THE MODEL WORLD AT YOUR FINGERTIPS

MECCANO MAGAZINE

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Constructing M.M. Computer Part 2

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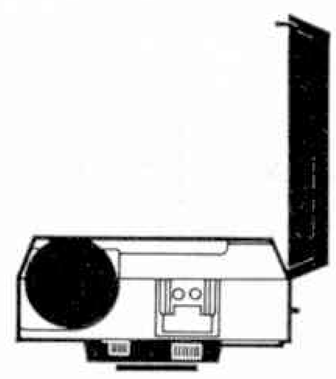
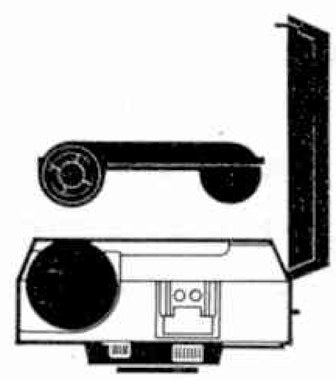


1. Open the camera.



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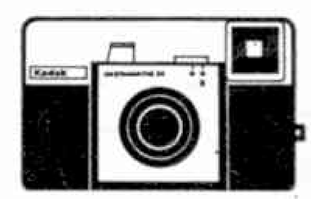

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GETTING THE GUN THE EXPERTS CHOOSE

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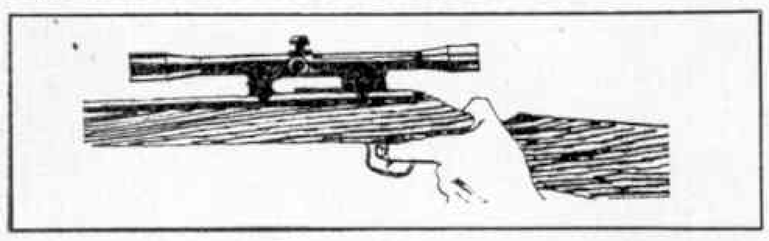

WHAT DO YOU KNOW ABOUT GUNS? What is (1) grouping? (2) bore? (3) choke? Reverse the page to check your answers.

(1) the accuracy with which you can group a series of shots close together on a target (2) the measure of the centrally bored hole which runs the full length of the barrel. (3) choke in a gun barrel is where the bore is reduced at the muzzle to control the area of the eventual shot pattern.

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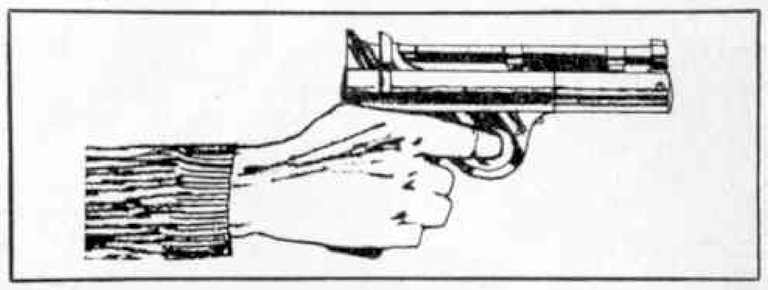

Shoot with safety. Never point a gun, unloaded or not, at anyone. Never handle a gun before checking that it's unloaded. Always carry it so that the muzzle is fully under your control. Never leave it where people younger or less responsible than you can meddle with it. Never leave a loaded gun unattended. Always make sure no-one is behind your target before opening fire.

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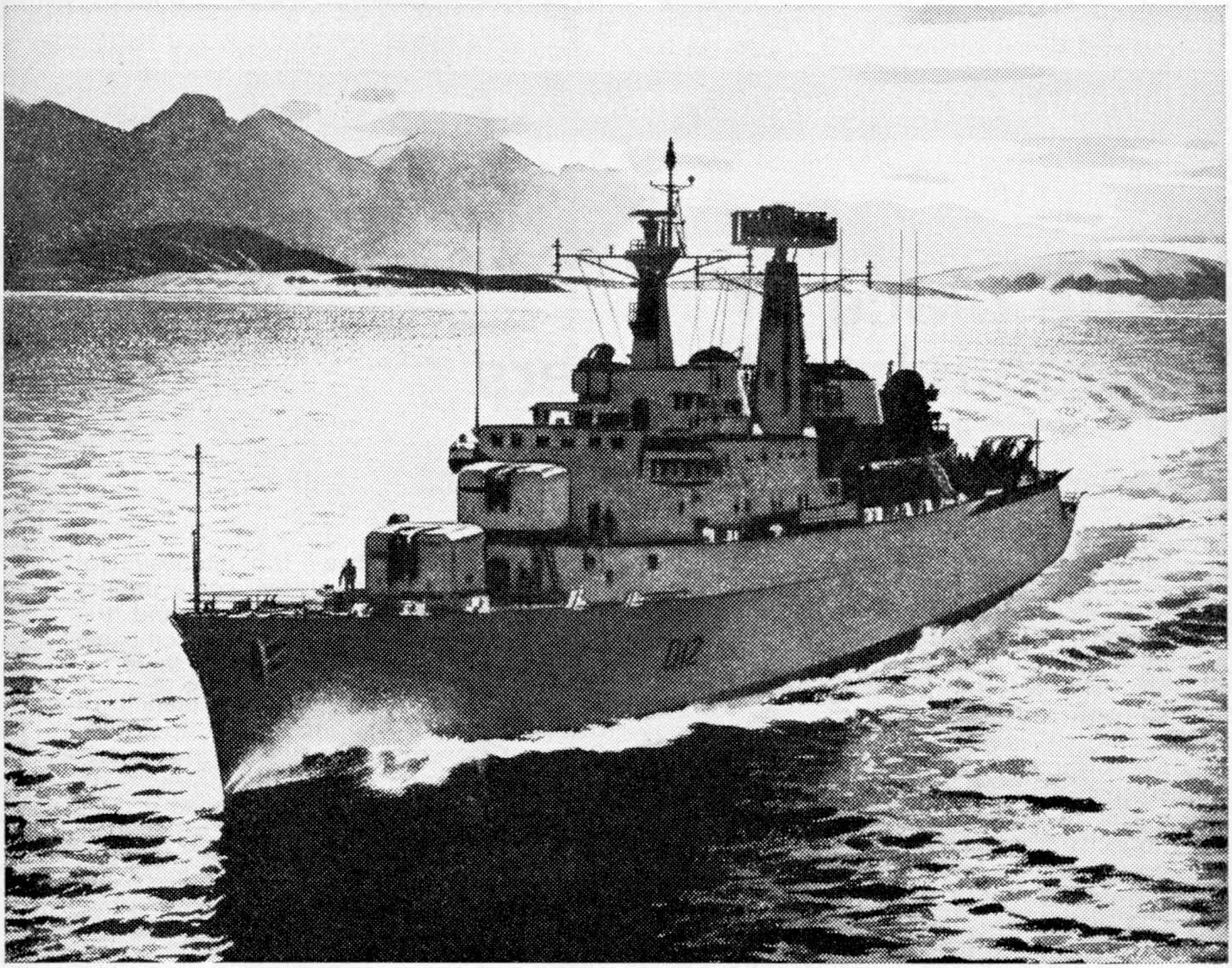

As this Royal Navy destroyer slips away at dawn

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The place of unpolished trousers

When finally you leave school you will have sat at a desk, cramped and largely silent, for some seven thousand hours. Which perhaps explains why so few school-leavers ever miss their old class-rooms. The Science lab, yes. The woodwork shop, yes. The Gym, perhaps. The class-room, no.

Seven thousand hours of sitting still. It is a solemn thought. Human bodies were not meant to be confined to one position for hours at a stretch. And human beings were not meant to remain silent, locked up in themselves, for long periods. Yet, if you choose many of the careers available to you today, you can repeat this absurd, isolating desk routine all over again—for the rest of your working life perhaps.

What is the alternative? Dig ditches? Not necessarily. There are always some professions that offer you movement and the constant stimulus of other people's company, male and female. Banking is one of them.

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THE MODEL WORLD AT YOUR FINGERTIPS

MECCANO MAGAZINE

THE MODEL WORLD AT YOUR FINGERTIPS

MAY 1967 VOLUME 52 No. 5

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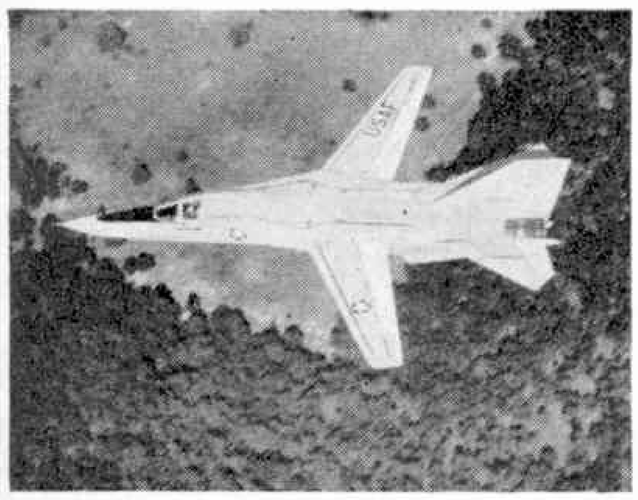

ON THE COVER: The swing-wing F.111 with its wings in the extended position. Compare the F.111 with the Saab Viggen. Both planes are intended for strike duties yet their designers have each produced completely different solutions to the many aerodynamic and structural problems The F.111 is, of course, on order for the Royal Air Force.

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The old saying that two heads are better than one, is just as true in the hobbycraft field as in any other. Unfortunately, a large number of lone hands never consider this point and lose a considerable amount of enjoyment potential from their chosen activity.

A good example of what can be achieved by concerted effort is to be found on page 17. There you can read about how a bunch of young Meccano enthusiasts got together to pursue a project that would have been too big for any of them to tackle single handed.

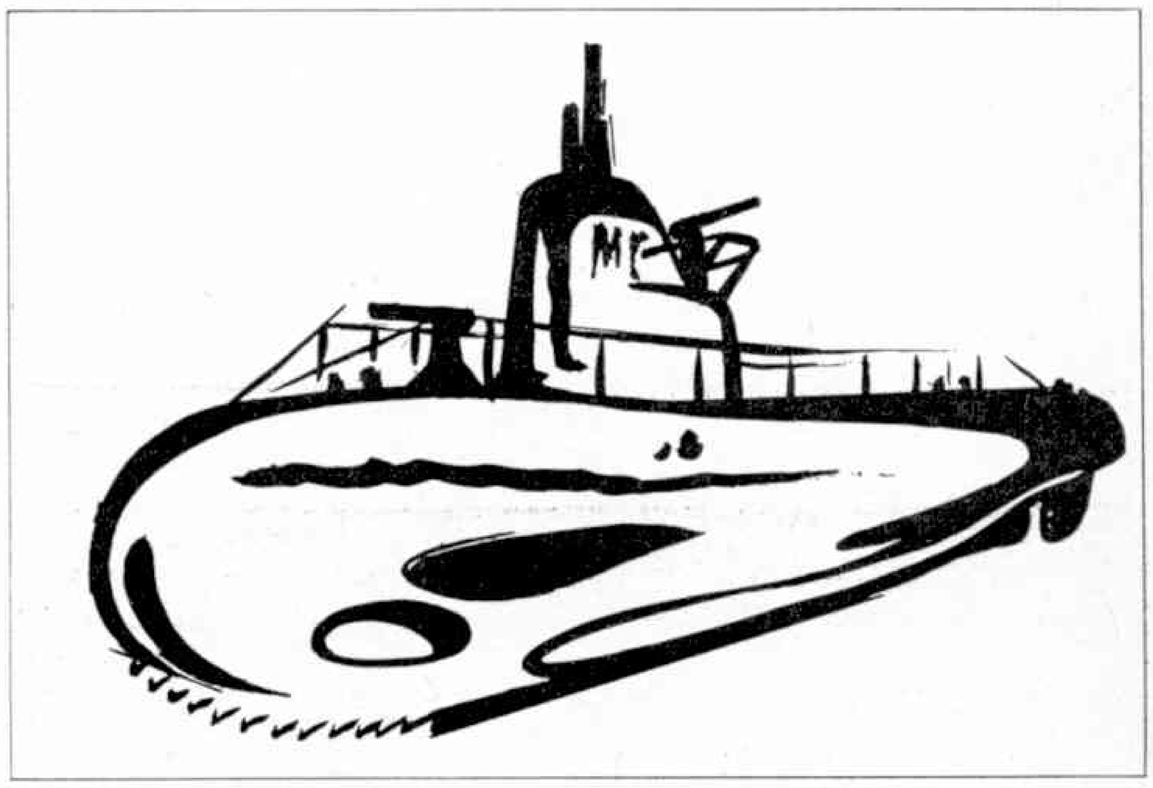
You can see exactly the same thing happening in the business world where, in order to compete with bigger rivals, small companies find it in their own interest to get together and form a smaller number of larger companies. This gives them greater production and research capacity and is known as a 'merger'.

Now the odd thing is that although today, more and more industrial mergers are taking place, the number of model clubs of all kinds is on the decline. This does not mean that fewer individuals are taking up a hobby, for the sales of such products have never been higher, but somehow the society in which we live seems to discourage club activity.

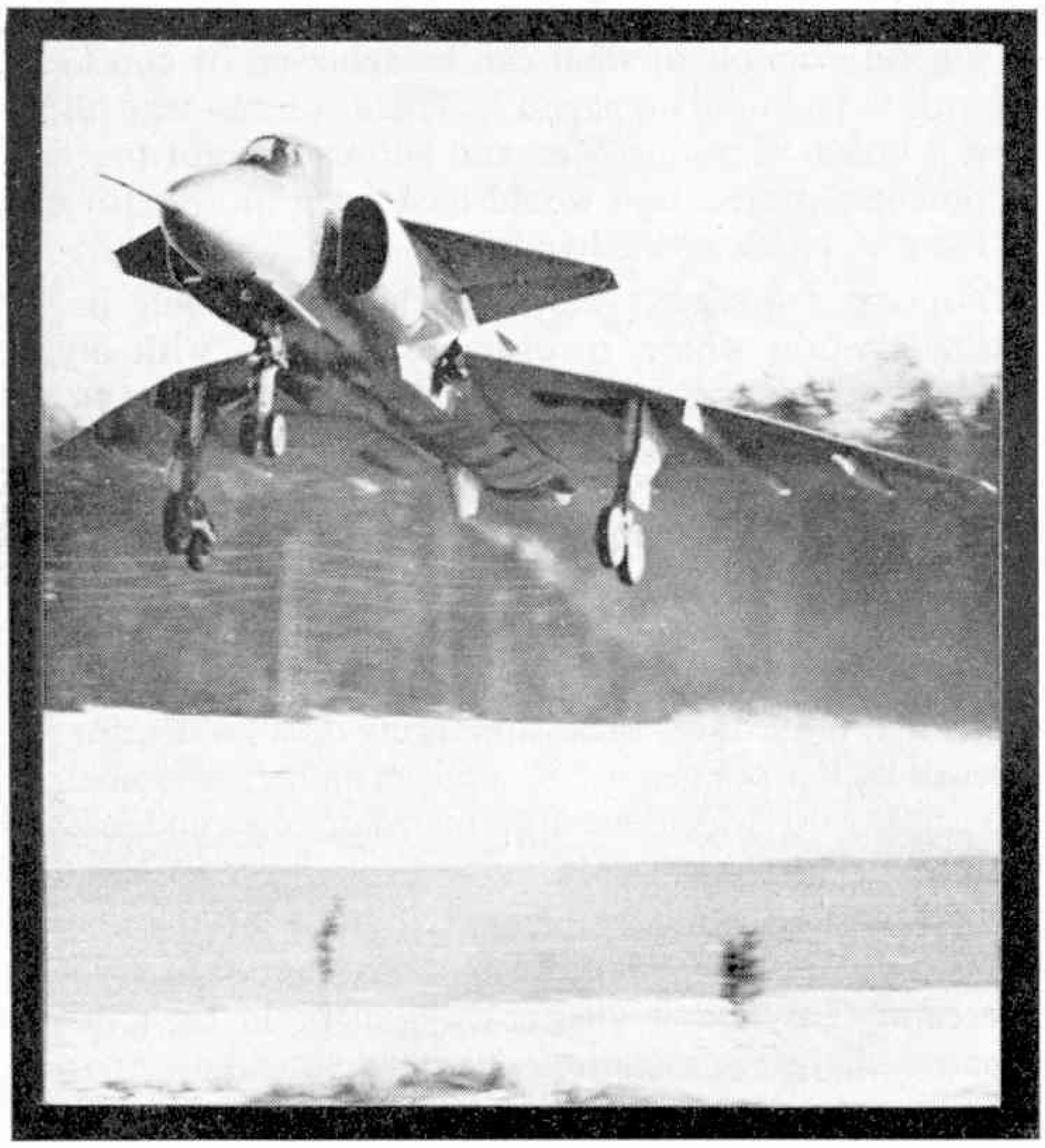
So I was particularly pleased to hear of the Pupils' Construction Company. I am sure that those young Meccano fans find a greater enjoyment in their hobby because of their association. Perhaps you know of some other people in your district whose hobby is the same as yours. Why not use your initiative, and get together to form your own club? You will find that you can learn from one another, derive greater enjoyment, improve your particular skill far more quickly and produce more ideas, when you operate as a team.

When your club is running properly and you have something to show for your efforts, write and tell me about it. If you can, send me a few photographs of your club members with their models too. I may be able to find space in a future issue to print the best reports received and, of course, there will be a publication fee due to those whose material is used—a reward for initiative and a useful 'extra' for your club funds!

NEXT MONTH—A free pull-out plan for a 3 foot long working model submarine that can be radio controlled or rigged for automatic diving!



Sweden's Thunderbolt



Early this year, on 8 February to be precise, the prototype Saab AJ37 Viggen (Thunderbolt) combat aircraft made its first flight from the company airfield at Linköping, where it was built. For the people of Sweden it was an important and exciting occasion. It was not only the first practical test of a piece of equipment that may eventually cost them a total of £570 million (about £75 for every man, woman and child in the country); it was also proof of the fact that Sweden's comparatively small aircraft industry can still design and build aeroplanes better than their counterparts anywhere else in the world.

THIS may seem a rather sweeping comment on an aeroplane that has made only a few flights; but the Saab company has built up such a reputation for the quality of its products that there is no reason to doubt that the Viggen will live up to its promise. Only Britain's TSR.2 might have been better, if our government had had the foresight and courage to continue its development for the R.A.F.

Two years ago, I was invited to Sweden with a party of British journalists, to see for myself something of the experience and effort that was being put into the Viggen project. At Saab's factory, we saw an impressive full-size mock-up of the aircraft and countless actual components, including the ejection seat, undergoing rigorous tests to ensure that they would be up to standard before becoming part of the prototype.

At the Svenska Flygmotor works, we were shown how this company has adapted the Pratt & Whitney JT8D turbofan engine for the Viggen. It was sad to think that, after years of producing Rolls-Royce engines for Saab fighters, the Swedes had chosen for their newest aircraft a military version of an American engine used in airliners like the Boeing 727 and 737. However, they believe it to be the best engine for the job and it was difficult to argue when the engine being run on the company's test-bench was already giving an impressive 26,000 lb. of thrust with its Flygmotor-designed afterburner in use.

Known in Sweden as the RM8, it is a huge engine which towers high above the men who assemble it at Flygmotor's Tröllhattan works. Everyday figures mean little when related to such a power plant; but it gulps in air at the rate of more than

By John W R Taylor

8½ tons a minute and develops more power than the engines of any but the very largest ocean liners. With its air intake and exhaust systems, fuel and fuel tanks, the engine represents 80 per cent of the take-off weight of the entire aircraft.

A single RM8 propels the Viggen at more than twice the speed of sound (1,320 m.p.h.) at high altitudes; yet it will take off and land in less than 550 yards, thanks to its unique design.

Having pioneered the 'double-delta' layout in the Viggen's predecessor, the J35 Draken, Saab have switched courageously to yet another new formula, which might be called the 'tandem delta', for the new type. This does not imply any shortcomings in the 'double-delta', which is almost unrivalled as a simple wing shape for high supersonic speeds; but it would not have given a low enough landing speed for an aircraft as fast and heavy as the Viggen.

The main wing is a fairly conventional delta, with ailerons and elevators on the trailing-edge. The foreplane is fitted with full-span flaps, over which air from the engine is blown during landing, giving greatly increased lift. In fact, the total lift produced from this layout is 50 per cent greater than with the Draken's simple 'double-delta'. This, combined with a thrust reverser which directs the jet thrust forward for braking, gives the Viggen its very short landing run.

With its afterburner switched on, it will climb to a height of more than 36,000 ft. in two minutes, making it a first-class interceptor for a country that is only a matter of minutes away from potential enemies. If an attack on Sweden were launched by sea or land, instead of from the air, the Viggen could carry out powerful counter-attacks, flying above the speed of sound at very low altitudes.

Such operations demand far more than just a good airframe and engine, which is why the Viggen will be so costly. During our visit to Sweden, we saw something of the radar defences that would detect and locate any incoming attack. We were also shown the vast array of 'black boxes' that are stowed inside the Viggen's own fuselage, beginning with the Honeywell automatic flight control system. Working in conjunction with a miniaturised computer of Saab design, this enables many phases of a mission, such as navigation, target approach and fire control, to be done automatically, leaving the pilot free to concentrate on tactics.

At Svenska Radio AB, we were shown the 'head-up display' which projects on to the windscreen most of the data the pilot needs in flight, so that he does not have to glance down at his instruments during critical stages of an attack or when flying close to the ground. The Philips company showed us the navigation equipment they were developing for the Viggen, and at L. M. Ericsson we saw the nose radar which is used both to locate the target and for automatic weapon firing. This massive electronic unit alone weighs 4 cwt., and we no longer wondered why the Viggen is so big but rather how so much can be packed into a comparatively small machine, flown by one man.

Nor is the Viggen just a one-job aeroplane. Unable to afford a variety of different aircraft, the Swedes intend to build it in four different versions. The prototype now flying represents the AJ37 single-seat attack aircraft, which will begin to replace the A32A Lansen in 1971 and will also be capable of interception duties. The AJ37 will be primarily a single-seat interceptor to replace the J35 Draken in the mid-seventies, but will also be suitable for attack missions. The S37 will be a single-seat replacement for the S32C Lansen in Swedish Air Force reconnaissance squadrons. And the Sk37 will be a tandem two-seat trainer with the rear cockpit taking the place of the forward fuselage fuel tank of the combat models.

To perform these various tasks, the Viggen has three weapon attachment points under its fuselage and one under each wing. Its primary armament will be the big Swedish Rb 04 winged air-to-surface guided missile for use against naval targets, or the new Saab 305 missile for use against both ground and naval targets, plus various types of air-to-air missiles, air-to-surface rockets, bombs, guns or mines. The Rb 04 and 305 missiles are among the most efficient of their kind in the world and it would take a very brave, or foolish, foe to risk attacking Sweden when the Viggen becomes operational.

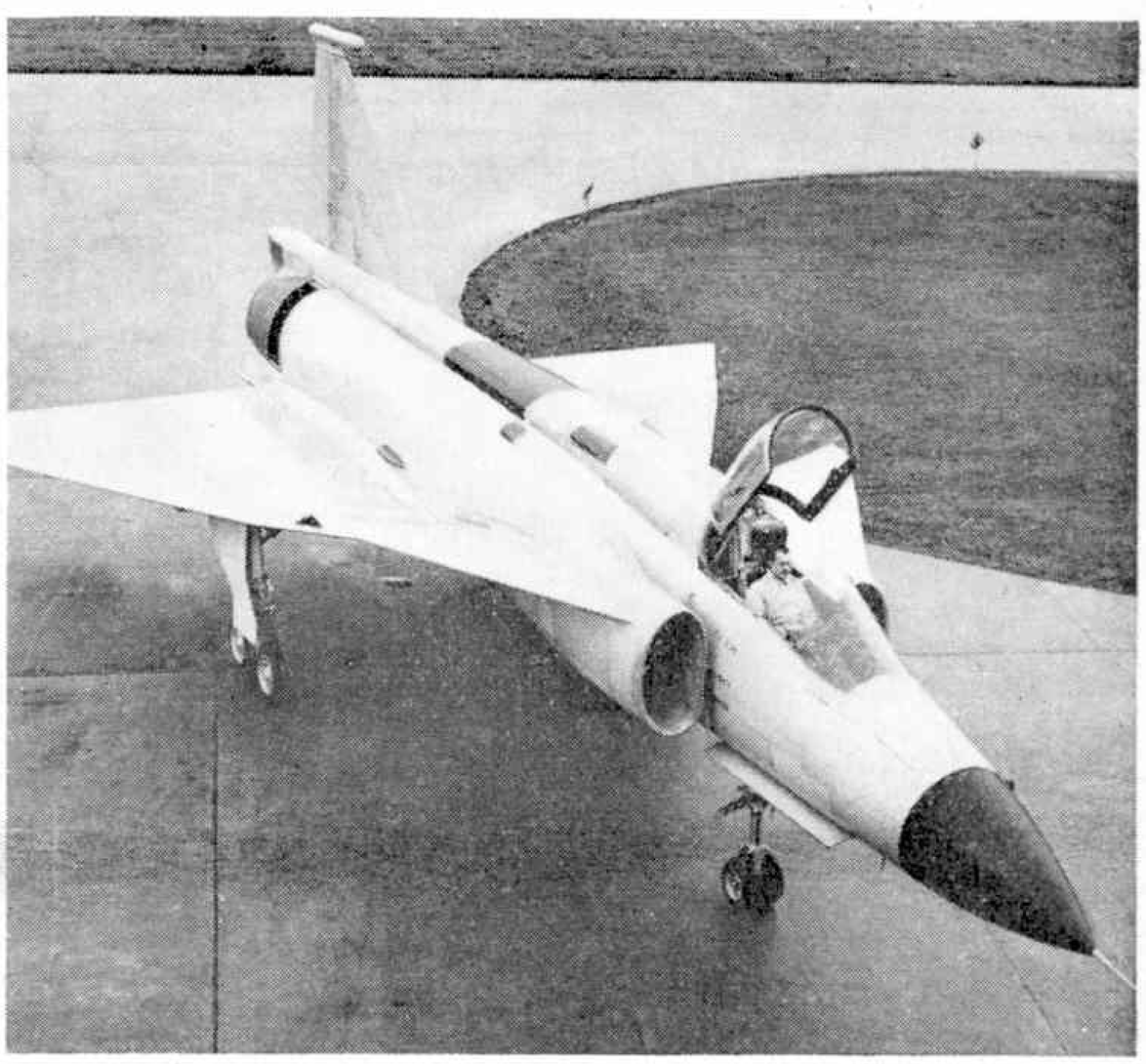
Some people might feel that even such weapons are a waste of time and money in a nuclear age; but the Swedish Defence Board don't agree. No great nation will ever risk provoking an all-out nuclear war, and they feel that their country would never be a primary target. The main threat is a sudden isolated attack with conventional atomic weapons, and this they believe they can cope with, although it may require up to 800 Viggens to do so, making the Swedish Air Force considerably bigger than the R.A.F.

The keys to survival in such an attack are dispersal and lightning-fast counter-attack. Clearly, we were not let into all the secrets, but what we saw was tremendously impressive. Many factories and aircraft hangars are underground, safe from even nuclear bombing. More impressive still are the road bases—stretches of ordinary main highway that have been specially strengthened for operation as dispersal airstrips.

We were told that we would pass over one as we flew by Dakota from Tröllhattan to the fighter airfield of Norrköping. We kept our eyes glued to the windows, but were unable to distinguish the airstrip from ordinary road. This shows how difficult it would be for an enemy to wipe out Sweden's air bases, even though the road-strips are capable of handling the Draken and Viggen, both of which fly faster than 1,300 m.p.h.

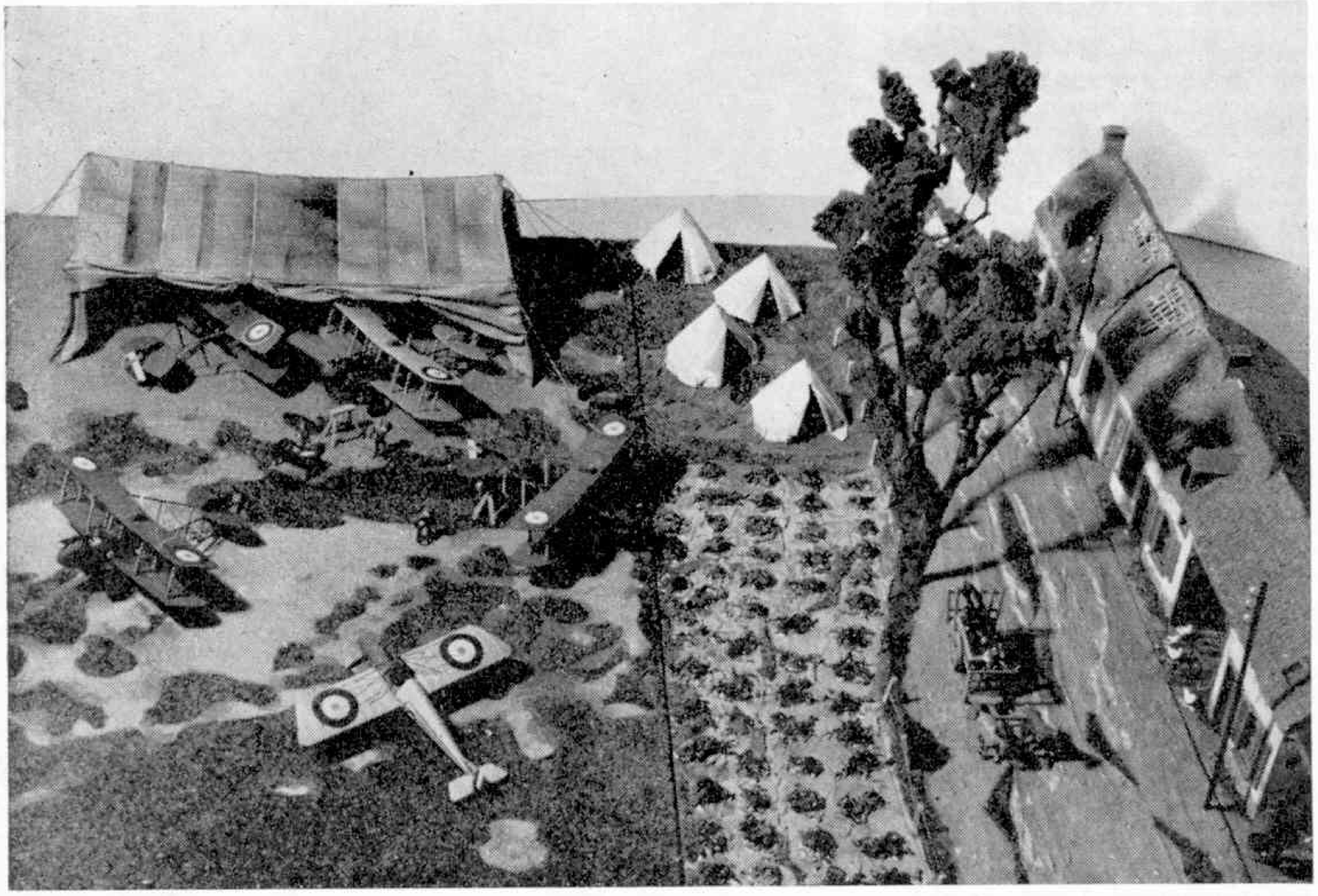
At Norrköping, we were treated to a demonstration of what the Swedes mean by fast ground handling. Two Drakens landed, after a simulated combat sortie, and were given a complete between-flights service, including refuelling, re-arming and changing a wheel, and were airborne again in 8 min. 27 sec. Such teamwork, allied to aircraft like the Viggen, offers as good a guarantee of Sweden's continued freedom and neutrality as one could wish for.

Above: the Saab J35 Draken, pioneer of the 'double delta' layout, was the ancestor of the Viggen



Home of the fighting scouts

Part 3—Making the Buildings



TWO points which often detract from the realism of model buildings are the use of unnaturally bright colours and a general lack of surface texture. These errors are particularly noticeable when the reproduction of old buildings is attempted. The following techniques for producing buildings to 1/72nd scale, will also be of interest to model railway enthusiasts.

The buildings described in this article were originally made by the writer in a simpler form with a view to producing a series of paintings about early aviation. Sketches and photographs were taken in France and general dimensions made in order to prepare accurate three-view drawings. Although the paintings are still in layout form, it was thought that the techniques employed would be useful to model makers. Grey card, obtainable in 30 in. by 20 in. sheets from most good art shops is used for the main structure. Any card of a neutral tone however can be employed, but it should be about postcard thickness. Commence by cutting out the various parts shown in Figs. 1 and 2 with a sharp knife. Cut out all windows and doors marked X and score all dotted lines for easier bending with a sharp 4H pencil or the back of a knife blade.

The sequence of construction is indicated on the drawings (which are exactly quarter size) by the letters on the tabs and the corresponding edges to which they are glued. Thus in Fig. 1 the four walls are formed, after the card has been folded along the dotted lines by glueing tab A to edge A. The roof is then folded and glued to tabs B. The out-house is added by glueing tabs C to their appropriate positions on the main building followed by the roof on to tabs D and to the main roof at E. Finally, the ceiling and walls of the archway are glued to tabs F. The sequence of construction for the two smaller buildings in Fig. 2 is self-explanatory. UHU glue was used but any good quality glue, with the exception of balsa or plastic cement, would be satisfactory. The garret windows M and K and the chimney stacks L are carved from balsa wood.

