Flying Indoors—Complete Plans Inside

meccano magazine

December

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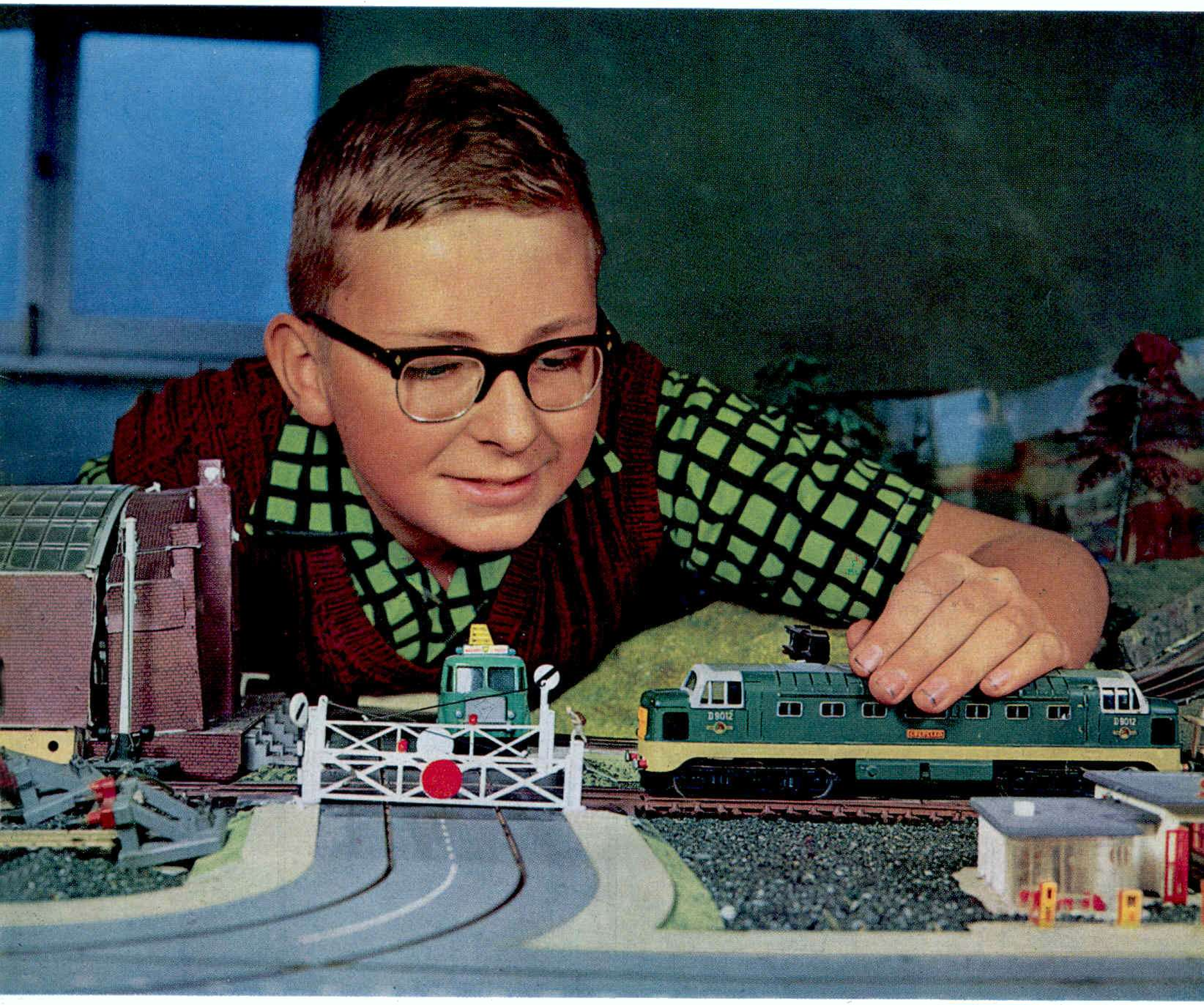

the practical boy's hobbies magazine

1964

IN THIS ISSUE

- Ideas for Christmas Presents
- Volt/Ohm Meter Construction Details

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PRODUCT

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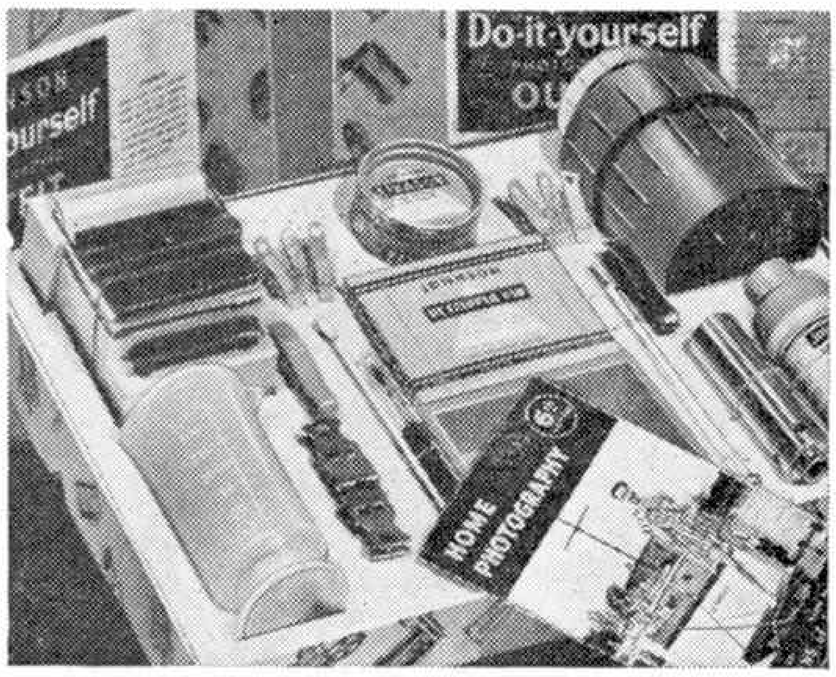

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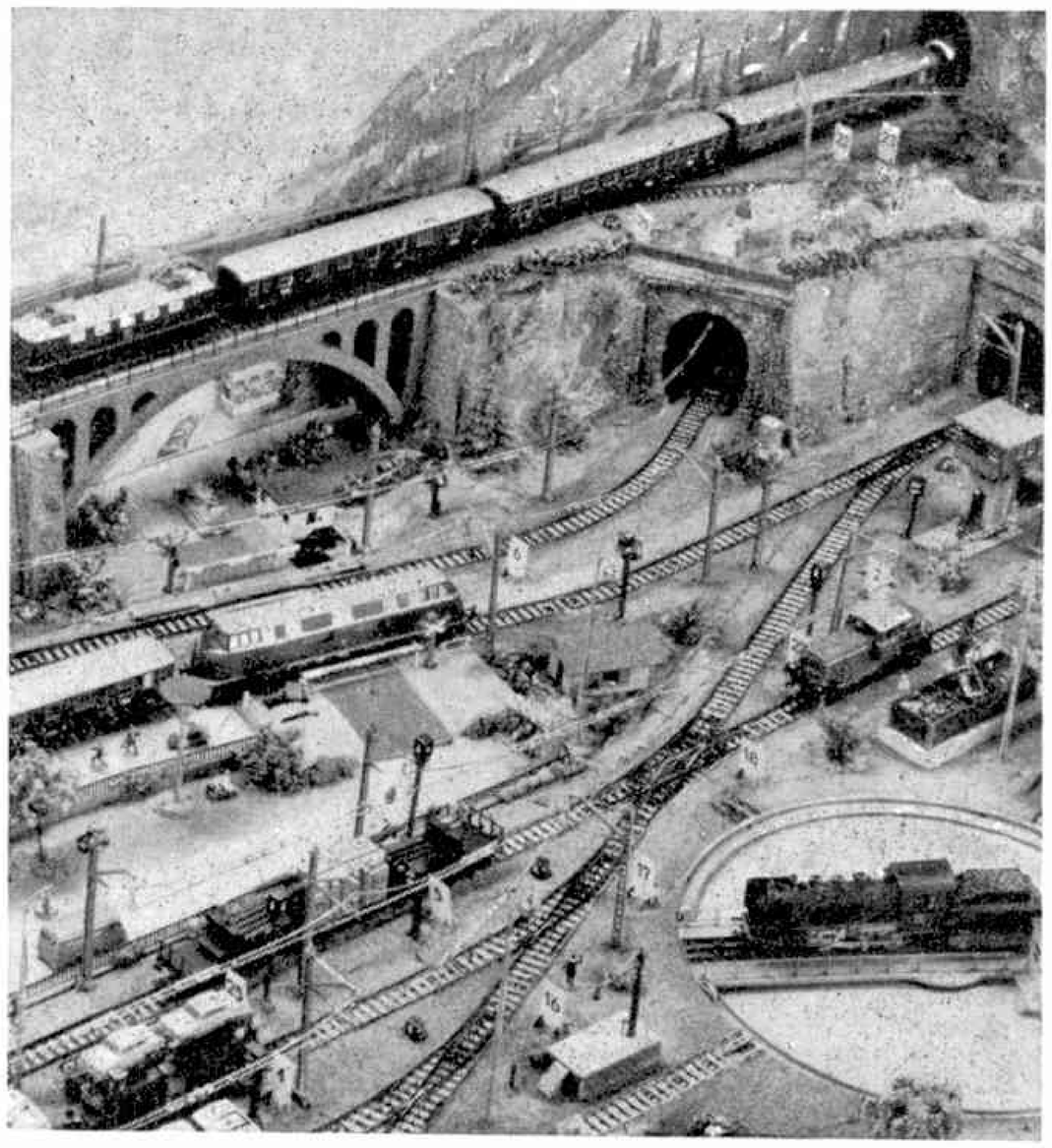

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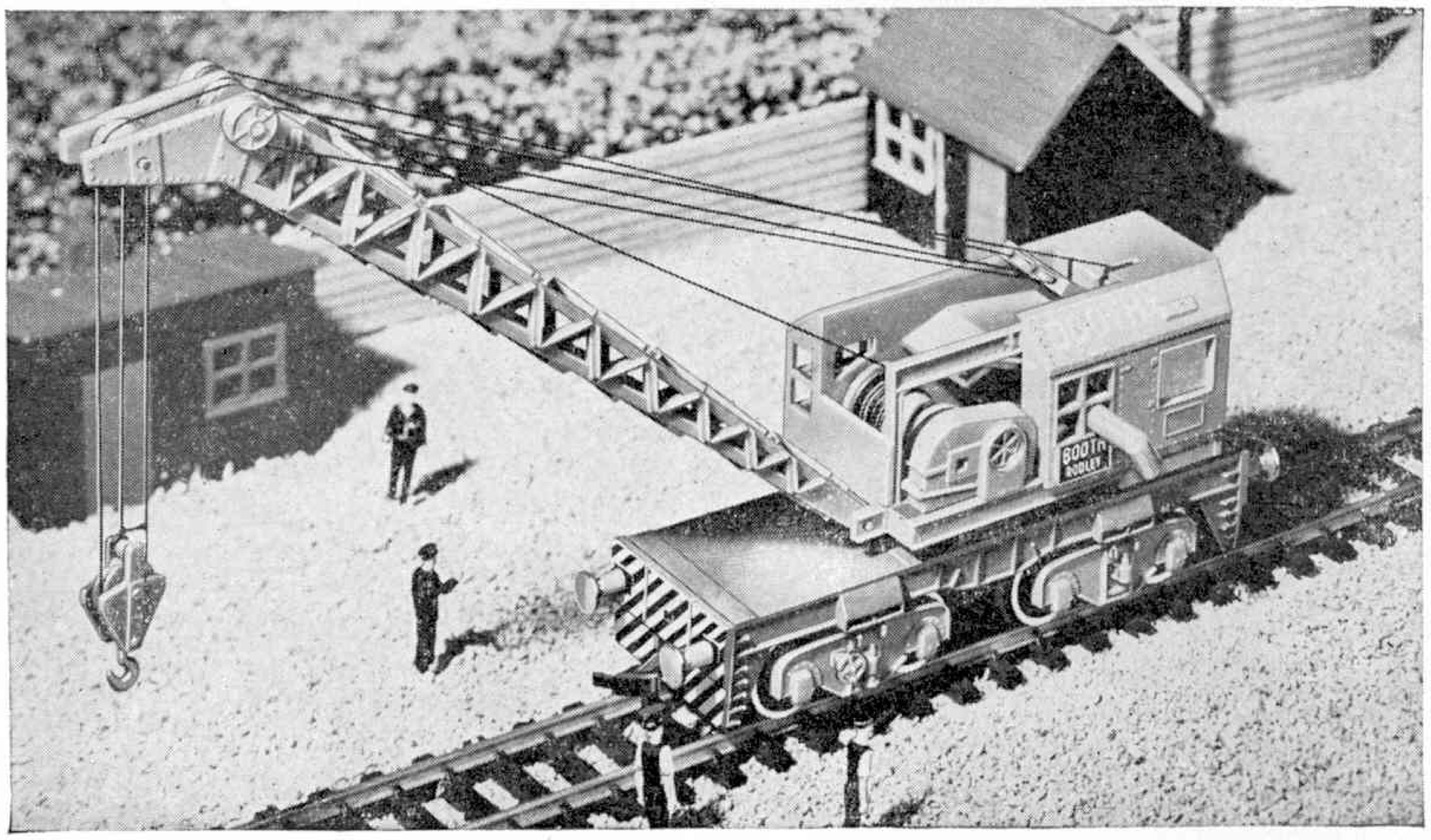

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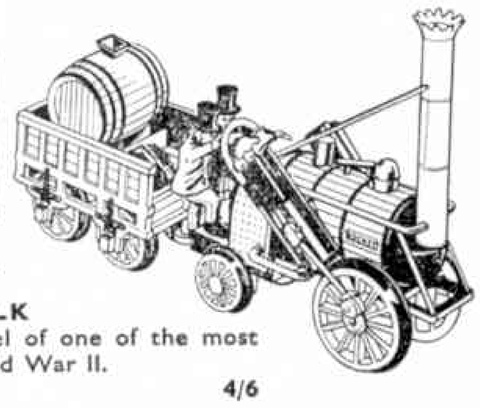

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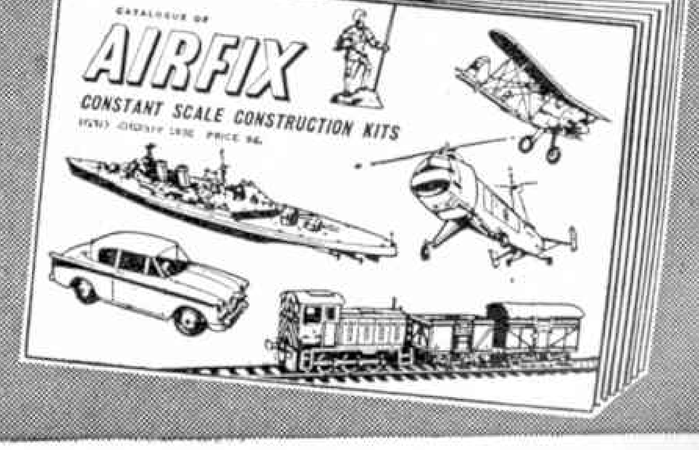

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the PRACTICAL BOY'S HOBBIES MAGAZINE

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Your Own Exhibition

HAVE you some questions you would like answered about the career you wish to take up on leaving school? Perhaps you would like to know how an International Airport operates? Do the Navy, Army or Air Force interest you?

This may seem an odd assortment of questions, but they all lead up to one thing—The Schoolboys and Girls Exhibition. Organised by the national newspaper, the *Daily Mail*, this annual display is arranged especially for *you*. Among the many features are a special careers section where you can obtain all details about many different careers, a working model, 800 feet square, of an International Airport, plus exhibits by the Royal Air Force, the Army and the Royal Navy.

Naturally, there are many, many more interesting exhibits, but it is impossible to list them all here. Meccano Magazine will, of course, have a stand at this show, so make a point of coming along to see us—we will be delighted to meet you.

It goes without saying that there will be something at the exhibition to interest everybody, so make a note of the following details in your diary and get your mother or father to take you along to see this wonderful show. The exhibition is being held at the *National Hall, Olympia, from December 28th to January 9th*. Admission is 3s. 0d. with no extra charges whatsoever except for the programme, price 1s. 0d. The show is open from 9.30 a.m. to 6.30 p.m.

Competition and Exhibition

The People's Dispensary for Sick Animals is an extremely fine organisation which provides invaluable service to many of Britain's pet owners. In order to raise funds to provide even better service for animal lovers, the P.D.S.A. is running a handicrafts and hobbies competition and exhibition at the Central Hall, Westminster, London, on Tuesday, January 5th, 1965.

There are many classes to enter in this competition and they include: Model Engineering, Toymaking, Sculpture and Pottery, Poster Design, Painting and Sketching, Photography, Needlework and Knitting and Mounted Collections. There are hundreds of prizes to be won and if you want further particulars of the competition and exhibition, write to: *The A.S.G. Handicrafts and Hobbies Competition and Exhibition, The People's Dispensary for Sick Animals, P.D.S.A. House, Clifford Street, London, W.1.*

Finally, before I sign off, I would like to mention one or two of the new features starting in this and next month's Meccano Magazine. Firstly, there is the exciting new series of complete fiction stories featuring Martin Tracy, a freelance pilot and his assistant Digger Ames. 'We fly anything—anywhere' is their motto and it certainly leads them into many exciting adventures.

How many of you are interested in camping? No doubt quite a few of you are looking forward to a camping holiday next year, either with the Boy Scouts or your parents. Therefore, next month in M.M. we are starting a brand-new series of camping articles, giving you all the interesting facts and details about this marvellous pastime. Be sure to place a regular order for Meccano Magazine. It is the *only* practical, hobbies magazine for boys!

The Editor

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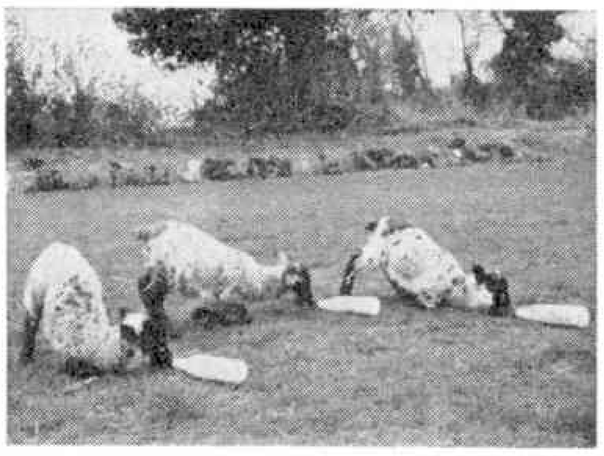
COMPETITION WINNING PHOTOGRAPHS

Last month, we gave the names of the first three places in the three different categories for our photographic competition held recently in Meccano Magazine. This month we feature the three photographs which won the 1st class awards under the following headings:

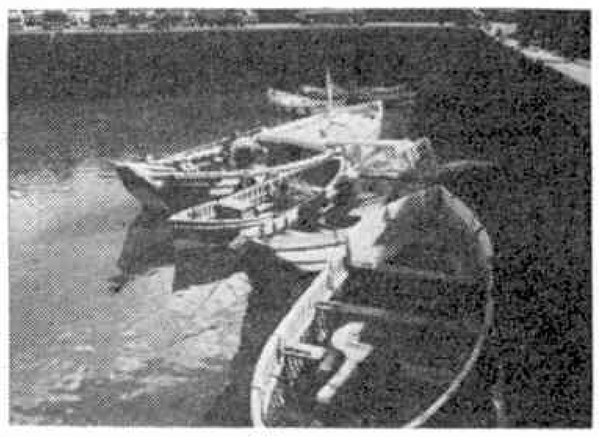
People

R. Waterworth of Coventry sent in this 'Under Cover' shot.



Pets

J. Rushen of Attleborough provided this wonderful shot of 'Feeding Time'.



Places

R. Dewdney's photograph has an air of calm and is entitled 'Fishing Boats'.

OUTLAW CARGO!

Freelance pilot Martin Tracy and his partner, Digger Ames, are held at gunpoint by a desperate bandit! How can they escape? Read this complete story to find out . . .

'STONE the crows, skipper. Somebody's shooting at us!'

Long, lean and lanky Digger Ames craned forward in the co-pilot's seat and pointed at the small hole that had magically appeared in the port wing of the battered D.C.3 transport.

'I knew we should have turned down this trip', he said, mournfully. 'I didn't trust that joker back in Sau Paulo.' He scowled at his friend and business partner, Martin Tracy. 'Mark my words we're heading straight into trouble.'

Martin Tracy peered down at the thick steaming carpet of Brazilian jungle, 3,000 feet below. 'A lot of people carry guns in these parts, Digger', he said. 'Like as not it was just some hunter aiming a little wild.'

Digger looked unconvinced. He peered ahead through the heat-shimmering air. 'Anyway, it's too late now. There's Skull Mountain dead ahead of us.'

They watched the tree-covered mountain rising slowly from the unbroken green of the jungle. It *did* look like a skull, thought Martin. A jagged outcrop of rock formed the nose, then came two dark patches, obviously large caves, followed by the rounded, treeless top of the mountain, that looked for all the world like the bald pate of a human skull. A sinister looking place.

* * *

Martin could just make out the cluster of tiny buildings perched on the very top of the mountain. In that village was the freight that he and Digger had to pick up and fly back to Sau Paulo. A tricky flying job, to be sure, but that was why they were in business. For Martin Tracy and Digger Ames were freelance charter fliers.

'We fly any kind of freight, in any type of aircraft, to anywhere in the world.' That was their slogan. All they asked was that the client supplied the aircraft, the cargo and the place of destination. The pals would do the rest and never, so far anyway, had they failed to deliver the goods. It was a job that took them all over the world, flying all manner of aeroplanes from supersonic fighters and bombers to lumbering scrapheaps like the D.C.3 they were flying right now.

Always the jobs were dangerous and difficult, but that is why people sent for Martin and Digger. There were very few pilots who could fly with the dash and precision of Martin Tracy. And no aircraft mechanic was more expert at coaxing more power out of a wheezing aero engine than Digger Ames. That was the way the partnership worked. Martin did the flying and Digger attended to the mechanical and navigation side of the business.

That is how they came to be flying across the steamy Mato Grosso jungle in an obsolete aircraft, towards a makeshift airstrip on the top of a mountain.

Martin remembered the man knocking at their hotel room in Sau Paulo the day before. Small and dark, with a long scar running down the side of his swarthy face, he did not look much like a geologist. But that is what he claimed.

'My colleagues on Skull Mountain have collected six crates of very important rock specimens', he told them. 'But they are far too heavy to be transported by mule. So we ask you to land on this mountain and fly these crates back here to Sau Paulo.'

'There is a Dakota aircraft waiting for you', he continued. 'It is not exactly the most modern of aircrafts, it is true, but I am told it is quite serviceable.'

'Can we land on this mountain?' Martin asked.

The geologist nodded. 'My colleagues and the natives of the village have prepared a runway for you.'

'There's one other thing', said Digger, who had been eyeing the man suspiciously. 'We like to know something about the freight we carry. We'd want to make sure that there's only rocks in those crates. We're very particular about not breaking any law.'

The client smiled and spread his hands. 'You will be at liberty to examine the contents of the crates before flying them back to Sau Paulo', he replied. 'I take it then, that you will accept this job?'

Even the pessimistic Digger had to agree that this was reasonable and so, the following morning, they had climbed into the Dakota and taken off from a small private airfield just outside the city.

Martin's mind jerked back to the present. Now, the village on the top of the mountain could clearly be seen.

'There's the runway', said Digger, pointing to a long gash cut through the scrub. Martin cut back the airspeed. They would have to fly in at their present height to touch down on the dusty airstrip. He lowered landing wheels and flaps and throttled back gently. There was a bump and then they were rolling along the ground in a swirling cloud of dust.

* * *

As the pals climbed from the aircraft they were met by three men. One was short and very fat, with heavy, brutal features. Behind him, his companions were of the same stamp as the man who had contacted them at Sau Paulo. They were dapper in tight-fitting, dusty but expensive suits. Each had his right hand bunched in a jacket pocket. Their dark eyes glittered watchfully from immobile faces.

Martin's muscles tensed. Digger was unfailingly full of foreboding about every job they took on, but this time he could well be right. There was trouble here. You could sense it in the tense atmosphere.

From the jungle far below rose a sudden echoing flurry of gunshots and the fat man smiled at the apprehensive glances that the two pals exchanged.

'Where's this freight we've got to fly out to Sau Paulo?' demanded Digger.

Still smiling, the fat man lifted a pudgy finger and the right hands of his companions moved swiftly from their coat pockets. Each held a revolver, with the dark menacing muzzles pointing unwaveringly at the pals.

'*We* are your freight', the fat man sneered. 'But you will not be flying us to Sau Paulo. No, you will take us to a certain border town in Bolivia.' He nodded a sleek head at the two gunmen. 'Or else.'

Martin Tracy had been studying the heavy features of the fat man. Where had he seen that face before? Then he remembered. A glaring headline on the front page of a Sau Paulo newspaper and beneath it a photograph released by the Brazilian police.

'Sanchez', Martin said harshly. 'The racketeer. The police have been hunting you since that big bank hold-up in Rio.'

'I knew it', Digger wailed. 'I knew this trip spelled trouble.'

'You will indeed be in big trouble if you do not do as I say', hissed the wanted gangleader. His cold, snake eyes

turned back to Martin. 'And you are quite right, amigo. I *am* Sanchez and for many weeks I have made use of this village as a hideout. But somehow the police tracked me here and have surrounded the mountain below us. So, it is time for me and my men to move on and we will take with us what you English call "our plunder".'

'I'll bet it was the police that shot at us', said Digger, wildly. 'They must have figured that our crate was going to be used to fly this rat out of their trap. Darn it, skipper, what a couple of fools we've been.'

Martin nodded, ruefully. 'But there's nothing we can do about it now, Digger. We have to do just as he says.'

Digger's face was a picture of bony outrage and astonishment as his friend turned dejectedly towards the aircraft. 'For Pete's sake, you're not going to do it, are you?' he yelled. 'This Sanchez has been robbing and killing people for years. *I'm* not going to help him escape so that he can murder more innocent people.'

Sanchez's close-set eyes blazed with fury. 'Show him that *nobody* disobeys my commands', he shrieked to his henchmen. 'Show the fool that we have ways of making even the most stubborn of men change his mind.'

For a moment all attention was on the tall Aussie mechanic who faced the crooks with his fists bunched. And in that moment Martin Tracy hurtled into action.

A right hook rasped against the stubbled jaw of the nearest gunman. As he went down, Martin whirled and ducked, his left already swinging. The revolver in the hand of the second gangster flamed, its bullet ruffling the hair of the lunging pilot. Then Martin's fist crunched in a knockout uppercut, hurtling the crook to the dust.

'Grab Sanchez, Digger', Martin yelled and, even as he spoke, he heard the solid impact of his pal's fist against the gang-leader's fleshy chin. Sanchez stood, head drooping, out cold and supported by Digger's grip on his shirt front. 'Load him in the kite and let's get out of here', Martin said, breathlessly.

But as Digger shouldered the heavy, unconscious body of the gangleader they heard distant shouts. A lorry swerved out from the houses of the village and began to race rapidly down the runway towards them. A tommygun chattered in the hands of a man standing in the open back of the lorry and a speeding line of bullets fountained across the ground and hammered up the fuselage of the D.C.3, missing Digger by inches.

'It's the rest of the gang with their truckload of loot!' Martin gasped.

Swiftly, the charter pilot stooped and grabbed at the revolver lying by the limp hand of one of Sanchez's henchmen. Steeling himself to ignore the hail of machine-gun lead lashing the air about him, Martin took slow, careful aim at the oncoming lorry and squeezed the trigger.

A front tyre exploded, ripped by the bullet from Martin's gun, and the driver lost control. The lorry skidded violently, swayed and overturned. Petrol leaking from a broken fuelpipe must have splashed on to the hot engine, for in a second the wrecked lorry was a roaring mass of flame. But from the direction of the village, more shots sounded and again the air was filled with the crack of passing bullets.

The lorry skidded violently, swayed and overturned. In a second it was a roaring mass of flames!

'The runway's blocked, skipper', Digger cried, pointing to the blazing wreckage of the lorry. 'We can't take off now.'

'Then we'll leave by the back door', Martin jerked.

Bullets starred the windows of the cockpit as the Dakota's engines churned over with maddening slowness. Then, suddenly, they caught and, with props whirling, the transport began to trundle in a half circle.

Digger Ames finished tying the hands of the unconscious gangleader. He glanced through the cockpit window and his face paled beneath its suntan. The dusty white ribbon of the airstrip was rushing towards them, its surface scarred by the wheel tracks made by their landing. But there was less than 200 feet of runway left. Beyond that was only mountain air, with a 3,000 feet drop to the jungle below.

Digger clasped a bony hand to his eyes. 'I can't look', he groaned. 'The engine will stall or the wings will peel off. We'll nosedive straight down. We'll never make it. Never!'

Grimly, Martin Tracy piled on the power until the twin engines screamed in protest and the whole aircraft was shuddering from nose to tail. The rumbling of the thick rubber tyres on the uneven ground grew faster and faster. . . .

Then they were over the edge, with Martin pulling with all his strength, fighting to keep up the Dakota's nose. He could almost hear the old aircraft groaning in agony as they dropped with frightening speed. Two thousand feet . . . one thousand five hundred . . . one thousand.

* * *

Suddenly, the treetops of the jungle below began to fall away, rapidly becoming a green blur as the Dakota gained height. Digger released pent-up breath in a long relieved sigh, then shook his head gloomily as he planted his long length in the co-pilot's seat next to Martin. 'Don't be surprised if the engines quit any minute after all that over-revving', he grumbled. 'And I'll bet my eye-teeth every rivet head of this whole kite has been shaken off. Mark my words, we're not out of trouble yet.'

Martin settled back comfortably and smiled. Digger was his old self again, happily meditating upon a future dark with strife and dangerous uncertainties. Everything was back to normal.

'Digger, get on the radio to the airfield', he said cheerfully. 'Have them tell the police to be standing by for an important delivery.' He grinned back at Sanchez, securely bound and still unconscious on the flight deck. 'We said we would deliver the freight from Skull Mountain to Sau Paulo. And that's just what we're going to do.'

This could be you....

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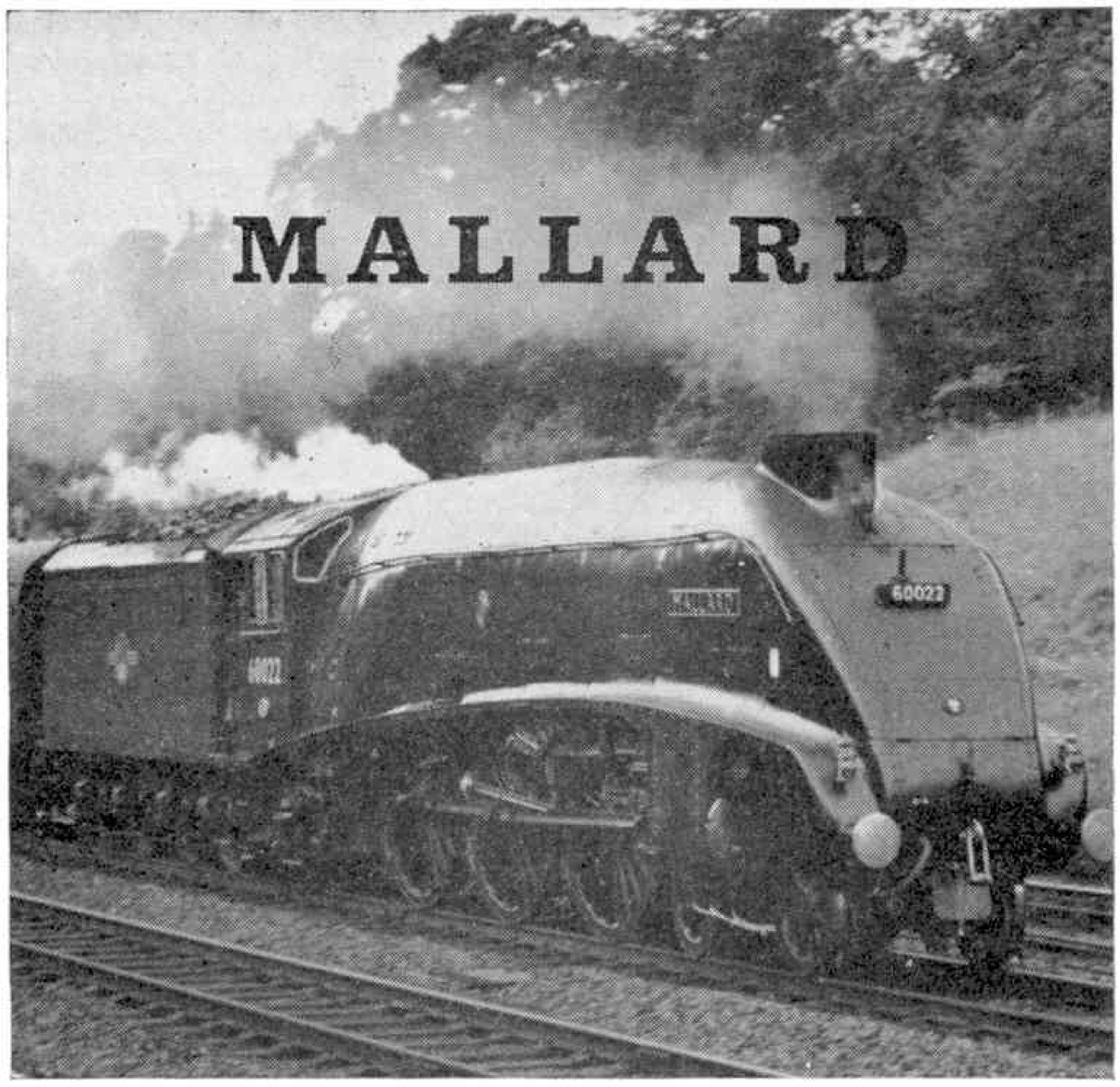

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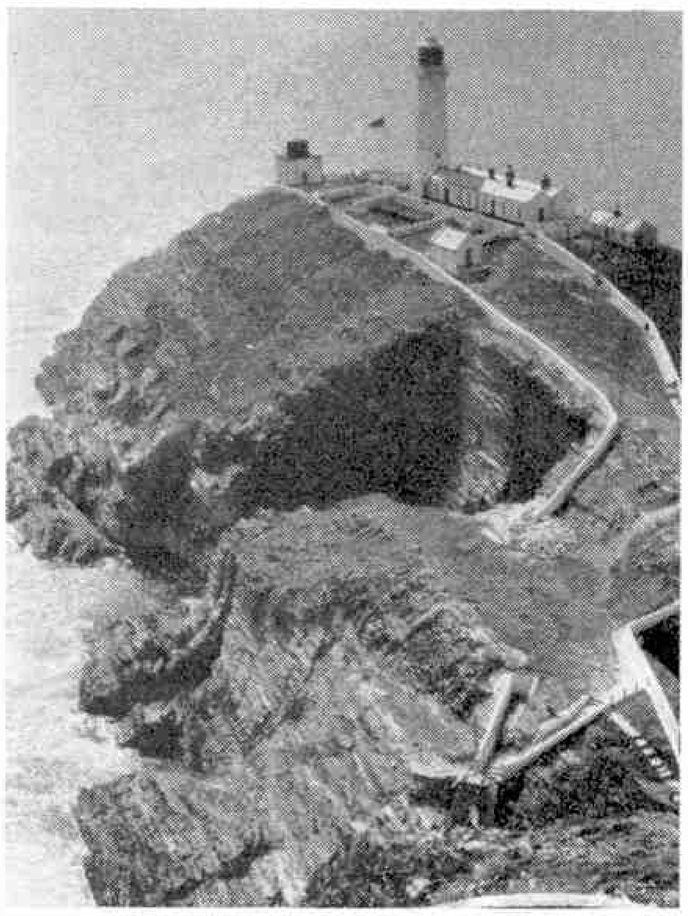
mailbag

Anything interesting . . . write about it to the editor

ROBOT LIGHTHOUSE—Many readers of the M.M. who have visited the South Stack lighthouse, in the northern part of Anglesey, will be interested to know that it is to become operated by remote control from Holyhead, which is four miles away. But before the changeover can take place many important tests will have to be made.

One of the most important pieces of equipment which is to be fitted is a system of electrical central heating, which is designed to protect the delicate remote control instruments from the extremes of weather. To this end, ten extremely heavy



off-peak electrical storage heaters of the domestic pattern had to be taken to the lighthouse. To reach South Stack, as many readers know, means going down 381 steps! Thus the problem arose as to how these ten heavy heaters could be taken to the lighthouse.

Fortunately, Trinity House lighthouse tender 'Argus' came to the rescue by landing the heaters on the tiny islet. This means that by the end of the year, all instruments and heaters will be in position, everything will be tested and the lighthouse will become fully automatic. *E. Emrys Jones, Old Colwyn, N. Wales.*

SANCTUARY FOR KOALAS—At Lone Pine, a Brisbane suburb, there is a sanctuary for Koalas, where they may live in peace and free from the fear of hunters. These lovely creatures almost became extinct some years ago and this sanctuary was set up for them to breed in safety and provide a place where the public can see them in their natural surroundings. The sanctuary is set near a bend in the Brisbane River where there are acres of trees.

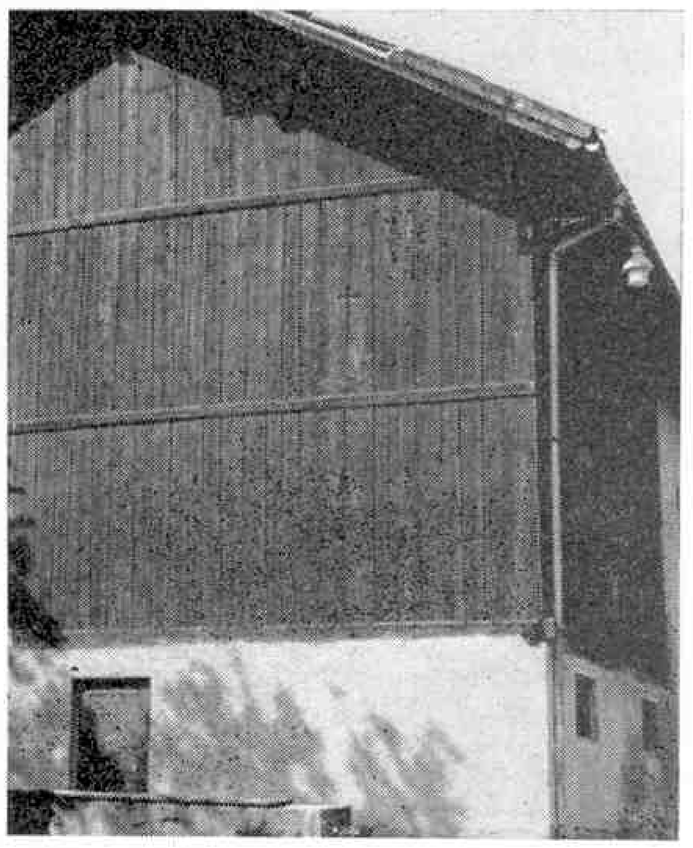
Originally, there were only a few bears but the numbers have grown rapidly and many have now been released to an enclosed paddock to roam in a semi-wild state. Koalas only eat a certain kind of gum tree leaf and for a while it was quite a problem to get enough food for them.

An interesting feature is that their name 'Koala' is Aboriginal and means 'no drink'. They do not drink water but get sufficient moisture from the leaves they chew. The sanctuary also houses many other animals and different varieties of birds. *Lyn Smith, Brisbane.*

STEAM ENGINE MEMORIAL—In Dartmouth, South Devon, there is a plaque erected to the memory of Thomas Newcomen, the famous engineer who invented and pioneered the atmospheric steam engine. Newcomen was, of course, born in Dartmouth and one of his beam engines is soon to be erected in Dartmouth, having been brought from Coventry where, until quite recently, it was still operating. The plaque shown here, which illustrates the Newcomen engine, is to be found in the Royal Victoria Gardens, Dartmouth. *R. W. Tandy, Upton, Torquay, Devon.*

MATCHBOX COLLECTING ANYBODY?—I have recently taken up collecting matchbox labels and have a considerable number covering many parts of Europe and it occurs to me that some of Meccano Magazine's readers might have a similar interest. Therefore, if some of them would like to communicate with me to exchange views on this hobby and possibly exchange matchbox labels, I shall be pleased to hear from them. *Anthony L. Caplin, Erlesdene, 9, Cambridge Road, Southport, Lancs.*

ART IN VENTILATION—When I was in Austria last year, I was very impressed by the beautiful picture decoration of the buildings. Also, I noticed the novel way in which some of the barns and other farm buildings were ventilated. The ventilation holes were cut in simple shapes depicting various figures of men and



animals. The enclosed photograph illustrates this unusual idea.

Another feature of these wooden buildings is the use of massive dovetail joints at the corners. These are often as large as six inches across the pins. In the older buildings these joints appear to have been assembled dry. *M. V. Hammersley, Sherwood, Nottingham.*

MELBOURNE CRUCK-HOUSE—One of the oldest type of dwellings still surviving in England is the cruck-house. The basic principle of cruck-house building was the method of supporting the roof ridge pole between two or more slanting pairs of posts or 'crucks' where they joined one another at the apex. These cruck-houses are now quite rare, although there are a few surviving specimens to be found in out-of-the-way villages in central and southern England. *A. B. Longbottom, Ashton-on-Trent, Derbyshire.*

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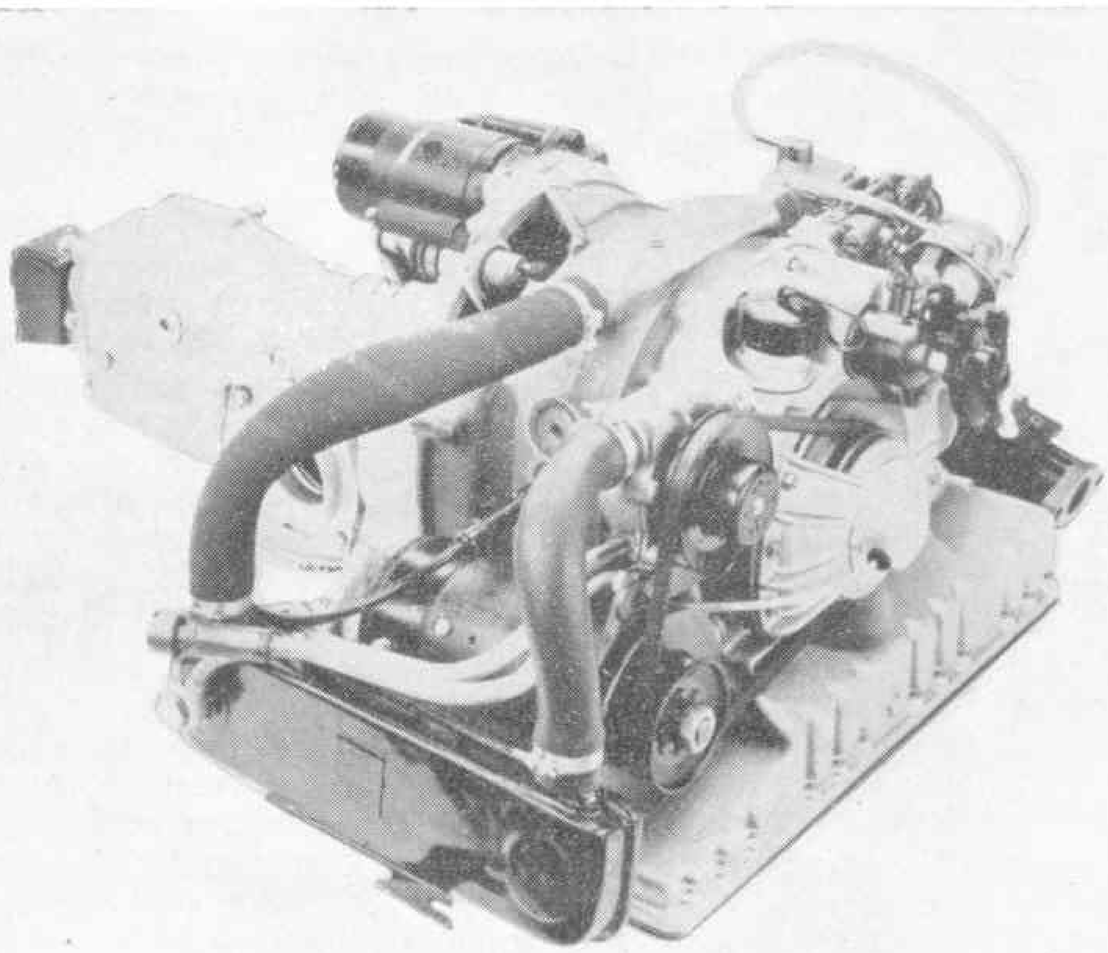
by **Jerry Ames**

Rotary Engines

PRESENT AND FUTURE



Top: The N.S.U. Wankel-powered Spider sports car. Above: The revolutionary rotary piston Wankel motor which is about one quarter the size of a piston engine of similar power.

THERE'S no doubt that engines of the future will be rotaries! This, of course, doesn't mean a sudden end to the piston engine, for the change is likely to be gradual and spread over many years. However, the first car with a practical rotary piston engine—the Wankel-powered N.S.U. Spider sports two-seater, is just going into production and an opportunity to drive this milestone in motoring history was too important to miss.

Wisely, N.S.U. decided to introduce the new type engine to a car of known and proved ability, the Sports Spider. Its Wankel engine, fitted behind the rear axle, is about one quarter of the size of a similar conventional piston unit and weighs a good deal less. It is linked to a normal N.S.U. four-speed gearbox. The engine has only one sparking plug, starts easily in the normal manner by an extra turn of the ignition key and it will idle around 750 r.p.m. but develops no real power below 3,000 r.p.m. It is desirable to take off at these revs, which is perfectly easy with the smooth clutch. The main problem is to avoid over-revving the engine which soars readily to 7,000 r.p.m. Persistent over-revving won't break anything, but can upset the combustion chamber sealing.

Beyond 4,000 r.p.m. power builds up rapidly and acceleration is deceptively quick. It will, for example, go from standstill to 50 m.p.h. in 10½ seconds and to 70 m.p.h. in 21½ seconds—times which are comparable with the latest Austin Healey Sprite. On a long enough straight, the Wankel Spider winds up to 95 m.p.h., but as top gear is virtually an overdrive, the last few m.p.h. build up more slowly. In the lower gears, one can see speeds of 45 m.p.h., 66 m.p.h. and 84 m.p.h. on the speedometer.

