland, and circling back again. The area was pumped dry about three years ago, and preparations for cultivation are now well ahead. A network of about 350 miles of roads will cross East Flevoland in all directions, and bridges will link it to the mainland and to the Noordoost Polder. Here, too, rapid progress is being made with Lelystad, the new town that will house about 30,000 people and will be the business centre and capital of a prosperous new Dutch province which has risen entirely from beneath the sea.

BOOK REVIEWS

Every day of our life we make use of all types of machines; clever inventions are put to practical application by thousands of people, many of whom accept them for what they are without bothering to learn what makes them "tick". For the younger reader **Everyday Machines** by Herman Schneider, with illustrations by Jeanne Bendick (Brockhampton Press Ltd., price 12/6) tells you all about such things as locks, clocks, bells, roller skates, vacuum cleaners, sewing machines and even ball-point pens in an easy-to-read manner.

Every schoolboy knows the story of Icarus, who flew too near the sun. He lived—and died—in legend but in actual life there have been men who, determined to fly like a bird, have succeeded in doing this through the modern invention of the helicopter. Their story is told in exciting fashion in **Hover Craft** by Angela Croome (Brockhampton Press Ltd., price 15/-). The book, profusely illustrated, has some quite outstanding sketches which include descriptions of the earliest attempts at a hover craft, among them Leonardo da Vinci's idea of an ornithopter, Sir George Cayley's Aerial Carriage and John Wooton's Flying Parasol. Progress made through the centuries is carefully traced.

Man's battle to win land and homesteads from the sea—building dykes at East Flevoland.

Railway Notes

Contributed by R. A. H. Weight

Cross-Country Expresses and Diesels

LONG- or medium-distance cross-country trains have a fascination of their own. Running roughly north to south, or east to west, they avoid London and serve a number of principal cities or towns. They traverse sections of various trunk routes as well as more secondary lines and enable the observant traveller to discern differing styles of station or line-side architecture, locomotives and rolling stock, junctions and branches. At the same time they provide valuable through and connecting services to and from many points.

Among such trains, locomotive hauled, and running daily with restaurant cars, through three or more Regions, is *The Devonian* connecting Bradford (Forster Square) and Leeds (City) with Torquay–Paignton, by way of Sheffield and Derby (Midland), Birmingham (New Street), Cheltenham (Lansdown), Gloucester (Eastgate), Bristol (Temple Meads), and Exeter (St. David's). Another is *The Pines Express* conveying portions from Liverpool, Manchester and Sheffield to Bournemouth (West) and vice versa, via Birmingham, Bath (Green Park) and the steeply-graded, largely single-track Somerset and Dorset line, along which the engine is often a 2–10–0 and double-headed trains are sometimes seen. There is also *The Cornishman*, in W.R. territory throughout and hauled mainly by Castle 4–6–0s, between Wolverhampton, Birmingham (Snow Hill), Cheltenham (Malvern Road), Bristol, Plymouth and Penzance. Through carriages for the Torquay line and other Devon coast towns are detached or attached at Exeter.

All three use the same tracks for 32 miles between Gloucester and Mangotsfield, 5 miles north of Bristol; *The Devonian* and *Cornishman* follow almost the same course all the way south of Gloucester to and from Newton Abbot, Devon. *The Devonian* and *Pines* do so between Mangotsfield and the vicinity of Birmingham, the latter train deviating via the Camp Hill loop line in order to face in the right direction at New Street where it transfers from the Midland to Western Division, L.M.R. Using all or part of the same Derby–Gloucester trunk route are through expresses from Newcastle–York to Cardiff, and to Bristol, also Bradford–Bristol, among the more numerous unnamed services.

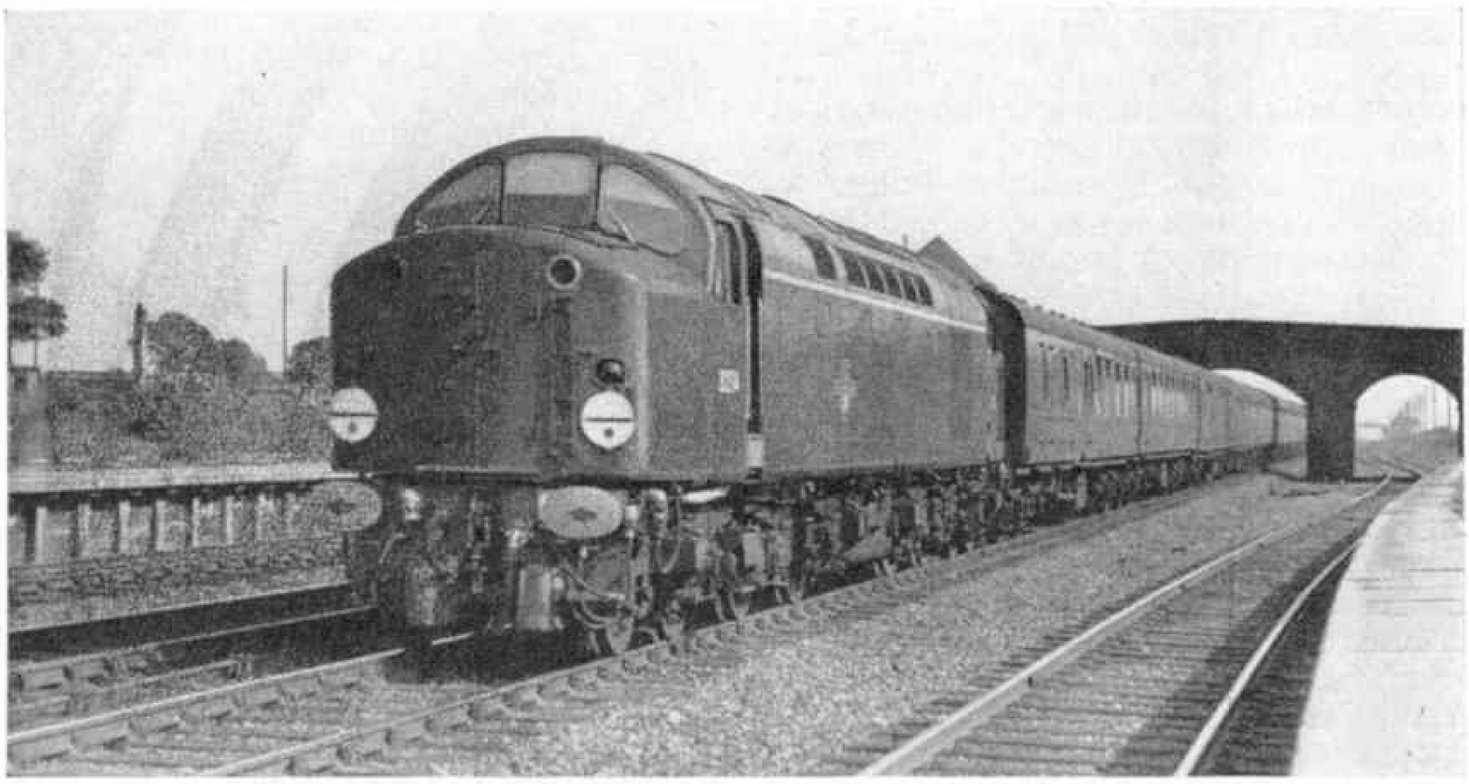
I travelled recently in a diesel set with good front views from Coventry, where station rebuilding was going ahead, to Peterborough. We were on the West Coast main line from Euston at Rugby, where a class 5 4–6–0 waited to connect southbound on a Northampton train: there was also a Princess 4–6–2 northbound with a train for Manchester and Liverpool. After branching off amid a network of lines on to a short stretch used as single track we set off across nearly 50 miles of Midlands agricultural country. We went under two main lines from St. Pancras respectively after restarting from Market Harborough, then near the imposing Harringworth Viaduct on the Melton Mowbray route.

We passed separate junctions with the lines from Manton, Rutland; Stamford; Northampton; and various crossings of the River Nene. Approaching Peterborough we ran beneath the East Coast main tracks just after *The Flying Scotsman* from King's Cross had passed over, and so into the East Station, G.E. Line, connecting with trains for East Anglia. A few minutes later another diesel train, from Cambridge, took me up by the Midland connecting spur to the North, main line Station, E.R., with other passengers bound for Doncaster and the north-east.

Sprightly Diesel Locomotives

My friend, Mr. D. S. M. Barrie, M.B.E., kindly supplied some running details summarised in the following notes. Two "Metrovick" Type 2, Co–Bo 1,200 h.p. diesel-electric locomotives in tandem, Nos. D5710, 5718, on the 4.25 p.m. St. Pancras–Manchester express with "11-on" or fully 400 tons with passengers, etc., ran to the first stop at Kettering, 72 miles in 70¼ min. arriving early despite a repair slowing in the early stages and an easing later. With the greater power available this was faster than my Royal Scot run reported in October last. After leaving Derby 7 min. late, with three coaches less, there was some lively performance up the sharp climbs beyond Matlock, such as the attainment of 42 m.p.h. up 1 in 90 from Millers Dale start to Peak Forest summit, nearly 1,000 ft. above sea level. All losses were recouped and the terminus at Manchester Central reached a little before time.

Nos. D5702, 5705, similarly double-heading with "9-on" in the reverse



A through L.M.R. express from Bristol and Derby is here being taken over the final stage of its journey to Newcastle by Type 4 diesel-electric locomotive No. D274. Photograph by C. Ord.

At the head of this page is Royal Scot No. 46126 "Royal Army Service Corps" on the turntable at Camden. Photograph by H. G. Forsythe.

direction suffered two out-of-course stops south of Leicester, the second at Radlett, 15¼ miles from St. Pancras, between which 67 m.p.h. was averaged over an undulating course, not falling below 66 on the long rise between Bedford and Luton. Again lost time was recovered. Incidentally, the very fast *Midland Pullman* achieves a considerably higher minimum speed up the same and other ascents.

Single-handed, No. D219, one of the bigger Type 4 2,000 h.p. locomotives now seen to a considerable extent on Euston and King's Cross line expresses, was on a principal-stations Carlisle–Euston train loaded to 16 vehicles including large vans and restaurant cars, or well over 500 tons. From the last stop at Bletchley over 10 min. was gained on this always heavy service, liberally-timed to allow for engineering work. There was only one slack for such just then on this 46¾-mile stretch so, after breasting the moderate rise to Tring at 59 m.p.h., and attaining 85 through the suburbs at Wembley, Euston was reached in less than 49 minutes.

In the same train with a coach less I had a similar trip with a maximum of 82 m.p.h. and some notable acceleration. A particularly fast longer run by No. D208 on the occasion of my run with the driver of the *Master Cutler* was reported in the July, 1960, *M.M.* These 16-wheeled units with electric propulsion weigh 133 tons compared with the 80 tons of the 8-wheeled W.R. D800 Warship class. The latter have hydraulic drive and are rated to be rather more powerful.

The small single-cab 1,000 h.p. Type 1 Bo–Bo diesel-electric units, D8000 series, appear sometimes on passenger trains. On the Great Northern Line for instance, No. D8023 shewed a fair turn of speed, running a 5-coach suburban train bound for King's Cross over the 5¾ miles from Oakleigh Park to Finsbury Park in under 7¾ minutes. I saw No. D8027 as an emergency replacement after a Pacific failure taking a Newcastle express in capable style over the same course, partly downhill from Hatfield to the London terminus.

In Scotland, as on various English routes, speeded-up schedules for some of the faster multiple-unit set trains, having underfloor plain diesel engines, require very sprightly running. A 6-car unit working the Ayr–Glasgow (St. Enoch) service, for example, maintained 70 m.p.h. or over during half of a 21¾-mile Irvine to Paisley start-to-stop run. This was completed in 22 min. at nearly a mile-a-minute average, but even so only a minute was gained on schedule.

The Hub of the Midland Division, L.M.R.

Derby, 128 miles from London, is a focal main line junction station from which important routes radiate in several directions. There are island platforms long enough to deal with two local or similar trains at once. Various extensions and improvements have been carried out there. Close by are big locomotive works, running sheds, sidings and marshalling yard, with divisional administrative headquarters. Considerable day and night passenger, mail and parcel traffic is handled, a good deal of it involving change or transfer. One can travel in a wide selection of through trains or portions therefrom to St. Pancras, Manchester, Bournemouth, Bristol and the West of England, S. Wales; Halifax; Bradford, Carlisle, Glasgow, via Leeds; Sheffield–York–Newcastle; and by diesel services to Stoke-on-Trent and Crewe; Trent–Nottingham–Lincoln, etc.

A B1 4-6-0 No. 61157, working through from York to Birmingham on a Scarborough holiday train, was leaving Derby when photographed by T. G. Hepburn.

There is an avoiding line used by the non-stopping *Midland Pullman*, freight or special trains and so on in each direction. From this a conecting spur enables trains from the Trent direction, such as the diesel I travelled by, to be kept clear of the normal approach, and to reverse direction and arrive from the north end ready to depart again. Thus a through service calling at Derby can operate, say, from Nottingham to the Bristol line. A number of handy alternative routes, triangular junctions and the like occurs in this busy area, through which many holiday trains pass hauled by a variety of engines, including ex-L.N.E.R. types.

Watching proceedings one afternoon last summer I saw the full northbound *Devonian*, an 11-coach train including chocolate and cream, red and cream, and maroon, vehicles belonging to the Western, L.M. and N.E. Regions. The locomotive was a 6P Jubilee 4–6–0, as on the southbound *Palatine* from Manchester to St. Pancras, also the Newcastle–Bristol express, which had been brought in by a green B.R. Standard 4–6–0 of class 5. Another arrival and departure was the 2.25 St. Pancras–Manchester worked by a 7P Royal Scot; a buffet car and a corridor coach were detached before the train went on towards the Peak District climbs.

RAILWAY BOOK REVIEWS

"Locomotive Stock Book 1960"

(Railway Correspondence and Travel Society, 13/6)

This is the twelfth issue of the *Locomotive Stock Book* published by the Railway Correspondence and Travel Society. Since the previous edition of 1954 considerable changes have taken place in British Railways motive power. These are reviewed in some detail and there is given also a summary table of locomotive stock, as well as a detailed analysis covering the years 1954–59. The changes year by year are recorded in classified list form and there follows a complete list of similar character of all B.R. locomotives and those of other British railways up to the end of 1959. The book is a mine of information for the locomotive enthusiast, and as usual it includes illustrations of the classes that have become extinct during the period under review. Copies are obtainable from the R.C.T.S. Hon. Assistant Publications Officer, Mr. N. J. Claydon, 19 Dene Court Road, Olton, Solihull, Warwickshire.

"The Observer's Book of Railway Locomotives of Britain"

(Frederick Warne, 5/–)

The 1960 edition of this popular "Observer's Book" has been revised and edited by H. C. Casserley. In this edition there has been a considerable re-arrangement in the order of presentation of the various classes of locomotives. They are now as far as possible arranged in numerical order, with illustrations of typical locomotives, dimensions, historical notes and details of likely routes for seeing the engines concerned.

Although the bulk of the material concerns steam locomotives, diesel and electric locomotives are covered.

DINKY TOYS NEWS

By THE TOYMAN

SNOWPLOUGH WILL ADD TO WINTER REALISM

Well, here we are at the start of another year—one that will see the introduction of some splendid new models into the wide range of Dinky Toys. At this time of the year we have the opportunity, out of doors, to weigh up many scenes which we can later put into effect in our layouts in the comfort of our own homes.

Imagine, for instance, the possibilities of using "snow" in your scenes. What you need for this is salt or cotton wool. A plentiful sprinkling of salt can work wonders in transforming your layout into a most realistic winter scene but, of course, you must be careful to confine your activities to your layout and not sprinkle the salt all over the dining room carpet.

There can be innumerable uses for "snow" in well-developed road arrangements and, of course, there is the added opportunity of bringing into use some models which you might not be able to use as effectively on normal layouts.

Let us just think what might happen in a heavy snow-storm. One thing is almost certain — telephone lines will come down; therefore, we can bring into the scene the Post Office Telephone Van No. 261. There is a possibility, too, that a car will crash or be forced off the road, and so we can introduce the Breakdown Lorry, No. 430.

A Road Safety Officer Advises . . .

WATCH YOUR STEP

The worst part of the winter is January and February—short days, bad weather. This, plus the fact that the excitement of Christmas is over, makes people become tired, depressed and irritable. These things tend to lower our vitality and to make us careless and impatient. Unknowingly, we become "accident prone"—it is now that we are most likely to be caught off our guard.

Whether walking or riding, use added care and vigilance. As a pedestrian, remember that drivers have greater difficulty in stopping when the weather, and the road surface, is bad. They have less chance of avoiding the careless walker, visibility is reduced, and there is less warning of danger. When walking at night, wear something light. Dark clothing cannot readily be seen.

When cycling, make sure your lights are in good working order and never ride without an effective rear light. Remember that, for everyone, dusk is the worst period of the day for seeing and for being seen.

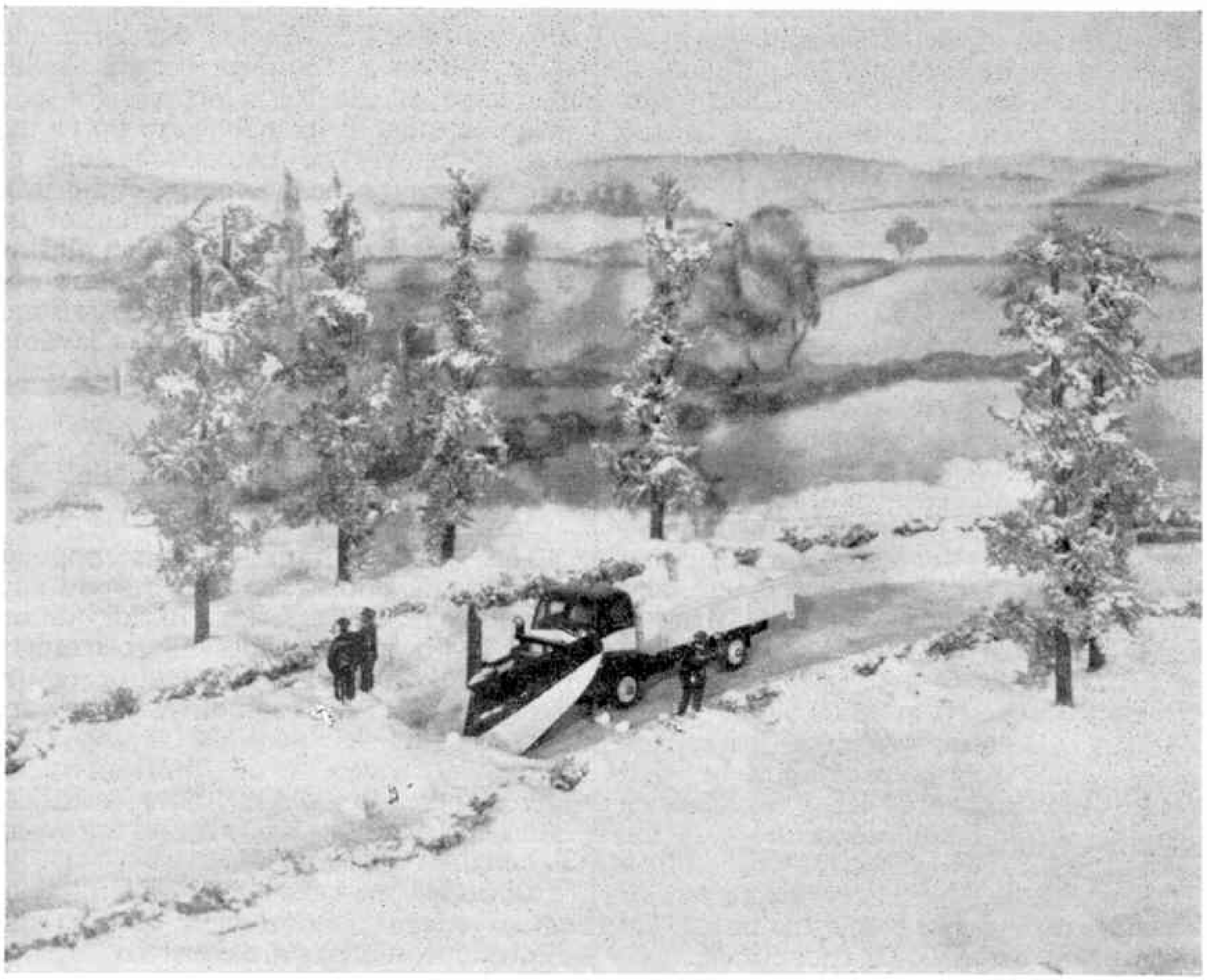
And a word to people using buses—wait until the bus has stopped at its proper stopping place before getting on or off. Dropping off before the bus stops can give you a nasty fall at any time; there is even worse risk of this happening when the ground is slippery.

If a town scene is required with snow, there is almost bound to be a lorry and group of workmen spreading sand on the road so that the traffic will not skid. On this occasion, then, we can introduce almost any of the lorries, such as the Bedford End Tipper, No. 410, or the Rear Tipping Wagon, No. 414, which are in the Dinky Toys range.

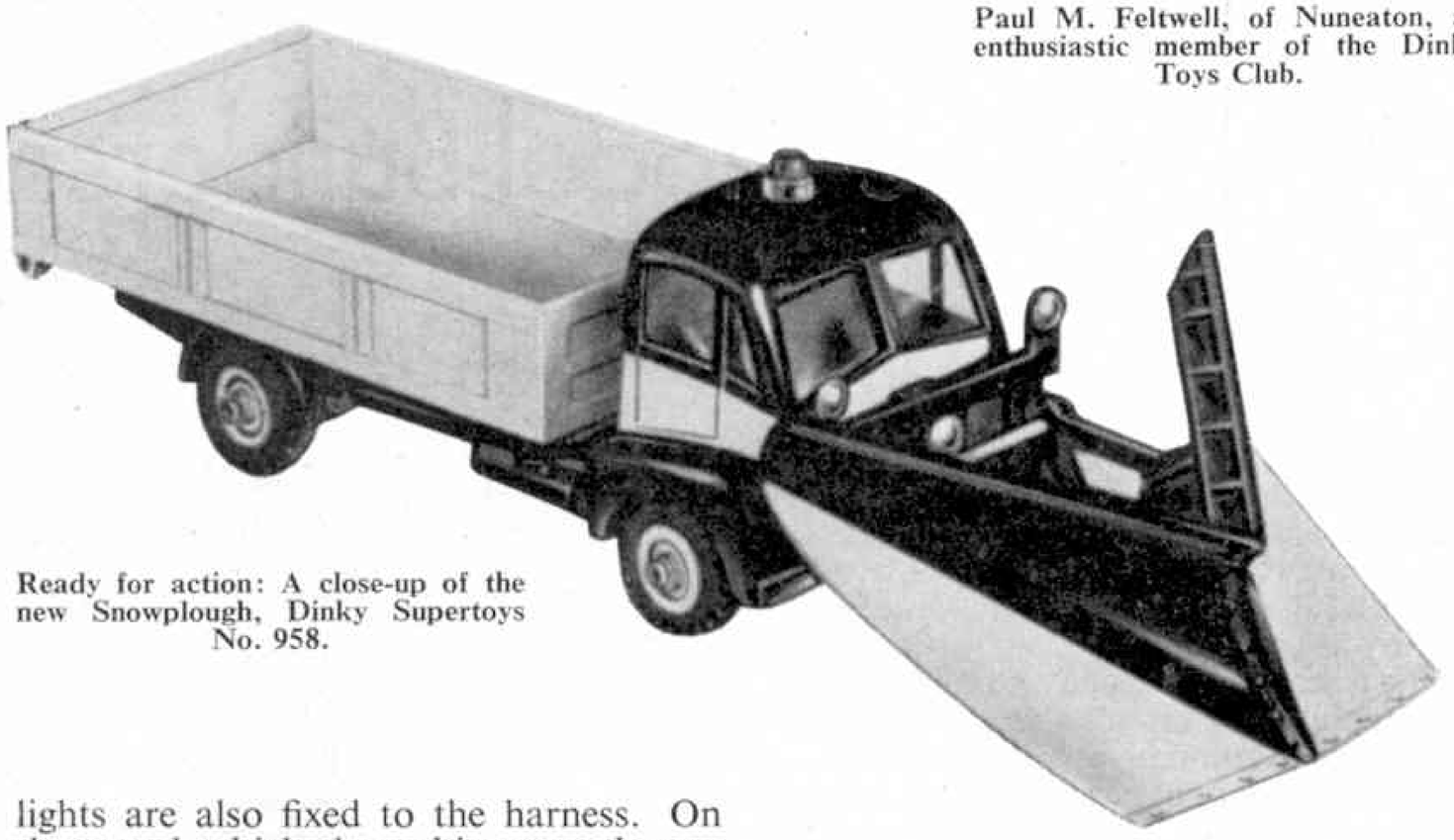
Bringing a new look to these often spectacular winter scenes is Dinky Toys latest model, which you see illustrated on this page. It is Dinky Supertoys No. 958, Snowplough, a fine miniature which is based on a vehicle often used on the Canadian highways where snow and blizzards are a common source of delay to traffic.

STRIKING TWO-TONE COLOURING

The actual vehicle consists of a wagon chassis to which a snowplough is fixed by means of a strong metal harness, which carries a hydraulic cylinder and ram enabling the plough to be raised and lowered as required. Two high-set head-



The new Dinky Supertoys Snowplough (left) pictured in a realistic winter setting.



Ready for action: A close-up of the new Snowplough, Dinky Supertoys No. 958.

Paul M. Feltwell, of Nuneaton, an enthusiastic member of the Dinky Toys Club.

lights are also fixed to the harness. On the actual vehicle these shine over the top of the plough when it is in use to give the driver a clear view of any dangers which may lie ahead of him. When the plough is in a raised position, the driver can see the way ahead.