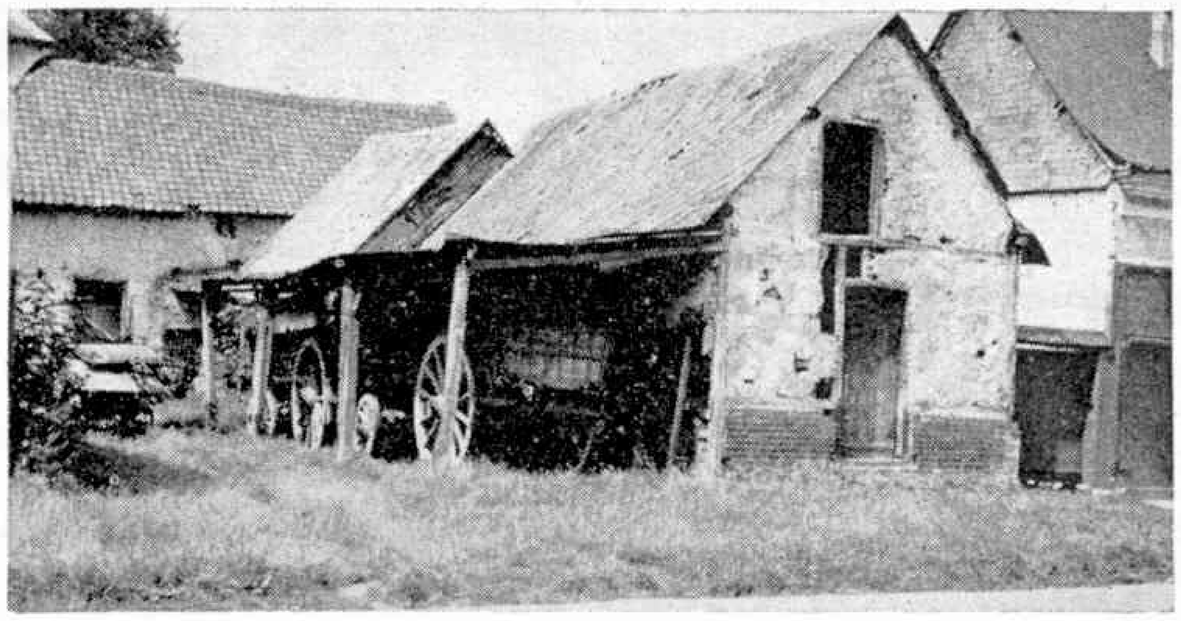
Fig. 3 shows three ways in which you can add realism to your buildings. In Fig. 3a a realistic 'sag' can be given to the roof by cutting along the fold as indicated and glueing the curved edges back in place from inside the roof. Many of these old farm buildings were in an advanced state of dilapidation quite apart from

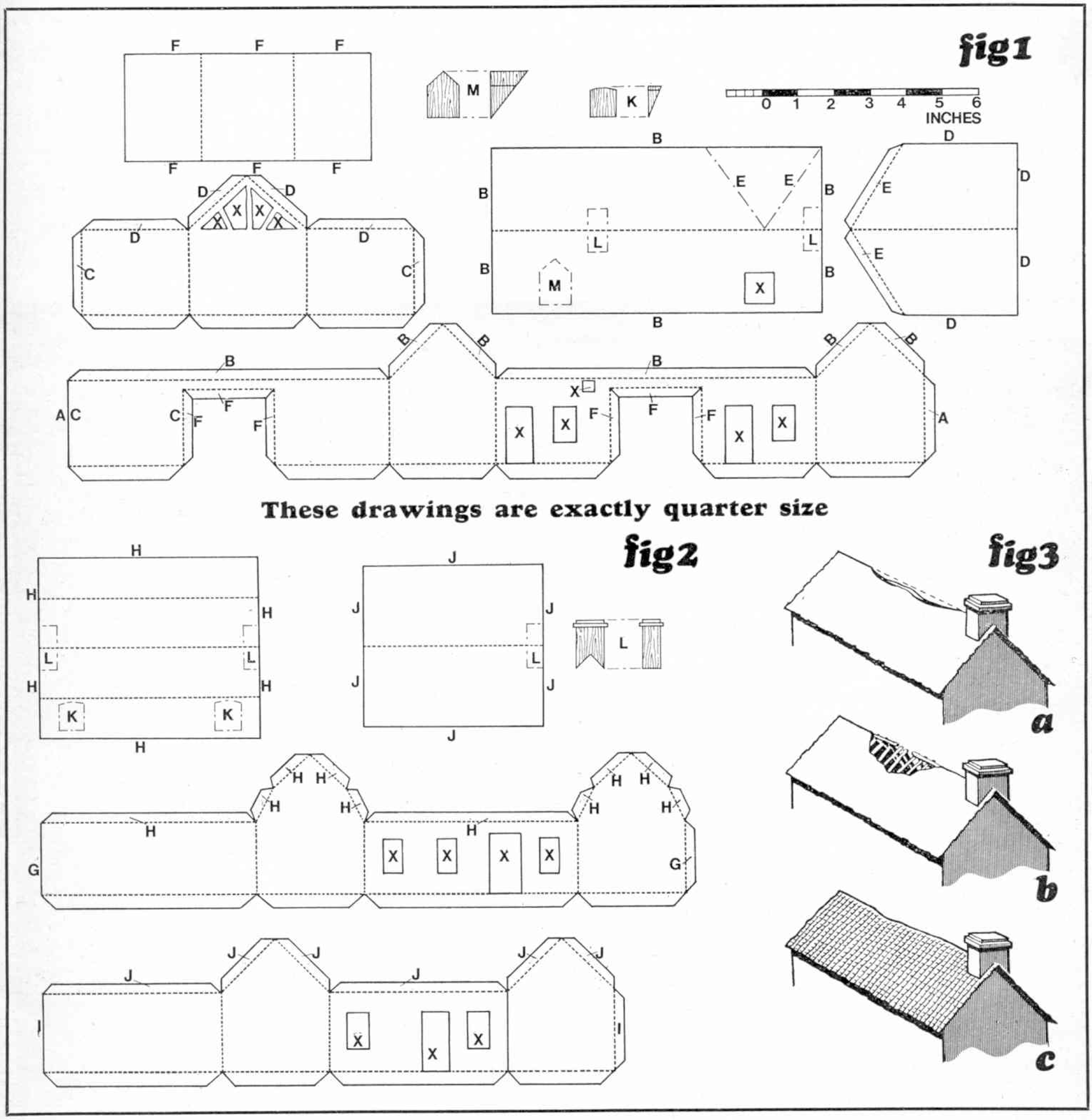
war damage. Fig. 3b shows another effective way of introducing a 'war-worn' look. Quite a sizeable hole is cut in the roof as shown and the broken rafters glued in place from inside the roof. Fig. 3c shows how the effect of a tiled roof is achieved. The roof is first given a coat of size or fish glue and then a thick layer of Polyfilla is applied all over with a table knife. The wet Polyfilla is then scored with a sharp pencil in horizontal lines about ⅛ in. apart, followed by vertical lines from the top of the roof to the eaves. The rest of the buildings can then be given a very thin coat of Polyfilla applied with a small square-edged piece of cardboard about ½ in. wide, using a palette knife technique.

Poster colours again are used for painting the buildings as they are far more economical than matt enamel. The walls are painted a faded stone colour. (White with a touch of burnt umber and black.) For the roof and chimney stacks, use burnt sienna and white with a touch of black. Notice how the edge of the roof in Fig. 3 is serrated by hacking with a razor blade.

The buildings should not be glued to the baseboards at this stage, for in next month's issue the method of making doors, windows and other small details will be described and it will be necessary to attach the window frames from inside the buildings.

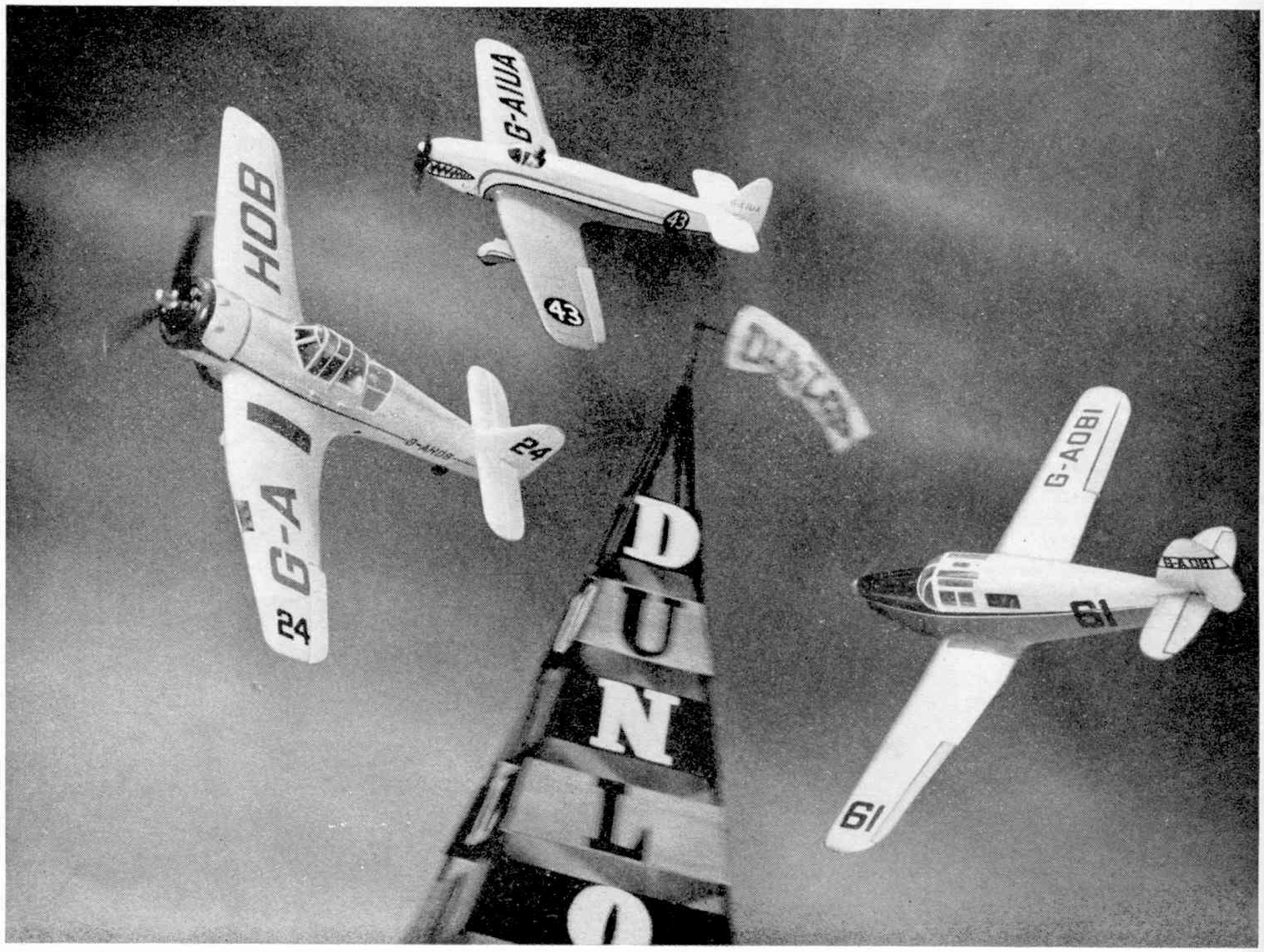
Ken McDonough





IN RACING COLOURS

Many of the light planes seen in the air race circuits of post-war days were ex.R.A.F. training and communications machines in civilian dress. Three such aircraft are included in the current Frog catalogue: the Miles Master, Miles Magister and Percival Proctor. The Gipsy Moth (from the Trail Blazers series) was also seen at race meetings for many years. The first three aircraft were dealt with and illustrated in their wartime camouflage in the December 1966 Meccano Magazine, and it is interesting to compare the photograph in that issue with the one on this page, where Doug McHard's three models are seen dicing it around a 'Dunlop' race pylon, resplendent in their peacetime owners' colours. Here are some details of the colour schemes and the modifications that were necessary to adapt the basic kits.



Miles Master.

THE radial engined Master was not widely used after the war, but three machines were on the strength of the parent company as demonstration aircraft for three or four years. One of these, G-AHOB, was entered in the 1949 King's Cup race and was allocated the racing number 24 but, as far as we know, it never actually took part. It was a Master Mk. II with a Pegasus 9 cylinder single row radial engine, whereas the Frog kit represents a Mk. III with the smaller diameter twin row Pratt & Whitney Cyclone. To adapt the kit cowling, we wrapped a strip of 20 thou. Plastikard round the cowl allowing $\frac{1}{8}$ in. to extend beyond the rear face. Before this can be cemented in place it is necessary to remove the flared-out cowling gills of the small cowling. Pre-bend the Plastikard and hold it in place with a rubber band until dry (photo. 1). Then complete the front face by building it up with body putty until it can be smoothed into a rounded contour. Cut away the front inner lip of the cowling to enlarge the area of the front opening. The nine equidistantly spaced 'blisters' are formed with body putty. Apply it in fairly large blobs, and carve and sand it to shape when dry. The small air intake scoops just behind the lower cowling are not required for our modified Master, so the fuselage contours at this point must be cut and filled with body putty until smooth (photo. 2). One of the discarded scoops is re-positioned below the cowling.

Scrape and sand the surplus moulding stem to reduce its diameter slightly and from it bend up the twin exhaust pipes. Heat the stem *slightly* to allow the bends to be made. Two short off-cuts from the stem are used to represent the twin tubular intakes at the top of the cowling. These project a little ahead of the front cowling face and are angled slightly downwards.

A $\frac{1}{16}$ in. drill can be used to hollow out the intake and exhaust pipe ends for added effect. Only the front row of the twin-row engine supplied with the kit should be used. Before fitting the completed cowling, remove $\frac{1}{8}$ in. from the front face of the fuselage (photo. 1).

Colour scheme for the Master was all cream with red cowl front and trim stripe, $\frac{1}{2}$ in. red Yeoman alphabet letters on the wing and $\frac{1}{8}$ in. on the fuselage. The racing numbers are $\frac{1}{8}$ in. black on the fin and $\frac{1}{4}$ in. on the wing.

Miles Magister.

This single seat Magister was frequently seen at race meetings until quite recently and makes a colourful subject. The only modifications to the kit are the spatted undercarriage which replaces the bare oleo legs supplied and blanking off the rear cockpit with a paper cover or a Plastikard insert. To be really accurate you may also wish to fit a more sharply raked windscreen.

Make the new legs, as shown in photo. 3, using $\frac{1}{16}$ in. thick plastic sheet for the 'core' (including the dummy wheel) and $\frac{1}{32}$ in. sheet for the two sides. Cement together and then shape to a streamline section. The photo shows both rough and finished legs.

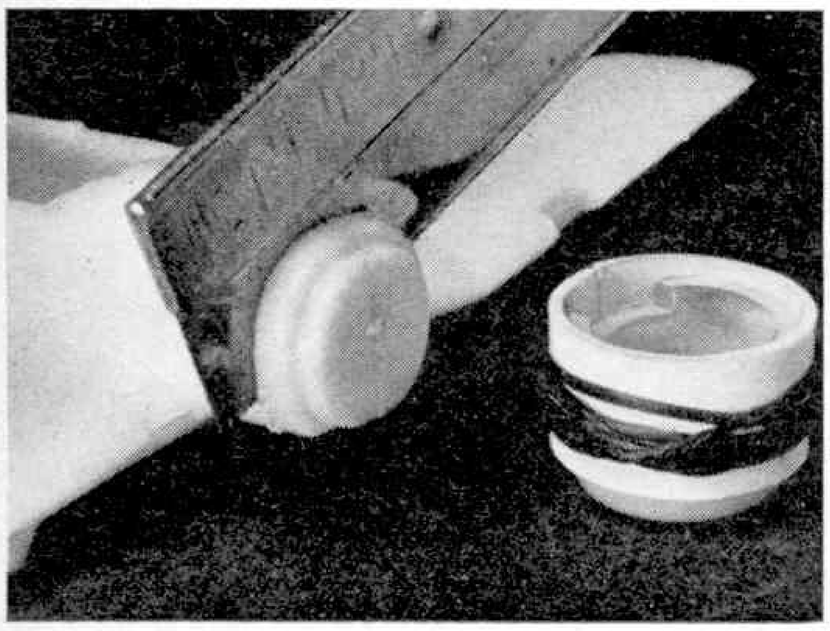
Colours are: orange wings and lower fuselage, orange trim stripe on fuselage and lower spats; black trim line along upper edge of orange areas and around the 'lips' of the shark's mouth. White fuselage top and tailplane, spinner tip and spat tops. Black $\frac{1}{8}$ in. lettering on wing. Black number discs with white numbers. Red 'mouth' with white teeth.

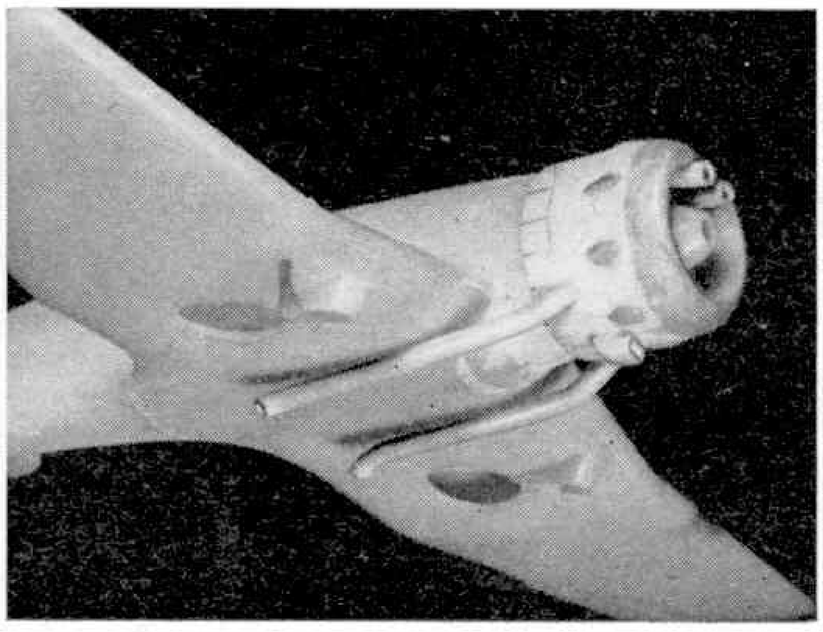
Percival Proctor.

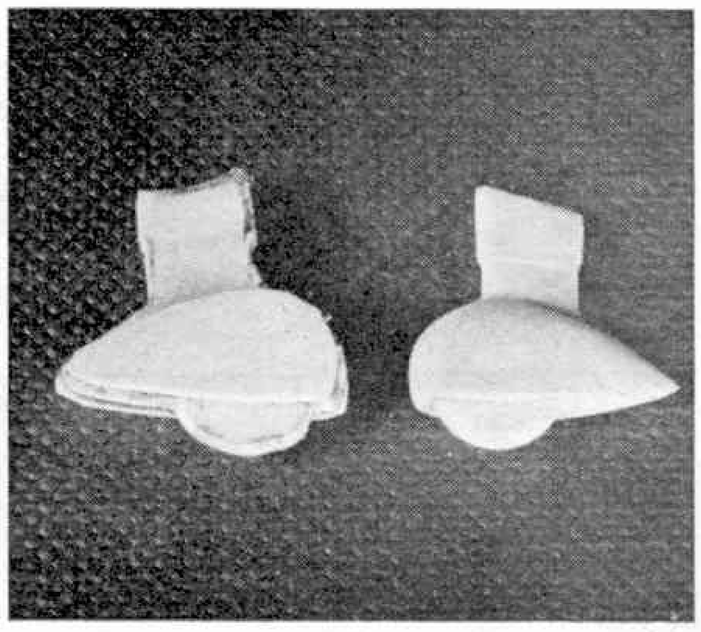
This particular aeroplane never, as far as we know, carried race numbers, but it is a most attractive colour scheme and Proctors are to be seen in so many races that such numbers are not really out of place.

Colours are: Silver wings and horizontal tail surfaces, white top of fuselage, fin and rudder. Dark blue top cowling and trim stripe, light blue lower fuselage (with thin white dividing line) and light blue spats. Blue $\frac{1}{4}$ in. wing registration letters and $\frac{1}{8}$ in. fin letters between two thin blue lines. Black racing numbers.

Doug McHard







THE KING'S CUP RACE

The King's Cup for air racing was presented to the Royal Aero Club by King George V in 1922. The idea behind this trophy, the oldest aviation cup still regularly competed for in a race, was to encourage, by competition, the development of sporting aviation.

THE Great War had only been over for three and a half years when the first race was announced; Britain was filled with ex-R.F.C. and R.A.F. officers, and war-surplus machines, expensive on fuel with their muscular military engines but dirt cheap to buy, were available from the Aircraft Disposal Company. Consequently, the first three years saw mainly military entrants on the start line.

The advent of the first true light aeroplane, the immortal Moth of Geoffrey de Havilland, changed all that. Flown by Captain Hubert Broad, chief test pilot of the company, it won the 1926 race. In the hands of Captain Wally Hope it won the next two. Captain Hope won again in 1932 in a D.H. Fox Moth, to become the only man to achieve the hat-trick. Only once since 1925 has a military aircraft successfully challenged the light aeroplanes for whose good the race was established, when Flt. Lt. 'Batchy' Atcherley, now Air Marshal Sir Richard Atcherley, won in a Gloster Grebe J 7520, at over 150 m.p.h.

The last race before the war was flown in 1938 over a thousand-mile course (1,012 miles exactly) and was an historic event in more ways than just being the closing sporting occasion of peacetime air racing. It was won by Alex Henshaw, at 236·25 m.p.h., in the Percival Mew Gull G-AEXF. This is the fastest time at which the Cup has ever been won. 'XF' herself has a remarkable history; in 1939, between February 5-9, in the same aircraft, Henshaw made a record solo dash to the Cape and back at an average 147 m.p.h. Sold to France and discovered after the war hidden in a barn, it was assembled and flown to England where it raced again regularly until 1965. Damaged in a forced landing, it now awaits probable retirement to a museum.

The King's Cup air race was revived as the culminating event of the Royal Aero Club's National Air Races in 1949. King George VI, who had presented the original cup for the first time in 1937, now presented a new one for the second series.

With the exception of 1951, when it was first rained off and then rendered unflyable by the Entertainment Tax demanded for putting it on at Farnborough, the alternative date, it has been flown every year since. There have been radical changes since the early, round-Britain circuits, with prototypes and demonstrators mingling with the private owners in the race; crowds used to aviation in their daily lives will no longer wait all day to see the contestants pass a pylon once and the courses are now 12-18 mile circuits of several laps. The almost complete death of British light aviation design and construction after the war—folly only recently recognised by the industry and which Beagle are trying to put right—meant that the King's Cup was becoming almost a veteran run until the rules were amended to allow foreign aircraft and engines to race. The pilot, however, must, as always, be British.

The Royal Aero Club is determined to keep air racing healthy as a major part in the important sporting side of flying. What this may mean to the King's Cup in the future cannot be known yet, but with Royal patronage of the Club and the Duke of Edinburgh its President, interest in the Royal race is still high. His Royal Highness has the additional personal interest of being the only Royal entrant to win the Cup, with a Turbulent piloted by his Equerry, S./Ldr. Severne, in 1960.

John Blake

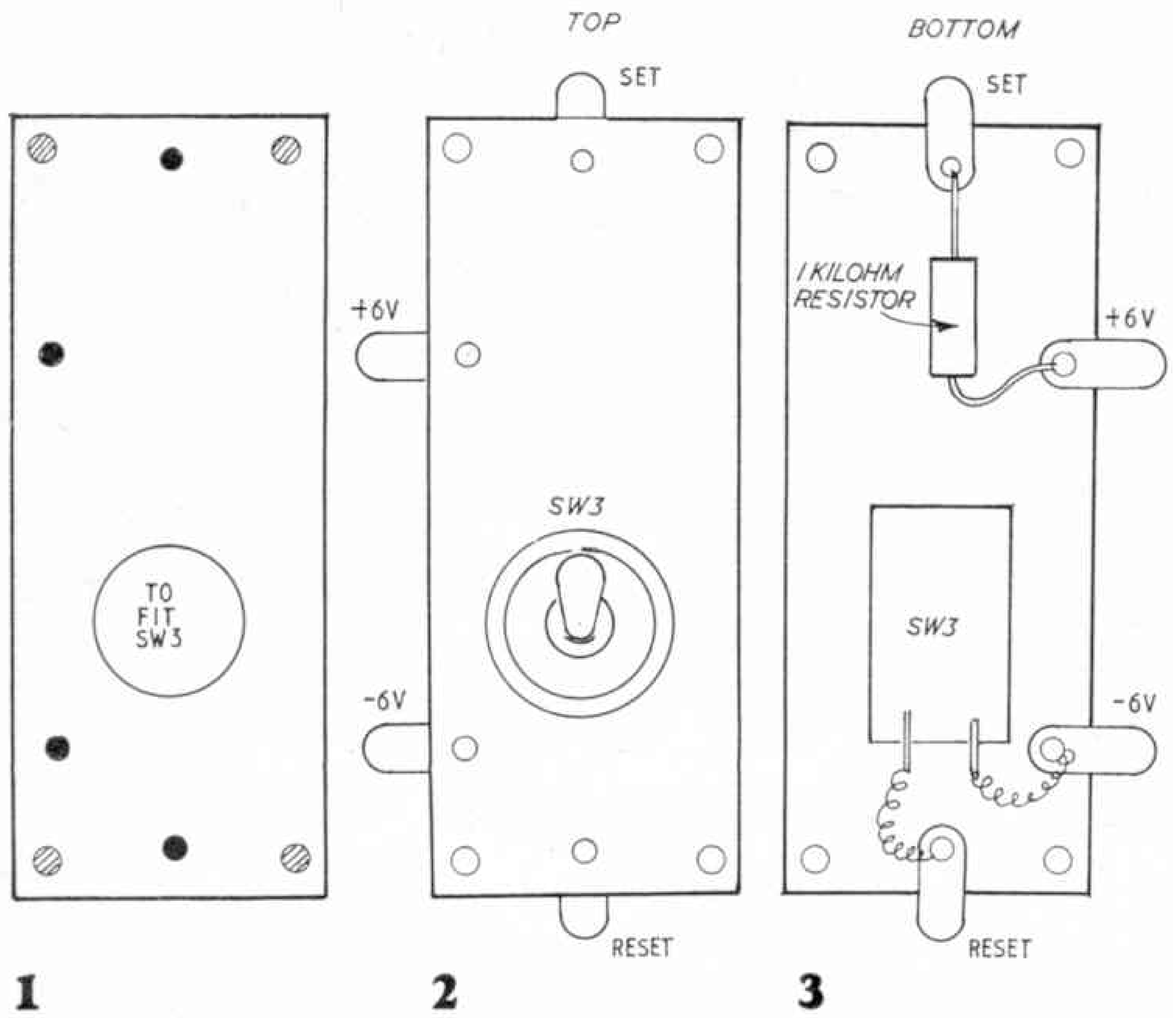
The Meccano Mag Computer

Part 2 by Ron Warring

HAVING constructed the required number of stages as described in the first article (each stage identical) there is one additional very simple circuit panel to make before the complete computer circuit is assembled. This is a simple switching panel carrying a switch and single resistor connected to four tags. Materials required are as follows:

Sheet Paxolin panel 2½ in. by 1 in. (from same material as used for the other stages).

SW3—two-way single-pole toggle switched *biased to make position*, one 1 kilohm resistor, ¼ watt rating.



IMPORTANT

Some readers have found their T.R.3 (OC.71 transistor insufficiently powerful to light the bulb. In this case an OC.72 or an ACY.22 (which is cheaper) should be substituted. You should replace resistor R.7 with a 2·2 kilohm resistor at the same time. *Do* make certain that electrolytic capacitors C1 and C2 are each connected *negative* to the transistor collector leads (C) as shown in last month's circuit diagrams. In addition to the supplier mentioned in last month's issue, components for the computer may be obtained from Henry's Radio Ltd., 303 Edgware Road, London, W.2 and I-Cor Systems, 18 Stamford Hill, London, N.16. See page 49.

Four plain terminal tags with eyelets, bolts or small rivets to mount.

A full size drawing of the panel is shown in Fig. 1. Use this to mark out the hole positions to be drilled, i.e.:

(a) one large hole for the switch
(b) four $\frac{3}{32}$ in. holes (solid dots) to mount the terminal tags
(c) four mounting holes (shaded), one in each corner of the panel.

Fit the terminal tags to the panel and also mount the switch. Take care that you fit these on the right side of the panel, which should appear as shown in Fig. 2 (top view) and Fig. 3 (viewed from the underside). Fig. 3 also shows the connections to be made, namely:

(a) the resistor soldered between the 'SET' tag and the '+6 V' tag
(b) a short wire connecting one side of the switch to the '−6 V' tag
(c) another short wire connecting the other side of the switch to the 'RESET' tag.

We now need to make up a simple cabinet to take the various units. This need only be a baseboard cut from ¼ in. sheet obeche for rigidity. To this are cemented edging strips of 1 in. by ¼ in. hard balsa, as shown in Fig. 4.

The actual sizes required will depend on the number of stages you are using. The dimensions given are for accommodating six stages. For every additional stage add a further $2\frac{1}{16}$ in. to the length. Alternatively, for every stage less than six, subtract $2\frac{1}{16}$ in. from the 14 in. length.

Bare wires are mounted on each side of the cabinet, as shown. These should be of 16 s.w.g. tinned copper, fastened taut between pins or tacks. The shorter wire on each side should be placed about ⅛ in. down from the top edge. The longer wire which wraps round one end should be about ¼ in. up from the bottom edge. These wires form the common connections for the stages.

The 'IN', 'OUT' and 'O' tags on each stage should now be bent down at right angles, as shown in Fig. 5. The stages can then be assembled by bolting together through these tags, using 8 BA copper screws and nuts. As well as mounting the stages together these also provide connection from 'OUT' to 'IN' from one stage to the next; and also connect the common or 'O' line through each stage.

The bolted together stages are then fitted into the cabinet, trimming away the top edges of the cabinet 1 in. by ¼ in. strips, as necessary, to allow the assembly to lie flat. Finally, the end panel is dropped into the remaining space at the left-hand end of the cabinet, but this is not bolted to the last stage. It is only connected electrically to complete the computer circuit as shown in Fig. 6.

A six stage assembly, together with its end panel, is shown in Fig. 7. Note that the stages read from right to left. The first stage has two spare tags—'IN' and 'O'—which are not connected to anything. The last stage similarly has two spare tags—'OUT' and 'O'—which are simply bent down and again not connected to anything.

The final connections are then made as follows:

(i) The '+6 V' tag on each stage, including the end panel, is connected to the '+6 V' wire on that side of the cabinet strip, using short lengths of insulated wire.
(ii) The 'SET' tag on each stage, including the end panel, is then connected to the 'SET' wire on the same side of the cabinet, again with short lengths of insulated wire.
(iii) Connect the 'RESET' tags on each stage, and the end panel, to the 'RESET' wire on the other side of the cabinet.

Check out count for a Six-stage Computer

No. of signals given on SW1 on stage 1	*Condition of lamps* B1	B2	B3	B4	B5	B6
0	off	off	off	off	off	off
1	on	off	off	off	off	off
2	off	on	off	off	off	off
3	on	on	off	off	off	off
4	off	off	on	off	off	off
5	on	off	on	off	off	off
6	off	on	on	off	off	off
7	on	on	on	off	off	off
8	off	off	off	on	off	off
9	on	off	off	on	off	off
10	off	on	off	on	off	off
11	on	on	off	on	off	off
12	off	off	on	on	off	off
13	on	off	on	on	off	off
14	off	on	on	on	off	off
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39	on	on	on	off	off	on
40	off	off	off	on	off	on
41	on	off	off	on	off	on
42	off	on	off	on	off	on
43	on	on	off	on	off	on
44	off	off	on	on	off	on
45	on	off	on	on	off	on
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53	on	off	on	off	on	on
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56	off	off	off	on	on	on
57	on	off	off	on	on	on
58	off	on	off	on	on	on
59	on	on	off	on	on	on
60	off	off	on	on	on	on
61	on	off	on	on	on	on
62	off	on	on	on	on	on
63	on	on	on	on	on	on

(iv) Connect the '−6 V' tags on each stage, including the end panel, to the '+6 V' wire on the same side of the cabinet.

The complete computer circuit is then wired up ready for working and only requires the connection of a 6 volt battery to the appropriate +6 and −6 volt lines at the left-hand end of the cabinet.

To use the computer it is then necessary to remember the following:

(i) Switch SW1 on each stage is used to trigger a signal or input to that particular stage. It is normally 'off' being biased to break position.

(ii) Switch SW2 on each stage sets the stage for either addition or subtraction. Moved to the positive side this gives addition. Moved to the negative side this gives subtraction. The position of SW2 on any stage, therefore, governs whether the signal or input from SW1 (or the preceding stage) is added or subtracted.

(iii) Switch SW3 on the end panel is the reset switch. This is normally made all the time (biased to make position). Operation of this switch breaks the reset circuit which restores all the stages to 'zero' condition. In other words, switch SW3 is operated to set the computer to zero to 'clear' any previous working.

You can now check the computer for proper working as follows:

(i) Set SW2 on each stage to the 'add' position.

(ii) Operate switch SW3, when any bulbs which may have lit up should go out.

(iii) Operate switch SW1 on stage 1 once. This should cause bulb B1 (on stage 1) to light up. This indicates a count of 'I'.

(iv) Operate switch SW1 on stage 1 again, when B1 should go out and B2 on stage 2 light up.

(v) Operate switch SW1, on stage 1 again, when B1 should light up as well as B2 remaining alight.

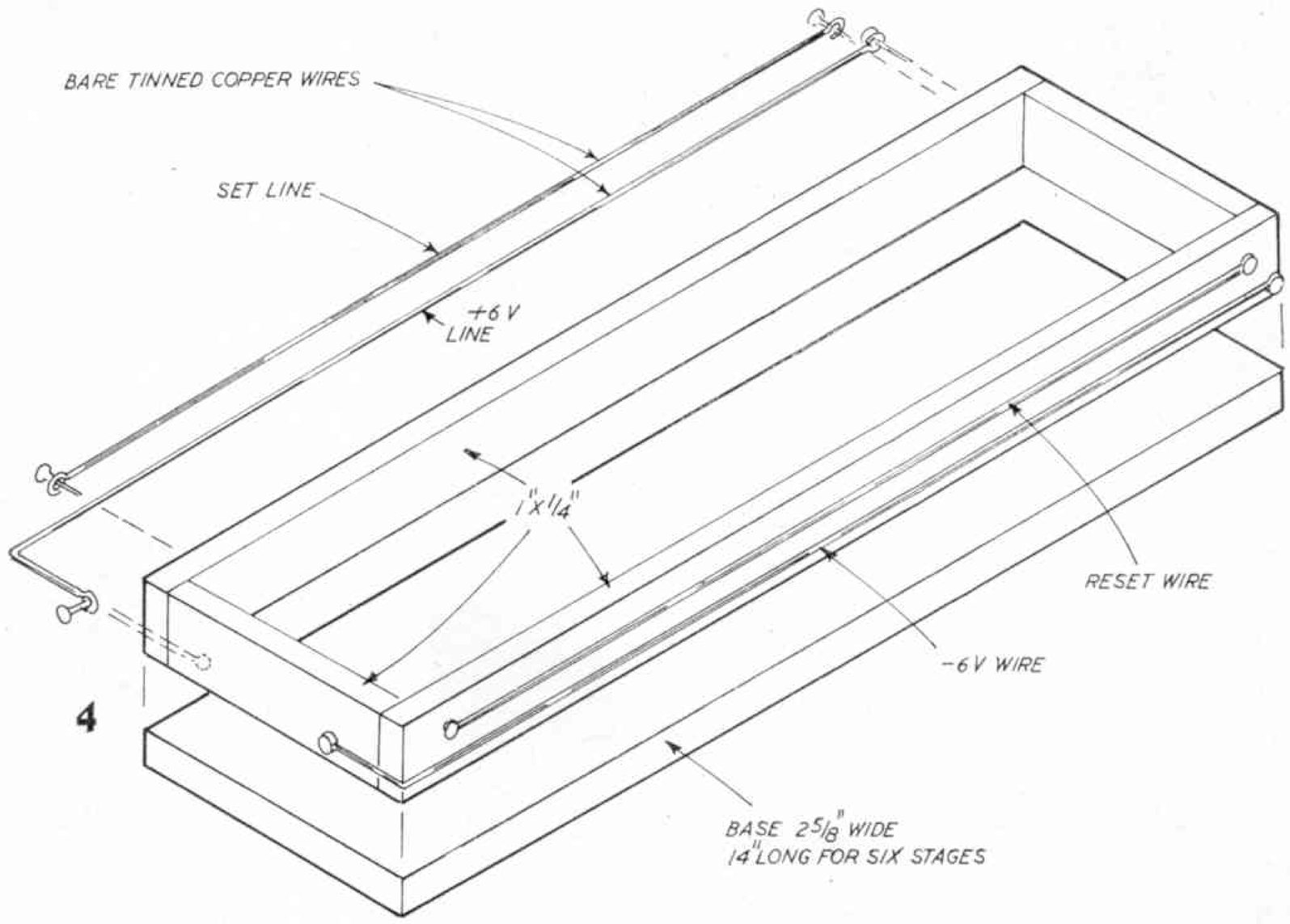
(vi) Operate switch SW1 on stage 1 again when B1 and B2 should both go out and B3 should light up.