The engine should be kept between 3,500 and 6,000 r.p.m., which means making good use of the four-speed, all-synchromesh gearbox. The engine is delightfully smooth, rather reminiscent of an Auto-Union three-cylinder two-stroke.

How does the Wankel compare with a gas turbine? The water-cooled, rotary piston unit is nothing like so smooth as a turbine, which dispenses with water-cooling. Both engines start easily from cold and use only one sparking plug. However, in a turbine, the plug is only used for starting, while a gearbox is not so essential in a turbo-car for maintaining power.

I would say the Wankel rotary piston unit is first-rate for small sports cars or family saloons up to the equivalent of 2 litres, but for luxury sporting vehicles and the very best saloons, the gas turbine should prove unsurpassable. Both the engines would need far less maintenance than the conventional piston engines.

After driving the Wankel Spider, I stepped straight into a beautifully-preserved, 1914 N.S.U., with 2½ litre, four-cylinder engine. Its massive, right-hand gear lever, outside the body, controlled a large four-speed 'crash' gearbox. Surprisingly, changing gear was easy and precise, because the whole thing was properly engineered. The magnificent, high seating gives the driver a commanding view, providing relaxed, 30 m.p.h. motoring. Top speed was around 35 m.p.h., while the steering was heavy and the brakes very feeble. Thus have we progressed during the last 50 years.

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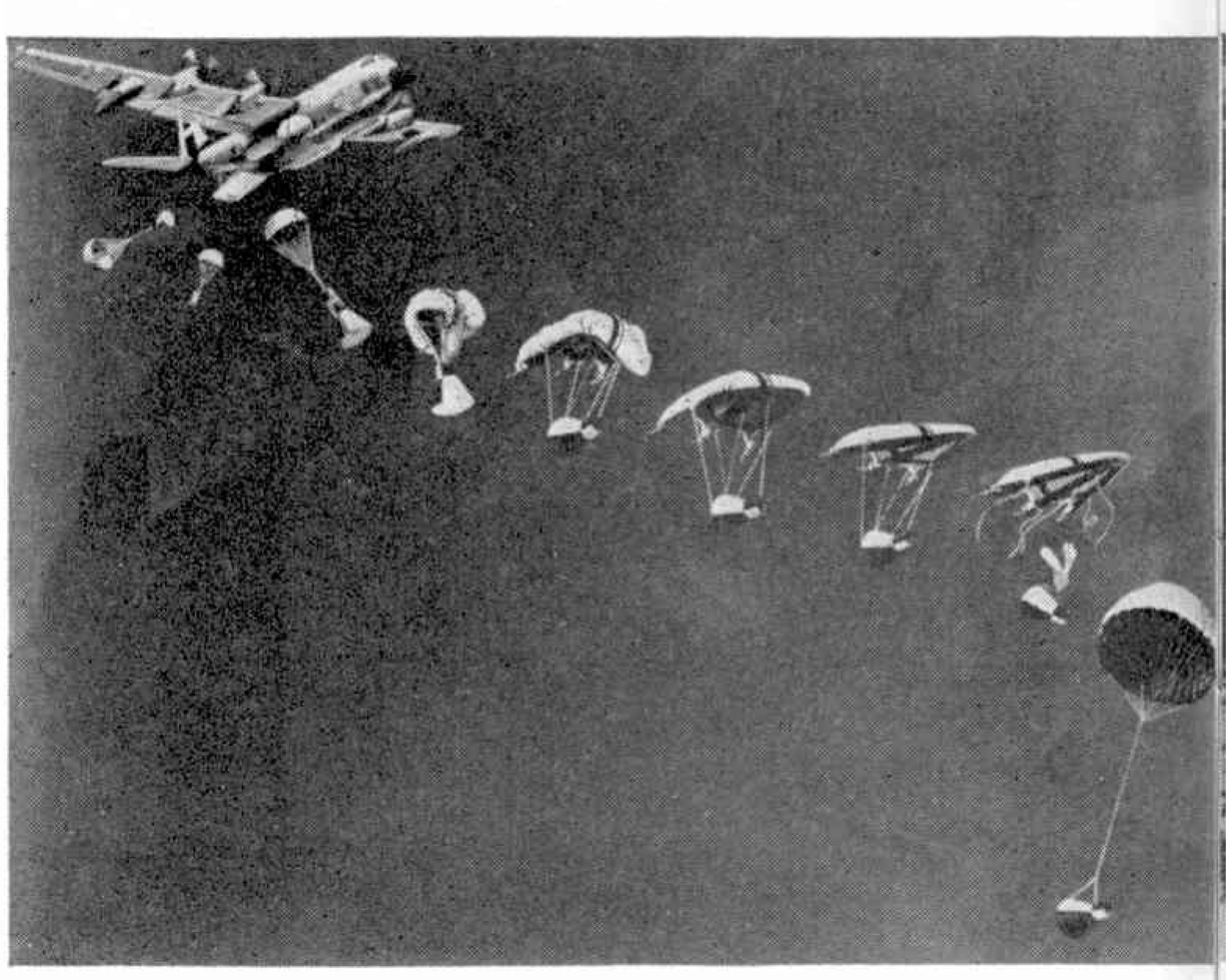


Paragliders may be used for space-craft re-entry into the earth's atmosphere. This drawing shows the method

FLEX-WINGS AND

SIXTEEN years ago, Dr. Francis Rogallo of the U.S. National and Space Administration's Langley Research Center, invented a new kind of wing. Like most worthwhile ideas, it was simple, consisting of a triangle of fabric supported by a keel and two leading-edge members which formed a rigid arrow-head shape.

As well as being cheap to build, this kite-like wing had other advantages. It could be rolled up when not in use; and there was no reason why the keel and leading-edges should not be inflatable tubes of rubberised fabric, so that the whole wing could be folded into a small package, like a Li-Lo mattress.

For a time, nobody seemed able to think of a use for the Rogallo wing. One suggestion was that it might be carried by helicopters as a safety device, to be deployed if the rotor stopped turning or broke in flight. Another idea was to use the wing as a glider to carry heavy cargoes. Models were made and tested in wind-tunnels. They showed that a medium-size helicopter could tow a nine-ton load supported by this type of glider without any reduction in its normal cruising speed.

At this stage, the U.S. Army and Marine Corps began to show more interest and the Ryan Aeronautical Company was awarded a series of contracts to build Rogallo-type wings for various military duties.

Ryan's version of the wing, which they call the Flex-Wing, has aluminium alloy keel and leading-edge members and a web of Dacron fabric of the kind used to cover the airframes of light aircraft. They fitted it first to a simple aeroplane fuselage, which had an open cockpit for the pilot at the front, a flat platform for freight or passengers in the middle and a 180 h.p. Lycoming piston-engine, driving a pusher propeller at the rear. The pilot had ordinary stick-and-rudder-pedal controls, but they caused the aircraft to climb, dive or change direction by tilting the whole Flex-Wing instead of by moving the usual ailerons and elevators.

This first prototype proved so successful that the U.S. Army ordered two improved Flex-Wing aeroplanes to study their usefulness as flying Jeeps. This caused them to be known usually as "Fleeps", although their correct Army designation is XV-8A. Their basic design is very like that of the original Flex-Wing, but they have a 210 h.p. Continental 10-360A engine and slightly different controls. Their wing spans 33 ft. 5 ins. and is 26 ft. long, giving sufficient lift to carry six passengers in addition to the pilot at a cruising speed of 57 m.p.h.

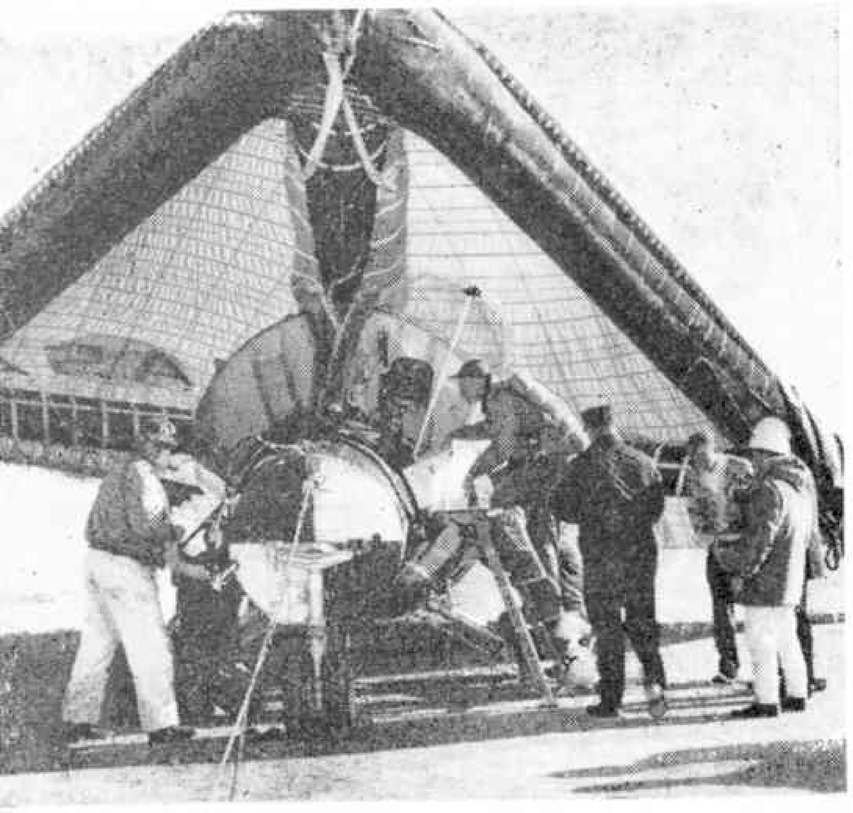
High speed is of little importance for this kind of vehicle. What really counts is the ability to take off and land in small spaces. With a full load the Fleep can be off the ground in 80 yards and it will land in 50 yards. What is more, it is so easy to fly that Ryan believe that army personnel accustomed to operating only ground vehicles could learn quickly to fly and maintain it.

This is only a start, because Ryan are investigating the use of Flex-Wings instead of parachutes for all kinds of jobs. Paratroops using Flex-Wings could guide themselves much more accurately to their landing site; and flight tests have already proved the practicability of dropping supplies by Flex-Wing glider from large transport aircraft. Almost perfect accuracy can be achieved by fitting the gliders with simple radio control, so that troops on the ground can guide the airborne supplies down to their positions.

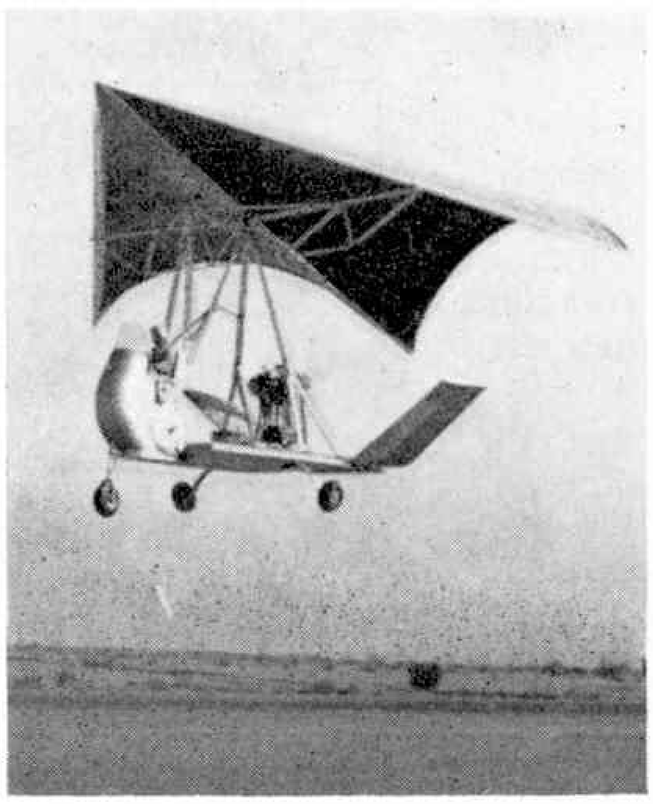
An even more interesting application of the Flex-Wing is being tested by the U.S. Marines. When these tough combat troops go into action they must know exactly where the enemy is waiting. It is not always possible to call in camera-carrying jet-fighters to photograph the areas being attacked and the Marines have been trying out all kinds of easily-transportable radio-controlled robot-planes for short-range battlefield reconnaissance.

One of the most promising is Ryan's little Flex-Bee. This

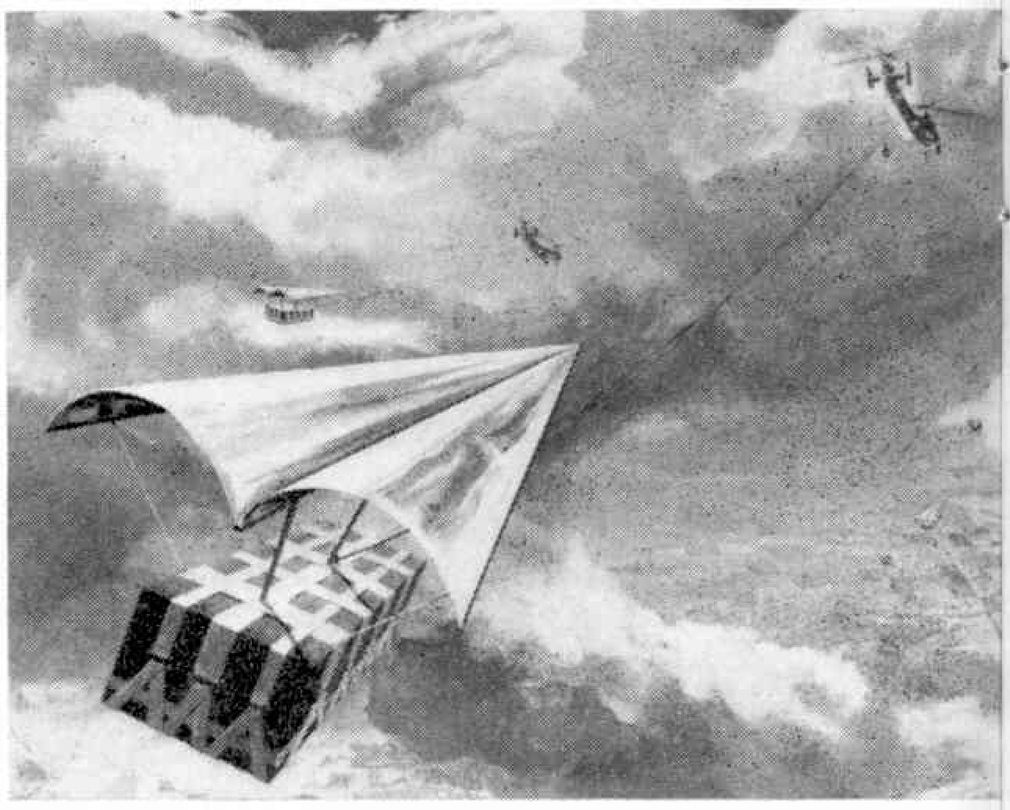
Paraglider for space research

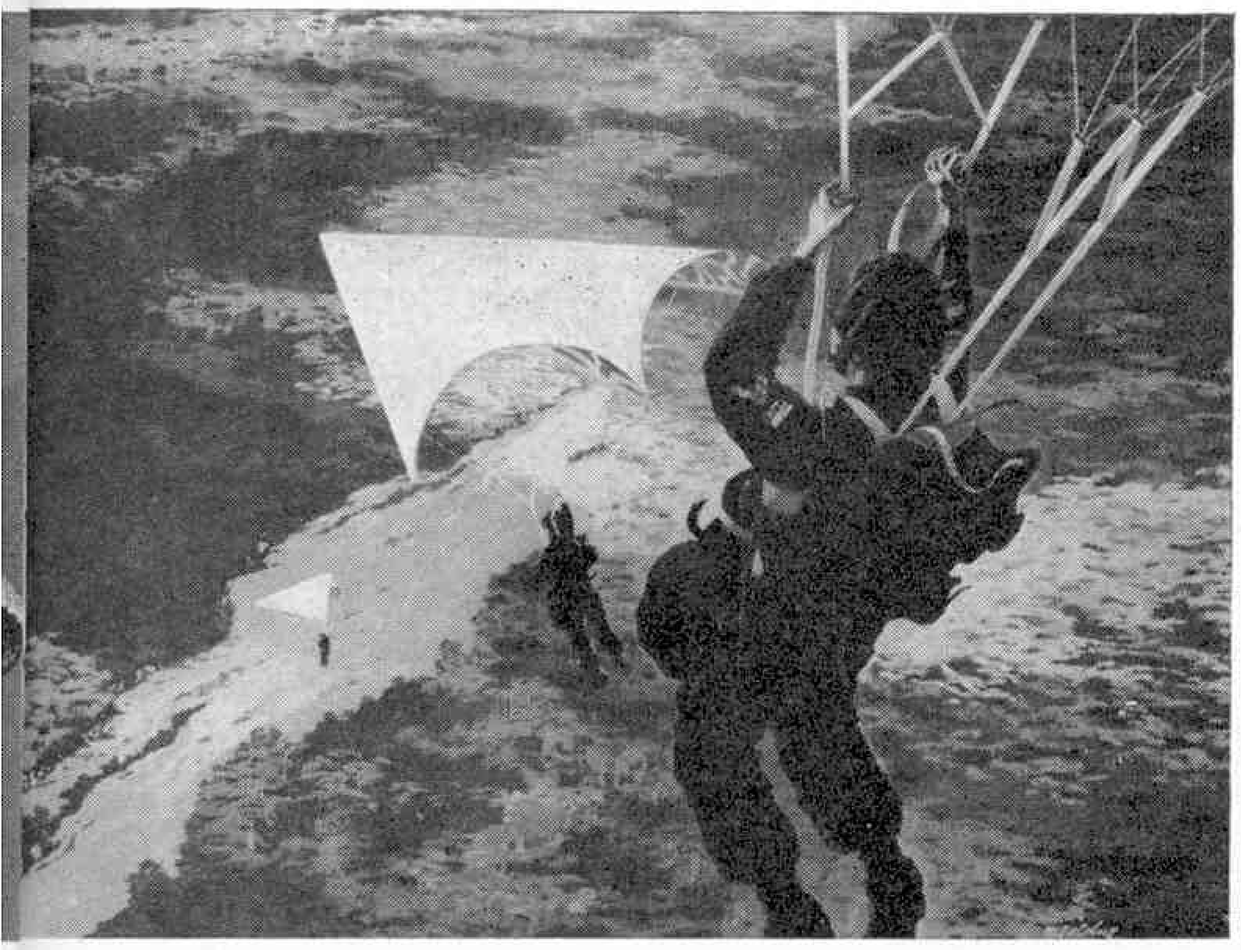


The flex-wing 'Fleep' in flight



Helicopters towing a flex-wing glider and load





Are parachutes obsolete? This flex-wing unit is fully controllable enabling far more accurate landings of troops

PARAGLIDERS

consists of a small Flex-Wing, carrying a box-like fuselage containing still or TV cameras and powered by a 9½ h.p. McCullough two-stroke engine. It cruises at 65 m.p.h. at heights up to 5,000 ft. and is controllable over a range of several miles. What is more, the Flex-Bee, its launching system and other ground equipment, can all be packed into a box small enough to be carried by a two-man operating crew.

It might be argued that a 65 m.p.h. aircraft would offer a sitting target for enemy troops. However, its job is to try and discover the whereabouts of the enemy and they would be unwise to give away their positions by shooting at it.

Another company engaged on Rogallo wing research is North American Aviation, whose designers are concentrating on the folding type with inflatable leading-edges and keel. They call their wing the Paraglider and have already used it to air-drop supplies under radio control, for the U.S. Army. But not all the planned uses of the Paraglider are for war and a particularly interesting series of tests began this Summer for the National Aeronautics and Space Administration's Manned Spacecraft Center.

When America's Mercury astronauts re-entered the atmosphere after orbiting the Earth, they made the last part of their descent into the sea inside their spacecraft on the end of a parachute. If North American's experiments are successful, the astronauts in two-man Gemini spacecraft may be able to guide themselves down to a smooth landing by using a Paraglider.

In the first test, on July 29, test pilot E. P. Hetzel sat in a dummy Gemini spacecraft suspended from a Paraglider wing and was towed to a height of 2,600 ft. by a helicopter. In another test, the spacecraft, without anybody on board, was dropped from a Hercules transport aircraft flying at 33,000 ft. After it had fallen for 30 seconds the canister housing the Paraglider was released. Nitrogen gas from cylinders inside the spacecraft inflated the wing, which was used to lower the craft to 21,000 ft. where a parachute was opened for the last stage of the descent.

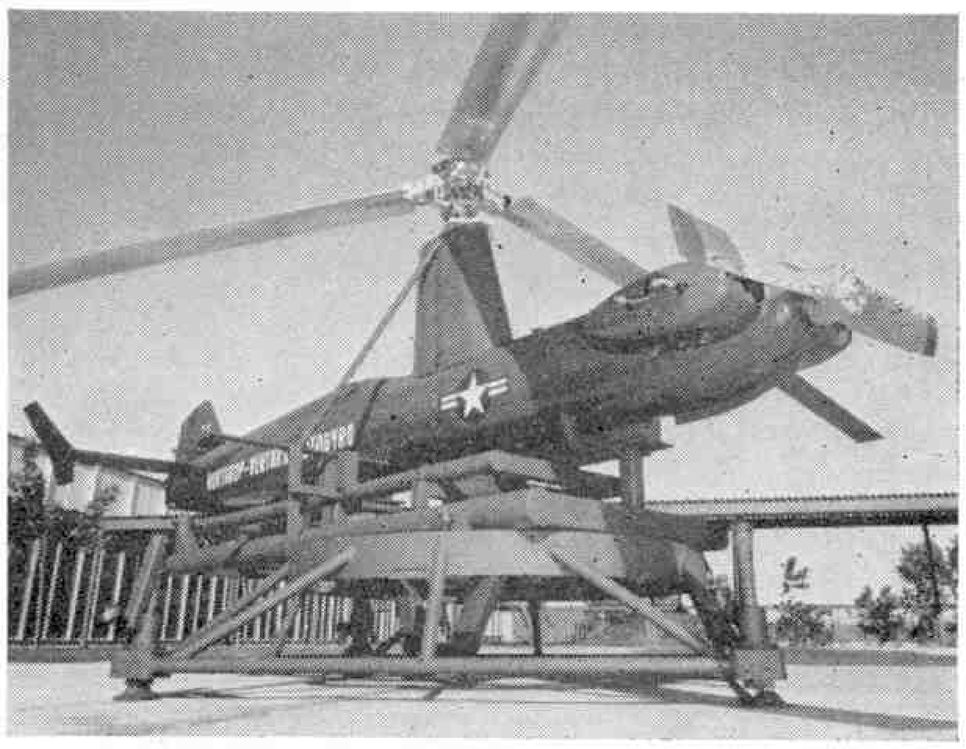
It looks, therefore, as if we shall be seeing a great deal of Dr. Rogallo's wing in the years ahead. In fact, it might well bring us a step nearer the day when flying an aeroplane will be cheap enough and easy enough for almost everyone to enjoy.

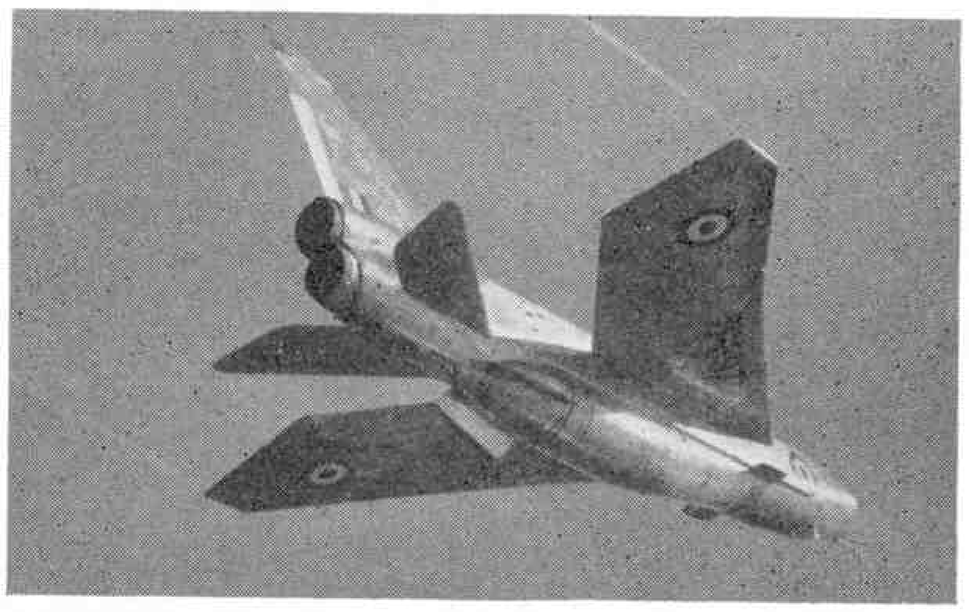
John W. R. Taylor

Built to be shot at

The little aircraft shown here is something quite new—a small pilotless autogyro designed to spend its life being shot at by anti-aircraft gunners. Known as the NV-101, it was built by Northrop's Ventura Division, which has supplied more than 65,000 remotely-controlled unmanned aircraft to the U.S. and foreign services, including our own Royal Navy and Royal Artillery.

The NV-101 is powered by a 72 h.p. McCulloch engine and has an auto-rotating three-blade rotor of 24 ft. diameter instead of the fixed wings normally fitted to this class of aircraft. In addition to playing the part of a helicopter or low-flying aircraft for gunnery or rock target practice, it can carry out battlefield reconnaissance missions at speeds of up to 140 m.p.h. for more than an hour at a time or deliver 300 lbs. of supplies to troops in jungle or rough mountain country.





Longer legs for the Lightning

The version of the Lightning F. Mk. 3 fighter now coming off the British Aircraft Corporation's assembly line for R.A.F. Fighter Command has several important improvements, two of which are shown in the illustration above. The outer portion of the leading-edge of each wing is now extended and cambered down to reduce drag during cruising flight at subsonic speeds. This increases the aircraft's range, which receives a further boost from a new under-fuselage fuel tank with more than double the capacity of the former tank.

Two large fins on the tank help to keep the fighter stable at supersonic speeds and there is little doubt that the Lightning F. Mk. 3 in its present form, armed with two of Hawker Siddeley's new Red Top homing missiles, is the finest interceptor in the world. It is already in service with No. 74 Squadron.

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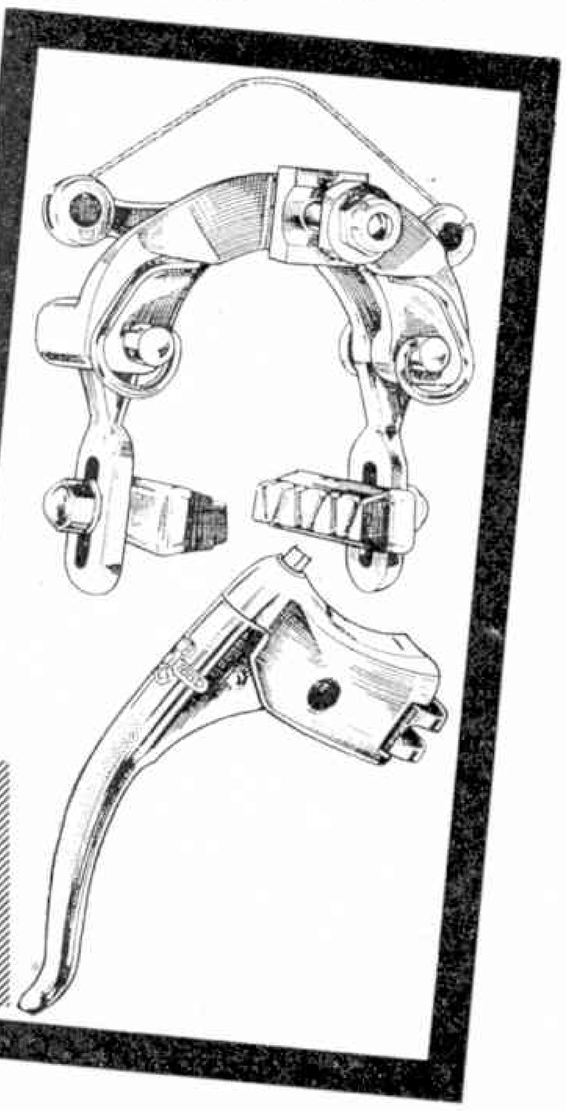

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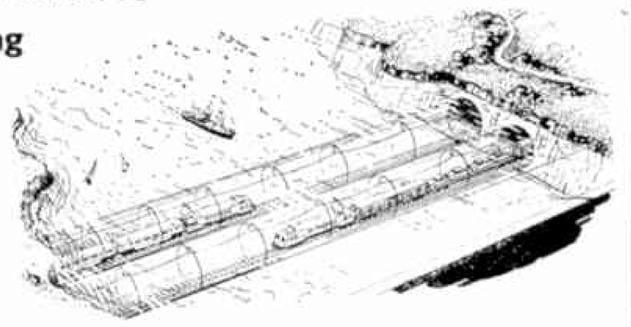
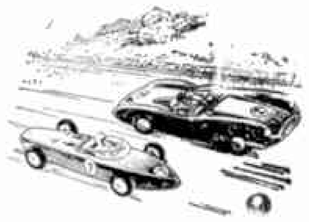


Yes, you actually see the busy railway traffic through the transparent twin tunnel, as well as a Channel Bridge! Just imagine it—the whole working layout covers an area 85 ft. long × 10 ft. wide.



Roads and Raceways are a big feature of the area near the Channel Tunnel. Two large, working layouts of Airfix and Scalextric double track provide a realistic background to a variety of racing cars.

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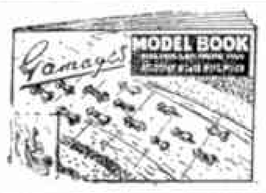

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You may submit as many questions as you like. We will deal with as many as possible each issue.

Magic twig

Q. *Is there any scientific principle behind the divining rod?—P. A. Oliver, Grimsby.*

A. The divining rod was brought to England, four centuries ago, by German miners who used it for metal prospecting. The most favoured wood was hazel, from which 'magic' wands had been made; and this is still commonly used by modern dowsers. Soon, forked twigs became widely employed in locating underground water and during the 1690s, were even used in France for seeking out criminals. Though animal and terrestrial magnetism were once held to be the principles involved, the 17th century genius Athanasius Kircher actually anticipated the explanation of later investigators that the rod's twitching movement is caused by unconscious muscular action. But diviners may still be guided by observation of soil, vegetation and other surface indications: African dowsers, who use no rods, have found water just the same.

Car prices

Q. *Is there a book that gives the prices of all the world's cars?—B. J. Fowler, Harrogate.*

A. Yes—*Motor Specifications and Prices* gives information on motor cars and cycles, scooters, mopeds, power units, and commercial and farm vehicles. It is obtainable, price 31s. 4d., from Stone and Cox Ltd., 44 Fleet Street, London, E.C.4.

Phonograph days

Q. *Can you furnish any details concerning Sterling Records, manufactured in London round about 1900?—D. S. Welsh, London, S.E.1.*

A. The Sterling Record Co. was established early in 1905 and manufactured 'gold-moulded' phonograph cylinders at Cambridge Heath, East London. The two men behind the venture came from America, where they were well-known as pioneers of the new industry—Louis (later Sir Louis) Sterling and Russell Hunting, a recording engineer who, under the name of Michael Casey, was also a popular entertainer. The firm soon changed its name to the Russell Hunting Co. Ltd., and in 1906-7 sold three million shilling records before both the principals joined other companies which favoured discs rather than cylinders. It continued under the control of Edison-Bell until 1912, when it was liquidated.

Bill of fare

Q. *How much food does the average man eat in a lifetime?—'Tom Tucker', Aylesbury.*

A. The food consumed by a human being in 70 years has been estimated at a total of 265 cwt. of bread, 800 lb. of meat, 50 cwt. of vegetables, 12,000 eggs, and 44,000 pints of liquids.

Brake tender

Q. *In the London Midland Region of British Railways I have seen diesel engines pushing a truck in front of them while pulling a train behind. What are these trucks? N.H.P., Grantham, Lincs.*

A. They are diesel brake tenders, which provide extra brake power when a diesel locomotive is hauling a coal train consisting of wagons not fitted with automatic brakes. They run on two four-wheel bogies, are 31 ft. 9 in. long, and weigh 35½ tons.

Mounting 'mints'

Q. *Does it devalue mint stamps to use hinges to mount them in an album?—K.R., Barrow-in-Furness.*

A. Some collectors use transparent envelopes and other special devices to avoid sticking hinges to the backs of mint stamps. Others hinge them to a small piece of paper or 'mat' which is then hinged to the page, so that this takes the wear and tear if the stamp has to be moved. But if you use good quality hinges and mount them properly, the backs of your stamps should suffer very little damage; and the value is not appreciably affected by using a hinge, unless it is a very rare specimen. The condition of the stamp itself is much more important.

Scientist scrawlers

Q. *Is it true that doctors' handwriting is less readable than other people's?—'Teacher's Pest,' Windsor.*

A. A national survey made in 1953, in which 25,000 samples of handwriting were classified and examined, showed that among doctors, nurses, dentists and chiropodists, less than four per cent wrote almost illegibly. The highest proportion of bad writers—over 23 per cent—was found among scientists and research workers. The best writing was done by shorthand typists and secretaries, of whom less than 2½ per cent had an illegible scrawl.

Ladies only

Q. *Why are hurricanes known by girls' names?—G.T.S., Pontefract, Yorks.*

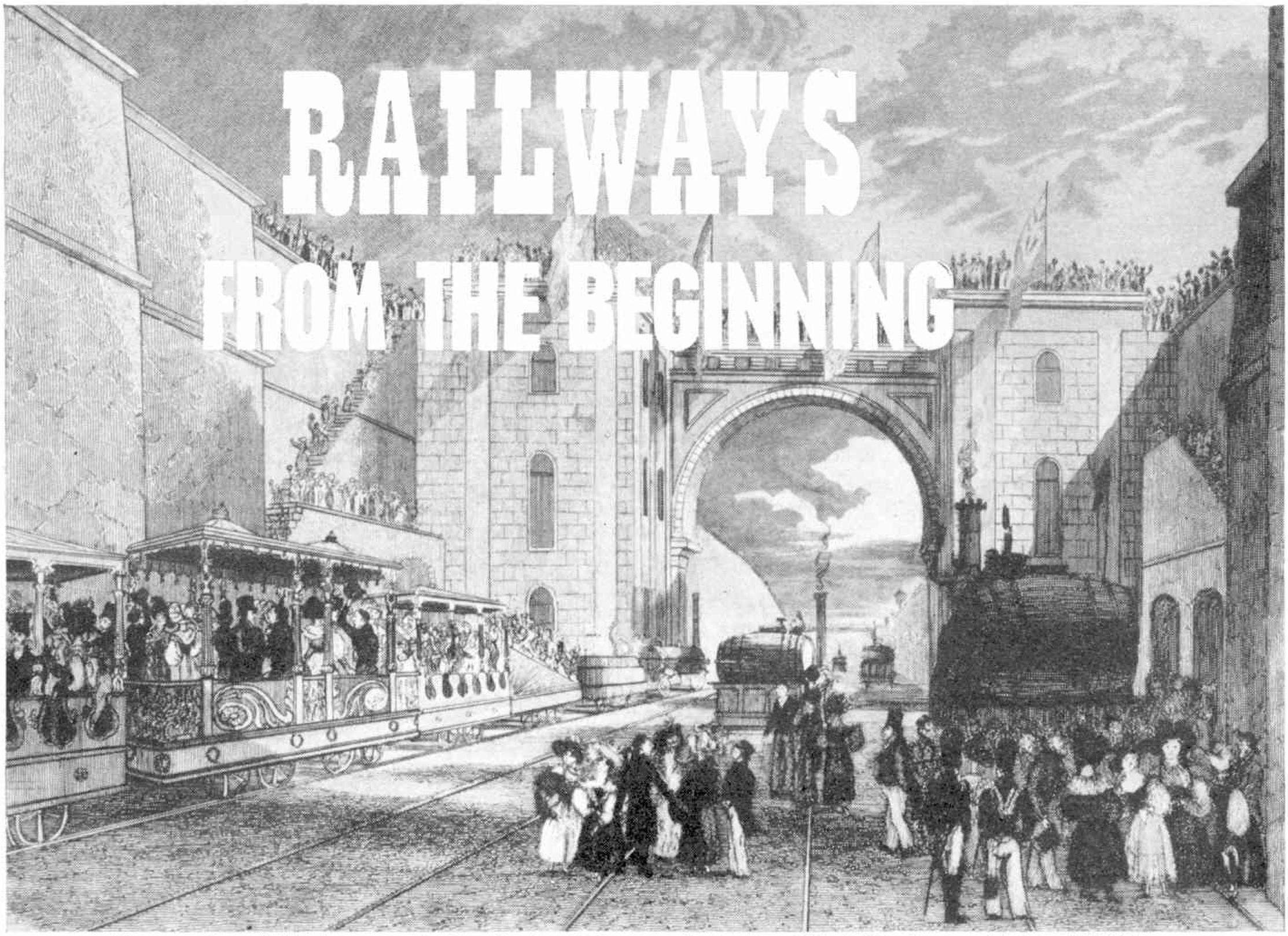
A. Purely as a means of identification. Every year the first hurricane in the western hemisphere is given a name beginning with the letter A, the second a name starting with B, and so on. Hence, 'Dora' was the fourth hurricane of the year.

Brando in uniform

Q. *What can you tell me about a film in which Marlon Brando appeared as a German officer?—'Brando Fan,' Ealing, Middlesex.*

A. The film was *The Young Lions*, shown here in 1958. Brando played a German lieutenant (see picture) tormented with doubts about the Nazi creed and finally, he was shot by two GIs—Montgomery Clift and Dean Martin. Based on Irwin Shaw's novel, the film was directed by Edward Dmytryk for 20th Century-Fox, was in CinemaScope, and ran for 167 minutes.

RAILWAYS FROM THE BEGINNING



The opening of the Liverpool & Manchester Railway on September 15th 1830. Scene at Edge Hill Station.

OF all the descriptive titles applied to items of everyday significance in modern life, the name 'permanent way', for the railway tracks which wind their way across our countryside, is one of the most colourful and certainly one of the most apt. It conjures up a vivid impression of the indestructibility of the railway tracks which have borne their share of Britain's industrial burden for very many years.

Of course, there have been permanent ways of one kind or another throughout the centuries and certainly, if one includes roadways, there are instances of ancient permanent ways in the Watling Street of the Romans and the stone roadways which the Greeks and other cultured peoples established centuries ago at the height of their civilisation.

But so far as this article is concerned, 'permanent ways' mean railways and the first reliable form of their development came in the fifteenth century in Germany, where mining was then being developed. Iron, lead and zinc ores were loaded into crude wagons, to be hauled along stone or wooden ways to be smelted. Many of these ways were formed from rounded wooden bars supported by cross pieces of wood that were the modern equivalents of sleepers.

Further progress

It was not until the reign of Queen Elizabeth the First, however, that any further progress was made in the construction of a reliable permanent way and, once again, it was the development of an industry that led to the superior forms of permanent way, so that products could be transported more cheaply. The industry concerned was coal, which at that time was beginning to be mined on an extensive scale in Great Britain, notably in the Midlands near Leicester and also on Tyneside.

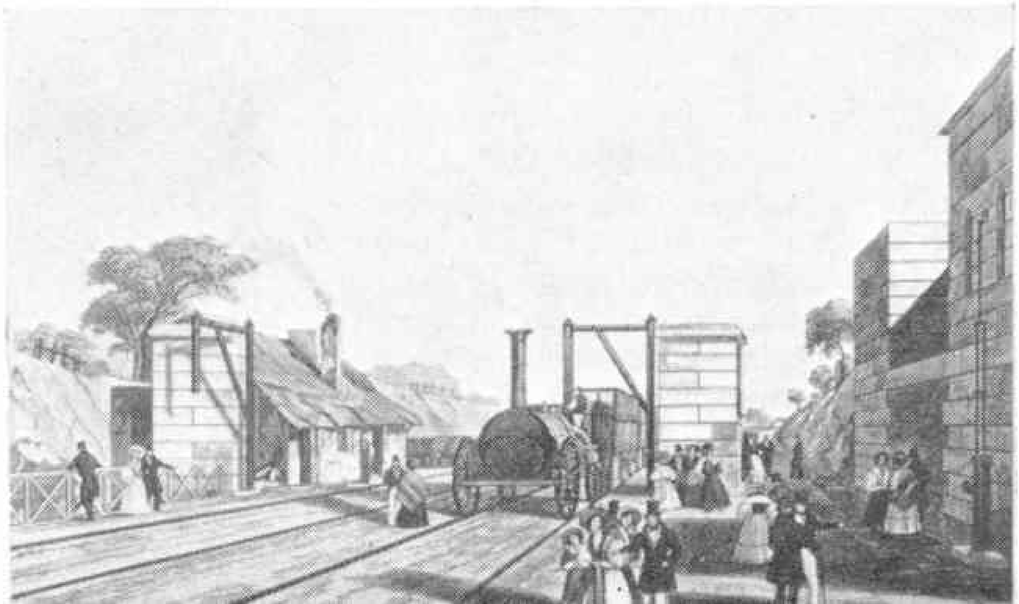
The mine owners of the period took the coal to places where it could by transported by water, although in later years, the railways usurped the canals' prerogative of coal transportation. This early development in building wooden ways to the rivers and canals led to them being called 'waggon ways', or occasionally, 'tram ways'. The designs were rather crude and consisted simply of wooden beams set the appropriate distance apart from the wheels of the wagons, which were kept on the beams by means of flanges on their inner sides.

Change to metal

During the seventeenth and eighteenth centuries, these 'waggon ways' were developed in many parts of Britain, for the demand for coal increased tremendously with the coming of the Industrial Revolution. During the first years of the nineteenth century, progress was made with the use of metal for the rails, instead of wood. The change from wood to metal probably began by covering the tops of the wooden ways with iron, consequently reducing the amount of maintenance and repair.

One form this new development took was in the forming of

Taking in water at Parkside Station.



'plate ways', which were iron ways with turned up flanges running along the inner sides of the two ways to guide the wagon wheels. This, however, proved less practical than the use of rails, which were in those days roughly similar to those in use at the present time. These early lines, known as 'edge rails', were produced in many forms, one being the fish-bellied rail, so called because of the convex curve on its underside.

The first true rail, as we know it today, was developed by John Birkinshaw. The first rails were of cast iron, but later, malleable or wrought iron was found to be better, although steel is used to produce present-day rail. It became obvious in the latter part of the eighteenth century and the first few years of the nineteenth century, that something more powerful than horses would be required to pull the increasing quantities of coal and other commodities which the new industrial age was producing.

Investigations were then made into the practicability of using steam power. This first became possible when Newcomen invented his 'atmospheric' steam engine, which was used chiefly for pumping water from mines. In this machine, steam from a boiler lifted a piston in a cylinder and a jet of water was then shot into the cylinder below the piston. This condensed the steam and the piston was then forced down by the pressure of the atmosphere. The piston was connected to the pumping rod by means of an overhead beam.

The famous inventor James Watt is supposed to have thought of his steam engine when watching a kettle boiling on a fire and holding a spoon against the jet that issued from the spout. But, in point of fact, Watt was familiar with the Newcomen atmospheric engine and, while attempting to improve on it, hit on the idea of using a separate condenser instead of simply condensing the steam under the piston by means of a jet of water.

Great improvements

This device completely revolutionised the steam engine, and by the end of the eighteenth century, it was in use for purposes other than merely pumping water out of mines. Other great improvements were made by engineers such as Woolf, Hornblower and, above all, Richard Trevithick, a Cornish engineer who first used steam at a high pressure and actually built a carriage in which the wheels were turned by a steam engine.

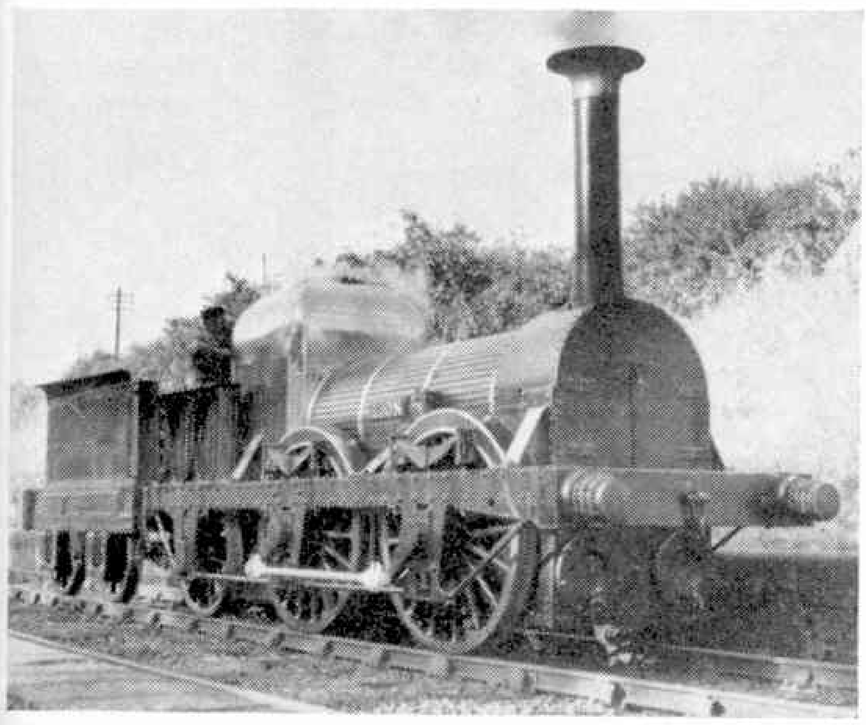
Trevithick is generally regarded to be the 'father' of the locomotive, although other carriages driven by the steam engines were built by William Murdoch, an engineer in the employ of James Watt. Trevithick built several locomotives, including one that ran in 1808 at an exhibition close to what is now Euston Station, London. The locomotive, which hauled an open carriage and gave rides at a shilling a time, was called 'Catch-Me-Who-Can' and ran at a speed of 12 m.p.h. Another locomotive ran on a colliery railway at Pen-y-darran, in South Wales.