The Dinky Toys model is coloured in a striking, two-tone yellow and black, the markings running diagonally in the case of the actual plough, and horizontally on the driver's cab. The cab is fitted with windows and there is a simulated blue operating light on the roof.

The photograph at the bottom of the opposite page depicts the snowplough in an interesting scene, and one which might be a common sight in this country if we have as bad a winter as we had a summer! It is shown clearing deep snow off a country road, and you can see how the snowplough pushes the snow in front of it for a short distance until it moves it to the side of the road. Because of this, the snow gets "packed", and hard lumps and boulders are formed. These boulders could be very dangerous to traffic and so they are being loaded into the back of the snowplough where they can do no damage.

Another new Dinky Toys model to be released this month is the Italian Alfa Romeo Coupe. This is a very fine miniature based on the Alfa Romeo 1900c "Super Sprint" which is becoming increasingly well-known both here and on the Continent.

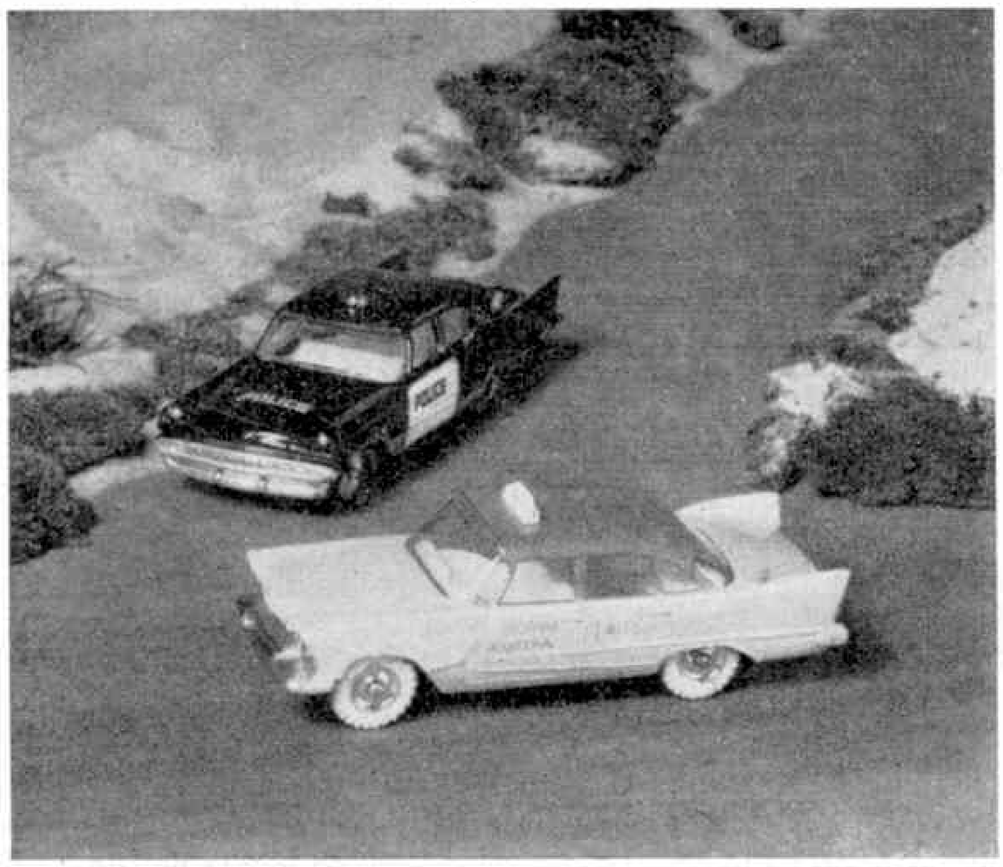
The actual vehicle is a two-seater, with left hand drive for Continental roads, and a top speed of approximately 125 m.p.h. It has a four-cylinder engine of 115 horse power and makes a very fine competition car.

ANOTHER MODEL WITH DIRECTIONAL CONTROL

The Dinky Toys replica of the Alfa Romeo, which you see illustrated at the bottom of this page is equipped with Directional Control, four-wheel suspension, windows, seats and steering wheel. It is available in two colours—a smart red or yellow hard finish, as preferred—and is No. 185 on the Dinky Toys list. It is four inches long with a wheelbase of two-and-a-quarter inches. As the majority of readers are no doubt aware, this is the second model to be fitted with the new Directional Control—the Jaguar 3.4 Litre Saloon (No. 195) being the first—and I am sure it will give a lot of enjoyment.

Many collectors will remember the recent introduction into the Dinky Toys range of two American vehicles, the U.S.A. Police Car (No. 258) and the U.S.A. Taxi (No. 265). These are shown in an appropriate setting in the picture at the foot of the page.

It is a scene in the scrub country which forms a background to many American films and shows a police car, parked in a road running off the main highway, keeping a check on the traffic speeding past. The police are probably searching for a wanted criminal and have stopped the Taxi to see if he is trying to escape in it.

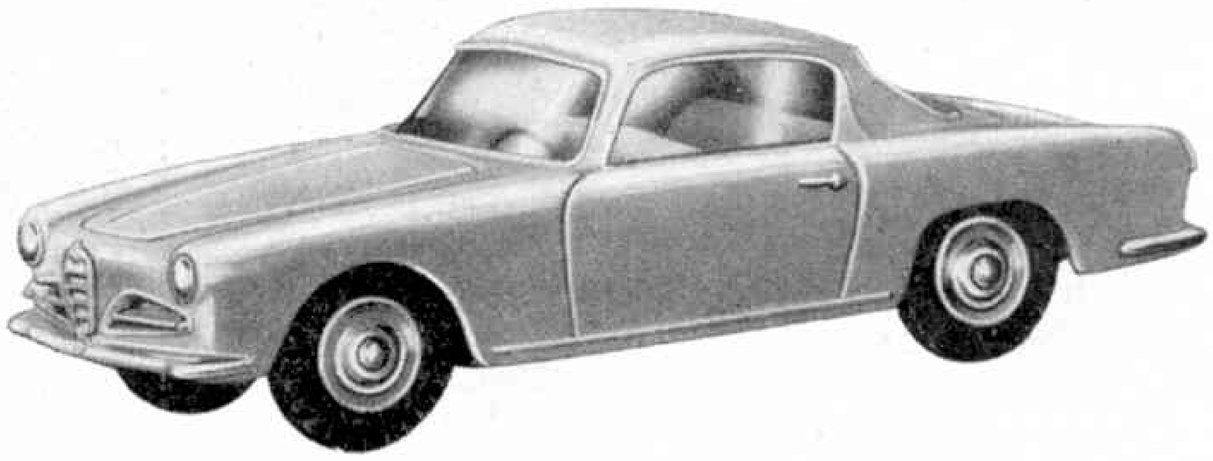


Hunter and hunted? The Dinky Toys U.S.A. Police Car and Taxi in what could almost be called a scene from the films. Below: The new Dinky Toys Alfa Romeo Coupe.

DINKY RHYMES

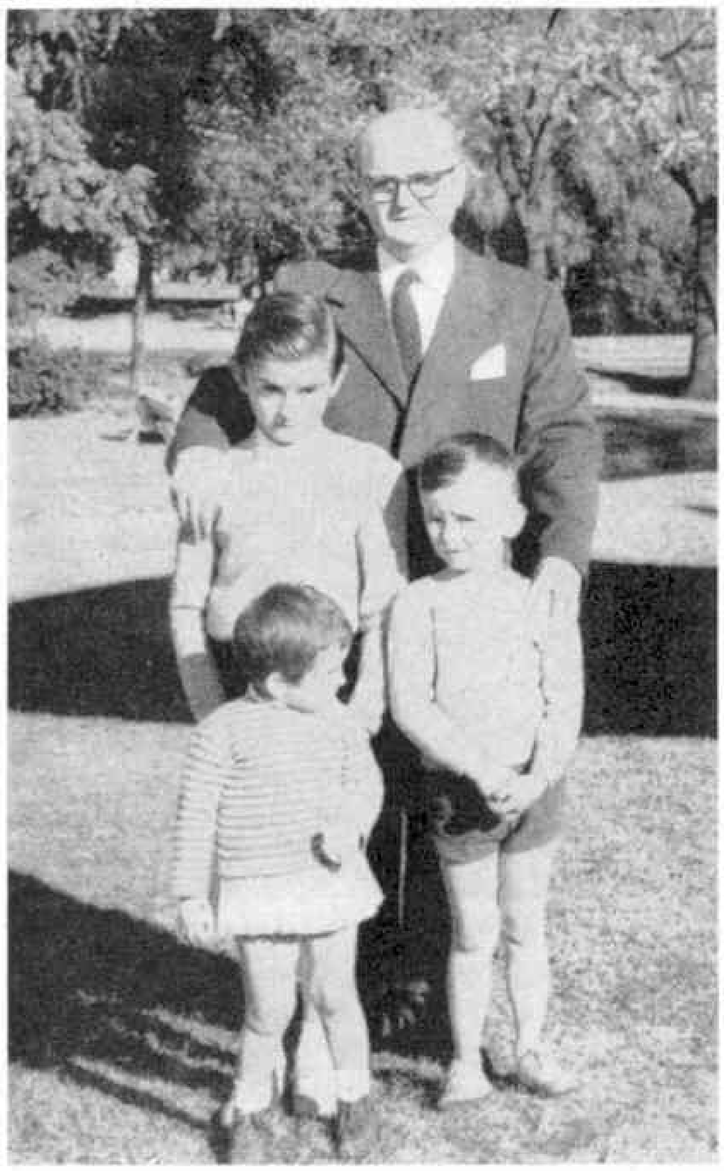
No. 999 D.H. Comet Airliner

When Uncle Charles says,
"I must fly"
He puts aside inertia:
Then, in a Comet riding high,
He visits friends in Persia.



Among the Model-Builders

By "Spanner"



Senor Manuel Escobar and his sons, of Buenos Aires, are keen Meccano enthusiasts, and a sample of their work is seen in the fine microscope stand shown in the illustration on the right of this page.

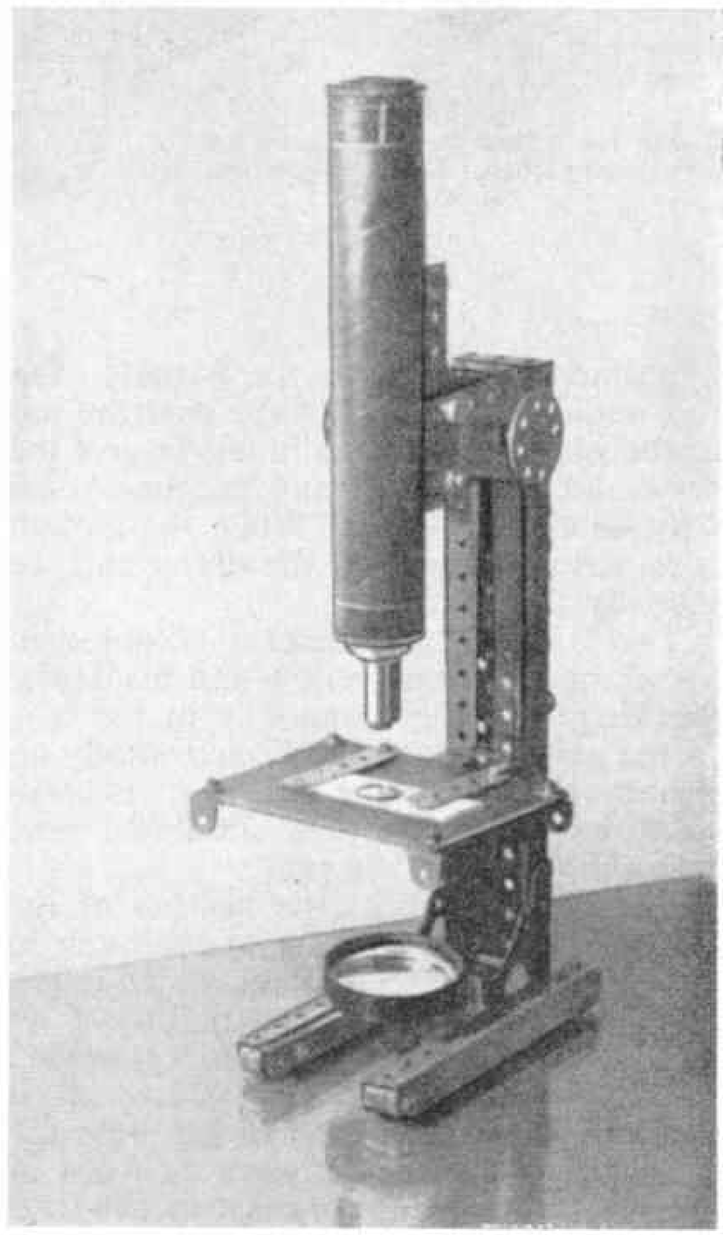
Return to Meccano after 25 Years

I am constantly hearing from fathers of young boys, who having enjoyed the pleasures of Meccano in their own youth, find their interest in the hobby renewed through their children, and when this happens it is not infrequent for the parent to become even more enthusiastic than he was in his boyhood! An example of this came to my notice quite recently when I received a letter from Sr. Manuel Escobar, Buenos Aires, in which he told me that he was a Meccano enthusiast in his young days and after a lapse of 25 years now found much pleasure in helping his sons in their model-building. Recently in conjunction with his eldest boy Fernando, he built a microscope, and this has proved very useful to the boy in his studies of Botany at school.

The microscope is seen on this page and Sr. Escobar and his sons are also seen in one of the accompanying illustrations.

The microscope has rack and pinion focusing, a fixed slide with adjustable diaphragm and a double mirror.

With the exception of course of the lenses, the barrel and the revetment of the slide, the microscope uses standard Meccano parts, and I gather that it gives excellent results. The eye piece is a Koristka No. 5, working with an O–P1 No. 8 lens and gives a magnification of approximately 290. I do not know where these were obtained, but suitable substitutes are no doubt available.



Twin-Control Drive-through Roller Bearing

One of the problems in connection with the construction of detailed models of mobile cranes and excavators is the assembly of a suitable bearing unit. The construction of the actual bearing is comparatively easy and many examples have been described in the *Meccano Magazine*. The difficulty arises in the arrangement of more than one drive through the centre of the bearing, to operate steering or brakes as well as the travelling movement. Fig. 1 shows one method of arranging such twin drives through a bearing.

The bearing assembly is made in the usual way, with radial arms bolted securely to a hub formed by a Wheel Flange 1. These radial arms carry Double Brackets 2 at their ends supporting Rods fitted with Flanged Wheels and held in place by Collars.

A Rod passed through the centre hole in the Wheel Flange carries two Socket Couplings 3 and 4 connected by a Short Coupling located in the centre hole. The Socket Couplings are fitted with Cranks held in the Couplings by their bosses, and the Rod carries at each end gears to suit the driving mechanism of the model.

In use, the Rod is used to transmit a drive through the bearing to the wheels or tracks of the model, and the Cranks form links to operate the brakes or steering.

A "Two-Pedal" Transmission Suitable for Model Vehicles

Builders of large scale model vehicles will be interested in the ingenious transmission system shown in Figs. 2 and 3. This was designed by Mr. J. F. Sharp, Huddersfield, who is at present living in London. Mr. Sharp has specialised in experimental transmission systems and some of his previous work has already been referred to in the *Meccano Magazine*. Readers may remember a most ingenious

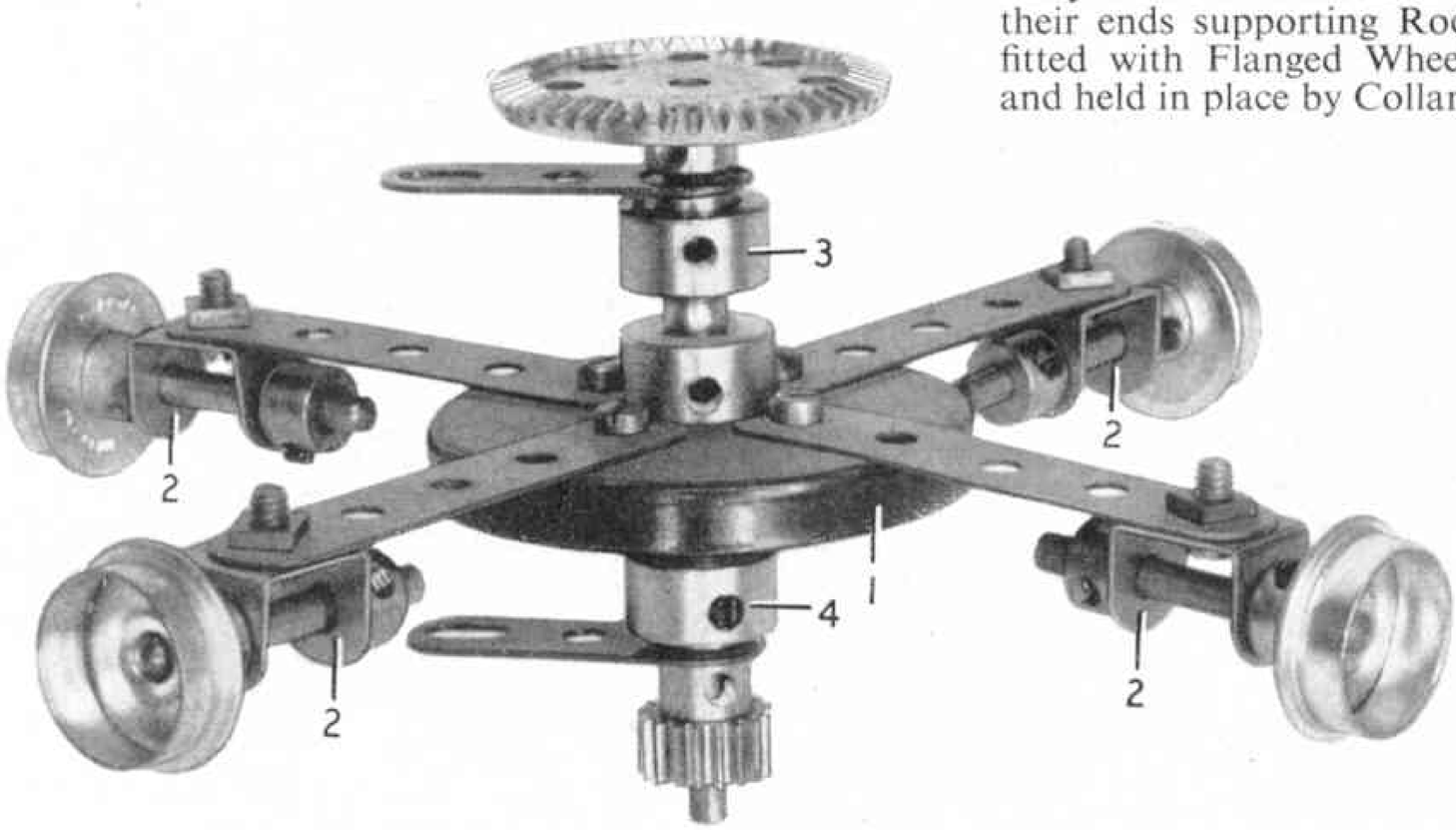


Fig. 1.
A twin-control drive-through bearing, designed by Mr. W. Johnstone, Liverpool.

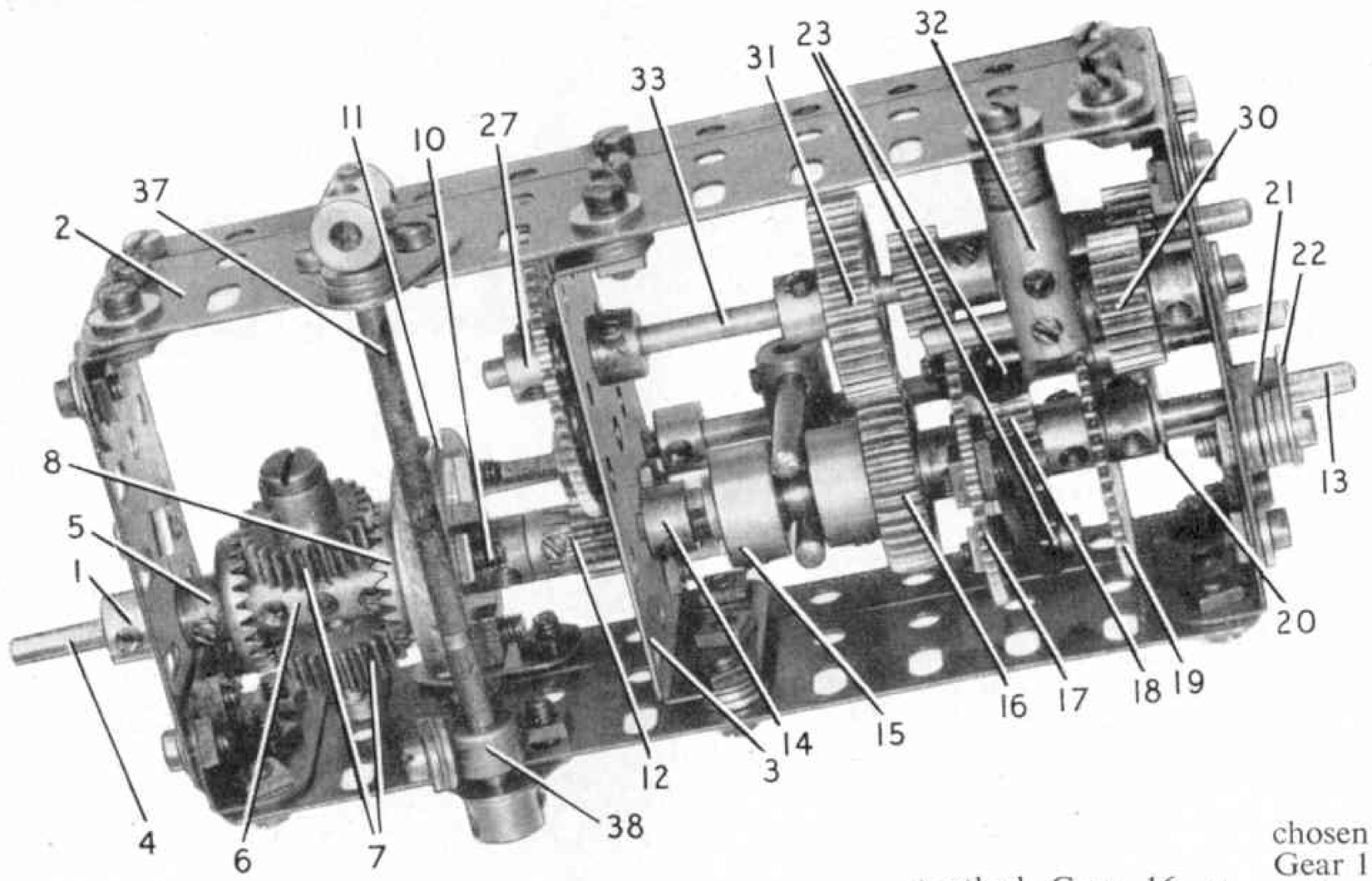


Fig. 2.
A two-pedal transmission system suitable for model vehicles is shown above and another view of it is seen in Fig. 3 below. The mechanism was designed and built by Mr. J. F. Sharp, Huddersfield.

auto transmission gear, designed by him, which was illustrated and described in the *Meccano Magazine* for February, 1959.

The "Two-Pedal" system shown in Figs. 2 and 3 is made up as follows. Construction is commenced by assembling the frame. This is composed of sides, made from 5½″ Strips and 5½″ Flat Girders, fastened to the ends, which are each composed of a 2½″ Strip and a 2½″ Flat Girder, by means of four 1½″ Angle Girders. A Double Arm Crank 1 is bolted on one of the ends to provide a bearing for the high speed input shaft 4.

Flat Girder 2 is spaced from the Angle Girders by a Washer on each Bolt.

A 2½″ × 1½″ Flanged Plate 3 is fixed, centrally spaced by Washers from the sides, as shown in Fig. 2.

Input shaft 4 carries a small Contrate 5 and enters Coupling 6. A 1½″ Rod is fixed in 6 by Pivot Bolts which carry loose 25 toothed Pinions 7. A small loose Contrate 8 runs on the 1½″ Rod, and two nuts and bolts 9 (Fig. 2) are screwed part way into the boss of Contrate 8.

These engage between four ⅜″ Bolts 10 in a 1⅛″ Flanged Wheel 11, also loose on the 1½″ Rod. A 15 toothed Pinion 12 is secured to the end of the Rod and thus any lateral movement of the Flanged Wheel assembly is prevented.

The output shaft 13, a Rod with Keyway, enters Pinion 12 and carries half a Dog Clutch 14; a Socket Coupling loose on Rod 13 carrying the other part of the clutch, and a 38-toothed Gear 16, a loose 57-toothed Gear 17, 19-tooth Pinion 18 fitted with a Keybolt, 57-tooth Gear 19 fitted with a Keybolt, and Crank 20.

Shaft 13 is located by Collar 21 between the end of the gear-box and Fishplate 22, spaced by five Washers from the end Flat Girder.

Pinion 18 and Gear 17 form a free-wheel device, with Spring Clips 23 pivoted on ½″ Bolts as the Pawls, and Pinion 18 as the Ratchet. Small driving bands looped around the Spring Clips provide the tension.

All the assembly on Rod 13 is free to slide as a unit since Coupling 24 carrying 1½″ Rods that engage the Socket Coupling groove, and Crank 20, are secured to operating Rod 25. Collars 26 act as limits to the travel of Rod 25 (Fig. 2).