This operation can be continued until you have worked right through the full 'count' of the computer, the 'count' representing the number of input signals given via switch SW1 on stage 1. Rather than describe this in words, which would take too long, the results you should get are shown in the Table.

Remember that you can always go back to zero and start again by pressing the reset switch (SW3)

Provided everything works out as it should, you can finally fasten the individual panels down with small woodscrews. If the computer does not work correctly, then possibly you have wired up the common connections wrongly; or, more likely, the connections between the 'IN' and 'OUT' and 'O' tags are poor where they are bolted together. You will have checked each stage for working separately, so it can only be the final connections which are at fault.

To use the computer properly for calculation—and see how numbers can be set up directly on each of the stages, if necessary—we need to know something about binary arithmetic. This we will describe fully in the next article and show you how to use your computer for rapid addition, subtraction, multiplication and division within the 'count' limit governed by the number of stages you have built.



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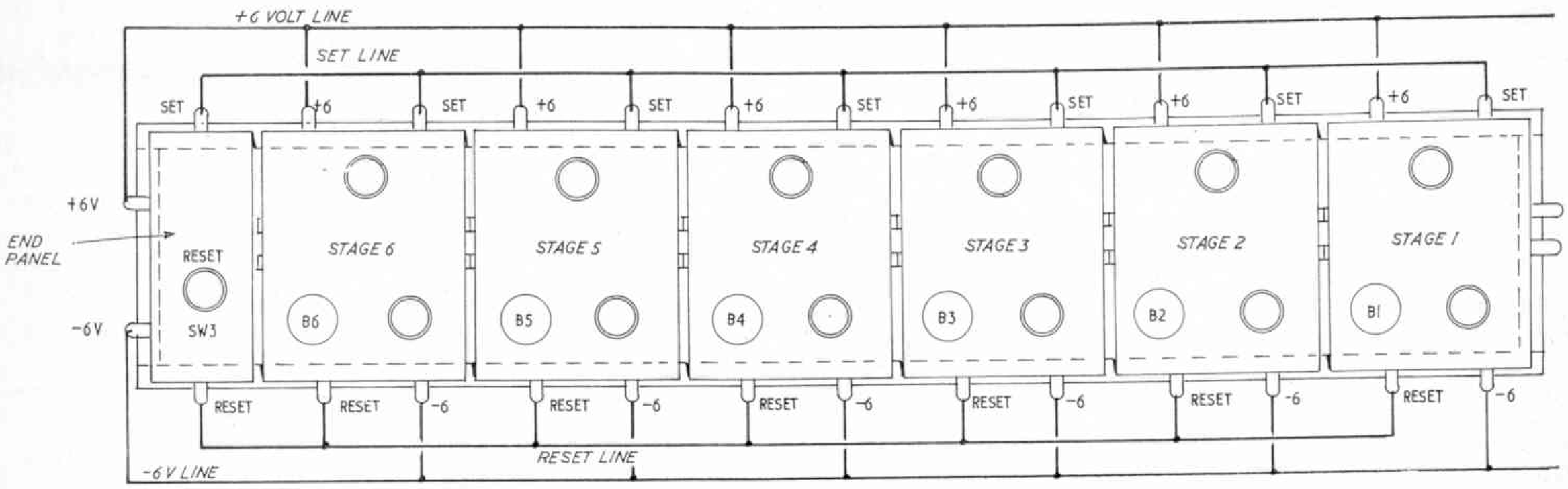

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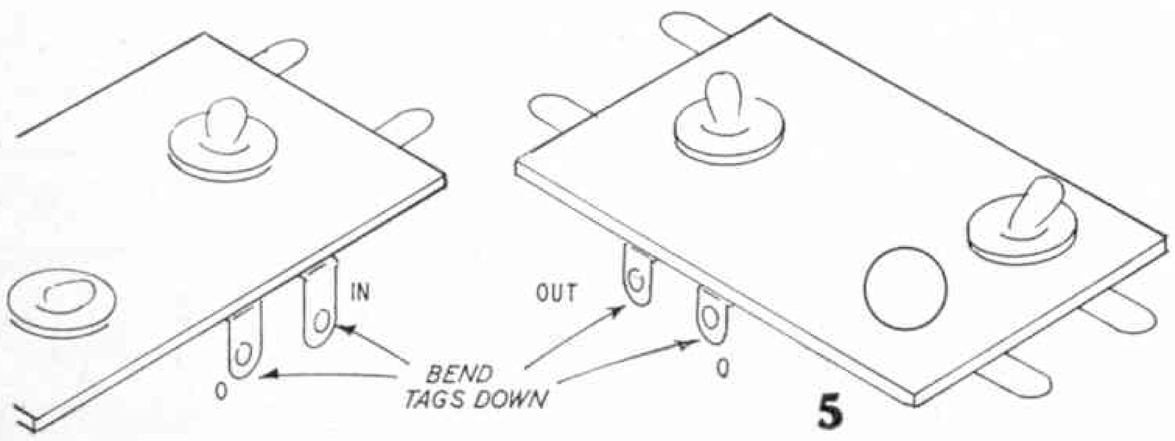

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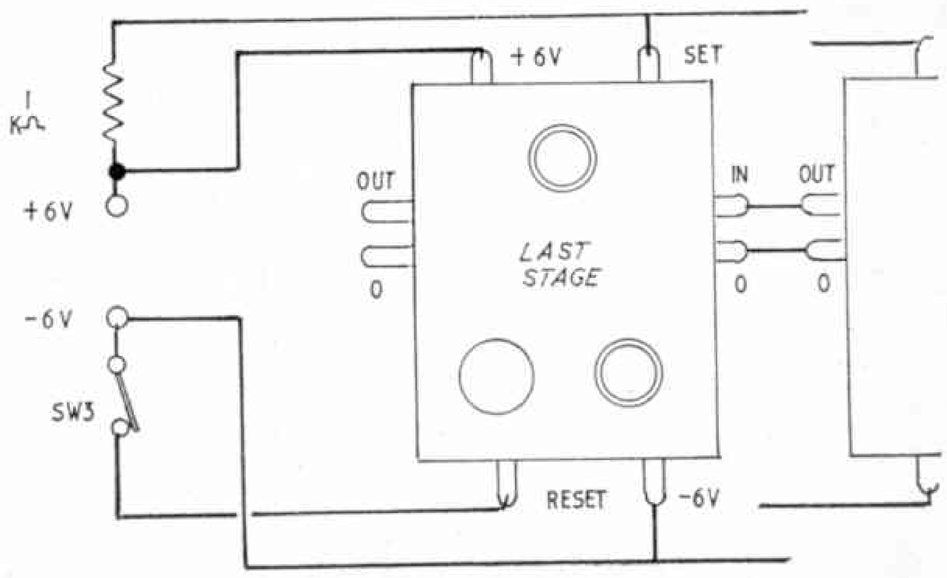

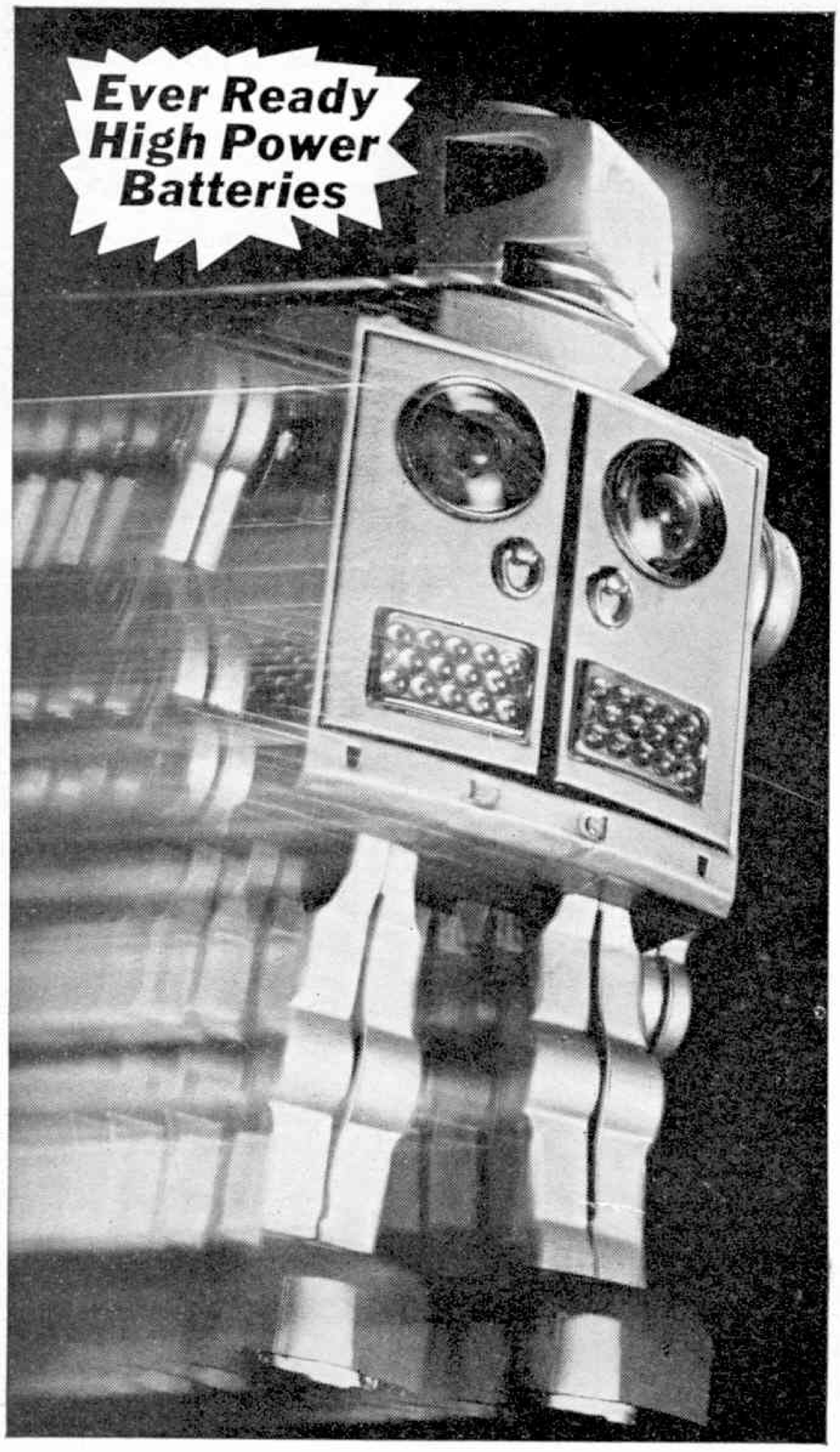

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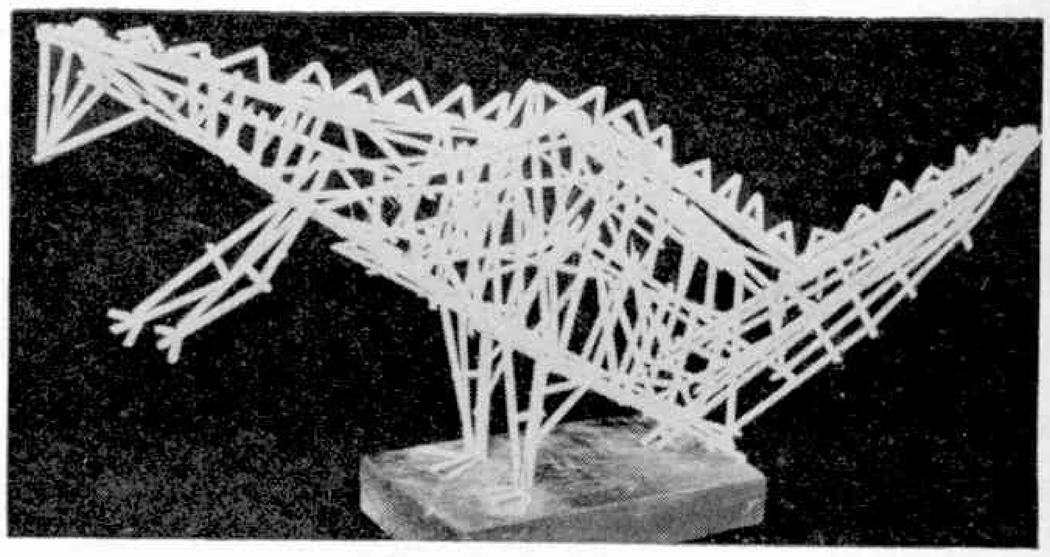

SPACE FRAME MODELS

Here's quite a different type of modelling you may care to try. It is called 'space frame sculpting', but what this really means is 'doodling' with lengths of balsa strip. You start off with a block of balsa as a base, decide on what sort of figure you want to make and then build up a skeleton shape from various cut lengths of strip. From there you go on to add more details to the skeleton, all in strip again, until the model looks complete—like the prehistoric monster in the photograph, for example. You don't need plans for this sort of modelling—it's all cut-and-try as you go. You can, however, make a rough sketch of the basic skeleton as an initial guide. After that, work out the design as you go. You don't have to stick to animal shapes, either. You can start with simple geometric shapes, like a triangle and go on from there. You could discover you have quite a gift for space frame modelling! It's fun . . . and it's cheap, too. And the accurate cut and high quality of Sclarbo Balsa strip help a lot. Solarbo Balsa always makes better models . . . whatever kind you build!

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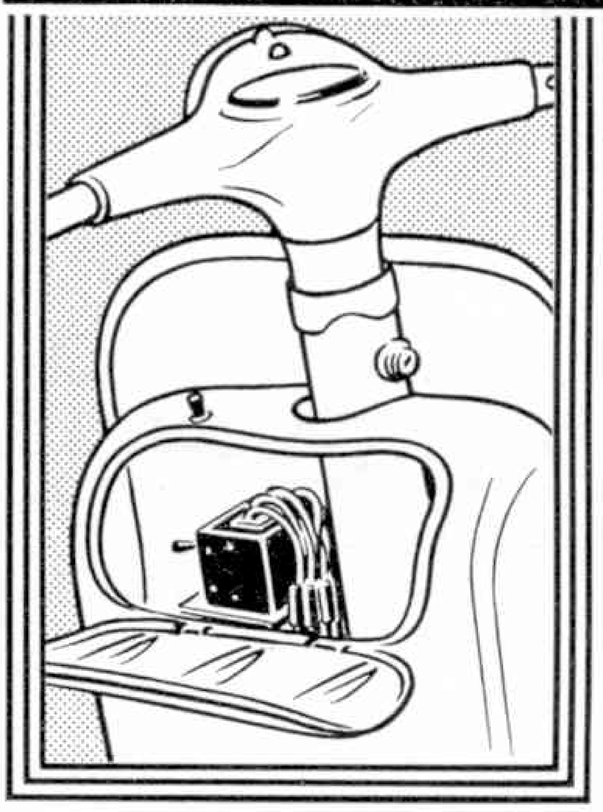

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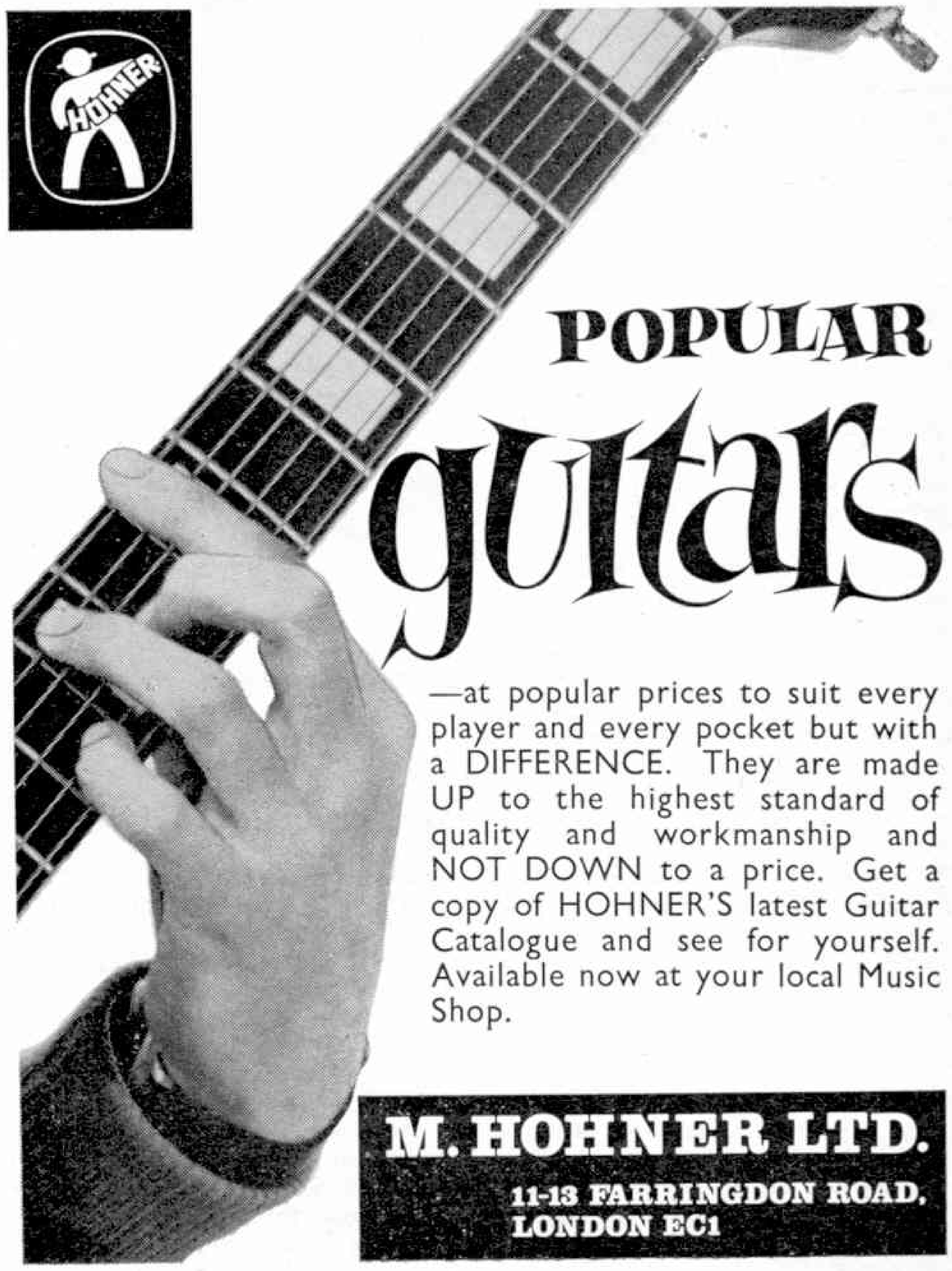
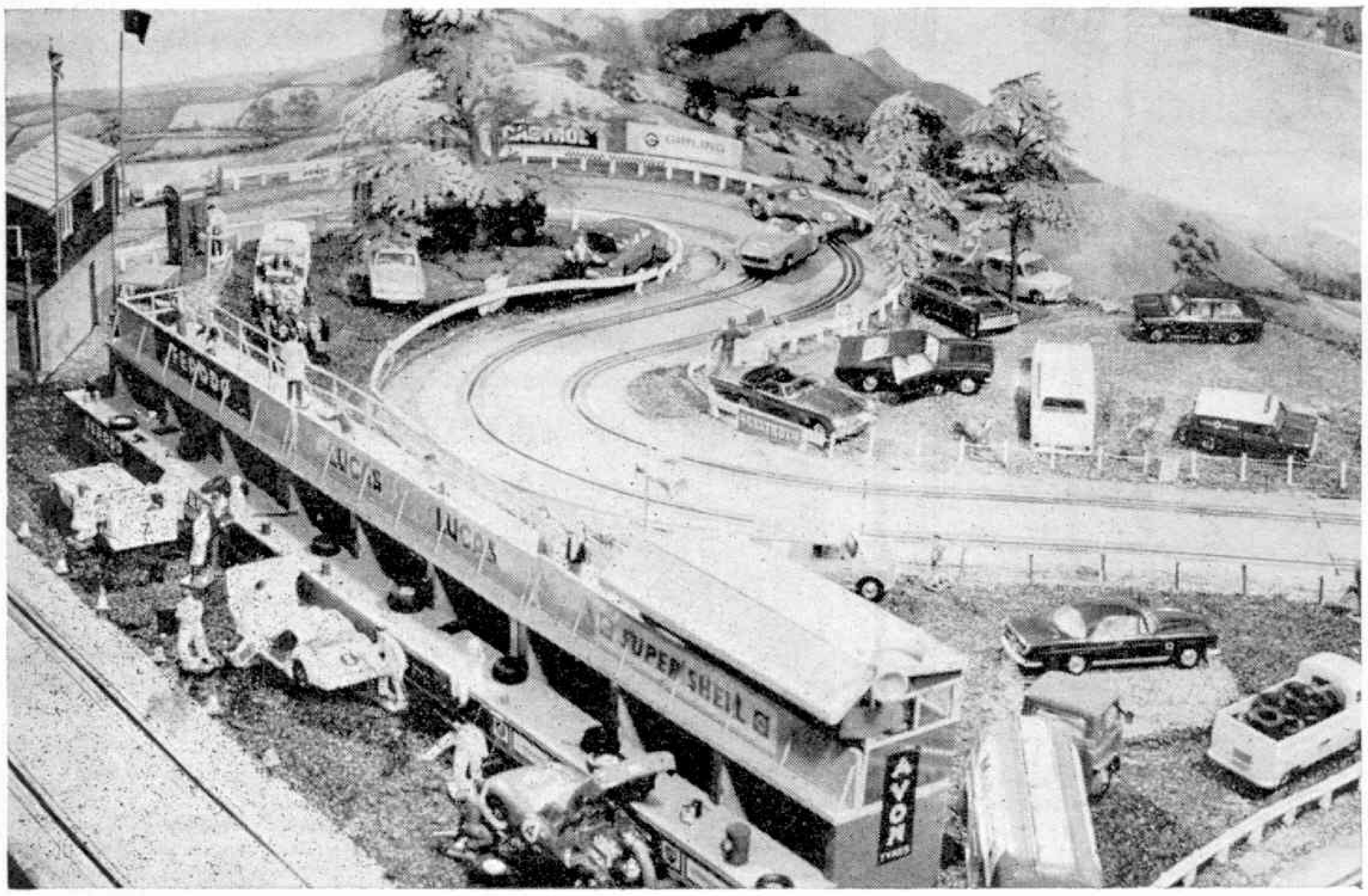
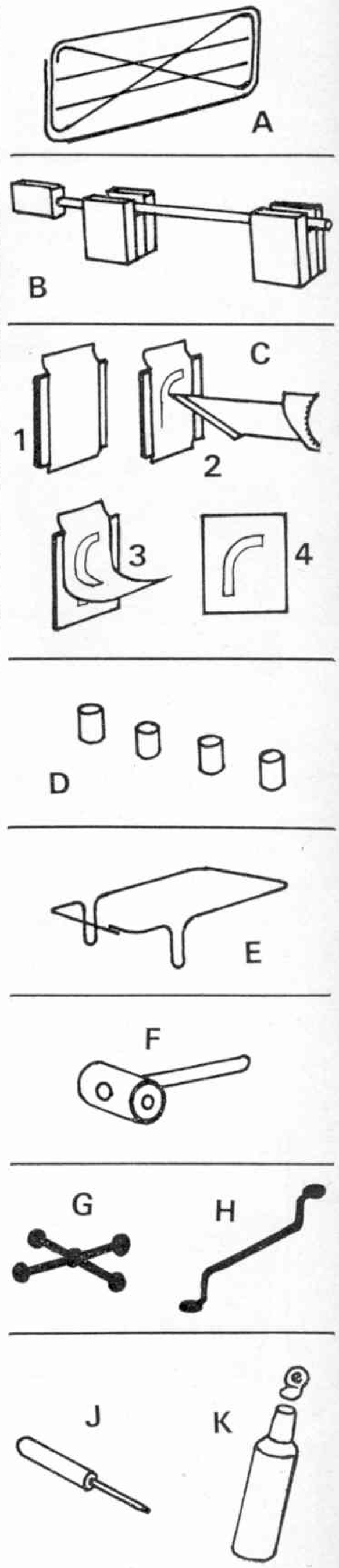


Building a Permanent Circuit - Part 5

By Godfrey Arnold





AT the end of last month's article the 'big' work was finished, and all that remained was the addition of details that give the realism that can be seen in the above photograph.

The buildings are the largest items remaining, and Corgi Silverstone kits are ideal for these. The Time Keepers' building was used exactly as supplied, but the pits were altered very slightly to fit in with the layout in that only one stairway was used for all three buildings, this being positioned where the rear service road is wide enough, the railings surplus from the addition of the press box being used to fill the gaps left.

Trees are essential for realism on any layout and it is difficult to better those produced by Britains, so these were used here, being assembled according to the instructions, and the bases stuck to the layout while other work was carried out.

Fences were described last month but, to be effective, they must be continuous and any gaps filled with gates or 'movable' barriers. Two types of gate that are easy to make are illustrated but others could be built from balsa wood and other materials.

Any racing circuit has track signs to give advance warning of bends and these may easily be made by cutting out pieces of polystyrene sheet, about ½ in. by ¾ in., sticking black P.V.C. tape on them, then cutting out the shape required and removing surplus tape. This method is usually neater than painting and the signs may be fixed by cutting a slit in the 'ground' and sticking them in. Other similar details required are warning notices, about ⅜ in. by ½ in., on which the word 'WARNING' can be written, and lines of print suggested, and advertisement hoardings, which can either be fixed straight on to the scenery or elevated on poles made of dowel or plastic sprue from old kits.

Transfers are supplied with the Corgi buildings and various other 'adverts' can be obtained from motoring magazines and publicity leaflets. The Corgi transfers are very strong and can be used to good effect to simulate cloth banners if applied to fences and gates, other ones being used on the pits. Do not use too many advertisements as it is all too easy to give the circuit a cluttered appearance.

It is in the pits that the best opportunity lies for the addition of detail and this is limited only by one's imagination and the time available. In real life, the most frequent reason for a scheduled pit stop is to change tyres, so any layout should have plenty of these around, some of which should be fitted to wheels. Makers of die-cast models supply tyres separately and these can be glued to the pit counters whilst wheels can be simulated by sticking 1/32nd scale wheel inserts into MRRC Mini wheels.

Various other items will be found in any pit and these include assorted tools, oil cans and fire extinguishers, suggestions for which are given in the diagrams.

The commonest items at a racing circuit are people and, in 1/40th scale, Corgi make a good range of figures; one of each of these will populate a circuit reasonably well while two of each will make it look quite crowded. Do not overlook the possibility of altering these figures to give a wider range.

The next most common items are cars; most of the die-cast models available are more or less to 1/40th scale and look realistic when placed on the circuit. Any models that are to a smaller scale can be used, provided that they are kept away from anything conspicuously larger.

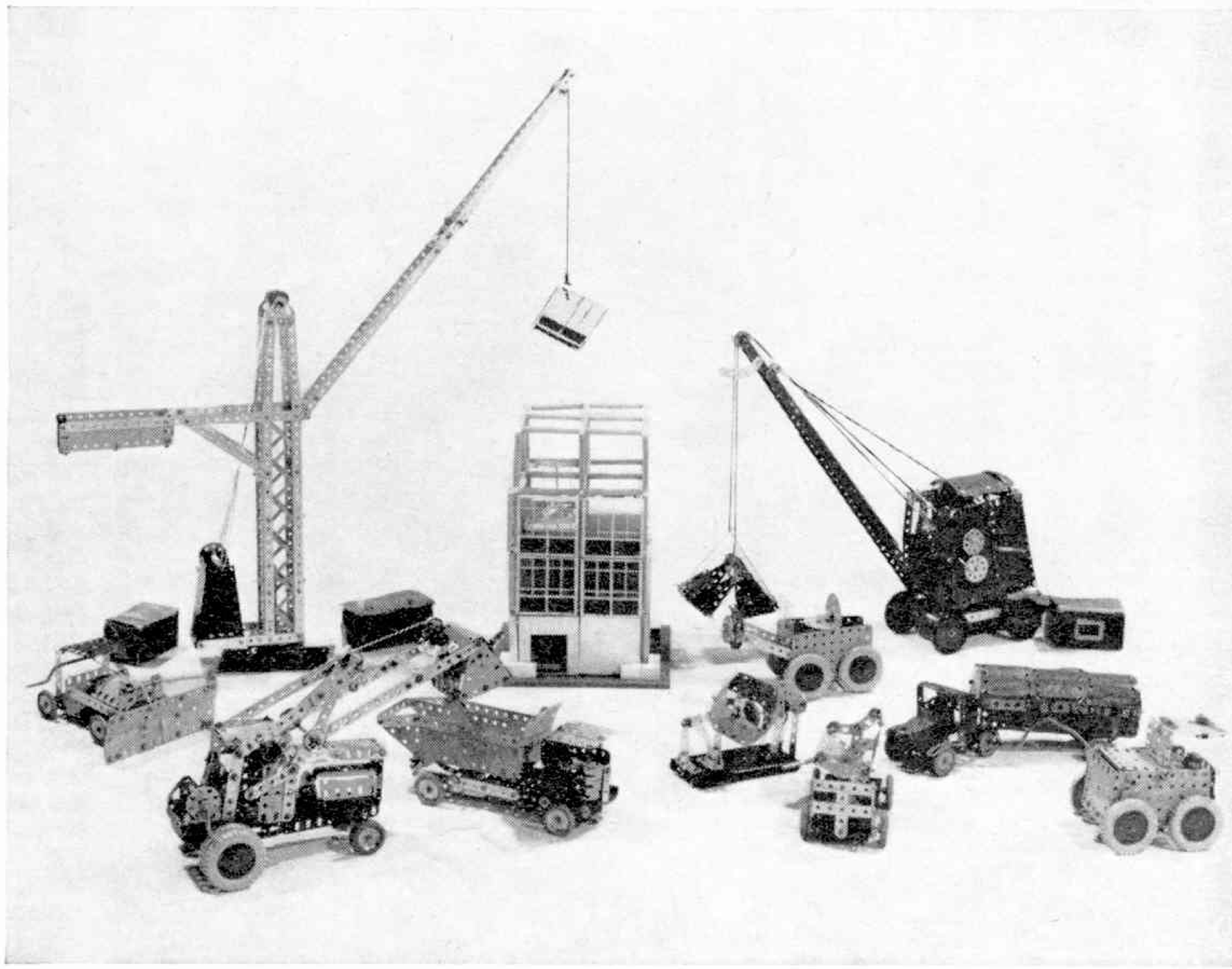
It would be very difficult to give specific instructions for adding detailed scenic effects to any layout and, in any case, much of the satisfaction in creating a scene would be lost if it were made as an exact copy of another layout. This series should, however, have given you enough ideas to enable you to build a layout which will stand comparison with any. Do not, however, admire your handiwork when racing; leave that to your opponents!

A: metal tubular gate from thick fuse-wire, with soldered joints; B: a counterbalanced barrier from $\frac{1}{16}$ in. dowel and scrap balsa; C: four stages in making a track sign. Stick black P.V.C. tape to plastic sheet, cut out sign with a knife, peel off surplus tape, and the finished sign; D: oil cans from plastic sprue or dowel; E: quick-lift jack from fuse-wire; F: hammer made from a pin and flex; G: spider wrench—four pins cut in half and soldered; H: ring-spanner from fuse-wire with ends flattened: J: screwdriver from pin and plastic sleeving; K: Airfix Mini shock-absorbers cut off to represent fire extinguishers

The Pupils' Building Company

Large model-building projects are often best tackled by a team of several enthusiasts working together. This way, not only is time saved but the expense of a large model is also shared. MM reader Graeme Kay of Dunfermline took this idea a step further and formed a 'company' of fellow pupils to build a miniature building site. He sent us some photographs and the following description of his team and their models.

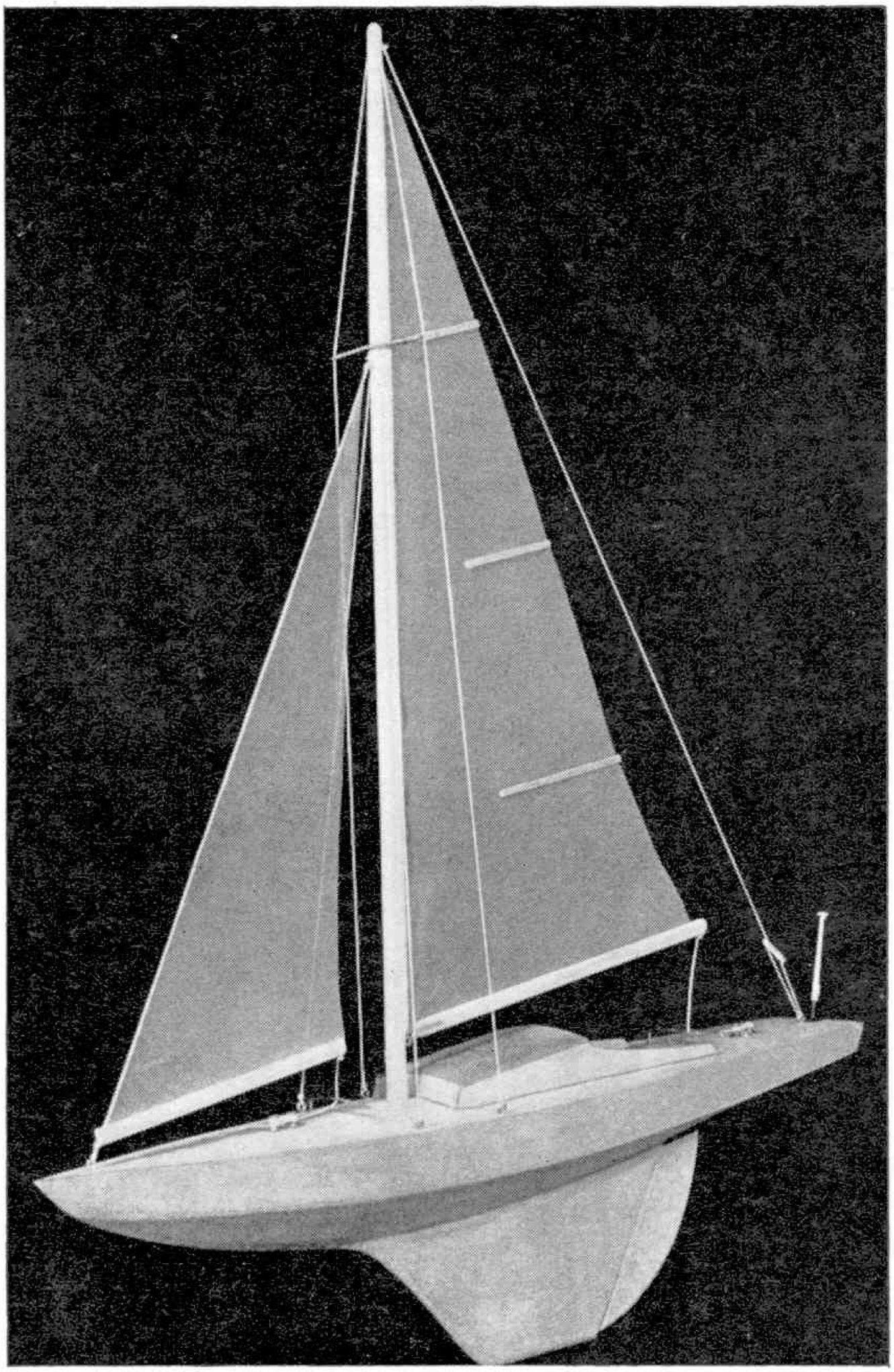
THE first person to start the Meccano craze in our class was a fellow pupil, Donald MacKenzie. (He is not in the photograph, as he was ill at the time it was taken.) Donald brought his Meccano No. 4 set to school and, during the handicraft period, allowed other boys to help him build some models. The idea soon caught on! Within six months there were eight different sets being used. It was round about then that I thought of forming a building company. It was to be called the 'Pupils' Building Company' or, for short, the 'P.B.C.' We appointed our teacher Managing Director, as we were using her 'site', namely the classroom. After some considerable thought, we also appointed a Chief Engineer, Secretary, etc. Soon we had formed a plan. We were all to build Meccano models to form a complete set of equipment for a building site. A non-member of the P.B.C. offered to get his father, a professional photographer, to take pictures of the models. In the picture can be seen a fuel-tanker, loading shovel, cement mixer, tipper truck, boring machine, side-tipping trolley, haulage tractor, bulldozer, giant crane, loading grab, and the building the models were supposed to construct. The next step was to send a description of the P.B.C. to the Meccano Magazine, and that is how this article came to be published!