Stephenson's triumph

Other inventors were also at work trying to develop ways and means of driving steam engines on rails. George Stephenson, who rose from the humble position of an operator of the winding mechanism of a coal pit, to that of the most famous railway engineer in the world, was first associated with colliery lines, but later became the engineer of the pioneer railway between Stockton and Darlington. A triumph it must have been for him to witness, in 1825, the opening of this remarkable railway. Trains of crude wagons were hauled by steam locomotives for the first time, making the Stockton and Darlington the first passenger railway in the world to use steam haulage.

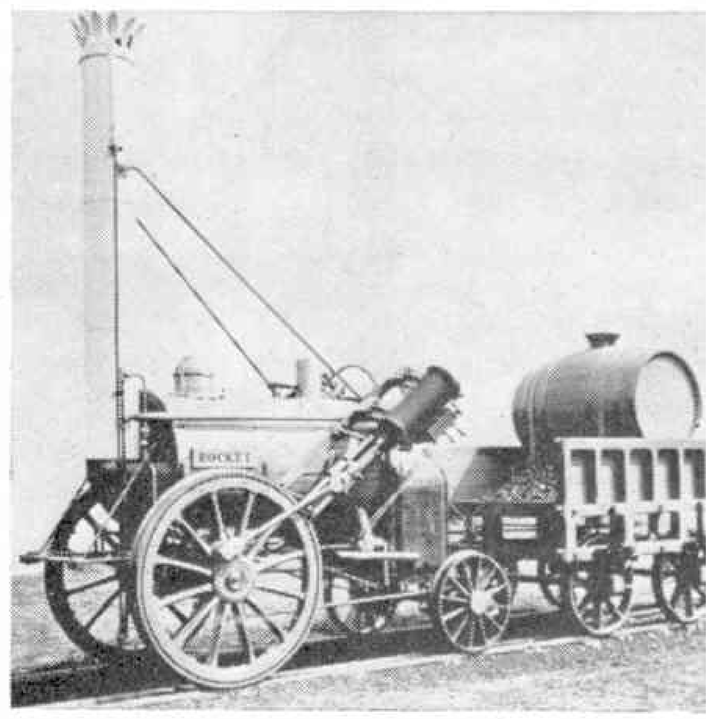
There had been other passenger railways previously, including one in Surrey and another near Swansea, that later developed into the well-known Swansea and Mumbles Tramway, but these railways used horses and not steam locomotives. Mention must also be made of a railway that conveyed coal from a colliery at Middleton to a coal depot in Leeds. This was the famous Middleton Railway, which began operations as early as 1812. This was the world's first industrial railway to use steam haulage and it survived until 1958, when motor lorries came to be used exclusively to carry the coal that had once been transported by rail. This fine old railway has since been revived by the Middleton Railway Preservation Society.

George Stephenson's greatest success came with the building and opening of the Liverpool-Manchester Railway approximately 130 years ago. Stephenson surveyed the route for the line and also built the bridges and hewed out the necessary cuttings. One of his finest achievements was to throw the line across a gigantic bog known as Chat Moss. Arguments for and against the use of locomotives raged within the Liverpool and Manchester Railway Company, and although the Stockton and Darlington Railway adequately proved that locomotives could be used, many people still believed that the steam locomotive was not the ideal source of power for railways.



On the right: George Stephenson, the famous locomotive engineer. On the left: Richard Trevithick, father of the locomotive. (Crown Copyright, Science Museum.)

The 'Lion' locomotive at Dunchurch near Rugby. This is a recent shot of this ancient locomotive which was featured in an ATV Midlands television show.



The historic 'Rocket' locomotive which was built by George and Robert Stephenson and which became a legend after winning the Rainhill Trials.

The Rainhill Trials

Stephenson persisted in his belief that the steam locomotive was the power unit of the future and eventually a locomotive trial was arranged at Rainhill over part of the Liverpool-Manchester Railway route. The locomotive that eventually won the Rainhill Trials was built by George Stephenson and his son, Robert. 'Sans Pareil', built by Timothy Hackworth, might well have won but for an untimely breakdown. The locomotive that did win the trials—'Rocket'—has, of course, become a legend and there is no need for me to enlarge on its history.

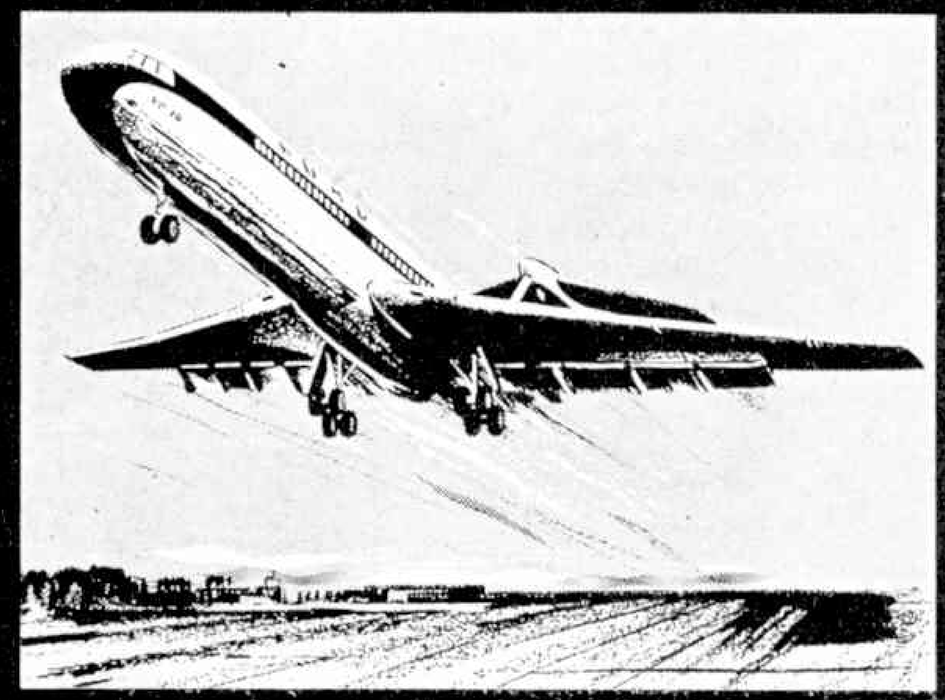
The result of the Rainhill Trials persuaded the directors of the Liverpool and Manchester Railway Company to adopt steam locomotive power for their line, which opened in 1830.

This opened up one of the greatest periods of industrial enterprise ever known in Britain. As production spread and railways developed in keeping with the need to transport both goods and people, permanent ways were improved to accept constantly-increasing loads and the steam locomotive grew in size and power. Within 40 years, a great network of railways had spread to nearly every corner of the British Isles—the forerunner of the present streamlined system which serves our island. **—Michael Rickett**

well! WHAT D'YOU KNOW...

NO SPARKS ALLOWED

Static electricity is often a cause of wonder or amusement. You've probably heard it 'crackle' when combing your hair, or seen tiny sparks when pulling off a nylon garment. But sometimes it is dangerous. For example, in hospital operating theatres the sparks could cause anaesthetising equipment to expiode. So surgeons and nurses must wear special Dunlop anti-static footwear which allows static charges to escape to earth.



SNAPPY LANDING

When the Vickers VC.10 touches down at 117½ knots, or 135 m.p.h. each of its 8 main wheels carries a load of 10 tons and the giant airliner can be brought to a halt in 15 seconds. These facts show how important the wheels, tyres and brakes are in operating big modern jets. No wonder most of them, including the V.C.10, are fitted with Dunlop as original equipment.

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STEERING HEAD OVERHAUL

IF you find that your steering judders when you apply your brakes, or that your handlebars are stiff to turn, then your steering needs immediate attention. Balance, braking and therefore safety, all depend on good steering and if you don't correct steering faults as soon as they occur, the result could be a nasty accident!

If you think your steering needs overhauling, the best plan is first to dismantle the bearings to discover which new parts are needed. It is also useful to be able to take the old parts along to the cycle shop in order to buy exact replacements. This is particularly important with the lightweight frame. There are two sizes of drive-fit races used, depending on the thickness of the head tubing. The difference between the two is only ten thousandths of an inch but you *must* fit the right size.

With the roadster type machine, fitted with the headclip type of handlebar clamp, the races merely fit into the belled ends of the head tube and do not have to be driven in. But the dismantling and renewal procedure for all types of steering head follows the same basic rules.

With a lightweight machine, of the type shown in the photographs, it is best to buy a complete replacement headset and ball bearings. With the roadster type is it possible to replace odd parts which are worn.

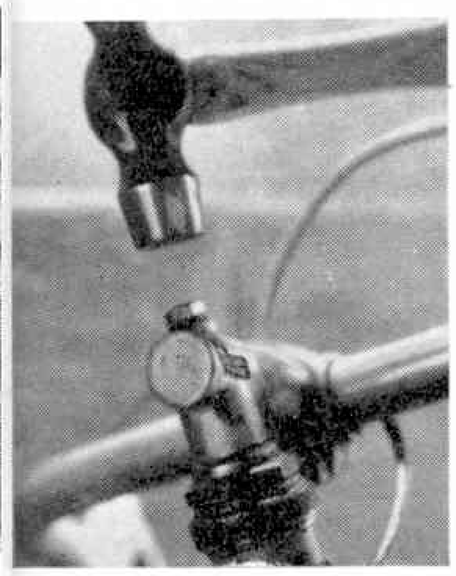
Why does the head bearing wear out and need replacement? Usually because it has been neglected. Lubrication is all-important and if there are no oil or grease nipples fitted, it is a good plan to loosen the top race, lay the machine down and pour oil direct into the bearings.

Correct adjustment is also vital. If the bearings are too tight, the balls will be ground down into the races and rapid wear will result. If they are too loose, the head will judder every time the front brake is applied and the hammering movement between the balls and the track will result in serious damage. So, if you keep the races oiled and properly adjusted, they will last a long time.

Now, armed with the new parts you will need, you can do the job of overhauling the steering head quite easily by following the photographs on this page.

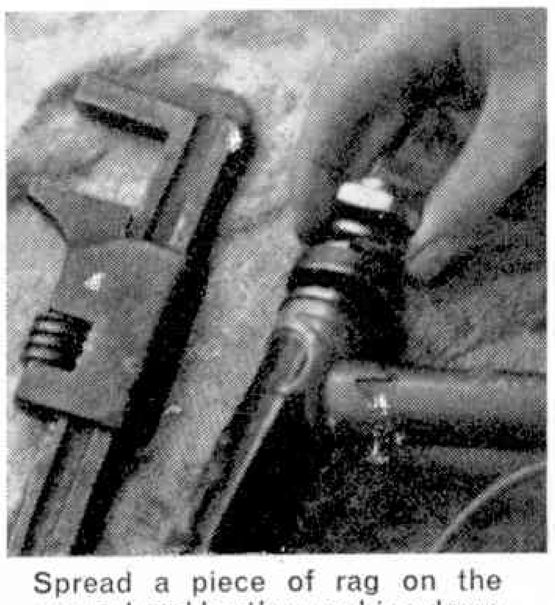
Remember, never put back damaged parts—always fit new ones. And damage in ball races can be minute, but still serious. When driving on new races, never hit them directly with the hammer. If you are putting the forks in the vice, be very careful not to grip them too hard and always use wood blocks to protect them. Always use plenty of grease to hold the balls in place, never try to put in more balls than the race will hold and always make sure you use the right size ball bearings.

The final adjustment is also important. The handlebars should be completely free to swing but there should be no appreciable "shake" in the races. When adjusted, lock the top nut securely.

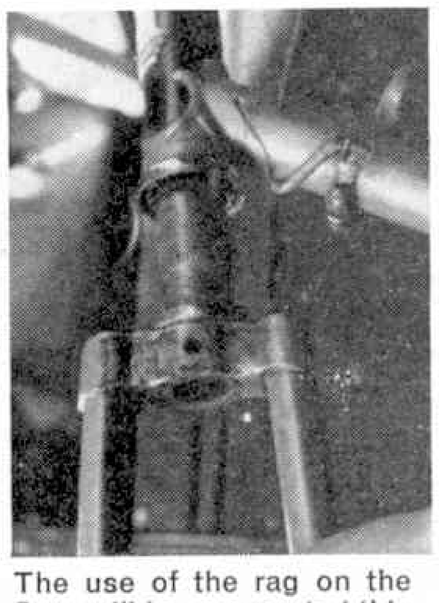


To dismantle the steering head, start by unscrewing the expander bolt a couple of turns and tapping with a hammer to release expander cone. Lift out handlebars.

All the parts which are in the way must be taken off. Apart from the handlebars, the front brake, mudguard and front wheel should all be removed.



Spread a piece of rag on the ground and lay the machine down with the steering head over the rag. Use a large, adjustable spanner to remove locking nut, spacer and top half of upper race.



The use of the rag on the floor will be apparent at this stage—all the ball bearings will fall on to it. Collect them together and then pull out the fork.

Clean up all the parts and inspect them for wear. If the lower races are worn, they must be renewed. Use a copper drift to tap them out.

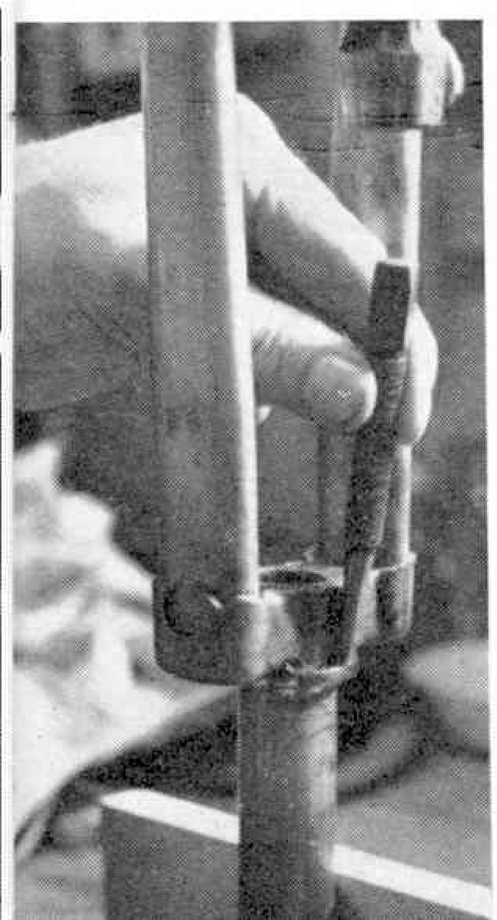
The easiest way to get the lower race off the fork crown is to clamp the forks gently between pieces of wood in the vice, upside down. Tap the race free with a hammer and punch.

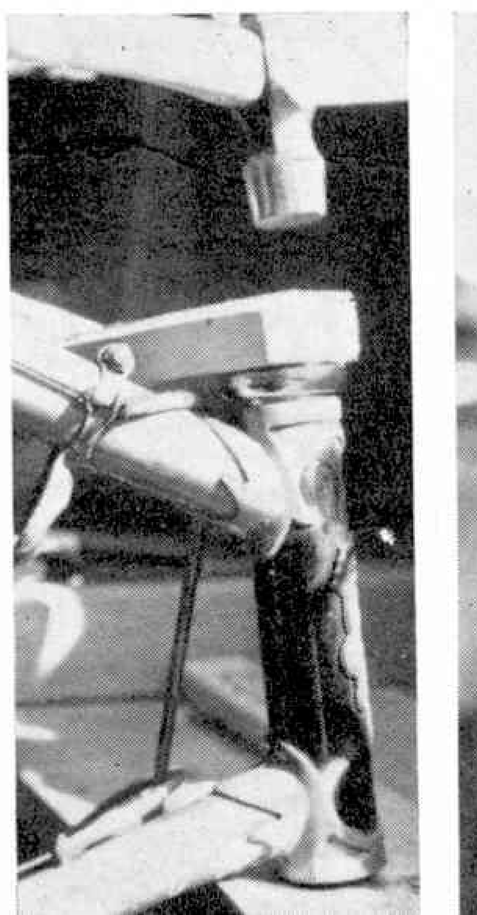
The new races must be protected from damage when they are driven into position. Use a piece of wood between hammer head and cup. Tap gently on all sides of the race until evenly seated all round.

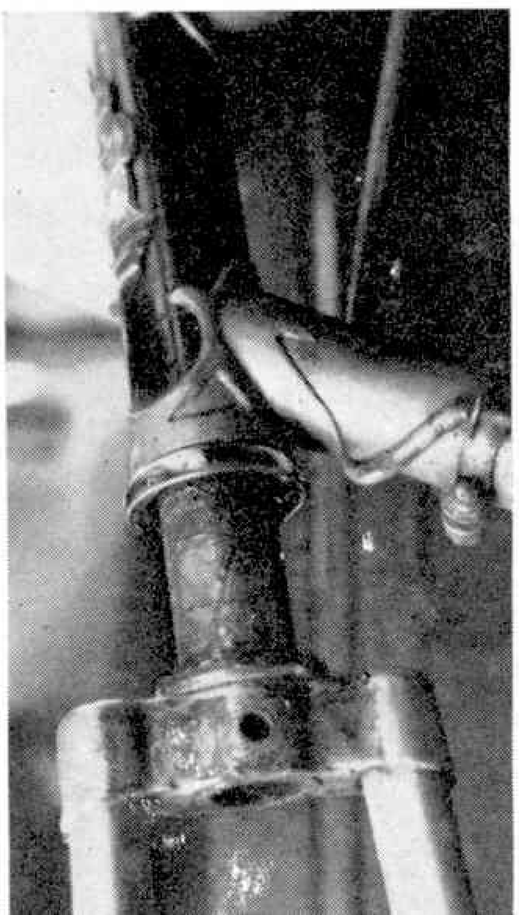
The same technique is used to seat the new lower race on the fork crown. Use either soft copper or wood drift. Fill the race with grease and set the balls round before replacing the forks back into the steering head on the frame.

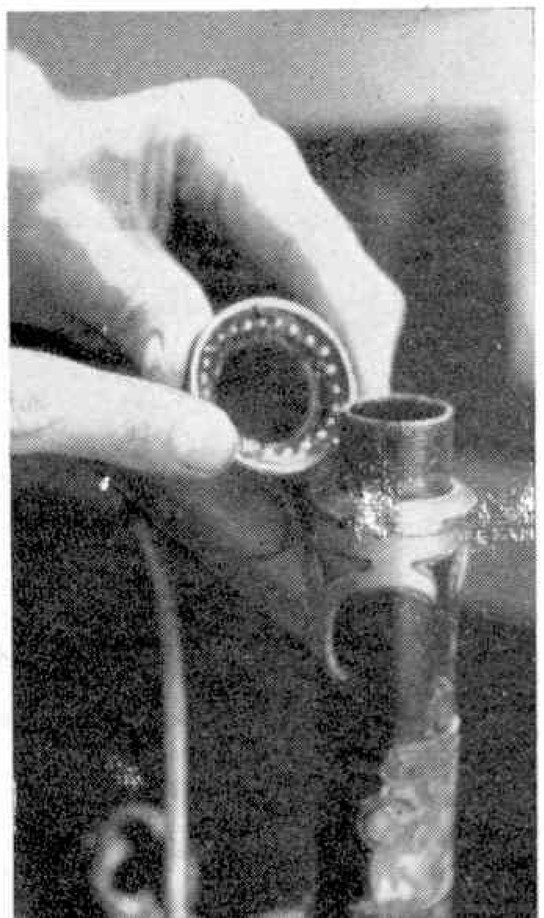
The remaining loose half of the top race is filled with grease and the ball bearings set in it, using plenty of grease to hold them firm. This can then be screwed down on to the lower half. Work smoothly to avoid disturbing the balls.

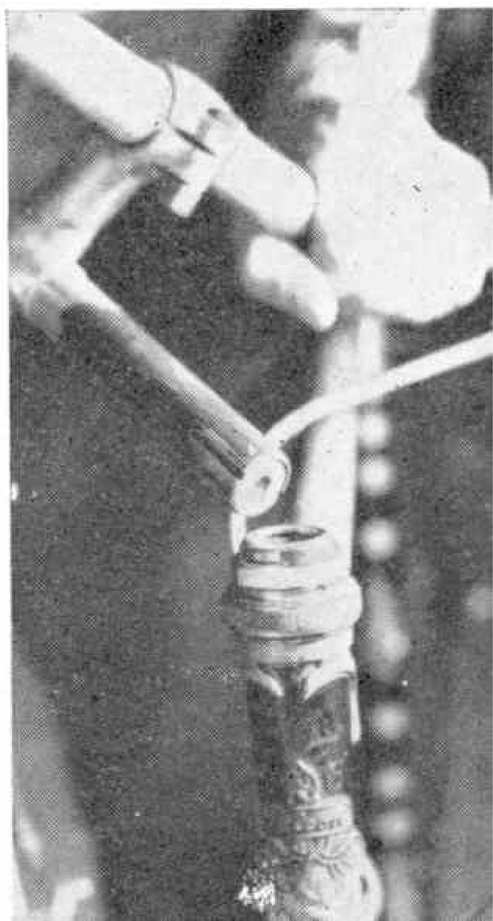
The spacer and locking nut are replaced next. To replace the handlebars, make sure expander bolt and cone are engaged but loose. Grease before re-fitting.











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by **Paul Dong**

Fast Film & Flash

IF you have put your camera away for the winter, bring it out again, at least to record the Christmas merrymaking.

With high-speed films, such as Ilford H.P.S. and Kodak Royal-X Pan, you can take pictures by ordinary room lighting without flash or floodlights, even with a box camera. The average speed rating of these films is 1250 A.S.A., but with extended development, you can use three or four times these speeds. But I cannot emphasise too strongly the fact that you must use the developers recommended for these films as others may ruin your results completely.

These ultra high-speed films are slightly more grainy than the slower H.P.3 or Tri-X, but even with forced development for maximum speed you can get good 10×8 prints from 2¼ inch square negatives. If you are trying these films for the first time, follow the makers instructions and keep naked lights out of the picture area if possible to avoid flare. But the candles on the cake can look very effective with a halo round them.

If your camera has a lens of f3·5 or 4·5 you can take pictures using only the light from a match. It is almost possible to take the proverbial black cat in the coal cellar in the dark. To get the best out of these films it is best to do your own processing. If you cannot do this or find a commercial processor who will carry out your instructions exactly, and a great many won't, it is best to forget high-speed films and use flash.

Flash comes in three forms: Powder, which is seldom used these days and can be dangerous if not handled with great care, bulbs and electronic. The electronic apparatus is the more costly (£13 upwards) but is the cheaper to run as you can take 10,000 or more pictures with one tube. My own has been in use professionally for seven years, the only replacements needed being batteries.

Flashbulbs, on the other hand, cost from 8d. to 2s. 6d. each, depending on size and they can only be used once. Fortunately, the smaller bulbs are adequate for most purposes, although if you take a lot of indoor pictures, they can soon add up to the cost of electronic equipment.

Your camera should be synchronised for flash, which means that it has a small switch built in to the shutter to fire the bulb.

Flash Exposure?

What exposure to use? It tells you on the box the bulbs come in, each different combination of film and bulb is given a guide number. You merely divide the distance from flash to subject into this number and the result is the correct aperture to use. For example, if the guide number is 180 and the subject 10 feet from the flash your aperture is f18.

Most cameras are made with two types of synchronisation and a little switch is provided to select the one you want either X or M. If your camera has no switch you probably have only one setting, the instruction book will tell you what it is.

The M setting is for use with flashbulbs, whilst the X is for electronic. The difference is that while electronic flash is virtually instantaneous, the flashbulb takes about 1/50th of a second or less to fire. If you look at the bulb you will see two small wires coming from the cap which carry the electricity to a piece of fine fuse wire which joins them at the top. The current makes the fuse wire glow and this sets alight the blobs of paste at each end of the fuse. This in turn sets light to the fine magnesium wire which fills the bulb.

The bulb is filled with oxygen, as the materials inside don't burn quickly in air, so be careful not to break the bulb. A small blue safety spot can be seen on the little insulator which steadies the wires inside, or sometimes painted in the top of the bulb. If this spot turns red it is a sign that air has got into the bulb and it should not be used. If by some miracle it did fire, it would shatter sending broken glass in all directions. In order to minimise this danger, the bulbs are coated with shellac, but be wise and use a shield over your flashgun, and never fire it close to anybody's face.

As you can see, it takes a little time for the bulb to burn up to full brightness, so the M setting makes electrical contact before the shutter starts to open and you catch the peak of the bulb. If you used electronic on this setting, your flash would be over before the shutter is fully open.

The X setting, therefore, makes contact when the shutter is fully open. With a bulb, of course, the shutter would be partially closed before you have a bright flash.

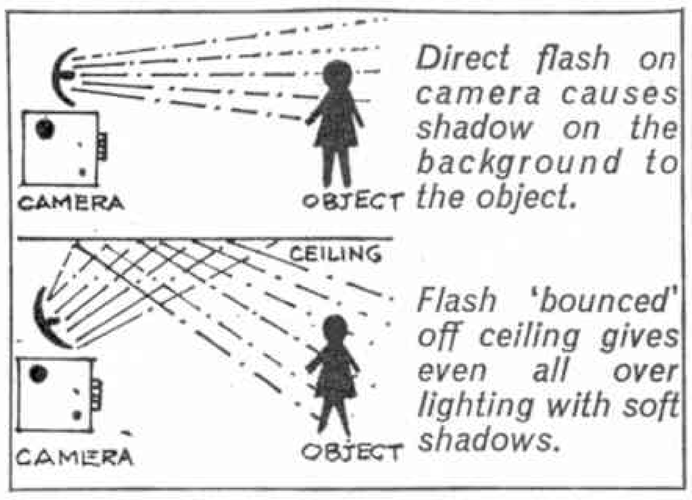
1/25th is the fastest speed that can be used with bulbs on X setting, but they can be used up to 1/100th on M. Electronic can only be used on X.

Cameras with a focal plane shutter usually need a special type of bulb which gives a steady flash while the shutter runs across the film. These are known as long peak bulbs.

If your camera is not synchronised, you can still take flash pictures, but you have to use the open flash method. To do this you must place the camera on a solid support, such as tripod or table. You then open the shutter, fire the bulb, and close the shutter again. Obviously your subject must keep reasonably still, and the room not too brightly lit otherwise there will be a lot of spare light to effect the film before and after the flash.

Directing Flash

Under normal circumstances a lot of light, whether from the sun or artificial sources, is reflected from various objects into areas that are shaded from the main light source. So we can see detail in the shadows. When we use flash, however,



Direct flash on camera causes shadow on the background to the object.

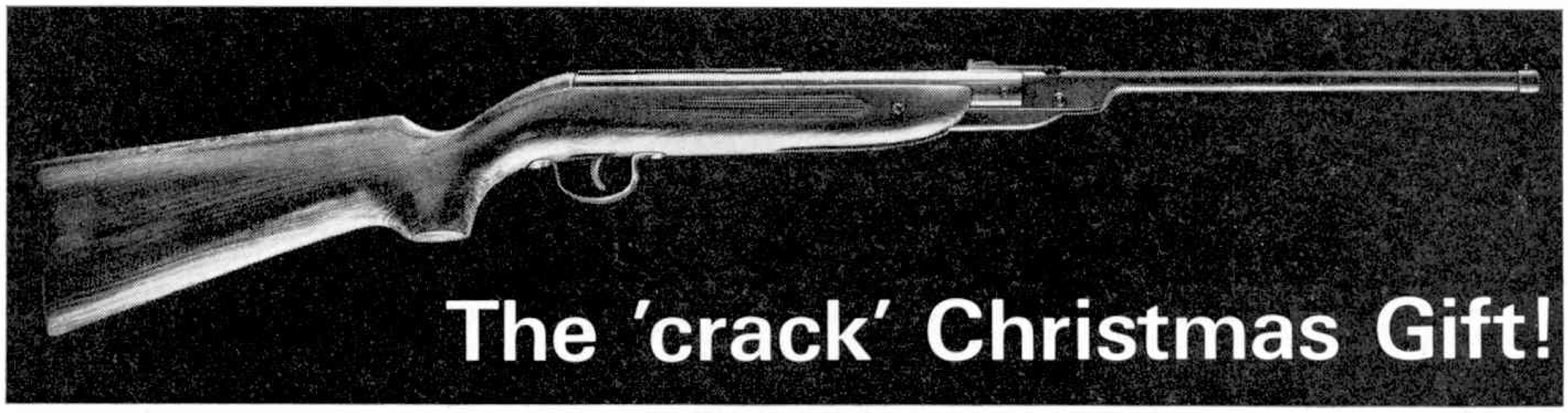
Flash 'bounced' off ceiling gives even all over lighting with soft shadows.

very little light is thrown around in this way and we get really hard dark shadows if we are not careful. This can be avoided by either using additional lamps to fill in the shadows, using white objects as reflectors or by bouncing the flash from the ceiling.

This is done by pointing the flash up to the ceiling midway between the flashgun and the subject so that only even reflected light is used for the picture. If you intend doing this you must open your aperture one stop to allow for the light lost. If you are in a large hall or in the open air, you cannot bounce it as the light would have no strength if it did come back again. Flash used in the open should be pointed straight at the subject and the aperture opened two stops to allow for the lack of reflected light.

Your subject should be fairly evenly lit. Harsh sunlight through a window falling on the neck and shoulders caused extreme over exposure in this area. Note the light reflected by the newspaper on the front of the face.

Two ways of achieving this effect; using two flash guns. One as the main light above the camera and the other slightly to one side. Or by one flash and a piece of white card as a reflector.



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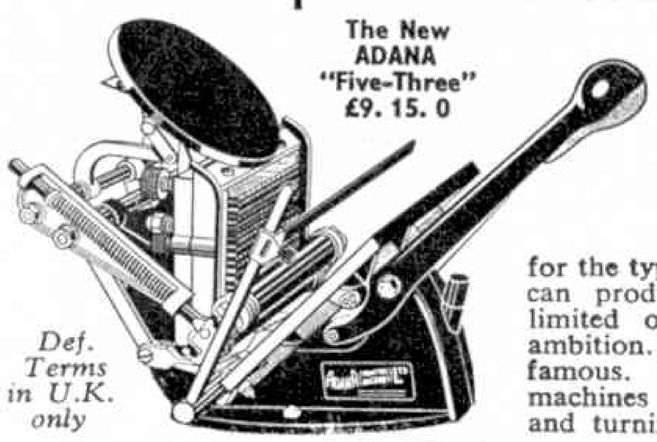

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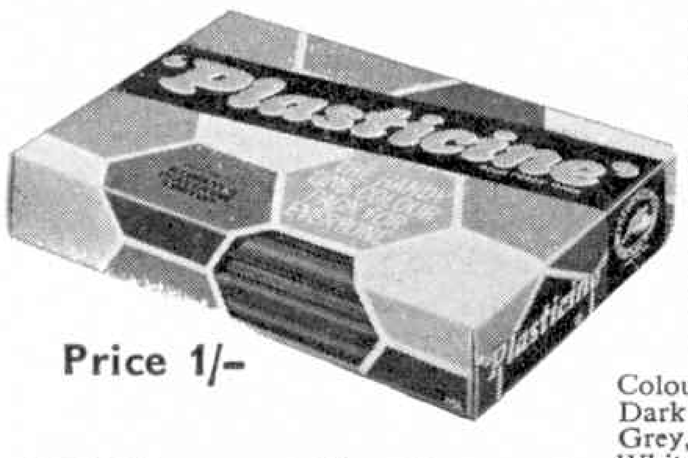

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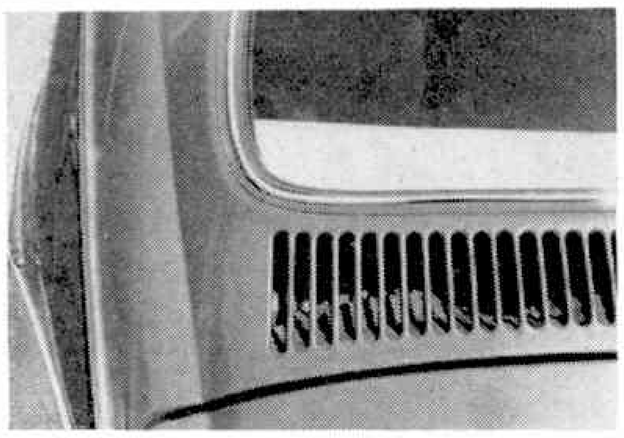
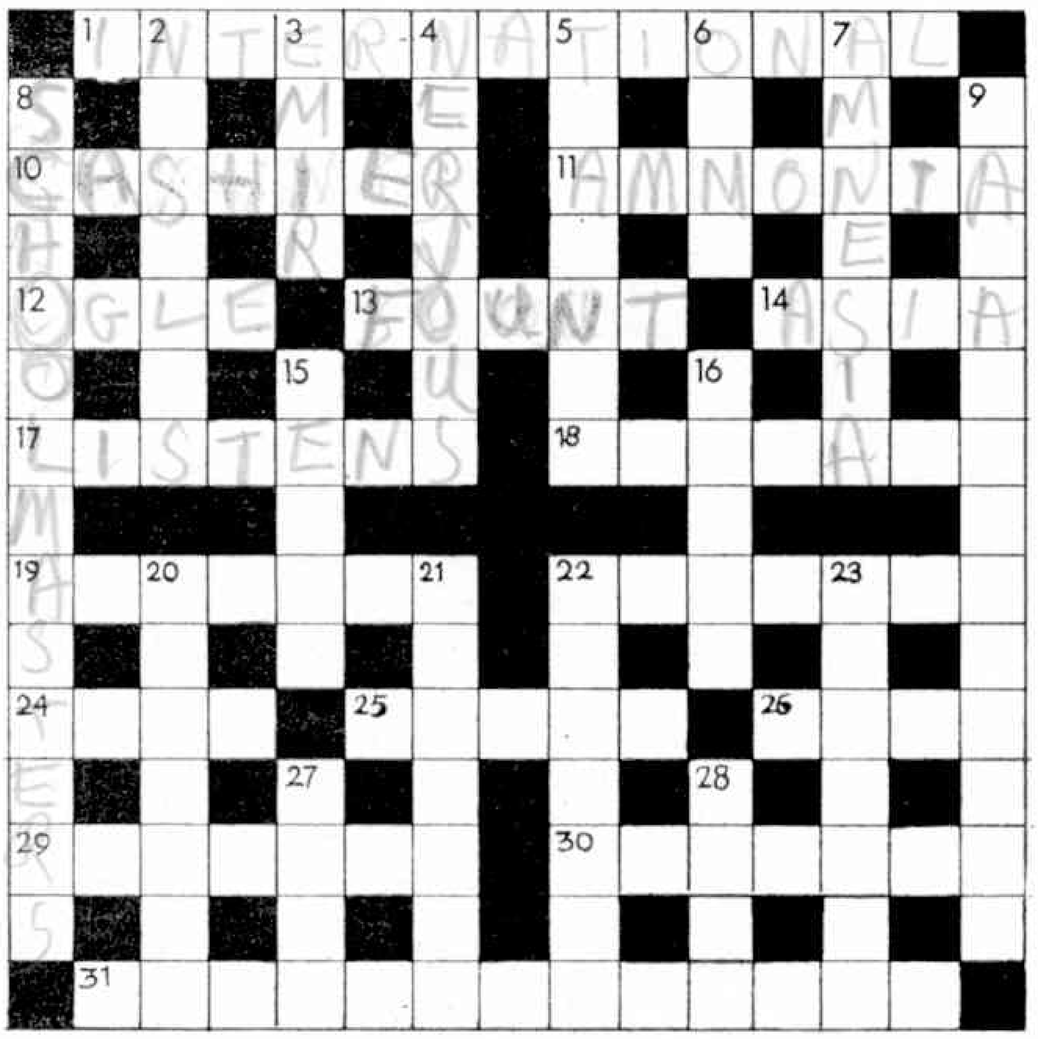
Turn to page 53 for answers to the puzzles on this page

Puzzle Page



CAR QUIZ No. 3

Designed as the people's car in a foreign country, this vehicle is powered by a four-cylinder air-cooled engine. What is its name and where is it made?



Across

1. Concerning all nations (13).
10. Found in a bank (7).
11. Pungently cleans (7).
12. Stare at (4).
13. Source (5).
14. A continent (4).
17. One does it on the 'phone (7).
18. Break up (7).
19. There isn't one in this puzzle (7).
22. Go before (7).
24. A yarn (4).
25. Entirely (5).
26. Going hunting? (4).
29. Reigning (7).
30. Looks pretty at the window (7).
31. We should try to behave thus (13).

Down

2. You'd find a bird here and a French tail (7).
3. Eastern title (4).
4. Timid (7).
5. One has to be this to do a good job (7).
6. A letter from the Queen (4).
7. We all forget sometimes (7).
8. Instructors (13).
9. You'd have been in disgrace if they'd done this to you years ago (3,3,7).
15. A vital part (5).
16. Beasts of burden (5).
20. Play briskly (7).
21. On horseback (7).
22. A good old pow-wow (7).
23. Going on for ever (7).
27. Girl from Lancashire (4).
28. Sometimes done by moonlight (4).

TRICKY TEASERS

Did you know that you can tell a person's age from the size of their shoes? Amazing? Yes, and here is the way to do it: ask your friend to write down, without letting you see it, the size of his shoes (no half-sizes, please!) Then tell him to double that figure; add five; multiply by fifty. Then add 1,714 and having done that, take away the year of his birth.

Ask him the total he has arrived at. The first figure in his total will be the size of his shoes, and the last two figures will be his age.

If, therefore, his total is 411, his shoes size is four, and his age is eleven. (If your friend is less than ten years old, the last figure will be his age.)

● ● ● ● ●

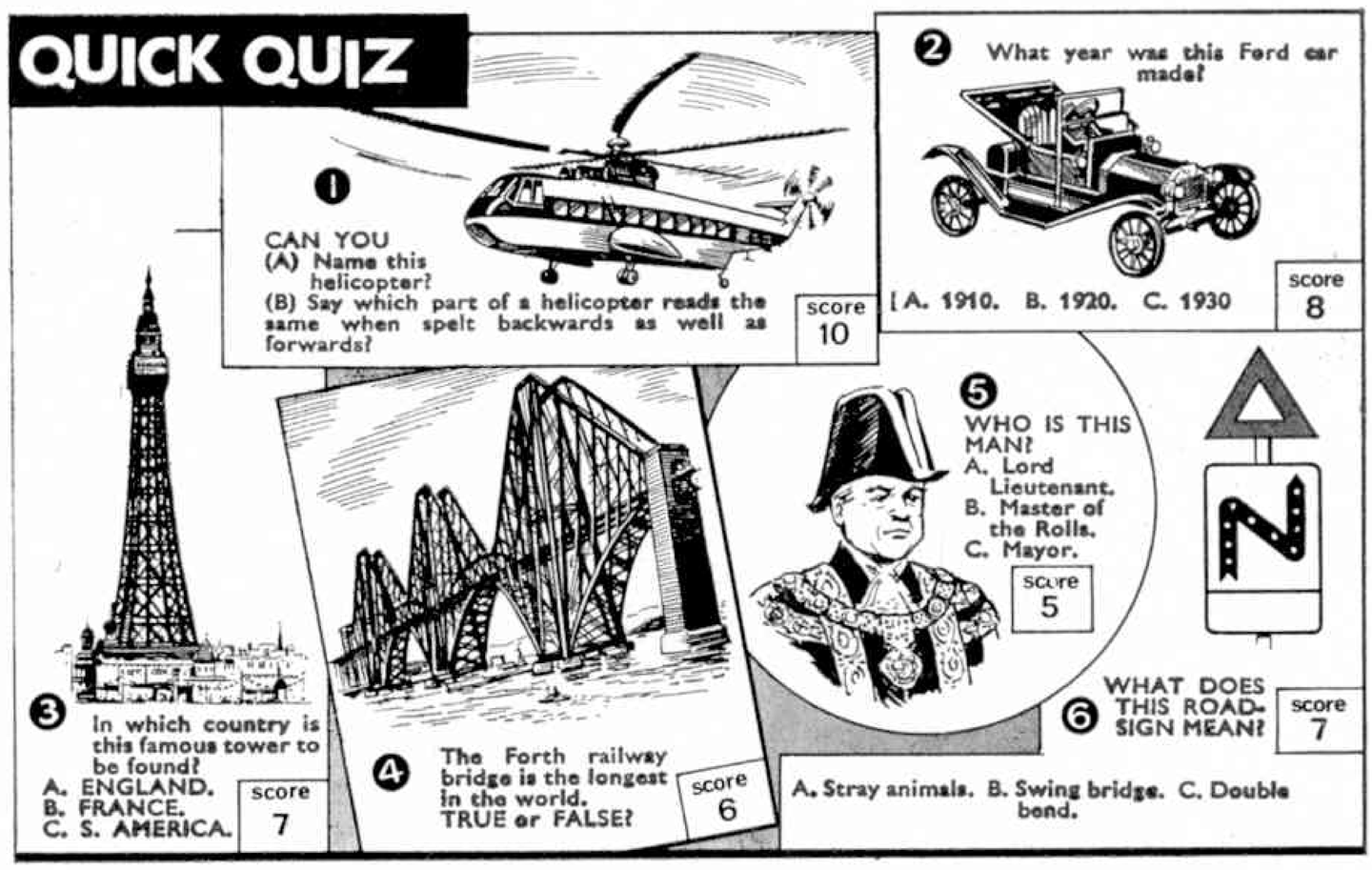
Here's another to baffle your chum. Ask him to write down, without you seeing, three different numbers—each one under ten. Then tell him to reverse it and take away the lesser from the greater. If he tells you the first figure in the result you amaze him by telling him the other two figures!

If, for example, he first wrote down 256, then reversed it (652) he takes one from the other and gets the result: 396. When he reveals the first figure to you (3) you are able to tell him the remaining two. How to do it? Well, the middle number will *always* be 9. You know this—so when he tells you the first figure you deduct this from 9 and that will give you the last figure.

● ● ● ● ●

Twins were born in March, yet their birthdays were in December. One was 20, the other 22. One grew up and married his mother. Impossible? See the answer, printed on page 53.

QUICK QUIZ



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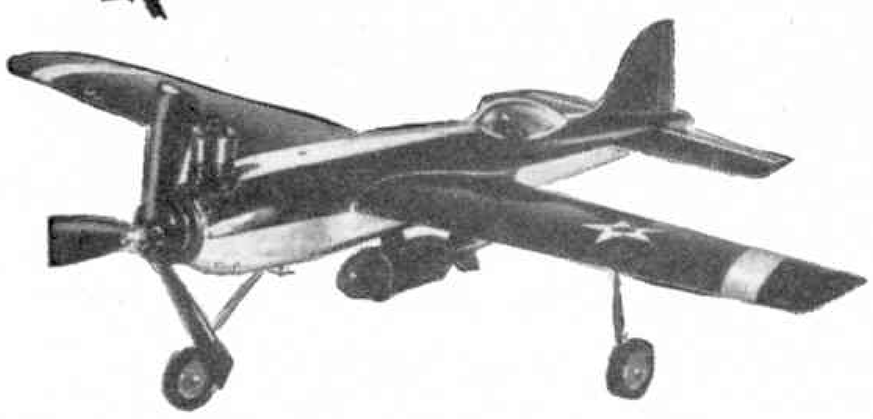
MODELS DROP BOMBS, SHOOT ROCKETS OR EJECT PILOTS WHILE IN FLIGHT!



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Ideal plane for beginner or expert. Drops bomb while flying. **Features** aluminium-metallised fuselage. Rotomatic starter ·049 **engine.** Tri-cycle landing gear. Comes complete with control **lines and handle.**

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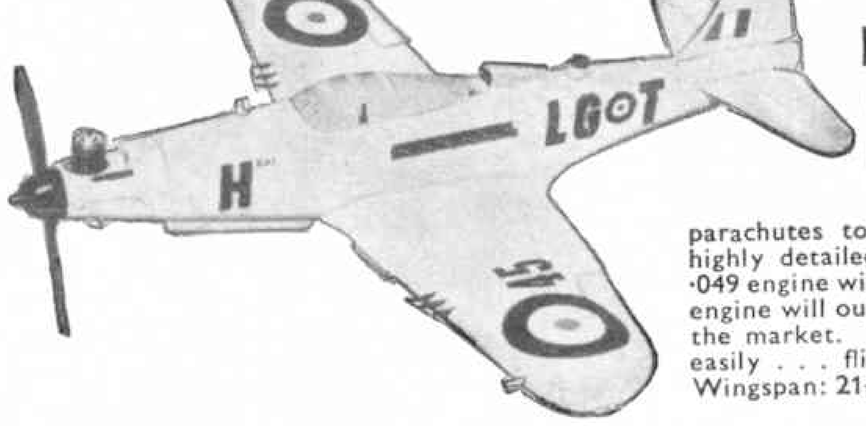

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From Britain's World War II air battles comes the R.A.F. DAY FIGHTER. Features the ultimate in action . . . a pilot you eject from cockpit while flying. He then parachutes to earth!. This all-white fighter is highly detailed. Powered by all-new Hot Shot ·049 engine with patented Rotomatic starter. This engine will out perform any other ready-to-fly on the market. Truly a beginner's ship . . . starts easily . . . flies well . . . has plenty of action. Wingspan: 21½"

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A-24 ATTACK BOMBER

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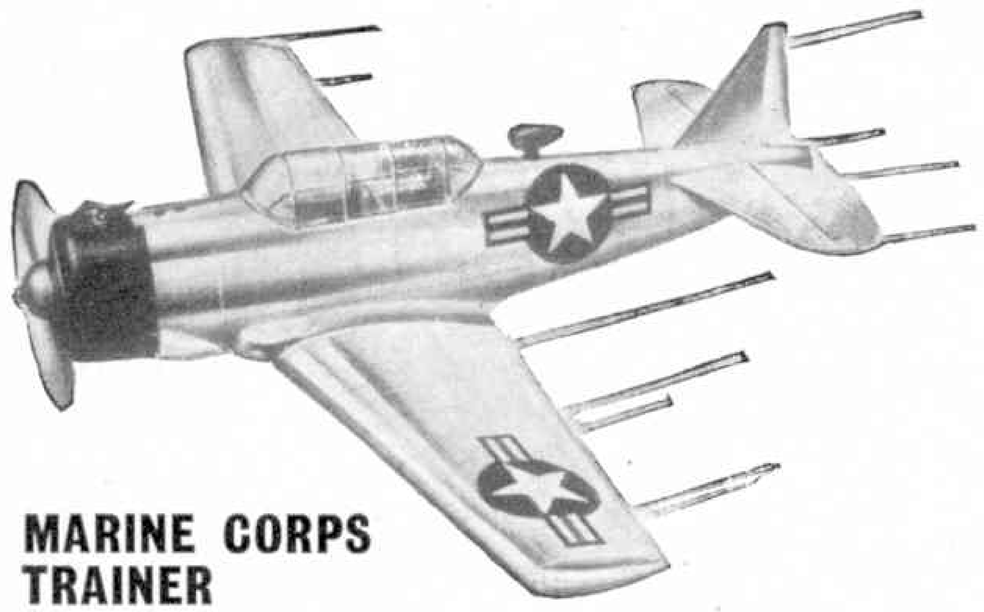
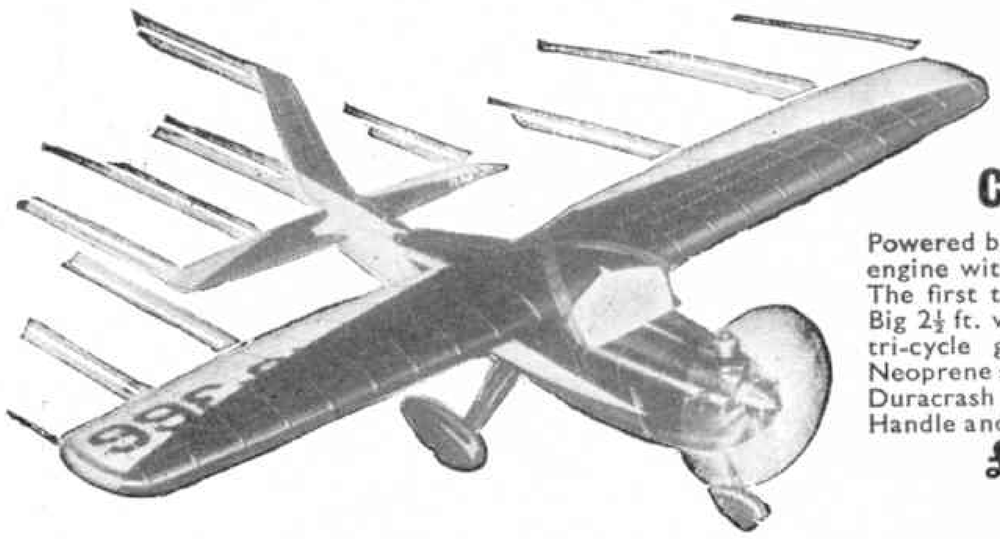


MARINE CORPS TRAINER

The Marine Corps Trainer is rugged and tough. Right in size, design, engine and price. Powered by all-new Hot Shot ·049 engine with patented Rotomatic starter. Detailed cockpit with engraved instrument panel. Tinted blue canopy. Nylon prop. Decals. Wingspan: 21".