The layshaft 33 carries a 60-toothed Gear 27, two Washers, a Collar, 38-toothed Gear 31 and 19-toothed Pinions 28 and 29. A 25-toothed Pinion 30 is in constant mesh with Pinion 29. It is carried on a 1½″ Rod gripped in a Threaded Coupling 32 and spaced from the latter by two Washers. The Coupling is secured to an elongated hole of Girder 2, spaced by seven Washers.

Operation of the Gear-box is as follows: (Fig. 2 shows Neutral Gear).

For direct drive Rod 25 is moved to the extreme left so that the Dog Clutch engages. The drive from Rod 33 to the output, is by Gears 31 and 16. Gear 17 and Pinion 28 are in mesh, but the direction of shaft 33 is chosen so that the free wheel operates on Gear 17.

On disengaging the Dog Clutch, free wheeling immediately ceases and Gear 17 and Pinion 28 transmit low gear.

Moving Rod 25 further disengages Gear 17 and Pinion 28 and neutral position is obtained. Moving Rod 25 to its extreme right-hand limit engages Pinion 30 with Gear 19 to give reverse drive.

A Spring 34 is depressed when Coupling 24 bears on Collar 35 on Rod 36. This prevents accidental engagement of reverse gear. Rods 25 and 36 are journalled in 1½″ Flat Girders as shown in Fig. 2.

The input shaft 4 is driven at constant speed, power and direction. The layshaft 33 speed is varied infinitely between zero and half input speed (*Cont. on page 32*)

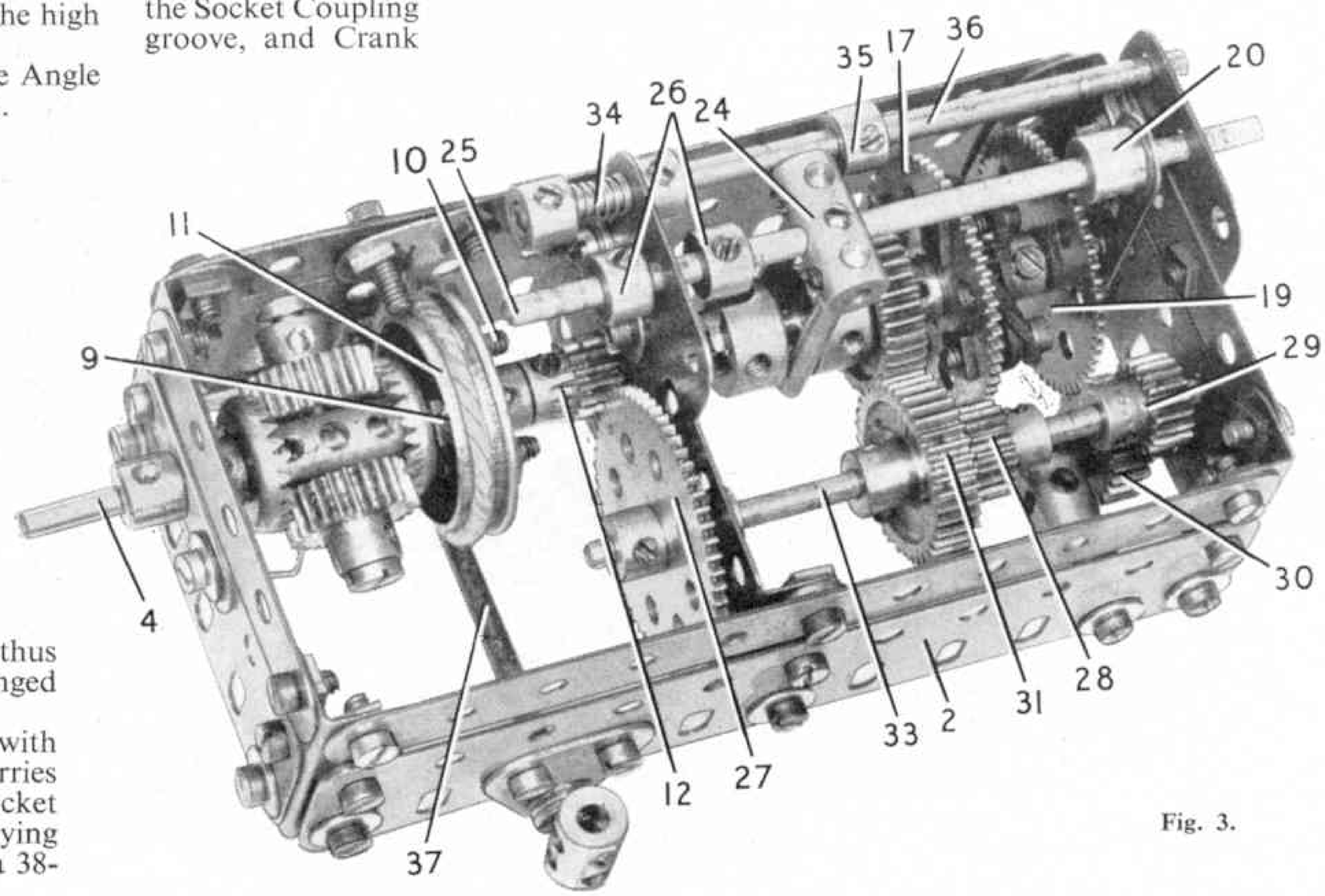


Fig. 3.

"Spanner's" Special Section for Juniors

Easy Model-Building

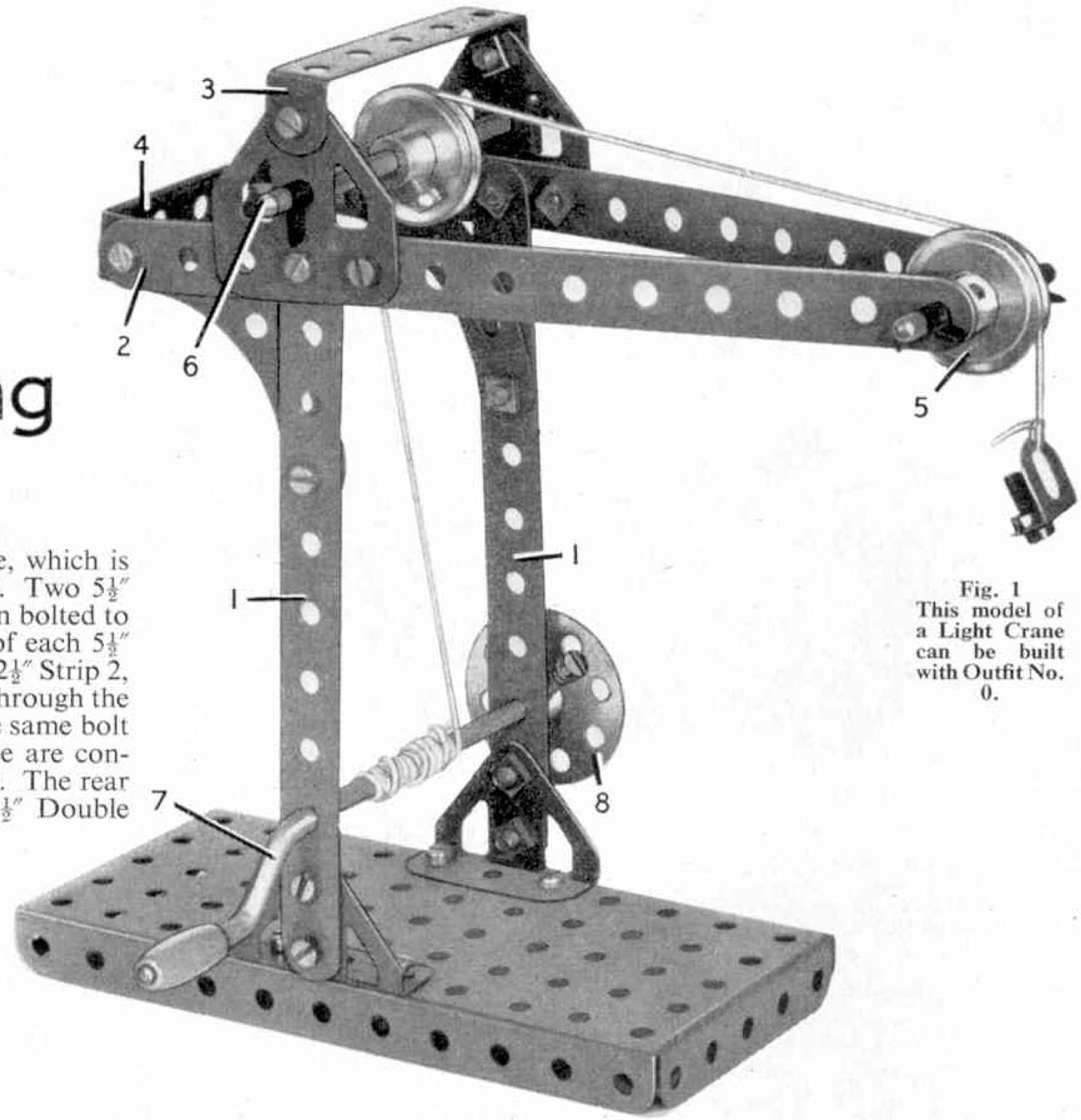


Fig. 1
This model of a Light Crane can be built with Outfit No. 0.

Light Crane

The attractive little model of a Light Crane, which is seen in Fig. 1, can be built with Outfit No. 0. Two $5\frac{1}{2}''$ Strips 1 are bolted to Trunnions that are in turn bolted to a $5\frac{1}{2}'' \times 2\frac{1}{2}''$ Flanged Plate. To the upper end of each $5\frac{1}{2}''$ Strip, a $6\frac{1}{2}''$ Strip, made up of a $5\frac{1}{2}''$ Strip and a $2\frac{1}{2}''$ Strip 2, is bolted at right angles, the bolt being passed through the fourth hole from the rear end of the strip. The same bolt also holds a Flat Trunnion in place and these are connected together by a $2\frac{1}{2}''$ Double Angle Strip 3. The rear ends of Strips 2 are joined together by a $2\frac{1}{2}''$ Double Angle Strip 4. The jib Pulley 5 is carried on a 2" Rod held by Spring Clips at the front end of the $6\frac{1}{2}''$ Strips.

Through the centre holes of the Flat Trunnions a $3\frac{1}{2}''$ Rod 6, carrying another 1" Pulley is journalled, and it is held in position by Spring Clips. A $3\frac{1}{2}''$ Crank Handle 7, is passed through the upright $5\frac{1}{2}''$ Strips as shown and is held in place by an eight-hole Bush Wheel 8.

A length of Cord is tied at one end to the Crank Handle and then passed over the two 1" Pulleys as shown. An Angle Bracket is tied to the other end to form a lifting hook.

Parts required to build the Light Crane: 4 of No. 2; 2 of No. 5; 1 of No. 12; 1 of No. 16; 1 of No. 17; 1 of No. 19s; 2 of No. 22; 1 of No. 24; 4 of No. 35; 19 of No. 37a; 18 of No. 37b; 2 of No. 48a; 1 of No. 52; 2 of No. 90; 1 of No. 111c; 2 of No. 126; 2 of No. 126a.

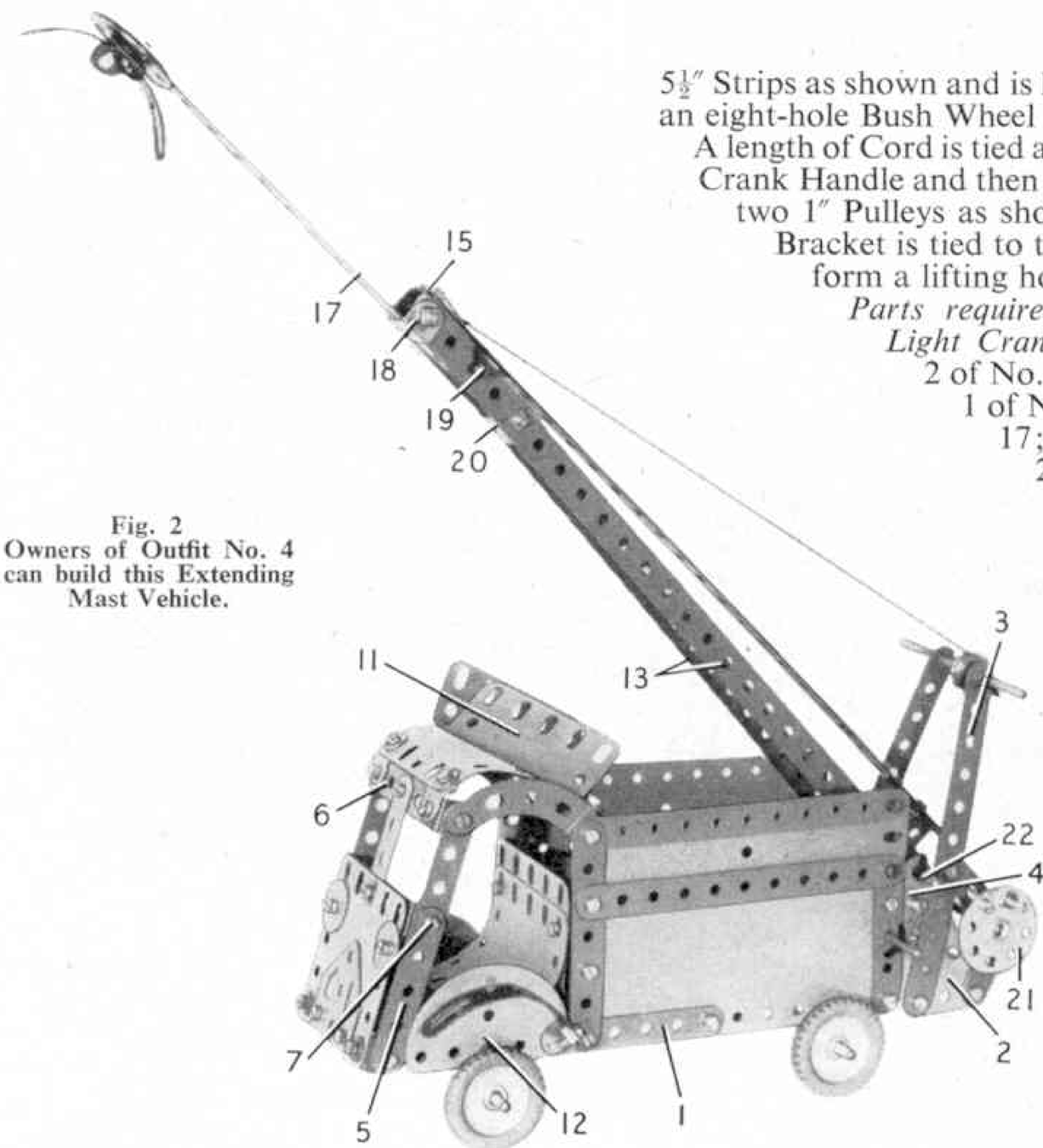


Fig. 2
Owners of Outfit No. 4 can build this Extending Mast Vehicle.

Extending Mast Vehicle

Owners of Outfit No. 4 have all the parts required to build the Extending Mast Vehicle that is shown in Figs. 2 and 3. Construction of the model should commence with the chassis, which is a $5\frac{1}{2}'' \times 2\frac{1}{2}''$ and a $2\frac{1}{2}'' \times 1\frac{1}{2}''$ Flanged Plate held together by Angle Brackets and a Flat Trunnion. A $5\frac{1}{2}'' \times 2\frac{1}{2}''$ Flexible Plate is attached to each side of the $5\frac{1}{2}''$ Flanged Plate and this Plate is extended forward six holes by $5\frac{1}{2}''$ Strips 1 overlaying the $5\frac{1}{2}''$ Flexible Plates. The front ends of these Strips are connected by a $2\frac{1}{2}'' \times \frac{1}{2}''$ Double Angle Strip. A similar Double Angle Strip is also held by Bolts 12.

Two $2\frac{1}{2}'' \times 1\frac{1}{2}''$ Triangular Flexible Plates 2 are bolted to the $2\frac{1}{2}'' \times \frac{1}{2}''$ Flanged Plate, the same Bolts holding in place a $5\frac{1}{2}''$ Strip 3 and a Curved Stepped Strip, which is joined to the $5\frac{1}{2}''$ Strip. $5\frac{1}{2}'' \times 1\frac{1}{2}''$ Flexible Plates are joined to the $5\frac{1}{2}'' \times 2\frac{1}{2}''$ Flexible Plates and both are edged with Strips as shown. A Fishplate 4 joins the $2\frac{1}{2}'' \times 1\frac{1}{2}''$ Triangular Flexible Plate to the $5\frac{1}{2}'' \times 2\frac{1}{2}''$ Flexible Plate.

The framework at the front of the cab consists on each side of two $4\frac{1}{2}''$ Strips 5, made up of a $3\frac{1}{2}''$ and $2\frac{1}{2}''$ Strip. These are joined at the top by a $2\frac{1}{2}'' \times \frac{1}{2}''$ Double Angle Strip 6 and also lower down by a $2\frac{1}{2}'' \times \frac{1}{2}''$ Double Angle Strip held by Bolt 7. A $2\frac{1}{2}''$ Strip joins the centres of these two Double Angle Strips and a $2\frac{1}{2}'' \times 2\frac{1}{2}''$ Flexible Plate forms the front of the cab.

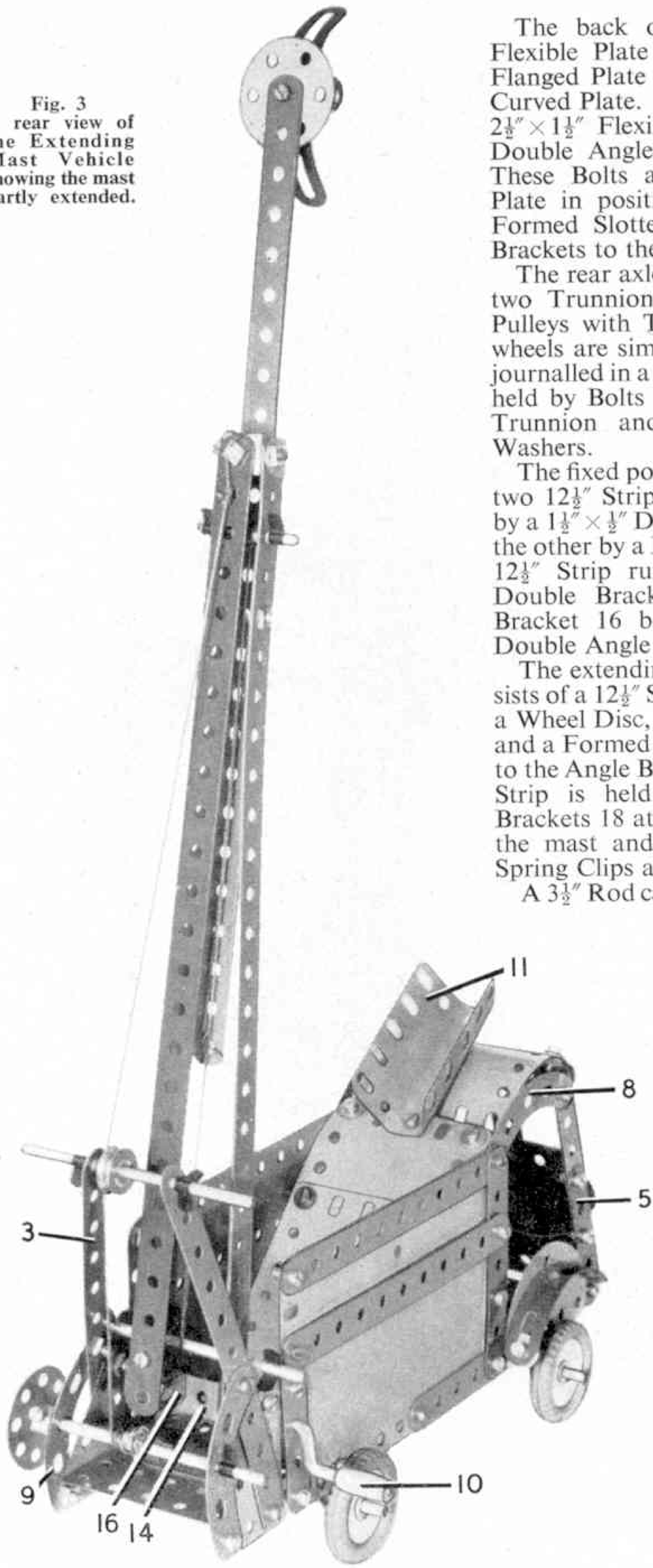


Fig. 3
A rear view of the Extending Mast Vehicle showing the mast partly extended.

A $2\frac{1}{2}''$ curved Stepped Strip 8 on each side joins Strips 5 to the back framework of the cab, and the roof is a $2\frac{1}{2}'' \times 2\frac{1}{2}''$ Curved Plate bolted to Angle Brackets attached to the Double Angle Strip 6. The Curved Stepped Strips 8 are joined by a Double Angle Strip to which a $6'' \times 2\frac{1}{2}''$ flexible plate, made up of two $4\frac{1}{2}'' \times 2\frac{1}{2}''$ Flexible Plates, is bolted. This plate is curved downwards and is bolted to the apex hole of the Flat Trunnion joining the two Flanged Plates together.

The back of the cab is a $2\frac{1}{2}'' \times 2\frac{1}{2}''$ Flexible Plate attached to the $5\frac{1}{2}'' \times 2\frac{1}{2}''$ Flanged Plate and the seat is a $2\frac{1}{2}'' \times 2\frac{1}{2}''$ Curved Plate. The floor consists of two $2\frac{1}{2}'' \times 1\frac{1}{2}''$ Flexible Plates attached to the Double Angle Strips held by Bolts 12. These Bolts also hold a Semi-Circular Plate in position. The mud-guards are Formed Slotted Strips joined by Angle Brackets to the Semi-Circular Plate.

The rear axle is a $3\frac{1}{2}''$ Rod journalled in two Trunnions, and the wheels are 1" Pulleys with Tyres. The front axle and wheels are similar except that the Rod is journalled in a $2\frac{1}{2}'' \times \frac{1}{2}''$ Double Angle Strip held by Bolts 12. The radiator is a Flat Trunnion and the head-lights are $\frac{3}{4}''$ Washers.

The fixed portion of the mast consists of two $12\frac{1}{2}''$ Strips 13 connected at one end by a $1\frac{1}{2}'' \times \frac{1}{2}''$ Double Angle Strip 14 and at the other by a Double Bracket 15. A third $12\frac{1}{2}''$ Strip runs from the back of the Double Bracket to a Reversed Angle Bracket 16 bolted to the back of the Double Angle Strip.

The extending portion of the mast consists of a $12\frac{1}{2}''$ Strip 17, to one end of which a Wheel Disc, two Obtuse Angle Brackets and a Formed Slotted Strip at right-angles to the Angle Brackets are bolted. The $12\frac{1}{2}''$ Strip is held in place by two Angle Brackets 18 at the top of the fixed part of the mast and a $1\frac{1}{2}''$ Rod 19 is held by Spring Clips and a Double Bracket 20.

A $3\frac{1}{2}''$ Rod carrying a Bush Wheel 21 and a $\frac{3}{8}''$ Bolt is journalled in the apex holes of the $2\frac{1}{2}'' \times 1\frac{1}{2}''$ Triangular Flexible Plates 2 and is held by Spring Clips. The extending mast swivels on this Rod, being pivoted through its second holes.

Another $3\frac{1}{2}''$ Rod carrying a $\frac{1}{2}''$ loose Pulley is journalled in the end holes of the $5\frac{1}{2}''$ Strips 3 and is held in place by Spring Clips.

A $3\frac{1}{2}''$ Crank Handle 10 is journalled as shown and a cord runs from an Anchoring Spring on this Rod, past the Rod on which the mast swivels, round the $1\frac{1}{2}''$ Rod at the top of the fixed part of the mast and down to the lower end of the extending part of the mast.

Also a cord runs from an Anchoring Spring on the Rod held in the Curved Strips 9, around the $\frac{1}{2}''$ loose Pulley and up to the top of the fixed part of the mast.

The mast is raised to the elevating position by turning the Bush Wheel 21. Extension and lowering of the extending section is operated by turning the Crank Handle 10. A "U"-Section Plate 11 is bolted to the top of the 6" flexible plate to form a cradle to carry the mast in its travelling position.

Parts required to build the Extending Mast Vehicle: 6 of No. 1; 8 of No. 2; 2 of No. 3; 9 of No. 5; 2 of No. 10; 2 of No. 11; 6 of No. 12; 4 of No. 12c; 5 of No. 16; 1 of No. 18a; 1 of No. 19g; 4 of No. 22; 1 of No. 23; 1 of No. 24; 1 of No. 24a; 9 of No. 35; 80 of No. 37a; 79 of No. 37b; 12 of No. 38; 1 of No. 48; 6 of No. 48a; 1 of No. 51; 1 of No. 52; 4 of No. 90a; 1 of No. 111c; 2 of No. 126; 2 of No. 126a; 4 of No. 142c; 2 of No. 188; 2 of No. 189; 2 of No. 190; 2 of No. 191; 2 of No. 192; 1 of No. 199; 2 of No. 200; 2 of No. 214; 3 of No. 215; 2 of No. 221.

New Model-Building Competition

This month we announce another of the general model-building competitions in which we offer good cash prizes for the most original and best-built Meccano models *of any kind* sent to us. Every competitor, no matter what his or her age may be, has an equal chance in this Contest, and it does not matter what size of Outfit he or she possesses.

All that a reader has to do is to think of a new model and then set to work to construct it as neatly and realistically as possible from standard Meccano parts. When he has completed his model, the next thing is to obtain either a photograph or a good sketch of it, and send this to us.

The Competition is open to readers of all ages living in any part of the world, and is in two Sections: A, for competitors under 14 years of age on April 30 next; B, for competitiors aged 14 years or over on that date. A separate set of prizes, as announced in the panel at the foot of this page, will be awarded in each Section. The judges will award the prizes for those models that are the most original in subject, well proportioned and built on correct mechanical principles.