Top: the assembled staff of the Pupils' Building Company. Graeme Kay, the founder, is sitting in the centre of the front row

Above: the complete range of machinery and equipment built and operated by the P.B.C. The building under construction is of modern, pre-fabricated type

WINDY '2'



Looking for a kit that's a bit more of a challenge than those 'fall-together' pre-fabs? Perhaps this new yacht kit is the answer. It will also introduce you to hardwood construction, without the need to buy a carpentry outfit, because all the parts are ready-cut to shape. The finished job is a very shapely craft indeed and if you build it carefully, it will repay your patience with many happy hours of real sailing in miniature.

BY DOUG McHARD

TO remove the die-cut pieces from their parent sheets you must *cut* the small 'ties' that keep the various components in place. Don't try to 'break' the parts from the sheets of hardwood—you'll certainly ruin them if you do, because the wood will split along the grain.

'Clean-up' the edges of the parts as they are removed, by gently sanding them with the sandpaper supplied in the kit. Don't alter the shape of the parts by doing the job too vigorously—just *lightly* rub the edges to smooth them off.

It is very important—particularly during the early stages of the assembly—that all angles should be 'square' (Photo 1). The keel piece is here being checked for squareness with a set square and it is vitally important to make certain that the keel is placed exactly centrally beneath the chine shelf piece. Mark this top and bottom, with a centre line before assembly.

Stage-by-stage drawings explain the assembly of the kit very clearly and in

addition to these sketches there is also a full size plan. In Photo 2, we are sanding down the top of the balsa transom to the correct angle. Always use sandpaper wrapped round a block of balsa.

The wire sheet horses are bent up according to the full size drawings supplied and the ends are passed through $\frac{1}{16}$ in. diameter holes drilled in the deck. The hole positions are clearly marked with a dimple on the deck surface. The horses must be gently bent again to get the ends through the holes (Photo 4).

These ends are firmly cemented beneath the deck and they can be seen in photo 5. Here too you can see how the lead weight is fitted into the keel before adding the second side piece. Slots in the balsa bulkheads to take $\frac{1}{8}$ in. square stringers are most easily cut with the edge of a file (Photo 6). Notice the keel side pinned in place until the cement dries thoroughly. When cementing the $\frac{1}{8}$ in. square balsa stringers in the bulkhead slots, be sure to leave the lower ones protruding slightly over the edge of the chine plate (Photo 7). This allows the whole side to be sanded smooth ready for the application of the outer hardwood skin. Use the sandpaper wrapped round a block again (Photo 8).

The hull skins are supplied oversize and they are then trimmed to fit exactly after cementing them in place. Sides are skinned first, then the bottom (Photo. 9). When all is smoothed with the sandpaper block, the keel may be faired smoothly into the hull with plastic wood, prior to covering with tissue and painting (Photo 10).

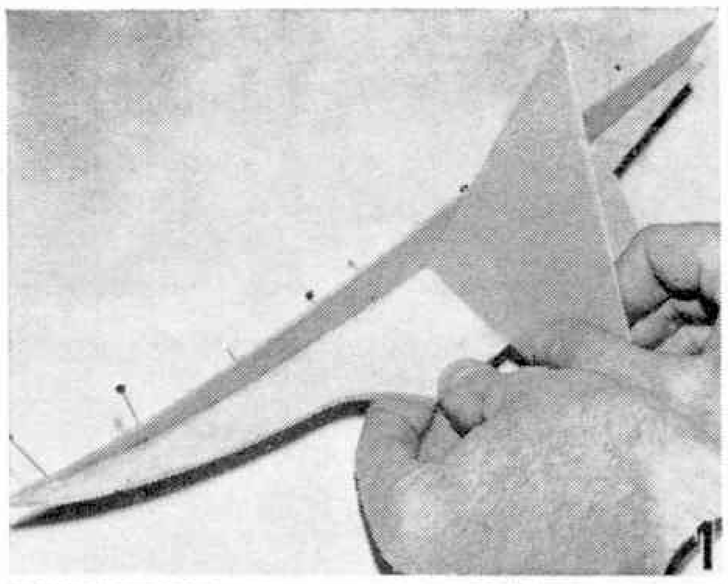
During the construction of our kit, we came across a few details that, in our opinion, need a little further clarification as follows.

Polystyrene plastic moulded deck fittings cannot be cemented in place with either balsa cement or plastic cement—you should try a contact adhesive such as Bostik 1 or Evo-Stik.

Screw eyes for the mast rigging are screwed into the deck where indicated by the four dimples, but it is best, *before* adding the hull side skins, to cement wood blocks beneath these points to give the screws a good grip. The top part of the mast must be slightly tapered, and this can be done with a sandpaper block or, if available, a small plane may be employed to do the job more quickly.

Rudder hinges are stiff wire, which tends to work loose in the balsa rear edge of the keel. A better material would be thin brass shim—glued in place with impact adhesive. Be very sure the cockpit side pieces are well cemented all round the edges where they join the floor and bulkheads. Any holes at this point will admit water to the hull interior and once in, it is almost impossible to get it out!

Windy II costs 30 shillings and measures $16\frac{1}{2}$ in. overall stem to stern, standing almost two feet tall to the tip of her mast.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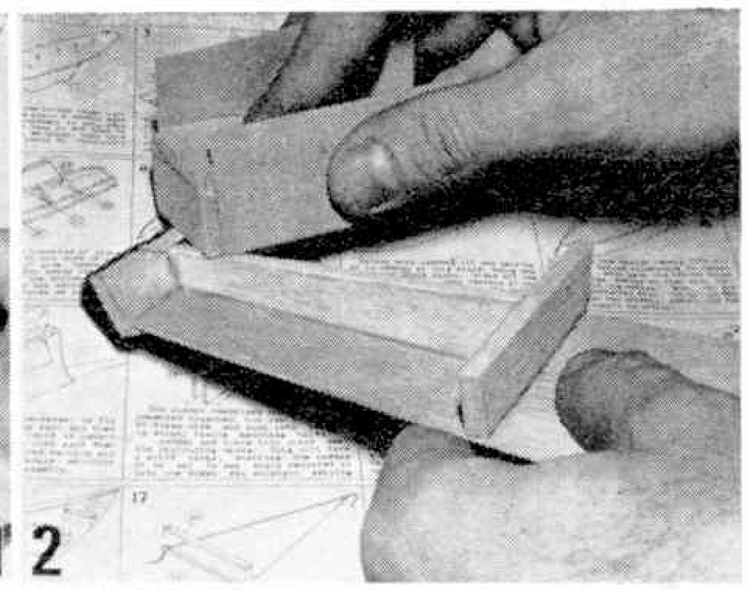
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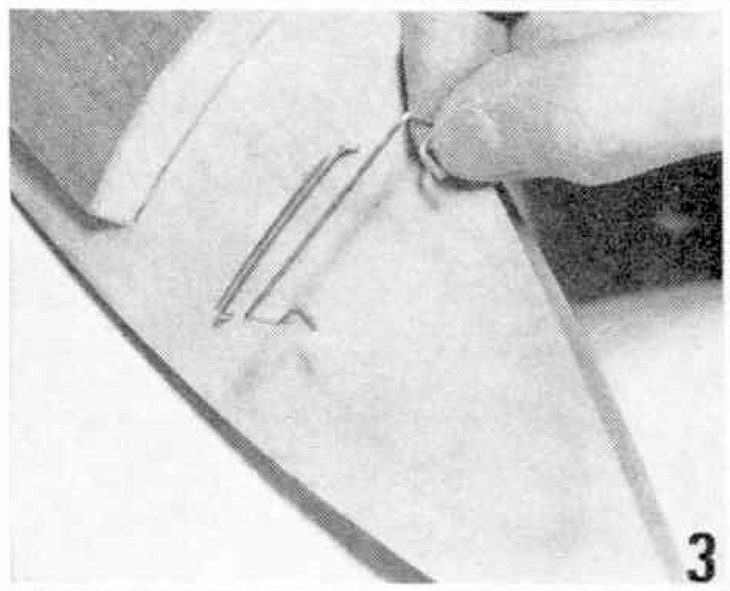
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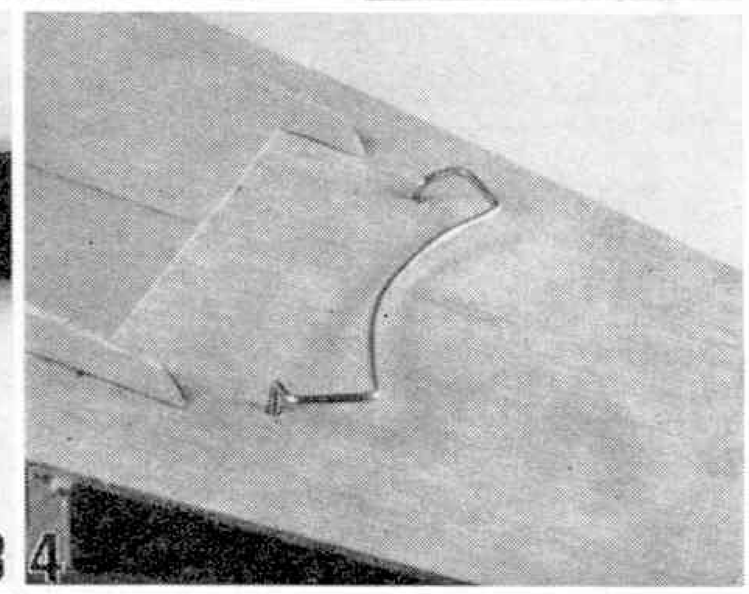
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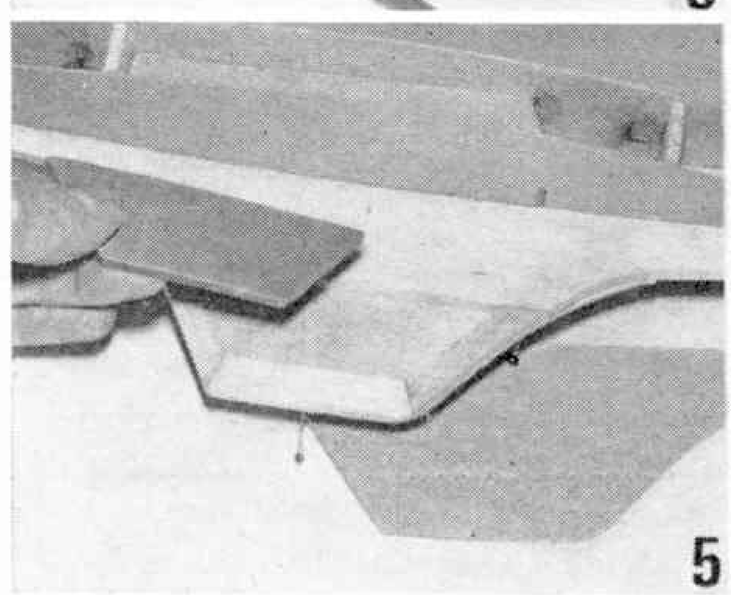
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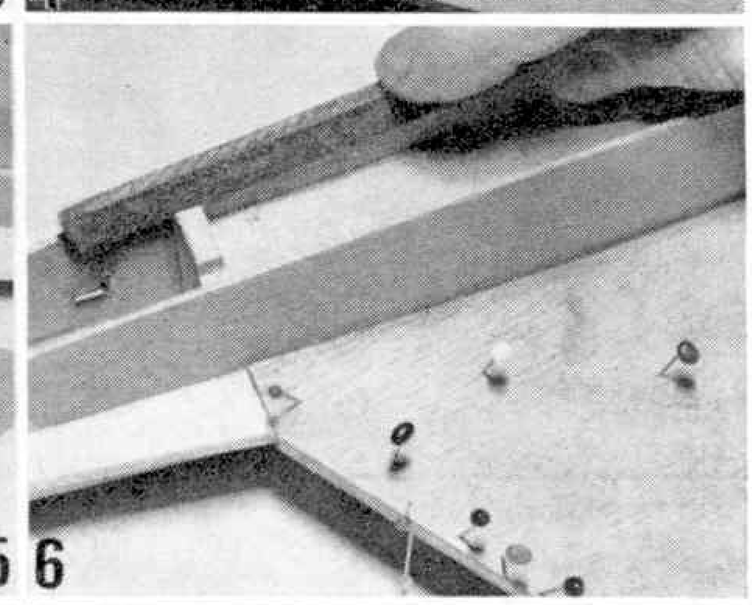
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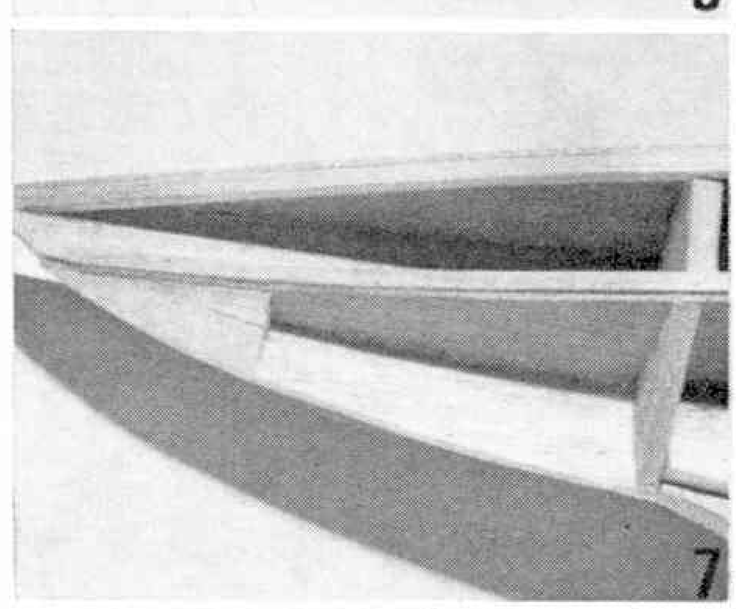
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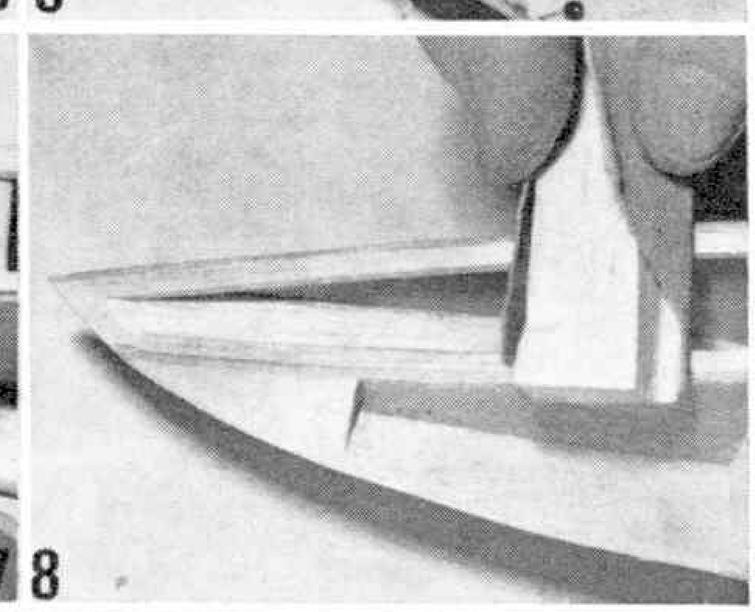
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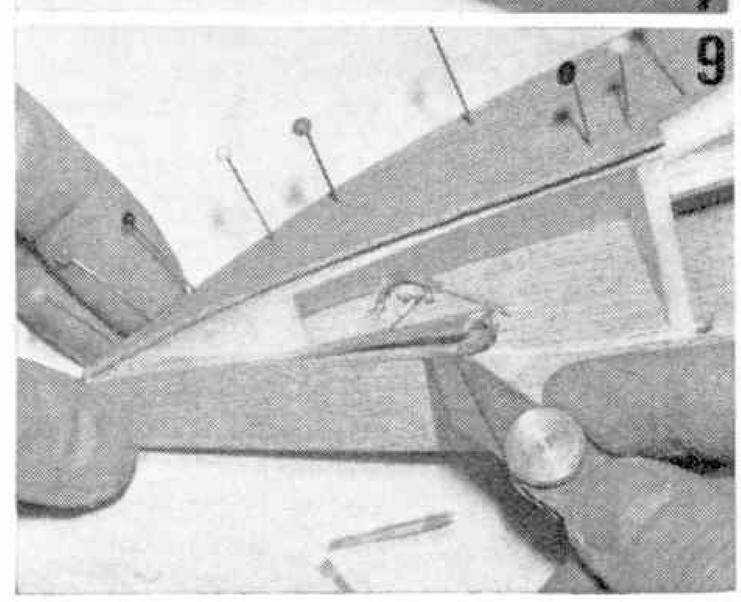
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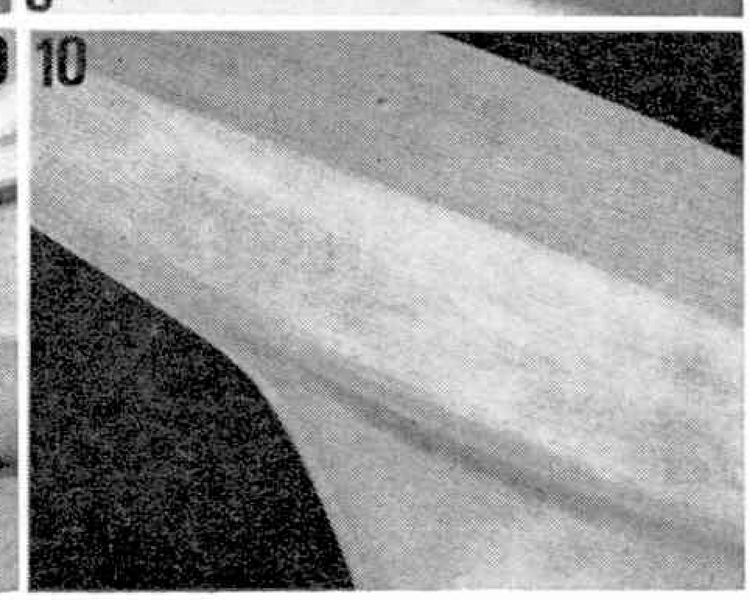
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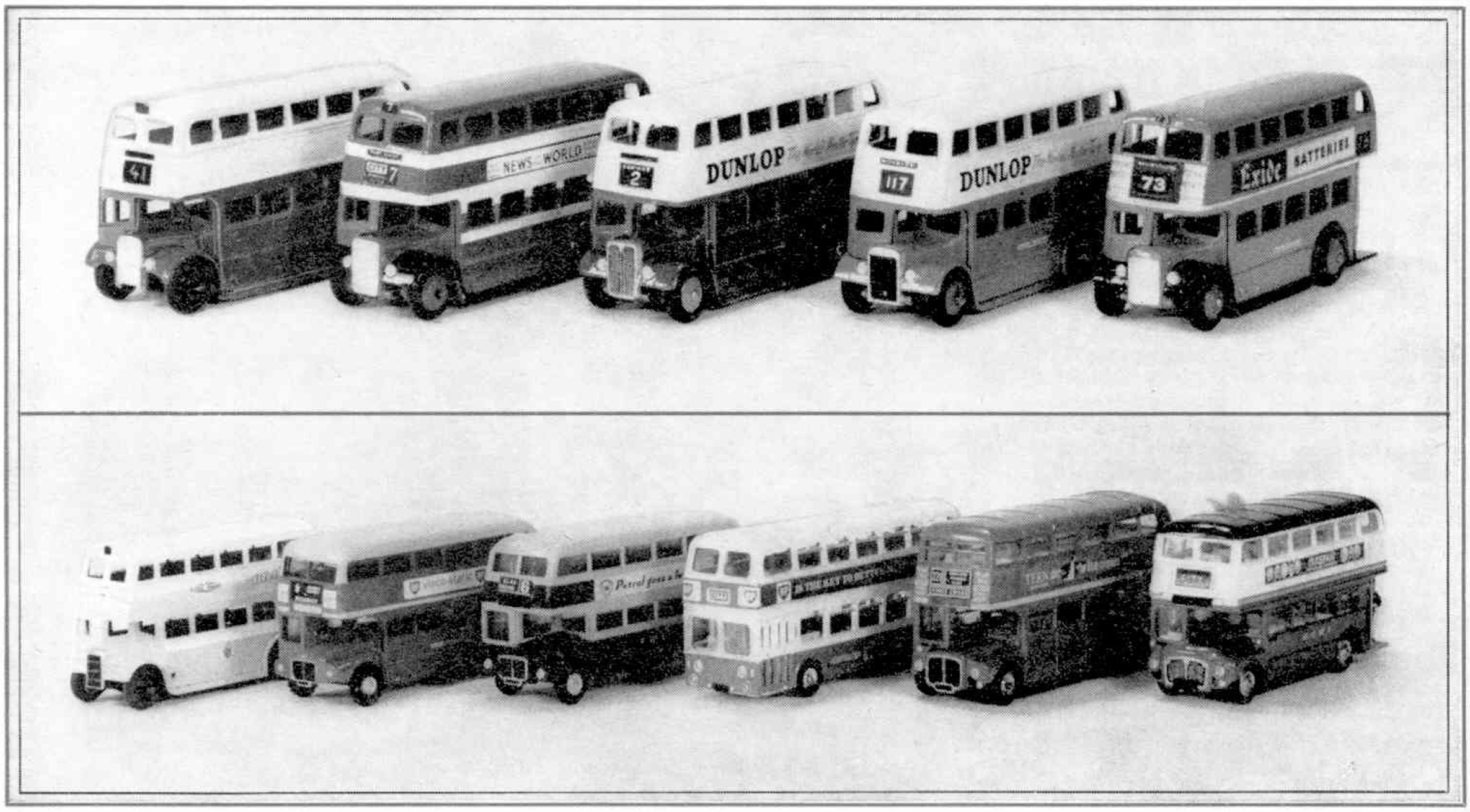
At The Turn Of A Wheel With Ken Wootton

Fares Please



I WONDER how many bus model enthusiasts read the Meccano Magazine, and how many of them remember the small scale 'handy size' buses made in the '50s and before by Meccano and other firms? For the benefit of all those mad keen mini-bus drivers, this month we're taking a whirl atop a number seven double-decker. This short epistle was inspired one cold wet Monday morning last January, when after a brief breakfast, I sallied forth into a force 8 gale (yes it was raining, too!) to stand for 30 minutes at a bus stop, on a 10 minute service run, because the so and so car wouldn't budge out of the garage

Have you ever been in the same spot? I expect you have, but can you remember what Satan-inspired thoughts passed through your head as you stood huddled up, waiting for that massive tin specimen to slowly trundle towards you from the very vague horizon? I had lovely visions of all the things I'd do to the driver when he eventually arrived. I pictured him sitting nonchalantly at the wheel, not thinking of me as he finally opened the door for me to board, but of the end of his shift. I vowed never again would I paint my buses in the colour of *that* company—one could go on for hours, but as I gradually thawed out on the top deck my thoughts turned to all you enthusiasts who get such a kick out of public transport and to the Editor who, I imagined, was by now warmly ensconsed in his office, and I decided to dedicate this ghastly 'outing' to you all. Let 'em all suffer as I've suffered, thought I, through the medium of the Meccano Magazine.

Seriously, though, I *am* a bit of a bus enthusiast, model-wise that is, and above you can see the various double-deckers from different manufacturers I've collected. All are not shown, for various reasons. My Chad Valley D/D is awaiting a coat of paint, my centre-entrance bus by Dinky is to a smaller scale, so was left on the shelf. My first type Dinky A.E.C.'s with stairs were too fatigued (metal-wise) to travel to the photographers and, etc. Still, there's enough left to fill the gap, and if any of you would like to see some single-deckers at a later date, just drop the Editor a line and he'll (I hope) pass on the good news to me.

The top photograph consists solely of Dinky Toy buses from Meccano Ltd. They are, from left to right, a 1st type A.E.C. in green and cream (post-war version of the 'one with stairs'). A 2nd type A.E.C. (the best Dinky double-decker to date, I think) in green and white with black mudguards. My own paint work with Lesney transfers. Next to this we have the same bus in original Meccano green and cream but without a roof indicator board.

Fourth from the left in red and cream stands the third radiator casting variation which is a Leyland. This model is probably the longest run Dinky, for it was made and sold until the introduction recently of the Routemaster. The 'Exide' model next to it is, of course, the same, but with that roof indicator board re-introduced.

There must be other slight variations in this particular range. I only have those shown and the 'stairs' type. Should be interested to hear of any other variants. In the lower photograph, there's a little more variety with first a Morris and Stone 'Morestone' Leyland? As far as I know this bus was always enamelled red, which was badly done. I've repeated the process with my yellow and white. When I find a spare minute, something must be done about that colour scheme!

Next to it, stands its 'descendant', the Budgie Routemaster, which I've again repainted in red and buff.

Incidentally, Budgies of this period weren't made by Morris & Stone, but by the company who inherited the Morestone series. They are, I think, now defunct, so all you Budgie lovers had better get busy before they disappear completely from the retailers' shelves.

By the side of the Budgie we have yet another Routemaster from the little known firm of Zebra toys. This firm also produced a range of trucks, a G.W.R. mechanical horse and trailer, A.A. and R.A.C. bikes, and an E-Type Jaguar.

Everyone knows the Dinky Atlantean bus in green and putty, so I won't linger, but instead describe briefly the last two models, *again* Routemasters!

These are from Dinky and Corgi, both have good points and both manufacturers have made small mistakes with regard to details against the real thing. On the whole, though, the Dinky version gets my vote, it's a prettier model and looks more 'right' to me.

The colours on the Corgi are very original and rare, being the colours of the New South Wales government transport. These are brown topping on cream with a light green bottom half.

This is, of course, an 'export only' model, but a few found their way on to shelves in this country—much to the consternation of Corgi, I believe!

Well, there it is, maybe there's a moral somewhere about 'have bus will travel', but until we meet next month *do* watch out for draughty bus shelters and force 8 gales. They go together!

LOOKING AHEAD

In January and February every year, when most people are just getting over Christmas and planning their summer holidays, the toy and model trade is already thinking of next Christmas! Perhaps "thinking" is the wrong word, for at the various toy fairs held during the first two months of the year, prototypes, of the models that you will be buying next December are already made and on display for trade buyers to order. At the British Toy Fair in Brighton and the gigantic Nuremberg Fair one can forecast trends for the year ahead, but neither of these shows is open to the general public. Meccano Magazine visited both fairs and on these pages we give you a tantalizing glimpse of some of the exciting products that you may be buying later this year.

1

In the bottom right hand corner of this picture there's a car! No ordinary banger this, for it's one of the six new A.M.T. 'snap-together' Mini Trophy series of 1/43rd scale plastic car kits. You need no cement to assemble these models and there will be six in the range—Chevrolet Camaro (illustrated), Cougar, Mustang, Baracuda, Pontiac GT6 and Corvette. By the way, the lady is Miss Monika Boutzman of Nuremberg.

2

Three more wonderful oldies will be added to the Inpact range of 1/48th scale vintage aircraft during 1967. The Bristol Monoplane shown in the photograph, a Blackburn Monoplane and a most impressive Valkyrie tail-first monoplane—a sort of great-great-grandfather of the Saab Viggen featured elsewhere in this month's issue.

3

This photo shows an advance hand-made model of the forthcoming Mini Trix Pacific locomotive. Fully spoked drivers are a notable feature and, we understand, the bogie wheels will also be spoked on the production model. Working valve gear and neat detailing were notable features of this N gauge beauty. What a wonderful B.R. conversion project this one would make!

4

Available very shortly will be these British Rail N gauge coaches from Trix. Things are certainly moving in 2 mm. scale these days.

5

Pointwork par excellence from the Italian Casadio company—and it's N gauge, too!

6

Peco will introduce a new series of N gauge 'Wonderful Wagons' this year. Here are a few advance samples to whet your appetite. Each wagon is a mere 2 inches long. There's a fine new 'Y' point in Streamline N gauge, too.

7

N gauge allows you to build really accurate street scenes in a tiny space. Everything in this photo comes from the Arnold Rapido catalogue. The buses and lorries are fully glazed, all wheels rotate and the lorry even tips! This scene measures only about 18 in. from side to side!

8

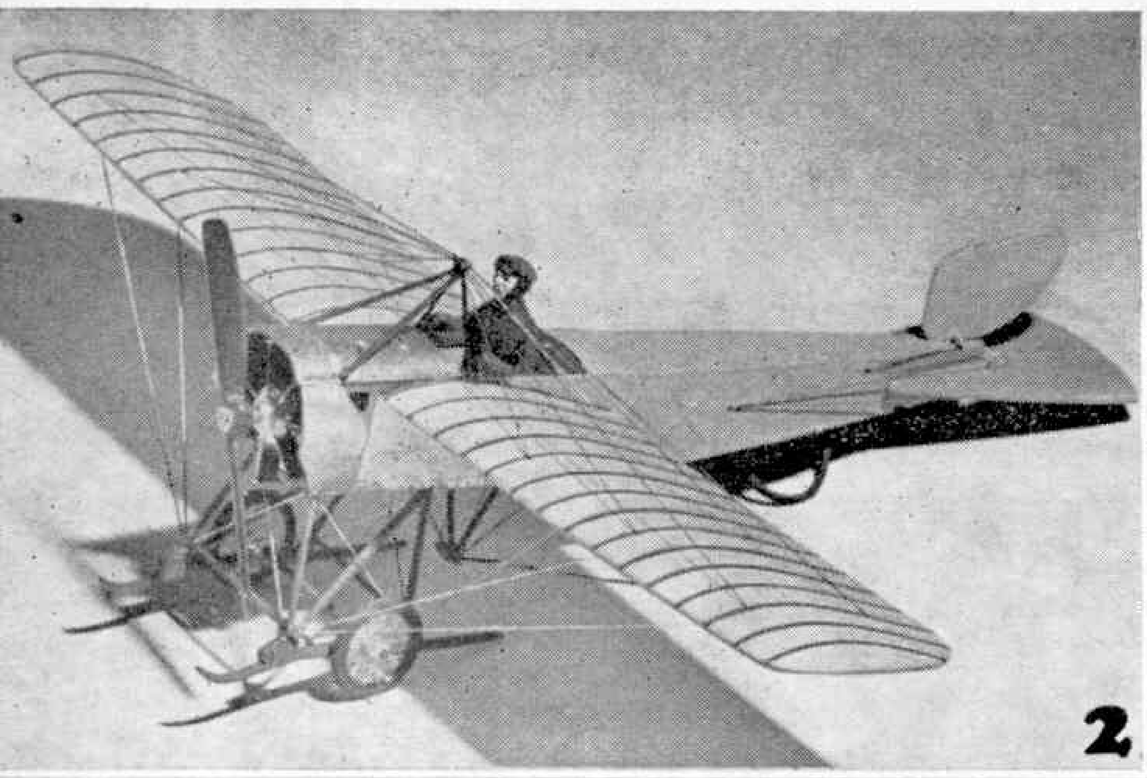
Ships and barges in 00 scale are always depressingly enormous. N gauge reduces them to manageable proportions as this little dockyard scene proves, the baseboard is just over 3 ft. long.
All the accessories are from the Wiad range and we were particularly taken with the tug and the gantry crane, both of which would go well with any British-outline layout.

9

Slotless car racing at last! These two 1/24th scale models are being raced over a track on which there are only contact strips. The cars can travel *anywhere* on the track and overtake at will. The contact strips provide current and the cars are independenty steered by radio signals selected by pressing the 'left' and 'right' buttons on the two little hand controllers.