£5-6-8



CESSNA

Powered by new Hot Shot ·049 engine with 25% more thrust. The first true beginner's ship. Big 2½ ft. wingspan. Foolproof tri-cycle gear. Big elevator. Neoprene strap-mounted wing. Duracrash plastic airframe. Handle and lines included.

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WEN-MAC FLYING WING

Wings take over where the other 'ready-to flys' leave off. They're designed for flying fast-action stunting. Each is powered by the all-new super thrust HOT SHOT ·049 automatic starter engine with stunt tank. The models have rugged Duraflex plastic fuselage and vacuum-formed ribbed wings. Nylon prop. Wingspan 24½".

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Pilot your own World War 2 Fighter!

Ready-to-fly

KEILKRAFT HURRICANE

A fine realistic model moulded in high impact plastic. Features clear plastic canopy, exhaust manifolds, four cannons, radio aerial and authentic insignia. Fitted with the very successful WEN-MAC ·049 glow-plug motor on nylon mounting and with 3 bladed nylon propeller.

Complete in attractive carton with control line handle, Terylene lines, glow-plug clip, lead, battery plug and full instructions.

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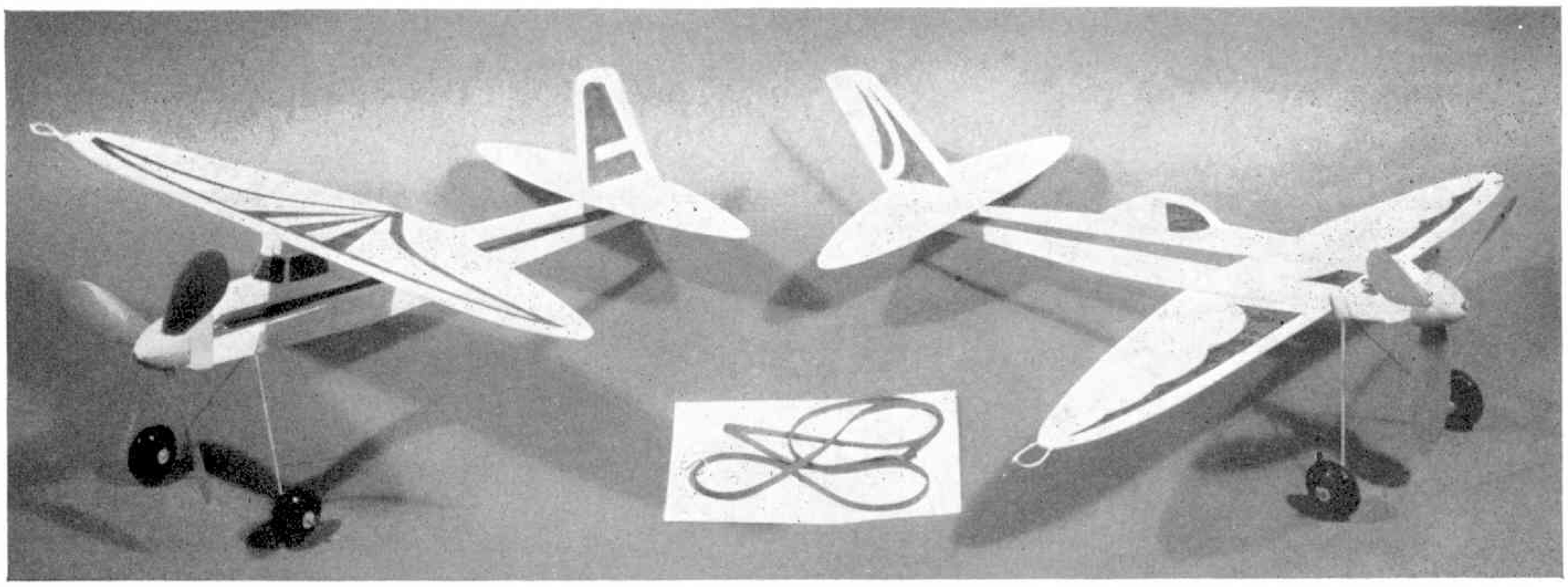


'Winghi and 'Winglo the two indoor flying models decorated and ready to fly. These easy-to-build models provide hours of entertainment flying round a pole

FLYING INDOORS

Fly these sleek speedsters indoors! Have flying fun and thrills—with no weather worries.

THE gales and storms of winter need not interfere with your enjoyment of flying model aeroplanes. This month, we introduce you to indoor Round-the-Pole or R.T.P. flying. To get you off to a 'flying' start on this exciting branch of aero-modelling, we are featuring full-size plans for not one—but two, small, indoor flying speedsters—one a high and the other a low wing model. Choose the one you prefer—'Winghi' or 'Winglo' or, if you are really enthusiastic, build them both.

These lightweight models, exclusive to Meccano Magazine, fly indoors on a thread line attached to a centre pole. The line length can be anything from four to eight feet, depending on how much space you have got. Fly anywhere indoors—your clubroom, schoolroom, garage, or a room in your own home. Introduce indoor model flying to your club, group or society. Once they've got the idea, all your friends will want to fly 'Round-the-Pole' this winter! At the end of this article, we will suggest some exciting competitions you can have with these simple-to-build, fast flying model aircraft.

You will see from the plan that both models use identical wings, tailplane, undercarriage and propeller assemblies. This makes for speedy building if you decide to build both models. Follow the 'easi-build' sketches and trace the parts on to tracing paper, transfer to sheet balsa and cut out. Note the nose slot takes a brass nose bush (18 s.w.g.). This is obtainable from your model shop. The wire undercarriage and skid are held in position by small pieces of linen tape or silk—cement with three or four coats of adhesive. Lightly sandpaper the edges of the wing to a rounded section. Assemble fin, tailplane and wing as shown. Note particularly the slits cut in the trailing edges of the fin and tailplane. These help trimming the model later. Pieces 2 reinforce the wing-fuselage joint.

The piece of tape or silk cemented under the right-hand wing tip (model viewed from the rear) reinforces the wing tip where the R.T.P. loop is tied. Add this loop where shown.

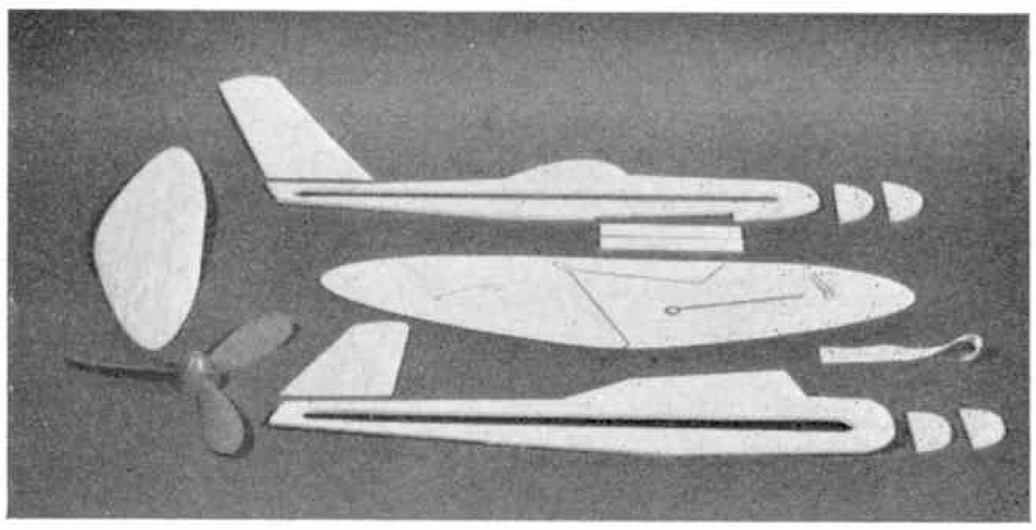
K.K. 3 or 2 blade plastic propellers cost 11d. each and you may use either. Decorate with coloured ball pens but do not dope.

Power for test flying is 20 inches of $\frac{1}{8}$ inch strip rubber. Thread the rubber strip around the rear anchor wire (part of tail-skid assembly). Tie the ends of the rubber strip *very tightly*. Slip front of loop over drive shaft hook. Lubricate the rubber generously with rubber lubricant (4d. tube).

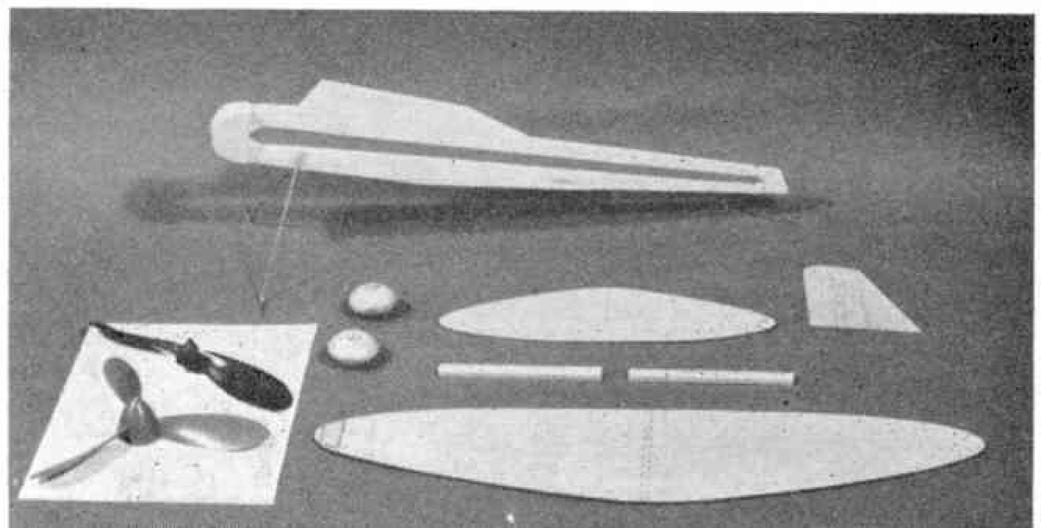
Now balance your model carefully. This is very important. Suspend your model from the point shown on the plan marked C.G. (balance point). It should hang level. A tiny amount of plasticine added to nose or tail may be necessary to achieve correct balance.

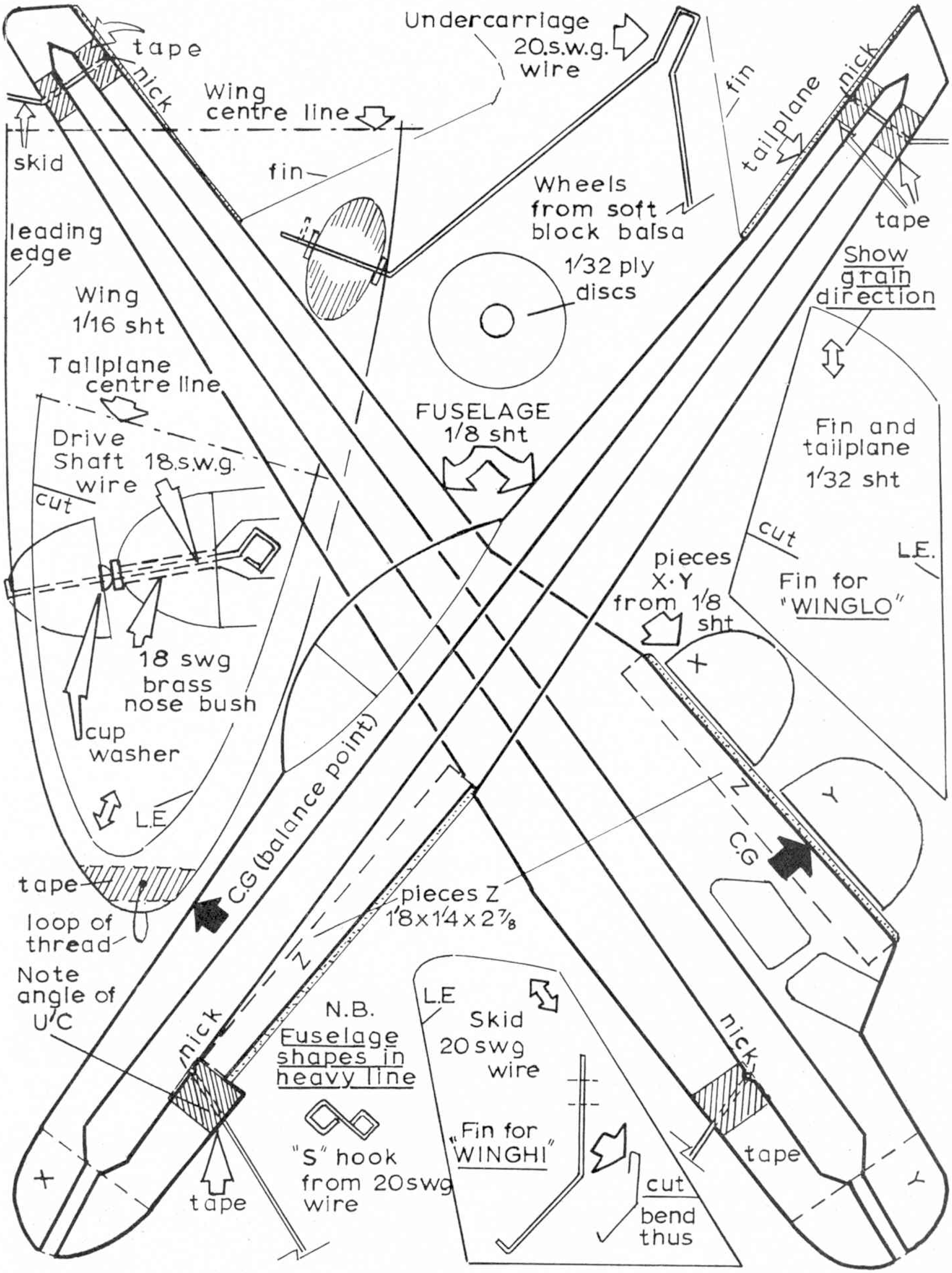
Details for making the very simple pole around which the models fly is included in the 'easi-build' sketches.

You should now almost be ready for your first test flight! Put about 150-200 turns on the rubber motor by turning the propeller clockwise, viewed from the front. Bend the rear edge of the fin about $\frac{1}{8}$ of an inch to the left (model viewed from rear), hook the model on to the line and let go. The model should take-off, climb to about the height of the pole, make



Parts for these models are few. Fuselage for 'Winghi and 'Winglo' as shown above. Constructional details of 'Winghi' are shown below. Note: 2 or 3 blade props are suitable




tape
nick
Undercarriage
20.s.w.g.
wire
Wing
centre line
fin
tailplane
nick
skid
leading
edge
Wheels
from soft
block balsa
1/32 ply
discs
tape
Show
grain
direction
Wing
1/16 sht
Tailplane
centre line
FUSELAGE
1/8 sht
Drive
Shaft 18.s.w.g.
wire
cut
Fin and
tailplane
1/32 sht
cut
L.E.
pieces
X.Y
from 1/8
sht
Fin for
"WINGLO"
18 swg
brass
nose bush
cup
washer
L.E
C.G (balance point)
Z
C.G
Y
tape
loop of
thread
pieces Z
1'8x1'4x2 7/8
Note
angle of
U/C
nick
N.B.
Fuselage
shapes in
heavy line
L.E
Skid
20 swg
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"S" hook
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"Fin for
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tape
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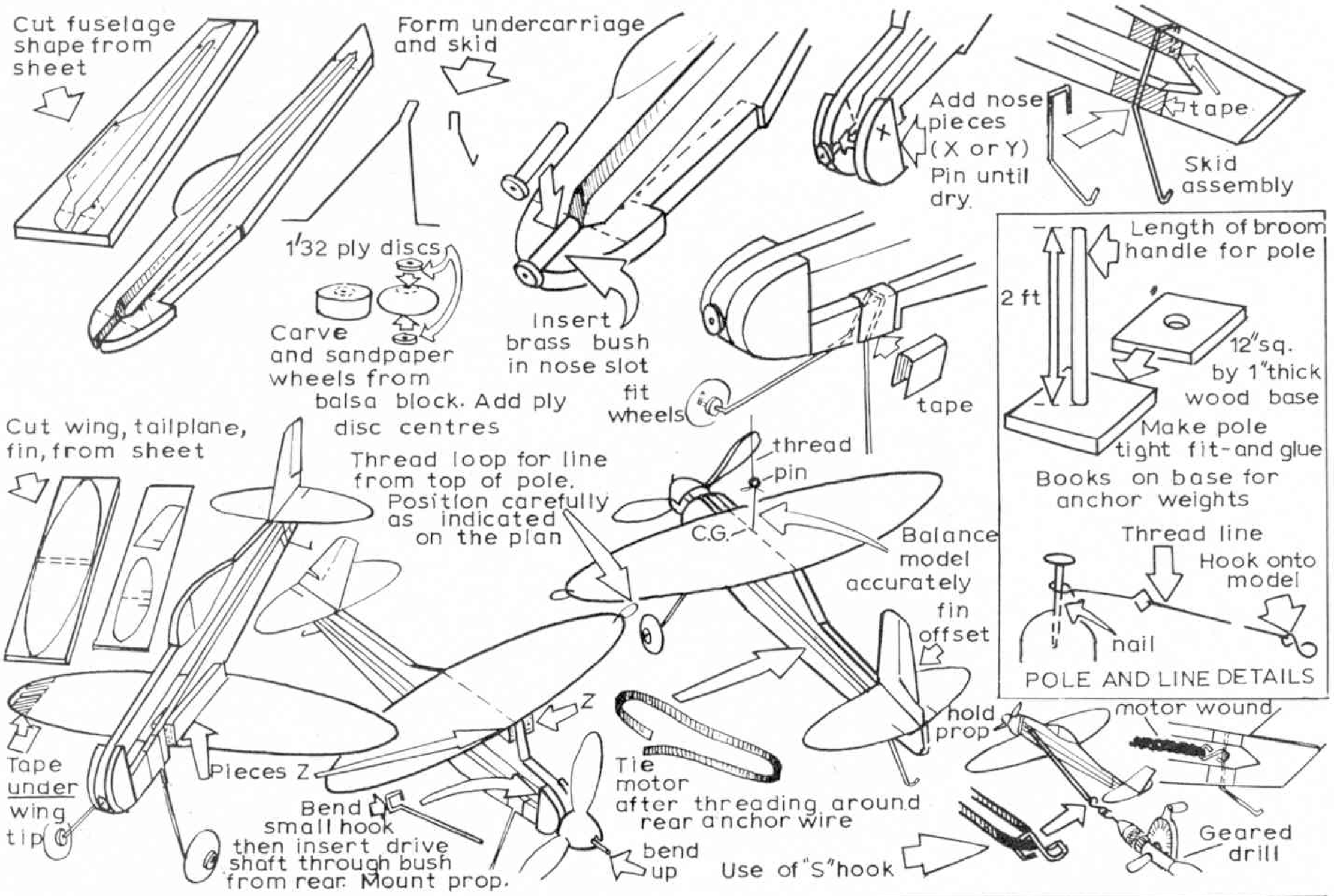
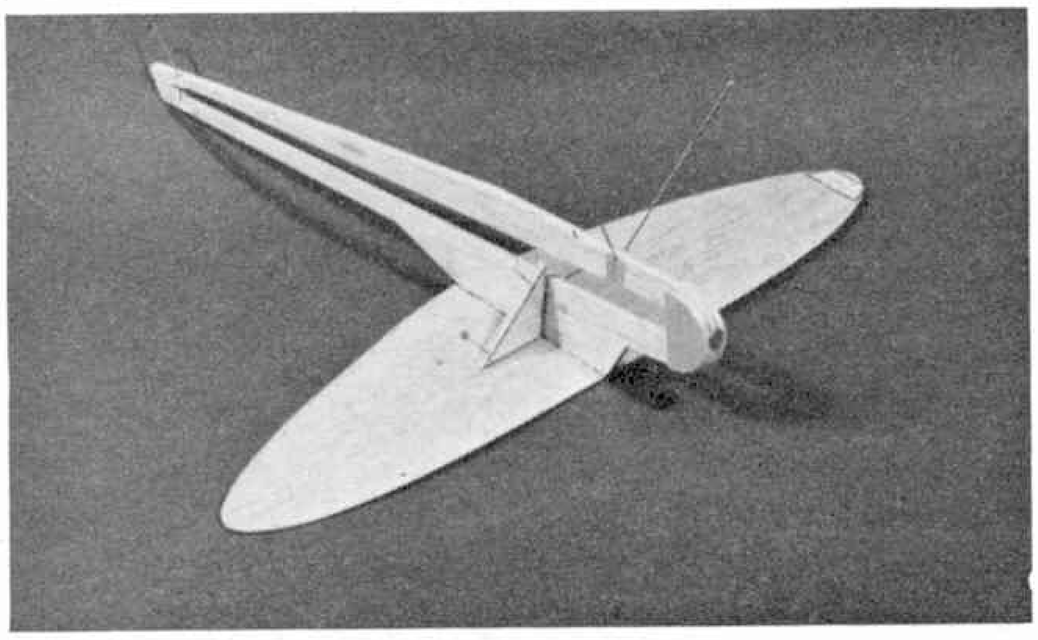


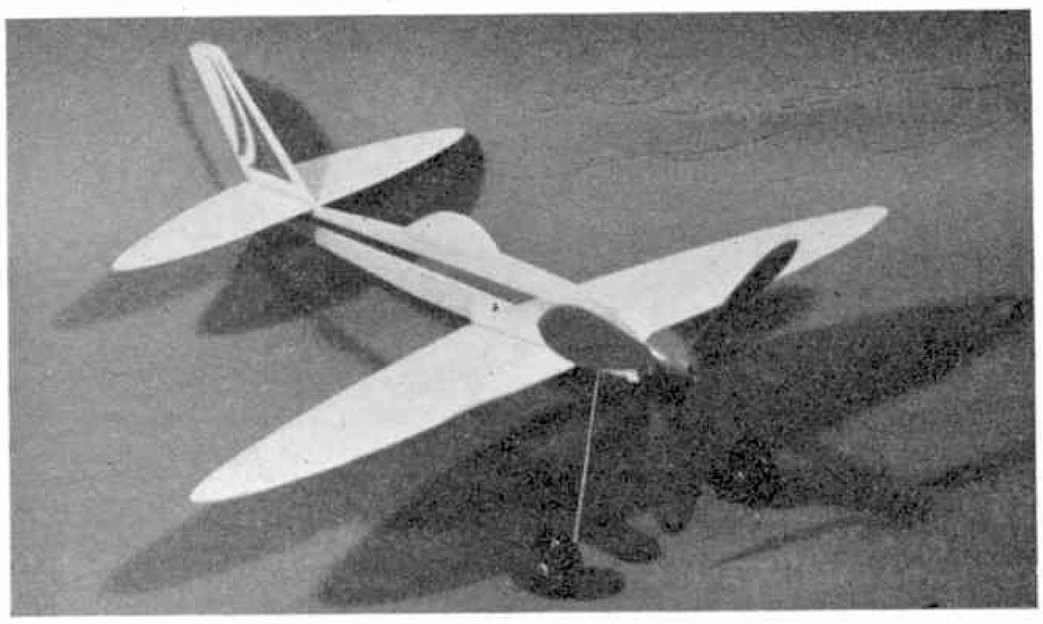
MATERIALS REQUIRED

1 sheet $\frac{1}{16}$ in. by 3 in. by 36 in. balsawood.
1 sheet $\frac{1}{32}$ in. by 3 in. by 36 in. balsawood.
1 sheet $\frac{1}{8}$ in. by 3 in. by 36 in. balsawood.
2 1 in. sq. balsawood blocks.
Small piece $\frac{1}{32}$ in. plywood.
3 in. length 20 s.w.g. wire.
3 in. length 18 s.w.g. wire.
1 18 s.w.g. brass nose bush.
1 cup washer.
Small piece of linen tape or silk.
Short length of thin thread.
36 in. $\frac{1}{8}$th strip rubber.
1 K.K. 5 in. diameter plastic propeller (3 or 2 blade).
Small tube of balsa cement.
Small tube of rubber lubricant.



Use a right-angled piece of sheet to get accurate alignment of wing to fuselage. Pin firmly until cement sets.

'Winglo' almost complete and ready to fly



two or three circuits and land. If model fails to take off, bend the rear edges of the tailplane UP about $\frac{1}{8}$ of an inch. If it climbs too steeply and falls back (stalls), add a little weight to the nose.

When trimmed, you can increase the turns to a maximum of about 350. For really longer flights, use a 16 inch loop of rubber ($\frac{1}{8}$ inch strip) and wind with a small "S" hook. After winding (maximum turns 750) this "S" hook is slipped on to the rear anchor wire. Do this carefully, remembering that these are lightweight indoor models and must be handled accordingly. Also, they will *not* fly outdoors.

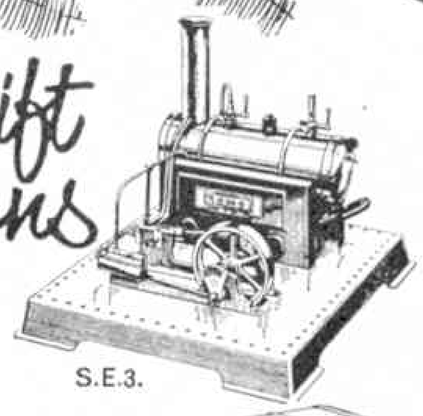
Finally, here are those exciting competition suggestions:

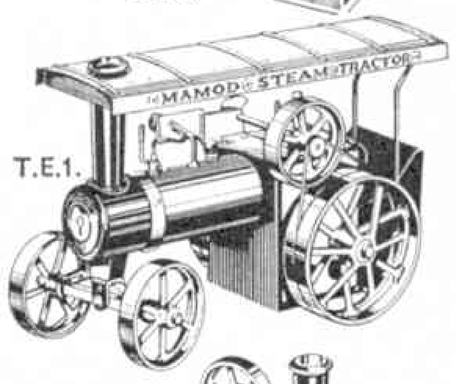
DURATION: Competitor making longest flight time wins. Each competitor allowed three flights.

SCRAMBLE: Competitor makes as many flights as possible in three minutes.

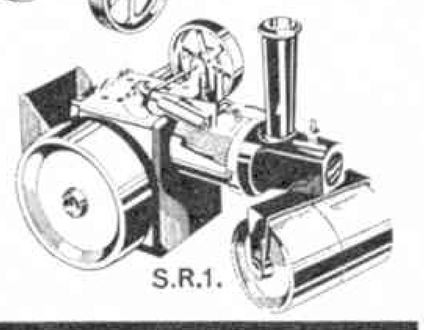
SPOT LANDING: Take off anywhere around circle. Competitor landing nearest to a line drawn from the centre to the outside of the flight circle wins. Flights of less than two circuits disqualified.

A Christmas Gift for all seasons


S.E.3.



T.E.1.


S.R.1.

Get a Mamod Steam Model for Christmas and you've got hours of fun the whole year round. These really well constructed steam models operate alone or with working models. They're absolutely safe and attractively finished in red, green and black enamel, brass and polished metal. **The new Traction Engine 105/-, Steam Roller 92/6, Stationary Engines 32/6 to 99/6.**

See them at your leading Toy and Sports Shops

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GEM NARROW-GAUGE KITS

12mm Gauge

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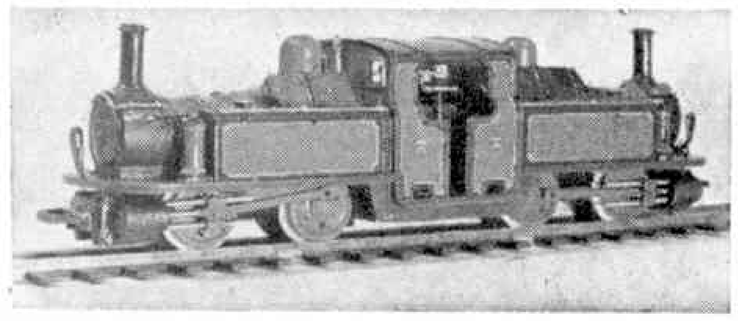
Produced in collaboration with the Festiniog Railway Company



This "double-Fairlie" forms part of the GEM range of Loco, Coach and Wagons for Narrow-Gauge modellers.

If you are interested in 00, TT, 000 or NG you need the GEM Catalogue. Price 1/6 post free.

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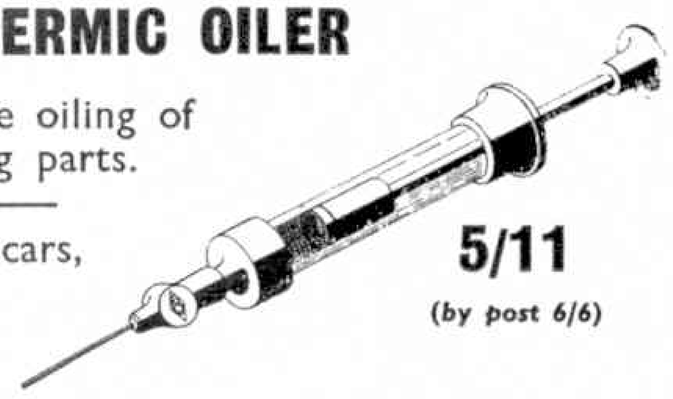
provides accurate oiling of intricate working parts.

Ideal for model cars, railways, aeroplanes, etc., etc.



5/11

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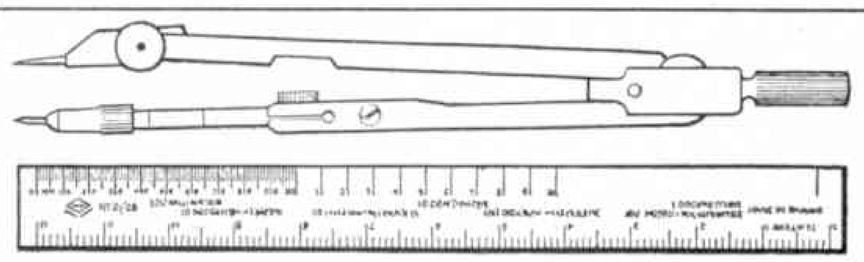
what's the difference between you and a genius?

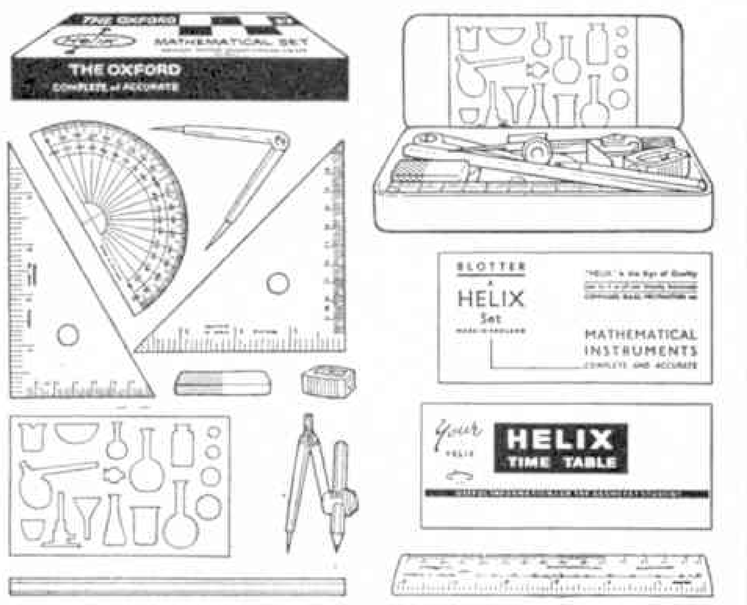
Maybe you are a genius. If you are then you will already know what we are talking about. If you are not—we mean, if if you have not been discovered yet—then we can tell you a secret. You'll never be a genius, or even get better marks, as long as you use chipped rulers and bent compasses. Accuracy is essential. A genius always get things right and so can you if you have good instruments.

If you want to get ahead make sure you start the term with

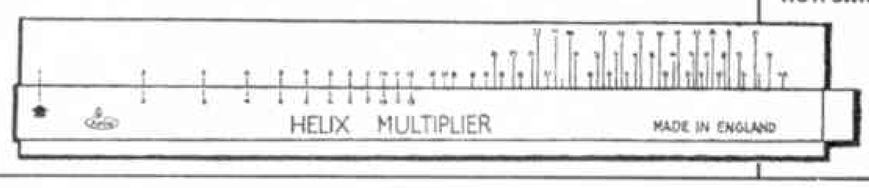


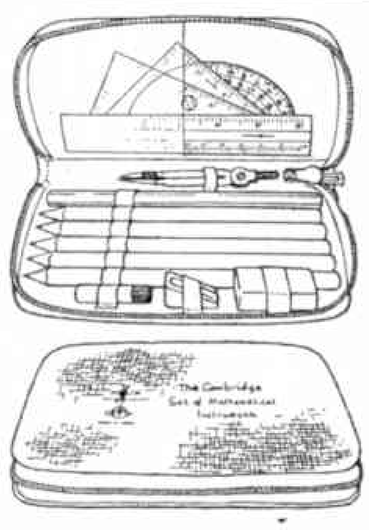
Helix new dual purpose compass.

Helix Rulers — in wood and plastic.



Helix all-purpose drawing set.





Helix Cambridge set.

Helix multiplier—you can be a genius for 4/11 with this new simplified slide rule which gives you your multiplication and division tables in a split second.

Be smart—Choose Helix and you're half way to being a genius already.

LOOK FOR THE NAME **Helix** UNIVERSAL

And you'll need set squares, protractors, rubbers, pencil sharpeners, geometry sets (each one has a class time table form and a list of geometric shapes).

Modern SHOPPING

Ideas for Christmas Presents

1 Here is a novel idea for a Christmas gift. It is the Dymo Labelmaker, which produces inexpensive, durable and easy-to-read labels within seconds. The M-4 kit contains the label-maker, ten rolls of tape and it enables every type of label to be neatly printed on a self-adhesive tape. It is ideal for labelling books, toy cupboards, tuckboxes, sports equipment, etc. Price—£7 2s. 0d.

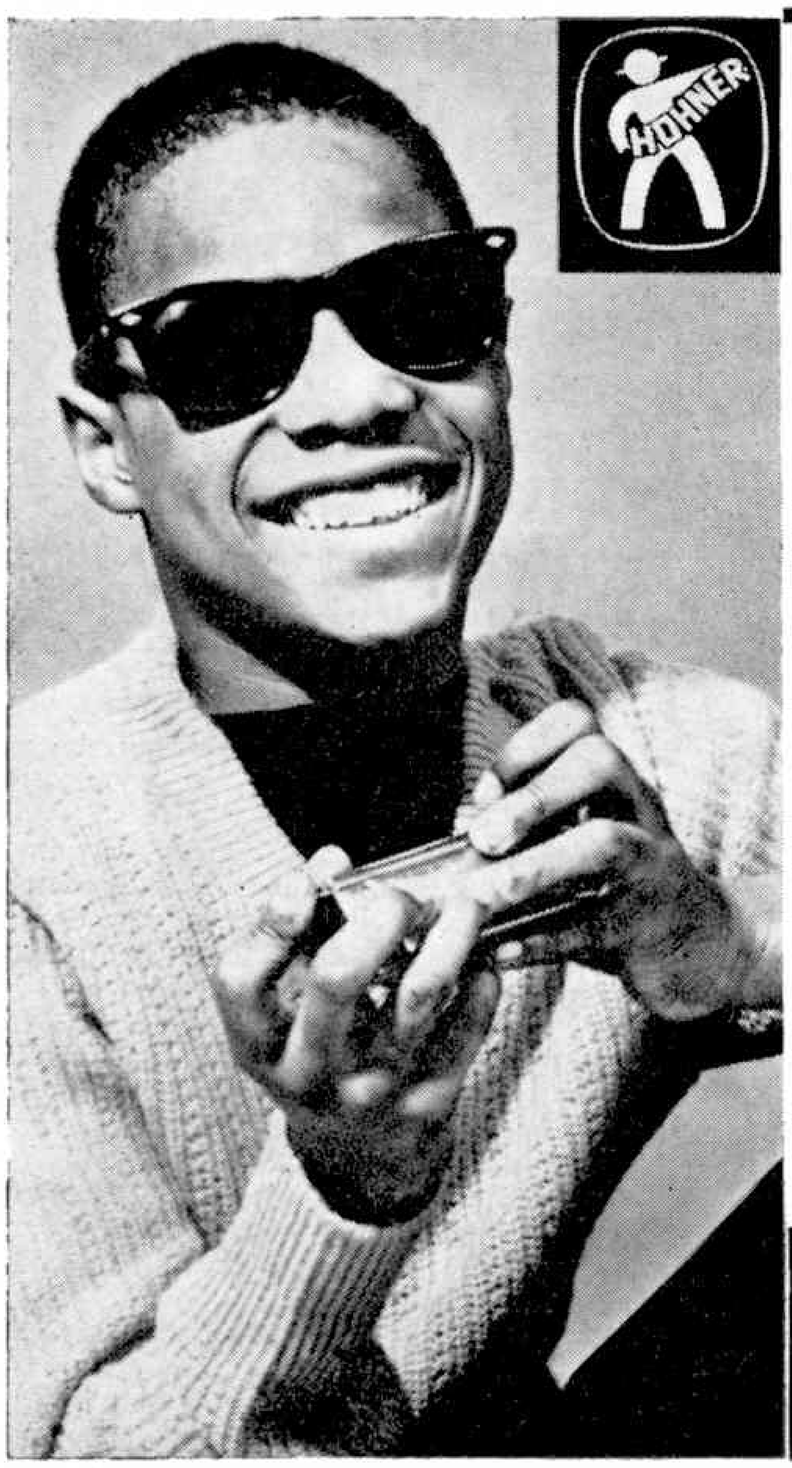
2 There are two new titles available to those of you interested in outer space. The first, entitled: 'Pathways in Space', is written by Brian Silcock, the science correspondent for the Sunday Times. It not only gives constructional details of rockets, but also the huge navigational problems involved in travelling through outer space. Details are also given on what will be the living conditions of man on the moon and how he will create them. 'Optical Astronomy' deals with outer space, but this time viewing it from the end of a telescope safely on Earth. Information on how new instruments such as the spectroscope and electron camera are helping to answer our space problems is given in this book written by Colin A. Ronan. What are stars made of? What makes them shine? How hot is a particular star? 'Optical Astronomy' tells how these questions are answered. Both titles are published by Phoenix and cost 12s. 6d.

3 A very popular gift at Christmas time is a mouth-organ. Hohner is probably the most well-known name. Here is shown the Super Chromonica, which is used by professionals throughout the world. It has 12 holes, 48 reeds and three octaves from C upwards. It is a luxury model and costs only 52s. For those who are beginners, the Echo Trimline Harmonica will give excellent results. It has 48 reeds, comes in a black and white plastic case and costs 28s. 3d.

4 Although these model soldiers by Britains Ltd.—a colour set of the U.S. marines—are only one-thirty-second of life size, they are accurate in every detail. Britains make many other similar models and also a very good range of model trees for your model car or railway layout. Ask at your toy shop to see them. By the way, the cost of the set of three U.S. marines is 8s. 11d.

5 With Faller Auto Motor Sport you can have the thrill of big-time racing on your own dining room table and, what is more, you can build models of Silverstone, Brands Hatch, or Goodwood racing circuits. The Faller system is such that two cars can be independently controlled on the same track and this gives realistic racing. The basic set 4001 contains two cars, a Mercedes 190 SL and a Porsche, two controllers, 12 pieces of track and a flyover. The cost is £5 5s. 0d. By the way, Faller also make a large selection of model buildings.

6 How about a camera kit? The Kodak 'Instamatic' 100 camera outfit contains a Kodak 'Instamatic' 100 camera, which has the wonderfully easy film loading system, a 'Kodapak' cartridge of Kodacolor-X film (for colour prints) and flashbulbs for the handy, built-in, pop-up flash-holder. In fact, it contains everything needed to start taking snapshots at Christmas. The cost is £5 19s. 0d.



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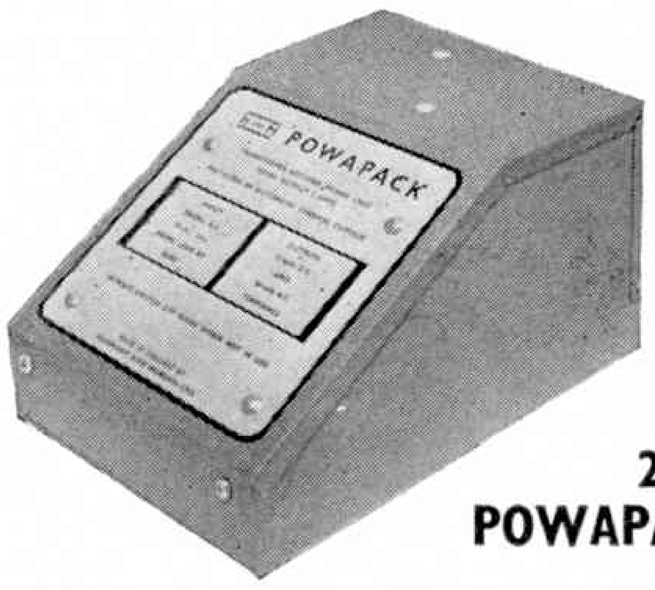

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Ideas for Christmas presents

7 Lone Star Products make an exciting new 'D-Day Invasion Set' at 47s. 6d. This is a scenic model of the battle of June 1944. The tough, durable, vacuum formings are painted in authentic colours and model the Normandy coastline with cliffs and landing craft, etc. Scaling ropes, ladders, parachutists, sand jeeps and over 70 painted 000 scale plastic figures are included in the set.

8 Two of the most popular Corgi models, the Austin London Taxi and the Routemaster Bus, have now been brought together in this attractive London Passenger Transport Set. Also included is a moulded policeman figure which can be rotated on its base to face any direction. The set is available on the full-colour scenic display stand as shown, which gives on the reverse side some historical details about London. The cost is 15s. 0d.

9 Lesney Products have introduced this new 'Matchbox' Roadway No. R-1, Main Highway. It is brightly printed in full colour on top quality card and features a main highway, bridge, by-pass link and car park. It is scaled for all 'Matchbox' models and the overall size is 34 in. by 23 in. The cost is 2s. 0d.