You will find it a good plan to choose a model that "works" or may be put to some practical use, rather than one that is merely static.

Write your age, name and address on the back of each photograph or drawing, and address the envelope to "Model-Building Competition, Meccano Ltd., Binns Road, Liverpool 13". Closing date April 30 next.

It should be noted that all prize-winning entries become the property of Meccano Ltd., but unsuccessful entries will be returned if a stamped addressed envelope of suitable size is sent with the entry for that purpose.

THE PRIZES

The following prizes will be awarded in each of the Sections A and B:

First Prize, cheque for	£4	4	0
Second Prize, cheque for	£2	2	0
Third Prize, cheque for	£1	1	0

Five Prizes each of 10s. 6d.
Five Prizes each of 5s. 0d.

Certificates of Merit also will be awarded.

MODEL OF THE MONTH

SPANNER'S CHOICE FOR ADVANCED BUILDERS

MODERN factories are equipped with many ingenious devices, specially designed for moving goods of all kinds not only from one department to another on the same floor, but also from one floor to another. One of the most modern and useful of these devices is The VertiVeyor, which is made by J. Collins and Sons Ltd., London. This is a machine for providing a rapid compact and labour-saving means of conveying goods vertically, from floor to floor, and a single VertiVeyor can serve a factory having several floors, one above the other. A feature of this appliance is that it is designed to take on its load of goods automatically and also to discharge them automatically at prearranged points. As it operates vertically through the building,

A Meccano VertiVeyor

The VertiVeyor occupies a minimum of valuable floor space and its continuous automatic action avoids interruption in production.

The VertiVeyor makes a really excellent subject for a Meccano model of the advanced type and one that is "off the beaten track" of ordinary model-building. Its various features can be reproduced in a variety of ways and with a variety of Meccano parts so that the construction of a model of The VertiVeyor offers ample scope to advanced model-builders. Some readers may remember that a year or two ago we organised a competition for models of The VertiVeyor, and we have chosen as the subject for our *Model of the Month*, one of the prize-winning models in that Contest. A complete set of illustrations of this model is shown on this and the facing page and a glance at the pictures will reveal many attractive model-building characteristics. The model can be driven by either an E15R or an E20R Electric Motor and is most realistic when in operation. As usual with these *Model of the Month* subjects, readers who wish to build The VertiVeyor can obtain full constructional details and a list of the Meccano parts required to build it simply by writing to the Editor enclosing a 3d. stamp to cover the cost of postage. Readers living in Canada, Australia, New Zealand, South Africa, Rhodesia, Ceylon, United States of America and Italy, can obtain the instructions by writing to our main agents for those countries, also, of course, enclosing appropriate stamps for postage.

We must strongly advise readers who wish to build this model to apply for the instructions as soon as possible because there is bound to be a big demand for the instruction sheets and we cannot guarantee to supply them after the end of the month in which the model is illustrated in the Magazine. So to avoid disappointment, please write for your copy as soon as you receive this issue!

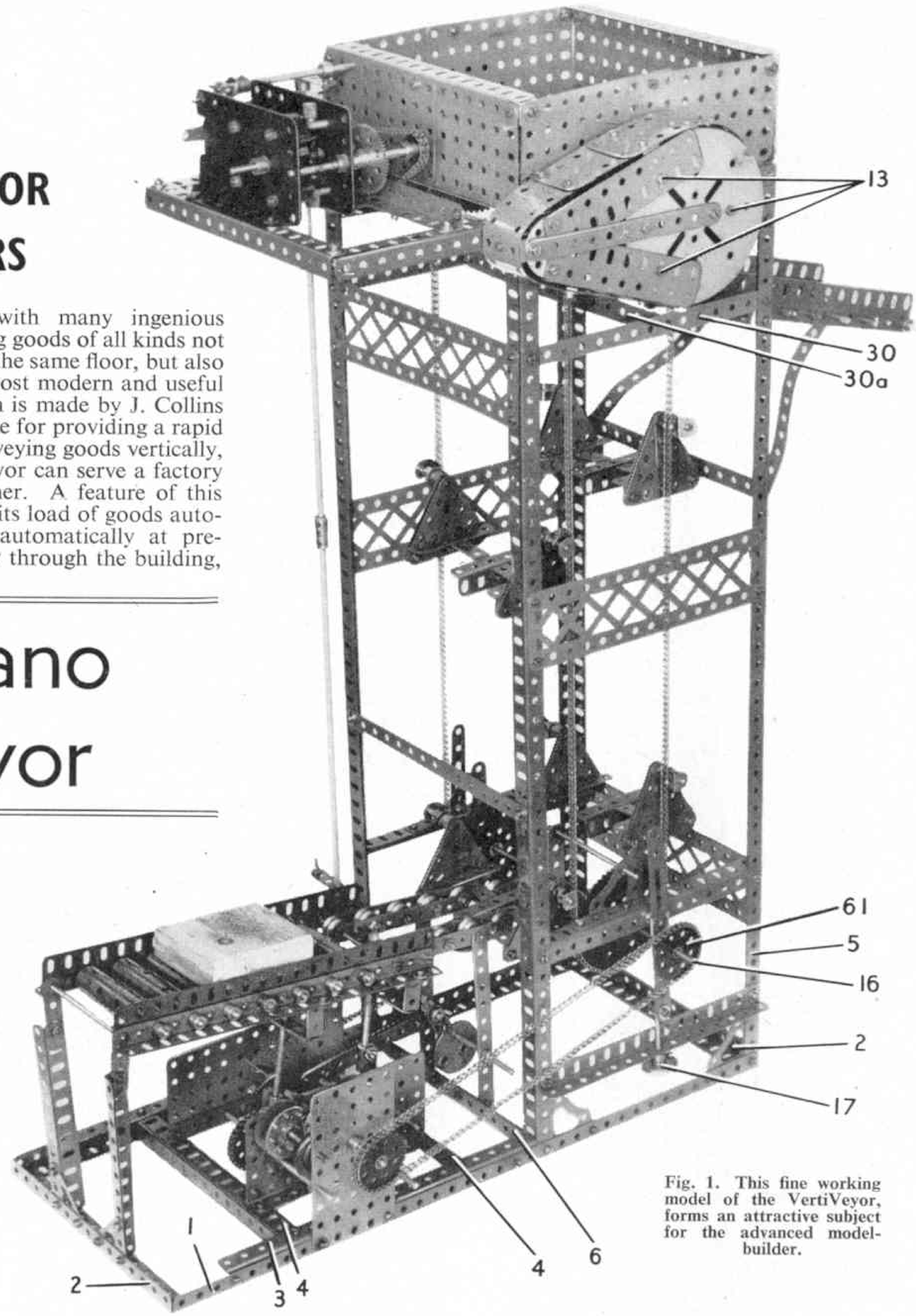
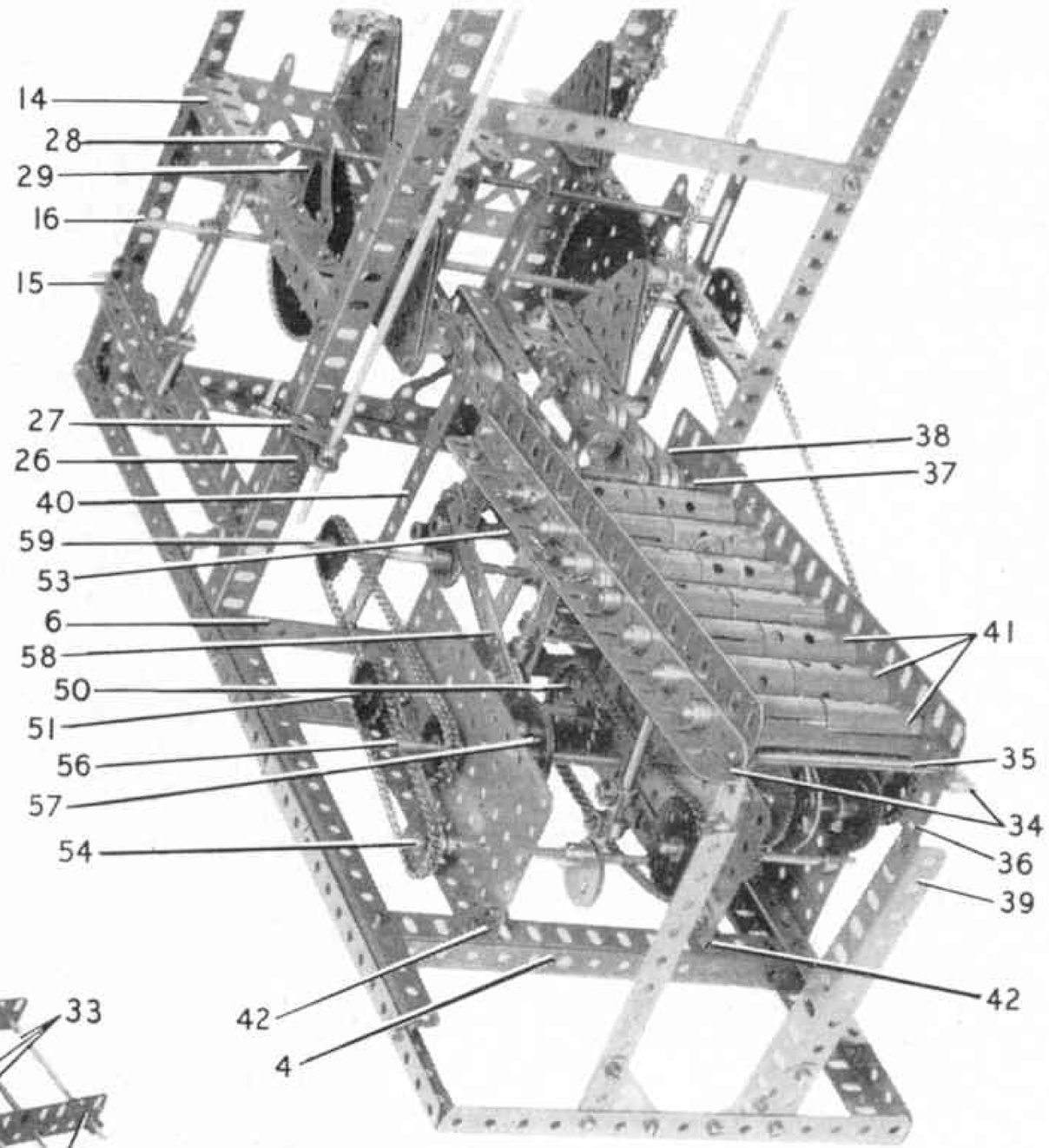


Fig. 1. This fine working model of the VertiVeyor, forms an attractive subject for the advanced model-builder.

Details of the VertiVeyor

The main structure or framework of The VertiVeyor is constructed from steel sections, braced and gussetted to form a rigid support for the driving motor and its gear, which are mounted at the top of the framework. The motor drives the main drive sprockets, and these carry, one on each side of the frame, steel elevating chains, to which are attached the load carriers.

Fig. 2. The feed-in section of the model VertiVeyor and the drive to the feed interrupter mechanism.



The chains pass around two further similar sprockets at the bottom of the frame, and these are mounted on a common shaft that can slide vertically in slots in a bearing block so that the tension in the chains can be adjusted by forcing the sprocket shaft downwards, by means of two screwed rods. Between the two elevating chains hang the load carrier trays, the chains running in vertical guides so as to prevent sway and allow correct pick-up and set-down loads.

The goods to be elevated approach the feed-in section of The VertiVeyor on a gravity roller track and as they near the feed-in point they are arrested by a stop which rises up between the rollers. This is attached to a pivoted rocker arm loaded at one end with a strong spring, and at the inner end of which is another stop known as an intermediate stop. When the apparatus is in motion the rocker arm rocks up and down and when the back stop

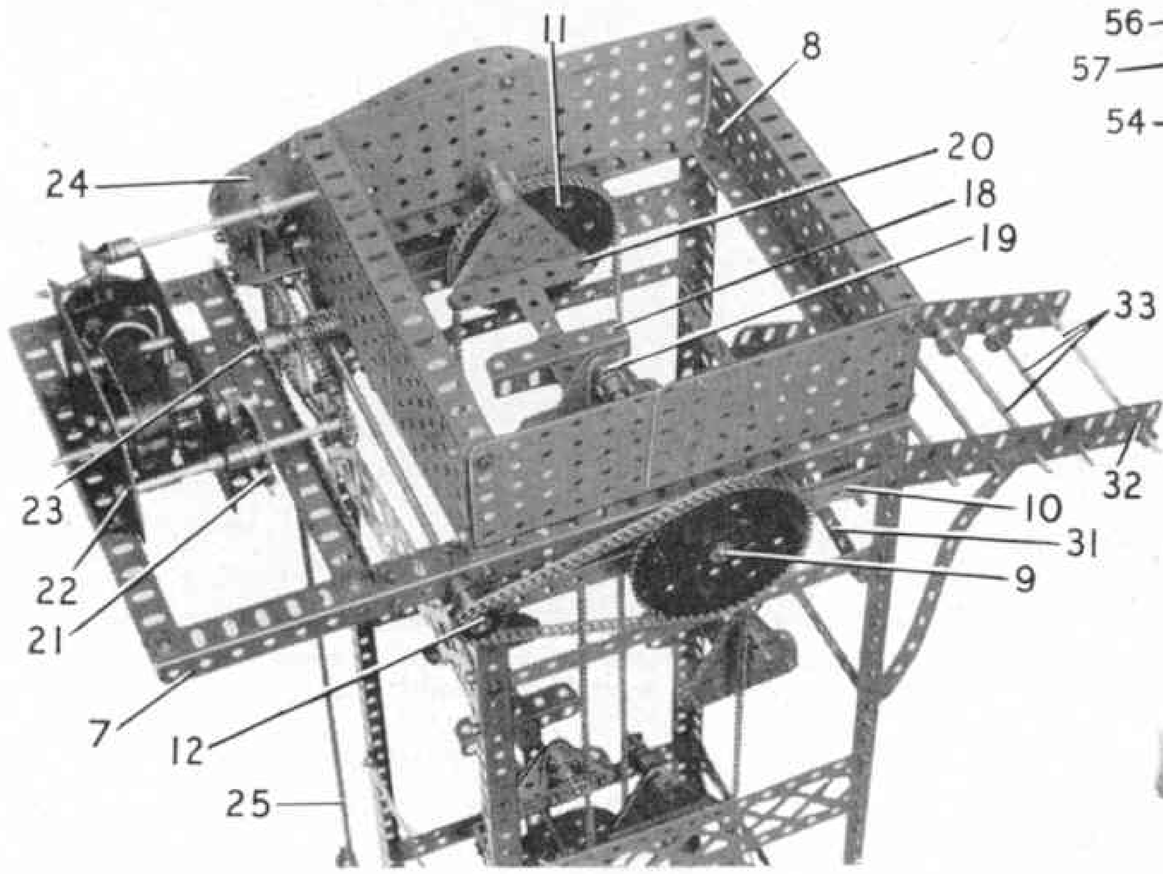


Fig. 3. The upper end of the conveyor framework showing the discharge point or feed-out grid, and the location of the driving motor.

lowers, the intermediate stop rises and allows the goods to advance. As the intermediate stop lowers in its turn, the back stop rises and again holds up the line of goods, with the exception of the first item, which now advances to a further front stop.

As soon as the carriers of The VertiVeyor are clear of the feed-in section, the front stop drops and a pusher comes into action and pushes the load on to the feeding grid of The VertiVeyor. The load remains in the centre of this grid until such time as the next carrier comes up through the grid, when it is taken upward. Having been picked up the loads are carried upward on the carriers and pass over the main upper chain sprockets. Continuing they then proceed in a downward direction until they meet the feed-out grid on the upper floor and leave the load behind. It is usual to link the feed-out grid to some form of power or gravity conveyor, which carries the discharged loads to the required point.

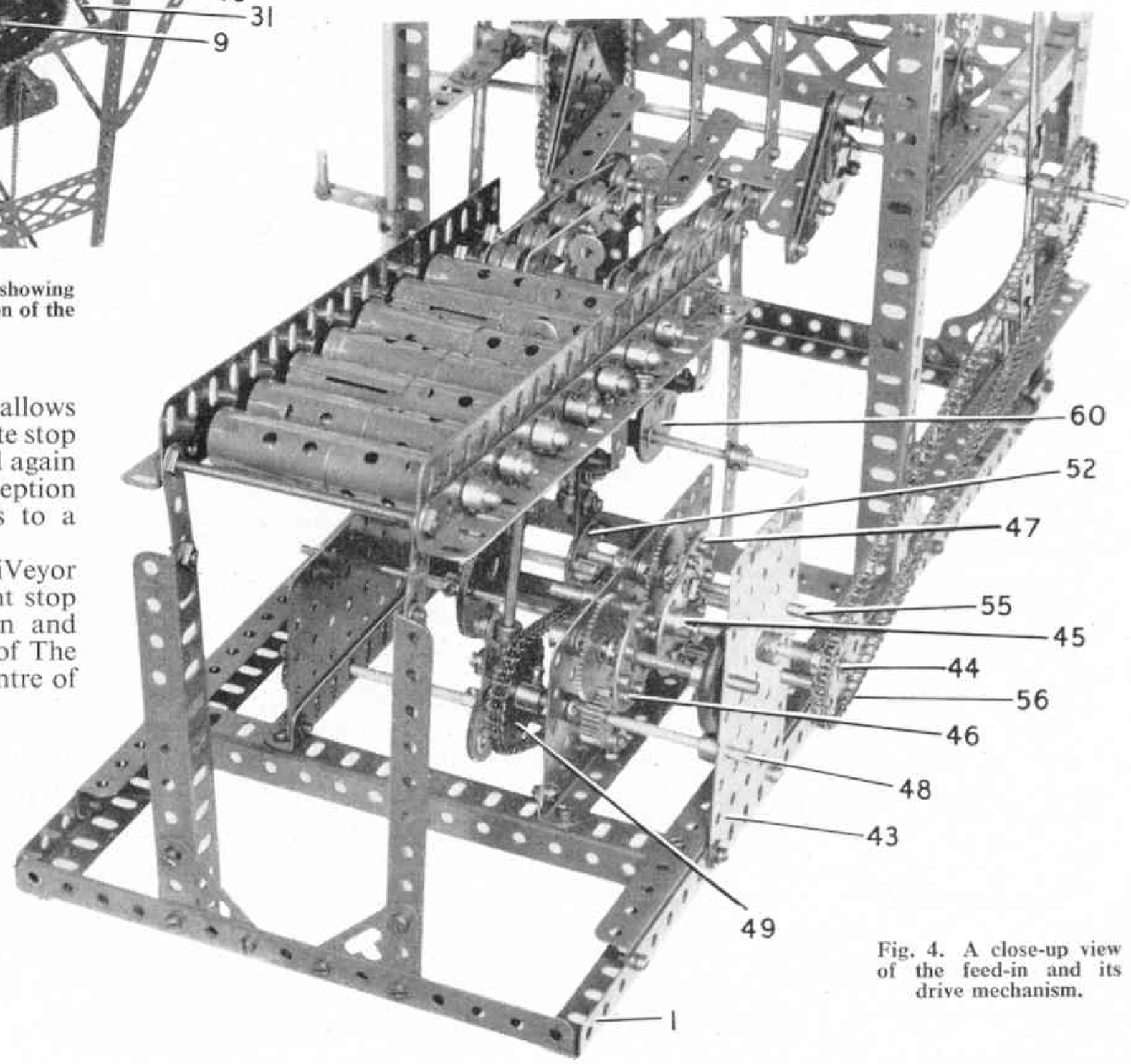


Fig. 4. A close-up view of the feed-in and its drive mechanism.

Club and Branch News

I AM very pleased to have this opportunity of wishing every member of the Meccano Guild and of the Hornby Railway Company a happy and prosperous year in 1961. I hope it will be a year of great progress in all Clubs and Branches, and that many new ones will be formed. The outlook is certainly good.

It is a great help to those enthusiasts who decide to set about forming a Club or Branch if their intention can be made known to other enthusiasts in the district. Local Meccano dealers are generally glad to co-operate by displaying a neatly-printed or typed notice about it in their window or in some eye-catching spot in the shop. I, too, am able to do my bit by publishing the names and addresses of the organisers on the *Club and Branch News* page of the *M.M.*, and in fact this has been done for many years.

We start the New Year well, with four such announcements on this page.

Proposed Meccano Clubs

Readers living in, or near to, Brierley Hill, Staffs; Bridlington, in East Yorkshire, or Harlow in Essex, will be interested to hear that a Meccano Club is being formed in each of these districts. The names and addresses of the organisers are given below, and readers interested should write to them enclosing a stamped addressed envelope for reply.

BRIERLEY HILL—Master W. D. Brereton, 1 New Street, Wall Heath, Brierley Hill, Staffs.

BRIDLINGTON—Master K. Wardill, 9 Brookland Road, Bridlington, E. Yorks.

HARLOW—Mr. J. R. Brown, 31 Ram Gorse, Little Parndon, Harlow, Essex.

Proposed H.R.C. Branch

Scottish readers living in, or near to, Glasgow, will be interested to hear that efforts are being made to form a Branch of the Hornby Railway Company there. Readers who are interested should write to Mr. D. Sharpe, of 103 Broomhill Drive, Glasgow W.1, Scotland, and enclose a stamped addressed envelope for reply.

CLUB NOTES

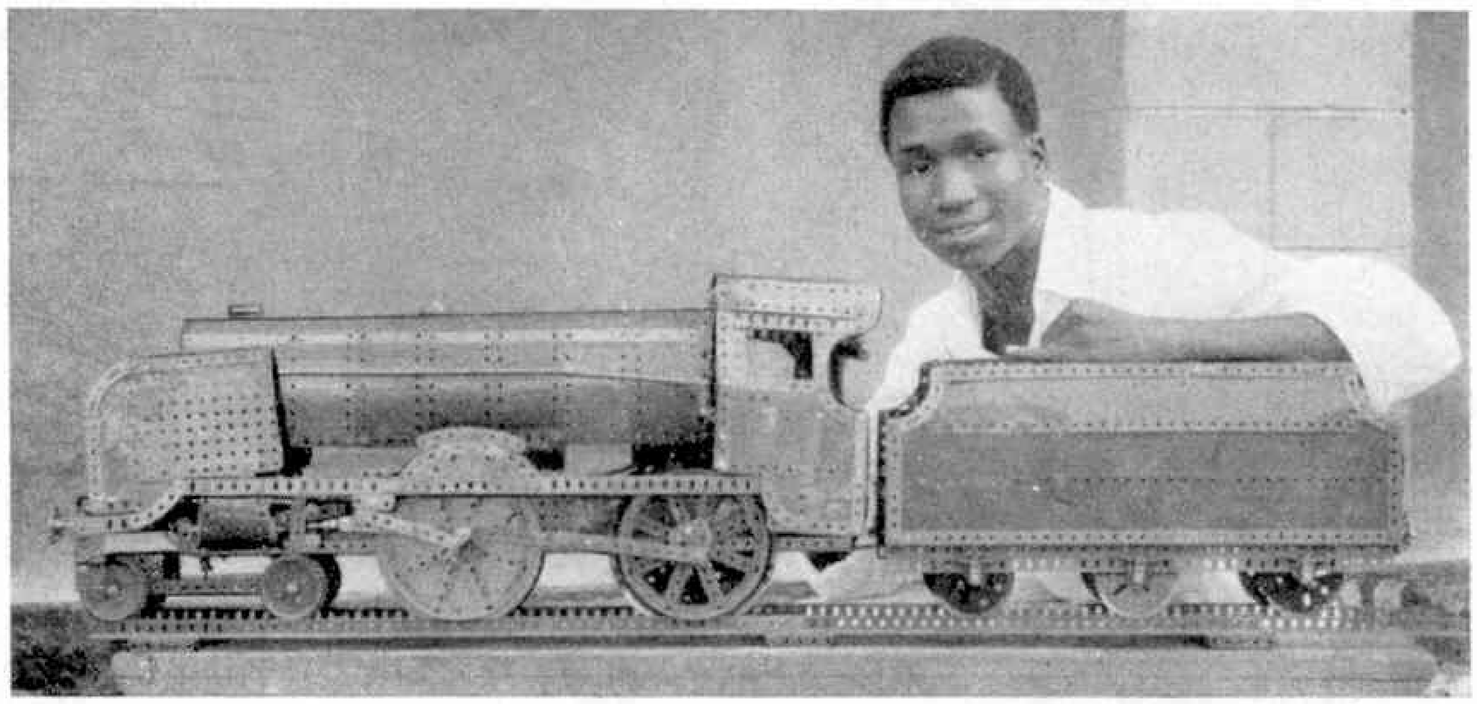
ASHTEAD FREE CHURCH M.C.—The first of this winter's Sessions began with a model-building competition, which Peter Dennis won with his fine model of an aircraft carrier, complete with rotating gun turret, firing rocket projectile, and a working lift for conveying the aircraft to and from the deck and the maintenance hangar below. Film shows, and a Talks evening during which each member gave a short talk on his own interests and hobbies, have added variety to the Club programme. Members enjoyed a most interesting tour of the B.R. South Lancing Carriage and Wagon Works. *Secretary:* Mr. R. Nagel, 41 Newton Wood Road, Ashtead, Surrey.

NORTH END (PORTSMOUTH) M.C.—The Club and its associated H.R.C. Branch have had a busy time during the past two months, during which they have staged joint displays at the Home and Handicrafts Exhibition in the Connaught Drill Hall on November 16 and at the Co-operative Toy Fair on December 5. The organiser of the Home and Handicrafts Exhibition was greatly interested in the Club's preparations, and visited the Club room several times. *Secretary:* Mr. A. J. Nicholson, 213, Sultan Road, Buckland, Portsmouth.