10

This exciting new development offers enormous development potential and it originates from the Italian Elgi company who also produce the R/C car shown in photo. 10. The beautiful Ferrari Berlinetta is electrically powered and under full independent radio



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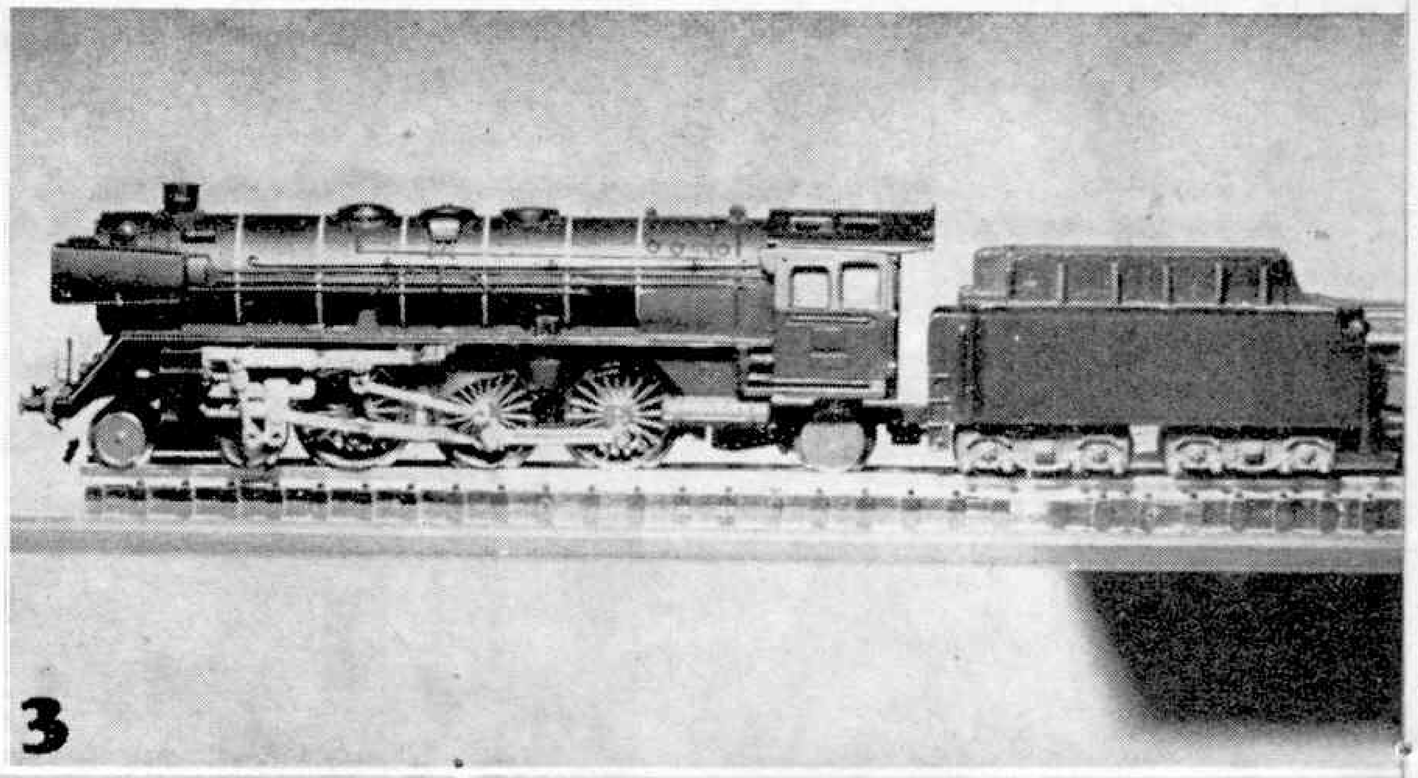

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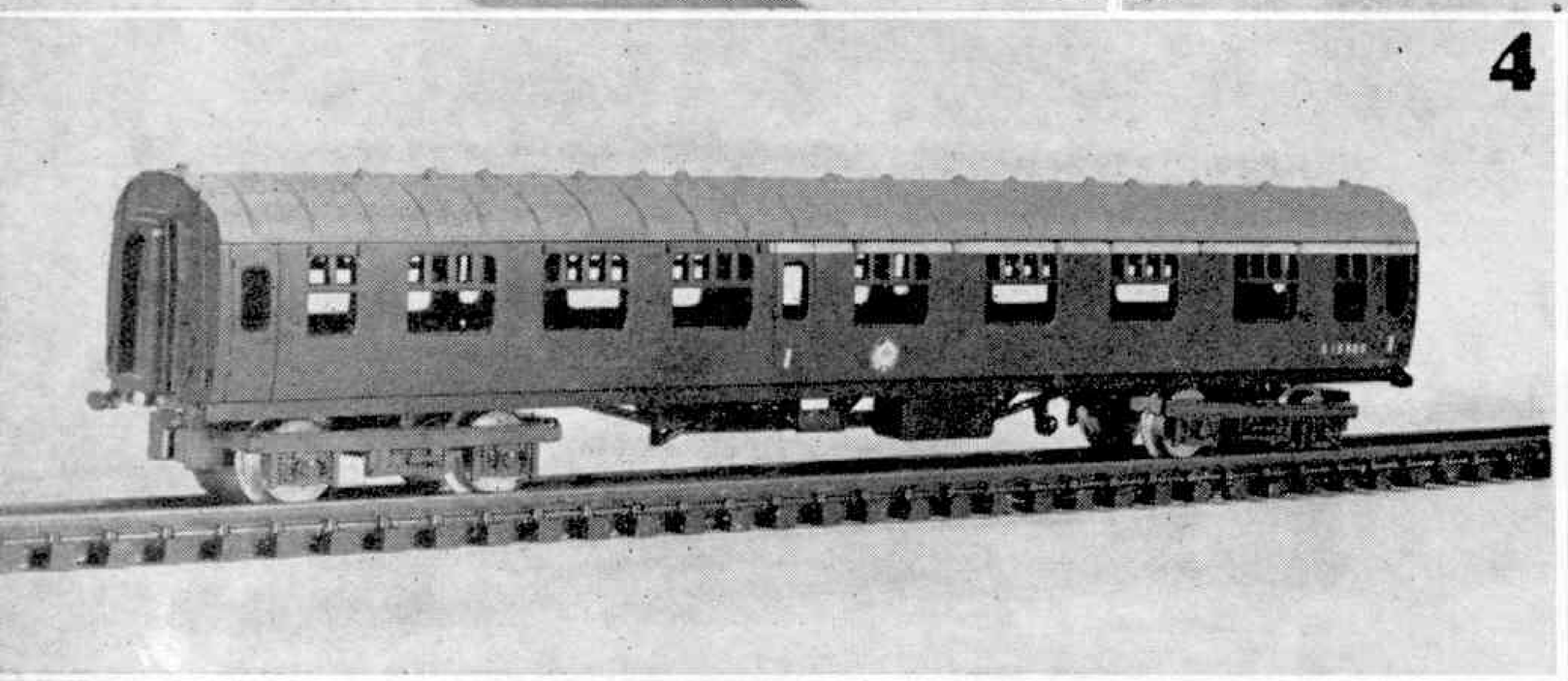

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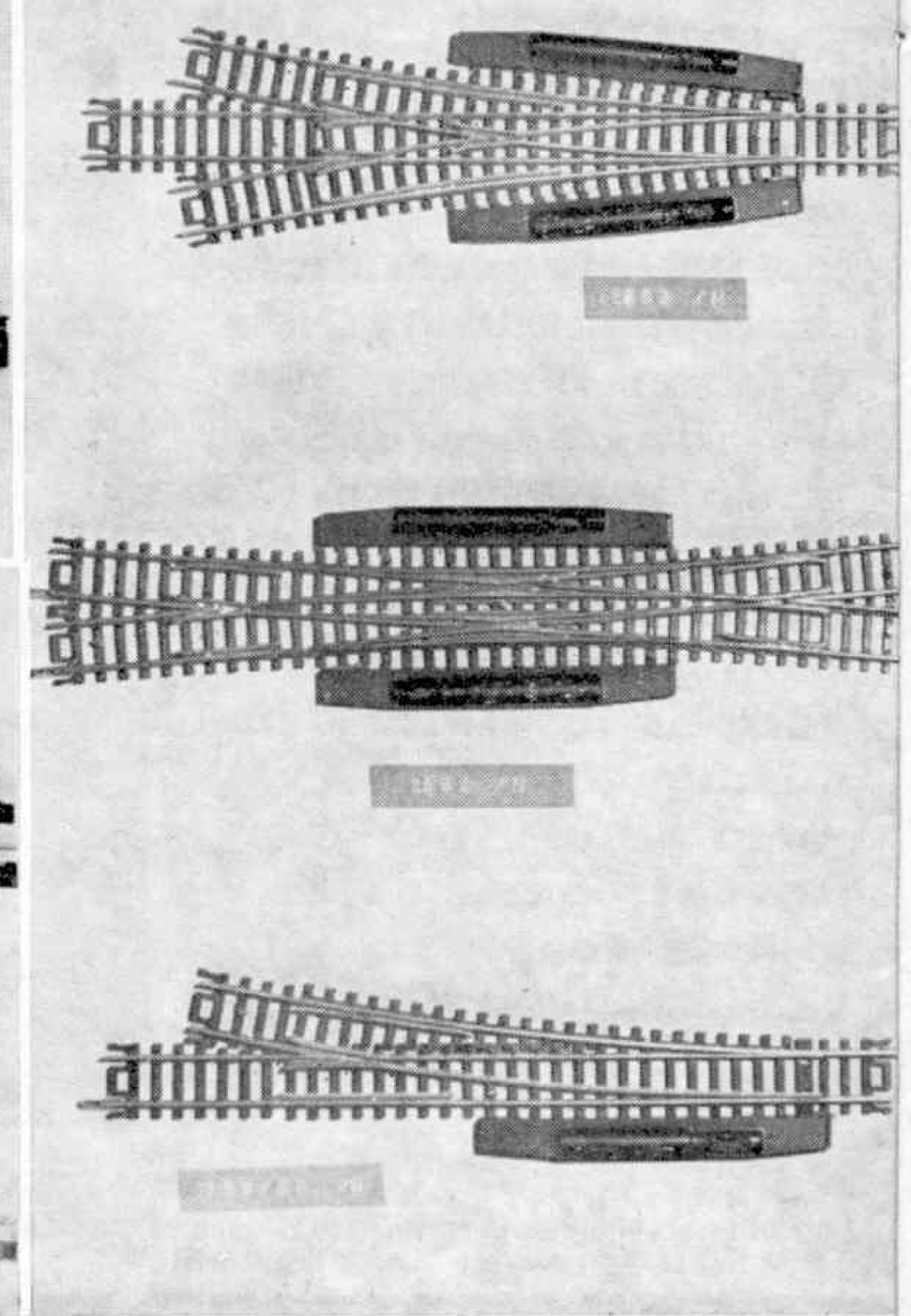

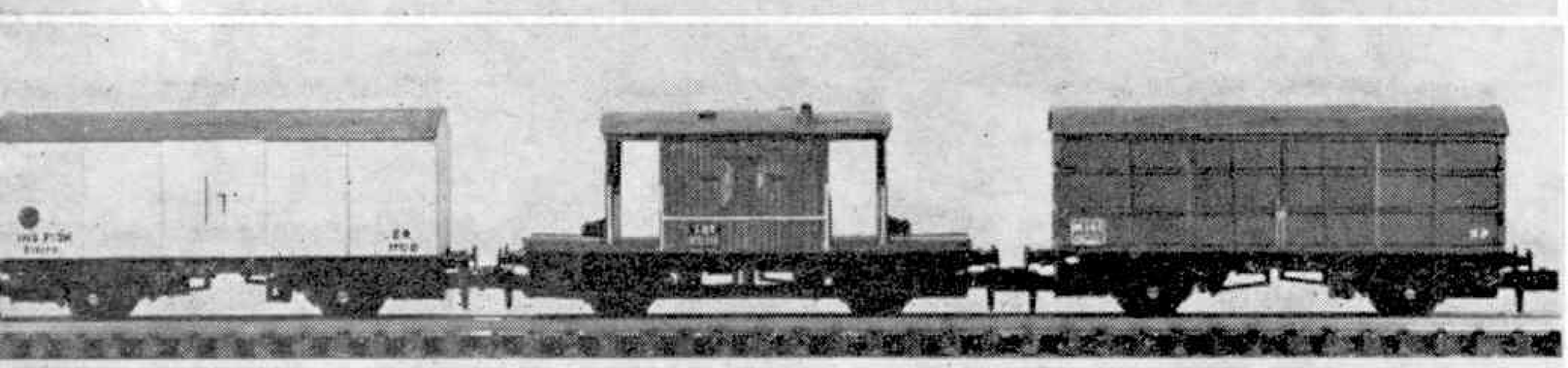

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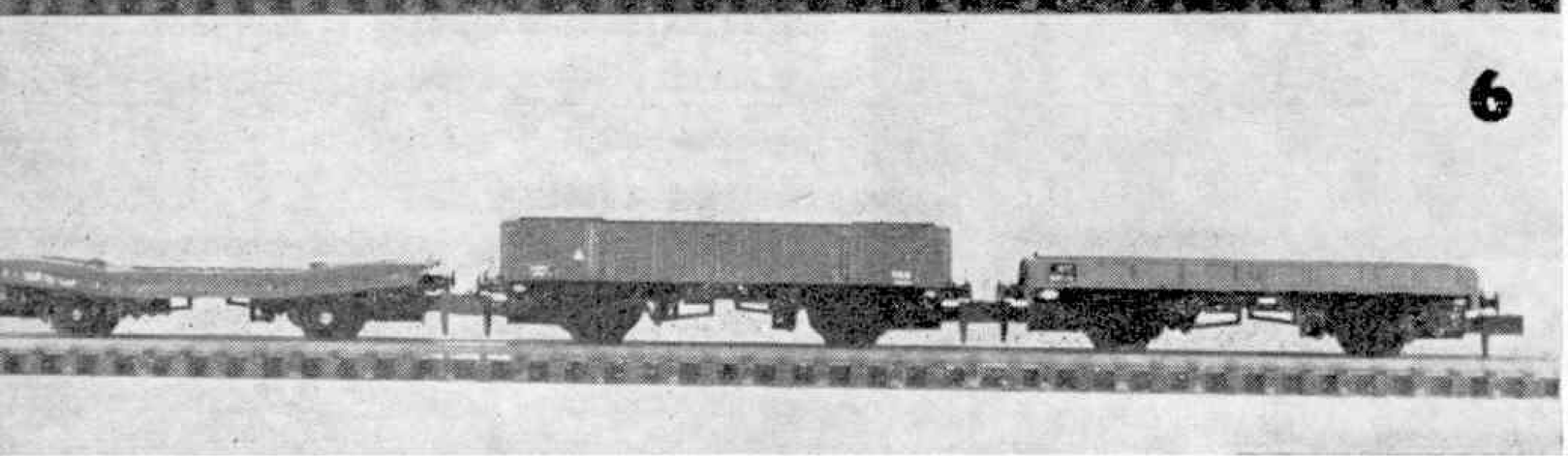

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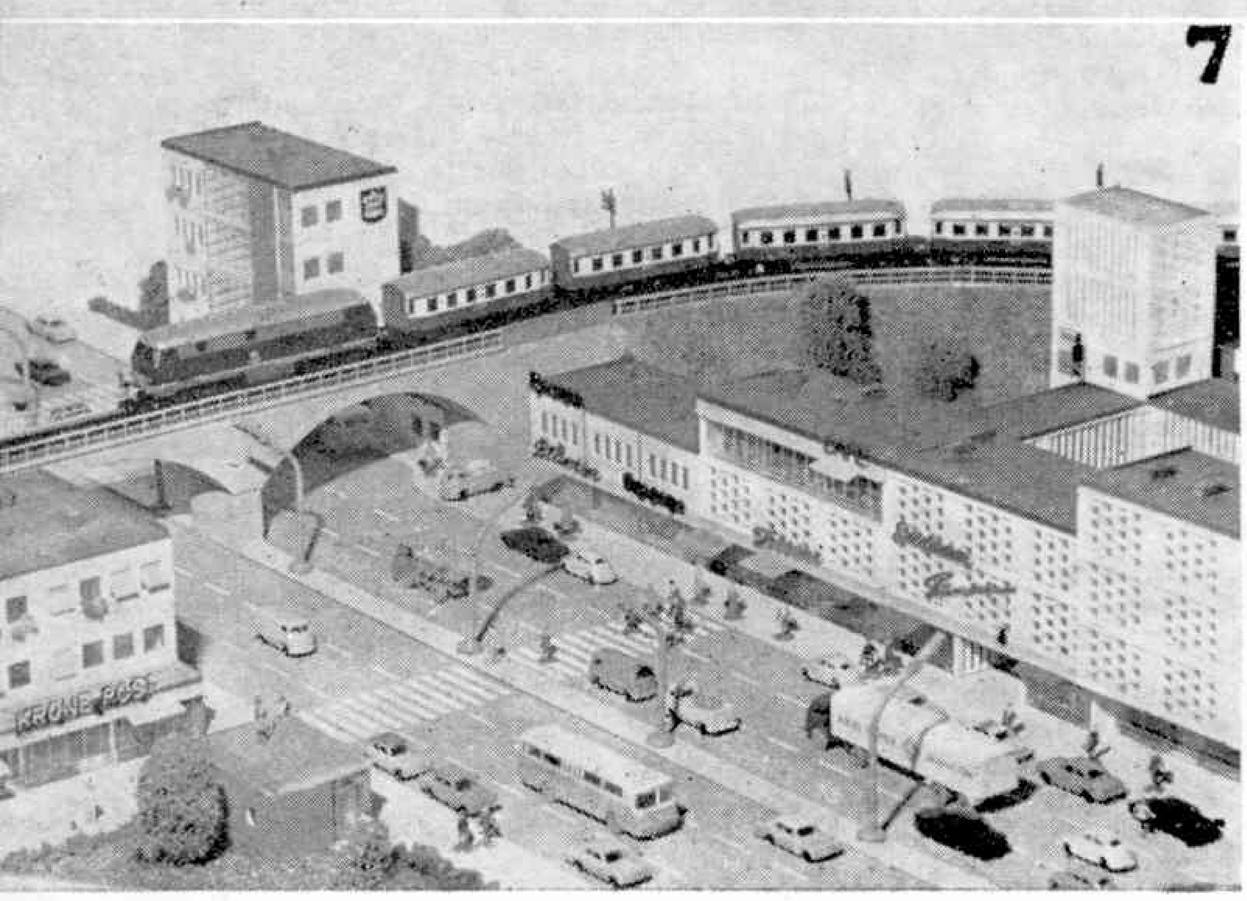

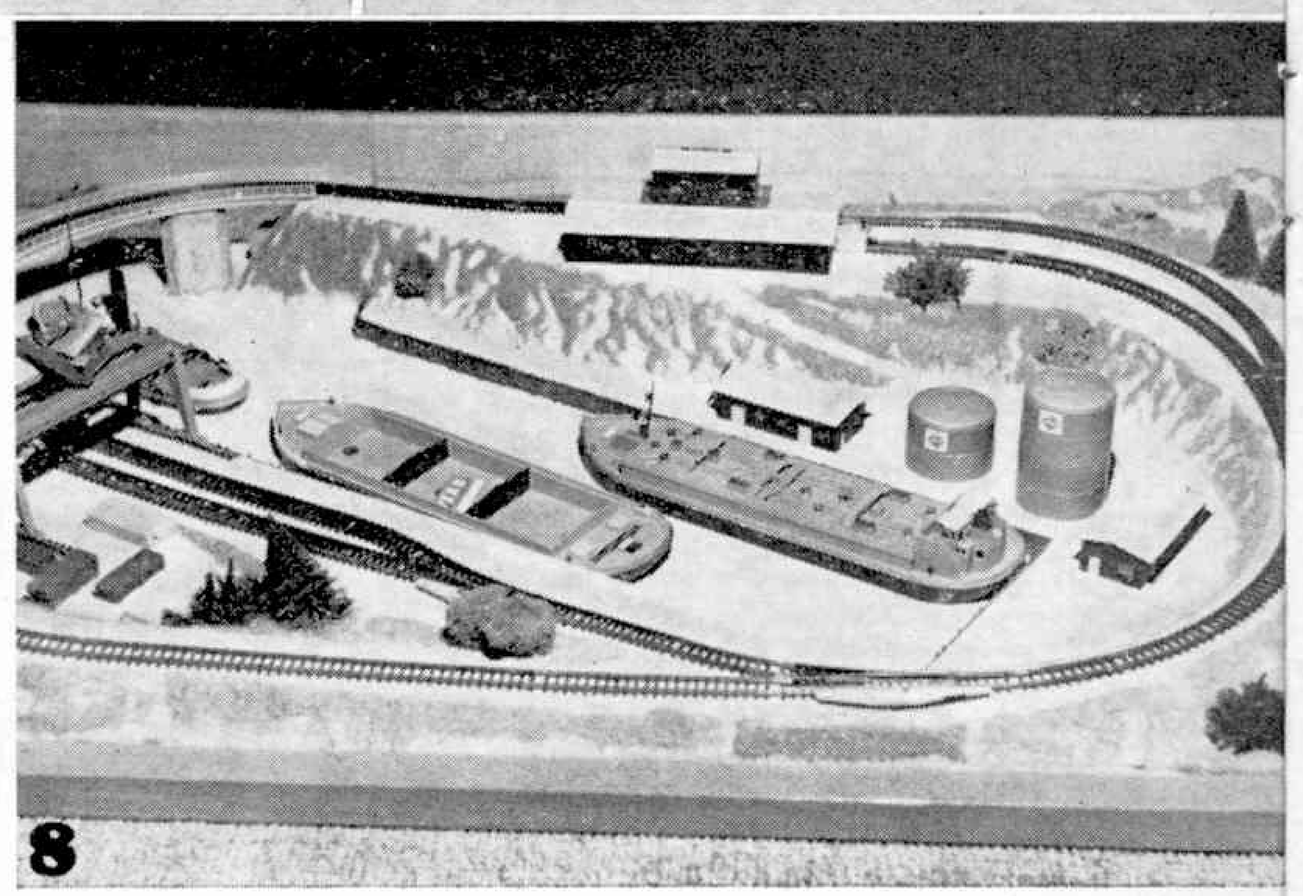

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control. The transmitter gives you forward, reverse, left, right, stop and start controls and, like the car, it comes completely assembled and ready-to-use.

11

A new idea in plastic model aircraft is this complete miniature glider club. Everything from the hangar to the glider transporter/trailer will be available from the German Fischer catalogue and a notable feature is that the models use no cement for assembly. They can thus be dismantled and re-assembled over and over again! Unfortunately no British distributor is currently importing this line.

12

Kleiwe N gauge accessory kits have, up until now, been restricted to buildings and lineside accessories. At Nuremberg they revealed their new girder bridge, moulded in dull green plastic and complete with extensive rivet detail. It's an impressive structure as you can see. Faller, too, had some most imposing N gauge bridges on show in a variety of types. No photos could be taken because of the glass case in which these models were displayed, but they're worth looking out for. Faller also revealed their new 1/24th and 1/32nd scale slot racing 'International Club Racing' system.

13

Lots of new things from Fleischmann (including yet another slot race system—this time to 1/32nd scale). Our photo shows the impressive new class 01 Pacific loco measuring 11 ins. overall, three axle drive, complete interior detailing and automatic multiple lights. Although railways are still, and seem likely to remain, their biggest hobby interest, German modellers have now discovered (rather belatedly) slot car racing, and several new home grown systems were on show at Nuremberg. It is almost certain that for a year or two the German car enthusiasts will be wooed by the world's slot car makers but few of the Continental systems are likely to gain a foothold in this country.

14

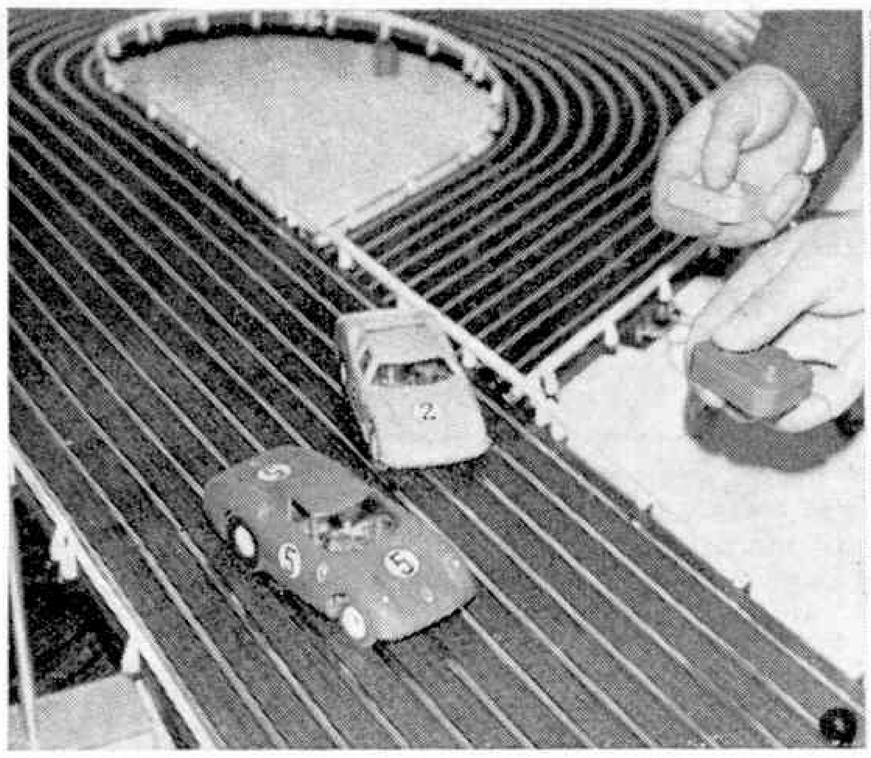
Perhaps the biggest German effort in the car field has come from the Carrera company who market not only cars, sets and track, but also run race car centres and offer completely finished circuits for both commercial and home use.
Banked circuits were widely exhibited and are likely to catch on.

15

Everyone was impressed by a display on which ten trains were independently controlled on *one* two-rail track! Like the slotless race cars described elsewhere, the control is effected by a simple transistorized radio unit, five trains taking current from the track and five from overhead catenary. Uncoupling can be made at any point on the track and no track sectioning is required. The control gear is seen fitted to a Märklin loco chassis in photo 15.
Another impressive development seen on several displays was the system by which coach and loco lights were kept on even when the trains were stopped. This was incorporated in both H.O and N gauge stock and will certainly be widely taken up in this country.

16

One of the new items on the Aurora stand was the fascinating 'loop-the-loop' track section. Approach it fast enough and the car does a complete loop—too slow and you will fall off the top! Several other such novelty items were on show at Nuremberg and all will be available here through Model Hobby Products Ltd.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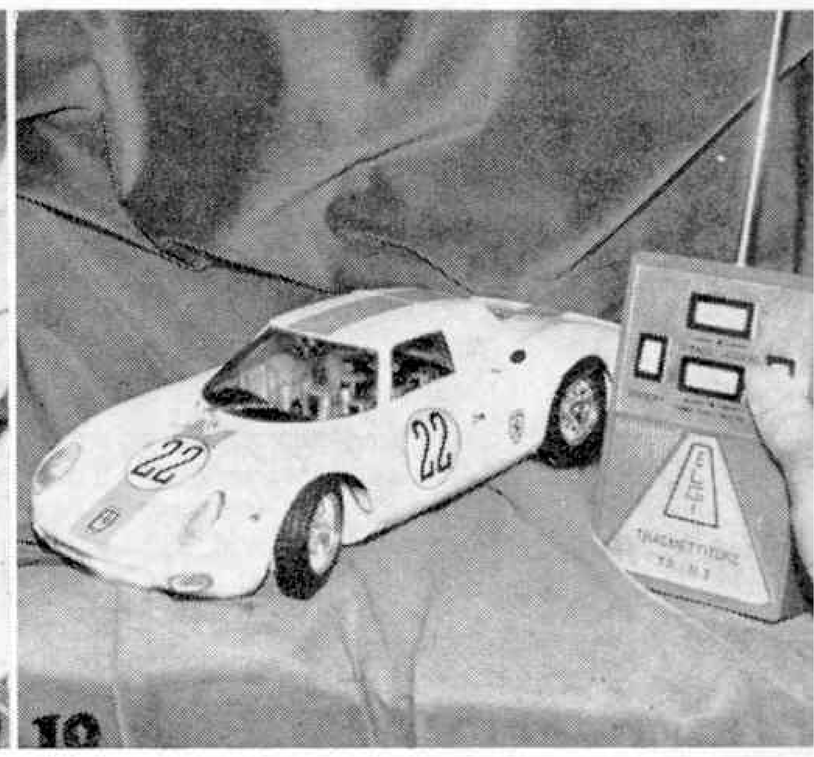
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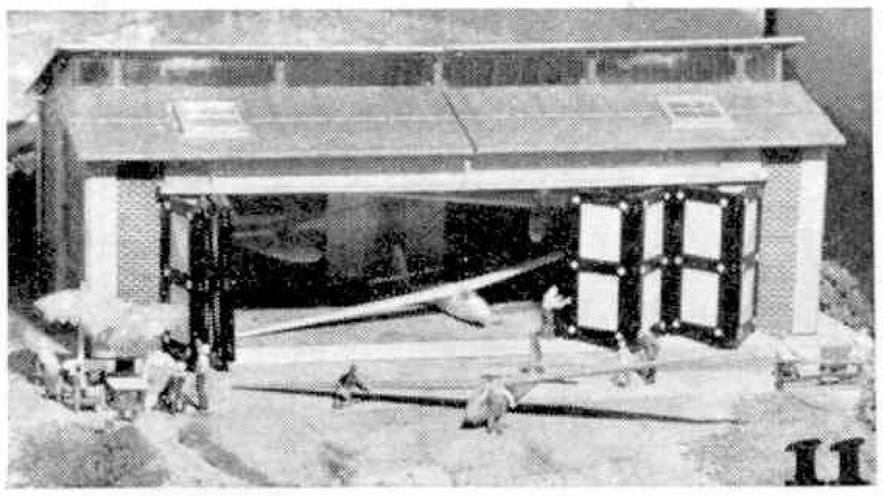
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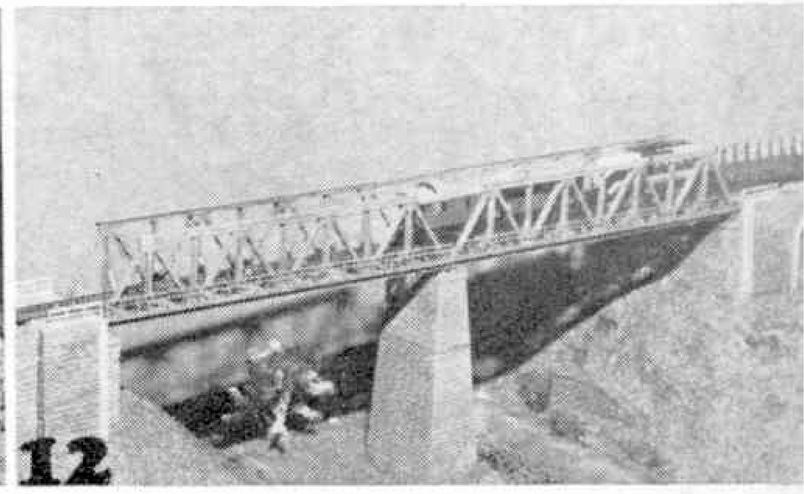
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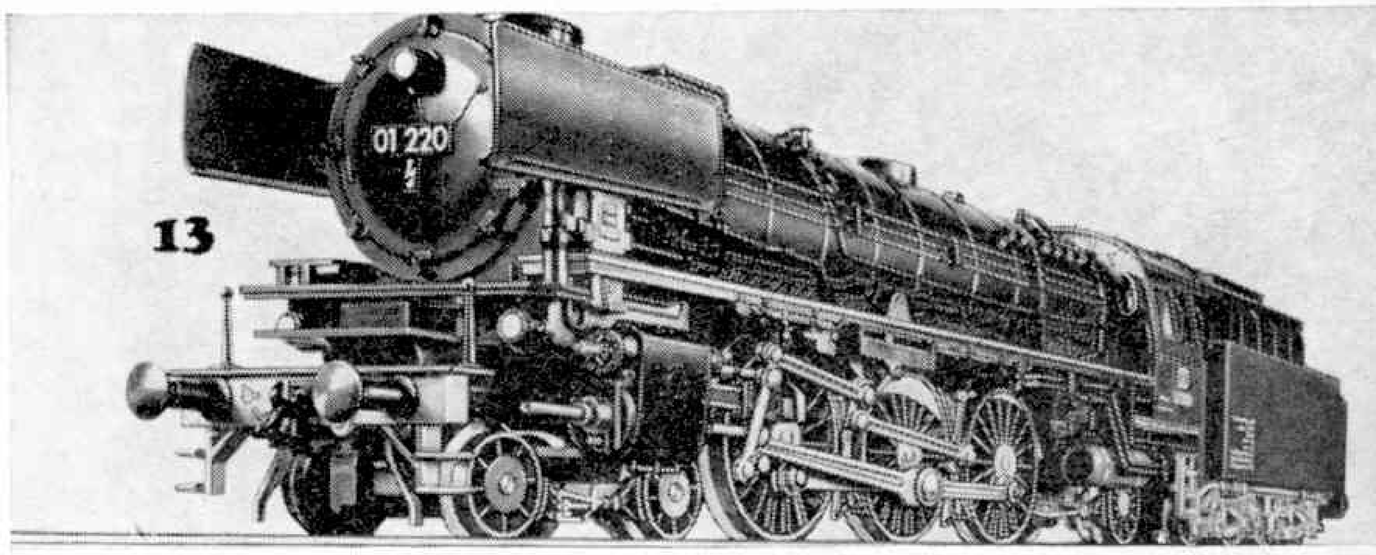