7

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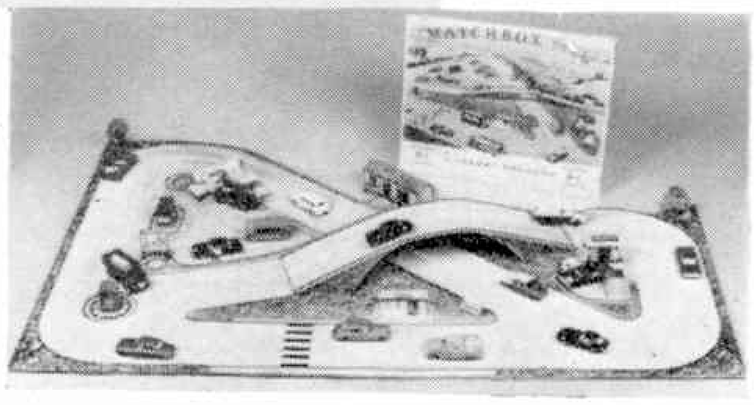

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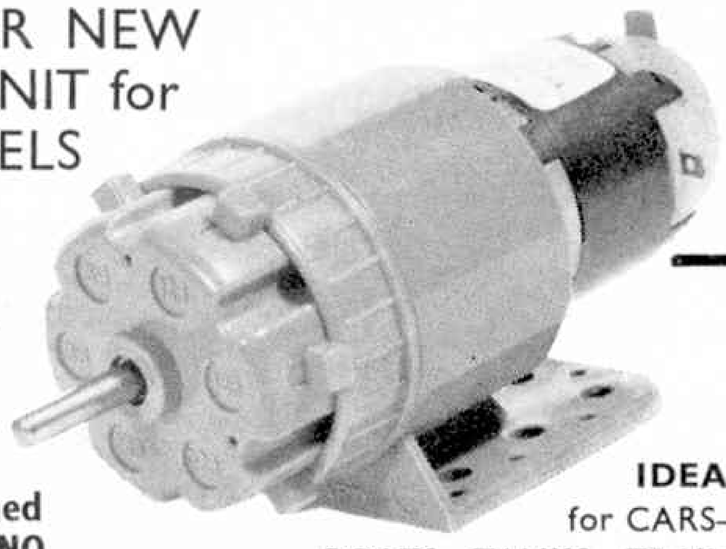

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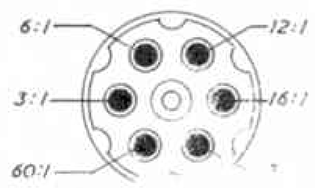

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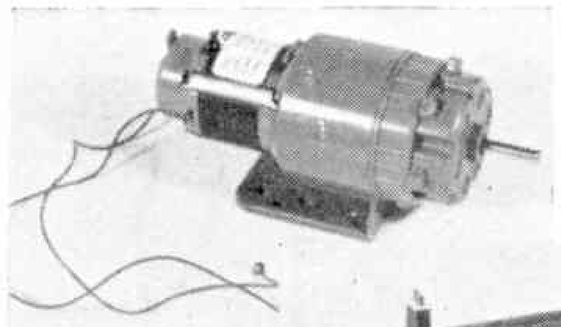
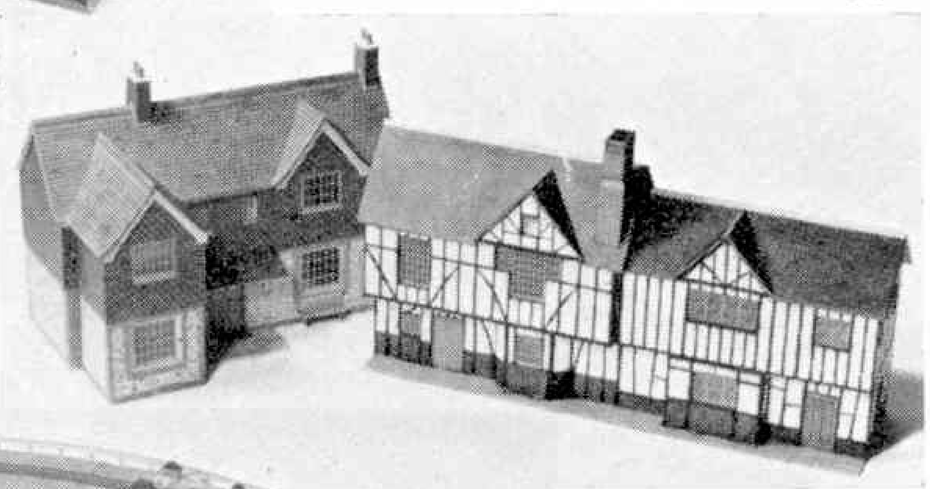
Ideas for Christmas presents

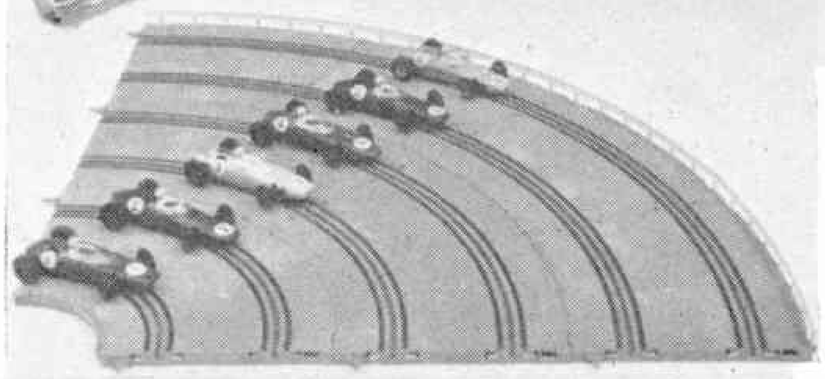


10 The Richard II motor comprises a Monoperm Super electric motor fitted to a multi-ratio gearbox as an integral unit. The gearbox housing incorporates an integral base plate for mounting, a special feature being that the fixing holes conform to Meccano standard size and spacings. The output shaft is also Meccano size $\frac{5}{32}$ in. The gearbox provides six different ratios—3:1, 6:1, 12:1, 16:1, 32:1, and 60:1. Price is 52s. 6d. The gearbox is available separately at 25s.

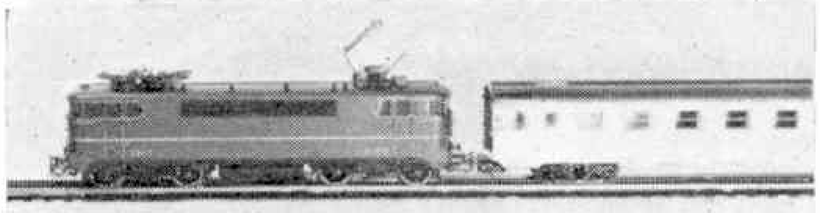


11 Realistic model buildings for your model railway can be made from the finely detailed Superquick kits, which are available from most toy and model shops. They come in flat form with all the folds scored so that they can be easily put together. The series includes old and modern buildings, churches, shops, etc., and they are suitable for 00/HO. Prices range between 2s. 11d. and 5s. 10d.

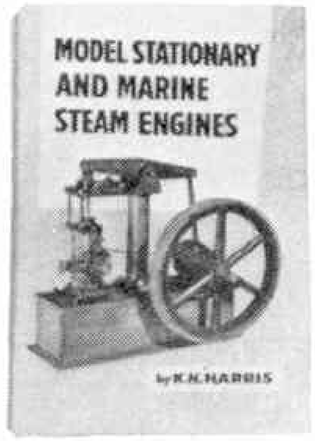
12 Over 100 types of ships are featured in The Observer's Book of Ships published by Frederick Warne & Co. Ltd., and it is the ideal guide for the amateur 'ship spotters'. All kinds of information about warships, merchantmen, sailing yachts, fishing and harbour craft is provided, as well as numerous full-page line drawings and 16 colour and 16 black and white plates. Price is 5s. 0d.



13 Scale Raceway Models (S.R.M.) have sent an example of their new six-lane curve. The curve is identical in design to the four-lane curve, but of larger radius. The opportunity has been taken to make this curve a 22½% section of a circle, 16 being required to produce a complete circle. The 22½% angle also allows interesting corners to be produced in two-lane circuits by using two, four, or six-lane curves together. The price of this new track section is 4s. 6d.

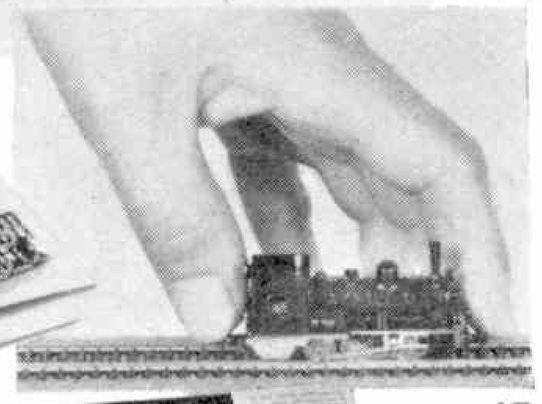


14 Märklin offers a full range of locomotives and rolling stock from Germany, Sweden, Holland, France, Switzerland, Austria, Italy, Belgium and Denmark, as well as certain North American prototypes. The illustration shows the modern French (S.N.C.F.) Bo-Bo electric locomotive of class BB9200 and the first all-stainless steel carriage of type A8 Myfi as used on the Paris-Riviera 'Mistral'. Both axles of the locomotives are driven and special adhesion tyres increase the tractive effort. Working headlamps are fitted front and rear and sprung pantographs can be switched to pick up from an overhead catenary. Price of the locomotive—£6 10s. 0d. The carriage—£1 11s. 0d.



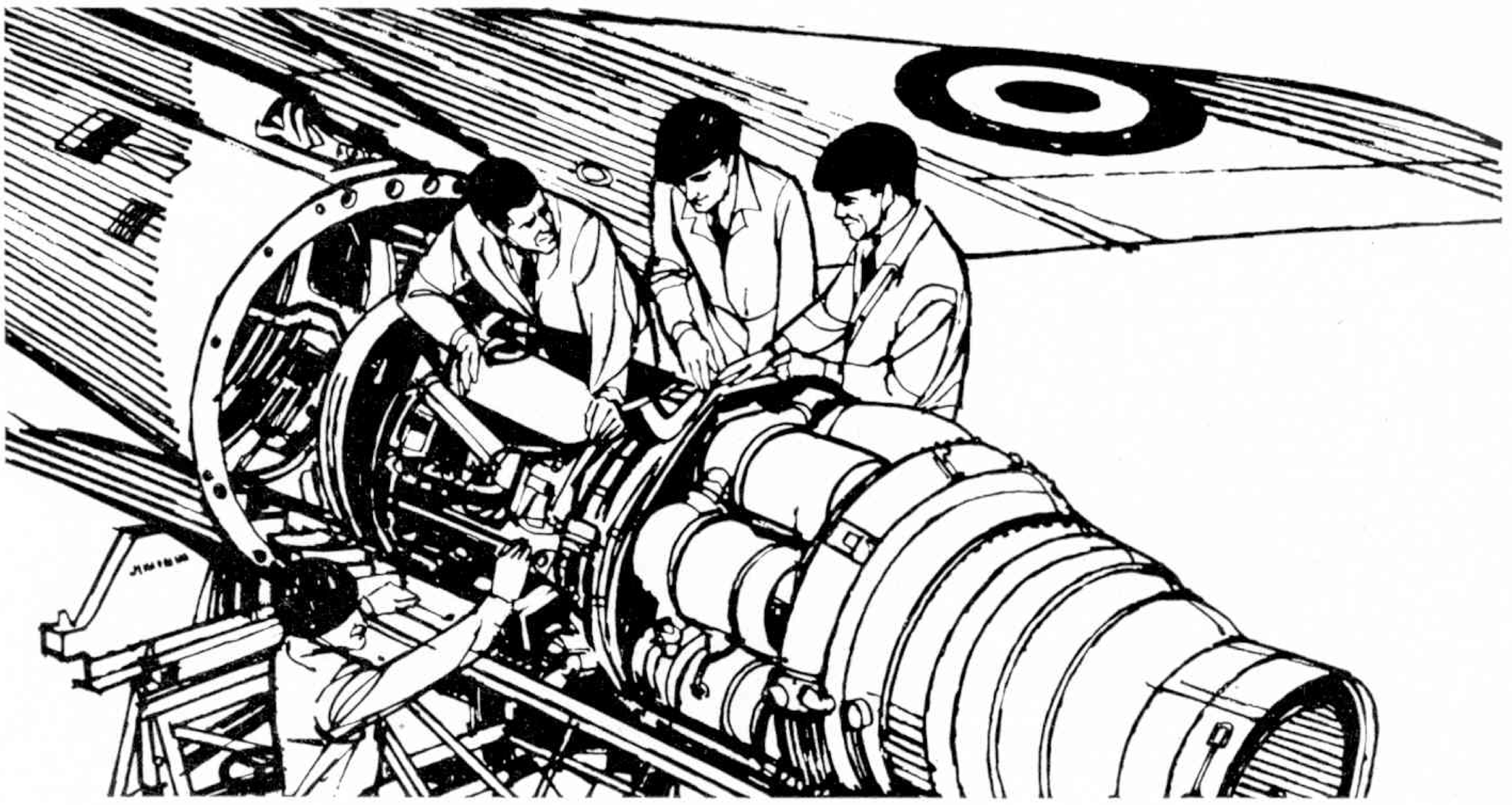
15 The title, 'Model Stationary and Marine Steam Engines', is published by Percival Marshall & Co. Ltd., and as its name implies gives a guide to a range of steam engines from the simplest oscillating engine to a high-duty marine unit. There are many points of general interest about reversing gears and lubrication—subjects which have been neglected in this field. Price of this publication is 15s. 0d.

16 The 'Evening Star', built in 1960, was the last steam locomotive to be built for British Railways. As the era of steam traction draws to a close, the interest in this form of transport is rising. Therefore, all steam locomotive enthusiasts will want to read the Pocket Encyclopaedia of British Steam Locomotives, which is published by Blandford Press Ltd., and written by O. S. Nock, an authority on the subject. The beautifully coloured picture gallery in this title extends from 'Locomotion' of 1825 up to the 'Evening Star' of 1960. The cost of the encyclopaedia—18s. 0d.



17 Treble '0' train sets are increasing in popularity. These sets are being made by Lone Star, who have a wide range of models of British and American prototypes, and by a German firm, Arnold, one of whose locomotives is shown here. These models are being imported by the Pritchard Patent Product Co., who also make Peko Streamline 000 track. This new track is entirely flexible, can be curved to any radius and is suitable for Arnold or Lone Star. The price per yard is 5s. 6d. and one yard of 000 track is equal to two yards in 00.

18 The OPTIKIT, which is produced by the Helio Mirror Company, enables one to produce optical instruments from a simple pocket microscope to a viewer for film transparencies. This exciting kit provides hours of entertainment in constructing the various instruments and also helps educationally, as one is able to study such items as crystal formations and insects in close-up. Kits are available at prices from 37s. 6d. to 150s. 0d. The Optikit No. 1 illustrated costs: 150s. 0d.



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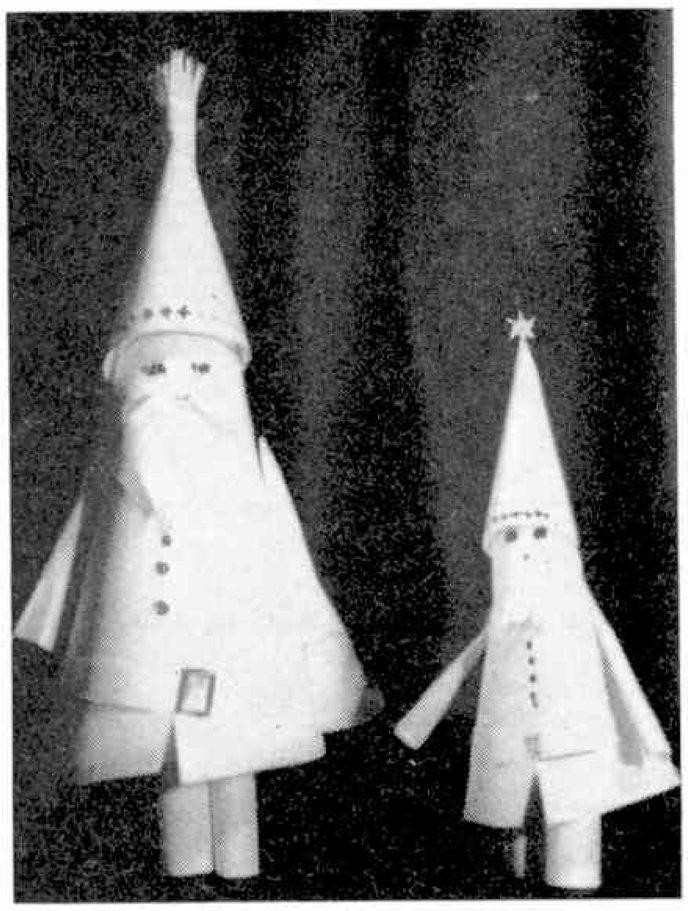

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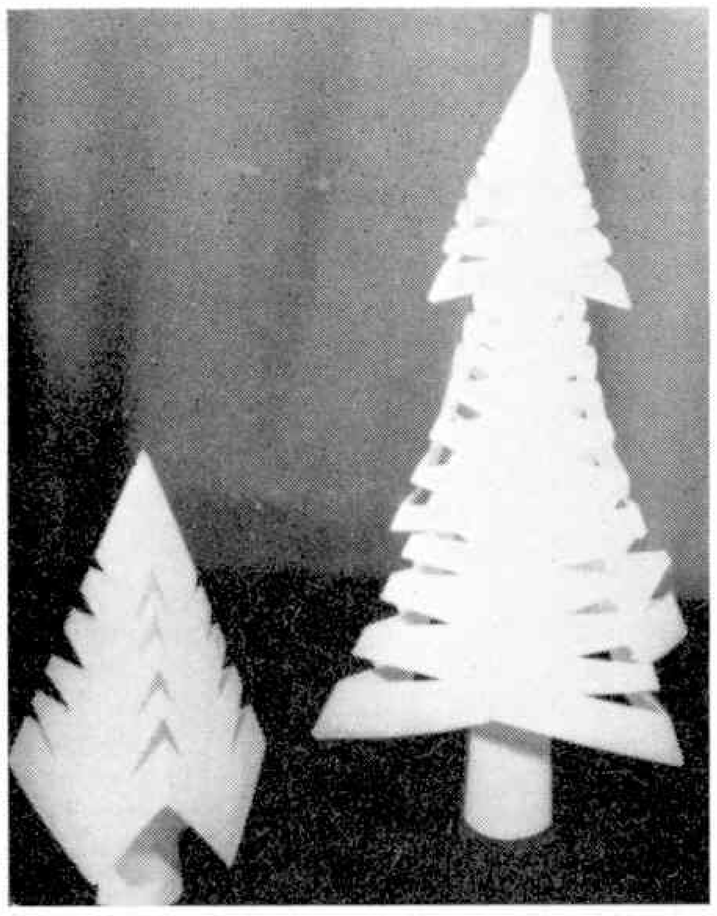


2

CHRISTMAS DECORATIONS

CONES, cylinders, pyramids and cubes are just a few of the shapes easily made from paper and you will be surprised how many different objects you can make combining these four basic shapes. The first two are often used to form the basis for figures in paper. Depending upon the shape of the article you wish to mould in paper, you choose one or more of these basic shapes that will make, as near as possible, a copy of the original object. For example, the Father Christmas seen in photograph 1 and the Christmas trees in photograph 2 were constructed in this way.

Father Christmas

The figure has been kept to its simplest form in order to make it easier for you to construct. Details such as eyes, nose, belt and decorative motif on the cap have been drawn afterwards.

The essential units, as seen in picture 2, are—two cylindrical shapes for legs, a large cone for the body, a small piece for face details, a cone for the cap and two cones for the arms. Diagram 1 shows how to make these shapes stage by stage. The best method of working is to start with the legs and work upwards to the cap. If you wish to add a sack to your figure, make an extra cone of a size which you think would suit. Details of this are *not* shown in the diagram.

The Christmas tree

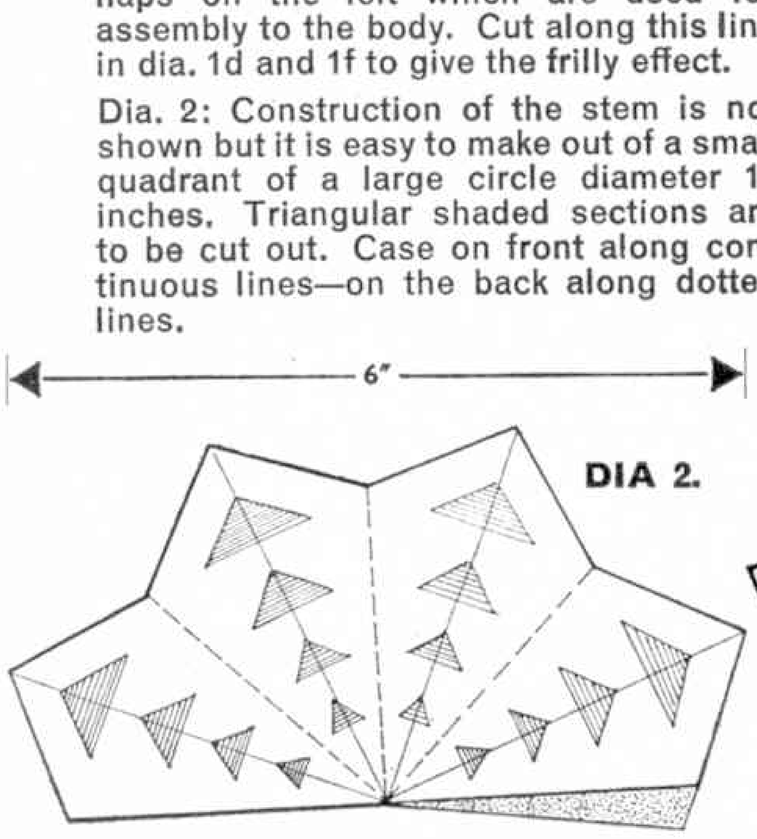
Two variations on this theme are shown, although you can no doubt improvise to make many more. The tree on the right is made out of three tiers, which are assembled around a conical stem trunk. The trees could also have been made from cones, but the object of ribbing and creasing is to take you a step further in more decorative conical constructions.

Diagram 2b only covers the construction of one tier of foliage. Make the other two by increasing the dimensions by 2 inches in each case. Having completed all the units, mount the largest tier of the foliage from the top of the stem downwards by cutting a hole in the top of the tier approximately the diameter of the stem at the point where you want the tier to fit. The next smaller tier is mounted in the same way and finally, the smallest one fits on top.

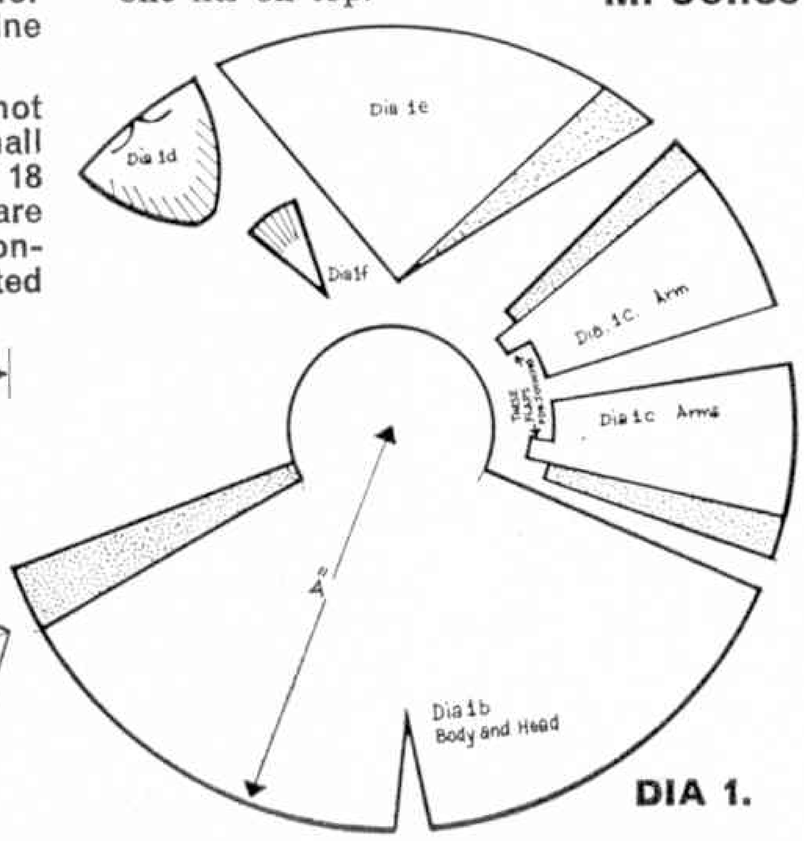
M. Jones

Dia. 1: Legs are not included in the diagram. They can be made by rolling two pieces of paper, size 3 inches square, into cylindrical shapes and joining them together with sticky tape. Grey areas with dots are joining flaps. Dia. 1c shows two flaps on the left which are used for assembly to the body. Cut along this line in dia. 1d and 1f to give the frilly effect.

Dia. 2: Construction of the stem is not shown but it is easy to make out of a small quadrant of a large circle diameter 18 inches. Triangular shaded sections are to be cut out. Case on front along continuous lines—on the back along dotted lines.

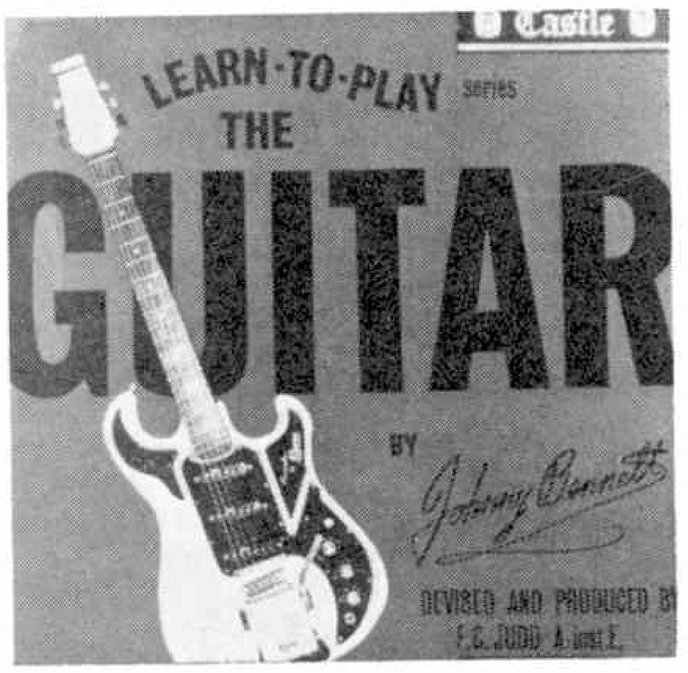


DIA 2.



DIA 1.

LISTEN
LEARN-
PLAY!



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by **F. C. Judd A.Inst.E.**

CIRCUIT TESTING

WHEN one has constructed a piece of radio or electronic equipment, it does not always follow that it will work correctly when switched on. An error in wiring, a badly soldered joint or the omission of a wire, can result in non-operation. To check such faults requires a 'continuity' tester, but since most items of radio and electronic equipment operate from a voltage supply of one kind or another some means of measuring 'voltage' is also invaluable.

The keen radio enthusiast should never be without even a simple volt/ohm meter which can be constructed without much effort and from a very few components. I should explain that the 'ohms' part of the meter is normally used to read resistance up to a given maximum value, but it may also be used for checking the continuity of a circuit, for example, a through connection of one or more wires or a tuning coil. It can also be used to check for 'short circuits' between wiring or components or in components such as tuning capacitors, etc.

How the Meter works

Although the volt/ohm meter described in this article is for reading voltage, resistance and general continuity, it actually employs a milli-amp meter as the indicator. Like all voltmeters it works on the principle of the current flowing in a given value of resistance and through the meter, both of which are connected in series. If you look at Fig. 1 you will see how the milli-amp meter is connected through a resistance to a battery. Ohms Law tells us that a current of 1 milli-amp will flow through a resistance of 1,000 ohms if the voltage across the circuit is 1 volt. ($I=\frac{E}{R}$ where I = the current, E the voltage and R the resistance).

Since the meter will be indicating 1 milli-amp (full scale), i. is also showing that the potential or voltage of the supply is 1-volt. The resistance is called a *multiplier* and since it requires 1,000 ohms to make the meter read full scale for 1-volt it follows that 10,000 ohms will be required to do the same thing when the supply voltage is 10 volts. We say that the multiplier value is 1,000 *ohms per volt* and can therefore calculate the values required for other multipliers to make the meter cover different voltage ranges.

The meter does, of course, have an internal resistance of its own and for real accuracy in calculation this should also be taken into account. In practice this internal resistance is very small and for our purpose can be ignored. The formula for the multiplier is then simplified to $Rm=\frac{1{,}000\times V}{I}$ where Rm is the required resistance of the multiplier, V is the required voltage range and I the current for full scale deflection of the meter. If for example we have a meter with a full scale deflection of 0·1 milli-amps and wish to use it to read 100 V we should require a multiplier resistance (Rm) of $\frac{1{,}000\times 100}{I}$ or 100,000 ohms.

The circuit of Fig. 2 is based on this and with a 0·1 milli-amp meter we can use multipliers of 10,000 ohms for 10 volts, 50,000 ohms for 50 volts and 100,000 ohms for 100 volts. In practice the multiplier resistors can be selected from standard values, but since these are not always exactly the value marked on them, some adjustment may have to be made to obtain accurate readings.

Using a 0-1 milli-amp meter sold by Stern-Clyne Limited the values of multiplier resistors are as shown in the circuit. For example on the 10 volt range a total value of 1,1000 ohms was required to make the meter read 10 volts full scale deflection (pointer right over to 10). This particular meter is calibrated in equal divisions from 1 to 10, so for the 10 volt range each division

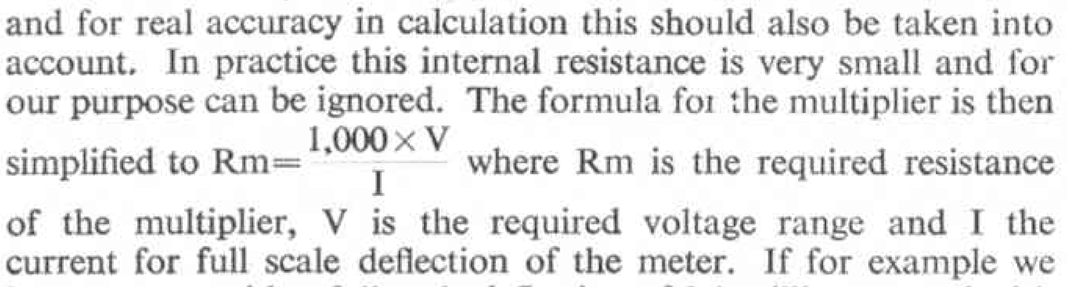


FIG. 4

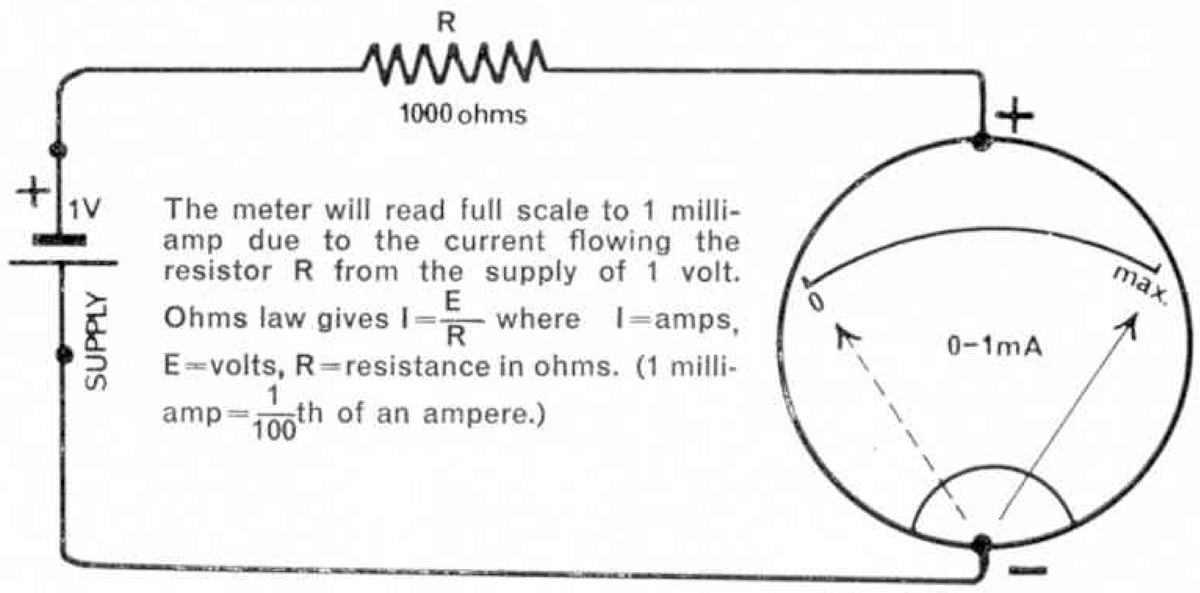


FIG. 1

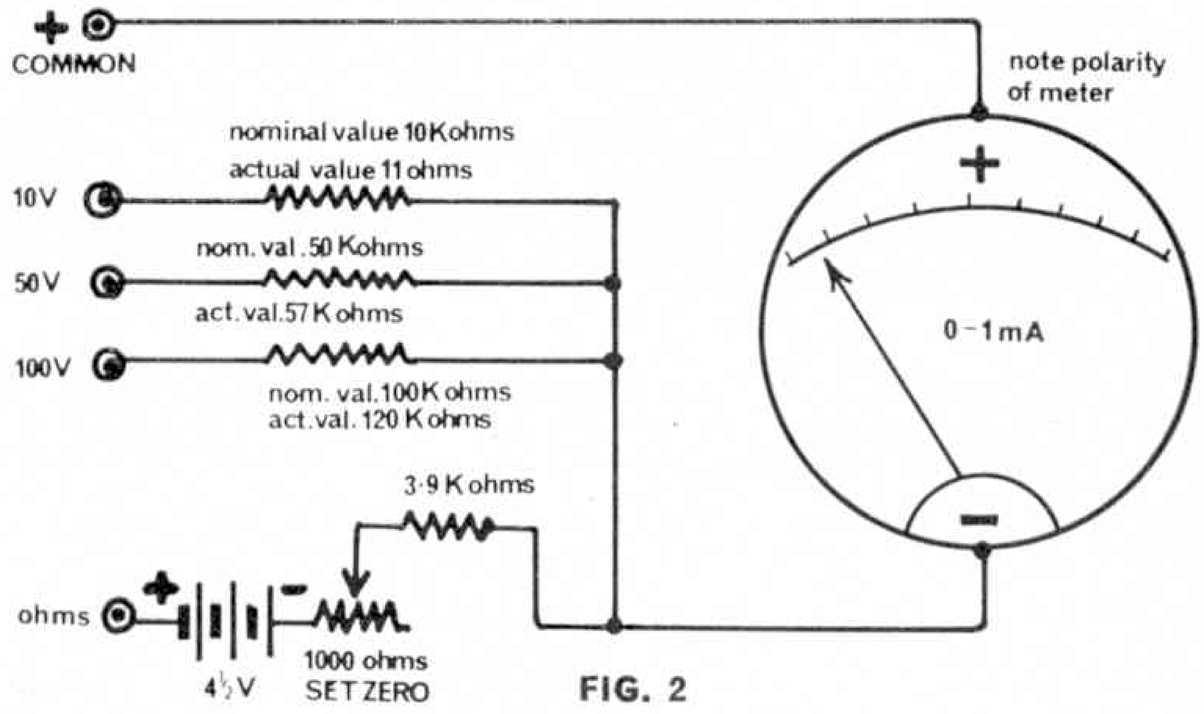


FIG. 2

Circuit of the volt/ohm meter.

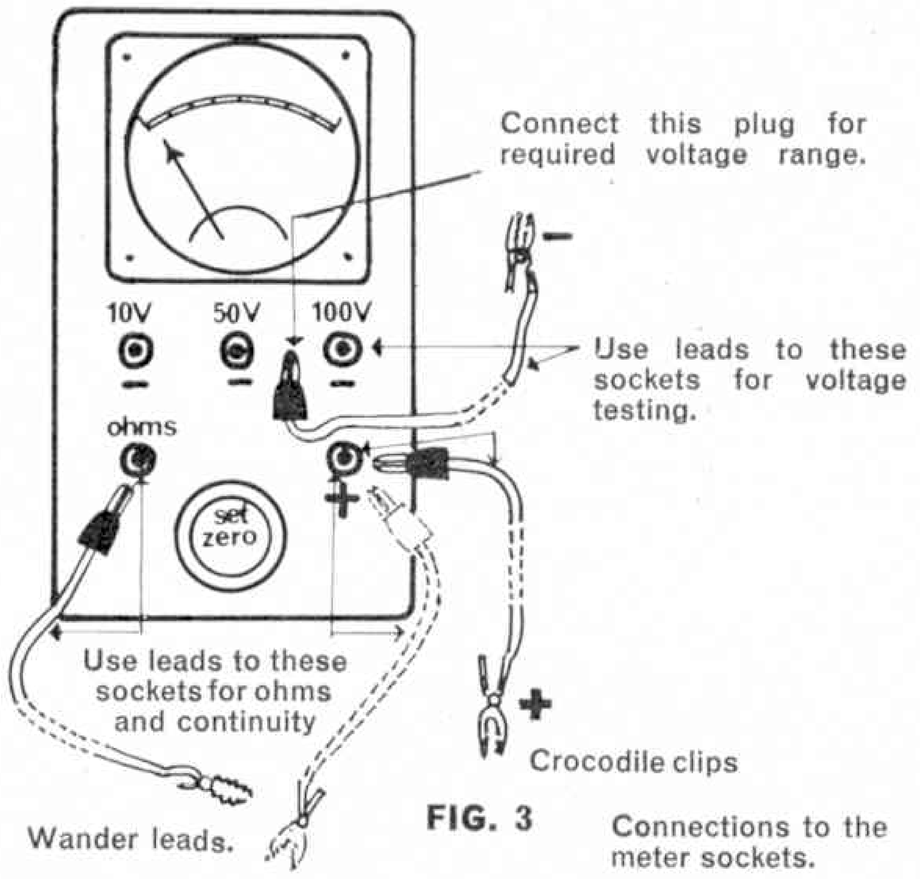


FIG. 3

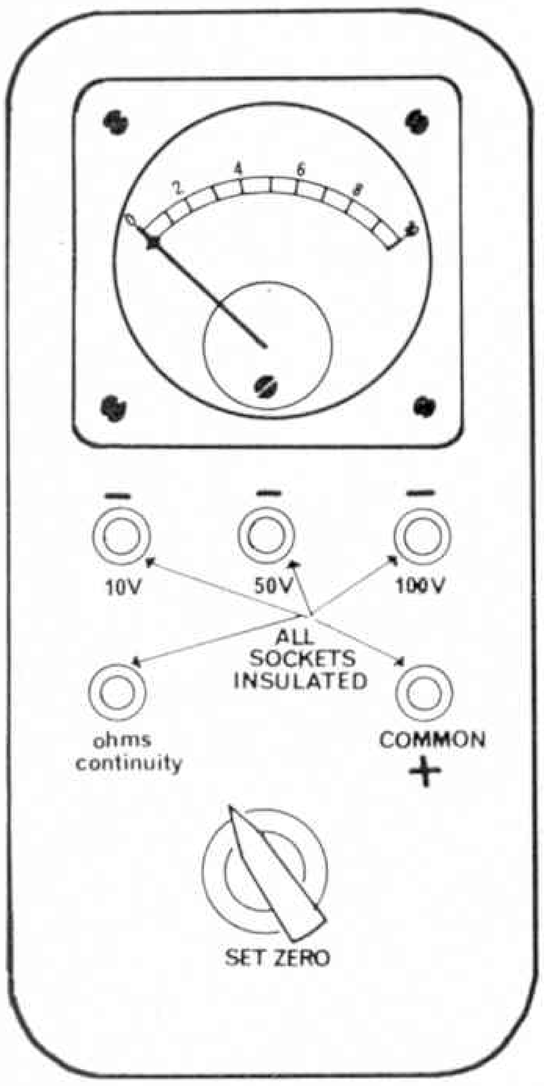
Connections to the meter sockets.

is 1 volt. On the 50 volt range you multiply the reading by 5, so if the meter were reading 6 the volt would be 6×5 or 30 volts. The 100 volt range is easier still, just add a 0 to the reading, i.e., for a reading of 8 add a 0 to read 80 volts.

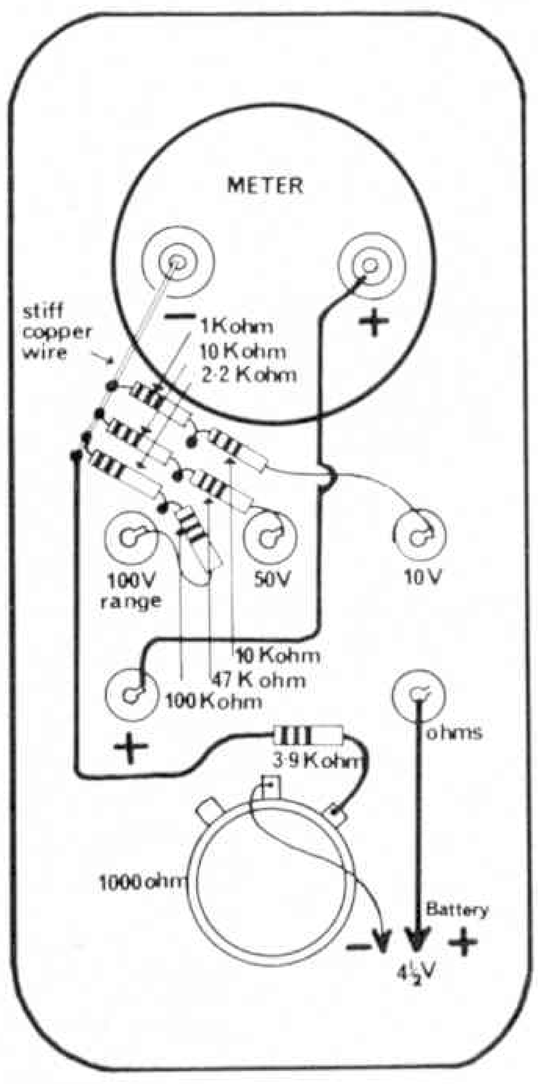
Continuity and Ohms

The meter circuit also contains a battery (4½ volts) and in series with this is a fixed resistor and a variable resistor. When the meter leads are connected together (plug in for ohms as in Fig. 3). The meter will read full scale when the variable resistor 'set zero' is adjusted correctly. If the meter does not quite read full scale, less resistance is required; but if the pointer goes hard over, beyond the end of the scale, more resistance is required. The 'zero set' control should be adjusted until exactly full scale reading is obtained.

The meter can now be used for continuity testing by connecting the leads across each end of the circuit one wishes to test. If the circuit has some resistance of its own, then the meter may read at some other point on the scale. We can make use of this to measure



Layout front of meter. **FIG. 6**



Wiring layout inside the meter. Battery is mounted inside the box.

FIG. 5 The completed meter ready for use.

the values of resistors or the resistance of a circuit and actually calibrate the meter scale in ohms. However, the meter itself is sealed and it is unwise to attempt taking it apart to mark on the extra scale. Instead we can draw a graph showing the actual calibrations for resistance as in Fig. 4.

Construction

The entire volt/ohm meter can be assembled in a small plastic box as shown in the photo (Fig. 5) or even in a wooden box of comparable size. For the original, a plastic 'bacon box' was used which measured about 7 in. by 2½ in. by 3 in. The lid becomes the base since the meter is mounted on the 'bottom' of the box. Be very careful when drilling plastic since it is very brittle.

The hole for the meter is the most difficult one and if you haven't a 'fly cutter', the only solution is to drill a series of small holes around a circle of the size required for the meter and carefully file into shape when the bulk of the material is removed.

The wiring is simple enough and is shown clearly in Fig. 6. *Make sure you have the correct values of resistors.*

Before you use the meter carefully check all the wiring and plug in the test leads. Check each range with a battery of lower voltage than that needed for full scale deflection, i.e. for the 10 volt range use a 4½ volt battery. Now try out the continuity test as explained earlier by first using the 'zero-set' for full scale deflection. You can use the graph shown in Fig. 4 with reasonable accuracy, but try making your own with the help of several resistors of known value.

One final note, on no account use the 'ohms' (continuity) circuit for testing transistors. The internal battery voltage is high enough to destroy a small transistor.

Components for the volt/ohm meter

1. 0-1 milli-amp meter—Stern-Clyne Limited.
2. 1,000 ohm wire wound variable resistor (potentiometer).
3. 5 standard sockets (single plug).
4. Resistors 20% ¼ watt.
   - 1 100,000 ohms (100K ohms).
   - 2 10,000 ohms (10K ohms).
   - 1 47,000 ohms (47K ohms).
   - 1 2,200 ohms (2·2K ohms).
   - 1 3,900 ohms (3·9K ohms).
5. Control knob for set zero.
6. Extra items:
   - 2 standard wander plugs for meter leads.
   - 2 crocodile clips for meter leads.
   - Wire—about 2 ft. each insulated red and black for meter leads.
   - Wire—internal wiring (insulated).
7. 4½ volt standard flashlight battery.
8. Box for meter as per text.

All the components except the box can be obtained from Stern-Clyne Limited, 162 Holloway Road, London, N.7 or other branches.

THE RESISTOR COLOUR CODE

THE values of standard resistors are given by means of a colour code. The colours are marked on the resistors and take two forms. On older types the colour of the 'body' denoted the first significant figure, the 'tip' the second figure and the 'dot' the number of noughts or a third figure. See Fig. 1. An additional tip colour of gold or silver indicated the 'tolerance', that is the amount by which the value might be different to that given by the colour code.

The modern carbon resistor, often enclosed in a ceramic case, is coded by the same colours but these are bands of colour around the resistor at one end. The tolerance colour, gold or silver is also a band next to the resistance value colours.

The diagram shows both methods of coding and two examples. Below will be found the complete colour code.

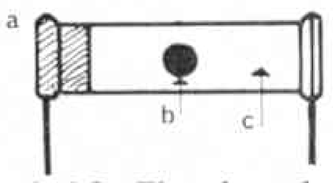
RESISTANCE COLOUR CODE

Colour	First Figure	Second Figure	Noughts or Dec.
	Body or first ring	*Tip or second ring*	*Spot or third ring*
Black	0	0	.0
Brown	1	1	0
Red	2	2	00
Orange	3	3	000
Yellow	4	4	0.000
Green	5	5	00.000
Blue	6	6	000.000
Violet	7	7	—
Grey	8	8	—
White	9	9	—

Tolerance Factor

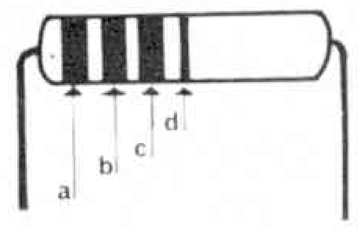
Gold (Metallic)	5% (also used for 0·1 values)
Silver (Metallic)	10% (also used for 0·01 values)
No additional colours or red	20%

How resistors are colour coded



Example: Body—Yellow=4
Tip—Violet=7
Dot—Orange=3 (noughts)
Value= 47,000 ohms. or 47 K ohms

a, 2nd fig. Tip colour. b, 3rd fig. dot colour. c, 1st fig. body colour.