NEWTOWN SCHOOL (WATERFORD) M.C.—An Exhibition was held at Halloween in the Club room. There was a good variety of models, every member having built one for the occasion, and an excellent display of Members' Dinky Toys. John Wigham kindly lent his electric train layout, and this was a great attraction. *Secretary:* M. Hall, Newtown School, Waterford, Eire.

NEW ZEALAND

CHRISTCHURCH M.C.—Generally a particular subject is chosen for Meccano model-building. At several meetings models based on the selected subject and built by the members at home have been displayed and discussed. On one occasion the subject was *Ships*, and resulted in some excellent models of docks, liners, freight steamers and one of a train ferry; all very good. Another time the subject was *Home-Built Cranes*, and the models built included mobile, hammerhead, and jib types and two splendid gantry cranes. A *simple vehicle* model-building evening produced excellent models of sports cars, a vintage car, lorry, Army searchlight and tractor and one of a tramcar. Two October meetings were devoted to preparing models for display at the Christchurch South Intermediate School Fair. *Secretary:* Robert Boundy, 25 McBratneys Road, Shirley, Christchurch, New Zealand.



Mr. Mtaku G. Mshelia, the Secretary of the Gindiri Boys' Secondary School M.C., Gindiri, Northern Nigeria, with a Meccano 4-4-0 locomotive and tender which was one of several large models built by the Club last year.

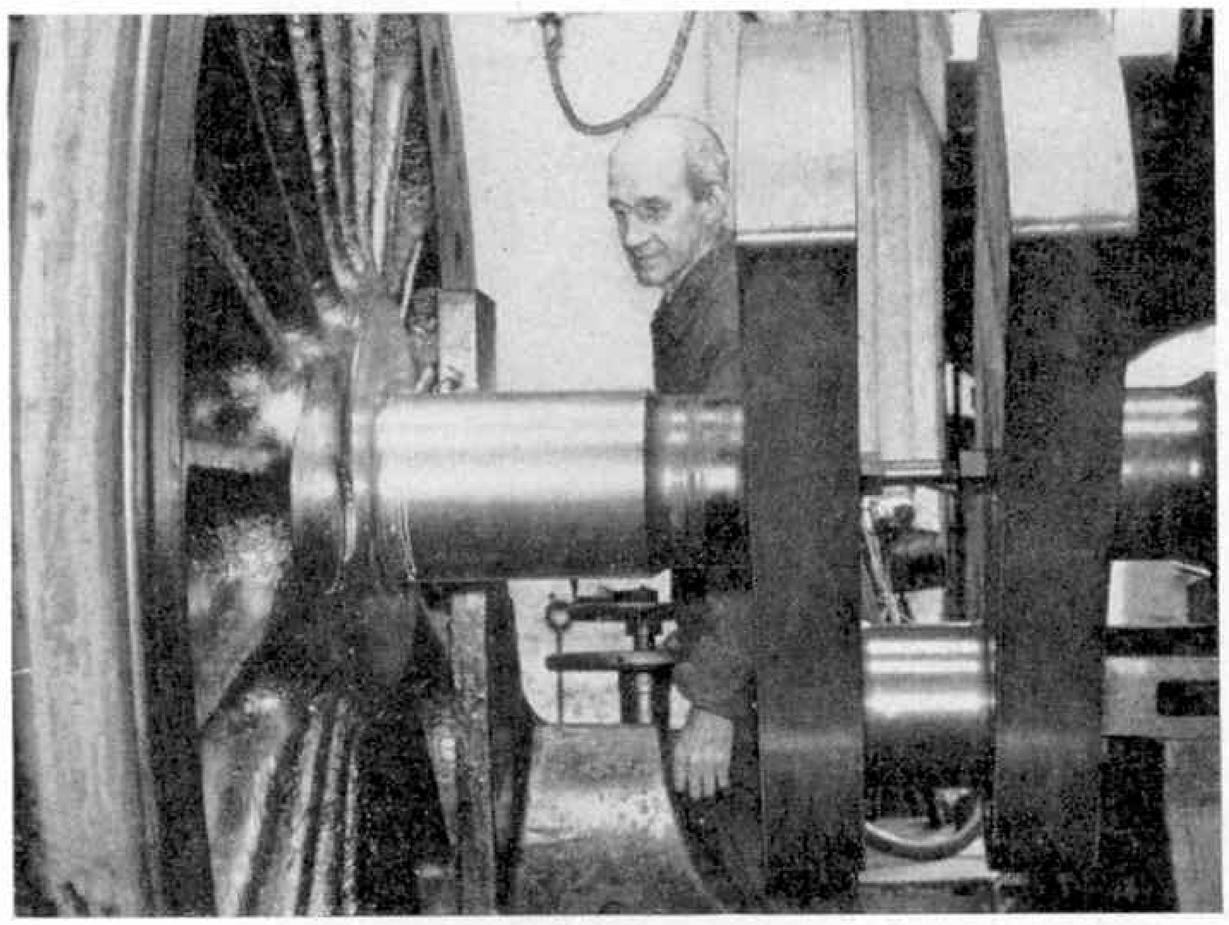
NIGERIA

GINDIRI BOYS' SECONDARY SCHOOL M.C.—Great enthusiasm for Meccano model-building continues, and a very good standard of work is attained. Most of the big models upon which the members had been working before the school holiday have been completed and subsequently dismantled. Models now under construction include the No. 4 Outfit model of a racing car, the No. 6 Outfit model of a planing machine and the No. 8 Outfit model meccanograph. *Secretary:* Mtaku G. Mshelia, Boys' Secondary School, Gindiri, P.O. Barakin Ladi, via Jos, Northern Nigeria.

BRANCH NEWS

Nigeria

GINDIRI BOYS' SECONDARY SCHOOL—The original Branch layout has been dismantled and an entirely different one laid down. It is almost rectangular in shape, with double track, and extensive siding accommodation in the inner space. During the first two weeks of the Session the senior members worked with the newcomers, but latterly the new members have been able to work almost on their own. *Secretary:* Mtaku G. Mshelia, Boys' Secondary School, Gindiri, P.O. Barakin Ladi, via Jos, Northern Nigeria.

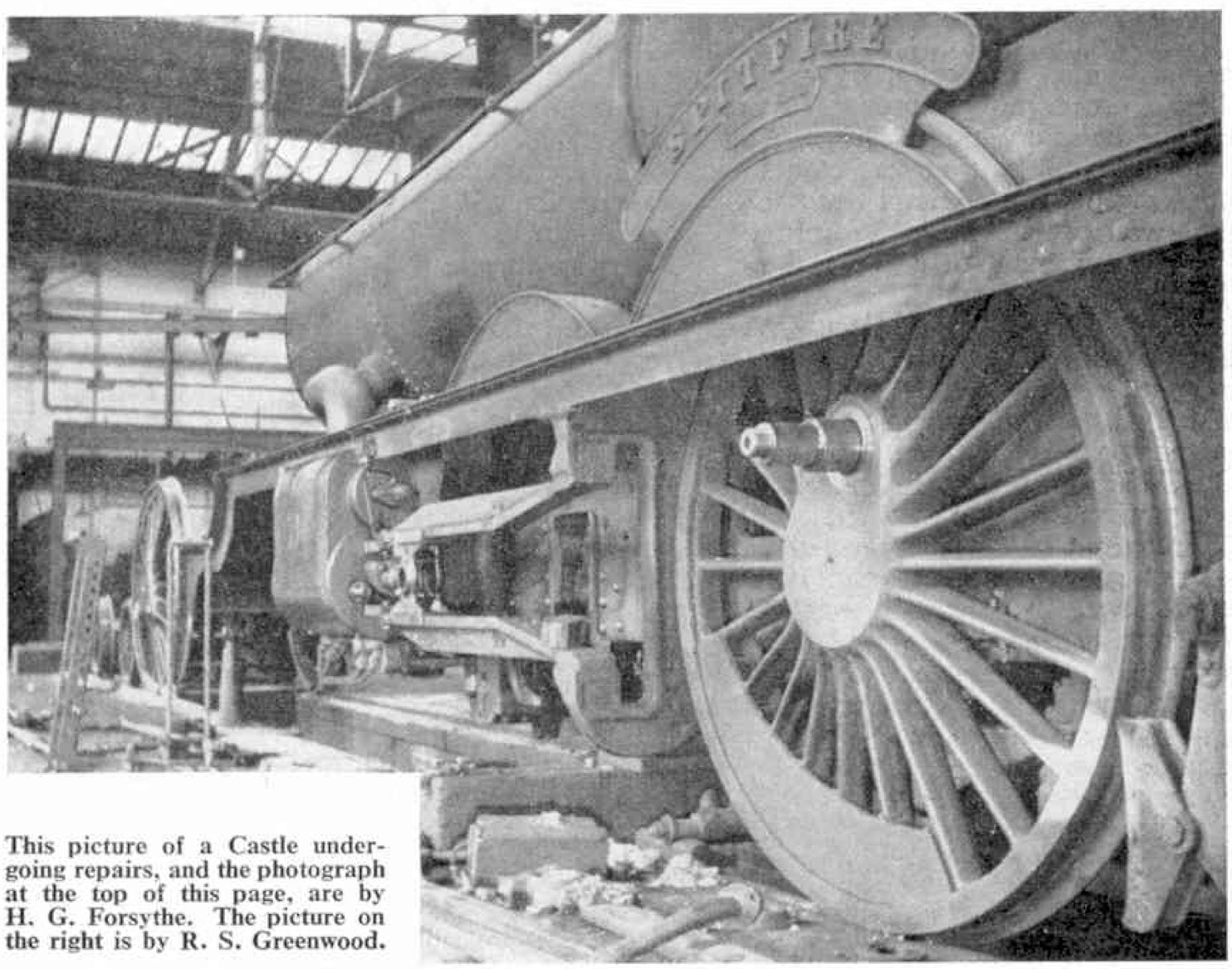


ENGINES TO MEND

Railway engines, like all other machines, require maintenance and repair if they are to continue to do their jobs properly. Apart from heavy overhauls, carried out at a principal works, locomotive maintenance and repair is done at motive power depots and their associated sheds. At these places engines stand cold and stiff—there is nothing quite so dead as an engine not in steam—while fitters, boilersmiths, and other "sheddies" minister to their ailments.

The pictures above and below show some of this shed repair work being executed. In the lower illustration, Spitfire *of the W.R. Castle class is standing partly supported on jacks and packing, and minus leading bogie and driving wheels, and in order to remove the last-named it has been necessary to take down the coupling and connecting rods, the inside motion, driving springs and part of the brake gear, to mention just some of the items. The left hand outside piston rod and crosshead are still in place, but the space between the jaws of the slidebar bracket, and between the bars themselves, looks strangely empty.*

It is possible that the driving wheels and their crank axle have been removed for the sort of attention that is being given to the journals of a crank axle in the top picture. Here, the crank axle of the driving wheels from an E.R. three-cylinder Pacific locomotive is shown being skimmed up in the wheel lathe at King's Cross Motive Power Depot. —**Leslie Norman**



This picture of a Castle undergoing repairs, and the photograph at the top of this page, are by H. G. Forsythe. The picture on the right is by R. S. Greenwood.

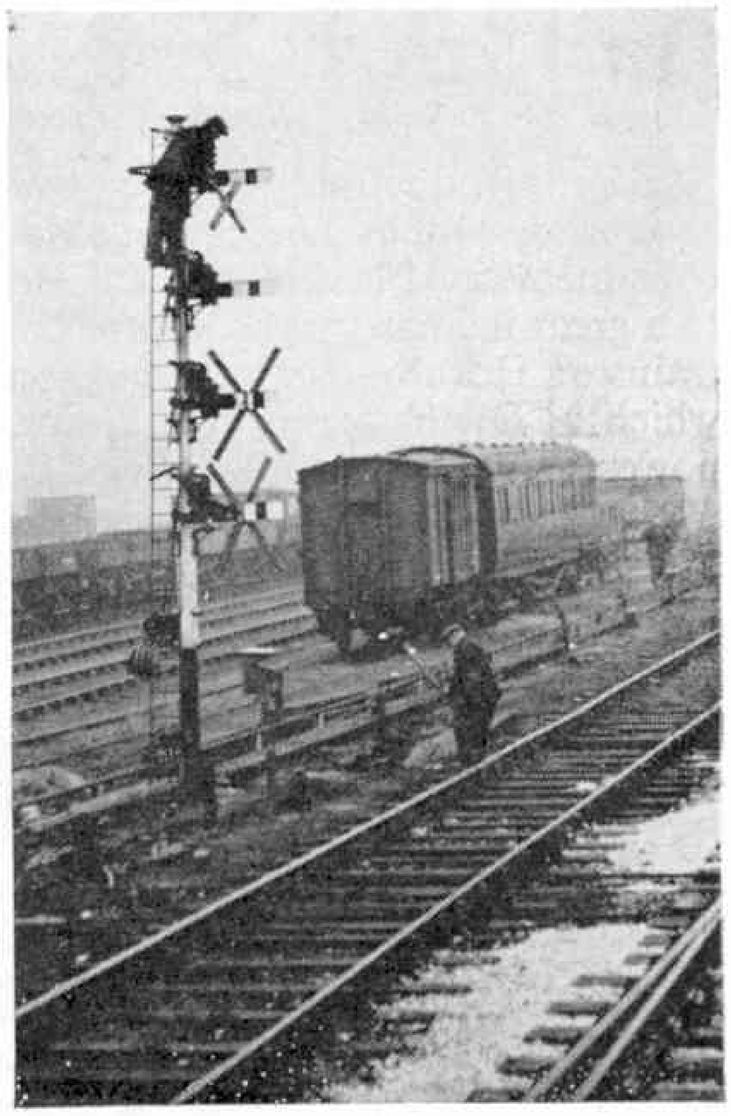
A Railway Miscellany

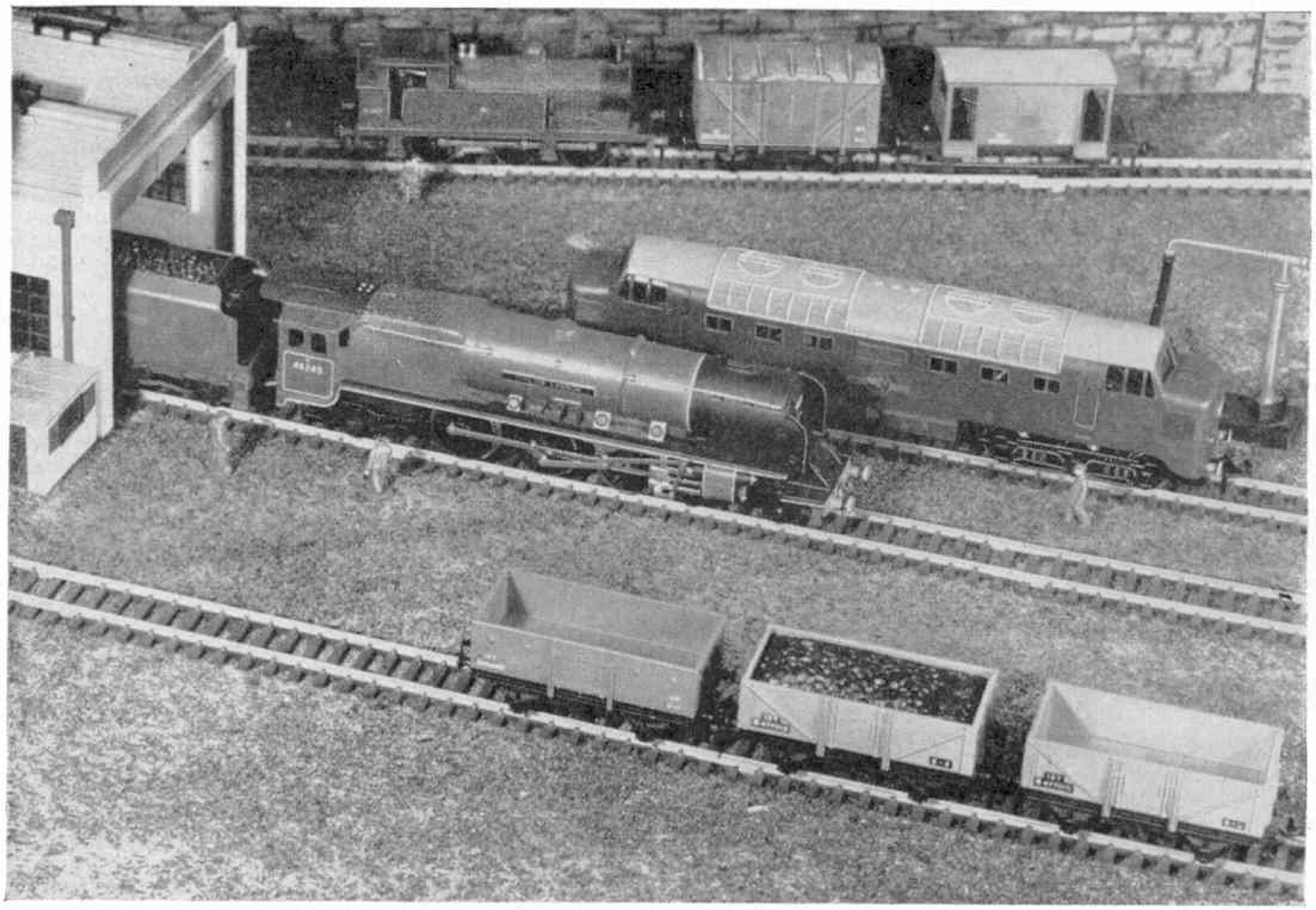
ALTERING SIGNAL SCHEMES

Railway semaphore signals are often seen with large crosses on their arms. This is to indicate that those particular signals are not in use and are not to be obeyed. Usually, one finds there is an alteration to the signalling scheme in progress when signals are thus cancelled. If it is merely the replacement of an old signal by a newer one then, by working at a quiet period, railway engineers can bring the signal into use without delay. The photograph below shows the scene at Rochdale East Junction on the day when the connection between the main ex-L & Y line across the Pennines and the Rochdale to Bacup branch was removed. The Rochdale-Bacup branch lost its passenger services in 1947 and is now worked only as far as Facit by one or two freight trains a day. When the connection was removed, access to the branch for freight trains was possible only from the down goods line, and much of the signalling at the junction had to be altered.

The crosses are being removed from the arms of a shunting signal. This type of signal may include several arms mounted one above the other for simplicity. The topmost arm indicates the road which is furthest left, and the lowest arm that on the extreme right.

As soon as the crosses had been removed from the semaphore arms, the signalman tested the working of the signal, setting up the various routes through his turnouts and seeing that the correct arms came "off" when he pulled the appropriate levers. In the siding adjoining is a work train typical of that accompanying permanent way gangs. —**R. S. Greenwood**





WHAT'S NEW IN HORNBY-DUBLO

THE introduction of the two Hornby-Dublo Diesel Locomotives mentioned last month has led to a great increase in the number of trains on Hornby-Dublo layouts on which a Diesel forms the motive power. Therefore, you will not be

HORNBY RAILWAY COMPANY

By the Secretary

surprised to see that in two of the illustrations here the Co-Co Diesel is featured. This is a heavy main line job capable of taking important long-distance passenger, or freight, trains and I expect all who have obtained this fine engine have found plenty for it to do on their own railways.

The design of the motor and of the Locomotive generally is straightforward and the instructions that are packed with it cover all the necessary aspects of maintenance. Thus you should have no difficulty in keeping your Diesel in service for long periods, as real diesels can be; which is one of the reasons why diesels are coming more and more into use on the main lines of British Railways.

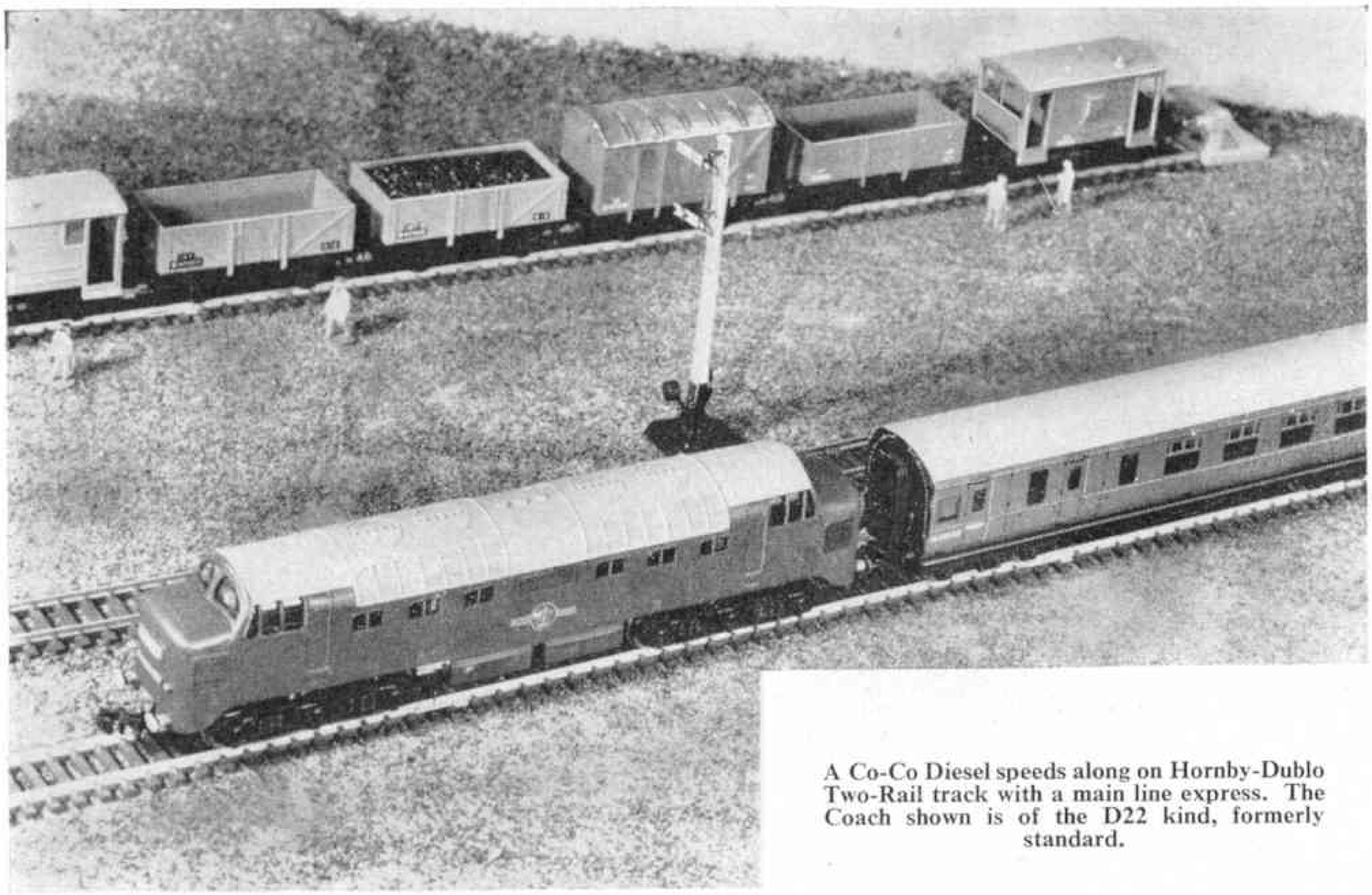
It may well be that on layouts already boasting a Bo-Bo Diesel the addition of the two new Locomotives might justify the establishment of a separate shed for diesel power alone. This would be in keeping with current developments in real practice, although quite often diesels have to share quarters with steam locomotives. This is the situation in miniature depicted in one of our illustrations, where the Co-Co Diesel makes an impressive stable companion to *City of London*.

From the operating point of view one advantage of the diesel is that it can work in either direction equally easily. It does not need to be turned round for a return journey, so there is no need for a Hornby-Dublo layout to incorporate special track arrangements to make this possible. In fact, I have no doubt that many Diesel owners simply provide on their layouts a run-round loop and the engine is changed from one end of the train to the other before a return trip takes place.

Now from engines, to their trains. Hornby-Dublo Coaches have always had a very good reputation, but a big step has been taken forward in the new-style First/Second and Brake/Second Coaches based on B.R. Standard prototypes. You will already have seen pictures of these in our advertising pages and you cannot fail to have been struck by the very close resemblance of these excellent miniatures to their B.R. prototypes. They are longer than the earlier Hornby-Dublo Corridor Coaches and they incorporate numerous improvements in design. The bodysides and the base are of metal, so constructed that the assembly is very strong as the two sides and what is, in fact, the "ceiling" of the coach are made in one piece. The use of tinprint permits the incorporation of all the necessary markings, numbers and so on, and the Coaches display the latest B.R. emblem in a most effective manner on the lower bodyside panels.

"On top" detail is rightly regarded as important, for most miniature railways are viewed from above. So the roofs of the new vehicles are one-piece mouldings incorporating correctly placed dummy ventilators, and, on the brake seconds, the representations of the periscopes provided on some B.R. vehicles for the guard.

In the illustration at the head of this page a Co-Co Diesel locomotive stands alongside "City of London" at a Hornby-Dublo Engine Shed.



A Co-Co Diesel speeds along on Hornby-Dublo Two-Rail track with a main line express. The Coach shown is of the D22 kind, formerly standard.

The new Coaches are correctly bow-ended and these ends also are moulded, incorporating even such fine detail as steps and the jumper cables used for train lighting on the real thing. Firmly secured to the ends are the dummy Pullman-type gangways of characteristic outline, and the handrails found at the ends of the coaches leading up to the roof are modelled in an extremely neat manner.