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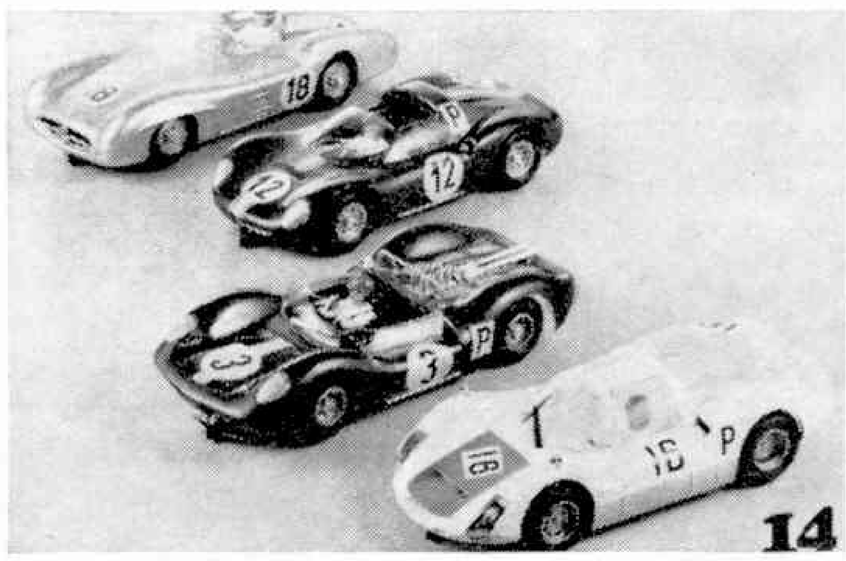
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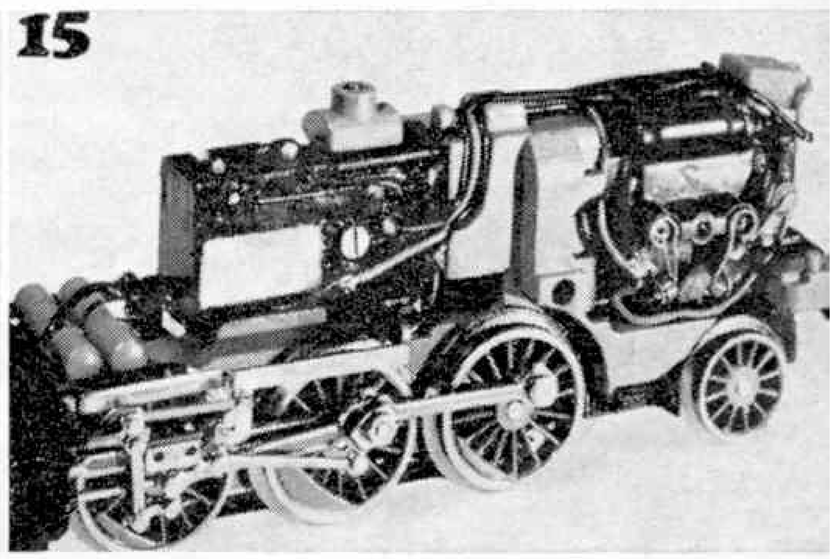
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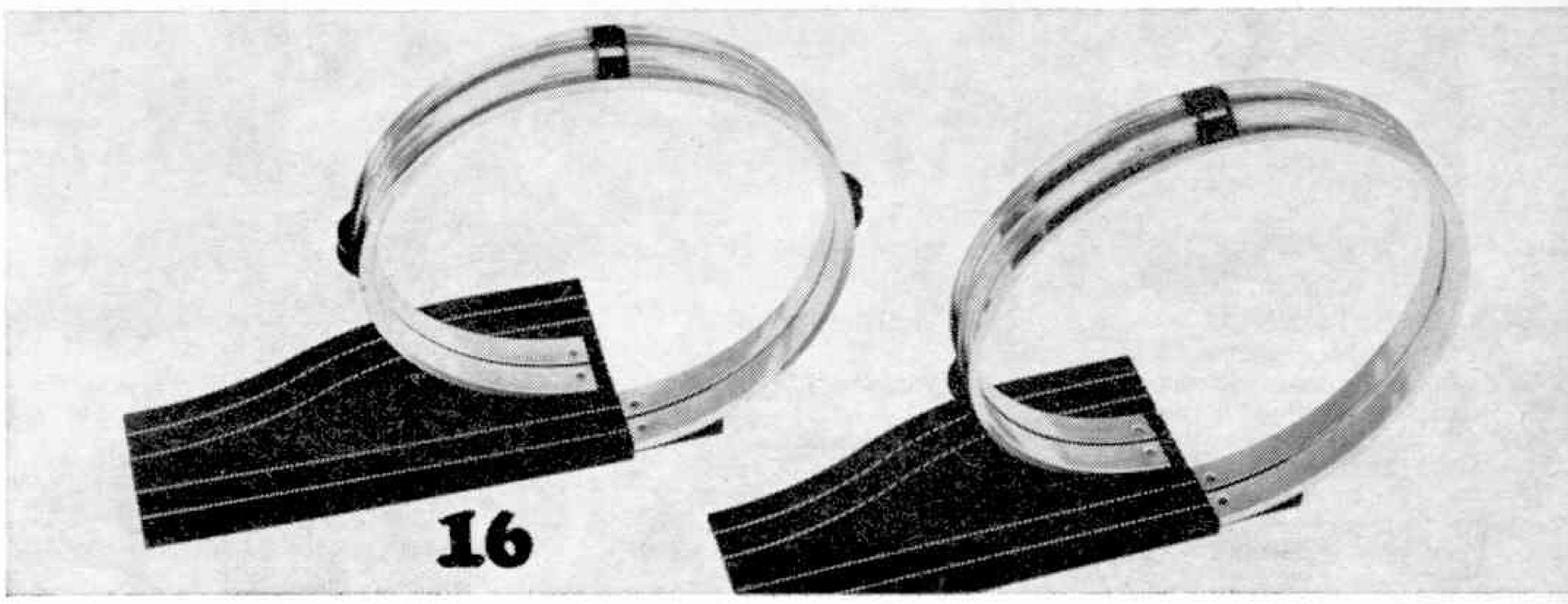
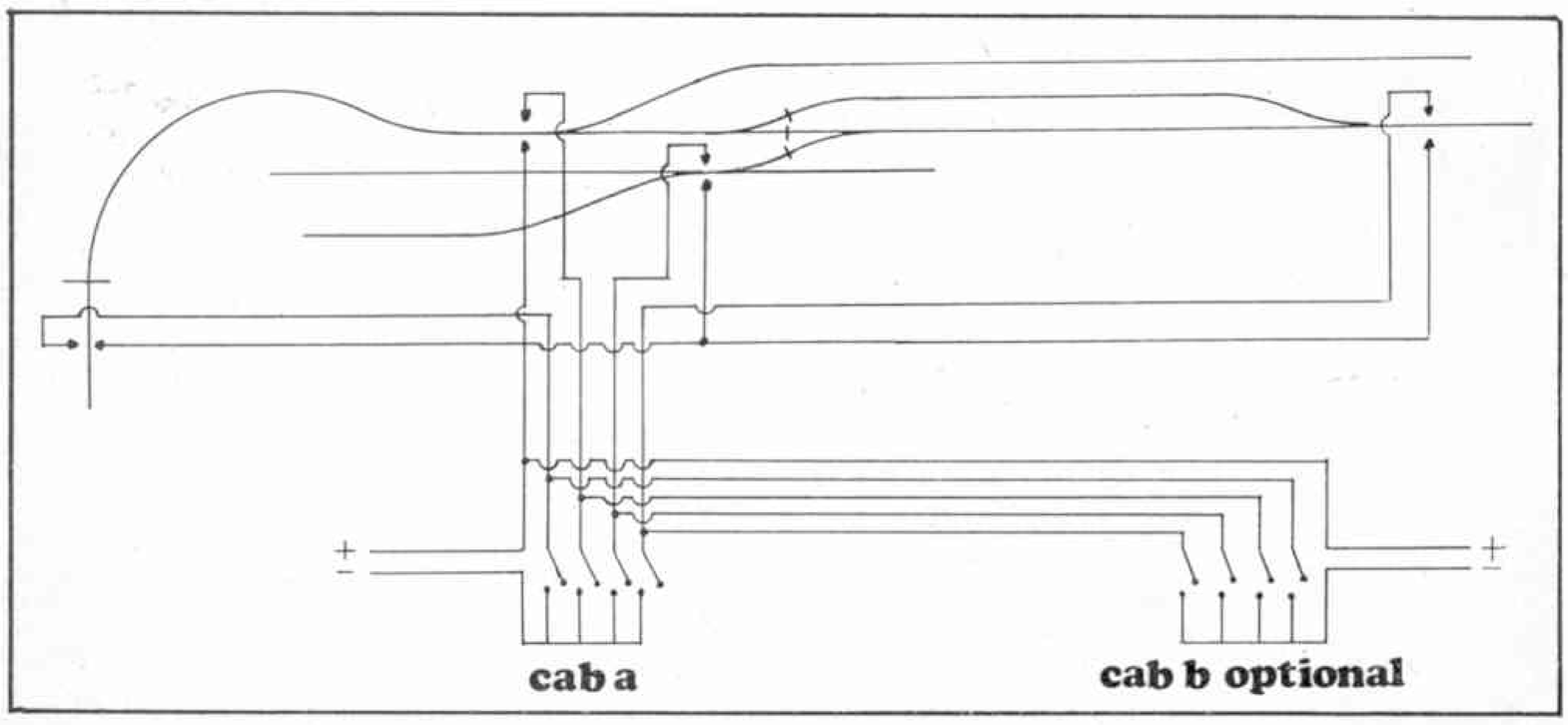

16

Building Bangthorn-5-The Wiring

by Mike Rickett



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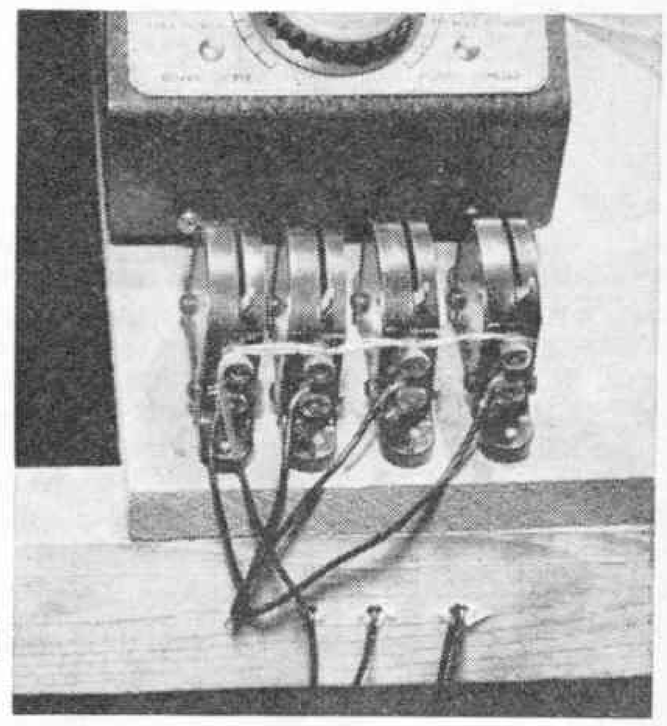

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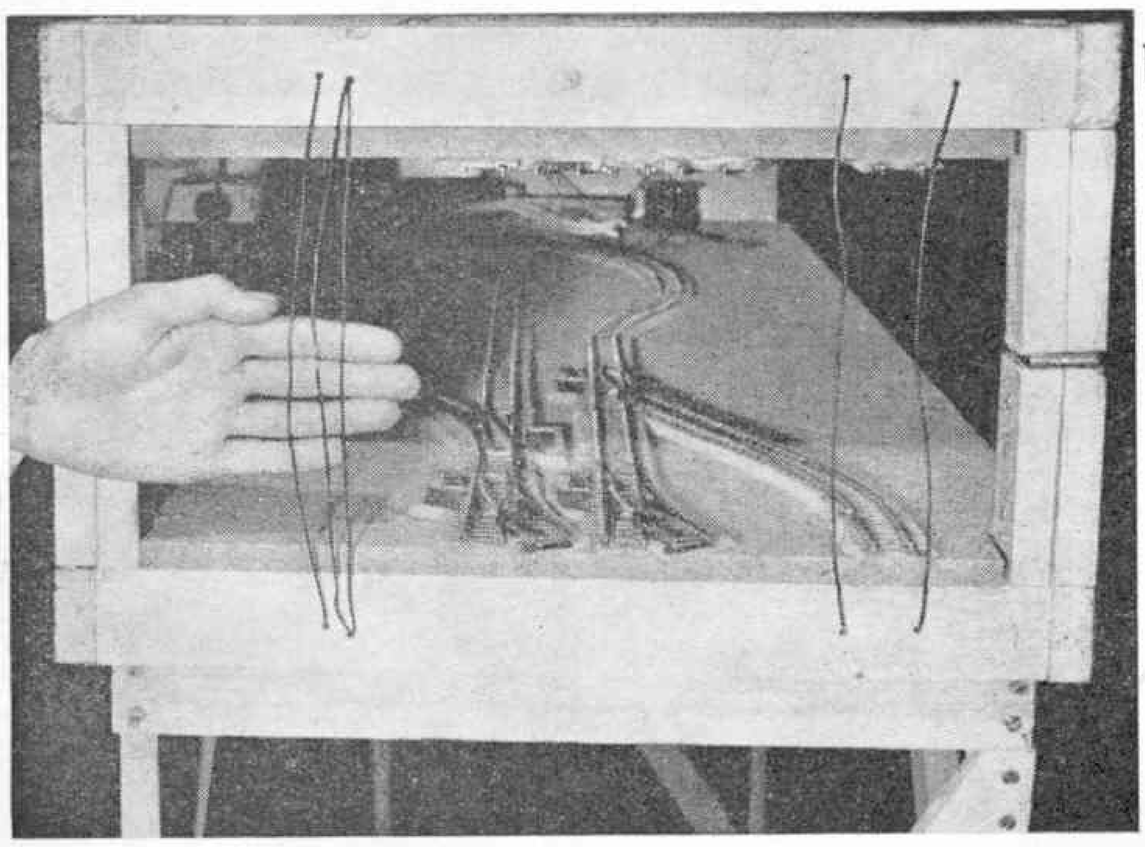
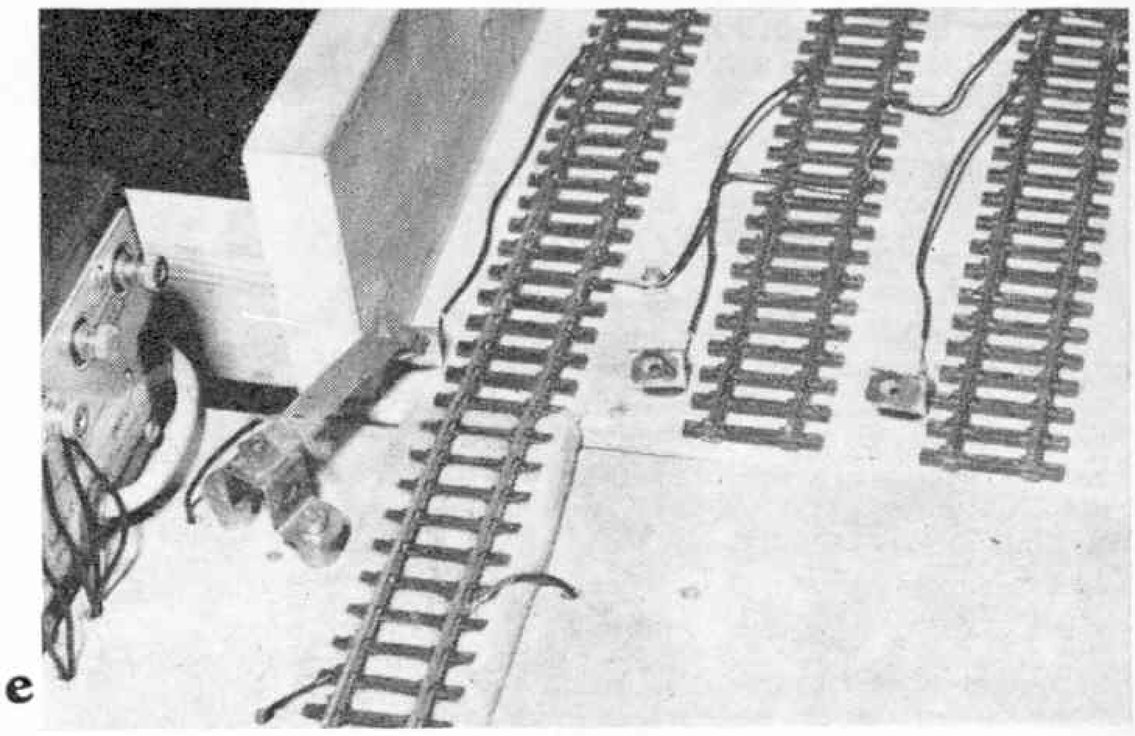


b



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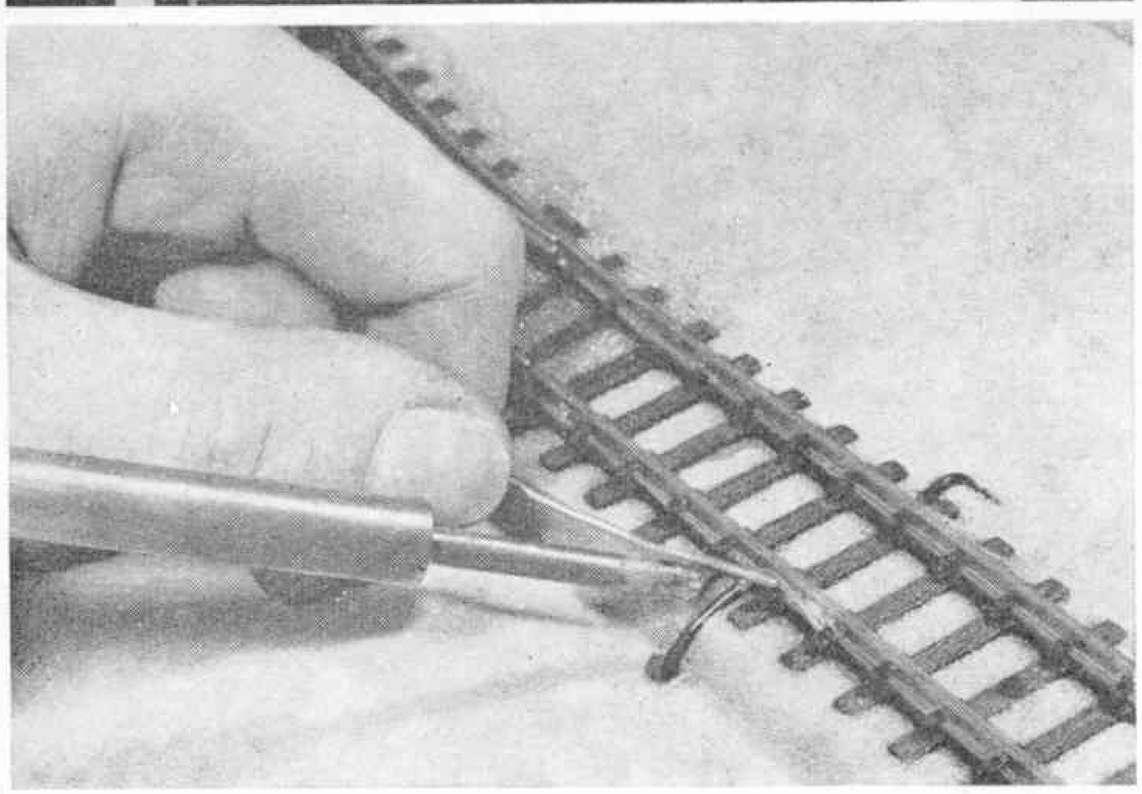

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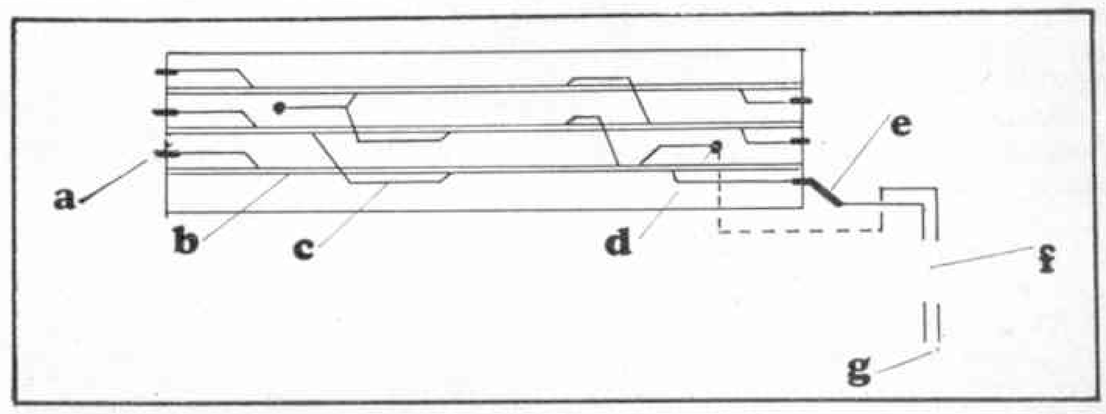

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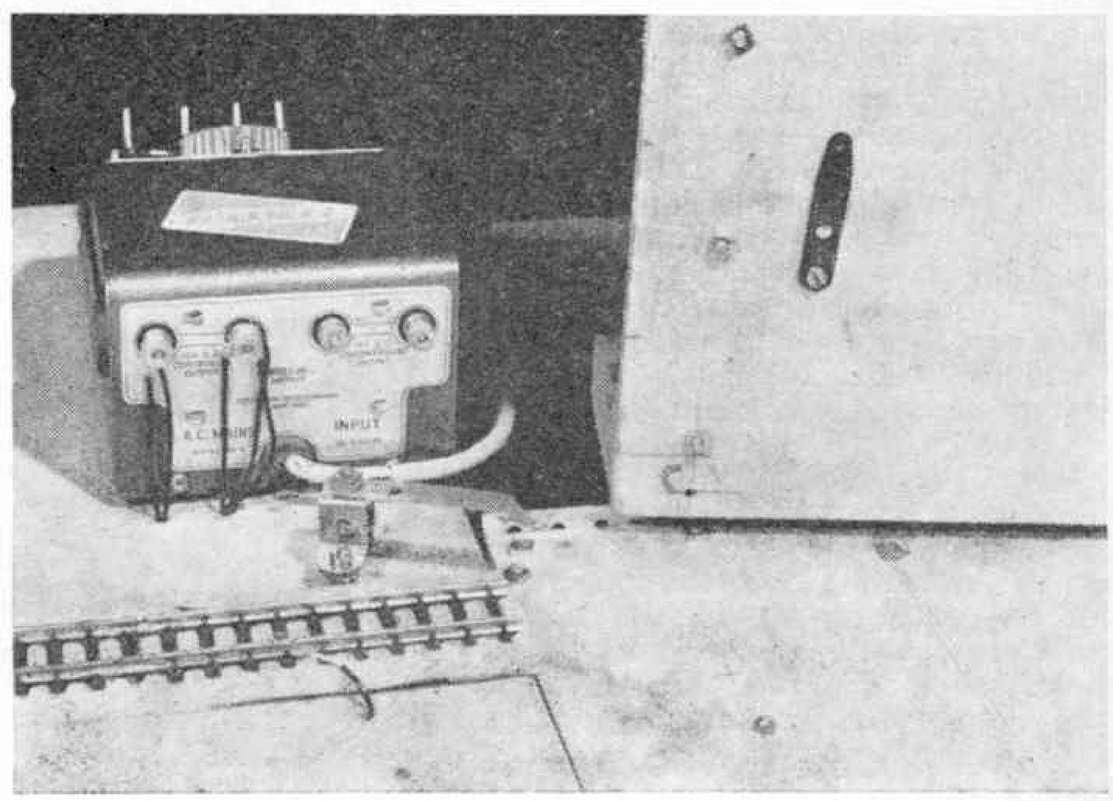
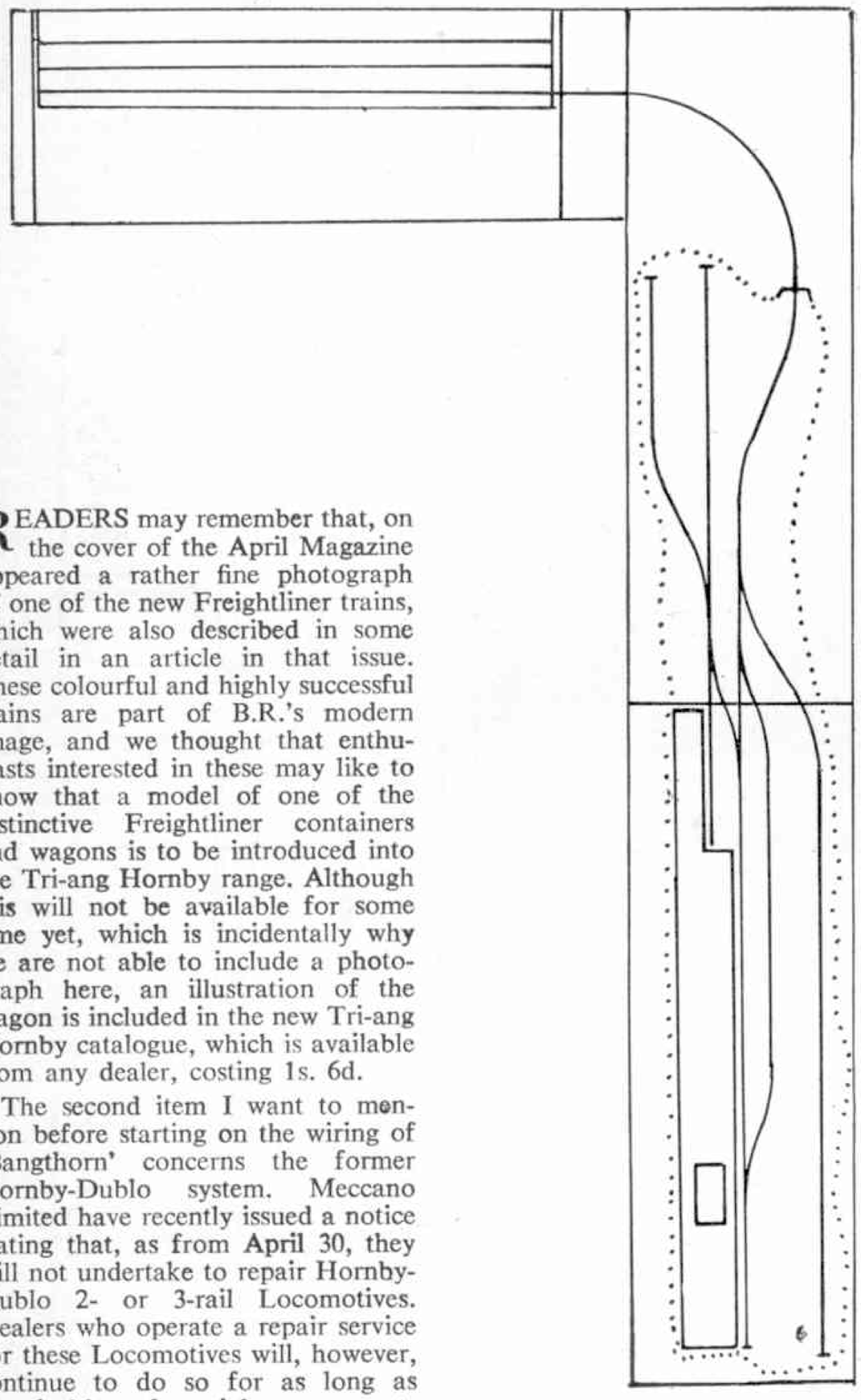


g

A The layout section diagram.
B Approximately twelve inches of slack wire should be allowed between baseboard sections, to allow for folding.
C Soldering a wire connection directly to the side of the rail.
D The controller and section switches and their connections.
E The traverser section showing the wiper arm and contacts.
F Diagram of traverser section. a—wiper contact. b—track. c—jumper wires. d—return terminal. e—wiper arm. f—DPDT switch. g—power switch.
G View of the underside of the traverser deck.

Many model railway enthusiasts rarely give much thought to the business of wiring, but impractical or faulty wiring, even on small layouts, can severely hamper realistic train operation. This month, Mike Rickett describes how he wired Bangthorn by (Cab Control) system for maximum operational enjoyment.



READERS may remember that, on the cover of the April Magazine appeared a rather fine photograph of one of the new Freightliner trains, which were also described in some detail in an article in that issue. These colourful and highly successful trains are part of B.R.'s modern image, and we thought that enthusiasts interested in these may like to know that a model of one of the distinctive Freightliner containers and wagons is to be introduced into the Tri-ang Hornby range. Although this will not be available for some time yet, which is incidentally why we are not able to include a photograph here, an illustration of the wagon is included in the new Tri-ang Hornby catalogue, which is available from any dealer, costing 1s. 6d.

The second item I want to mention before starting on the wiring of 'Bangthorn' concerns the former Hornby-Dublo system. Meccano Limited have recently issued a notice stating that, as from April 30, they will not undertake to repair Hornby-Dublo 2- or 3-rail Locomotives. Dealers who operate a repair service for these Locomotives will, however, continue to do so for as long as practicable and special arrangements have also been made with G. & R. Wrenn, of 7/9 Bowlers Croft, Honywood Road, Basildon, Essex, to continue the repair of Hornby-Dublo 2-rail Locomotives only. Whilst on the subject, I might also mention that there are still considerable stocks of Hornby Dublo available from Rovex Scale Models, Westwood, Margate, Kent.

To continue on the construction of 'Bangthorn', readers may remember that I mentioned last month that I would be using cab control for the layout, partly to show readers the principles involved and partly because it is the most convenient type of control for the simultaneous operation of two trains. It also happens to be the easiest of systems to enlarge and install, especially where extensions to a layout are involved. Strictly speaking, 'Bangthorn' does not really require a wiring system quite as complicated as cab control, basically because as built, it is the sort of layout ideally suited for operating on the 'one engine in steam' principle. The point is, however, that two trains can be operated if required providing cab control is used and, for example, a locomotive can be shunted in the goods yard while a second train is operated from the storage sidings to the station.

It will be noticed from diagram A that the layout is divided electrically into four sections, three on the station itself and the other between the station and the traverser section. For cab control wiring, shown on the diagram, each section is wired to two simple S.P.S.T. (single-pole/single-throw) or simple on/off switches, each switch being situated near a different controller or 'cab'. There are, of course, more complicated ways of doing exactly the same thing, but the arrangement shown in the diagram is the simplest and easiest form of cab control for use with two trains.

For the actual task of wiring the layout, I would suggest you use multi-strand wire rather than the single-strand variety, which has the serious disadvantage of breaking if it is bent or twisted more than a few times. For connecting the wire to the track, you have the choice of using the Tri-ang Hornby Power Connector, or you can, if you wish, solder the wire directly on to the side of the rail. This is purely a matter of personal preference, although, of course, the Tri-ang Power Connector is by far the easier of the two methods. Soldering the wire to the rail has the advantage of being the most unobtrusive. Whatever method you choose, you will need to drill holes in the baseboard —on either side of the track for a soldered connection and on the same side if the Power Connector is used. You will also need to fold the station over upon itself and drill holes in the end as shown in photo B. These are for jumper wires between the two halves of the station baseboard to give current continuity between adjoining tracks. The baseboard join between the station and traverser does not need jumper wires and you will only need to drill holes for the wire from the power feeds on the station to the multi-plug.

An important point about cab control is that each section must be electrically isolated from each other, and I show on diagram A the section breaks that are required. Luckily, all these coincide with the baseboard join between the two sections of the station baseboard and you will not need to make any saw cuts.

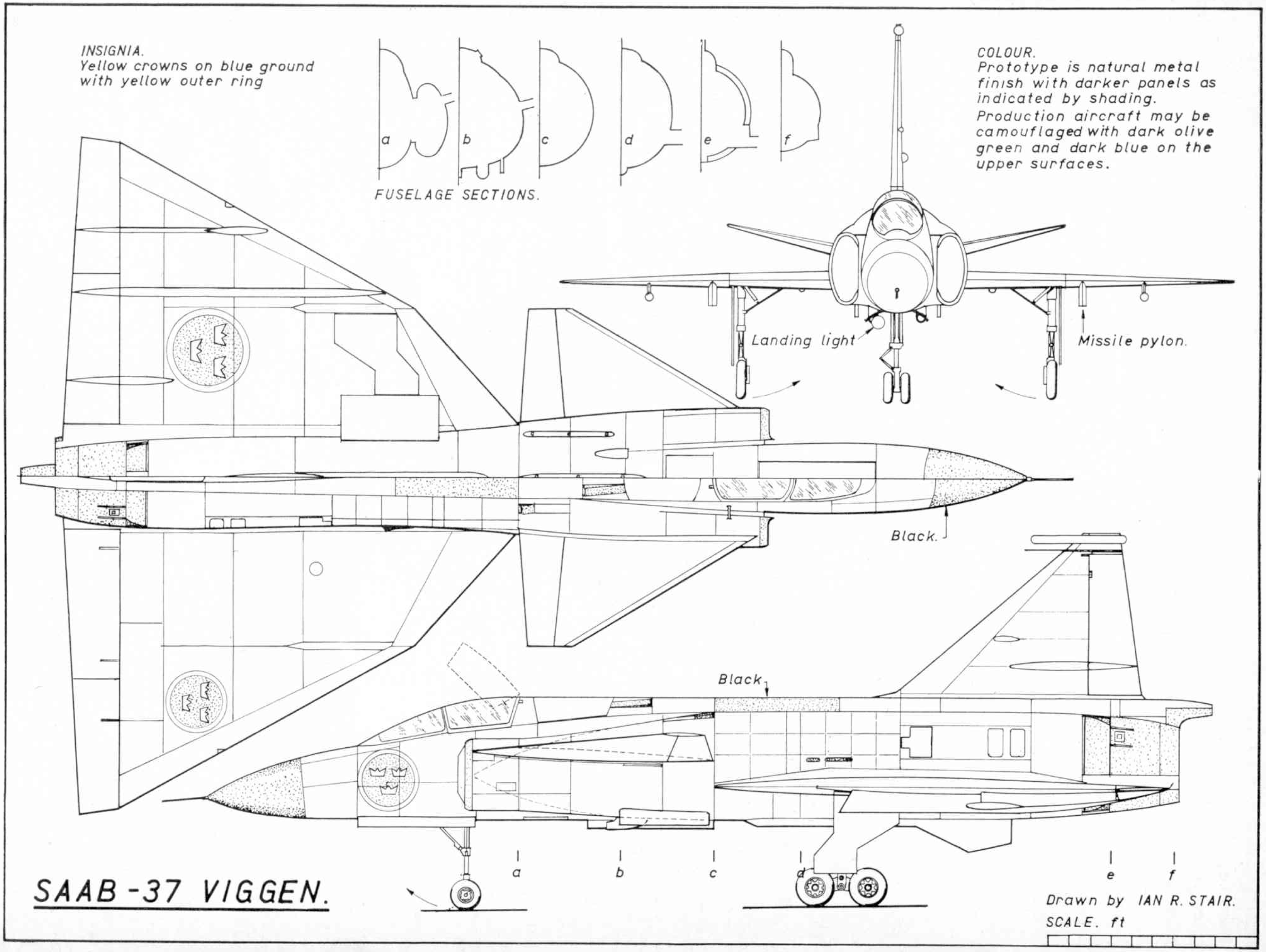
Once all the holes in the baseboard have been drilled, the process of wiring can begin with the furthest section away from the controller, which is the one at the end of the platform. If you wish to solder the wire on to the rail, bare about half an inch of wire and push it through the hole in the baseboard, bending over the end of the wire so that it lies flat against the side of the rail. Flux can then be applied and the joint soldered as shown in photo C. A similar procedure is followed for the other power feeds, which can then be taken one at a time through the holes in the baseboard and to a multi-plug at the opposite end of the station near the controller. This is used to connect up wires from the controller to the power feeds on the station baseboard. Remember to leave approximately twelve inches of wire loose at the baseboard hinge position so that when it is folded over, the wire will look as shown in photo B.

Once all the sections have been treated in this way and connected to the multi-pin plug, the four isolating switches can be mounted in front of the controller situated at the station end of the traverser baseboard. Whatever type of switch you choose—I used Tri-ang Isolating Switches—you will require holes in the baseboard surface in front of each switch. The wire from the coresponding socket of the multi-plug can then be pushed through these holes and connected to the switches and controller as shown in diagram A and photo D. To avoid confusion, it is probably best to begin by connecting the wire to the lower terminals of the switches and also to start with the right-hand switch working to the left.

As shown in diagram A, you will find it easier for connections on one side of the track to be joined together underneath the baseboard so that one wire only is connected to the multi-plug. This has the advantage of reducing the amount of wire involved and it also avoids unnecessary complications. This same wire is connected to the power unit and not to any of the switches.

Diagram F and photo E show the wiring arrangements for the traverser section. Both negative and positive power must be fed to the traverser section and since the negative can be made common to one rail of all three tracks, I have included an arrangement under the traverser baseboard for supplying power to all three traverser tracks, irrespective of their positions. Photo G shows the two Meccano Elektrikit parts, one part No. 53 1½ in. Wiper Arm fixed underneath the traverser storage unit and the other part No. 543, Contact Screw is mounted on top of the traverser section proper. It will be necessary for part No. 532 to be fixed at both ends of the storage section and in the same position, to allow the storage unit to be reversed. The positive feed to each traverser track is shown on photo E and the unit mounted on the baseboard is built up from Meccano part No. 45 with two Collars, part No. 59, supporting it, with Elektrikit part No. 533 mounted on top. Fixed on each end of the storage section are three Reversed Angle Brackets, part No. 25, sawn and bent as also shown in photo E. The positions of these is important and they must be made to coincide exactly with the wiper arm on the adjacent baseboard.

Wiring of the traverser can now begin by connecting up the wiper arm to the power terminal of the control unit. The return wire is soldered to the Elektrikit part No. 543 underneath the traverser baseboard. The storage section is then wired up as shown in diagram F, with the power wires soldered to the Angle Brackets and the return wires soldered to the shank of the bolt holding on the 1½ in. wiper arm on the other side of the storage section. A D.P.D.T. (double-pole/double-throw) switch is finally wired between the power unit and the connections on the traverser, as shown in diagram F.