Example: First band—red=2
Second band—red=2
Third band—yellow=4 (noughts)
Value= 220,000 ohms. or 220 K ohms
(K=1,000). Tolerance—gold=±5% of the marked value.

a, 1st fig. b, 2nd fig. c, 3rd fig. d. Tolerance%

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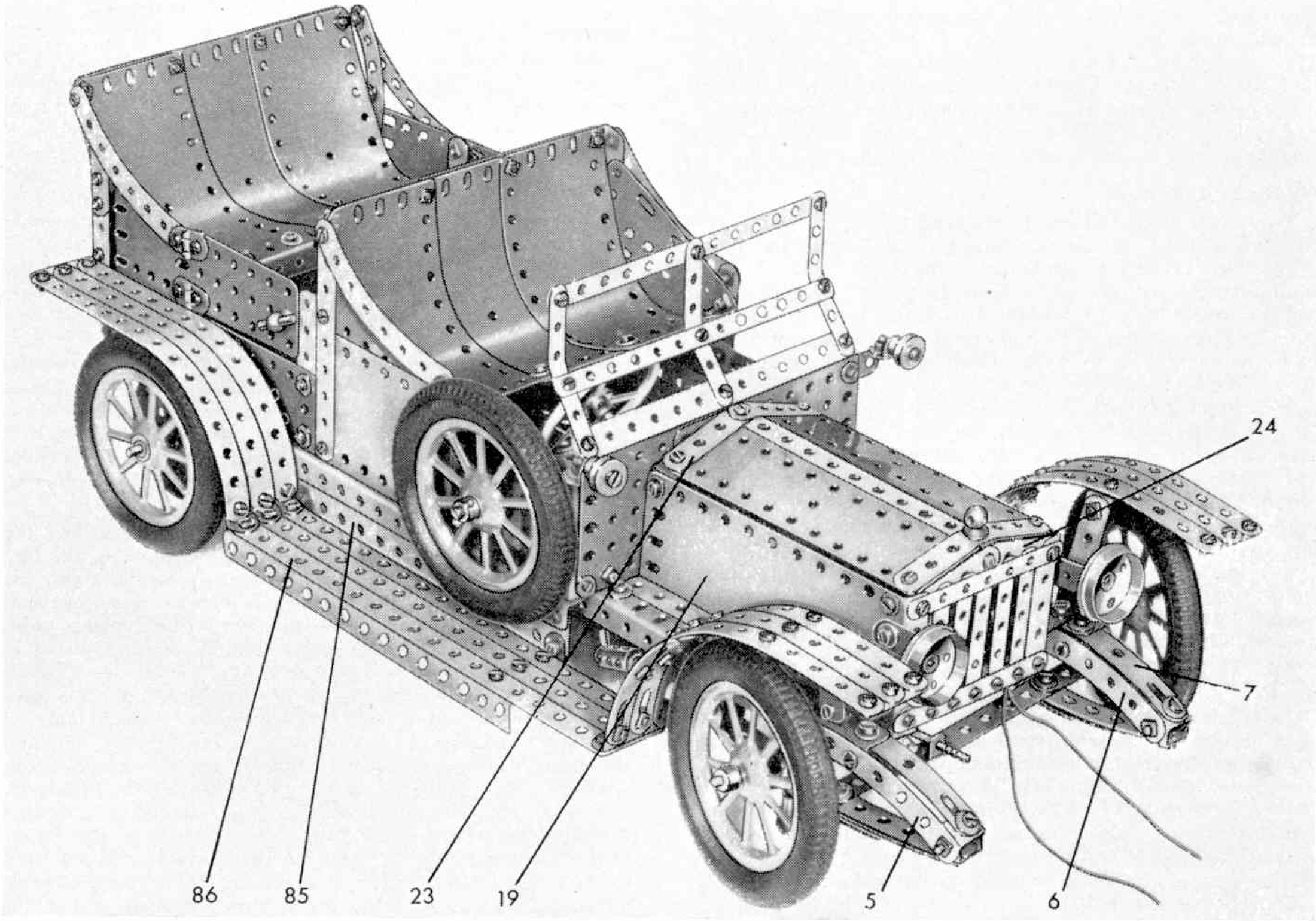
MORE than two years ago, we published details of a huge Veteran Motor Car which subsequently proved enormously popular with builders. Since then, I have received countless requests for another model on the same lines. Here, I bow to those requests and give full building instructions for another 'giant' veteran based on the 1905 Rolls-Royce. Motive power is supplied by an E15R Electric Motor that drives the rear wheels via a clutch, gearbox and differential.

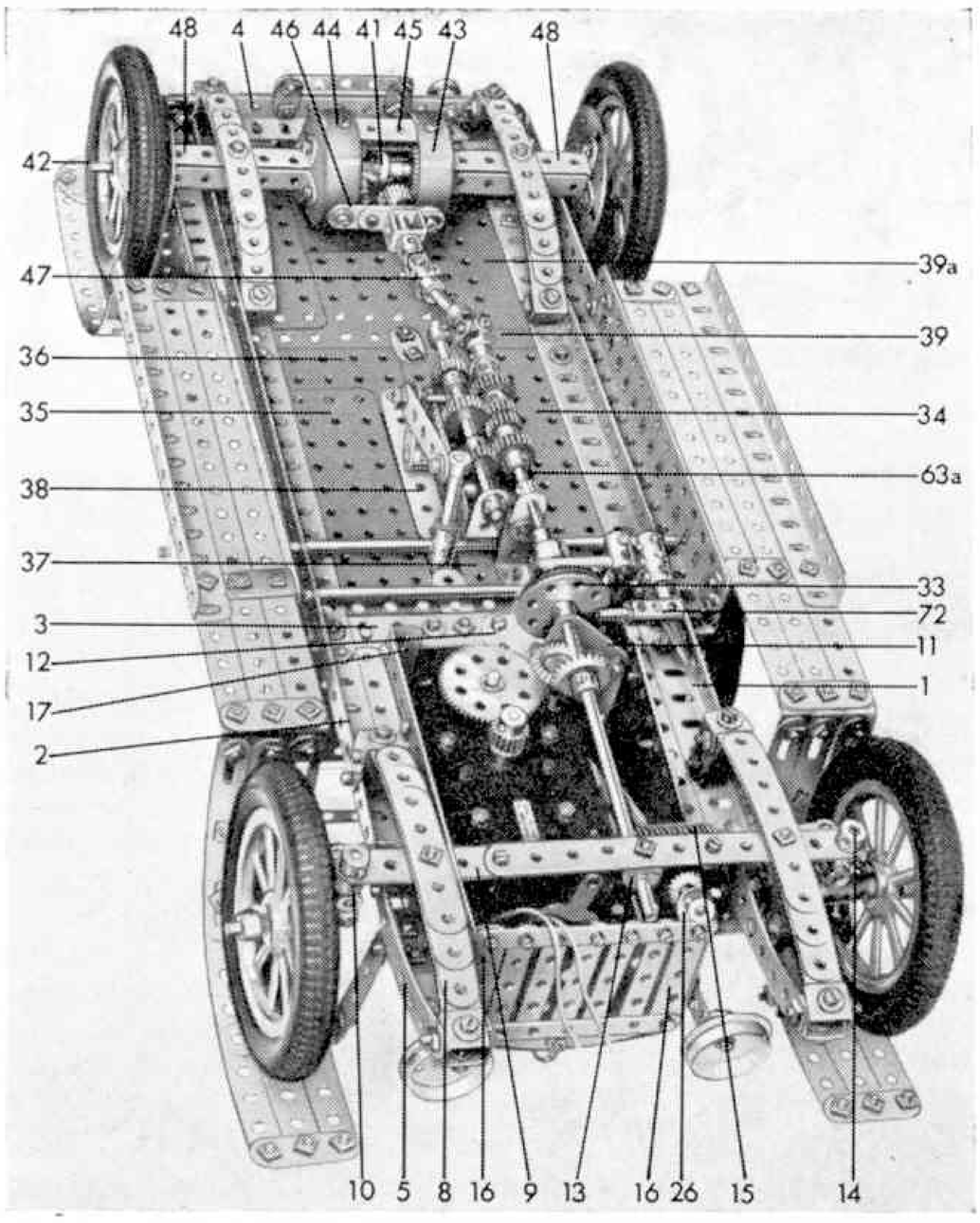
Because of the size of the model, construction is fairly complicated and so it is best, I think, to give the instructions under specific headings.

Chassis and steering gear

The main framework consists of two 18½ in. Angle Girders 1 and 2 joined together by two 5½ in. Angle Girders 3 and 4. Both Angle Girders 1 and 2 are extended by a pair of 4 in. Curved Strips 5 and 6, protruding 2 in., the two inside Strips being attached by Angle Brackets. A 3 in. Formed Slotted Strip 7 is bolted to a Double Bracket secured to the forward ends of each pair of Curved Strips. Suspension springs 8 are built-up from a 5½ in., a 4½ in., a 3½ in. and 2½ in. Strip, bent to shape, the 5½ in. Strip having a Double Bracket fixed at its ends. The front Double Brackets are bolted to the Double Brackets at the end of Curved Strips 5 and 6, while the rear Double Brackets are attached to Fishplates by ¾ in. Bolts. The Fishplates are then connected to the Angle Girders, one direct and one by means of an Angle Bracket.

Two 5½ in Strips 9, overlapped seven holes, and with Cranks 10 at each end, are fastened to the suspension springs. A 1½ in. Corner Bracket 11 is bolted to a 1½ in. Angle Girder which, in turn, is bolted to a 1½ in. Flat Girder 12 attached to the





An underside view showing transmission, gearbox and axles

Angle Girder 3. An Angle Bracket 13 is fixed to the Strips 9, then a 1½ in. Rod 14, carrying a Coupling and a Short Coupling secured at right angles to each other, is positioned and held in place by a Collar. Spoked Wheels are mounted freely on 1½ in. Rods fixed in the Short Couplings, and are held in place by Collars. The two Couplings are connected by a 6½ in. Rod carrying two Worms 15 and two Small Fork Pieces, one at each end. The Small Fork Pieces are loosely attached to the Couplings by ½ in. Bolts, held by the Grub Screws.

Motor and Bonnet

Two 2½ in. Angle Girders 16 are fixed to 1 in. by ½ in. Angle Brackets bolted to the Angle Girders 1 and 2, while two more 2½ in. Angle Girders 17 are bolted to the Angle Girder 3. The Motor flanges are secured to 5½ in. Strips 18 and a 5½ in. by 2½ in. Flexible Plate 19, all bolted to the 2½ in. Angle Girders 16 and 17 at one side. The opposite side of the bonnet is filled in by another 5½ in. by 2½ in. Flexible Plate. Two 4½ in. by 2½ in. Flat Plates 20, overlapped six holes, and with a 2½ in. Angle Girder 21 attached to each end, are bolted to the Angle Girders 3 and 17. The bonnet top consists of two 5½ in. by 1½ in. Flexible Plates and a 5½ in. Strip, held together by a 3½ in. Strip 22 and two 2 in. Strips 23. Obtuse Angle Brackets are used to attach the bonnet top to the bonnet sides, while an Angle Bracket in the centre of the 2 in. Strips holds the bonnet fast to the Flat Plates 20. The radiator is represented by five 2½ in. Narrow Strips bolted to two 3½ in. Narrow Strips which, in turn, are bolted to Angle Girders 16. Two 2 in. Strips 24 are fastened to the bonnet by an Angle Bracket held by a Handrail Support.

An 8 in. Rod 25, on which is mounted a Steering Wheel and a ½ in. Pinion, is journalled in the Flat Plates 20 and an Obtuse Angle Bracket 26, a Collar holding it in position. A $\frac{7}{16}$ in. Pinion on the motor shaft drives a 60-tooth Gear Wheel on a 2½ in. Rod 27 that has on its uppermost end another $\frac{7}{16}$ in. Pinion driving 60 teeth Gear Wheel 28 on a 3 in. Rod 29. On the lower end of Rod 29 a ⅞ in. Bevel Wheel 30 is mounted and this engages with a further ⅞ in. Bevel Wheel 31 secured on a 5½ in. Rod 32. An 8-hole Bush Wheel 33, forming the driving part of the clutch is fixed on the end of the Rod 32.

Four Flat Plates, a 5½ in. by 3½ in. 34, a 5½ in. by 2½ in. 35, a 3 in. by 1½ in. 36, and a 1½ in. by 1½ in. 37, are bolted to each other and to the chassis followed by a 3½ in. Strip 38 and a 1½ in. Strip to complete the front part of the floor. The rear part is built from two 4½ in. by 2½ in. Flat Plates 39, and three 5½ in. by 1½ in. Flexible Plates 39a.

Differential and rear axle

A 1½ in. Rod that carries a Collar at each end, is fitted in the transverse bore of a Coupling. The Collars are held in place by 1 in. Screwed Rods through their transverse tapped bores, the Rods also serving to secure the Couplings to a 1½ in. Contrate Wheel 40. Between the Coupling and the Contrate Wheel 40, a ¾ in. Contrate Wheel 41 is fitted, three Washers being used for spacing purposes. A 5 in. Rod on which the last-mentioned Contrate Wheel is mounted forms one side of the back axle, the opposite side of which consists of a 4½ in. Rod 42 which carries a further ¾ in. Contrate Wheel. This Contrate Wheel and Contrate Wheel 41 are in constant mesh with two ¾ in. Pinions freely mounted on Pivot Bolts secured in the Coupling.

The 5 in. Rod is now fitted with a Boiler End 43, spaced away from the Contrate Wheel 40 by six Washers. In a similar way the Boiler End 44 is fitted, two Washers being used to space this from the ¾ in. Contrate. Three 2 in. Strips, one of which is shown at 45, are bolted between the Boiler Ends, on the inside. A fourth 2 in. Strip 46 is fixed to the outside edges by ⅜ in. Bolts, two spacing Washers on each shank. A Double Bent Strip is bolted to the 2 in. Strip, a Washer being placed under the head of the ⅜ in. Bolt, then a 1½ in. Rod, carrying a ½ in. Pinion and a Universal Coupling 47, is mounted in it. Four 2½ in. by ½ in. Double Angle Strips 48 are bolted to each Boiler End to represent half-shaft casings, and to these the rear suspension springs, constructed in a similar manner to the front springs, are attached by ⅜ in. Bolts. This done, a Face Plate is bolted in the same way as is the front axle. Spoked Wheels with 3 in. Tyres are fastened on to the axles, as shown.

Gearbox

The end of a 4 in. Rod with Key-Way 49, on which is mounted a ¾ in. Pinion 50 and a ½ in. Pinion 51, is inserted in the bore of a ½ in. Pinion 52 that is carried on a separate Rod 53 from which the Universal Coupling 54 is connected to the rear axle by a 1 in. Rod 55. Rod 53 carries also a ¾ in. Pinion 56 and a Collar. The sliding layshaft is a 4½ in. Rod on which are a ½ in. Pinion 57, a ¾ in. Pinion 58, and a ½ in. Pinion 59. A ½ in. Pinion 60 is carried on a ¾ in. Bolt screwed into the transverse bore of a Threaded Boss, and is locked by means of a Grub Screw screwed into the opposite end of the bore. The Threaded Boss is rigidly attached to a 3 in. Angle Girder 60a by a ½ in. Bolt 61, but is spaced from it by a Collar and two Washers. The movement of the sliding shaft is controlled by a ¾ in. Bolt 62, the head of which fits between the bosses of the Pinions 58 and 59. Bolt 62 is fixed in a Crank by a Nut on each side of the Crank, while a 2½ in. Strip 63 is pivotally held by two Nuts locked together. The Crank is secured to a 2 in. Rod journalled in two 1 in. Triangular Plates, one bolted to 3 in. Angle Girder 60a, and the other to another 3 in. Angle Girder 63a.

When ½ in. Pinion 51 is in mesh with Pinion 58, at the same time as ½ in. Pinion 59 is in mesh with Pinion 56, the first gear is obtained. By sliding the layshaft to the right, the Pinion 59 disengages, but Pinion 58 remains in engagement with its ½ in. Pinion and, at the same time, meshes with Pinion 52. This gives a straight through drive resulting in second gear. Further movement of the sliding Rod brings into engagement Pinions 50 and 57, and 58 and 52, thus providing two step-up stages for top gear. Reverse gear is obtained when the rod is slid over to the extreme left, and the drive then goes through Pinions 50 and 60—which are in constant mesh—to Pinion 58, Pinion 59 engaging the Pinion 56.

A 1 in. pulley with Rubber Ring is fastened in a Socket Coupling 64 with a Key Bolt being screwed in the Pulley boss. This assembly is placed on the Rod 49 preceded by a Compression Spring 65 and a Collar 66. The Collar is adjusted so as to keep the Pulley firmly pressed against the

Bush Wheel 33. Rods 32 and 49 must be in perfect alignment. The gearbox is fixed to the car by means of two 1 in. by ½ in. Angle Brackets bolted to the 1 in. by 1 in. Angle Brackets 67 and the Flat Plate 34. An 8 in. Rod 68 is passed through the transverse bore of a Coupling, in which is fixed a 1½ in. Rod carrying a Collar, to which the 2½ in. Strip 61 is attached, and a 2 in. Rod 69, topped by a Handrail Coupling, forming the gear lever.

Brake and Clutch pedals

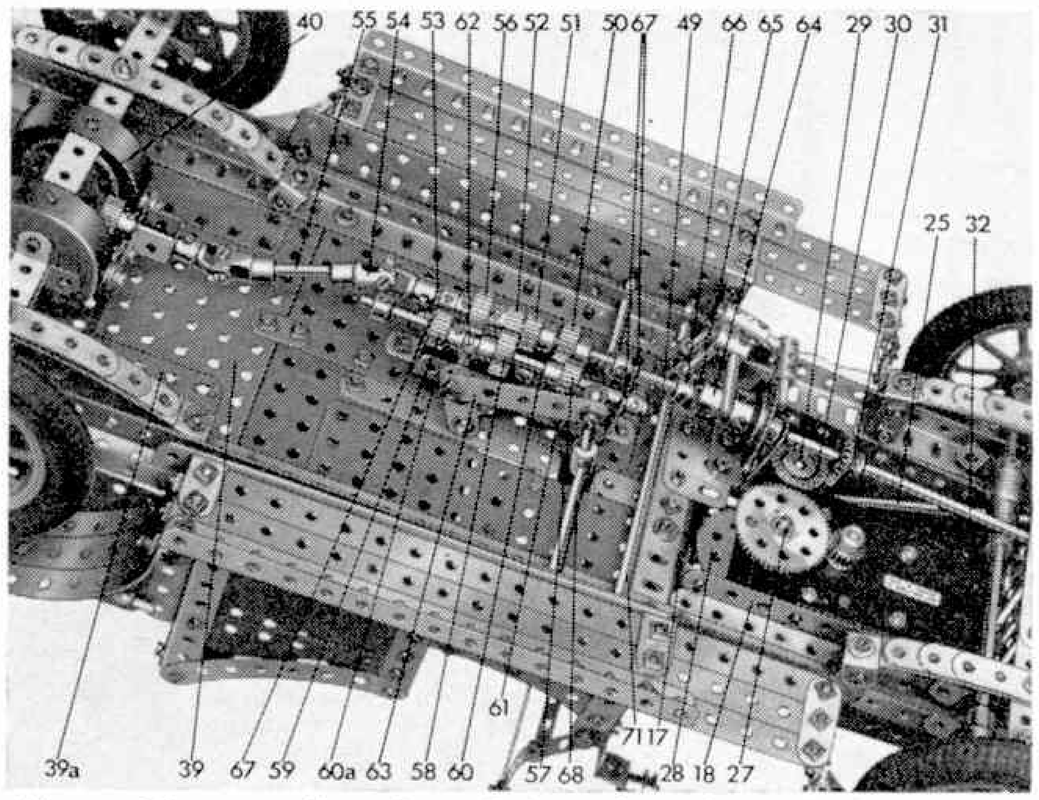
On an 8 in. Rod 71 two Couplings, each having a 1 in. and a 1½ in. Rod secured in them, are loosely mounted. Both 1 in. Rods have a Collar fixed at their upper ends and to each of these is fastened an Obtuse Angle Bracket by a nut and bolt to represent the pedal. A short Coupling, carrying a 1½ in. Rod that engages in the groove of the Socket Coupling, is mounted on the 1½ in. Rod in the left-hand Coupling. This actuates the clutch. Fixed on the 1½ in. Rod in the right-hand Coupling is another Coupling which supports a 1 in. Rod. Mounted on this 1 in. Rod is a third Coupling 72 also holding a 1 in. Rod that presses against the Bush Wheel when the brake pedal is depressed. Normally, however, Spring Cord keeps the Rod clear of the Bush Wheel.

Bodywork

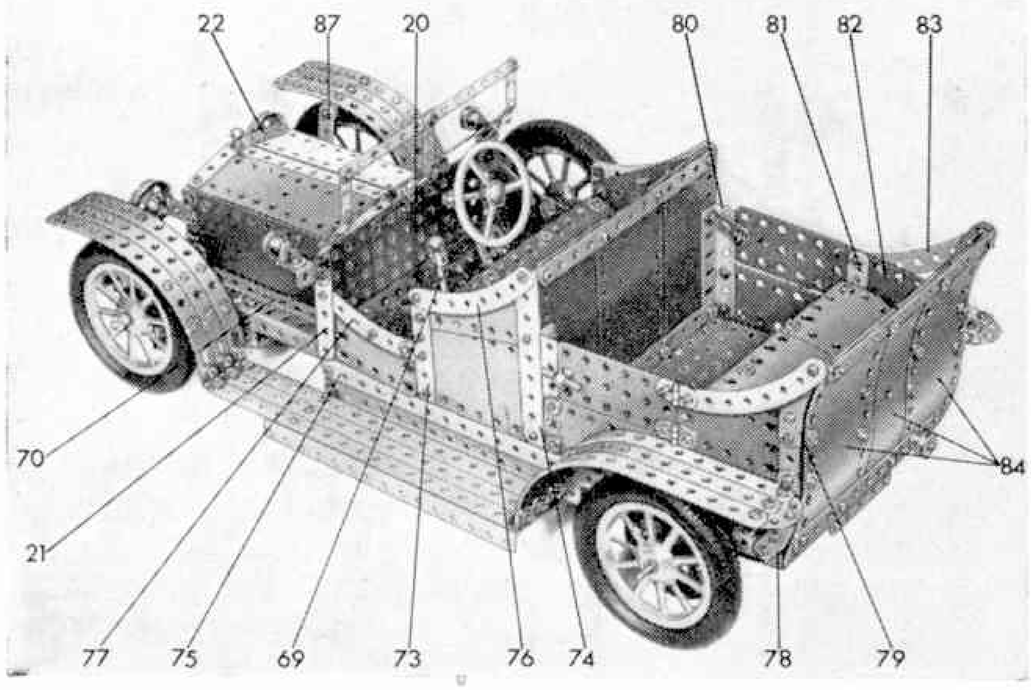
A 3 in. Strip 73, a 3½ in. by 2½ in. Flexible Plate and a 4½ in. Angle Girder 74 are all secured to a 3½ in. Angle Girder bolted to the Angle Girders 75. The Strip and the Girder are joined together by a 4 in. Curved Strip 76 and a 3½ in. by 1½ in. Triangular Flexible Plate. Both sides are similar and are connected together by 6½ in. compound strips and Angle Brackets. The back of the front seat consists of three 4½ in. by 2½ in Flexible Plates while the seats themselves are made from three 5½ in. by 2½ in. Plastic Plates bolted to the compound strips. To finish the front seat, a 4 in. Curved Strip 77 and a 2½ in. by 1½ in. Flexible Plate are bolted to the Angle Girder 21 and the Strip 73. The spare wheel is mounted on a 1⅛ in. Bolt attached by two Nuts to one of the 4 in. Curved Strips.

To the end of the Girder 75, a 2½ in. Curved Strip 78, that has been extended by a 2½ in. Strip and another 2½ in. Curved Strip 79, is bolted. Two 3 in. Angle Girders 80, bolted to the front seat-back, support a 5½ in. by 1½ in. Flexible Plate extended one hole by a 2½ in. by 1½ in. Flexible Plate fastened to the Curved Strip 78. A 3 in. Strip 81 supports a 2½ in. by 1½ in. Flexible Plate 82, a 4 in. Curved Strip 83, and the hinges for the doors which are 3 in. by 1½ in. Flat Plates.

A Handrail Support, carrying a 1 in. Rod in its transverse bore and with a Fishplate locked between two nuts on its shank, is mounted in each door to act as a handle. Three 5½ in. by 2½ in. Plastic Plates 84 are bolted to two 4½ in. Strips, overlapped five holes, at the top and bottom of the Plates. These are fastened to the Strips 79 by Angle Brackets. A further three similar Plates form the rear seat and are secured at the top by the same bolts as the Plates 84. The other ends are bolted to two 3½ in. Angle Girders overlapped one hole and attached to the sides by Angle Brackets. The front of the Angle Girders support a 5½ in. by 1½ in. and a 2½ in. by 1½ in. Flexible Plate overlapped three holes. Two 5½ in. Curved Strips, overlapped nine holes, are attached to the bottom of the Flexible Plates. The rear lamp, a ½ in. Pulley on a ¾ in. Bolt, and the number plate, a 2½ in. Narrow Strip attached by Fishplates, complete the back of the body. At the front, two 5½ in. Strips 70 are bolted between the Angle Girders 1 and 2 and the bonnet. The windscreen is built up from Narrow Strips of various lengths, as shown, and is attached to Flat Plates 20 by Obtuse Angle Brackets. ½ in. Pulleys with boss, attached to Angle Brackets, form the side-lamps, and they are fixed to Angle Girders 21 by right-hand and left-hand Corner Angle Brackets respectively. The headlamps are 1½ in. Flanged Wheels mounted on the bonnet with the help of 1 in. by ½ in. Angle Brackets.



Above: Close-up of gearbox. Below: A working gear lever is fitted



Running Boards and Mudguards

A 7½ in. Flat Girder 85 is bolted to the Angle Girders 75, then three 9½ in. Strips 86 are placed side by side, secured to three 1½ in. Strips, and fastened to the Flat Girder by two 1 in. by ½ in. Angle Brackets. The rear mudguards each consist of three 7½ in. Strips, bent to shape and attached to the running board by Angle Brackets. A Wheel Disc, fixed to the car body by an Angle Bracket, adds the final touch. The front mudguards consist of three 5½ in. Strips extended by Formed Slotted Strips bolted to Angle Brackets attached to the running board. The mudguard stays 87 are 2 in. Strips secured to the mudguards and chassis by Angle Brackets and 1½ in. Strips.

Before the 3 in. Tyres can be fitted on to the Spoked Wheels it will be necessary to trim the inside 'V' down until a flat surface is obtained. I realise that, after this, the tyres can no longer be used with 3 in. Pulleys, but the overall effect Spoked Wheels have on the model makes trimming the tyres well worth it. **—Spanner**

Parts required: 6 of No. 1a; 1 of No. 1b; 17 of No. 2; 18 of No. 2a; 8 of No. 3; 4 of No. 4; 7 of No. 5; 10 of No. 6; 11 of No. 6a; 2 of No. 7a; 2 of No. 8; 2 of No. 8b; 2 of No. 9; 2 of No. 9a; 4 of No. 9b; 4 of No. 9c; 6 of No. 9d; 1 of No. 9f; 19 of No. 10; 10 of No. 11; 52 of No. 12; 4 of No. 12a; 11 of No. 12b; 6 of No. 12c; 1 of No. 13a; 3 of No. 14; 1 of No. 14a; 1 of No. 15; 2 of No. 15a; 1 of No. 16a; 1 of No. 16b; 2 of No. 17; 13 of No. 18a; 5 of No. 18b; 5 of No. 19a; 2 of No. 20; 1 of No. 22; 3 of No. 23a; 1 of No. 24; 2 of No. 24a; 5 of No. 25; 8 of No. 26; 2 of No. 26c; 2 of No. 27d; 1 of No. 28; 2 of No. 29; 2 of No. 30; 360 of No. 37a; 316 of No. 37b; 126 of No. 38; 1 of No. 45; 8 of No. 48a; 1 of No. 52a; 4 of No. 53a; 19 of No. 59; 3 of No. 62; 8 of No. 63; 3 of No. 63d; 1 of No. 64; 1 of No. 70; 3 of No. 73; 1 of No. 74; 2 of No. 77; 4 of No. 82; 2 of No. 89; 10 of No. 89b; 4 of No. 90; 1 of No. 103h; 2 of No. 103k; 2 of No. 109; 15 of No. 111; 5 of No. 111a; 8 of No. 111c; 1 of No. 111d; 4 of No. 114; 2 of No. 116a; 1 of No. 120b; 1 of No. 133; 3 of No. 136; 1 of No. 136a; 2 of No. 140; 5 of No. 142b; 2 of No. 147b; 1 of No. 154a; 1 of No. 154b; 1 of No. 155; 2 of No. 162a; 1 of No. 171; 1 of No. 185a; 7 of No. 188; 8 of No. 189; 2 of No. 190a; 3 of No. 191; 2 of No. 192; 9 of No. 193e; 8 of No. 215; 2 of No. 224; 1 of No. 230; 1 of No. 231; 6 of No. 235; 3 of No. 235a; 6 of No. 235b; 1 E15R Electric Motor.

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Boys, here's a great idea from Meccano. Six sets, each specially designed to give the greatest excitement, the widest variety of games.
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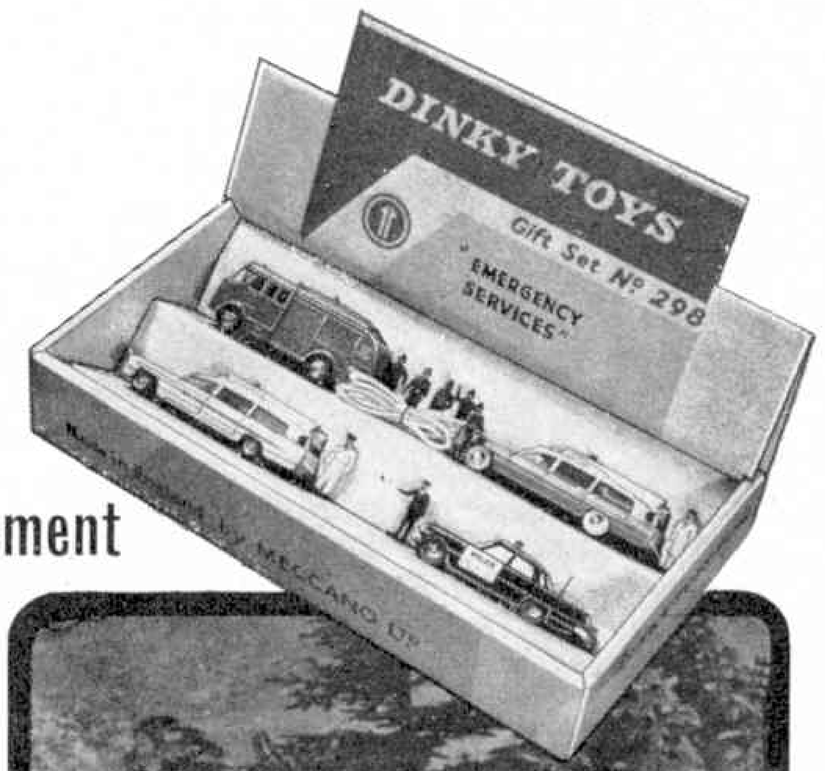
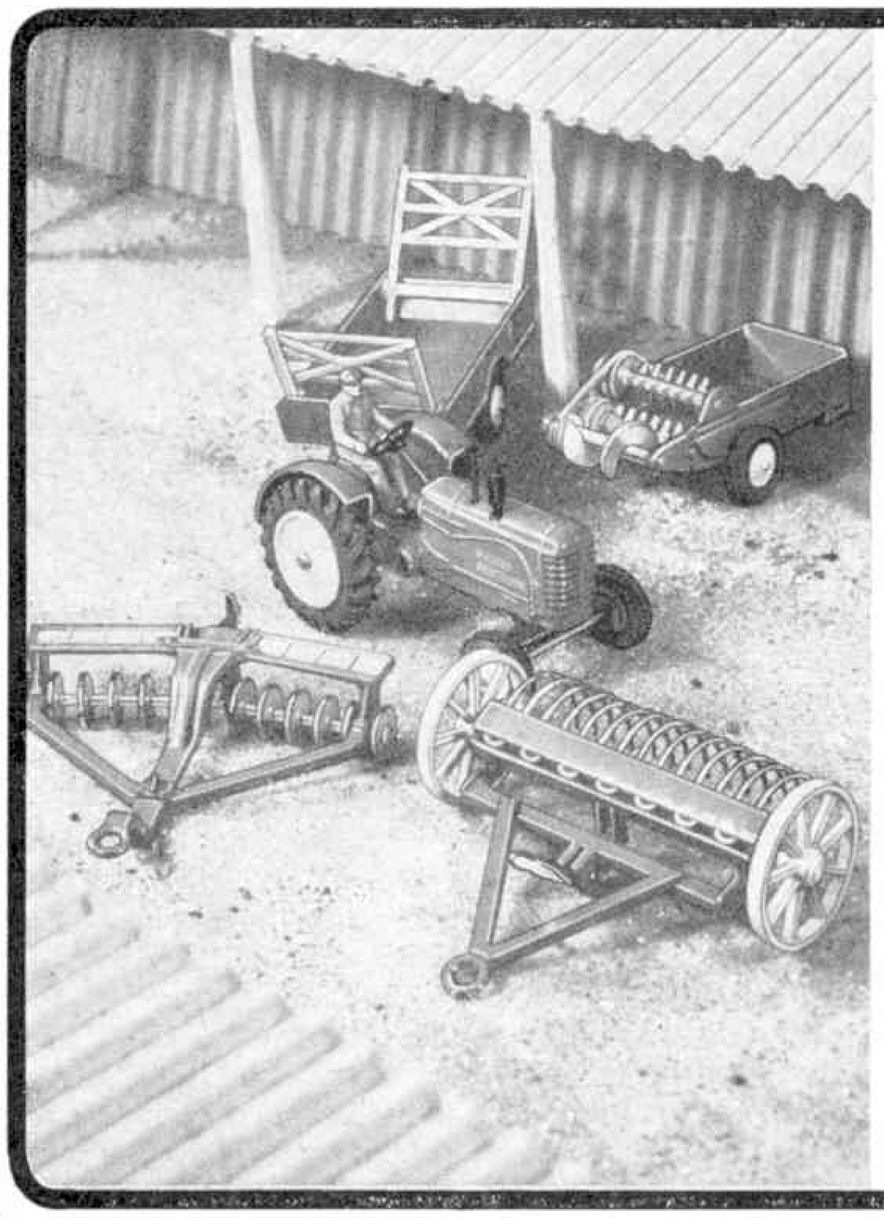


All set for hours of excitement



FARM EQUIPMENT SET

All the fun of the farm. All the variety of a farmer's life. You can plough, sow, carry loads, spread manure, gather in the hay.

Farm Tractor. Massey-Ferguson model, with driver. Steering wheel revolves.

Hayrake. For breaking up earth, covering seeds, etc. Discs revolve.

Halesower Harvest Trailer. With detachable fences.

Manure Spreader. Very impressive in action.

Set No. 398 **21/-**

HOLIDAY SET

Organise coach tours. Car trips. Run your boat to the seaside. All the fun of the holidays any time you like!

Vega Major Luxury Coach. Flashing trafficators. Prestomatic steering. Opening boot.

Plymouth Fury Convertible. Hood comes off, reveals fascia, steering wheel, seats. Bonnet opens to show detailed engine. Prestomatic steering.

Mark X Jaguar. Opening boot with luggage. Prestomatic steering.

Boat and Trailer. Healey sports boat. Trailer attaches to Jaguar.

Set No. 124 **35/11**

EMERGENCY SERVICES SET

Cope with any emergency—crashes, fires, accidents. Ideal for a model airport.

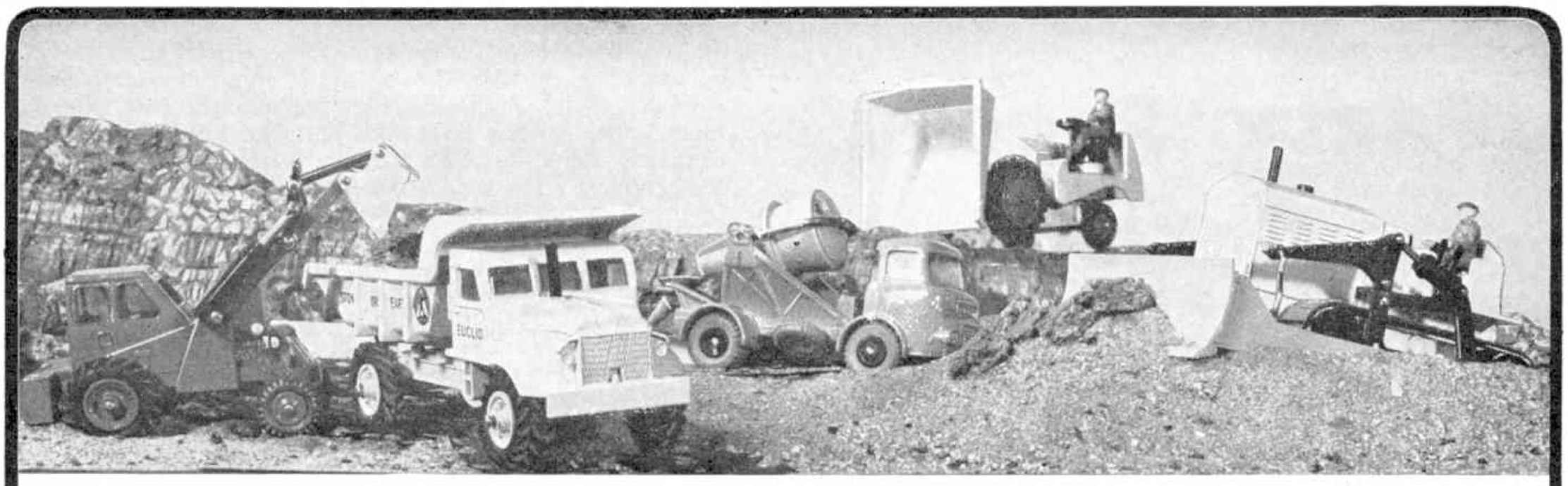
Airport Fire Tender. Flashing amber light. Revolving foam turret. Bell.

Ambulances. Both Super Criterions with drivers and attendants. One has flashing beacon and opening back. Other has a stretcher case.

Police Car. Ford Fairline. Aerial.

Personnel. Extra ambulance attendants, police officer, firemen with axes, breathing apparatus etc. Hosepipe.

Set No. 298 **35/11**



BUILDING SITE SET

Be a construction man—make motorways, rocket sites, houses. Or a demolition man—knock down old buildings. Clear ground, mix cement, carry earth.

Euclid Rear Dump Truck. Tipper works realistically.

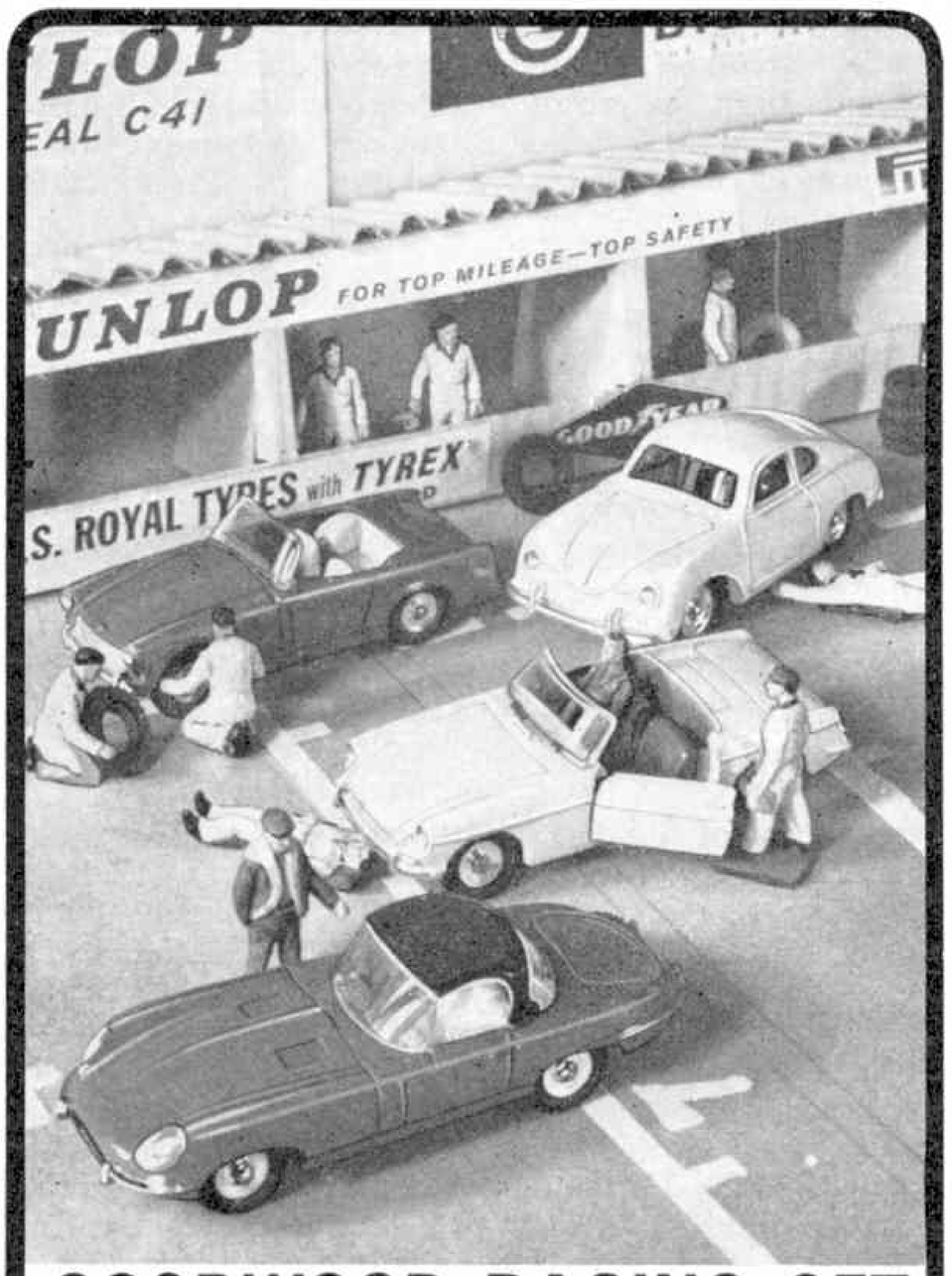
Blow Knox Bulldozer. Caterpillar track. Driver. Shovel rises.

Albion Concrete Mixer. Concrete mixer revolves as lorry travels. Spare wheel.

Muir-Hill Dumper. Dumper tips forward. Steering wheel revolves. Driver.

Muir-Hill Mechanical Shovel. Shovel rises and tilts. Driver. Detailed engine.

Set. No. 900 **53/11**



GOODWOOD RACING SET

Hold your own race meetings.
4 cars—two red, two white.

E Type Jaguar. Hard top removes to reveal fascia, bucket type seats. Prestomatic steering.

Porsche. A detailed model of this exciting car.

MG B. Doors open and click shut. Gearbox and lever. Bucket seats. Driver. Prestomatic steering.

Austin Healey Sprite. Fascia. Gearbox. Bucket seats. Prestomatic steering.

7 Mechanics and an owner.

Set No. 121 **22/11**

MOTORWAY SERVICES SET

Arrange chases with the Motorway Police Jaguar. Tow away breakdowns. Race to accidents with ambulance & fire engine.

Police Jaguar 3.4. In Motorway white. Blue flasher. Aerial. Driver and observer. Prestomatic steering.

Fire Chief's Control Car. Nash Rambler. With beacon.

Airport Fire Tender. Amber light flashes. Foam turret revolves. Bell.

Crash Truck. Top Rank Bedford with winding towing winch.

Superior Criterion Ambulance. Back opens. Light flashes. Driver and attendant. Prestomatic steering.

Set No. 299 **35/11**

"I'd love one of these super sets for my birthday".

Always something new from

DINKY TOYS®

precision-engineered by Meccano Limited

by **Spanner**

Party Special for Christmas

CHRISTMAS is almost here again and children everywhere are looking forward to it with anticipation. For many parents, however, the Festive Season brings the added worry of staging a children's party—a job which is sometimes far from easy.

If a party is to be a success, guests' interest must be held the whole time. Games, undoubtedly, are the answer to the problem, but we must admit that some of the traditional party games are getting a little "old hat". Children are soon bored with them and become restless; therefore, something new—and different—is required. The model described here *is* different, and I am sure it will be a big hit with everybody.

Basically, it is a form of roulette wheel made from Meccano and Elektrikit. When a large disc on top is spun, coloured lights flash on and off until, when it finally stops, only one lamp remains lit. Plenty of fun can be had guessing which one it will be.

Easy to build

In spite of the model's externally complicated appearance, and highly impressive operation, it is unbelievably easy to build—so easy, in fact, that it is not necessary to give complete step-by-step instructions. A sturdy framework of any required size is built up, depending entirely on the parts available. I made the illustrated framework 12½ in. long by 5½ in. wide by 2 in. deep, using Angle Girders for strength. This frame is covered by suitable Plates, one or more of which must be a 5½ in. × 2½ in. Insulating Plate (Elektrikit Part No. 510). Eight Lamp Holders (Elektrikit Part No. 539) are fixed to the Insulating Plate, but care must be taken to see that all these are completely insulated from the metal framework.

Contact mechanism

Pictured on its own is the most important part of the model —the spinning contact mechanism. Eight Contact Studs (Elektrikit Part No. 544) are bolted to an Insulated Bush Wheel 1 Elektrikit Part No. 514). A 5½ in. Insulating Strip 2 (Elektrikit Part No. 501) is then bolted to the Bush Wheel, as shown. A 1 in. radius flexible Wiper Arm 3 (Elektrikit Part No. 531) is bent to shape and attached to a Double Arm Crank 4. The Double Arm Crank is then fixed tightly to a Rod, mounted in the boss of Insulating Bush Wheel 1 and held by a Collar 5, being positioned so that the Wiper Arm presses gently but firmly against the heads of the Contact Studs.