A really exciting feature of these new Coaches is the fact that they are fitted up internally to include the usual arrangement of compartments found on side-corridor coaches. Corridor partitions, seating and so on are beautifully represented and these details can be clearly seen through the very effective glazing that is an essential feature of the body construction. You really feel as though you could get aboard and take a seat!

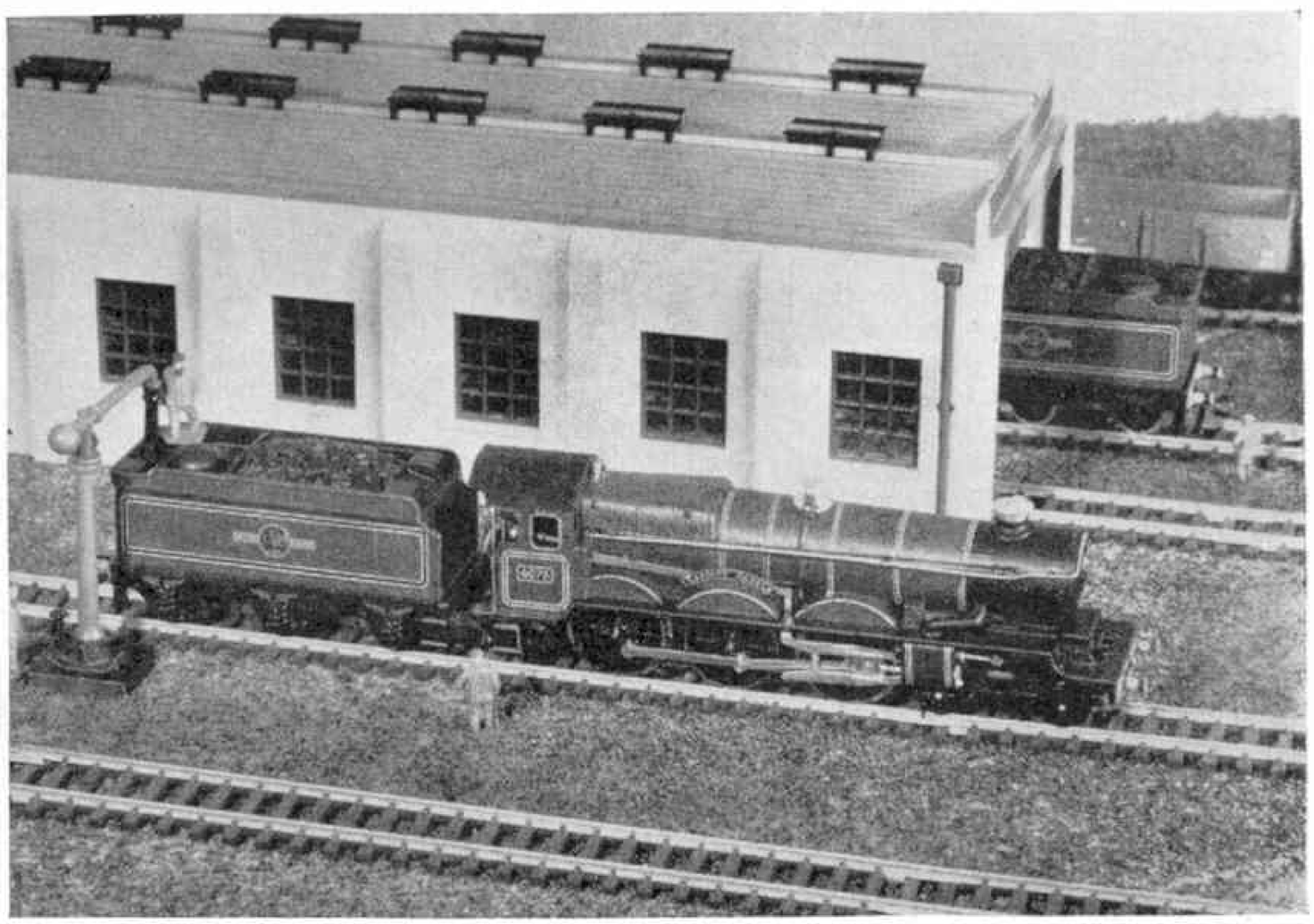
The bogies are of new design, the side frames being mounted on an upper assembly or "bolster" in such a way that the frames are pivoted about a centre point and have a small amount of up and down play. This means that the wheels can readily accommodate themselves to any inequalities in the track, and the riding of these new Coaches on their nylon wheels is really remarkable for its smoothness. Couplings are attached to the bogies in such a way that they are automatically centred when the vehicles are on the track. There has been a change, too, in the couplings themselves, the original metal pattern having been replaced by finely-moulded nylon couplings of the same basic design. These are hard, but not brittle, and will stand up to the usual shocks to which they are subjected in use in a really satisfactory manner.

A new feature for Hornby-Dublo stock is the incorporation of underfloor detail between the bogies in the form of a single plastic moulding. This is attached to the base of the coach and represents very effectively the underframe girders, accumulator boxes, brake cylinders and V-hangers, and even the domed end of the lighting dynamo which is quite a prominent feature on many B.R. Standard vehicles.

The new Coaches were produced first in W.R. brown and cream for inclusion in *Red Dragon* Train Sets, but stock in B.R. maroon is also being introduced.

Recent pressure on our space has so far crowded out any reference in these talks to the Hornby-Dublo Passenger Fruit Van, the introduction of which a month or two ago must have been very welcome to all of you. You have already seen pictures of it and there is no need for me to tell you that the prototype is a Western Region design. The model catches exactly the "Swindon look", with its long wheelbase and characteristic external detail. Of course, the bodywork is moulded and the three pairs of double doors on each side of the real van—known as *Fruit D* to Western men—are beautifully modelled, while the spaces between the doorways incorporate the rather unusual X-shaped ironwork that helps to stiffen up the real body construction.

The ends are no less perfect than the sides, and the roof carries perfect reproductions of the ventilators. The tonnage and code description appear correctly at the left hand end of each side, while the *XP* indication, showing that the Van is suitable for fast traffic, and the number, are shown at the right hand end. Details of the die-cast base incorporate correct W.R. type axleboxes and "Either-Side" brake lever. The smooth-running nylon disc wheels are flanked by dummy brake blocks.



"Cardiff Castle", fitted with Ring Field Motor, "takes water" from a Hornby-Dublo Water Crane. The plastic "bag" or pipe of the Crane has been cut short in order to allow it to fit over the tender.

A TWO-LEVEL LAYOUT AT PORTSMOUTH

A view across one end of the main station on the "Cornwall Railway," described on this page, showing the effective nature of the layout as a whole.

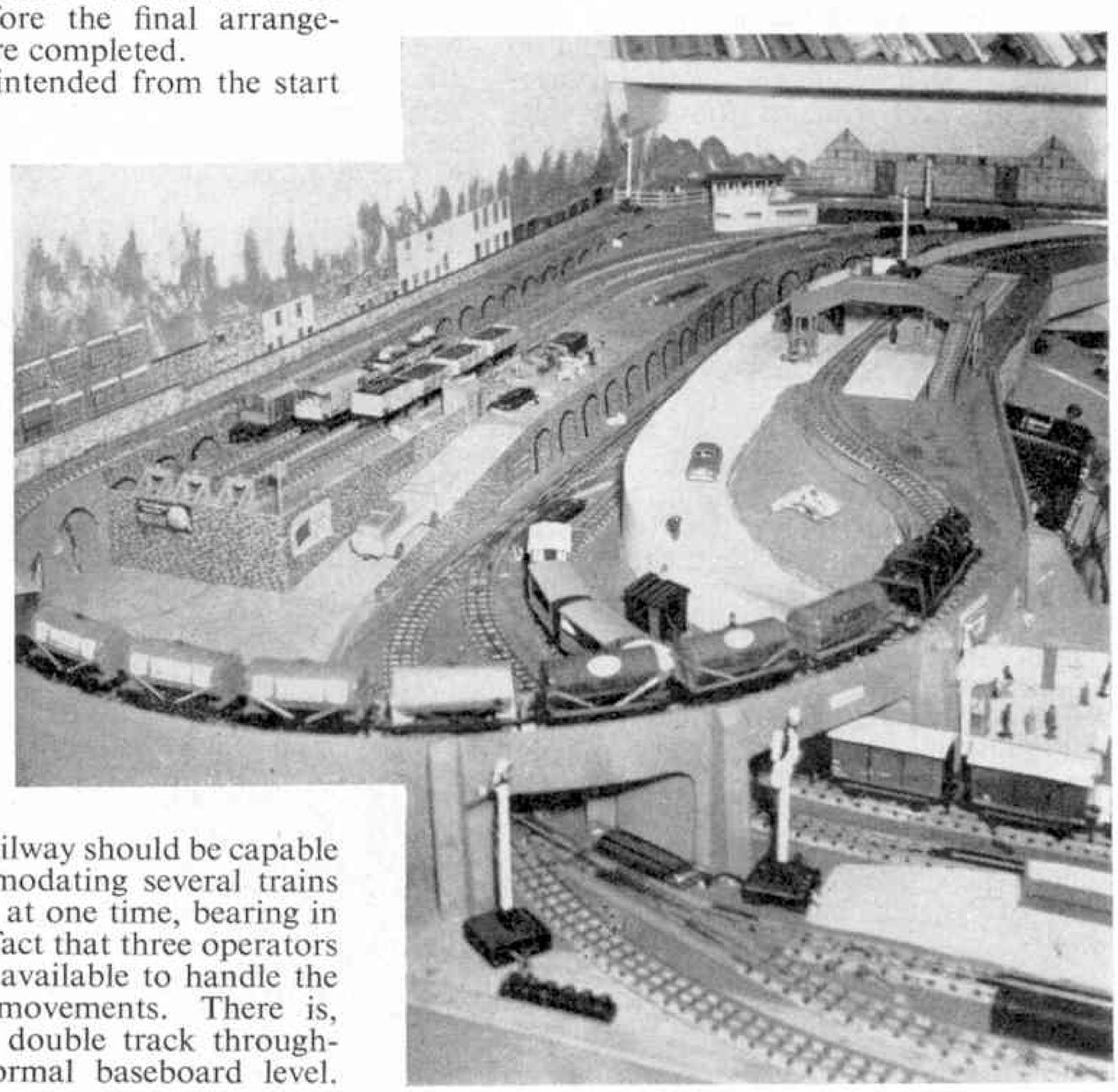
I RECEIVED details recently of a rather remarkable Hornby-Dublo Three-Rail layout, two views of which appear on this page. It is not exceptional in the matter of size, although it does occupy a space 7 feet 9 inches by 6 feet 9 inches, but in its general character, and in the scope of the operations it permits, there is little doubt that it is a very effective system.

By "Layout Man"

The details given here are taken from notes that were prepared with the *M.M.* in mind by the late Mr. R. Cornwall Read, of Portsmouth, father of the present owners, Michael and Peter Read. The system was originally begun for the two boys a number of years ago as the *Cornwall Railway*, a truly family affair. The material has kindly been made available now for *M.M.* readers by Mrs. Cornwall Read, in the hope that the description and photographs will be of interest to all, and may encourage others to develop their Hornby-Dublo layouts on similarly sound lines.

It is clear that before a single rail was laid, and even before the baseboard had been made ready for the track, a good deal of careful planning work was accomplished. The system was intended to be a permanent one and the track requirements for the various movements to be provided for were worked out in full detail. This is undoubtedly the right way to begin, and the successful building up and subsequent operation of the system is a tribute to the thoroughness with which the initial preparations were made. Incidentally, the original scheme was revised three times before the final arrangements were completed.

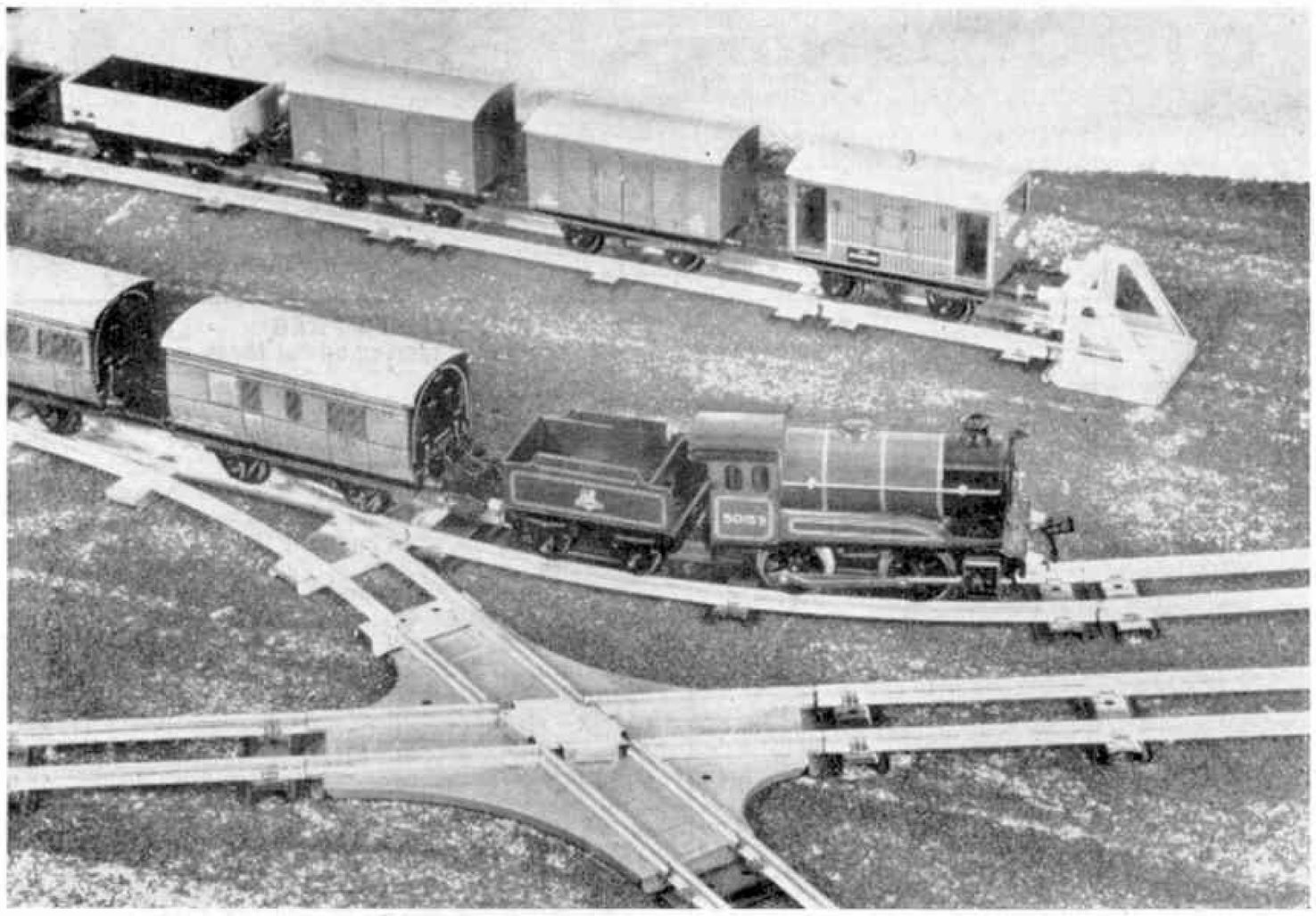
It was intended from the start that the railway should be capable of accommodating several trains in motion at one time, bearing in mind the fact that three operators would be available to handle the different movements. There is, therefore, double track throughout at normal baseboard level.



The high-level section is clearly shown here, including the gravity marshalling yard in the middle distance.

The two main tracks pass through the centre platforms of a comprehensive main line station used, as necessary, as a terminus and as an intermediate stopping and junction point. From the outer main line a branch is taken off near the station, serving an outer or local line platform there and leading ultimately to an inclined section and the high-level area that you can see in the lower picture on this page. At baseboard level various sidings serve lineside industrial buildings and there is as well an engine yard with a two-road engine shed.

Having reached the high-level area the branch running line continues along the outer edge of the baseboard, doubling back over the curved viaduct you see in the picture below and serving a high-level station before rejoining, by means of a trailing Point, the original approach from the inclined section. Within the space thus enclosed is a sloping marshalling yard arranged to be worked on the gravity principle, (*Continued in col. 3, next page*)



Part of a Hornby layout including an Acute Angle Crossing, and Points, as referred to on this page.

Tommy Dodd writes about:

CROSSINGS

YOUR talk this month follows up in a sense the hints that appeared in last month's *M.M.* You will remember I mentioned that when carrying out any layout extensions it is important to obtain rails and so on of the same radius as those you already have. It will be clear how this applies to Curved Rails, and to Points, for Points include a curved section and Curved Rails and Points must match one another satisfactorily. It may not be too easy to follow how the term radius applies to track components such as the Acute Angle Crossing that is prominent in the picture above, because both arms of the intersecting tracks that form such a crossing are straight, not curved.

Crossings of this kind are very often used in order to form what are usually known as "figure-eight" layouts and it will be realised that there must be some relation between the radius of the curved rails used to form the "loops" of the figure and the lengths of the intersecting tracks at the crossing. So we have what are called 1-foot radius and 2-foot radius Crossings in the Hornby System. How "figure-eight" and similar layouts are built up is shown in the leaflet *Layout Suggestions for Clockwork Track* and apart from the schemes shown there I am sure that many of you will already have tried out numerous variations of your own.

This kind of thing is only part of the enjoyment to be had when you are a Hornby railwayman. In due course many of you will settle on one or two layouts that you consider your favourites and you will probably build these up over and over again. As a result, train running becomes more regular on a given layout and operations generally are of greater interest because they are carried out to a more definite plan.

In addition to the Acute Angle Crossing shown here the Hornby System also includes a Right Angle Crossing and this, like the Acute Angle one, is made in 1-foot and in 2-foot radius form. It can be used effectively where plenty of space is available but as a rule it is not associated with the use of Points. The Acute Angle Crossing on the other hand is very useful in schemes where Points are involved. Points provide the means for leading a branch or siding track from a main running line and such a branch can be taken over an adjacent track by means of a Crossing. Where the adjacent track runs parallel to the main line and 2-foot radius Points are in use it is necessary to place a standard 2-foot radius curve between the end of the curved branch of the Points and the Acute Angle Crossing.

Many different versions of Points-and-Crossings layouts are possible, and this adaptability is particularly useful where a layout has to be of somewhat irregular shape, owing perhaps to various obstacles that may be encountered on the floor where the railway is laid.

A Two-Level Layout At Portsmouth

(*Continued from previous page*)

there being a series of Points so arranged in relation to an Uncoupling Rail that wagons detached run through the Points into one or other of the several sidings.

In movements leading up to such an operation the there-and-back principle on which the high-level main line was laid enables an engine to ascend the incline with its train, make a circuit of the high-level track and then, with the Points leading to the marshalling yard now behind the train, shunt the wagons one by one, or in groups, over the Uncoupling Rail and so into the various sidings.

On completion of the job, the engine could then return to the baseboard level track for further duty, or re-assemble in a different order the train it has shunted, and then lead it down to the main part of the system again. The presence of a station on the high-level section makes it possible to operate a branch line or local passenger service between it and the main station. At the latter a loop line is provided so that the engine could be run round from one end of an arriving train and couple again at the other end for a further journey.

The arrangement of the branch line, with its there-and-back loop, also makes it possible for a main line train to complete a through journey, starting from the terminal platform at the main station. After making a given number of circuits on the inner track it can cross to the outer track and so gain the branch line. After traversing this and regaining baseboard level, several more circuits could be made before the journey is terminated.

The arrangement of isolating sections and Uncoupling Rails in the track serving the terminal platform is such that before the start of a run of this kind one engine could bring the empty stock alongside the platform, be uncoupled and then remain in a "buffer-stop" section that can be isolated. This means that the engine due to take the train on its journey can then be backed on at the front end of the train without difficulty. As soon as this train reaches the separate main section provided by the outer main line, and the branch, the engine that brought the empties in can be released.

Another scheme that has been worked successfully involves the use of a banking or assistant engine in the rear of a train leaving the station to climb the incline to the high-level section. In this instance, the train stops alongside the local platform at the main station, the engine standing just beyond a short isolating section. The assistant engine is then attached at the rear of the train and, with the isolating section lying between the two engines switched out, power is applied to each locomotive from a separate controller. The train now moves off with both engines working until, at just the right moment, the ramp of an Uncoupling Rail situated within the isolating section is operated. This causes the assisting engine to be uncoupled, just as it encounters the switched-out section and stops.

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FOR OTHER STAMP ADVERTISEMENTS SEE ALSO PAGE 32

For Stamp Enthusiasts

Southern Africa

By F. E. Metcalfe

RECENTLY I received a letter from a collector who told me that he had switched over to South African stamps, and that they were providing him with the best fun he had ever experienced with modern stamps. He went on to suggest that I might like to mention these stamps to others who, like himself, wanted something to get their philatelic teeth into, but who also had not a lot of spare cash for the hobby. That letter has given me a good deal of food for thought, as it contained much of interest to many collectors who, apart from not wishing to spend much money on the hobby, are unable to tackle a lot of countries, owing to the huge number of stamps which are being issued by most of those outside the Commonwealth.

Now let me say right away that today, as never before, many really beautiful stamps are being issued, and a lot of them could hardly be cheaper. For a few shillings quite an attractive display can be made. But the re-sale value of many of these stamps is not very high, as compared with even the low prices paid for them in the first place. Here I would like to make another point. Many collectors buy stamps at a big reduction from catalogue prices. This is possible as all too often these catalogue prices are inflated above all reason. For instance, it is quite easy to get some stamps at as low as one-tenth of the catalogue quotation. That is all right, but there comes a time when a collector wishes to sell. Before doing so, he carefully prices all his stamps, as per the current catalogue, and then gets quite a disappointment when he finds that the selling value of the stamps is a long way below his figure, as was the case when he bought them.

Anyhow, to get back to South African stamps, those issued during the past twenty years or so are the philatelist's dream of home. But I am not going to suggest that you should go in for all the varieties unless you are a very skilled collector; nor am I going to suggest that you just take up South Africa. My proposal is that you take the whole of Southern Africa, including South-West Africa, and add Southern and Northern Rhodesia, Rhodesia and Nyasaland, as well as the small protectorates Basutoland, Bechuanaland and Swaziland. In a word, Southern Africa.

Now I am quite aware that stamps of the three latter countries are not very common, as with very small populations their postal needs are correspondingly small. But you can pick up used copies

here and there, often for a mere copper or so; and by keeping your eyes skinned, as they say in the "Westerns", it is amazing what you can find. I know of one collection which contains a lot of these little fellows, and the collector told me that he had not spent a pound on the lot—and even that expenditure had been spread over a couple of years. What you do need, of course, is patience.

When we get to other countries, then there are plenty of used stamps about, and these—even the high values—are relatively cheap. Do not bother to limit your collection, starting from a certain date; just make all grist for the mill. Anyhow, taking the major country, South Africa itself, it only began to issue stamps in 1910. I am, of course, ignoring the expensive triangular Capes, but you can have triangular stamps, for in 1956 one was issued (in the original design) and the same stamp overprinted for South-West Africa. Incidentally, these two stamps seem to be improving in value.

But my favourite South African and South-West African stamps are what collectors call the "Bantams", the stamps known officially as "War Effort" issues. In the first place, there was an issue in 1941-2 with the designs depicting various aspects of the war, then at its height. Later, the same designs were reduced and used on stamps which were only half the normal size. These small stamps were not only perforated, but rouletted as well. The best way to collect them is not in single copies, but in pairs or strips of three, with perforation all round. The example illustrated will show what I mean.

Another South African stamp that will appeal to British collectors is the one issued to celebrate the Silver Wedding of King George VI and Queen Elizabeth. It was issued in bi-lingual pairs and also overprinted for South-West Africa. The most interesting point about the stamps is the illustration of silver leaves, *Leucadendron argenteum*, in what I suppose is silver—at least it looks like it—on the stamps themselves. Many readers know what these leaves look like of course, and I personally have picked them off Table Mountain. The stamps are very attractive, and having been heavily bought when on issue they are still quite cheap to buy.

Among the other interesting special issues of South Africa is one which appeared last May to mark the 50th Anniversary of the Union. At the same time a stamp was issued to celebrate the centenary of South African railways, but—as the *South African Philatelist* put it—the date of issue was not historically accurate. It also mentions that, from the design of the stamp, it might be judged that the first

railway started at or near Cape Town, which is also not correct. But my concern here is with the stamps themselves, and this "Railway" stamp, historically inaccurate as it undoubtedly is, will interest *M.M.* readers nevertheless, especially those to whom railways have a special appeal.

I am afraid that there is not time to detail the stamps of Rhodesia and Nyasaland, but they are easily come by and well worth having. I must mention the pending currency change of South Africa, however, which will also affect the three protectorates. In February this year new stamps all round will be issued, so now is the time to get the stamps which are being changed.

Stamp Gossip

Europa Issues

IT seems to be becoming more and more the fashion for a number of countries to join hands, as it were, and all issue a set of stamps which have something in common as far as the design is concerned. The object behind the agreed issues is the same, of course, and examples of what I mean are the "Refugee Year" and "Olympic Games" issues. Another batch of issues concerned the "First Anniversary of the European Postal and Telecommunications (*Continued on page 33*)

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FOR OTHER STAMP ADVERTISEMENTS SEE ALSO PAGE 30

"THE WORLD OF MODEL RAILWAYS"

by Joseph Martin

(Percival Marshall, price 12/6)

Books on miniature and real railway subjects are numerous nowadays and it is not easy for an author to strike a new note, but *The World of Model Railways* is refreshingly different. It pays tribute to the thrill of real railways, and rightly so, for if there were no such thrill there would be no miniature railways. Throughout the book the author deals with real and miniature railway subjects side by side, and much sound advice is given. Layout design and station planning are given due attention, while signalling and control arrangements also are dealt with. Train operations, miniature railway maintenance and lineside development are included among other fascinating subjects.