INSIGNIA.
Yellow crowns on blue ground with yellow outer ring
a
b
c
d
e
f
FUSELAGE SECTIONS.
COLOUR.
Prototype is natural metal finish with darker panels as indicated by shading.
Production aircraft may be camouflaged with dark olive green and dark blue on the upper surfaces.
Landing light
Missile pylon.
Black.
Black
SAAB-37 VIGGEN.
Drawn by IAN R. STAIR.
SCALE. ft

PROJECT SECTION

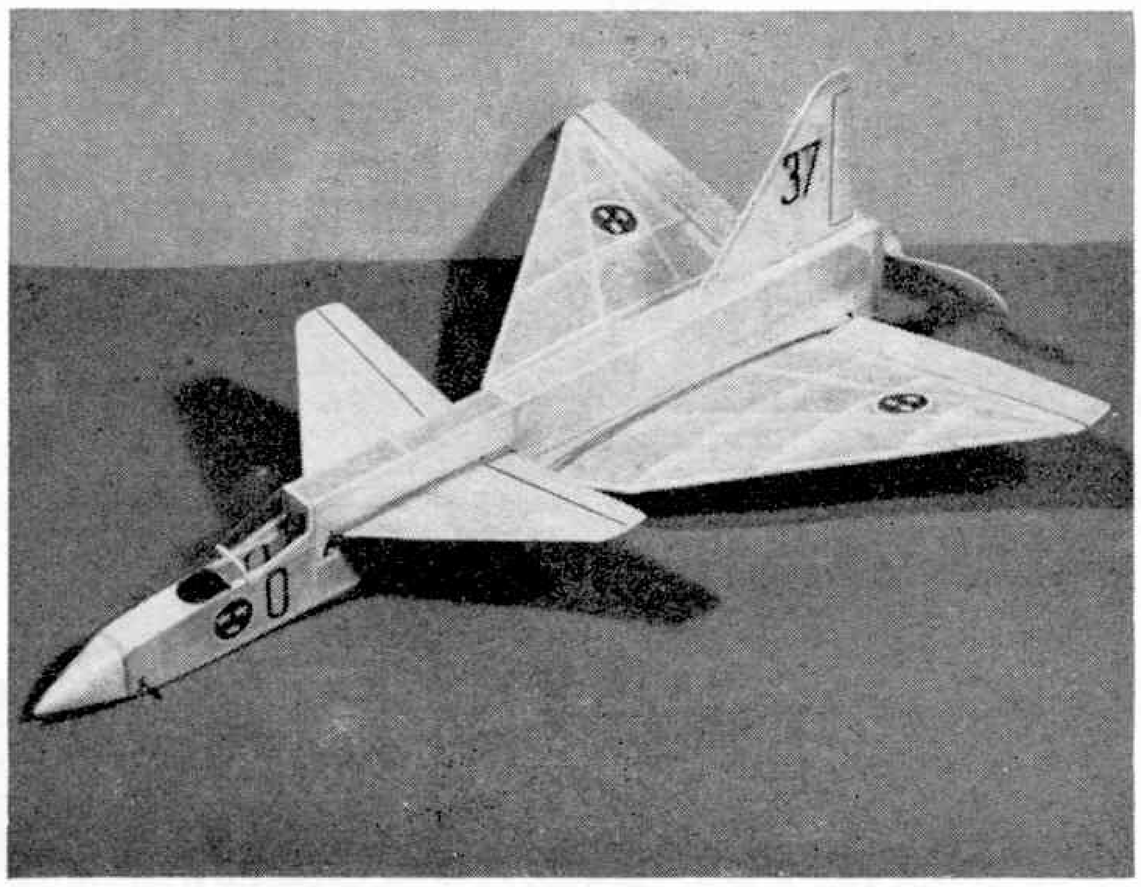
THE SAAB A37·VIGGEN·

An exclusive MM design by Ray Malmström

BUILDING an unusual type of model aeroplane is always an exciting business, and when the model flies as well as this one, then you really can be assured of flying thrills ahead. The new SAAB A.37. VIGGEN (Swedish for Thunderbolt) is without doubt one of the most deadly and advanced fighters in the world today, and is destined to go into squadron service with the Swedish Royal Air Force. The design is a delta-canard type and appears to fly *backwards* with its tailplane *in front*. Contrary to what you may expect, this lay-out flies exceptionally well (two big advantages of tail-first or canard types are their stability and freedom from stalling). Construction too in our model, is simple and straightforward—so what are we waiting for!

These constructional notes will concentrate on the more important building points. Generally speaking if you follow the 'easi-build' sketches, work slowly and accurately, construction will not present any problems. Build two identical fuselage side frames and add the sheet top, bottom and side pieces as shown in the sketches. Check that the forward elevator and wing cut-outs are accurate. A set-square is useful, for checking the 'squareness' of the fuselage. Add elevator and wing dowel rods. Both elevator and wing are held in place with rubber bands. This allows for slight changes in the incidence angles—but this should not be necessary. Note the slight slope of the rear end of the fuselage. *This slope is important* so check that you have built it in correctly. Build tailblock from plan and sandpaper to shape. Make it a good push-fit into the fuselage. Get the 20 s.w.g. brass bush from your model shop. The propeller is a KeilKraft 5 in. diameter, plastic prop. also obtainable at your hobby or model shop. Carefully cut off the spinner portion with a small tenon or hack saw, holding the prop. hub in the end of a vice. Take care to mount it on the driving shaft with the smaller face of the prop. hub *towards* the *tailblock*.

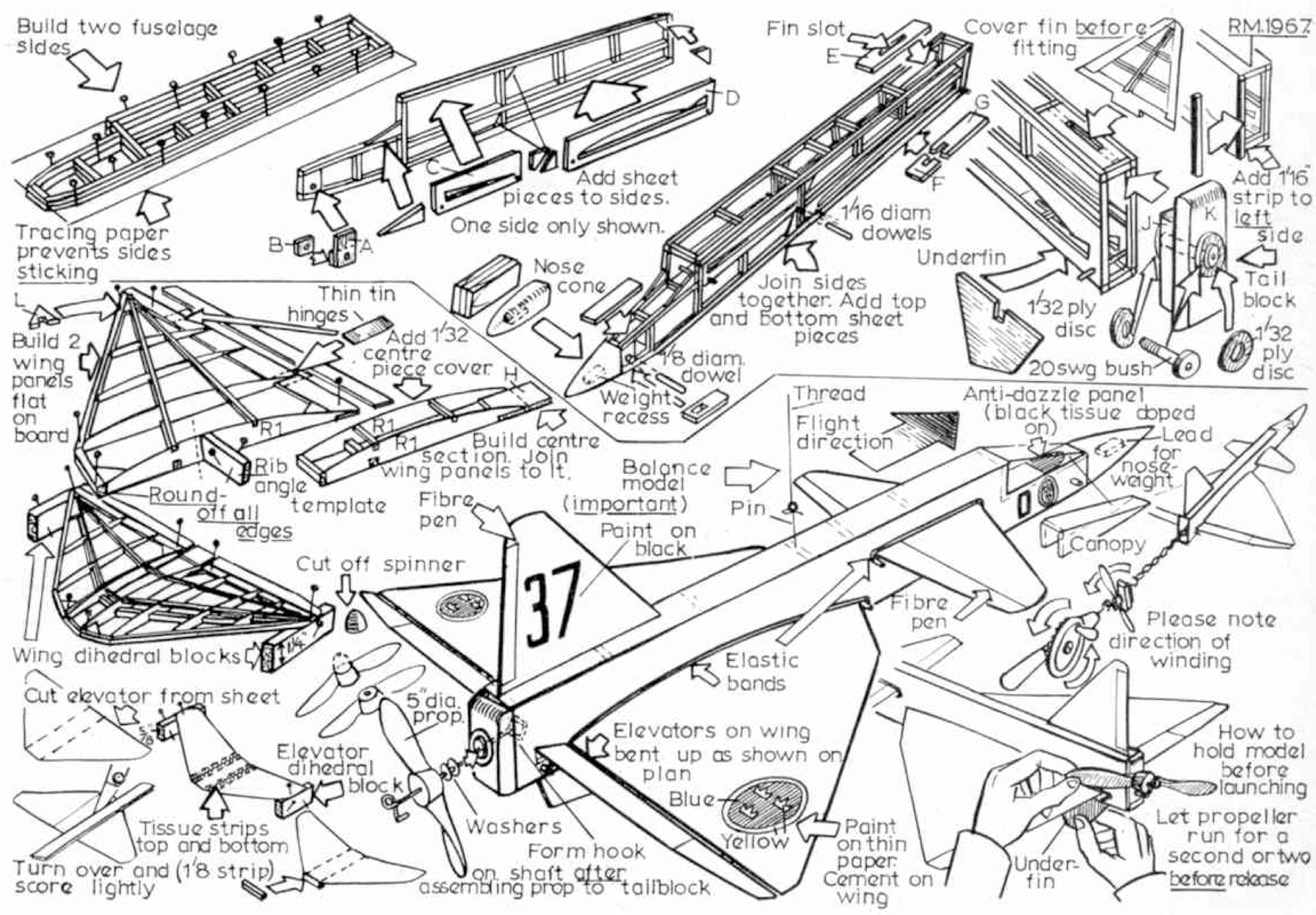
Remember this model is a pusher! Sandpaper the fuselage frame with very fine sandpaper, cover with lightweight Modelspan tissue paper, water-shrink and give one thin coat of clear dope. Build the upper main fin over the plan, lightly sandpaper and cover with tissue, shrink and dope as for fuselage. Fin and wing frames should be pinned down (using small balsa blocks, under the edges to stop the undersurfaces from sticking to building board) at all stages of shrinking and doping. This will avoid warps. Cement fin in position. Build elevator, referring to the 'easi-build' sketches. Make sure that you add the tissue strips over the centre section score-lines, and that you have the correct dihedral. Use



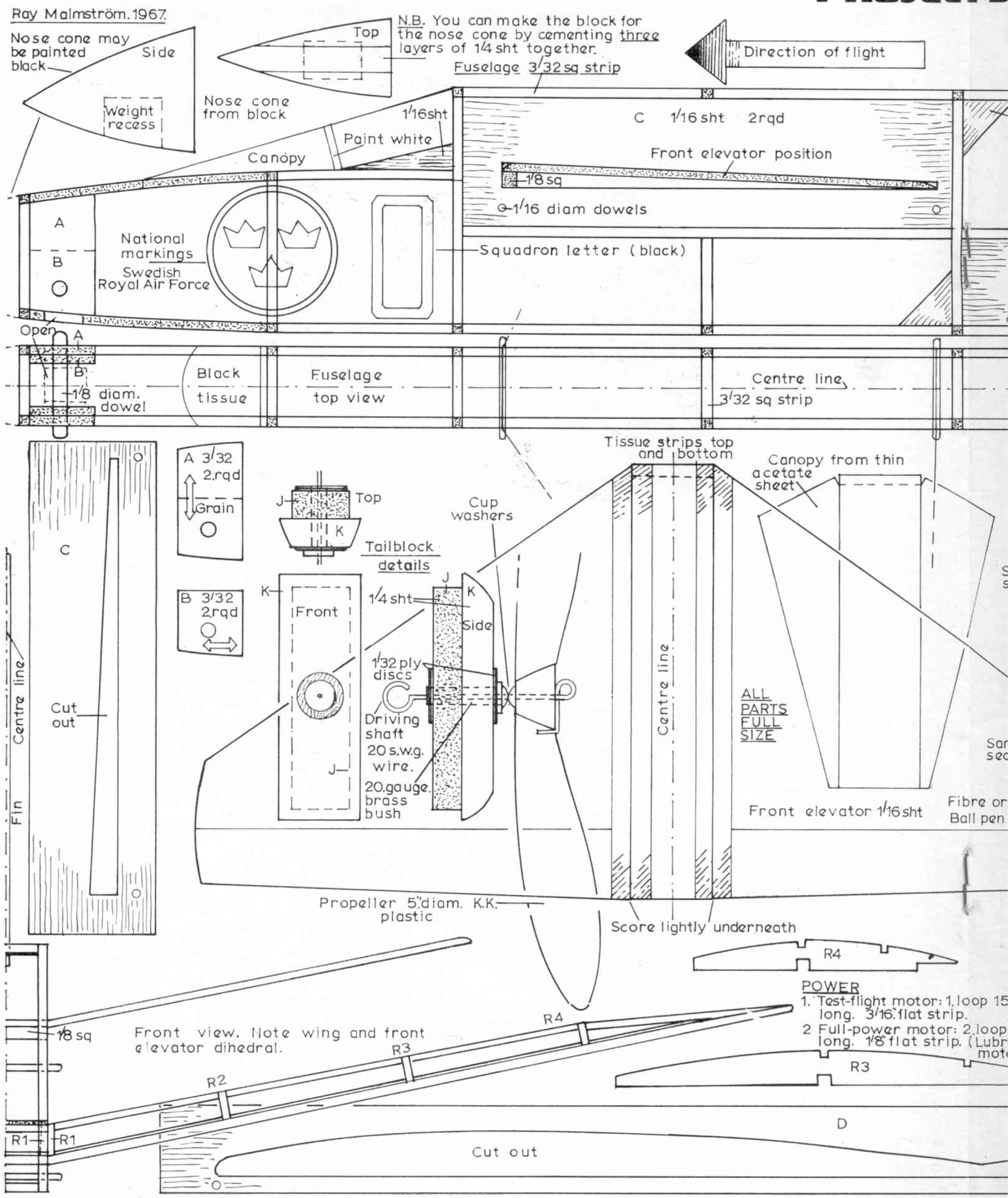
blocks of the correct height as indicated. Give elevator one coat of thin clear dope. Cut underfin from sheet, then dope and cement very firmly in place.

The delta (or triangular) shaped wing is built in three sections. Two wing panels and a centre section. Leave the $\frac{1}{32}$ in. sheet covering over the wing centre section until the whole wing assembly has been completed. Build the port wing panel over the plan. You will need a reversed tracing for the starboard panel. Before covering, cement the wing panels to the centre section. Note the end or root-rib on each panel is sloped slightly inwards. Use the template provided to obtain the correct angle of slope. See also that the tips are raised the right amount. See 'easi-build' sketches. Cover wing panels with lightweight tissue then shrink and dope as for fuselage and fin. Now add the $\frac{1}{32}$ in. sheet centre-section covering. Cut out the sheet elevators and fix to the wing trailing edges with thin aluminium hinges. These hinges are best glued in place with an impact adhesive like Evo-Stick or Bostik 1. Balsa cement is not satisfactory for bonding metal to balsa. Decorate fuselage, fin and wings as indicated on plan and sketches. Do not use colour dope on your Viggen—its weight will spoil the flying performance but coloured Modelspan tissue can be used if you prefer. Cut out canopy, fold carefully and cement in place. The wing and front elevator are slipped through their respective openings, but remember to first cement a strip of $\frac{1}{8}$ in. square balsa along the front edge of the elevator centre section and a strip of $\frac{1}{16}$ in. square balsa down the left-hand side of the end of the fuselage. These are flying adjustments and must not be omitted. Rubber bands hold the elevator and wing in position.

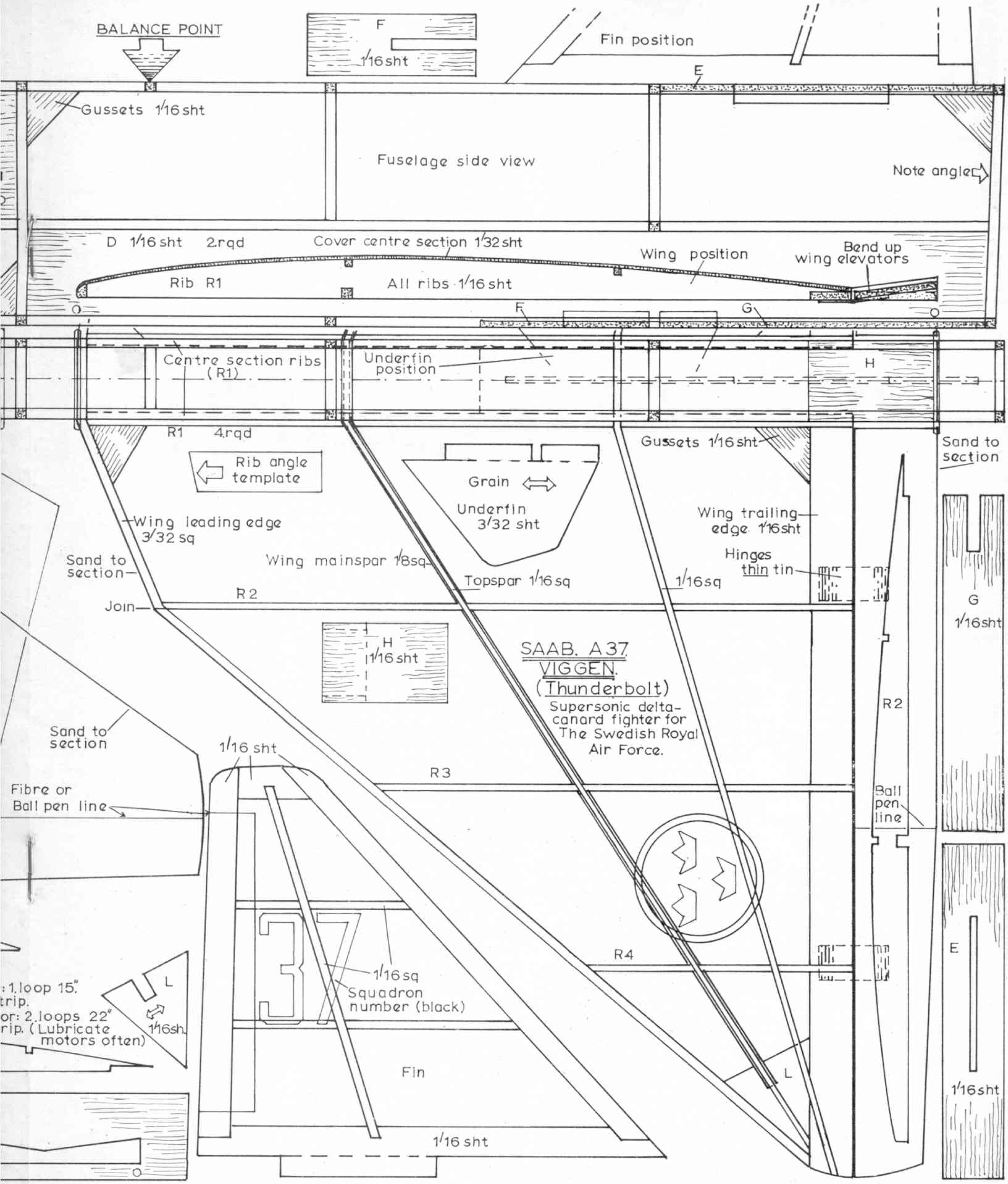
Flying. Make up and lubricate the 'testflight' rubber motor as per plan instructions (tubes of rubber lubricant 6d). By the way *never* rub oil on to your rubber motors, as it will seriously affect the rubber. Instal the motor, and then balance your model carefully. The balancing is most important. Suspend your model from the balance (or C.G.) point as shown in the sketches. You will need a small amount of noseweight (folded cement tube or sheet lead) which is put in the noseweight recess. Adjust the noseweight until your Viggen hangs level



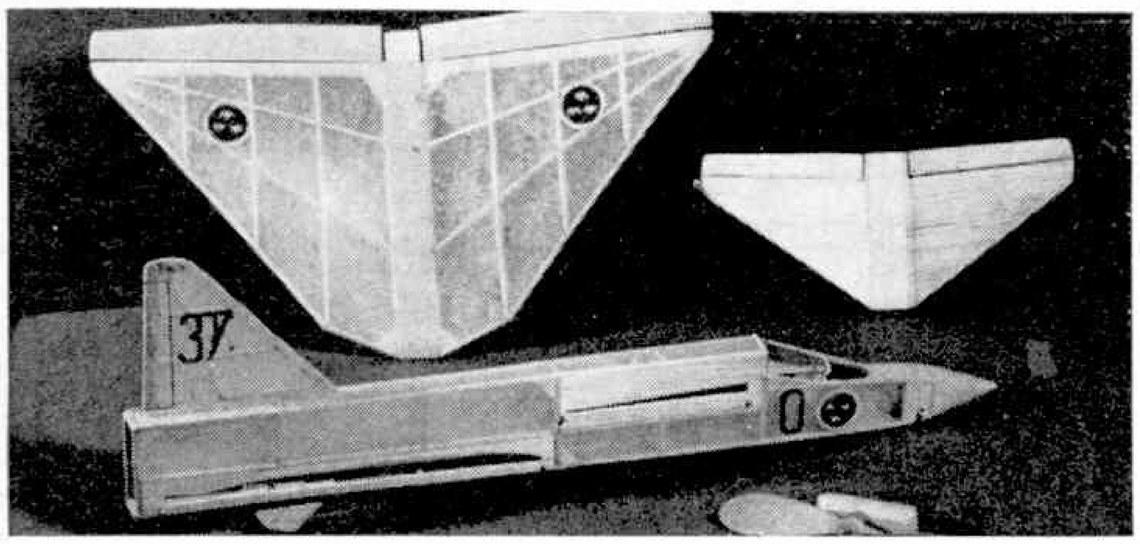
PROJECT S


Ray Malmström. 1967.
Nose cone may be painted black
Side
Weight recess
Top
Nose cone from block
N.B. You can make the block for the nose cone by cementing three layers of 1/4 sht together.
Direction of flight
Fuselage 3/32 sq strip
1/16 sht
Paint white
Canopy
C 1/16 sht 2 rqd
Front elevator position
1/8 sq
1/16 diam dowels
A
B
National markings
Swedish Royal Air Force
Squadron letter (black)
Open
A
B
1/8 diam. dowel
Black tissue
Fuselage top view
Centre line
3/32 sq strip
Tissue strips top and bottom
Canopy from thin acetate sheet
C
Cut out
Centre line
Fin
A 3/32 2 rqd
Grain
B 3/32 2 rqd
J
Top
K
Tailblock details
Cup washers
K
Front
J
1/4 sht
J
K
Side
1/32 ply discs
Driving shaft 20 s.w.g. wire.
20 gauge brass bush
Centre line
ALL PARTS FULL SIZE
Front elevator 1/16 sht
Fibre or Ball pen
Propeller 5" diam. K.K. plastic
Score lightly underneath
R4
POWER
1. Test-flight motor: 1 loop 15 long. 3/16" flat strip.
2 Full-power motor: 2 loop long. 1/8" flat strip. (Lubr mot
1/8 sq
Front view. Note wing and front elevator dihedral.
R4
R3
R2
R3
D
R1
R1
Cut out

ECT SECTION


BALANCE POINT
F
1/16 sht
Fin position
E
Gussets 1/16 sht
Fuselage side view
Note angle
D 1/16 sht 2.rqd
Cover centre section 1/32 sht
Wing position
Bend up wing elevators
Rib R1
All ribs 1/16 sht
O
F
G
O
Centre section ribs (R1)
Underfin position
H
R1 4.rqd
Gussets 1/16 sht
Sand to section
Rib angle template
Grain
Underfin 3/32 sht
Wing trailing edge 1/16 sht
Wing leading edge 3/32 sq
Hinges thin tin
Sand to section
Wing mainspar 1/8 sq
Topspar 1/16 sq
1/16 sq
R2
Join
G 1/16 sht
H 1/16 sht
SAAB. A37 VIGGEN. (Thunderbolt)
Supersonic delta-canard fighter for The Swedish Royal Air Force.
R2
Sand to section
1/16 sht
R3
Fibre or Ball pen line
Ball pen line
R4
E
1/16 sq
Squadron number (black)
L
1/16 sh
L
Fin
1/16 sht
1/16 sht

PROJECT SECTION



from both side and front views. Then carefully bend *up* the wing elevators about $\frac{3}{16}$ in.

Choose a calm day and some long grass for your gliding and flying tests. Facing into the wind launch your Viggen with both wings level to the ground. Never *throw* the model, but launch with a 'follow-through' movement of the arm. The model should glide down and land about 25 ft. in front of you. If it stalls (rears up and then dives in) bend the wing elevators *down* a little. If it dives, bend them *up*, a very small amount. If model turns sharply to left or right add a small paper trim-tab to the rear edge of the fin, and bend it in the *opposite* direction to the turn. Get a fairly shallow and straight glide. Now wind the propeller about 200 turns. Note the way the propeller is wound. Hold the model and propeller as shown. Release the propeller a second or two *before* releasing model, again launching with a smooth follow-through arm movement. Your Viggen should climb gently for a short distance, level out, and then as the power dies glide into a smooth landing. Once you have your model flying satisfactorily you can increase the number of turns with each flight up to about 500. If the model stalls add a $\frac{1}{16}$ in. square strip along the *top* edge of the tailblock. If it dives under power add a $\frac{1}{16}$ in. square strip at the *bottom* of the tailblock. When your Viggen is making steady flights you can replace the 'test-flight motor with the 'full power' motor. This will take, when run in, about 700 turns, and Viggen will really be away.

If you are still in a little doubt about building this unusual model perhaps this will convince you: our original Viggen (the one in the photographs) flew right off the drawing board and in 25 test flights never caused the designer's heart to miss a single beat! Who can ask for more than that?

"Viggen" Material List

8 36 in. by $\frac{3}{32}$ in. sq. balsa strips
1 36 in. by $\frac{1}{8}$ in. sq. balsa strip
1 sheet 3 in. by 36 in. by $\frac{1}{16}$ in. balsa
1 sheet 3 in. by 10 in. by $\frac{1}{4}$ in. balsa
1 piece 8 in. by 1 in. by $\frac{1}{32}$ in. sheet
1 small piece $\frac{3}{32}$ in. sheet
1 sheet Modelspan lightweight tissue
1 small piece of black tissue
1 small piece $\frac{1}{32}$ in. plywood
6 in. length 20 swg. piano-wire
1 brass bush 20 gauge
2 cup washers 30 gauge
1 KeilKraft (K.K.) 5 in. diameter plastic propeller
$1\frac{1}{2}$ in. length $\frac{1}{8}$ in. diameter dowel rod
6 in. length $\frac{1}{16}$ in. diameter dowel rod
1 small piece thin acetate sheet
2 rubber bands (2 in. and 3 in. approx.)
Small piece of thin tin or aluminium
1 tube balsa cement
1 tube Evo-Stik
1 small bottle clear dope
1 tube rubber lubricant
1 length 32 in. long $\frac{3}{16}$ in. flat strip rubber
1 length 88 in. long $\frac{1}{8}$ in. flat strip rubber
Enamel or poster paint for decor

A BALSA DRAGSTER

By Ron Warring

SIMPLE models of this type are ideal for 'sprint' racing over flat surfaces, such as a lino covered floor. Using a powerful rubber motor—four or six strands of $\frac{3}{16}$ in. aero strip, for instance—the power run is short, but acceleration tremendous. Because of this the dragsters are best run tethered, so that they describe a circle around a central pylon. This has the advantage of keeping the model under control, the length of line can be adjusted to suit the space available, and the model can be timed over a specific number of laps so that the actual speed can be worked out. Another great advantage is that models of this type cost little to construct—and nothing at all to operate!

The plan shows all necessary parts actual size for making a typical balsa dragster. Basis is a simple chassis assembly incorporating a pylon, on top of which the propeller shaft bearing is fitted. The addition of a body is quite straightforward, although not essential to the working of the model. It merely adds to the appearance. You can try alternative body shapes to the simple design shown, but the main thing is to keep the construction light.

Start with the main chassis member, which is a $6\frac{1}{2}$ in. length of hard $\frac{3}{8}$ in. by $\frac{1}{4}$ in. balsa. The full size drawing at the bottom of the plan shows how this is notched for the axle beams and drilled for the front tether point.

The axle beams are cut from $\frac{1}{4}$ in. by $\frac{1}{8}$ in. hard balsa strip. Simply cement into the main member slots. The rear axle is further supported by two triangular braces cut from $\frac{1}{8}$ in. sheet balsa and cemented in place. The shape of the pylon can be traced off the side view drawing on to medium hard $\frac{1}{4}$ in. sheet balsa with the grain running from top to bottom. Cut out and cement to the main chassis member to complete the basic chassis unit.

Now make the propeller shaft bearing from hard brass strip. Note that this is pinned in place to the top of the pylon, and also bound with thread. For additional security, add a generous coating of cement.

The front rubber motor hook is bent from 18 gauge piano wire to the shape shown and bound securely to the front of the main chassis member. Again apply cement generously over the binding.

Lightweight plastic wheels are used for the front wheels. To make the rear wheel 'slicks', start with a pair of 2 in. diameter balsa wheels and sand the outside of the tyre section down until it is flat and the diameter is reduced to $1\frac{1}{2}$ in. Alternatively you can cut these 'slicks' directly from $\frac{1}{2}$ in. balsa sheet (or better still two laminations of $\frac{1}{4}$ in. sheet). It is most important, though, that you get these rear wheels perfectly circular. If in difficulties on this point it would be best to use ready-made $1\frac{1}{2}$ in. diameter wheels, even if they are normal tyre section.

All four wheels are mounted in the same manner. First mount on a large pin and check that the hole in the hub is large enough to let the wheel spin very freely. Turn down the pointed end of the pin, locate on the axle beam and bind in position with a washer between the end of the beam and the inside of the wheel, Coat the bindings with cement.

A body of $\frac{1}{16}$ in. sheet balsa can now be added. Cut the two sides first and attach with cement to the front of the main chassis member and to the $\frac{1}{8}$ in. sheet braces at the rear. Now add the top and the two small pieces of $\frac{1}{16}$ in. sheet filling in between the sides and the pylon aft of the cockpit. Finally add the $\frac{1}{16}$ in. sheet fill-in to the sides of the cockpit.

You can leave the cockpit open, or fit a canopy if you prefer. In the latter case use a standard model aircraft canopy about $2\frac{1}{2}$ in. long. This will have to be cut both to fit around the pylon and sit on the top and over the open cockpit. You can only get a good fit by 'cut and try'.

For the propeller you can use a $4\frac{1}{2}$ in. diameter plastic aircraft type prop (or a 5 in. diameter prop trimmed to $4\frac{1}{2}$ in.). You will, however, get more thrust and thus more speed by using the 'fan' type propeller shown with four blades. This is made by cutting a 1 in. diameter hub from $\frac{1}{4}$ in. sheet balsa and slotting as shown. Use a saw—or better still, a $\frac{1}{16}$ in. thick flat file—for cutting these slots. The blades are simply cut from $\frac{1}{16}$ in. sheet and cemented into the hub slots to complete the propeller.

The propeller is mounted on a piano wire shaft fitted through the bearing, with a washer between the rear of the bearing and the propeller hub. Turn the end of the shaft back into the hub to lock the propeller on to the shaft.

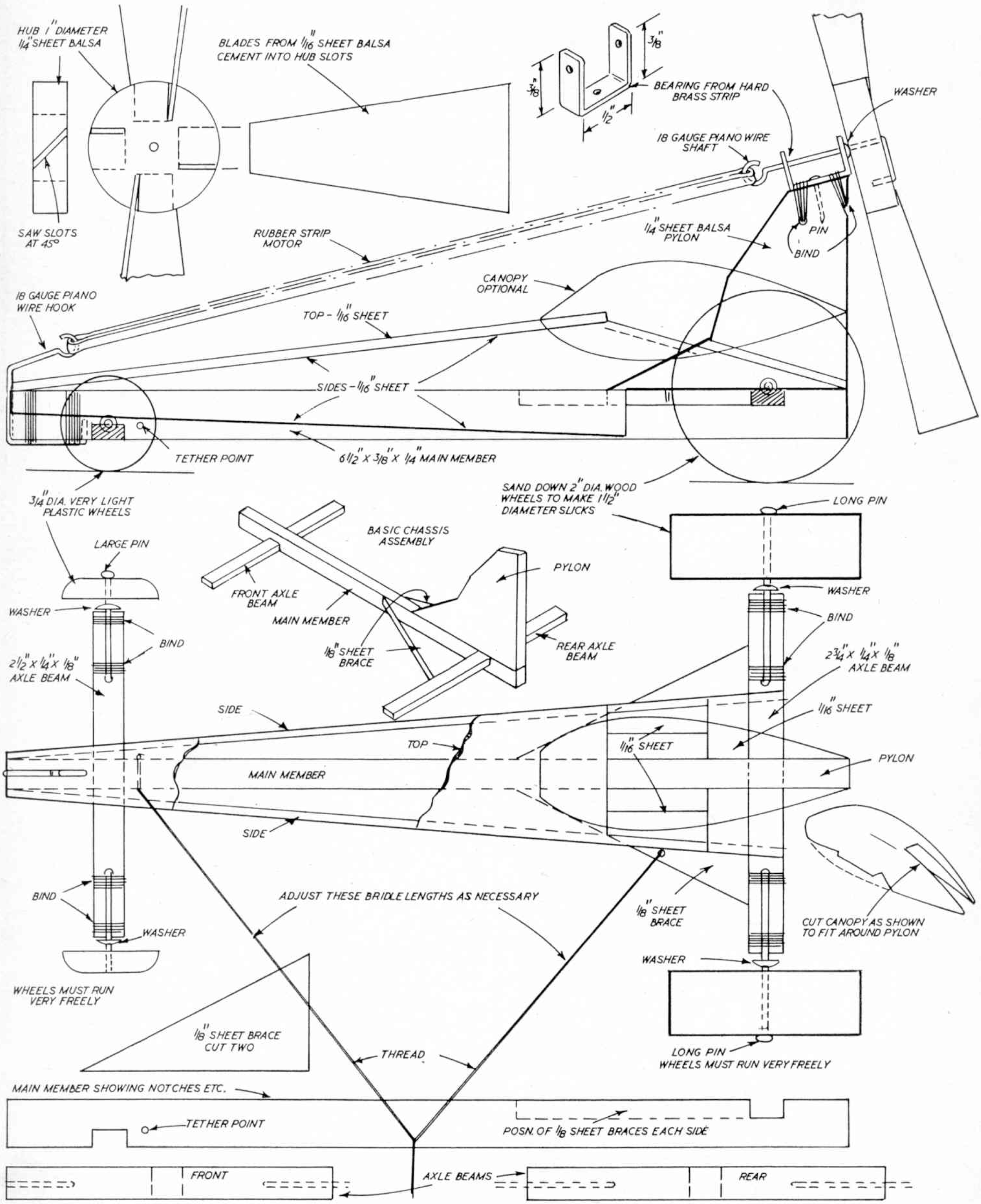
Power can be anything from a single loop of $\frac{1}{4}$ in. aero strip (or a 5 in. or 6 in. wide rubber band), up. Low power will give the longest motor run and thus the greatest *distance*.] Increasing the power will increase the acceleration and speed. Adjust the power, as necessary, to suit both the length of tether line on which you are operating the model, and also whether you want speed or distance (i.e. maximum number of laps). It is also recommended that you use a simple winder to wind the rubber motor from the front end (after detaching from the front hook) rather than hand wind via the propeller itself.

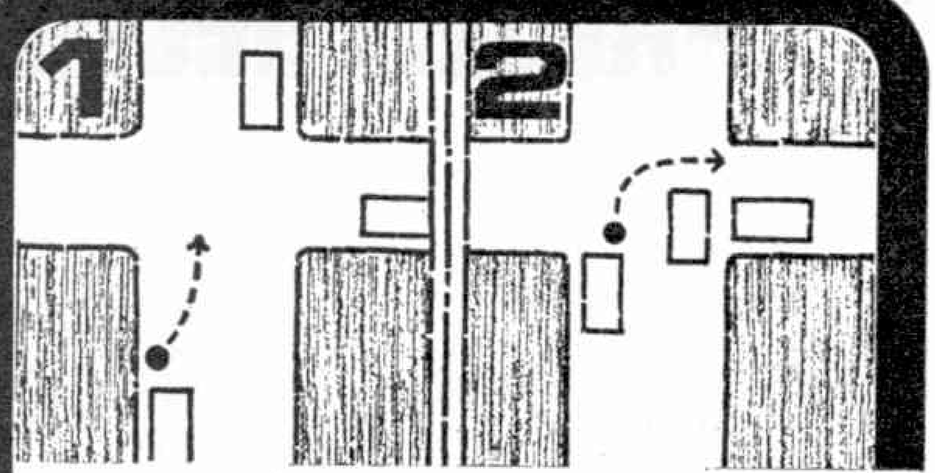
Tethering is accomplished by attaching two bridle lines to the points shown on the plan, joining about 3 in. out from the centre of the model, where they attach to the main tether line. This line can be as long, or short, as you need to run on the space available. The free end of the tether line is attached to a simple pivot mounted on a short pole—e.g. a piece of dowel about 3 in. or 4 in. long—mounted in a base. The base can be weighted down to prevent the model from pulling the centre pole out of position. All it will probably need is a couple of books or objects like that laid on the base.