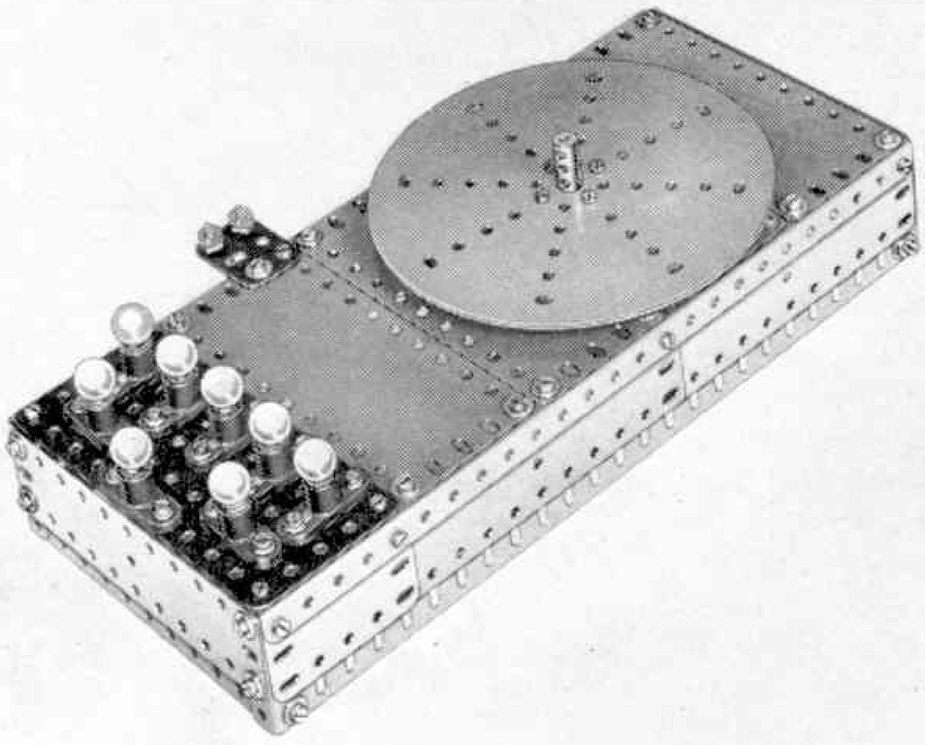
The completed assembly is mounted inside the framework by bolting Insulating Strip 2 to the Angle Girders forming the frame. The Rod protrudes through a hole in one of the covering Plates, this, preferably, being a Flat Plate rather than a Flexible Plate. An Angle Bracket is bolted to the underside of this Plate in such a position as to allow another 1 in. Wiper Arm, bolted to the free lug of the Angle Bracket, to press against the Rod.

Two 6 in. Circular Plates are bolted to a Bush Wheel which, in turn, is fixed on the protruding length of the Rod, followed by a Coupling. Two Circular Plates are used to provide the necessary weight required to keep the mechanism spinning, but if Plates are not available then any suitable replacement could be substituted.

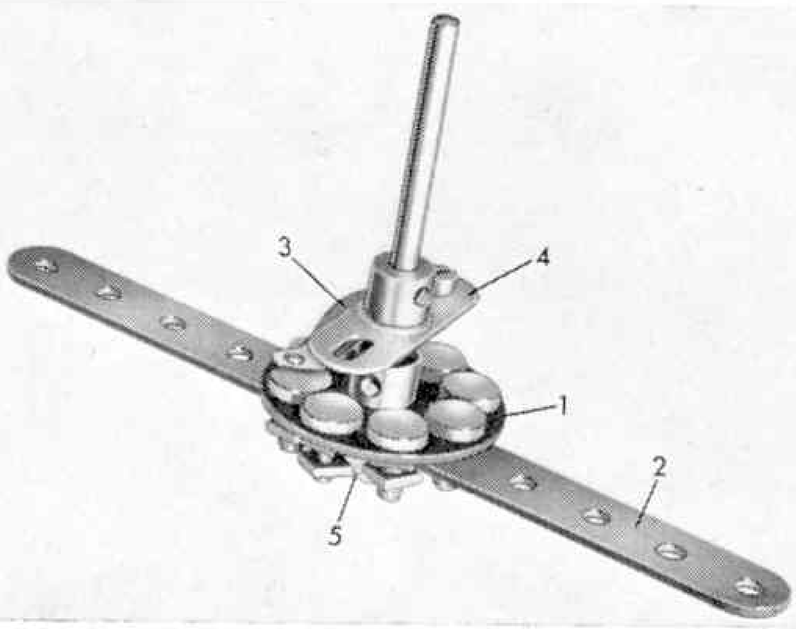
The wiring

A length of insulated wire is taken from each Contact Stud to one Terminal of each of the Lamp Holders. The other Terminals are then connected together by a length of wire, which is continued to a terminal 6, insulated from the chassis by a 1½ in. Insulating Flat Girder (Elektrikit Part No. 508). This wire must not make an electrical contact with the framework or any of the Terminals connected to the spinning contact mechanism. Lastly, a wire is taken from another terminal 7 and earthed by bolting it to the framework. Before the model will operate, however, leads from a battery or other power source corresponding to the value of the Lamps in the Lamp Holders must be connected to terminals 6 and 7.

For the benefit of builders who do not possess all the Elektrikit parts required, I should mention that Spare Elektrikit Parts can now be ordered through your local Meccano Dealer.



Besides Meccano standard parts, several Elektrikit parts are used in this Roulette wheel. *Below:* The spinning contact mechanism.



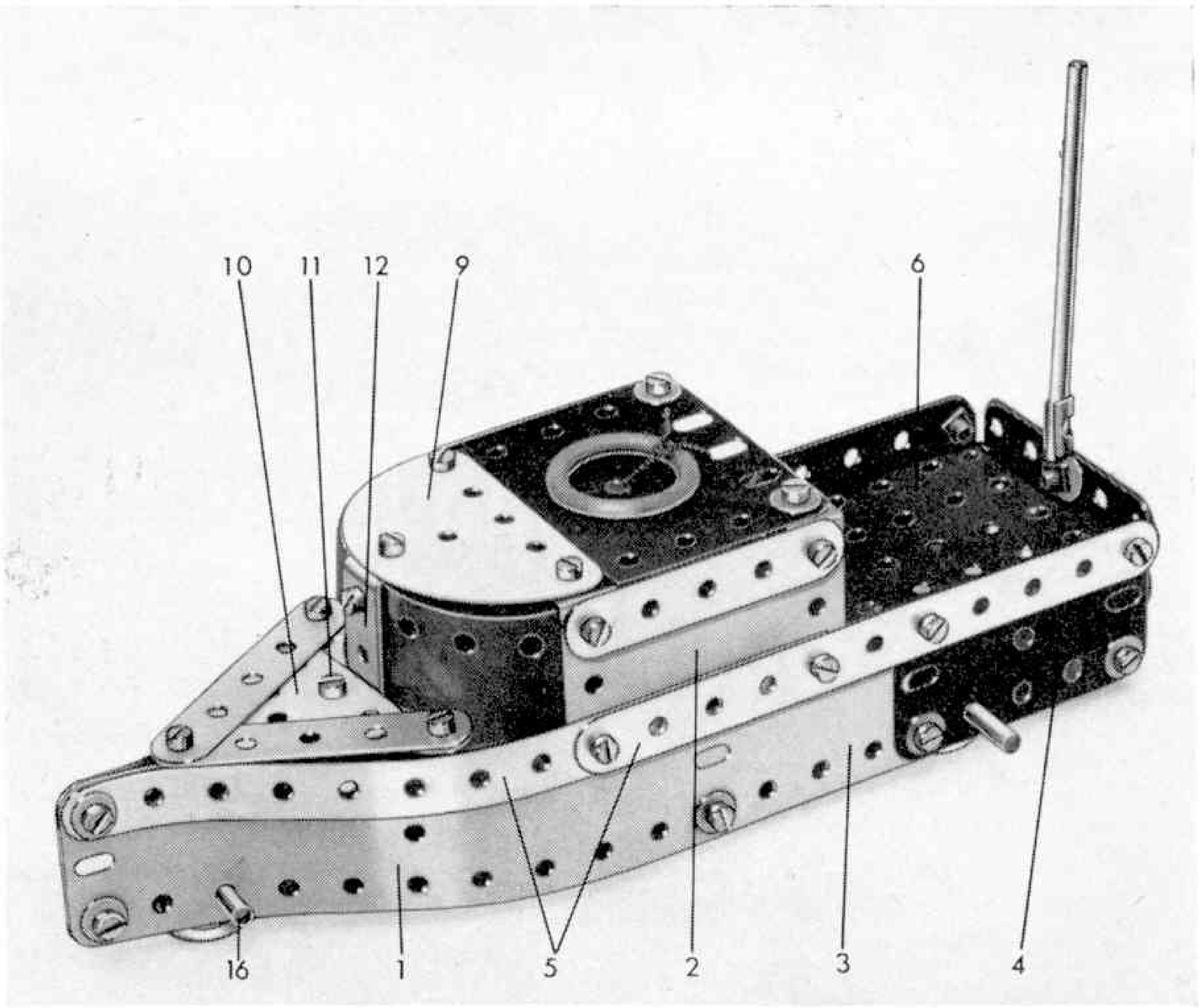
Calling Meccano Enthusiasts

Mr. G. Maurice Morris, of 248 Woolwich Road, Abbey Wood, London, S.E.2, who is a great Meccano enthusiast, has prepared two stereo-typed works on this hobby. The first, entitled "The Meccanoman's Guide" has 61 information-packed pages of great interest to the model-builder. Split into four sections, it covers the dates of introduction, modification and withdrawal of Meccano parts, lists and appraises all important items of Meccano literature, lists all models and articles which have appeared over the years in Meccano literature; and, finally, lists obsolete Meccano parts, giving working drawings for making many of them. The second is a 74-page supplement to the Guide, which covers, in addition to the four original subjects, other matters of interest such as "Motors and Ancillaries" and "Meccano Magazines from 1916 to 1964"—to name two of the five extra sections.

If support is forthcoming, Mr. Morris also plans to compile a list of world-wide Meccano enthusiasts. Any reader interested in this, or his two publications, should contact him at the above address.

by **Spanner**

A LAUNCH FOR YOUNGSTERS



A model launch on wheels made up from Meccano Outfit No. 3

RECENTLY, I mentioned in these pages that the main disadvantage of a model boat built in Meccano is that it will not float. A good deal of pleasure, however, can be obtained from Meccano Boats by simply fitting them with wheels. True, it is not very realistic to see a liner ploughing sedately across the living room floor but, at least, it's fun!

The model described here is based on a small pleasure launch, and is well within the scope of most young builders. Outfit No. 3 contains all the parts necessary for its construction, but it could also be built with Outfit No. 2 plus two Semi Circular Plates, part No. 214. A glance at the illustrations, incidentally, will show that our model has been built with parts finished in the new colours.

Building the sides

Two similar sides are each built up from a $5\frac{1}{2}$ in.$\times 1\frac{1}{2}$ in. Flexible Plate 1, extended by a $2\frac{1}{2}$ in.$\times 2\frac{1}{2}$ in. Flexible Plate 2, a $2\frac{1}{2}$ in.$\times 1\frac{1}{2}$ in. Flexible Plate 3 and a $2\frac{1}{2}$ in.$\times 1\frac{1}{2}$ in. Plastic Plate 4. Plates 1, 3 and 4 are edged at the top by two $5\frac{1}{2}$ in. Strips 5, the four rear bolts holding the Strips in place also serving to fix each side to a $5\frac{1}{2}$ in.$\times 2\frac{1}{2}$ in. Flanged Plate 6. Flanged Plate 6 is extended at the front by a Semi Circular Plate 7. A $2\frac{1}{2}$ in. Strip 8 is bolted to the top of Plate 2 on each side, the same bolts also holding two Angle Brackets in place. The roof, a $2\frac{1}{2}$ in.$\times 2\frac{1}{2}$ in. Plastic Plate extended by a Semi-Circular Plate 9, is attached to these Angle Brackets.

A foredeck is built up from a Flat Trunnion 10, edged on top by two $2\frac{1}{2}$ in. Strips and, underneath, by a Stepped Curved Strip. A Bolt 11, fixing the Curved Strip to the Flat Trunnion, also holds an Angle Bracket beneath the deck. A $2\frac{1}{2}$ in.$\times\frac{1}{2}$ in. Double Angle Strip 12 is bolted to this Angle Bracket and to Semi-Circular Plate 9. Two $2\frac{1}{2}$ in.$\times\frac{1}{2}$ in. Transparent Plastic Plates form the windscreen, which is bolted to each side and to the Double Angle Strip 12.

The two sides are now connected at the front as shown and are shaped to form a sharp bow. At the stern a $2\frac{1}{2}$ in.$\times\frac{1}{2}$ in. Double Angle Strip 13 is fixed between Plates 4. A $2\frac{1}{2}$ in. Strip 14 is joined to Double Angle Strip 13 by a Fishplate, then the rear flange of Plate 6 is overlaid by another $2\frac{1}{2}$ in. Strip 15.

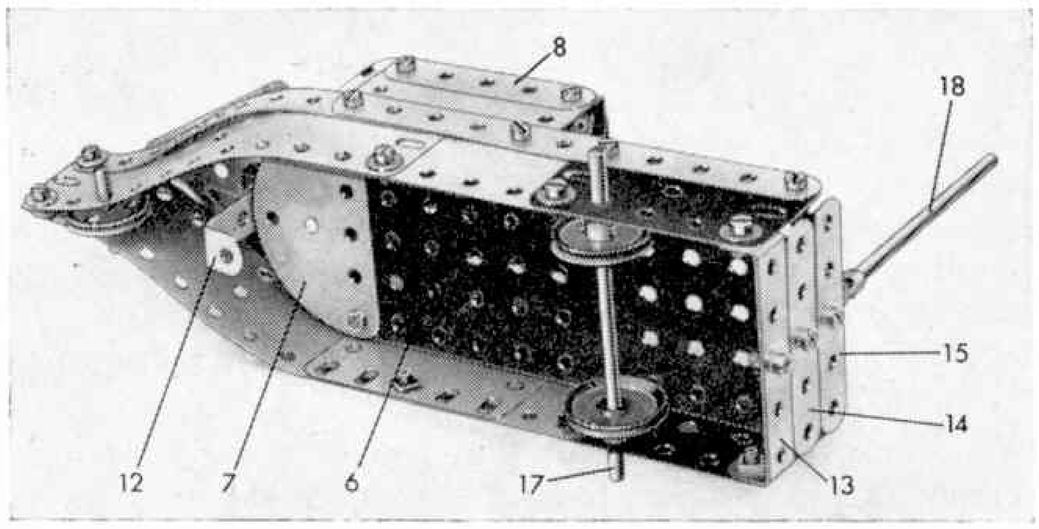
Mast for ensign

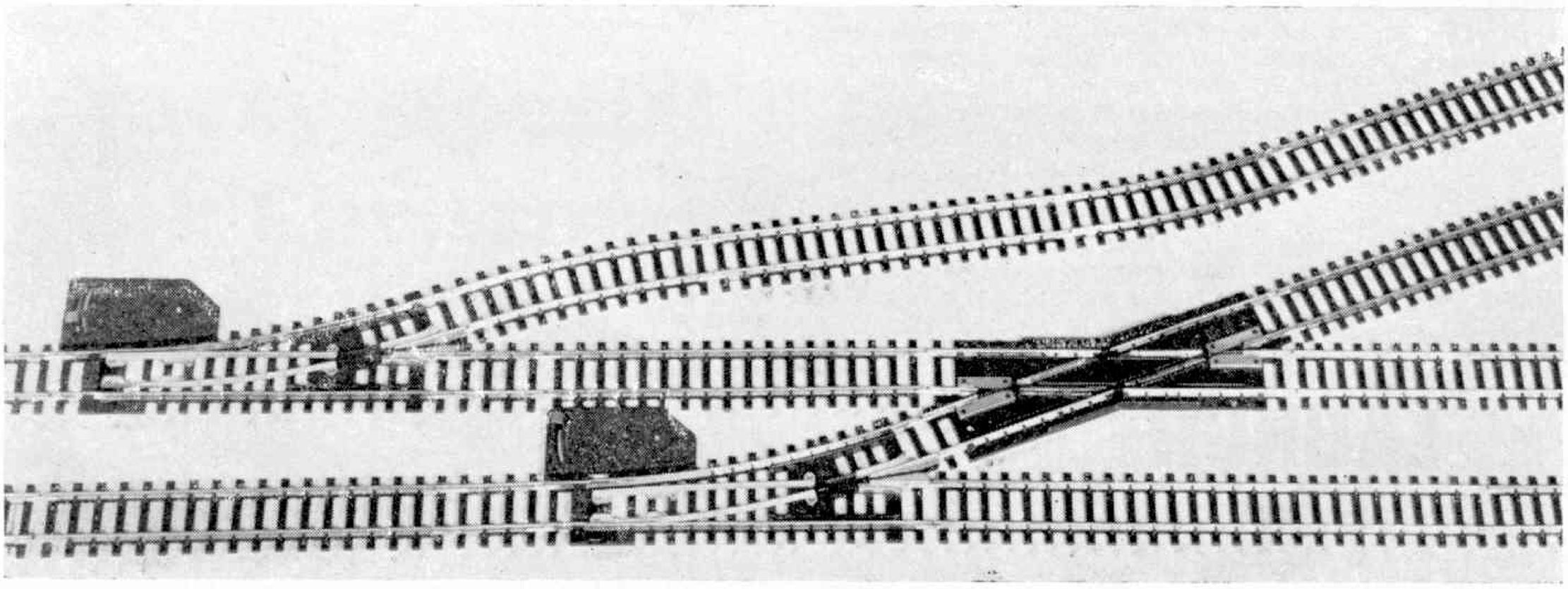
A Rod 16, carrying a 1 in. Pulley without boss, is mounted in Plates 1. The Rod is held in place by the pressure of the Plates themselves, caused by the curve of the bow. A $3\frac{1}{2}$ in. Rod 17, on which is mounted two 1 in. fixed Pulleys, is journalled in Plastic Plates 4.

Finally, an ensign mast 18 is added by mounting a $3\frac{1}{2}$ in. Rod in a Rod and Strip Connector bolted to the rear of Flanged Plate 6, and a Rubber Ring is tied to the roof of the cabin to represent a life-belt.

Parts required.—4 of No. 2; 6 of No. 5; 1 of No. 10; 5 of No. 12; 2 of No. 16; 1 of No. 18b; 2 of No. 22; 1 of No. 22a; 38 of No. 37a; 38 of No. 37b; 8 of No. 38; 2 of No. 48a; 1 of No. 52; 1 of No. 90a; 1 of No. 126a; 1 of No. 155; 2 of No. 188; 2 of No. 189; 2 of No. 190; 2 of No. 193; 2 of No. 194; 1 of No. 194a; 1 of No. 212; 2 of No. 214.

An underside view of the launch showing the simplicity of the model's construction





The double junction shown here is reproduced from the diagrammatic layout figure 6 below

TRACK FORMATIONS

by **Linesman**

MANY of the track formations in use on British Railways can easily be reproduced in model form using Hornby-Dublo track components. The terms used to describe the wide variety of track formations may, however, puzzle some readers—particularly the younger ones—and I would like to take this chance of explaining the uses of the more common formations, and how they can be built with Hornby-Dublo track parts.

The two terms most commonly used are 'facing', and 'trailing', points. These names simply refer to the way in which points are facing in relation to the direction in which trains are moving. Most of you will know that, in Britain, trains are run according to the left hand principle—that is, that on a double track main line, trains always travel on the left hand track. If you refer to figure 1, you will see part of a double track main line with two points forming a crossover. Let us suppose that a train is travelling in the direction indicated by the *double* arrows on the *upper* line. The train would first pass over that end of the point containing the switch rails and then the 'frog'—or V-rails—of the point. In such a case, the point becomes a 'facing point'. The same applies if a train is travelling in the direction indicated by the *double* arrows on the *lower* line.

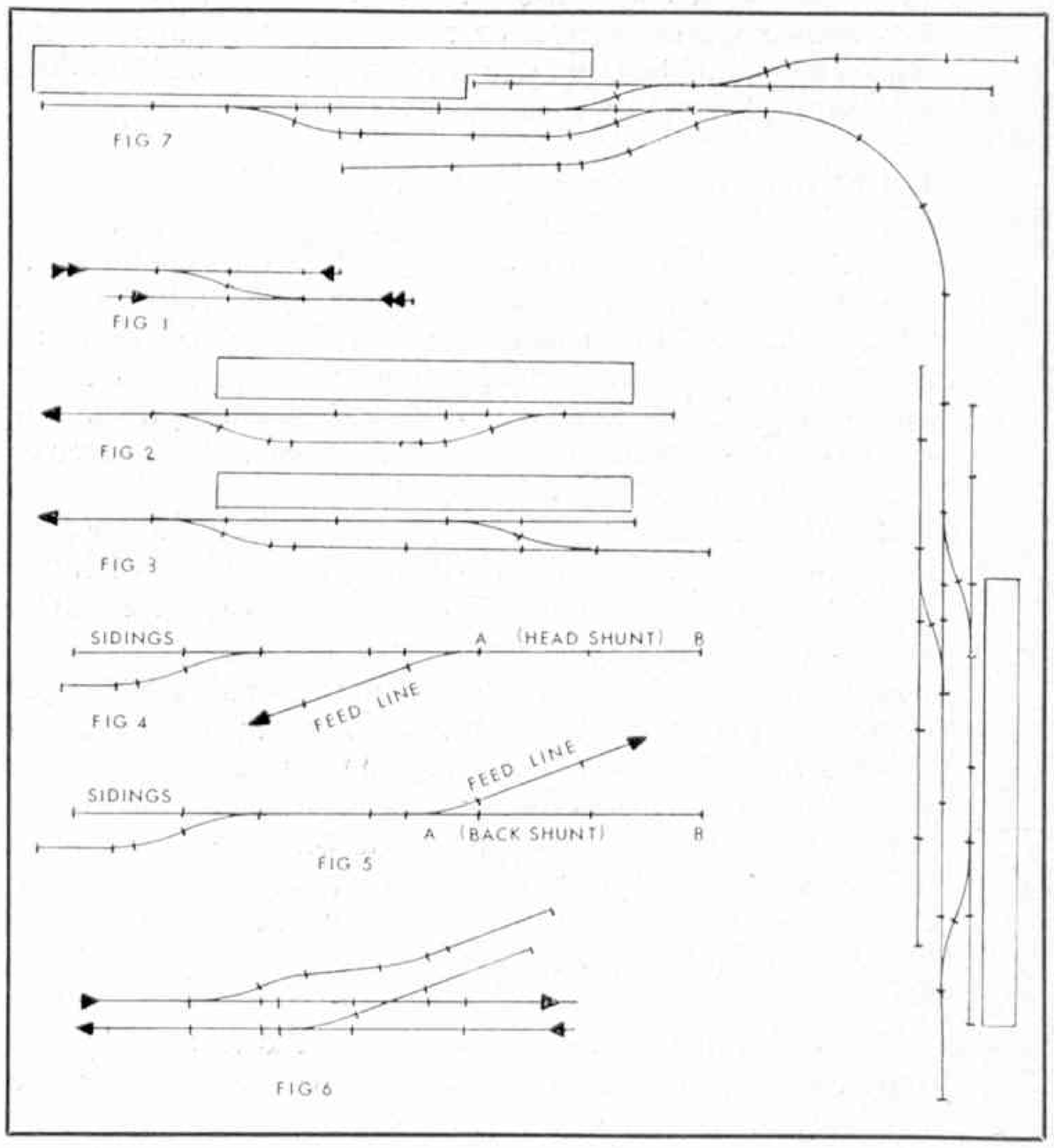
If a train is moving in the direction shown by the *single* arrow on the *upper* or *lower* line, the point becomes a 'trailing point'.

Building a crossover

A simple form of crossover is easily built from two Hornby-Dublo Points of the same hand, that is, two left or two right. It must be borne in mind however that if, for reasons of track geometry, the ends of the point rails are required to coincide with the ends of the rails opposite the points, two two-thirds Straight Rails—each the equivalent in length of one point—should be used. The principal function of crossovers is to divert trains between two parallel tracks. Crossovers can often be found useful when building a 'run round' (or loop) which is the next formation I want to deal with.

As the name implies, the 'run round' is used for transferring the locomotive from the head of the train to the tail, and figures 2 and 3 show two typical arrangements of this formation. Figure 2 is the more popular, and an additional siding can be added by forming a crossover at the buffer stop end of the station. This, in fact, can be done at both ends of the run round, and the lower station shown in figure 7 has been designed in this way. This is a useful method of adding extra siding space to your layout, and many enthusiasts use the siding formed by a crossover in the run round to feed a goods shed or a small locomotive depot.

Figure 3 differs from figure 2 in the respect that a facing crossover is used at the buffer stop end of the station instead of a trailing one. A disadvantage here is that a longer



platform is usually needed to hold a train of equivalent length to that which can be accommodated in the example shown in figure 2. Building a run round from Hornby-Dublo track is quite simple, and the one shown in figure 2 requires only one Left Hand Point, one Right Hand Point, two Curved Half Rails (No. 2711), two Curved Quarter Rails (No. 2712), five Straight Rails (No. 2701), one Straight Short Rail (No. 2706), and one Straight One-Third Rail (No. 2703). The dimensions are not critical, however, and the run round can be designed to suit a station of your own choice.

Terminal or through

When designing a terminal station, some form of run round should be provided to allow the locomotive to detach itself from the head of its train; unless this is done, a second locomotive will be needed to remove the carriages from the station.

We have discussed then, the two most important items of any station—the crossover and run round. In the case of through stations, however, a loop is *not* essential if trains are not likely to reverse once they are in the station.

When choosing a station design, it is wise to decide first on the length of the main platform by calculating the maximum number of coaches likely to be used in the station, and then converting that into feet and inches. This measurement should then be transferred into terms of Hornby-Dublo Rails. This track should lie between the point at the beginning of the run round and the point at the opposite end. A further 9 in. to 1 ft. should be added to the section of track immediately preceding the buffer stops. This is simply to accommodate the loco once it has been detached from the coaches and will, of course, vary according to the maximum length of the locomotives in use.

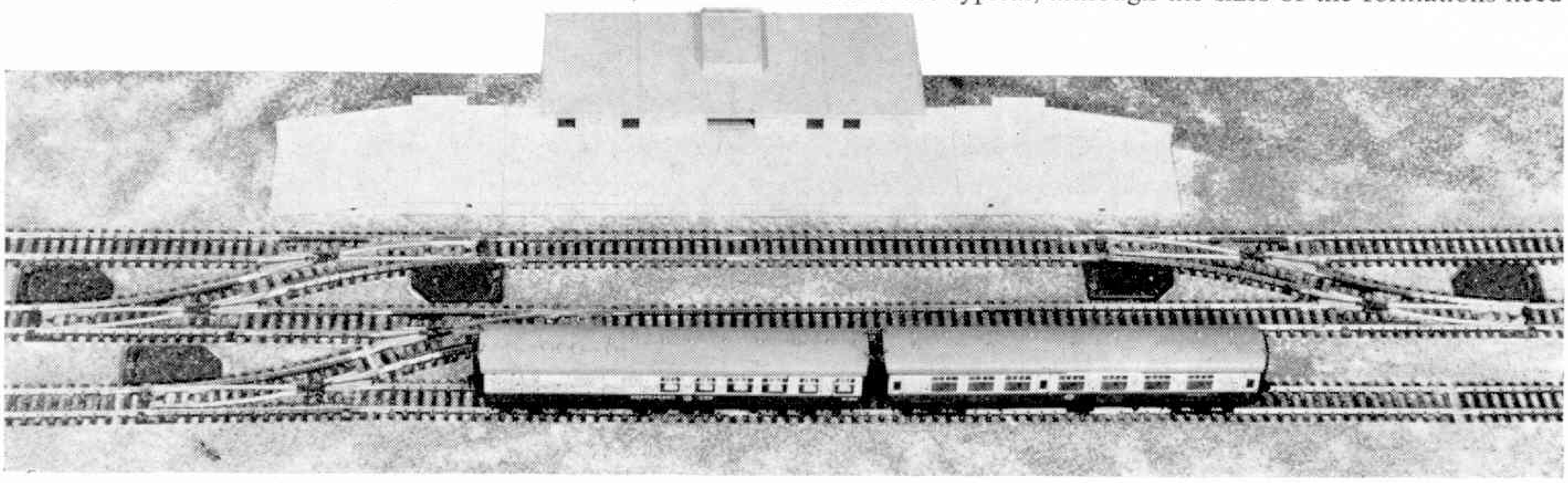
The length of the run round will have to be measured to the nearest $1\frac{5}{16}$ in., which is the length of the Hornby-Dublo Short Rail (No. 2706). The composition of the track opposite the run round can then be decided by including Straight Rails, Two-Thirds Rails, One-Third Rails, and so on, until both lines are equal in length.

Designing the sidings

Once the position of the run round has been decided, you can turn your attention to the design of the sidings. Most stations of moderate size have what is known as a 'head shunt', or 'back shunt', or both, and most sidings have, at one end, a 'neck' (distance A, B on figures 4 and 5) for the locomotive to travel along when shunting. 'Head shunt' and 'back shunt' refer to the position of the shunting neck in relation to the line that 'feeds' the sidings.

Figure 4 shows a typical form of head shunt, and you will appreciate that a goods train approaching the shunting neck, engine first, along the track marked 'feed line' would shunt wagon into the sidings by reversing, once it had reached the limits of the head shunt (B). A locomotive on the head of a train travelling into the sidings shown in figure 5, however, could not shunt wagons into the sidings without the aid of a second locomotive following on behind, or without reversing, once it had reached the sidings, and leaving wagons in the back shunt. Only if a second locomotive is situated at the bottom end of the back shunt (B) can a goods train be sorted and shunted in the sidings at the opposite end.

The number of rail components illustrated in figures 4 and 5 are typical, although the sizes of the formations need not be adhered to closely. One rule that must always be remembered when designing a goods yard is that the length of the 'head' or 'back' shunt is dictated by the maximum length of the goods train likely to use the yard.



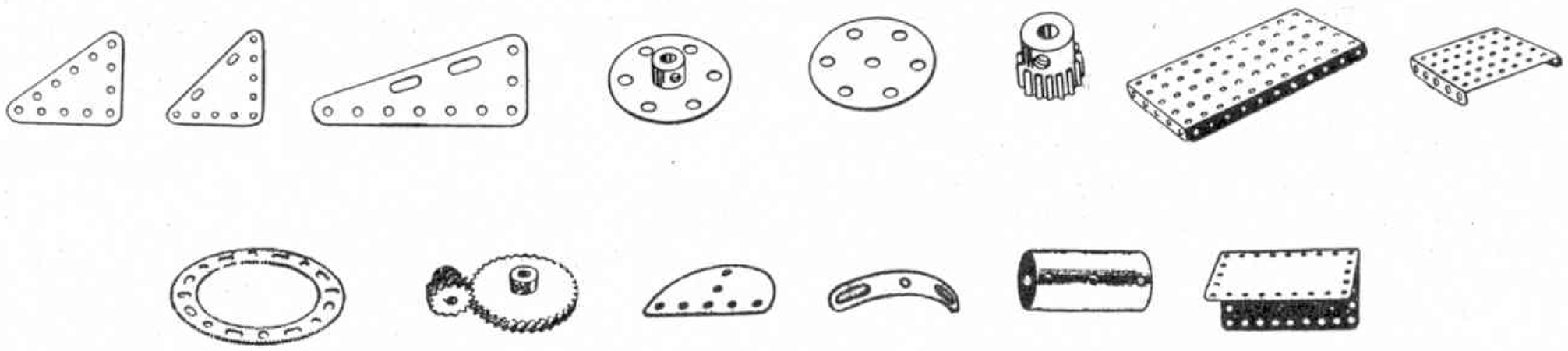
Three crossovers are featured in this section taken from diagram 7

Double junction

A rather more complicated track formation is the 'double junction', which allows two double track main lines to make a junction with each other. It is normally difficult to assemble using proprietary track components, and a modified form of double junction is shown in figure 6. In this instance, trains proceeding in the direction of the arrows on the upper main line track can travel along the correct line on to the branch line, and trains approaching the junction are able to travel on to the *lower* main line in the correct fashion. This formation is useful if a double track main line terminal station is to make a junction with the main line.

The two end-to-end layouts illustrated and described in the August 1963 edition of the 'Meccano Magazine' proved so popular, according to the letters that you sent me, that I thought I would design another end-to-end layout—this time an 'L'-shaped one. The plan (figure 7) includes two rather interesting station designs. Included in the upper one are two of the features I have described in this article. One is a back shunt, and I invite readers to see if they can spot it. The other is a run round—a feature which is repeated in the track layout of the second station.

The lower station also has a head shunt, and you can see this on the third road from the platform face. With a layout of this kind many exciting operational possibilities are opened up. As an example, timetable running can be indulged in and, at some future date, I hope to tell you how to compile a timetable for your model railway.



Dealers who specialise in Meccano spare parts

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

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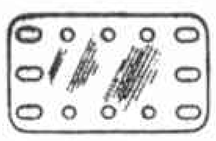

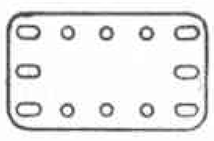

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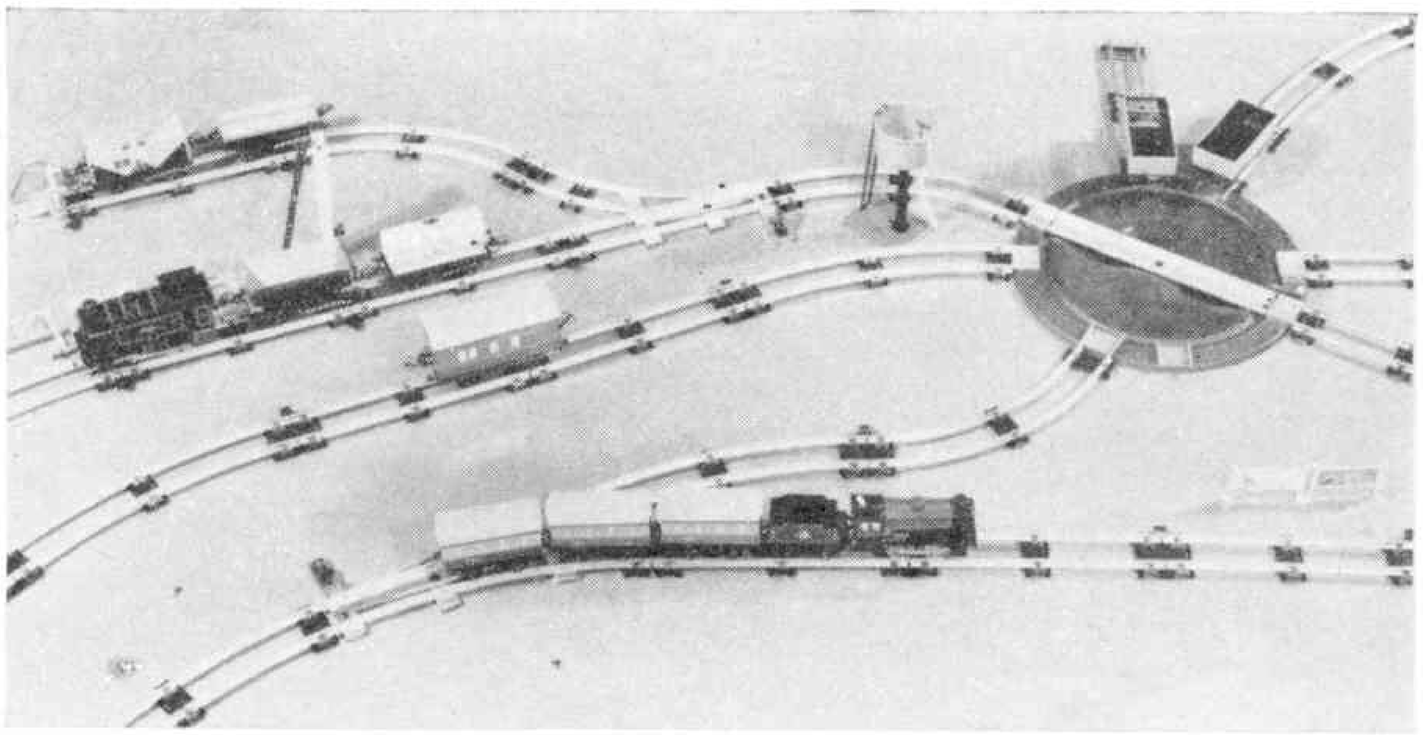
by **Layoutman**



Showing how Hornby 'O' Gauge track can be used to provide an effective system of sidings. On the main line in the foreground is a No. 20 locomotive and set of coaches. On the left you see a No. 40 Tank Loco and suitable items of rolling stock. The spurs which radiate from the Turntable could lead off to a locomotive depot or sheds. A Hornby No. 1 Water Tank and a Single Arm Signal help to add a further air of realism.

Some Hornby 'O' Gauge Topics

CLOCKWORK drive is probably one of the oldest, yet most reliable forms of propulsion ever applied to miniature railways and I am sure that it is no coincidence that the beginning of the Christmas holidays heralds the time when enthusiasts, young and old, begin to plan extensions and additions to their layouts.

For those of you who receive a Hornby 'O' Gauge Train Set this Christmas, I would like to pass on a few hints to help you extend the basic circle of track supplied with your train set. Six different sets are sold by Meccano Ltd. Two of these include the powerful No. 40 Tank Loco., with either passenger coaches or goods wagons and sufficient track to make up an oval measuring 5 ft. 4 in. by 4 ft. 6 in., with curves of 2 ft. radius. In the smaller sets, in which the locos are of the No. 20 or No. 30 type, the oval included in the set measures 3 ft 3 in. by 2 ft. 6 in. since the curves are of the 1 ft. radius type. Straight rails, and curves of both radii can be bought separately so that you can enlarge the initial oval of track, but the No. 40 Tank is not intended for use on 1 ft. radius curves. Another point to be borne in mind is that different types of Couplings are fitted to the No. 20 and No. 40 items of rolling stock. These two Coupling systems are not interchangeable, and so you cannot link No. 40 stock with No. 20. Both systems have an interesting range of rolling stock for you to choose from.

Easily assembled

The track components available separately allow almost any formation to be built, and you will see in our main picture a turntable with spur tracks leading from it, and approach lines running to it. Such formations are easily assembled using standard components, and it is often fun to experiment.

The basic oval of track supplied with the Train Set can be enlarged in a variety of ways. It can, for instance, be lengthened by adding straight rails between the two half ovals of track. Alternatively, two complete ovals can be linked simply by using four Points and a number of Straight Rails. Another interesting formation is the figure-of-eight, which is assembled by using an Acute Angled Crossing, four Straight Rails, and 20 Curved Rails (if they are of 2 ft. radius). Many other track formations can be built up using standard components, and if any of you would like a leaflet describing a selection of them, please write to me.

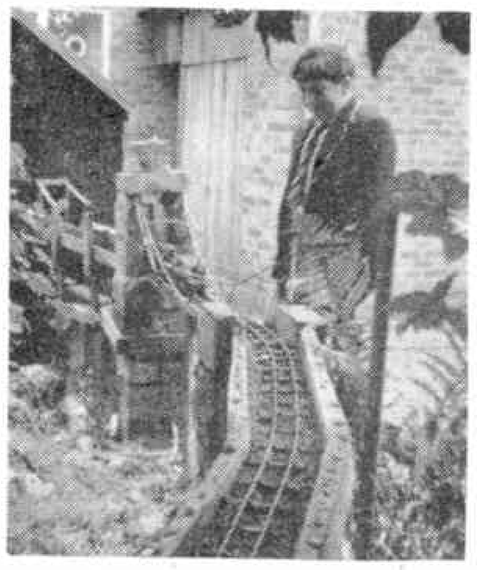
'The Highland Line'

Many enthusiasts have collected Hornby 'O' Gauge locomotives and stock for a number of years, and Mr. Maxwell Walker recently wrote to me describing his layout 'The Highland Line' which is built in the garden of his home. Mr. Walker's railway follows a winding course on rocky embankments and felled trees from the far end of his garden, where there is a terminus station on a rather mountainuous-looking promontory, to the important crossing known as 'Deadman's Halt'. Railway company notices were bought from a closed branch line, and these were erected in various positions around the garden to add to the atmosphere of the railway.

His terminus station is housed in a shed measuring 9 ft. by 6 ft. A single line runs into the shed and divides into three once inside. These three tracks then diverge on to the turntable and three sidings run out beyond. Two other spurs from a turntable run round the back, and one of these divides again. The nearside main line has a branch running up an incline, and round the end of the shed to a goods depot. Many pre-war Hornby 'O' Gauge locomotives and items of rolling stock can be seen, all of which blend very pleasantly with the current Hornby models. One of the early Hornby locomotives in use is approximately 30 years old. Mr. Walker uses Hornby track on some parts of his layout, and brass rail, properly ballasted to absorb rainwater, on the outdoor sections.

There is something distinctly attractive about Mr. Walker's railway, and I am sorry this resumé is so brief. Perhaps at some other time I may be able to tell you a little more about it.

Mr. Maxwell Walker watches one of his Hornby 'O' Gauge trains passing over a bridge on his garden layout.



A section of the track which runs its winding course through Mr. Walker's garden. Standing by the side of the railway is his son, Jeremy.

The Rolls-Royce Silver Cloud Mk. III is one of the most elegant cars to be modelled by Dinky Toys

Ending the year in style

by **Chris Jelley**

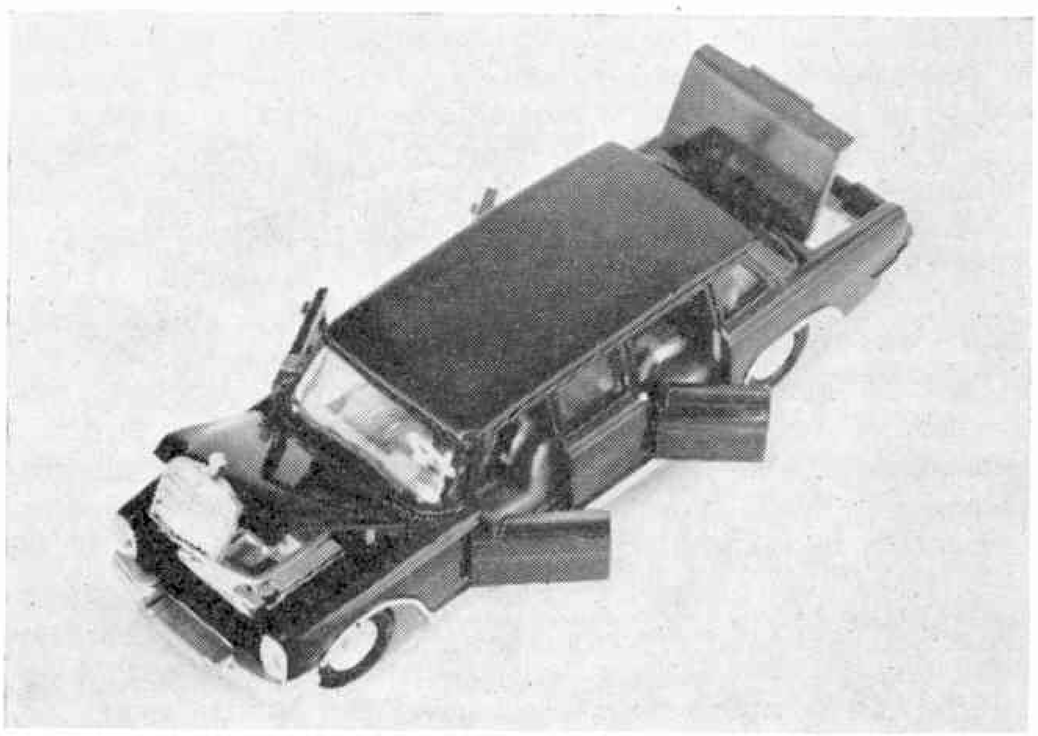
DINKY Toys end 1964 with a bang! Not one, not two, but three new models are scheduled for release this month—and three first-class replicas they are, too!

Pictured at the top of the page is the Rolls-Royce Silver Cloud III, a luxurious vehicle that has already won the admiration of the world. As you may have guessed, it forms the prototype for new release No. 1 which, I think, is destined to ride as high in the miniature world as the real car does in the adult world. Attractive features are numerous. They include, as usual, Prestomatic steering, 4-wheel suspension, windows and full interior fittings, but, in addition the model has jewelled headlamps and two opening doors, plus a bonnet that opens from the side—just as the real one does—to reveal a highly-detailed engine. New-type wheels are fitted, the radiator and bumpers are plated and the baseplate, sporting much chassis detail, is die-cast in Mazak. Also, this is the second Dinky Toy to be fitted with tipping seat-backs. A flamboyant dark blue finish succeeds in capturing the refined air of elegance expected of such a 'quality' car.

Dimensions are: length 5 in.; width 1¾ in.; height 1½ in.; wheelbase 2⅞ in.

Three versions

Rolls-Royce make the Silver Cloud III in three versions —a two-door saloon, a four-door saloon, and a drophead coupé. We are modelling the two-door saloon version shown in the picture. Power for the actual car is provided by a huge 6-cylinder engine of 6,230 c.c. capacity that gives the car a top speed of something in the region of 115 m.p.h. Drive to the rear wheels is via an automatic 4-speed and reverse gear box actuated by a lever on the steering column. Power-assisted steering is fitted—a necessary feature con-



Last month we promised a photograph of the new Mercedes Benz 600. This model has four opening doors, plus an opening bonnet and boot. The interior is fully 'upholstered'

One of this month's new Dinkies is based on the Brink's Armoured Car, seen here.

The new Ford Cortina also joins the ranks of Dinky Toys

sidering that the car weighs more than two tons—and power-operated windows are available as an optional extra, along with several other pieces of equipment.

The coachwork itself is hand-built by H. J. Mulliner, Park Ward, one of the oldest and most famous coach building firms in the world. Inside, the car is upholstered in top grain English hide with a polished walnut veneered facia panel. Externally, an interesting feature for a type of car well-known for its reserve in styling are the twin headlamps. Rolls-Royce cars have always been big, and the Silver Cloud III is no exception. Approximate overall dimensions are: length 17 ft. 6¼ in., width 6 ft. 2 in., height 5 ft. 3½ in., wheelbase 10 ft. 3 in. What can be said to sum-up the vehicle? Simply this—it is a Rolls-Royce—the finest car in the world.

The new Cortina

Visitors to this year's Motor Show in October may well have seen the prototype of our second new release—the new Ford Cortina—which made its debut there. Externally, there is not a great deal of difference between this model and the original version, as our picture of the new Cortina shows. In fact, there are only two major alterations. The radiator grille has been modified, and air vents have been fitted behind the rear side-windows. These air-vents are part of a new ventilation system known as "Aeroflow" which, in the Ford Company's own words, "brings you almost air-conditioned comfort". Movable nozzles are fitted one at each end of the facia and allow a stream of warm or cool air to be directed anywhere inside the car. The ventilators at the rear are extraction vents for this new system. The facia itself has been redesigned and a crash pad added to increase safety.