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Among the Model-Builders—

(*Continued from page 19*)

by means of a simple band brake bearing the Flanged Wheel 11.

The end of the Cord is attached to Collar 38 on Rod 37, which is carried on 1" Triangular Plates bolted to the frame. Rod 37 is turned by a linkage connected to the accelerator pedal. When the brake is off (pedal released), Wheel 11 revolves idly and no power is transmitted. With the brake fully on, maximum power is transmitted.

The direct drive can be kept engaged and the speed regulated by the accelerator alone, except when the low gear or reverse is required. The free wheel ensures no power loss when changing gear.

Stamp Gossip— (*Continued from page 31*)

Conference" in which Great Britain took part and issued a couple of stamps like the rest of the countries.

Ireland was another country concerned, and like the rest emitted itspair of stamps. There is not room to illustrate one of our stamps to show what I mean, but this should hardly be necessary, as there is bound to be at least an envelope about the house with one stuck on; and you will notice that wheel similar to the one on the Irish stamps. Of course, as usual we smother the design with superfluous lettering, etc.—how dreadfully trite our stamp designs generally are—but there is the wheel all right, and the clue to it lies in the spokes, which number 19. This is the number of countries participating in the conference. Incidentally, the wheel motif was the idea of a Finnish artist, Pentti Rahikainen, whose design was selected.

STAMPS ABOUT STAMPS

Many collectors go in for stamps which have "stampic" connections, as they might say on *Twenty Questions*, so the one issued by Israel on October 9 last year to celebrate the National Stamp Exhibition, and illustrated on this page, is naturally in keen demand, as are most stamps of that tight little country. It will be noticed that

the design is very similar to that on the 3d. value of our own G.L.O. stamp which, along with a 1/3, was issued in July last. But if the design of the Israel stamp is like that of our own (I am referring, of course, only to the horse and rider) the origin of the design of the Israel stamp is very different. The postal courier depicted in it is from an engraving printed in Prague in 1741, and shows a Jewish postal courier. Such stamps can teach us a lot about history, if we care to delve into the why and wherefore of some of the designs. As I have repeatedly stated, the place to indulge in the search is the local reference library. Stamp collecting should be much more than merely sticking copies, willy nilly, in a book. Don't you agree?

"PHILATELIE DE LA JEUNESSE"

It is probably a fact that there are as many stamp collectors in Great Britain (calculated on a percentage of the population) as in any other country, in spite of the apathy of our Postal authorities when it comes to making popular the stamps that they and other postal administrations provide. It is very different in many foreign countries where, believing that stamp collecting has considerable educational possibilities, help is given from time to time by issuing special stamps to popularise the hobby. Take Belgium for instance. On October 3 last year a 40c stamp was issued "en faveur de la propagation de la philatelie parmi la jeunesse." That is an actual quotation from an attractive brochure issued by the Belgium

P.O. to announce the issue. The brochure, as well as illustrating the stamp—which is reproduced here—shows two pictures of young collectors busy with their stamps.

EAST AFRICA

Just now several countries in our own Commonwealth are issuing new sets, and as it is at least six years since any of them had a new definitive issue they are all very much entitled to make a change. East Africa (which embraces Kenya, Tanganyika and Uganda) put out its contribution to collector happiness, as one collector described it in a letter I received October 1st, and followed up on October 18th with eight of the values overprinted Official, and while the values up to 65c are only of a small size, the whole set, depicting as it does animals etc., is proving very popular with collectors. If you can manage the set to, say, 1/– you will have something well worth putting in your album.

THE TIP OF THE MONTH

I am afraid that lack of space prevents me this month from saying all I would like to about recent Pakistan special issues, but I will try to return to the subject at some future date. Meanwhile, any nice *used* sets picked up today, at present prices, may prove good bargains, as Pakistan stamps are growing fast in popularity everywhere.

New Series by E. W. Argyle

Locomotives On Stamps

THE first German railway locomotive was "Der Adler" (The Eagle). It was built by Robert Stephenson & Company, at Darlington, in 1835, for the Nuremburg–Furth Railway. In working order the engine had a weight of 6 tons 12 cwts. A model of this engine was built in 1935 for the Railway Centenary celebrations and is now at the Nuremburg Railway Museum. Stephenson had to send out a driver with the locomotive to instruct the German footplatemen.

* * * *

The second stamp illustrated was issued to commemorate the 75th anniversary of the completion of the first transcontinental railway in the United States. The stamp design is from the painting by John McQuarrie, entitled the "Golden Spike Ceremony." On May 10, 1869, the tracks of the Union Pacific Railroad, from the east, met those of the Central Pacific R.R., from the west, at Promontory Point, Utah. Governor Stanford drove in the last spike, made of gold. The locomotive is Union Pacific's No. 119.

THE WORLD'S SHORTEST RUNWAY

THE world's shortest runway runs uphill at an angle of about 20 degrees.

At the snap of a switch this sloping runway launches an F-100 Super Sabre aircraft which, within four seconds, is travelling at a speed of 275 miles an hour.

The runway itself is, in fact, only about one foot in length, for it consists of the channels which cradle the wheels of an F-100 on its Zero Launch platform.

In operation Zero Launch—called ZEL for short—is a spectacular thing of fire and smoke that lasts for only a few moments. But, in that time, 130,000 lbs. of thrust is added to the engine output of the F-100. This combined thrust is the answer to tactical aircraft take off in the shortest possible time and space.

ZEL is a self-contained launching platform on wheels. Its rudiments consist of, firstly, a mechanism for elevating the F-100 into its launching position on a mobile platform and, secondly, a rocket engine which is attached to the aircraft to provide the increased thrust necessary to get the Super Sabre immediately to flying speed.

BY MICHAEL LORANT

In short, ZEL is a miniature travelling airfield that can be moved almost anywhere, and what is more, moved again and again when tactical dispersal requirements so dictate.

The development of ZEL by North American Aviation, Inc. for the United States Air Force, was beset with problems, as is any development project. Not the least of these was that of making sure, within a fraction of a degree, of the line of thrust of the XM-34 rocket motor. For, if the line of thrust of the aft-mounted rocket were too low, its tremendous push would flip the aeroplane over on to its back; if it were too high, it would drive the aircraft into the ground.

Astrodyne, Inc. of McGregor, Texas, who are the manufacturers of the XM-34 booster rocket engine, had to develop new techniques for testing it under static conditions. They found themselves faced with two requirements—holding the XM-34 during test and measuring accurately the thrust alignment of the canted-nozzle ZEL booster.

The system of measuring at which they finally arrived combines massive steel yolks with delicate thrust-measuring transducers which record the tiniest deviations from the line of thrust while, at the same time, holding in check the tremendous forward forces exerted by the rocket.

The start of the leap skyward! The ZEL and Super Sabre make a thrilling picture.

Raising The Dust

ZEL pilot Al Blackburn, of North American Aviation, talks to Captain Bob Titus of the U.S. Air Force before a rocket boost flight.

In a cloud of desert dust an F-100 Super Sabre hurtles from the launching platform at Indian Springs, Nevada, bombing range.

The Flying Fire Engine—

(*Continued from page 3*)

Working from 28 bases, its pilots spotted 121 of the 1,558 fires which burned 36,652 acres of good forest land during the year. Most were in areas where they might not otherwise have been detected in time to stop the fires spreading disastrously.

The main enemy of the Forest Service is still the careless member of the public who fails to damp out a camp-fire or who flings down a lighted cigarette. Campers and smokers caused 696 fires in this way, compared with 219 brought about by lightning and 149 by sparks from passing trains.

At least one thoughtless settler is unlikely to repeat his carelessness. He was on the point of leaving a large brush pile burning and going home for the night when an Air Service pilot spotted him. One of the items of equipment fitted to the Beavers is a loudspeaker device known as a loud-hailer, and as he passed overhead the pilot shouted a warning through this. A few hours later, a puzzled and shaken man told a friend about a great "voice from the sky" that had told him to "Put out that fire, or else . . . ."

Why Trains take the Other Road—

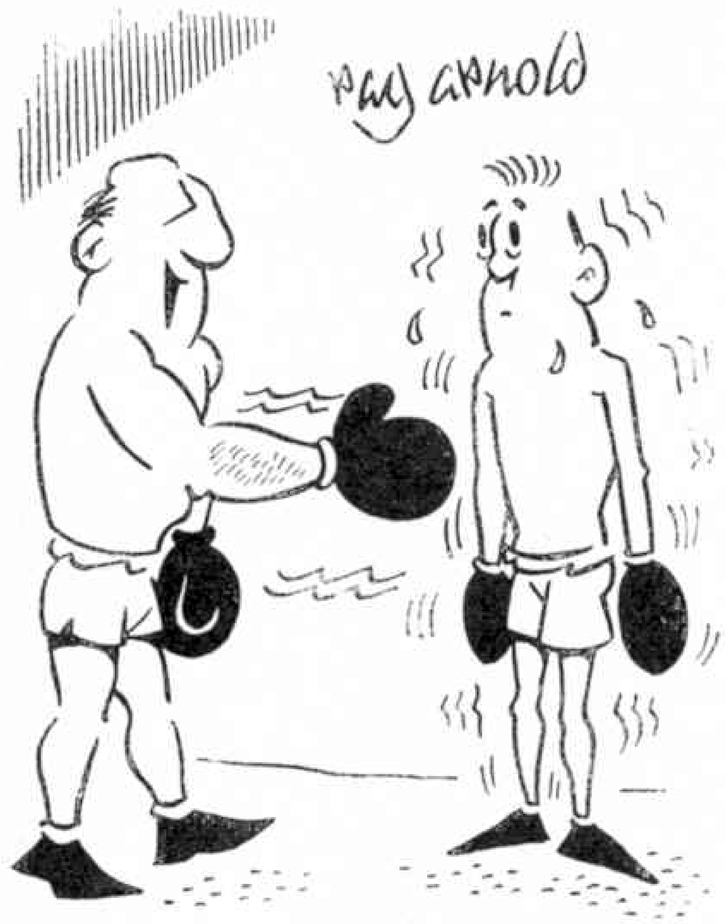
(*Continued from page 5*)

Southern Region. This was Stage One of the electrification of the Kent Coast lines and on various occasions it made necessary the diversion of some very important trains.

Owing partly to the fact that the routes to the Kent Coast from London were originally separate and competing railways, the Southern Region has numerous recognised alternative routes available for boat train services, particularly when bad weather has caused late arrivals at Channel ports, and the trains have missed their normal "path". So diversions of different services over any of these, or a combination of parts of them, are nothing new to S.R. operating and train staff if special engineering work or some other circumstances should call for them.

Sunday is the favourite day on which to stage short-term diversion of traffic owing to engineering work, and so on. Sunday work in Sevenoaks Tunnel on the main line to Dover, via Ashford, last February occasioned diversion of traffic. Even the lordly *Golden Arrow* is not immune from treatment of this kind, as is clearly shown by the illustration on page 5 of the train near St. Mary Cray Junction when, one Sunday, it ran via Otford and Maidstone owing to the closure of the main line between Weald and Hildenborough.

Snowfalls, floods and other visitations of this kind, landslips and similar instances can also cause train diversions on a fairly large scale, and flooding has in the past been responsible for such a notability as *The Flying Scotsman* travelling via Carlisle, which is situated on the route of its great rival *The Royal Scot!*



"Shake!"

MORE NEW BOOKS

"THE CRAFTSMAN ENGINEER"

by Raymond Lister
(Bell, price 15/–)

Readers who are of school-leaving age and are thinking of taking up an engineering apprenticeship will find this book a useful and interesting introduction to their new career. It deals in turn with the work of the blacksmith, machinist, foundryman, sheet-metal worker, welder and fitter, and emphasises the high degree of skill and craftsmanship required in each trade. The tools used are illustrated by the author's own drawings, and there are half-tone pictures of work in progress. In each instance one or two actual jobs are described, so that by following them through the reader gets a good idea of what is involved. Finally, there is a chapter showing what kind of conditions an apprentice is likely to find in the average engineering workshop, and describing the status of the various people he would meet in his job, such as works managers, foremen and storekeepers.

"THE AEROPLANE" PICTORIAL REVIEW (No. 5)

(Temple Press, price 12/6)

This Pictorial Review has now become an established and popular Annual. The fifth edition, just published, is on the same lines as earlier issues and provides a pictorial survey, by means of over 200 illustrations, of all the latest types of aircraft both in service and under development. The reader will find here pictures of the newest fighters, bombers transports and trainers of the world's air forces and the latest jet and turbine engined aircraft of the world's airlines. Naval aircraft, helicopters large and small, VTOL and STOL aircraft are included and, as before, there are pictures of the newest types of light and executive aircraft. Some of the most striking photographs taken at the 1960 Farnborough Air Display are reproduced, and there is the always popular section portraying outstanding aeronautical events of the year.

"THE JOHNSON PHOTOGRAPHIC YEAR BOOK 1961"

(Johnsons of Hendon Ltd., price 6/6)

The 1961 edition of this popular photographic annual is in the usual two separate parts, one containing the now familiar articles and tables of technical data and the other the diary and useful ruled pages for recording exposures. This latter section is slotted into the front cover of the main part of the annual. The technical section contains the now well-known exposure calculators and light tables for all latitudes, plus a great deal of useful information on taking and processing both black and white and colour material. There are also several pages on artificial light and flash photography. The Johnson Photographic Year Book is obtainable from all photographic dealers.

TRACK PLAN OF LIVERPOOL TRAMWAYS

Among the now vanished networks of tramways which once spread across large areas of Britain, was the vast system operated by the Liverpool Corporation, and which was closed over the years 1948–1957. A scale plan published by the Merseyside Tramway Preservation Society shows in great detail the vast extent of this former system. All junctions and other track layouts are shown as they were in the last year of the existence of the system in its entirety. It will form a useful work of reference for historians of local passenger transport undertakings.

Copies can be obtained from Mr. J. Horne, 158 Albert Road, Morecambe, Lancashire, price 5/– paper or 7/6 cloth, post free.

"L, M, E, N, R . . . ."

NEW BOOKS FOR RAILWAY ENTHUSIASTS

THE LONDON BRIGHTON AND SOUTH COAST RAILWAY

C. Hamilton Ellis
(Ian Allan, 30/–)

The London Brighton and South Coast Railway was a well-engineered line, with locomotives that were always popular. The author tells its story in his usual entertaining yet informative manner, for he knew it well in its later days. He deals with the gradual development of the system and its various routes. Then the locomotives of successive definite periods are considered in some detail, and there are corresponding sections covering the contemporary train services. The Company's marine activities are not neglected and architecture, engineering and other structures and signals that were characteristic of the Brighton line bring the account to a close. There are two welcome appendices and a useful index. The book is very well illustrated.

SOUTHERN ELECTRIC

G. T. Moody
(Ian Allan, 25/–)

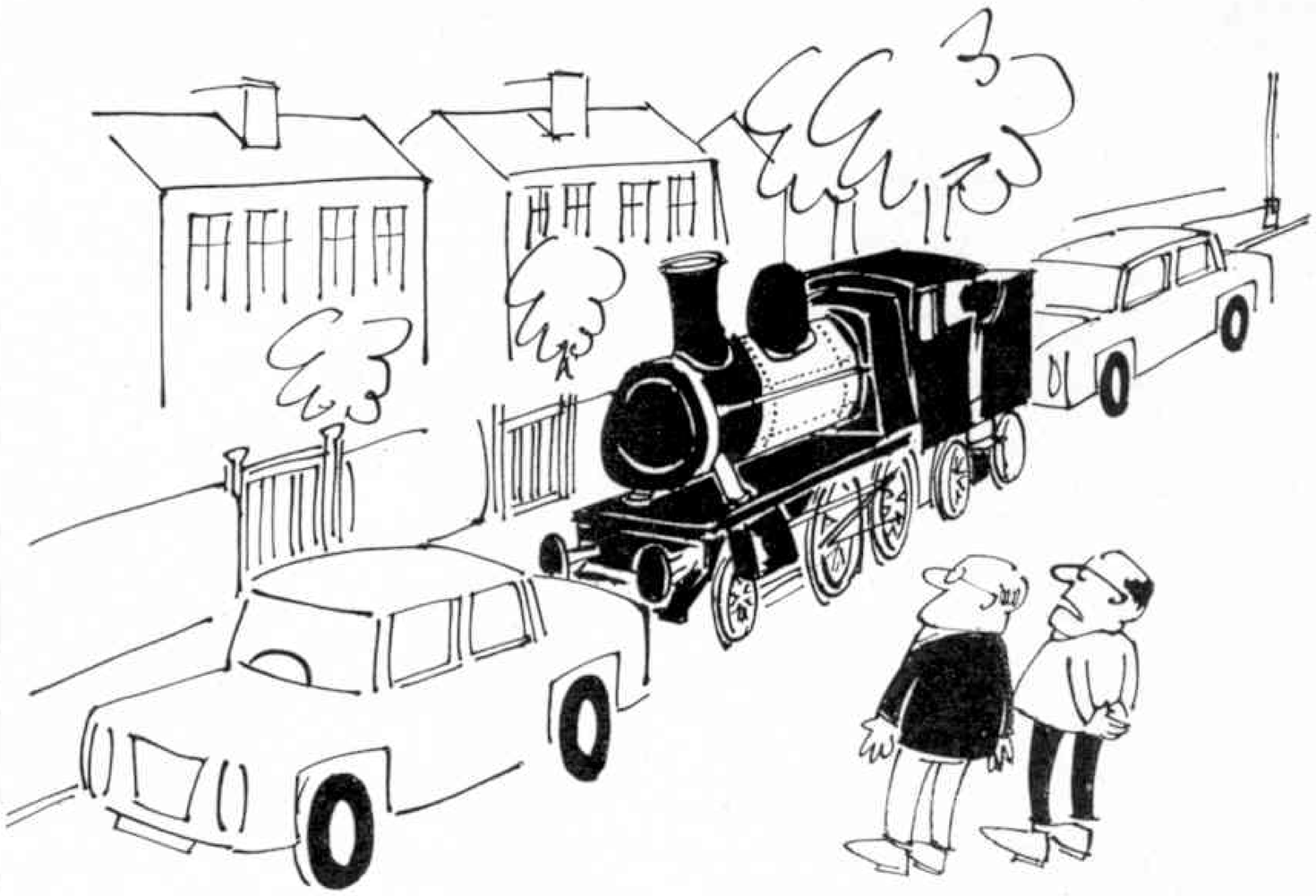
In this third edition of the same title the author considers what has become the most extensive suburban electrification in the world, covering at present some 715 route miles. The beginnings of the present system are considered, the "elevated electric" of the L.B.S.C.R. and the initial three-rail electrification schemes of the L.S.W.R. Ultimately under the Southern Railway the third-rail system became standard and is still in course of extension.

General policy, the various well-defined schemes of electrification carried out by the Southern, traffic characteristics, trains and equipment all receive their share of attention. There are plenty of photographs, while maps, track diagrams and a section dealing with the Waterloo and City Railway are included in the two appendices.

MORE UNUSUAL RAILWAYS

John R. Day, A.M.INST.T.,
(Muller, 21/–)

More Unusual Railways is in a sense a supplement to the previously published *Unusual Railways*, in the preparation of which the present author took part. As it includes details of schemes proposed, as well as those that have actually taken shape, it can be considered to a certain extent a research project rather than a book as such on this particular subject. Among the unusual railways considered are some on which horse and sail power were used and there are details too of monorail systems, both of the suspended and the supported type. Railways on gradients, moving platforms and other methods of transport are considered as well as automatic or remotely controlled railways such as the G.P.O. tube line. The Talgo and other articulated systems that have been applied to trains of standard gauge lines are included.



"I picked it up cheap when they turned over to electrification."

Fireside Fun

Mrs. McTavish looked out of the window as the family was going in to dinner and wailed:

"Och! John, here comes your brother and I bet he has'nt eaten yet".

"Quick!" ordered McTavish, "Everybody out on the porch with toothpicks."

* * * *

Applicant: "So this apartment was occupied by an experimental scientist. I suppose those spots on the wall are from his experiments?"

Landlady: "No, those are the scientist."

* * * *

Air Pilot: "How would you like to have a hop in my airplane?"

Sambo: "No, suh, Ah stays on terrah firmah, and de more firmah, de less terrah."

* * * *

Two opposing political candidates argued on a busy street while a crowd of spectators listened.

"There are hundreds of ways of making money," one of the campaigners declared, "but only one honest one."

"And what is that?" jeered the other.

"Ah, ha!" rejoined the first, "I thought you wouldn't know."

There was an Irishman who went down one day to the bottom of his garden where he saw a very delicate little fairy. "What's your name?" said the Irishman, "Nuff" said the fairy. "Nuff! that's a funny name" said the Irishman. "Oh! I don't know" said the fairy, "Everyone knows Fairynuff".

* * * *

Office Manager to boy: "You and the president of the company have one thing in common."

Incompetent officeboy: "What's that, sir?"

Manager: "You've both gone as far as you can go in the company."

* * * *

Tommy returning home from school told his parents: "Teacher liked my homework so much he asked me to do it again."

* * * *

Old lady to paratrooper on leave: "Son, how many successful jumps must you make before you are qualified?"

Paratrooper: "All of them, ma'am."

* * * *

"The police shot my dog."

"Was he mad?"

"Well, he wasn't any too pleased about it."

* * * *

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The Detective and the Crime

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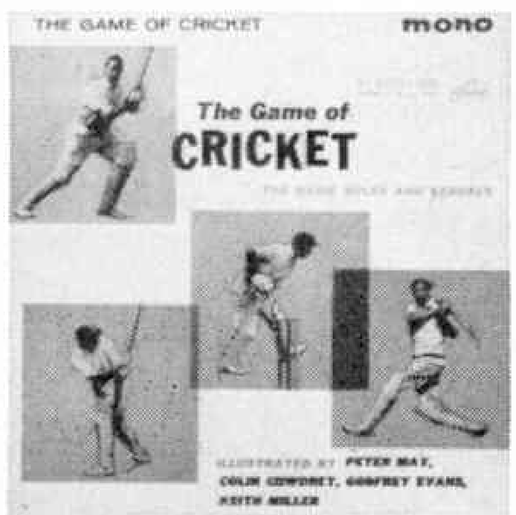

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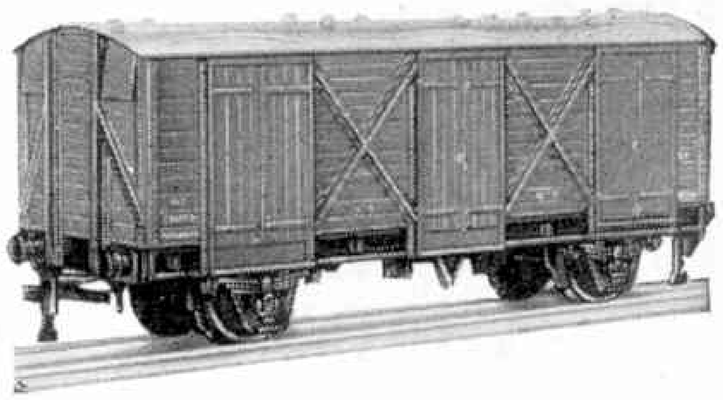

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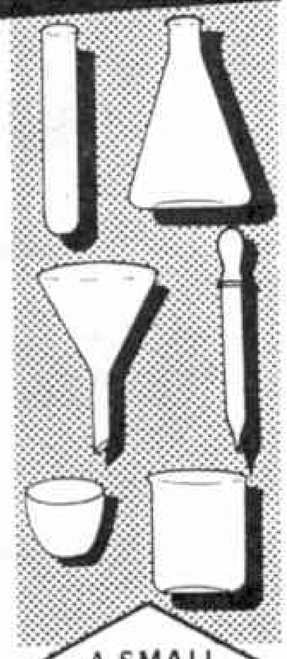

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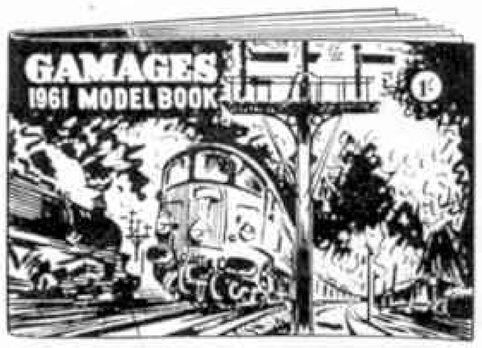