Excluding estate versions, the new Cortina is available in three forms—saloon, de luxe saloon and super saloon. A 1,198 c.c. capacity 4-cylinder engine, developing 54 b.h.p. (gross) at 5,000 r.p.m., is fitted as standard in the saloon and de luxe saloon, while the super saloon has a 4-cylinder engine of 1,500 c.c. capacity that develops a gross power output of 65 b.h.p. at 4,800 r.p.m. Although normally powered by the smaller engine, the de luxe saloon is available with the larger one, if required. Transmission on all versions is via a four-speed and reverse gearbox, with synchromesh on all forward gears. Of particular interest from the safety viewpoint are the disc brakes on the front wheels—a feature which, I think, is desirable on most family cars.

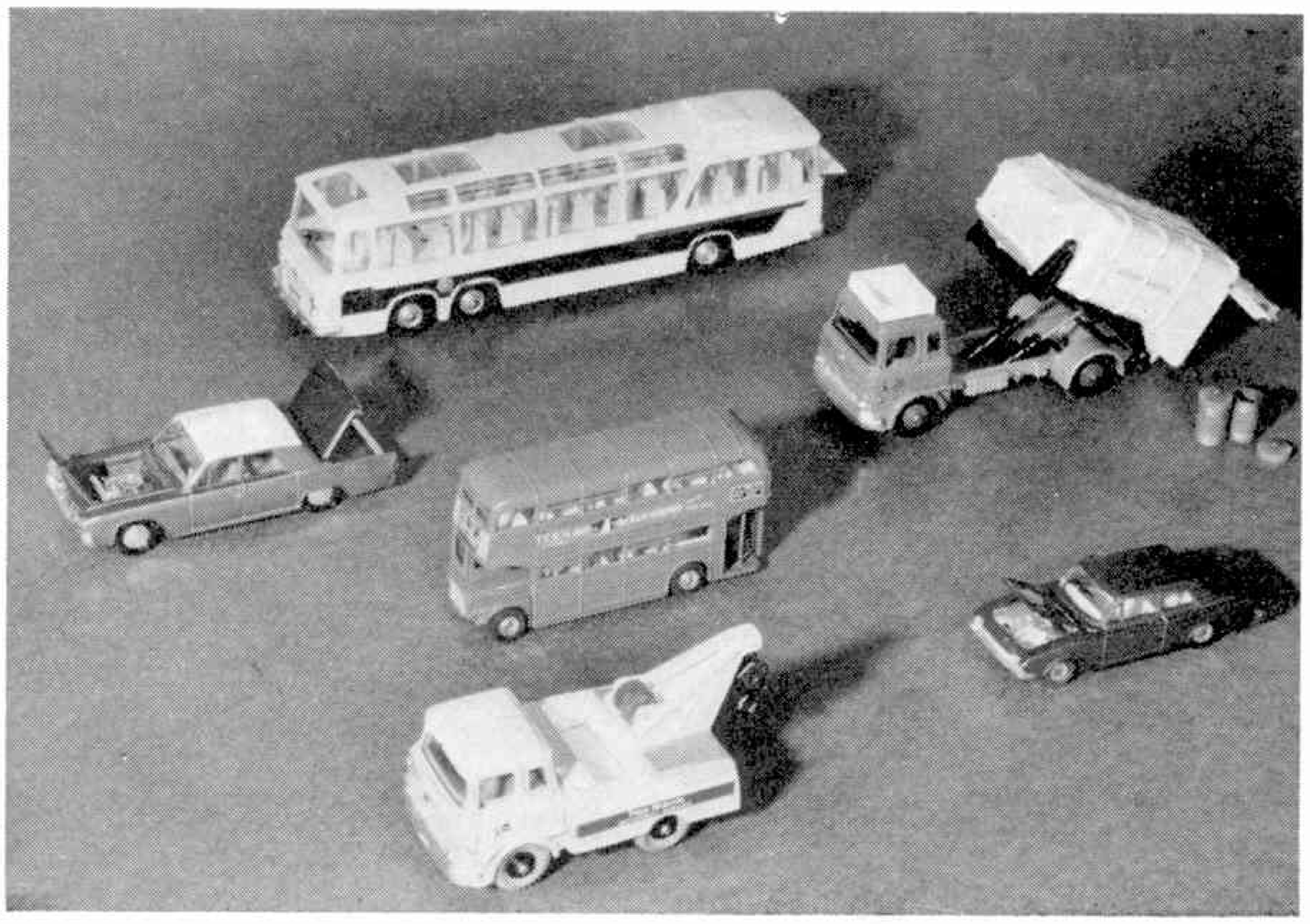
Turning, now, to the Dinky Toy, this has, like the earlier model, two opening doors, windows, interior fittings, Prestomatic steering, 4-wheel suspension and tipping backs on the front seats. Unlike Model 139, however, it has jewelled headlamps and an entirely new colour-scheme of yellow with a white roof and red seats. It is marketed under list number 133.

Transporting gold

Before space runs out on me, I must move on to the very last Dinky Toy due to appear in 1964 — the Brinks' Armoured Car (No. 275). Brink's are a private security company who do the same sort of job in America that a firm such as Securicor do in Britain. One of their main duties is to transport money and gold for banks or to carry large payrolls for industrial concerns, etc. To do this they use strong armoured vans, and it is one of these, made by General Motors, that we have produced in miniature. Features of the Dinky model embrace opening cab and rear doors, interior fittings, and windows. Inside the cab, the windows of which are fitted with removable protection screens, are a driver and guard in semi-official uniform. The vehicle is finished in grey, decorated with authentic transfers. The windscreen and windows are tinted, and the model comes complete with two opening chests, each containing eight 'gold' ingots. Overall dimensions are:— length, 4¾ in.; width, 2$\frac{5}{64}$ in.; height, 2$\frac{3}{16}$ in. Wheelbase, 3¼ in.

On these pages we show you pictures of the actual vehicles on which this month's Dinky Toys are based. The models themselves are featured in our advertisement pages, but I will try to include further views of them shortly.

Six of the most popular Dinkies produced this year — No. 952 Vega Major Luxury Coach, No. 170 Lincoln Continental, No. 289 London Routemaster Bus, No. 978 Refuse Wagon, No. 434 Bedford T.K. Crash Truck and No. 130 Ford Consul Corsair.



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• M.M.'s—back numbers, 1960, 1962, 1963. List from Tee, 136 New Dover Road, Canterbury, Kent.

• M.M.'s 1950-1964; collection of Dinky and Corgi cars, etc.; Meccano set No. 7; many shipping and railway magazines. S.A.E. please. R. H. Green, 38 Britannia Drive, Gravesend, Kent.

• Meccano No. 10, as new. Stacks of spares, including two electric motors, transformer. Offers, R. Ottoway, 32 Wingrove Road, Newcastle-upon-Tyne.

• Meccano—large assortment about set 4, many gears, magic motor; 45/-. Apply: 184 Jersey Road, Osterley, Middx.

• M.M.'s 1942-1957, "Eagles" Vol. 1-Vol. 5, aircraft books, magazines. S.A.E. details. 188 Coventry Road, Ilford, Essex.

• Meccano Magazines, 1956, 7 and 8. S.A.E. for list. 12 Williams Terrace, Croydon, Surrey.

• 3-rail Hornby Dublo 0-6-2 T goods set. Six coaches. "Duchess of Atholl" 4-6-2, station, points, track, etc. Details, offers. Hudd, 35 Regent Street, Gloucester.

• Clearance cheaply, 100 radio electrical items, lamps, transformers, chokes, valves, condensers, microphones, etc. S.A.E. list. 45 Leycroft Way, Harpenden, Herts.

• Two Tri-ang "00" "TT" sets. Selling separately. Quick sale, low prices. S.A.E. Beckett, 67 Sebastian Avenue, Shenfield, Essex.

• 100,000 back number loco books, combines, A.B.C. magazines. Plus all current Ian Allan railway publications. S.A.E. for lists. M. Thelwall, Minimarket, Crewe.

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• M.M.'s December '52 to August '53, and from April 54 to March '58. "Airfix Magazines" June '60-August '63; over 200 "Hobbies Weekly", '58-'61, many with designs. Any reasonable offer considered. R. James, Frilsham Manor Farm, Hermitage, Berks.

• For Sale: Quantity of Hornby Dublo Three-rail track, etc. Write for details to: R. Wainwright, 13 Eddisbury Avenue, Flixton, Urmston, Lancashire.

• Several "0"-gauge steam locos, new, 4-wheel oscillators, geared drive, 90/- each, post paid. Baxter, 103 Morningside Road, Whangarei, New Zealand.

• M.M.'s, August 1956-August 1961 complete, perfect condition. Any offer accepted. B. Young, 32 Beresford Road, Harrow, Middx.

• Large quantity Meccano, composed number of sets, E20R and two No. 1 motors. Cheap. Mamod S.E.2 and Meccano steam engines. M.M.'s May 1960 to date. Airfix Motor Racing: M.R.11 with additional track. 800 all-world stamps catalogued £14. Large "00"-gauge railway, Tri-ang rolling stock, Wrenn track, catalogued £35. S.A.E. for details: Walker, 9 Tennyson Avenue, Bridlington, Yorkshire.

• M.M.'s from 1934-1941 and 1943-1952 inclusive. Owner must sell. Any reasonable offer accepted. Wilkinson, 13 Byron Avenue, Lincoln.

• Breaking large collection of red/green and obsolete Meccano. Many rare items. Offers and inquiries to: Ashfield, 169 Donegall Road, Belfast 12.

• Tri-ang "00" and Airfix items; Meccano outfit 4, plus extras. S.A.E. lists. Blake, 3 Mountfield, Faversham, Kent.

• Meccano Magazines, 1930-1931, 1932 complete. Excellent condition. Also 10 others, pre-1936. What offers? Braithwaite, Garden Cottage, Bull Lane, Lewes, Sussex.

• Meccano No. 10, good condition. Also transformer, electric motor E020, and No. 1 clockwork motor. Bargain, £10. J. Davies 14 Pantycelyn, Llwynhendy, Llanelly, S. Wales.

• Hornby Railway No. 21, extras, 70 2 ft. radius rails, 16 rolling-stock, some new. Offers? Cross, 25 Grestone Ave., Birmingham 20.

• M.M.'s June 1948-December 1955. Reasonable condition. January 1956-June 1964. "Trains Illustrated, April 1957-May 1958, April 1960-July 1963. Excellent condition. Offers including postage. Cannings, 30 Playfield Drive, Parkstone, Dorset.

• Tri-ang "00" layout, as new, 2 trains, coaches, trucks, track, etc. Also two power units, value £24; accept £16 o.n.o. J. Hobday, Sorita, Hillcrest Road, Portishead, Somerset.

• Good condition Dinky Toys, numbers 412, 433, 991. Edis, Duck Street, Elton, Nr. Peterborough.

• M.M.'s 1957 and 1958 complete, also 1956 and 1959 almost complete (three missing), excellent condition. Offers. King, 62 Barton Road, Luton, Beds.

• For Sale: "00" gauge model railway, mainly Tri-ang; will sell for £10 or any good offers. S.A.E. to: A. R. Leach, "Westgates", Dudley Avenue, Westgate-on-Sea, Kent.

• Mamod Minor 1, Minor 2, SE3 steam engines, half price o.n.o. Walker, Green Griff, Riding Mill, Northumberland.

• In brand new condition, hardly looked at. Copies 1-26 of "Knowledge" magazine with binders. Price when new, 52/-. First reasonable offers. G. T. Noble, 14 Acre Lane, Bromborough, Cheshire.

by **F. E. Metcalfe**

STAMPS

Imperf Values

I HAVE mentioned the matter of 'Imperfs' before, but it was some time ago and I still get letters from collectors asking me about the Canadian stamps they have come across which lack perforations. Now these must not be compared with those imperf. rarities which sometimes turn up in our booklets (where there are no perforations at all) or, on the other hand, with those booklet panes where, in cutting, the outer perforations have been clipped off, for those of Canada were actually prepared without outside perforation. There are also Canadian booklets with strips of three, which means that the outer stamp actually has three sides imperf.

However, this is the real point, they are not scarce—and thus are not valuable—as are those panes which have been found occasionally in British booklets. I suppose it is the news about the latter which has aroused interest in the Canadian ones, just in case they, too, are valuable.

Europa

I imagine the Olympic Games issues are the most popular among theme stamps (apart, of course, from flowers, etc., of the general themes) but running a close second now are the issues which appear yearly from most of the countries which are members of 'CEPT', or, to give it its full title, European Postal and Telecommunications Conference. There are 22 members, but not all of them issue a set of stamps in each year that the conference is held. Our own country issued sets in 1960 (these stamps are rather scarce) and again the following year.

Each year a competition is held to select the best stamp design and I must say that even the winners, to date, have done only a pretty moderate job, in my opinion. Heaven only knows what the losers' designs looked like if this year's winner was the best.

The design selected for this year was by a Frenchman, G. Betemps, and the 22 petals of the flower (if it can thus be described) symbolise the member countries. At least, that is what we are told. Never mind, these stamps are very popular and I think will increase in popularity each year a new batch comes out. But, oh for some attractive designs!

Issues galore

There was a time when the issue of a new set of stamps was quite an event. But those days have apparently gone, even in the British Commonwealth, where until very recently, a much more conservative stamp-issuing policy prevailed than was the case with most foreign countries. Anyhow, it is the island of Malta I wish to refer to in this case—a country whose stamps are particularly popular. But I wonder if that popularity will not suffer a little if the island is going to continue to bring out so many stamps in future.

For instance, a set of three appeared on September 5 to mark the First European Congress of Catholic Doctors. Then, on September 21, there was the 'Independence' issue of five values, with a face value of 5s. 11d. (a bit too high, really). On January 7, we are to get the big definitive set, which goes up to £1. Once before, Malta overdid things and only now has the erstwhile popularity returned.

I don't know what collectors will think of the definitive designs, for like the 'Doctors' issue, the colours look a bit lurid. Anyhow, we will have to see if Malta continues to issue a lot of stamps. If she does, well, I know of many collectors who will want to drop them. Alas, it is no longer possible for the Colonial Office to urge restraint and I fear the worst, not only with Malta, but with countries such as Jamaica, etc., who may not have heard of the fairy story about the goose and the golden eggs.

Malaysia

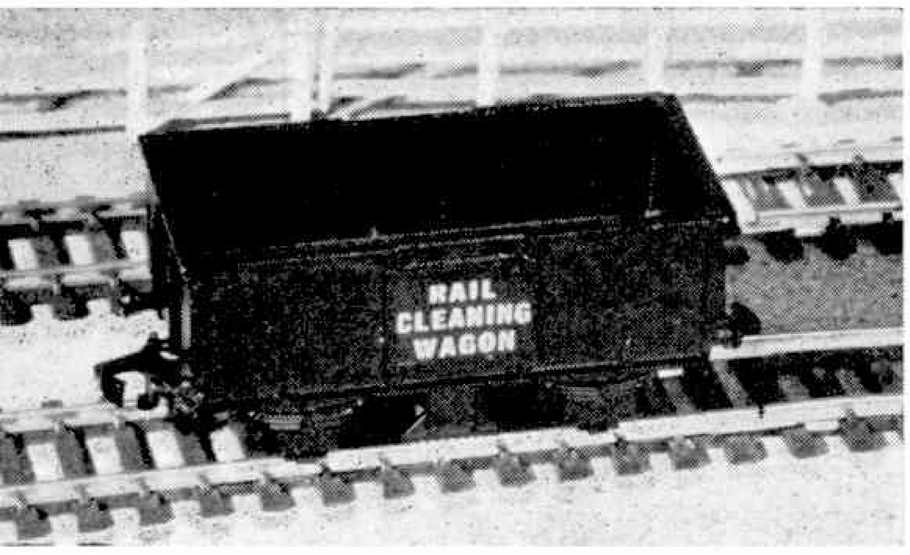
This part of the world is much in the news these days, on matters more serious than stamps. Nevertheless, new sets are announced for the various states for next year and no one can claim that this is overdoing things, for definitives here are long overdue. As a matter of fact, I don't think we will ever have to complain about too many stamps coming from that part of the world, for even when they do make a special issue the face value is strictly limited and I am going to suggest that anyone wishing to take up a limited group might fare much worse by going elsewhere.

The Commonwealth QE II Catalogue gives a full listing of Malaysian stamps issued since 1949 (actually these stamps were released during the reign of King George VI, but they continued on sale so long into the Queen Elizabeth II period that they also qualified as present reign issues, hence their inclusion). With most of the stamps quite reasonably priced, a full lot makes a most attractive showing—one which would please even your friends, particularly as they are the postal issues of such an interesting part of the world.

Tip of the month

It will have been noticed by all collectors who take some interest in what is going on in general in the hobby that, apart from the usual countries who like to cash in philatelically on any event—even though they may have no actual connection with it—one or two of the colonies have issued stamps to commemorate the Olympic Games. Bahamas, Bermuda and British Guiana are the countries concerned. Cyprus has also issued a set, but that island is not a colony.

The three sets mentioned are quite inexpensive and although many have bought them, the demand is so world wide that, if you do not buy them now, you may have to pay quite a bit more later. After all, if you do collect Commonwealth stamps and, or, Olympic Games issues, you will need to buy them sometime and in this case there will be no time like the present. You might buy the Cyprus issue also if you wish, but I am afraid that, with British collectors at any rate, the stamps of that once very popular country are suffering a bit of an eclipse.



RAIL CLEANING WAGON

MANY of you will have had difficulty from time to time in cleaning inaccessible sections of track on your layout. Using normal methods, that is, a brush, or a rag soaked in methylated spirits, you will have found it almost impossible to do the very necessary maintenance that every layout needs at regular intervals if trains are to run faultlessly.

Among the most difficult and exasperating sections of track to clean on a layout are those lying hidden in a tunnel; usually, the only solution is either to remove the tunnel or remove as much of the dust as possible with the nozzle of a vacuum cleaner. On Hornby-Dublo layouts, problems such as this are now solved by the introduction of the Rail Cleaning Wagon. All track cleaning problems are easily overcome by simply propelling the wagon over every part of the layout that requires attention.

Valuable addition

The wagon is certainly a valuable addition to any stud of rolling stock, and many of you may wish to use it in conjunction with the Breakdown Train (Sales No. 4620) and Packing Van (Sales No. 4318). The vehicle is black, and has the words 'Rail Cleaning Wagon' painted in white on each side. Underneath the wagon are two circular holders for cotton wool plugs, six of which are supplied with every wagon. The plugs are fitted into the two holders and methylated spirits should be poured into the two holes in the floor of the wagon. Damage may result to the track if an excess of liquid is poured into the cotton wool plugs. They must, however, be saturated for the wagon to operate successfully.

The rail cleaning wagon can be included in any goods train, but for best results, the train should be propelled rather than pulled. It is important that methylated spirits, and no other liquid be used, since damage may result to the sleeper base.

The wagon is a most attractive and useful addition to every layout. Its sales number is 4654.

'Meccano Magazine' Index March to December 1964

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Window Shopping: 24 May; 26 June; 26 July; 27 Aug.; 27 Sept.; 37 Oct.; 37 Nov.; 27 Dec.

AROUND THE SOCIETIES

North-End M.C. & H.R.C.

WORK BY the North End (Portsmouth) Club on the Christmas Exhibition has kept the members occupied for some weeks. Dates of the show are Dec. 2-4, Dec. 9-11 and Dec. 16-18, from 7.30 p.m. to approximately 9.30 p.m., and Saturdays, Dec. 5, 12 and 19 from 2.30 to 5.30 p.m. Posters have been displayed in shop windows in Fratton Road, Kingston Road, Osbourne Road, Elm Grove and in Cosham, Waterlooville and Havant.

Mr. Kinchen and Mr. Williams have put the finishing touches to the small layout, including Mr. Kinchen's Dinky Toys, Mr. Enfield has been at work on a large layout and Messrs. J. Foord and M. Diamond have built Meccano models. Mr. Kinchen has purchased some more buses (Atlanteans, red), making a total of 33 (so far!).

More members are still urgently needed as this club intends to be 'on-the-air'. All inquiries should be sent to J. Kinchen of 79 Fortunes Way, Bedhampton, Havant, Hants. (enclosing a stamped addressed envelope) for details of membership.

The Model Railway Club

THE CLUB fixtures arranged for December are as follows: December 3, Track Night (Gauge One Group); December 10. Track Night (Southern Group); December 17, 17, Track Night (All Groups). Meetings take place at the club's headquarters. Keen House, Calshot Street, King's Cross, London, N.1. Please send all inquiries to the Hon. Secretary, Mr. J. E. Geach, at that address.

Christchurch (N.Z.) M.C.

THE MEETINGS of the Christchurch, New Zealand, Meccano Club have been well attended and model-building has again been the major activity. The two most recent meetings held at the time of writing were at the New Zealand Industries Fair and New Zealand Food Fair where the club have had a display of working models. These have included some very intriguing items, as can be seen from the following list—twin gantry cranes, both remotely controlled; two fork lift trucks, a front loader, a bulldozer, a mechanism showing automatic reversing gear, a turntable stage with an orchestra on one side and a piano and harp on the other, with the arms of all the figures working, a steam traction engine, two vintage cars and an army tank. Driven by 230 volt motors, and running all day long throughout the period of the exhibition, were five other splendid Meccano models—a big wheel, a stationary steam engine, a Meccanograph with two pens working together, a Dutch windmill carrying a flashing 'Meccano' sign and a chairoplane with dolls as passengers. There was an excellent attendance of boys, some of them spending all day from 12 noon to 10 p.m. at the fair, and the paid attendance of visitors to the event was more than 110,000, which was a record. Many compliments were paid to the Christchurch Club on their display. One visitor was a Dutchman who called at the stall and explained, in the friendliest way, that the Dutch windmill was turning the wrong way. The exhibition brought many inquiries from enthusiasts anxious to join the Christhurch Club.

Gindiri M.C. & H.R.C.

MEMBERS HAVE made the automatic gantry crane from the No. 10 Outfit and it has worked very well. Mr. P. F. Bradford, the Leader, helped with the gearing. Some boys were so keen that they stayed on after the club's official closing time and two others, who were spending holidays at the school, devoted a great deal of time to the models. Representatives from different clubs in the area were invited to see what the Gindiri Meccano Club had achieved in the way of modelling.

Some repairs were found necessary to the locomotives operated by the H.R.C. These repairs were carried out and members were able once again to operate their layouts. Average attendance 100 per cent. Secretary, Danny Babalola, B.S.S. Gindiri, via Jos, Nigeria.

The Gauge '1' M.R.A.

THE GAUGE '1' Model Railway Association reports another successful year, with increased membership, and activities well maintained. A particularly welcome event was the demonstration of live steam running on the association's layout at the Model Railway Club's exhibition. The seventeenth annual general meeting will be held at 3 p.m. on Saturday, December 5, at Keen House, Calshot Street, London, N.1. Following formal business, there will be a 'get-together' with refreshments, a film show of member's layouts. and a track session which will cater for all forms of motive power. All interested in Gauge '1' will be welcome at this meeting. They are invited to contact the Hon. Secretary, Mr. S. J. Roberts, of 35 Colebrooke Avenue, Ealing, London, W.13.

Talyllyn R.P.S.

WITH CHRISTMAS almost upon us, railway enthusiasts are advised that the Talyllyn Railway Preservation Society has available two Christmas cards, a 1965 calendar and a 1965 T.R. centenary diary all of which are available from the Railway Shop, Wharf Station, Towyn, Merioneth. One of the cards from a J. Arthur Dixon photograph, shows one of the T.R.'s original engines, No. 2 'Dolgoch', heading a train of the original coaching stock and taken at Brynglas during 1964. The other card is from a water colour by Eric Oldham showing the same train in the 1860's. The prices are as follows (post free in every case): Calendars 3s. 6d. each; Christmas cards (J. Arthur Dixon photo) 10d. each or 9s. a dozen; (Eric Oldham water colour) 1s. 2d. each or 12s. a dozen; 1965 centenary diaries 5s. 4d. each.

West Ham & Dist. M.R.C.

THE PROGRAMME for December is: December 7, Practical Night; December 14, Bumper Tracknight (All Gauges); December 21, Christmas Party. All members, both past and present, are invited to the party, which will be held at the 'White Hart', Green Street, London, E.7. Those wishing to attend should contact the secretary. Ordinary meetings are held in St. Gabriel's Church Hall, Aldersbrooke Road, London, E.11, from 7.30-10.30 p.m. each Monday, where new members will be made welcome. Further details about the club may also be obtained from the Hon. Secretary, Mr. G. R. Lloyd, of 32a Goldsmith Road, Leyton, London, E.10.

Answers to puzzles on page 21

CAR QUIZ NO. 3— Volkswagen. Germany.

TRICKY TEASERS

The twins were born in March (Cambridgeshire). One was 20 and the other was 20, too. One grew up, became a clergyman and married his widowed mother to another man.

QUICK QUIZ

1. The Sikorsky S-61N (b) Rotor.
2. 1910.
3. England (Blackpool Tower).
4. False, The longest is the 46 span Lower Zambesi bridge (12,064 ft.).
5. Mayor.
6. Double Bend.

If you scored 35 or over, your standard of general knowledge is excellent.

CROSSWORD PUZZLE

CLASSIFIED ADVERTISEMENTS

Readers Sales and Wants

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The rates are 3d. per word, with a minimum of 3s. (cash with order). Readers' advertisements are published as soon as possible, inclusion in the first issue after receiving them, however, cannot be guaranteed.

• Obsolete Dinky toys, etc. Highest prices, single or collections. Pinnock, 6 Stream Farm Close, Lower Bourne, Farnham, Surrey.

• Collector will pay following prices for cased coin sets. 1911, £20; 1927, £40; 1937, £15; 1950, £5; 1951, £12; 1953, £8; £7 for any Maundy set. Top prices for English crowns; also Canadian coins and early American. D. H. Woodberry, 104 Risca Road, Rogerstone, Mon. Tel.: Risca 614.

• Wanted. Collector wishes to purchase: Jane's Fighting Ships, 1897 to 1902, including 1904, 1913, 1914 (4th censored edition also acceptable), 1916 (Admiralty edition, uncensored). Clowes Naval Pocket-Book, any edition. Jane's All The World's Aircraft (or Airships), 1909/10 to 1915 inclusive, 1921 to 1926, 1928, 1930. British Admiralty Flag Book, 1890, 1910, 1930. Admiralty Ship Identification Manuals, World War I or II. Jane's Naval War Game with models as made pre-1914. Model warships and merchant ships, 1:1200 scale, in wood by Bassett-Lowke and others (World War II identification models and before). Ship models, 1:1200 scale in metal by Tremo (Treforrest Mouldings). Dinky Toy (Meccano) Ship Models made pre-World War II. Frog pre-World War II 1/72nd scale model aircraft and airport accessories. Write and describe. John Holton, 15 Lymington Gardens, Stoneleigh, Epsom, Surrey.

• Pre- and early post-war Dinky Toys. Top prices paid. Details to: T. George, 124 North Lane, Aldershot, Hants.

• Pre-war mechanical toys, especially trains, no objection to faults if repairable. Butler-Edwards, 1 Chesham Crescent, London, S.E.20.

• Wanted: Obsolete aeroplanes, Dinky or similar, not plastic. List and prices please. T. F. M. Pryor, Lannock Manor, Hitchin, Herts.

• For every copy of Ian Allan A.B.C. steam, locoshed or combine published 1960 or earlier, used or unused, that you send to us, we will replace it with any current A.B.C., etc., of your choice to the same value. M. Thelwall, Minimarket, Crewe.

• Wanted: Locomotives and coaches, electric, clockwork and steam, of early Hornby, Meccano Ltd., Märklin, Bing, Bassett-Lowke, etc., 1900-1935 era; also want Hornby 4 wheel, American Pullman coaches, all to be in nice condition; all letters answered by Air Mail. Mr. John A. Markham, 2261, Moy Avenue, Windsor, Ontario, Canada.

• Meccano Loom Shuttle Part 104 required. Have obsolete parts to exchange. Also any deleted items. Literature bought. A. E. Dodd, 8 St. Bernard Road, Stockton-on-Tees.

• M.M.'s for June, September, and November 1924. Also obsolete parts. Forster, 144 Malvern Road, Billingham-on-Tees, Co. Durham.

• Want Dinky Toy No. 641 (Army 1 ton cargo truck), two if possible. Any price paid. Would swop for No. 677 (armoured command vehicle). Jacques Amartin, 231 Boulevard St. Germain, Paris 7, France.

• Wanted urgently, 30a Chrysler Airflow, 38a Frazer-Nash B.M.W., 38b Sunbeam-Talbot, 38c Lagonda, 39a Packard. Also early Dinky racing cars. Any condition. State price. Prosser, 17 Ryland Road, Erdington, Birmingham 24.

• Gauge "0" vans, "Jacobs", "Seccotine", "Toys", "United Dairies", "Nestles" milk tankers, also Nord rolling stock. Pearson, 86 Dovedale Road, Erdington, B'ham. Phone: Erd. 7723.

• Model Soldiers, "Herald Series" and other makes of ancient Greeks always wanted. Details to: Masson, 303 Kilmarnock Road, Glasgow, Scotland.

• Wanted. Slightly damaged or non-working model of ex-L.N.E.R. "Mallard" or "Flying Scotsman" in "00" gauge. G. Abbot, 2 Tyndale Avenue, Yate, Bristol.

• Good prices paid for Dinky buses. Duple Roadmaster, B.O.A.C. Coach, Maudslay Coaches and Double Deckers. J. V. Watkins, 18 Bronawelon Ter., Goffryd, Cumlin, Mon.

Sales

• M.M.'s 1958, 1960-1964; good condition; £1. Ian Gibson, 24 Southfield Grove, Merry Hill, Wolverhampton.

• For Sale. Portable "00" Model Railway Layout, stud contact, 150 ft. track, Locos, 50 Wagons and Coaches, 34 Points, Transformer Controls, Point Motors and other equipment. Cost over £300. Price £75 o.n.o. Apply: V. H. Ekins, New Street, St. Neots, Hunts.

• Meccano No. 2 Car Constructor Outfit. Pre-war Dinky Toys. S.A.E. Box 1003, c/o "Meccano Magazine".

• Scalextric G.P.3 Set (1961). Two extra cars. More track, transformer. Many extras. Old track, but adaptors included. £20 new. Sell £10 o.n.o. S.A.E. details. P. J. Hadfield, Oaklands, Lees Lane, Wilmslow, Cheshire.

• "Meccano Magazine" November 1944-November 1964 complete, £5 o.n.o. Hornby Dublo 3-rail "Duchess Atholl", coaches, wagons, accessories, 30 ft. track, £5 o.n.o. Watson, 90 Windmill Road, Hampton Hill, Middx.

• Br. Cols. and Foreign, Wants invited. Advertiser, 15 Queenshill Ave., Leeds 17.

Continued on page 50.

Cycling

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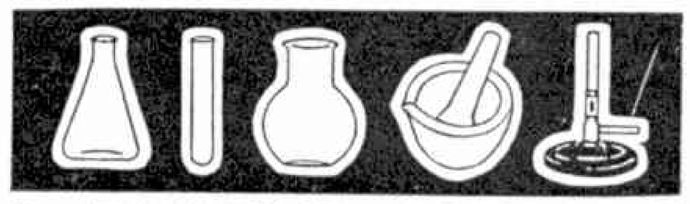

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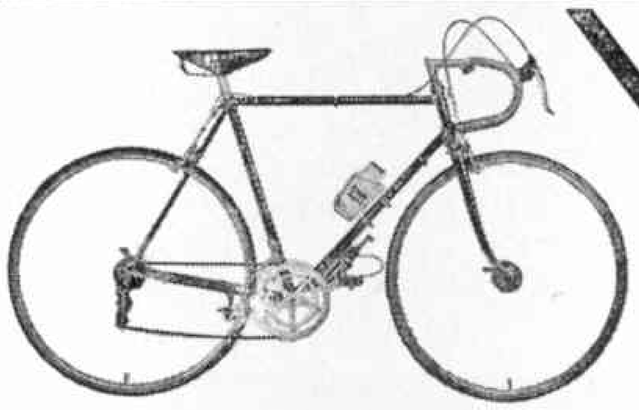

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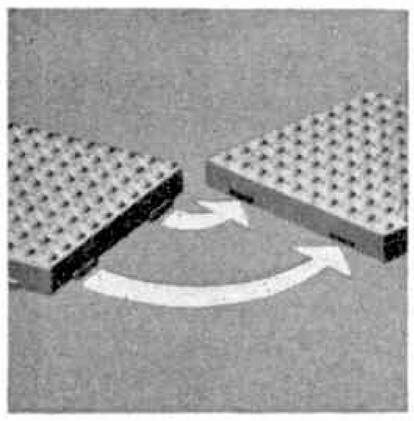

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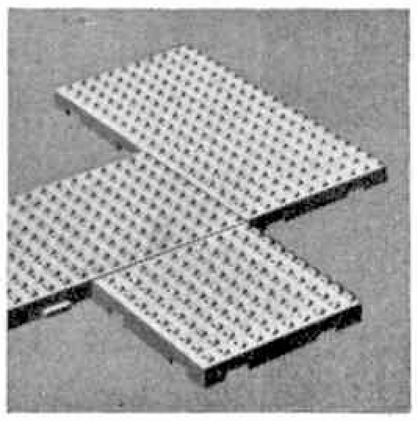
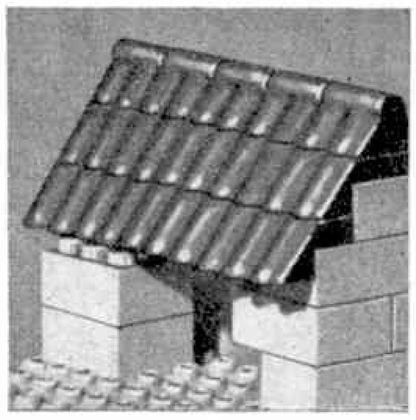
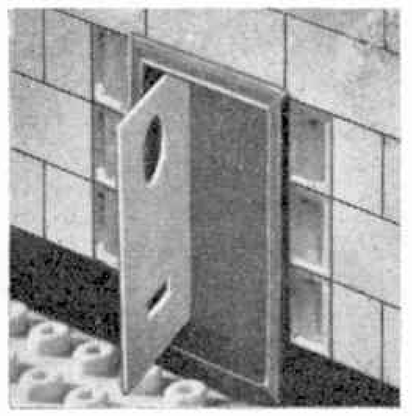




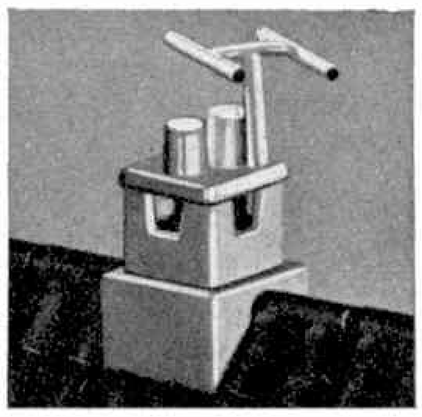
roofs that have tiles and look just like real roofs

windows that open and shut

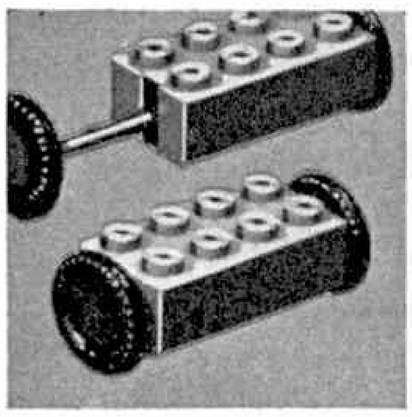


doors that are hinged to open and close

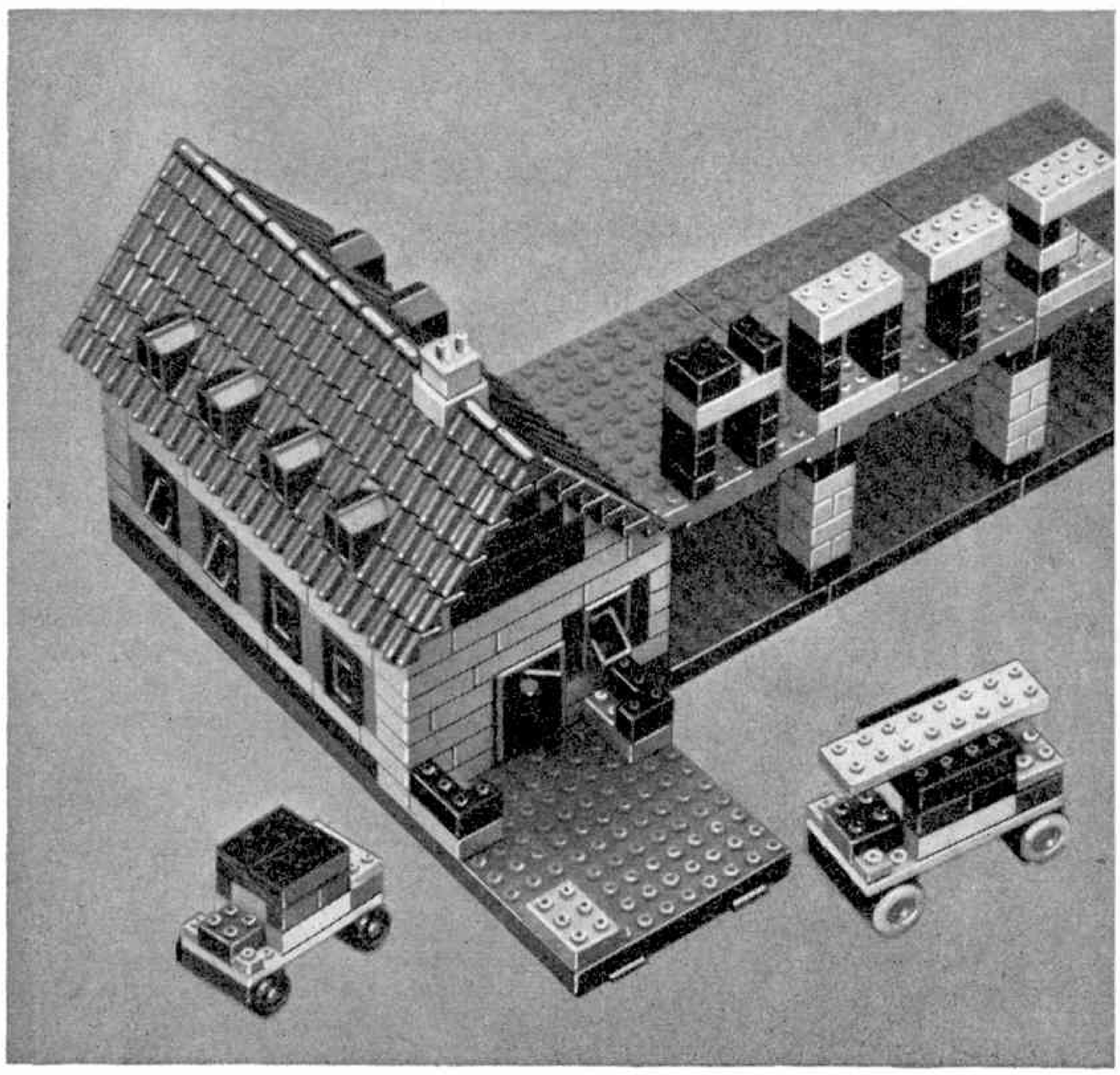
neat little bay windows with flowers in a bowl



chimneys, TV aerials and many more finishing touches



with *every* set there are wheels, axles and special holed blocks for making pushalongs



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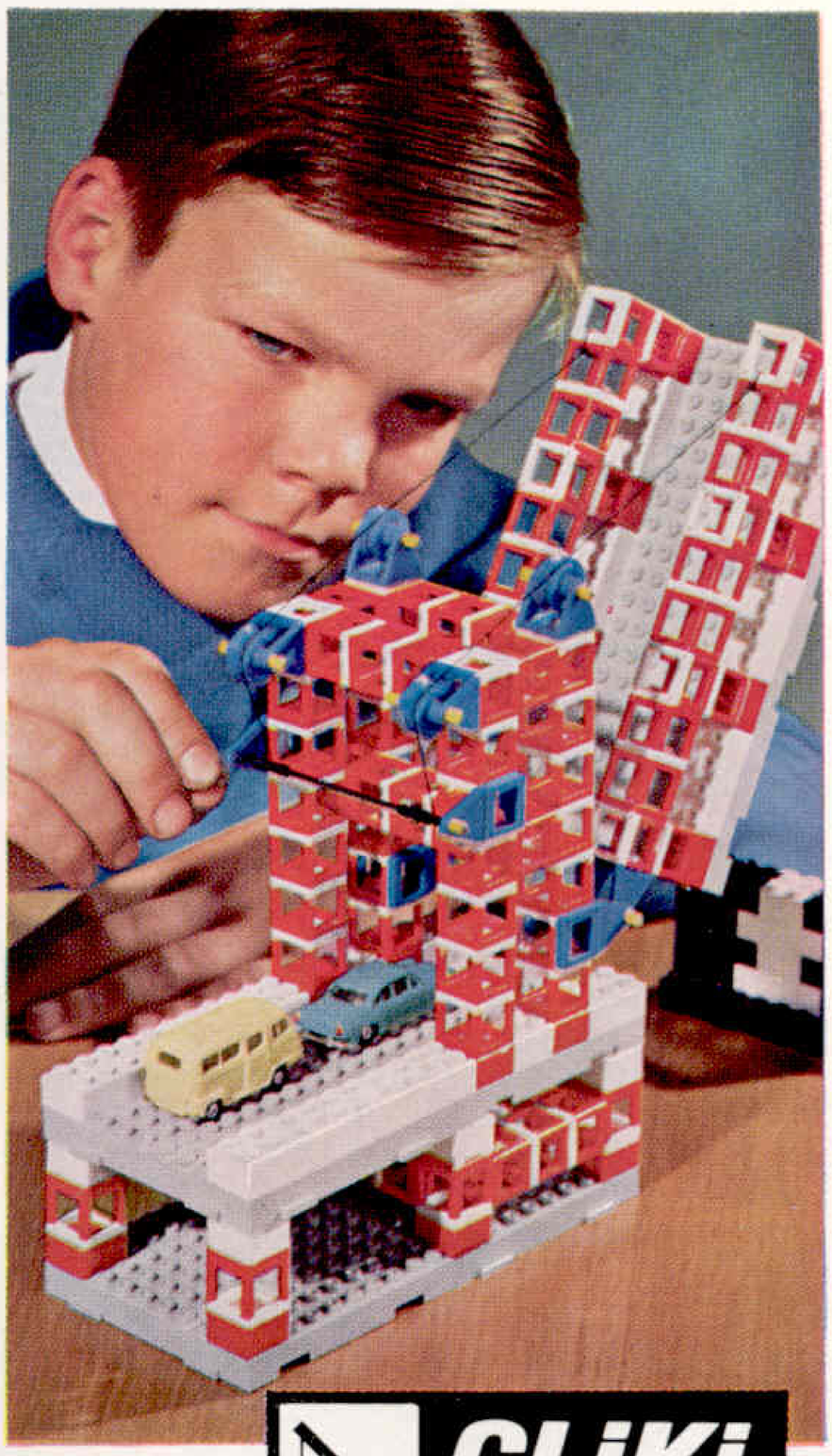

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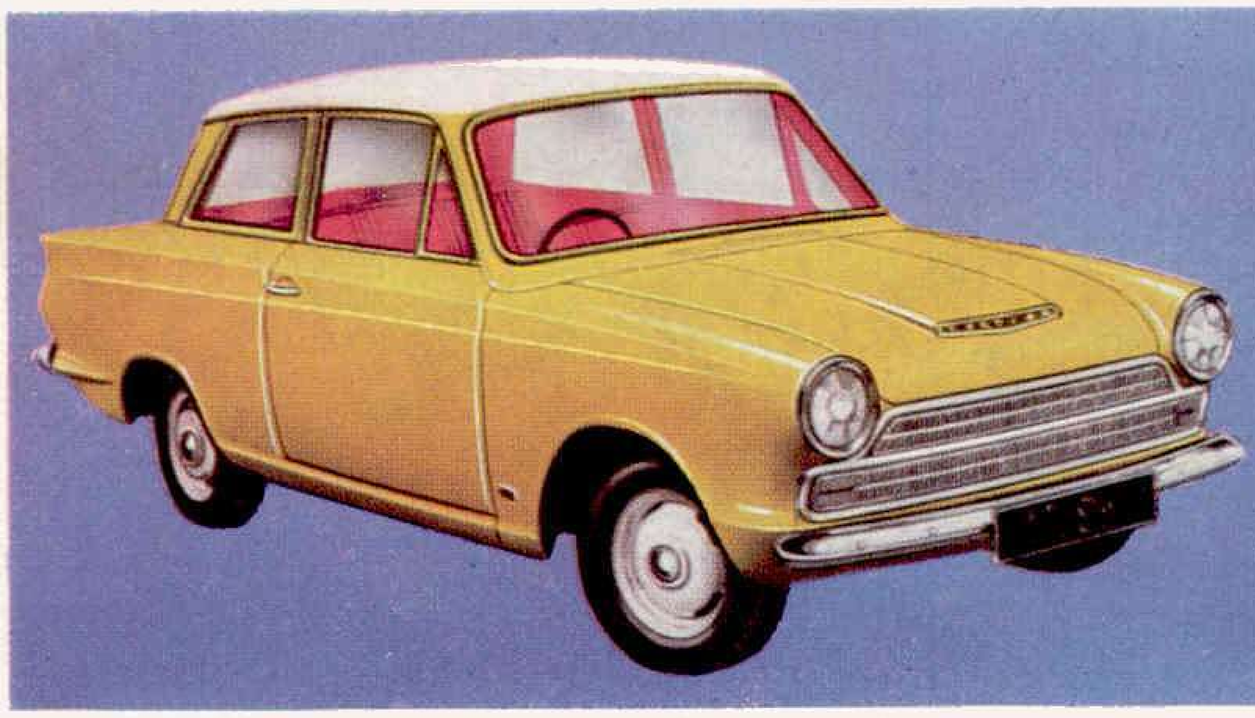

Get ahead of the crowd with this 1965 model. Two-tone body, opening doors, tipping seats. Jewelled head and rear lights. Number plates. Prestomatic steering. All-round suspension. Length 4".

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