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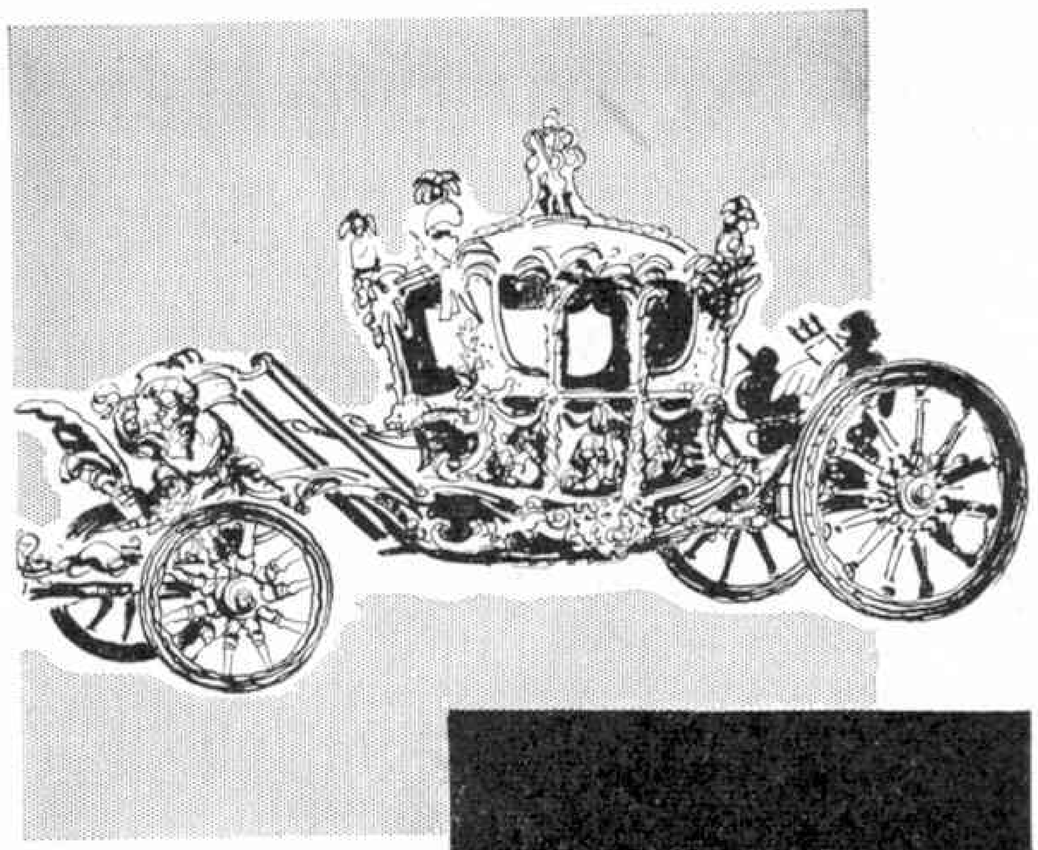

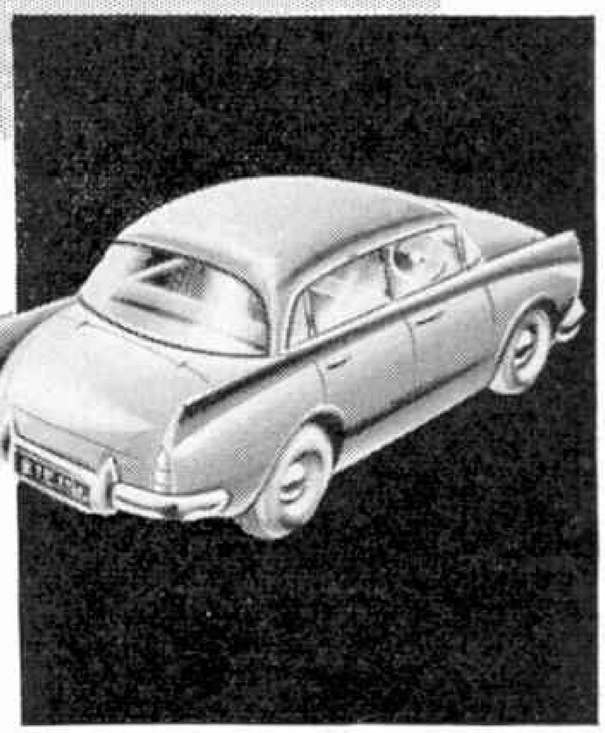

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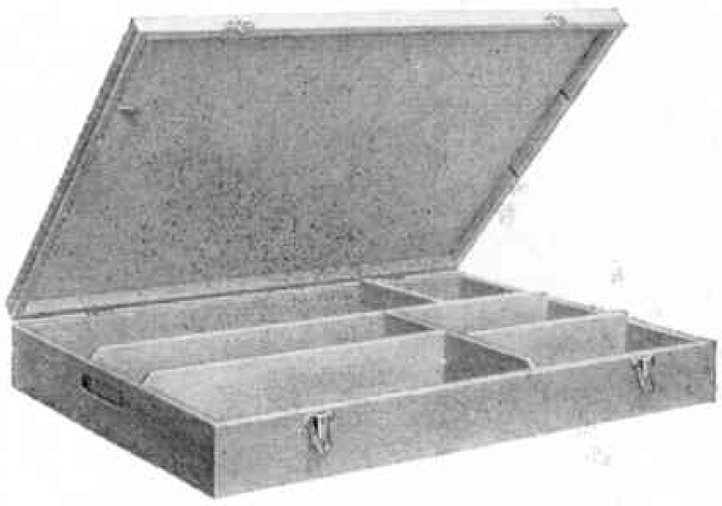

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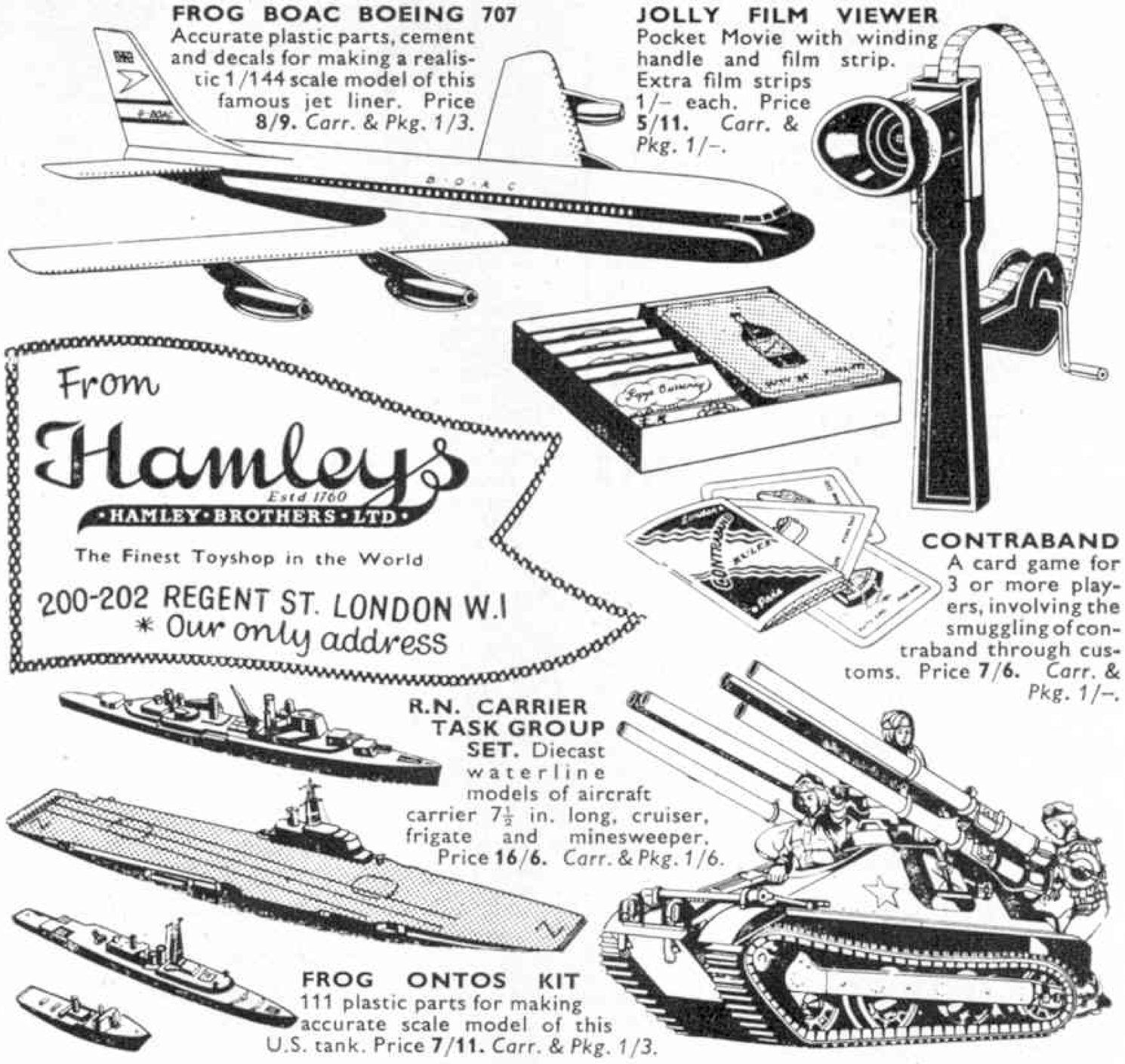

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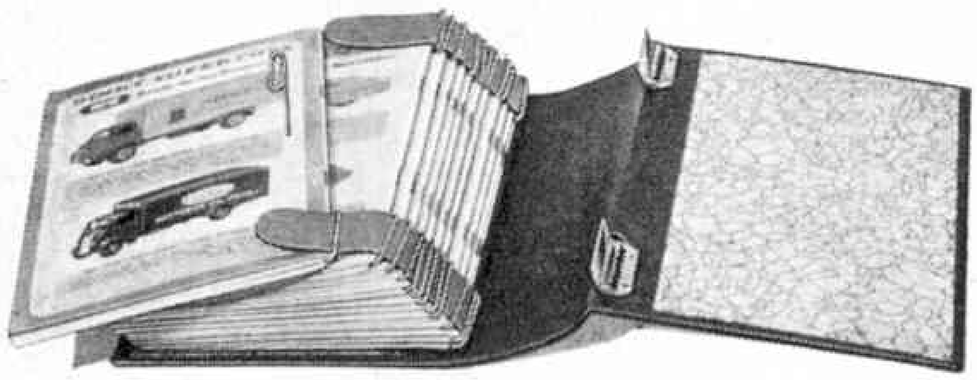

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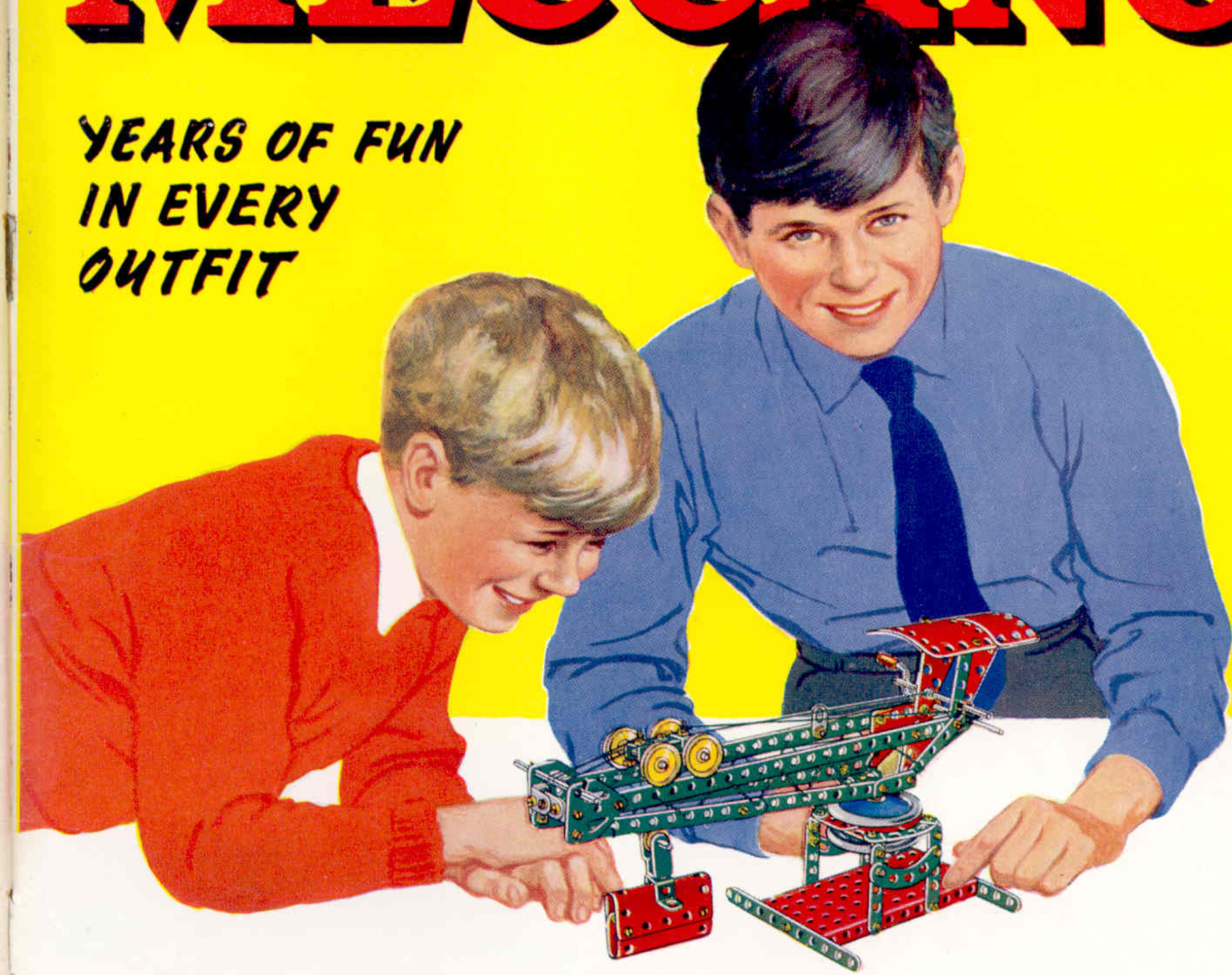

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MODEL OF THE MONTH

Meccano Model VertiVeyor.

Illustrated in the January, 1961, issue of the Meccano Magazine.

Framework.

A rectangular base is built with two 18½" Angle Girders 1, and two 7½" Angle Girders 2. Two 7½" Angle Girders 3 are bolted to the 18½" Angle Girders 1 and supported with 7½" Angle Girders 4. Four vertical 24½" Angle Girders 5 are attached to the base with Corner Gussets. A 7½" Angle Girder 6 is secured to the bottom of two of the vertical Girders 5. At the top of the Angle Girders 5, bolt two 12½" and two 7½" Angle Girders 7 and 8. Strengthen the upright Angle Girders 5 with 7½" Angle Girders, 7½" Strips, and 7½" Braced Girders as shown.

The bearings for the Rods 9, one on each side of the model, are made by bolting two Double Bent Strips to the inner and outer sides of the 12½" Angle Girders 7, and the inner side of the 7½" Angle Girder 10. A 1½" Strip placed on each of the Rods 9, is bolted to the lower Double Bent Strip. Three Washers are placed on the Rod before securing to it the 3" Sprocket Wheel 11. Another 3" Sprocket Wheel and a Collar are placed on the outside of the Rod 9.

The compound 10" Rod 12 carries a ¾" Pinion and two ¾" Sprocket Wheels, which are connected by Chain to the 3" Sprocket Wheels. Eight 4½" x 2½" Flat Plates, forming a 7½" square are fastened to the Angle Girders 8.

The chain-guards are made by bolting a 5½" Strip, and two 4½" Flat Girders to a 4" Circular Plate and a Wheel Disc. The Wheel Disc has a 1½" x ½" Double Angle Strip attached, whilst the Bolts 13 have a 1" x ½" Angle Bracket on the inside. To these Angle Brackets and Double Angle Strip, three 5½" x 1½" and two 2½" x 1½" Flexible Plates are fixed. The guard is fixed to the 12½" Angle Girder by the Double Angle Strip and an Angle Bracket.

On the Angle Girders 14, a Slide Piece is secured with a ⅜" Bolt. A 5½" Slotted Strip is placed in the Slide Piece, the lower end being attached to a Threaded Boss, which is moved by a 2" Threaded Rod mounted in the 7½" Angle Girder 15 and operated by a 1" Pulley Wheel. Two 3" Sprocket Wheels are secured to the 11½" Rod 16.

Endless Chain and Carriers

Two lengths of Sprocket Chain, preferably previously unused, each consisting of 560 links, have Double Brackets attached to them with bifucated paper clips, the Brackets being spread apart every 112 links. (i.e. 111 empty links and then a Bracket.)

The Chains are placed over the top and bottom 3" Sprocket Wheels and held taut by the screwed adjusters 17.

Now build five carriers as follows. A $2\frac{1}{2}$" Angle Girder 18 (Fig. 3) has a Double Bracket and a $1\frac{1}{2}$" x $\frac{1}{2}$" Double Angle Strip bolted to its centre hole, and another $1\frac{1}{2}$" x $\frac{1}{2}$" Double Angle Strip is bolted to the Double Bracket. A $2\frac{1}{2}$" Triangular Plate has a Crank 19 attached, and this holds a 1" Rod. The Plate is bolted to the $2\frac{1}{2}$" Angle Girder 20 with another $2\frac{1}{2}$" Triangular Plate, spaced away with two $2\frac{1}{2}$" Strips between the Plates, so that no bolt shanks protrude on the inside of the carrier. The carriers are fastened to the Chain by placing the 1" Rods through the Double Brackets with a Collar between its lugs. The 3" Sprocket Wheels are set so that the carriers are level.

The Drive

An E15R or E20R Electric Motor is attached to the $7\frac{1}{2}$" Angle Girder and a 3" x $1\frac{1}{2}$" Flat Plate bolted to the $7\frac{1}{2}$" Angle Girder. A $\frac{1}{2}$" Pinion on the Motor armature shaft, drives a 57-tooth Gear Wheel 21 on Rod 22. A $\frac{3}{4}$" Sprocket Wheel also on this Rod drives a 2" Sprocket Wheel on a 2" Rod 23, which carries a Worm Wheel that engages with a $\frac{3}{4}$" Pinion on the Rod 12. A Threaded Pin, attached to the starting lever, holds a $3\frac{1}{2}$" Rod with an End Bearing, and is connected to the Crank 24 by a Collar. Two $11\frac{1}{2}$" Rods 25, joined by a Coupling are placed in the Angle Girder 7 and a 1" x 1" Angle Bracket 26. The Cranks 24 and 27 are fastened in position to start or stop the motor. An 8" Threaded Rod 28 held by nuts in the Flanged Brackets 29 has two $2\frac{1}{2}$" Strips, also held by nuts. A $1\frac{1}{2}$" Strip carrying a $\frac{1}{2}$" loose Pulley on a $\frac{1}{2}$" Bolt is bolted to the bottom of each $2\frac{1}{2}$" Strip. This is part of the loading platform, and must clear the $2\frac{1}{2}$" Angle Girders of the carriers. Bolt a $7\frac{1}{2}$" Strip 30a with Angle Brackets to the $7\frac{1}{2}$" Strip 30. Two Bent Strips with $\frac{1}{2}$" loose Pulleys on lock-nutted $\frac{1}{2}$" Bolts, are fastened to the Strip 30a so as to pass between the $2\frac{1}{2}$" Angle Girders in the carriers.

A $7\frac{1}{2}$" Strip 31 is attached to the vertical Angle Girders 5 with Angle Brackets. Two $7\frac{1}{2}$" Flat Girders 32 are attached to Strip 31 by Angle Brackets and support the Rods 33, which have $\frac{1}{2}$" Pulleys or Collars to hold them in position. Two $5\frac{1}{2}$" Strips slightly bent are used to support the Flat Girder 32. The Bent Strips are adjusted to be the same angle as the feed-off platform. Between the Bent Strips is bolted a Flat Trunnion. To the inside of the Strip 31, two Bent Strips with $\frac{1}{2}$" loose Pulleys on $\frac{1}{2}$" Bolts, are placed to face the Bent Strips on the Strip 30a.

Feed-in Platform

Two $9\frac{1}{2}$" Angle Girders 34 have $9\frac{1}{2}$" Flat Girders bolted to them and held apart with a $3\frac{1}{2}$" Screwed Rod 35, which also holds the 2" Slotted Strips 36. A $3\frac{1}{2}$" Screwed Rod 37, besides holding the Angle Girders 34 apart, has two pairs of $4\frac{1}{2}$" Strips 38 fastened to it with a nut on each side of each Strip. Two $\frac{1}{2}$" loose Pulley Wheels are mounted between each pair of Strips. In the next hole of the Strips, a $1\frac{1}{8}$" Bolt with $\frac{1}{2}$" loose Pulleys and nuts is bolted to the Angle Girders 34 and the Strips 38. The next two pairs of $\frac{1}{2}$" loose Pulleys are mounted on $\frac{3}{4}$" Bolts, with nuts and a Washer, and the last roller is a single loose Pulley on a $\frac{3}{8}$" Bolt, the Strips 38 being bent slightly inwards.

The feed-in roller conveyor is attached to the model by two $5\frac{1}{2}$" Angle Girders 39 and two $5\frac{1}{2}$" Strips 40. The Strips are secured to a $2\frac{1}{2}$" x $\frac{1}{2}$" Double Angle Strip bolted to the Angle Girder 6. The rollers 41 each consist of two Sleeve Pieces joined together by a Chimney Adaptor, with a further Chimney Adaptor at each end. They are mounted on $3\frac{1}{2}$" Rods.

The Stop Rod and Pusher.

To the Angle Girders 4 two $5\frac{1}{2}$" Angle Girders 42 are bolted, each supporting a $5\frac{1}{2}$" x $2\frac{1}{2}$" Flat Plate. A 4" Rod 44 carries a Bush Wheel 45 that has four Set-Screws in adjacent holes, these mesh intermittently with Bush Wheels 46 and 47, each having eight Set-Screws and nuts in their holes. The Bush Wheel 46 is mounted on a $2\frac{1}{2}$" Rod that carries a 50-tooth Gear Wheel and a 1" Pulley fitted with Rubber Ring, which presses against the Flat Plate 43. A $\frac{3}{4}$" Pinion on $3\frac{1}{2}$" Rod 48 engages with the 50-tooth Gear Wheel and so drives a $1\frac{1}{2}$" Sprocket Wheel 49 which in turn drives a $1\frac{1}{2}$" Sprocket Wheel 50 on a 5" Rod 51. A Single Throw Eccentric 52 has a $3\frac{1}{2}$" Rod attached to its arm by means of two Collars each of which is fixed to the arm by a bolt fitted with three Washers as shown. The Rod is passed through a $3\frac{1}{2}$" Strip 53 fastened to the Angle Girders 34 by 1" Reversed Angle Bracket. On the upper end of the Rod, a Rod and Strip Connector is placed. A 5" Rod 54, driven by Sprocket Wheel and Chain from Rod 51 carries a similar Eccentric fitted to a 4" Rod that also has a Rod and Strip Connector attached to its upper end. The two Eccentrics are set so that one is in its highest position when the other is in its lowest position. The Bush Wheel 47, similarly fitted to Bush Wheel 46, drives a 50-tooth Gear Wheel on a $3\frac{1}{2}$" Rod 55 that engages with a $\frac{3}{4}$" Pinion on an 8" Rod 56. A Triple Throw Eccentric,

mounted to give a $\frac{3}{4}$" throw, has a $4\frac{1}{2}$" Strip 58 bolted to it. A 1" Sprocket Wheel on the Rod 56, drives a similar Sprocket on a 5" Rod 59 which carries a Triple Throw Eccentric 60. To this Eccentric a Coupling is attached by Bolts with three Washers on their shanks, and a 3" Rod fitted with a Rod and Strip Connector is fastened in the Coupling. The Strip 58 is connected pivotally to the lower hole in the Coupling by a bolt. The Eccentric 60 is set in its highest position when the Eccentric 57 is moving the Strip 58 in its farthest position forward.

To set the intermittent motion the $1\frac{1}{2}$" Sprocket Wheel on the Rod 44 is turned so that when its Bush Wheel disengages the Bush Wheel 47, the Eccentric 60 is in its lowest position, and when the Bush Wheel disengages with the Bush Wheel 46, the Eccentric on the Rod 54 is in its highest position. The $1\frac{1}{2}$" Sprocket Wheel on Rod 44 is adjusted in relation to the $1\frac{1}{2}$" Sprocket Wheel 61 so as to ensure that the Pusher operates midway between any two carriers on the endless chains.

<u>Parts required to build the model VertiVeyor:-</u> 8 of No. 1b; 6 of No. 2; 5 of No. 2a; 2 of No. 3; 22 of No. 5; 4 of No. 6; 4 of No. 7; 2 of No. 7a; 2 of No. 8; 4 of No. 8a; 17 of No. 8b; 4 of No. 9; 15 of No. 9d; 15 of No. 11; 15 of No. 12; 1 of No. 12a; 6 of No. 12b; 3 of No. 13; 1 of No. 13a; 5 of No. 15; 6 of No. 15a; 10 of No. 15b; 5 of No. 16; 3 of No. 16a; 2 of No. 16b; 12 of No. 18b; 3 of No. 22; 24 of No. 23; 12 of No. 23a; 3 of No. 24; 2 of No. 24a; 3 of No. 25; 1 of No. 26; 2 of No. 27; 1 of No. 27a; 1 of No. 32; 322 of No. 37a; 261 of No. 37b; 104 of No. 38; 6 of No. 45; 13 of No. 48; 1 of No. 48a; 2 of No. 50; 9 of No. 53a; 2 of No. 55; 2 of No. 55a; 50 of No. 59; 12 of No.62; 3 of No. 63; 2 of No. 64; 20 of No. 69; 2 of No. 70; 1 of No. 73; 20 of No. 76; 1 of No. 79; 2 of No. 80a; 2 of No. 81; 16 of No. 94; 1 of No. 95; 4 of No. 95a; 6 of No. 95b; 4 of No. 96; 3 of No. 96a; 4 of No. 99b; 4 of No. 102; 2 of No. 103a; 4 of No. 103c; 2 of No. 103k; 6 of No. 108; 5 of No. 111; 2 of No. 111a; 16 of No. 111c; 2 of No. 111d; 2 of No. 115; 4 of No. 124; 1 of No. 126a; 2 of No. 130; 2 of No. 130a; 2 of No. 133; 1 of No. 139; 1 of No. 139a; 2 of No. 146a; 1 of No. 155; 14 of No. 163; 21 of No. 164; 1 of No. 166; 4 of No. 188; 6 of No. 189; 3 of No. 212; 1 E20R(S) Electric Motor; 10 Paper Fasteners.