For 'speed' and 'distance' runs, select the line length from the following table, remembering that tether length should be measured from the pole to the centre of the model. All that you then need to do is to count laps for working out actual distance covered; or time the model running over a specific number of laps to work out average speed.

LINE LENGTH* (To Centre of Model)	LAPS PER $\frac{1}{4}$ MILE	MILES PER LAP
17′ 6″	12	·0208
13′ $1\frac{1}{2}$″	16	·0156
8′ 9″	24	·0104
6′ $3\frac{3}{4}$″	32	·0078
4′ $4\frac{1}{2}$″	48	·0052

*Use light thread line


HUB 1" DIAMETER
1/4" SHEET BALSA
SAW SLOTS AT 45°
BLADES FROM 1/16" SHEET BALSA CEMENT INTO HUB SLOTS
3/8"
3/8"
1/2"
BEARING FROM HARD BRASS STRIP
WASHER
18 GAUGE PIANO WIRE SHAFT
RUBBER STRIP MOTOR
1/4" SHEET BALSA PYLON
PIN
BIND
CANOPY OPTIONAL
18 GAUGE PIANO WIRE HOOK
TOP - 1/16" SHEET
SIDES - 1/16" SHEET
TETHER POINT
6 1/2" X 3/8" X 1/4" MAIN MEMBER
3/4" DIA. VERY LIGHT PLASTIC WHEELS
SAND DOWN 2" DIA. WOOD WHEELS TO MAKE 1 1/2" DIAMETER SLICKS
LONG PIN
LARGE PIN
BASIC CHASSIS ASSEMBLY
PYLON
FRONT AXLE BEAM
MAIN MEMBER
WASHER
BIND
1/8" SHEET BRACE
REAR AXLE BEAM
2 1/2" X 1/4" X 1/8" AXLE BEAM
2 3/4" X 1/4" X 1/8" AXLE BEAM
SIDE
TOP
1/16" SHEET
MAIN MEMBER
PYLON
SIDE
BIND
ADJUST THESE BRIDLE LENGTHS AS NECESSARY
1/8" SHEET BRACE
CUT CANOPY AS SHOWN TO FIT AROUND PYLON
WASHER
WHEELS MUST RUN VERY FREELY
1/8" SHEET BRACE CUT TWO
THREAD
LONG PIN
WHEELS MUST RUN VERY FREELY
MAIN MEMBER SHOWING NOTCHES ETC.
TETHER POINT
POSN. OF 1/8 SHEET BRACES EACH SIDE
FRONT
AXLE BEAMS
REAR



1 If you intend to turn right at a road junction, **prepare in advance!** When you are about 20 yards short of the turn, look behind you. If all is clear, signal your intention, and draw out to take up your position just to the left of the centre line.

2 Do not cut the corner. See that the road is clear to the right and left, wait until oncoming traffic has passed you, then take the corner in a wide arc. Gain the inside lane straight away, so as to let faster vehicles, which may be turning with you, overtake.

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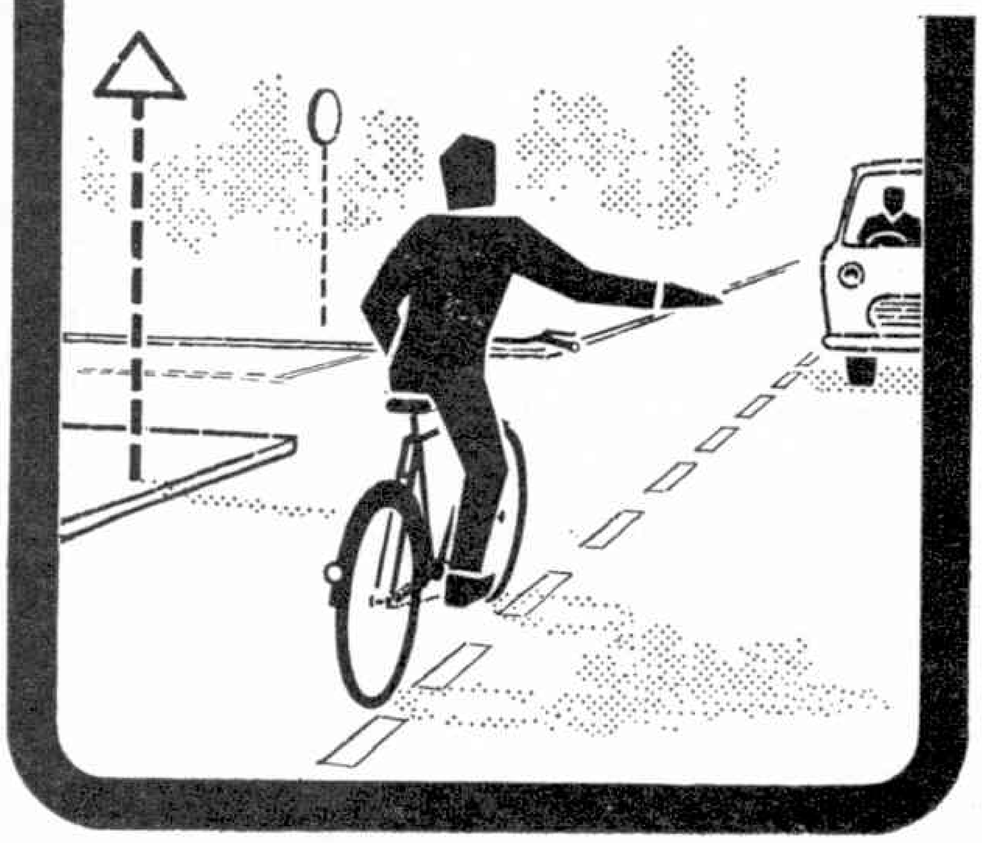

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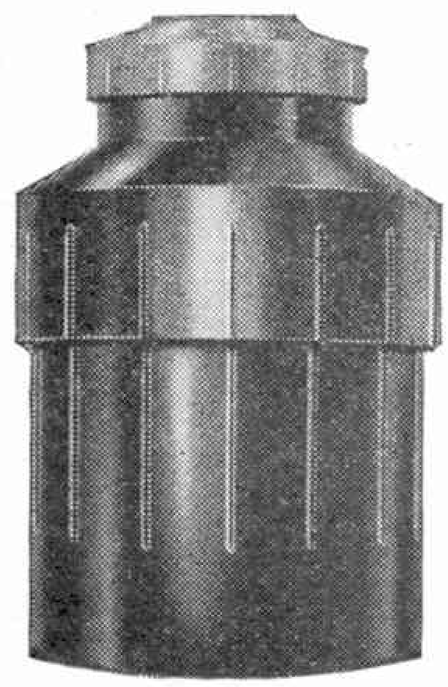

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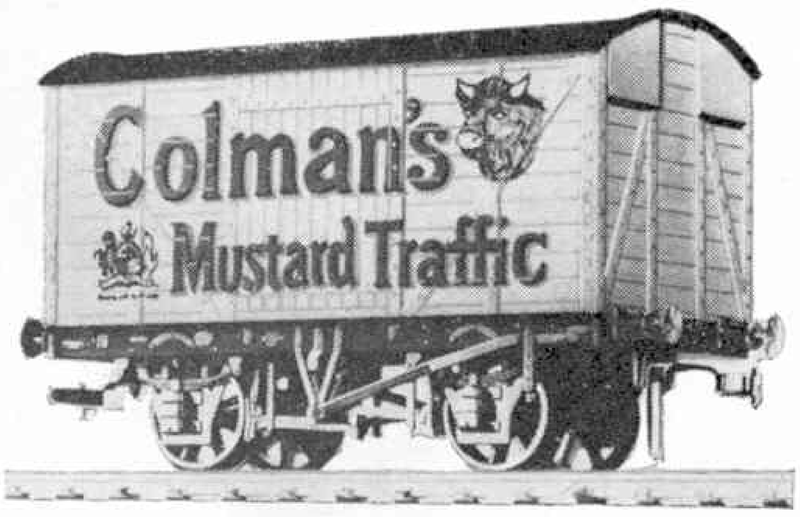

PECO WONDERFUL WAGONS —*LATEST ISSUE*

Second in a new series of box vans for 00, is this superb "Colmans" container kit. Accurately embossed sides are printed in full prototype colours, and the kit features all the details for which this range has become renowned—working buffer and axle-box springs, separate brake-levers etc. etc. This is a must for every 00 enthusiast, a wonderful wagon indeed.

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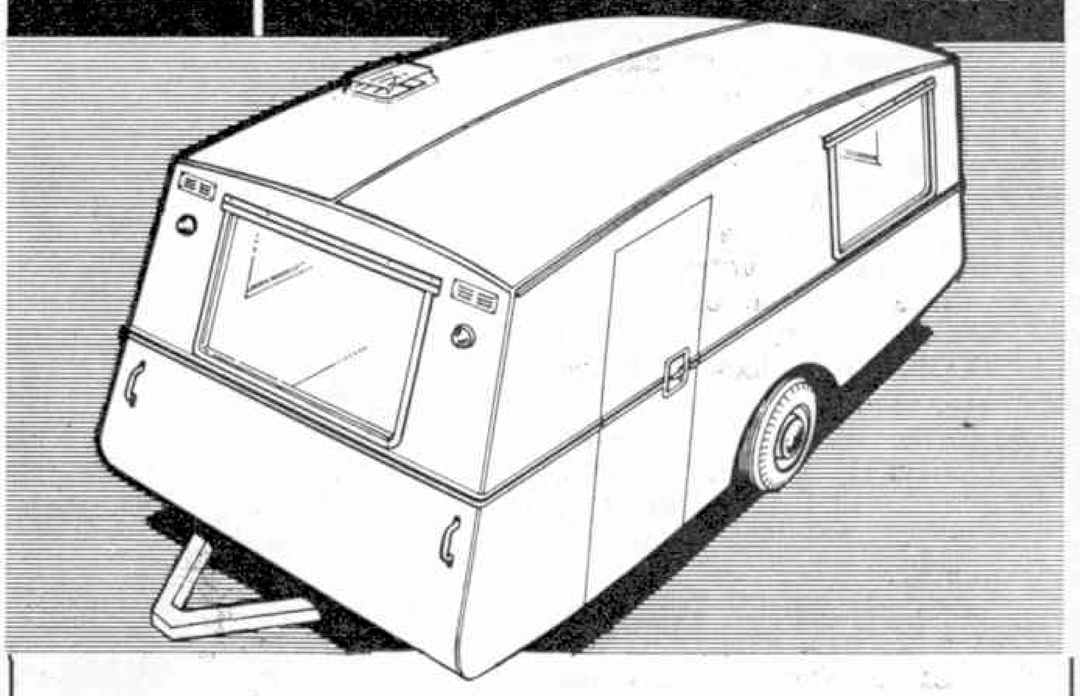

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Shovelling the

CRANES, lifting equipment, and associated machines are probably among the most popular types of Meccano models. They are, after all, ideally suited to Meccano, which has always been a winner where models of engineering equipment have been concerned. For some odd reason, however, mechanical diggers or shovelling machines have rarely been used to form the basis of a model, and I therefore sought to rectify the situation this month by including details of this rather unusual and somewhat complex model of a Mechanical Shovel. Like the real thing, this has creeper tracks, on which the model can actually travel, and also a jib that is pivoted vertically. The shovel unit is also pivoted to move up and down and its radius of swivel can be varied. The entire cab, jib and shovel swivel round, and the back of the shovel is hinged for unloading purposes. In other words, everything that works on the real thing, has also been made to work on the model.

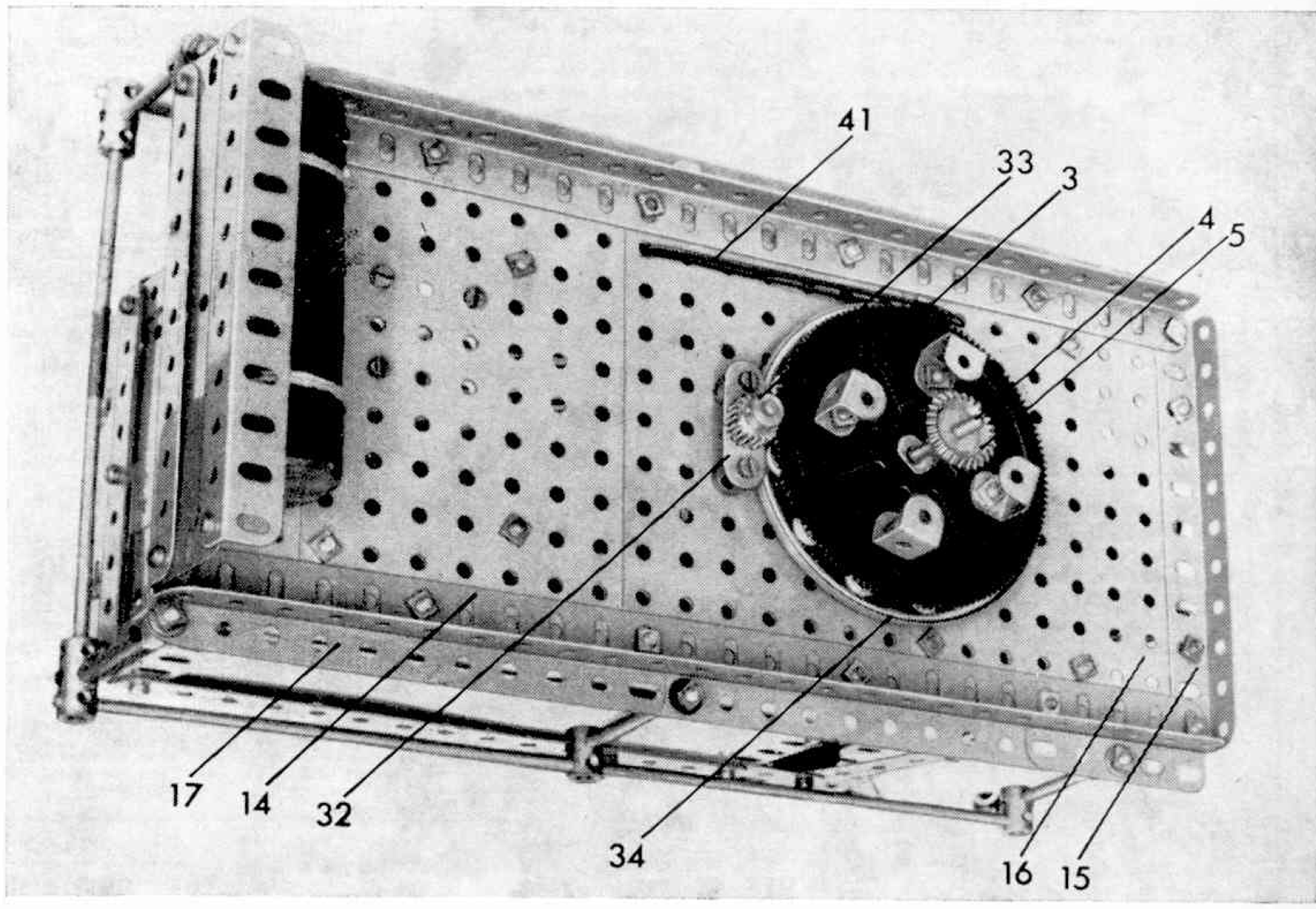
Chassis and Creeper Track

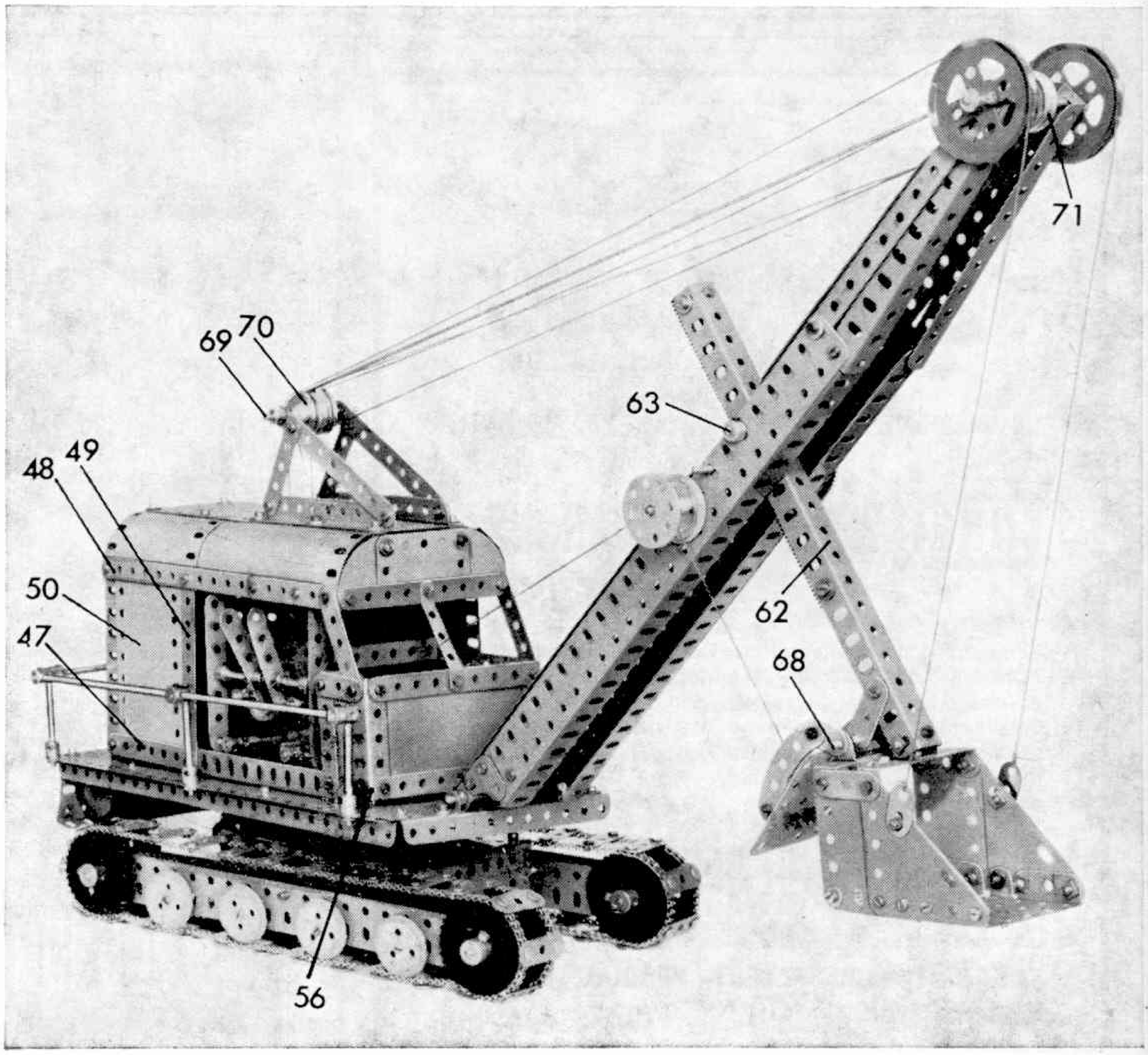
Beginning with the inverted box construction between the creeper track, two 5½ in. Strips 1 and a 5½ in. Angle Girder are bolted to two 1½ in. Angle Girders, the centre ¾ in. Bolt put in from the inside. Build another similar side and join them together by the 3½ in. Strips 2. A 5½ in. by 3½ in. Flat Plate is secured to the 5½ in. Angle Girders and a 3½ in. Gear Wheel 3, is attached to this Flat Plate by Double Brackets. Place a Rod through the Gear Wheel and Flat Plate, secure the Bevel Wheel 5 to engage with the Bevel Wheel 6, and make sure that the end of the Rod is free in Coupling 7 on 6½ in. Rod 8. A Collar keeps the Bevels in mesh.

Two 9½ in. Angle Girders 9 on the creeper track units are bolted together in the third hole from each end, to form a "U" girder, so that the elongated holes of one Girder are placed on the round holes of the other Girder. To each side of these attach a 9½ in. Flat Girder 10. Four 1 in. loose Pulley Wheels with Rubber Rings are mounted on ⅜ in. Bolts, secured to one of the Flat Girders by two Nuts locked against each other. This framework is then secured to the base by two Nuts on the ¾ in. Bolts 11. A ¾ in. Sprocket Wheel is fastened between the Flat Girders by two Nuts locked against ¾ in. Sprocket Wheel on Rod 12 which, in turn, carries two 2 in. Sprocket Wheels 13. The other end of the Flat Girders has only the 2 in. Sprocket Wheels fixed to the Rod. Measure two lengths of Chain to fit tightly round the Sprocket Wheels, then attach in every sixth link, 1½ in. Strips with Bifurcated Paper Clips. Make a similar unit for the other side and secure to the ¾ in. Bolts as before.

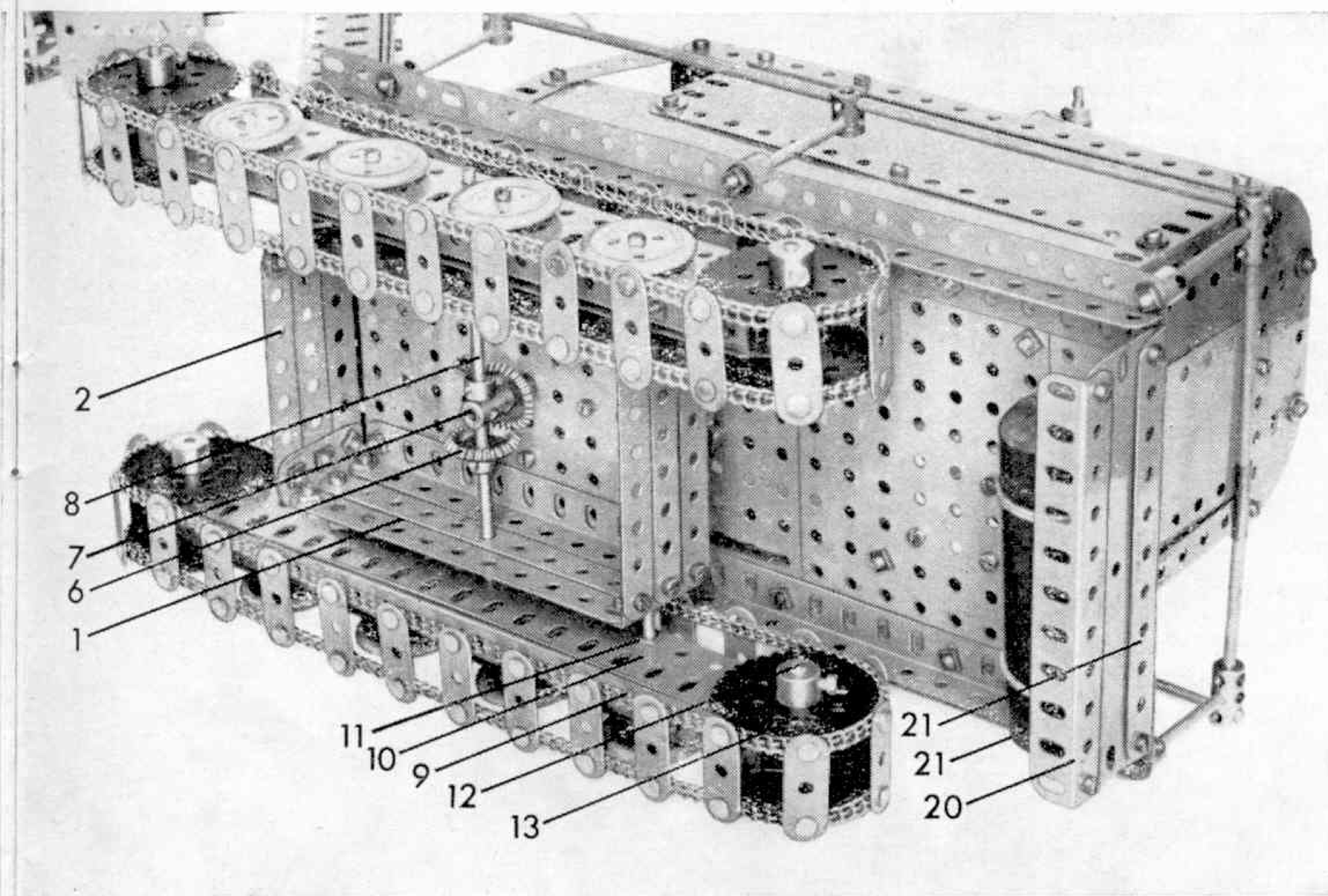
Base of Cab

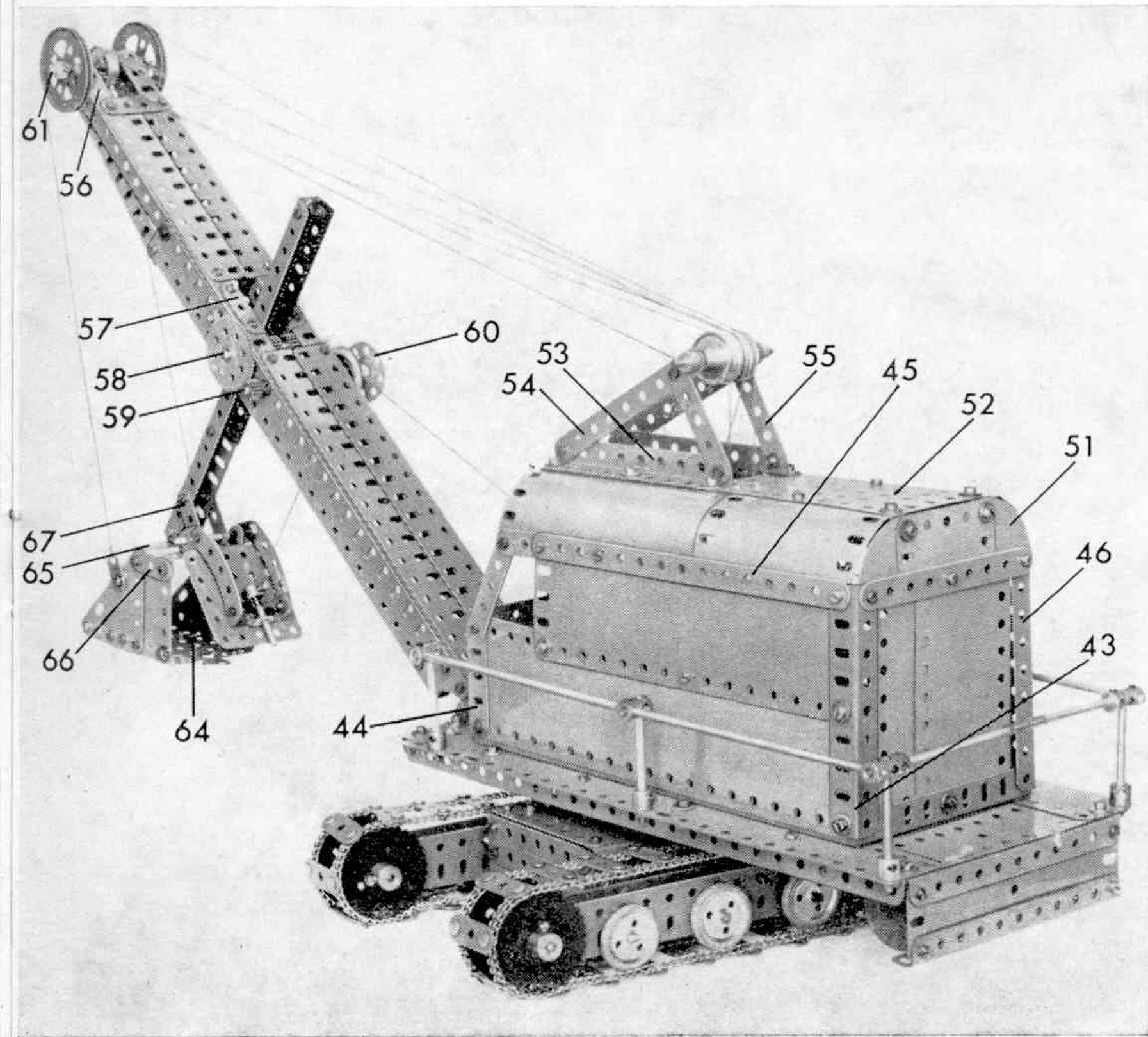
A rectangular framework of 12½ in. and 5½ in. Angle Girders 14 and 15, supports three 5½ in. by 3½ in. Flat Plates 16 and with the same Nuts and Bolts secures the 5½ in. by 1½ in. Flexible Plates 17. The 9½ in. and 4½ in. Angle Girders 18 and 19 are then bolted in posi-





Mechanical Way





tion on the upper side. An Angle Girder 20 is attached to a $5\frac{1}{2}$ in. by $1\frac{1}{2}$ in. Flexible Plate and is bolted to the rear of the base. To balance the weight of the jib a piece of lead or a length of steel shaft is tied to Angle Girder 21.

Gearbox

The gearbox is made by connecting two $5\frac{1}{2}$ in. by $2\frac{1}{2}$ in. Flat Plates together at each end by $2\frac{1}{2}$ in. by $\frac{1}{2}$ in. Double Angle Strips, and the gearbox is attached to the cab base by two 1 in. by $\frac{1}{2}$ in. and two 1 in. by 1 in. Angle Brackets.

The drive is taken from the motor to a $\frac{3}{4}$ in. Sprocket Wheel 22 on a Rod 23, mounted in the sixth central hole of the Flat Plates. Rod 23 is also fitted with a $\frac{3}{4}$ in. Pinion 24 and a $\frac{1}{2}$ in. Pinion 25, which is in constant mesh with a 57 teeth Gear Wheel 26 on a Rod 27, which also carries a $\frac{3}{4}$ in. diameter $\frac{3}{4}$ in. face Pinion 28. The latter engages a 50 teeth Gear on a slidable Rod 29. A $\frac{1}{2}$ in. Pinion 30 is also fixed on the Rod 29 and is located centrally over a $\frac{3}{4}$ in. Contrate Gear 31 fixed on a Rod mounted in the cab base and in a $1\frac{1}{2}$ in. Strip 32 that is attached to the base by $\frac{1}{2}$ in. Bolts, so that it is located beneath the Ball Thrust Race and Flanged Disc 34. Spaced from the base by Washers, the Contrate Wheel engages accurately with the Pinion 30, with the $\frac{1}{2}$ in. Pinion 33 also in constant mesh with the $3\frac{1}{2}$ in. Gear Wheel 3. Pinion 30 can be engaged with either side of the Contrate to provide reversible drive for the slewing motion.

A similar arrangement on Rod 35 operates the Bevel 5 to drive the creeper tracks. Two more Sliding Rods 36 and 37, fitted with 50 teeth Gear Wheels that can engage with the Pinion 24, are placed in the positions shown in the photograph.

Each of the two Sliding Rods are controlled by levers formed from 3 in. Strips, each of which is pivoted between Collars fixed on a Rod which is mounted in a Trunnion and a 1 in. by $\frac{1}{2}$ in. Angle Bracket bolted to the $5\frac{1}{2}$ in. by $2\frac{1}{2}$ in. Flat Plate. Compression Springs are also placed between the two end Strips and the Collars and also between the 50 teeth Gear Wheels and the Flat Plate. The two end levers 38 and 39 are held vertically by a 6 in. Driving Band 41 attached to the $\frac{3}{4}$ in. Bolts 40. Rods 36 and 37 are fitted with 1 in. Pulleys and Rubber Rings, held against the Flat Plate by the Compression Springs to act as a brake. Each of the two centre levers has a Threaded Pin in the end hole that fits between the boss of the 1 in. Pulleys and the Collar.

Before building the remainder of the cab it is advisable to wind a single length of Cord between the Bush Wheels on Rod 36 and two Cords 42 between the Bush Wheels on Rod 37 which will be fixed to the jib and shovel later. The Motor can now be bolted in position, and the $\frac{3}{4}$ in. Sprocket Wheel on the driving shaft connected by Chain to the $\frac{3}{4}$ in. Sprocket Wheel 22.

The Cab

To the Angle Girder 19 bolt $4\frac{1}{2}$ in. and $2\frac{1}{2}$ in. Angle Girders 43 and 44 and the Strip Plates. Flexible

Plates and a Compound Strip 45 are fastened to the Strip Plate, whilst a 2½ in. Strip connects the Strip 45 to the Angle Girder 44.

Another 4½ in. Angle Girder 46 and a 3½ in. Strip 47 spaced from the Angle Girder 19 by a Washer, is bolted in position. A similar arrangement between the compound strip and the Strip 48 allows the 4½ in. by 2½ in. Flexible Plate 50 to slide up and down in the space provided. The 4½ in. Strip 49 is bolted between the Strips 47 and 48 and two Semi-Circular Plates 51 are joined togther by a 2½ in. by 1½ in. Flexible Plate and fixed to the 5½ in. Angle Girders with a 4½ in. Strip. A similar unit is attached to the front of the cab by Angle Brackets. The roof of the cab is made from one 4½ in. by 2½ in. and a 2½ in. by 2½ in. Flat Plate fastened by Angle Brackets to each end. The 2½ in. by 2½ in. Flat Plate supports the 4½ in. Angle Girders 53, which, in turn, have 4½ in. and 2½ in. Strips 54 and and 55 bolted to them.

A 2½ in. Angle Girder can now be bolted to the Angle Girder 19, with a 4½ in. by 2½ in. Flexible Plate and a 2½ in. by 1½ in. Flexible Plate bolted to the latter. 2½ in. and 1½ in. Strips are bolted to the small Flexible Plate, with a Narrow Strip bolted in the centre of the 4½ in. by 2½ in. Flexible Plate. The railings consist of Rods and Couplings and can now be attached around the base.

The Jib

Construction of this can begin by joining together two 18½ in. Angle Girders 56 by two 2 in. Strips, two 5½ in. and two 7½ in. Flat Girders. Between these Flat Girders bolt two 1½ in. Angle Girders 57, and a 12½ in. Flat Girder. 12½ in. and 5½ in. Angle Girders are bolted to each side of the jib with Corner Brackets bracing the lower ends. The 3 in. Rod 58 half-way down the jib carries a 57-teeth Gear Wheel and two ½ in. Pinions. On the 3½ in. Rod 59 below this is a ½ in. Pinion which drives the Gear Wheel while a 1 in. Pulley and Rubber Ring forms a brake. This Rod is turned by the Bush Wheel 60 on the outside of the jib. On the 3 in. Rod 61 at the top of the jib place two 1 in. loose Pulleys and screw a 2 in. Pulley at each end. The jib pivots vertically on a 2½ in. Rod fixed to the cab base by Angle Brackets and Collars. A U angle girder 62 is built up from two 7½ in. Angle Girders with, on the inside of each girder, a 6½ in. Rack Strip bolted in to engage with the ½ in. Pinions on the Rod 58. A Rod with Collars 63 holds the Rack Strips in mesh with the Pinions.

The Shovel

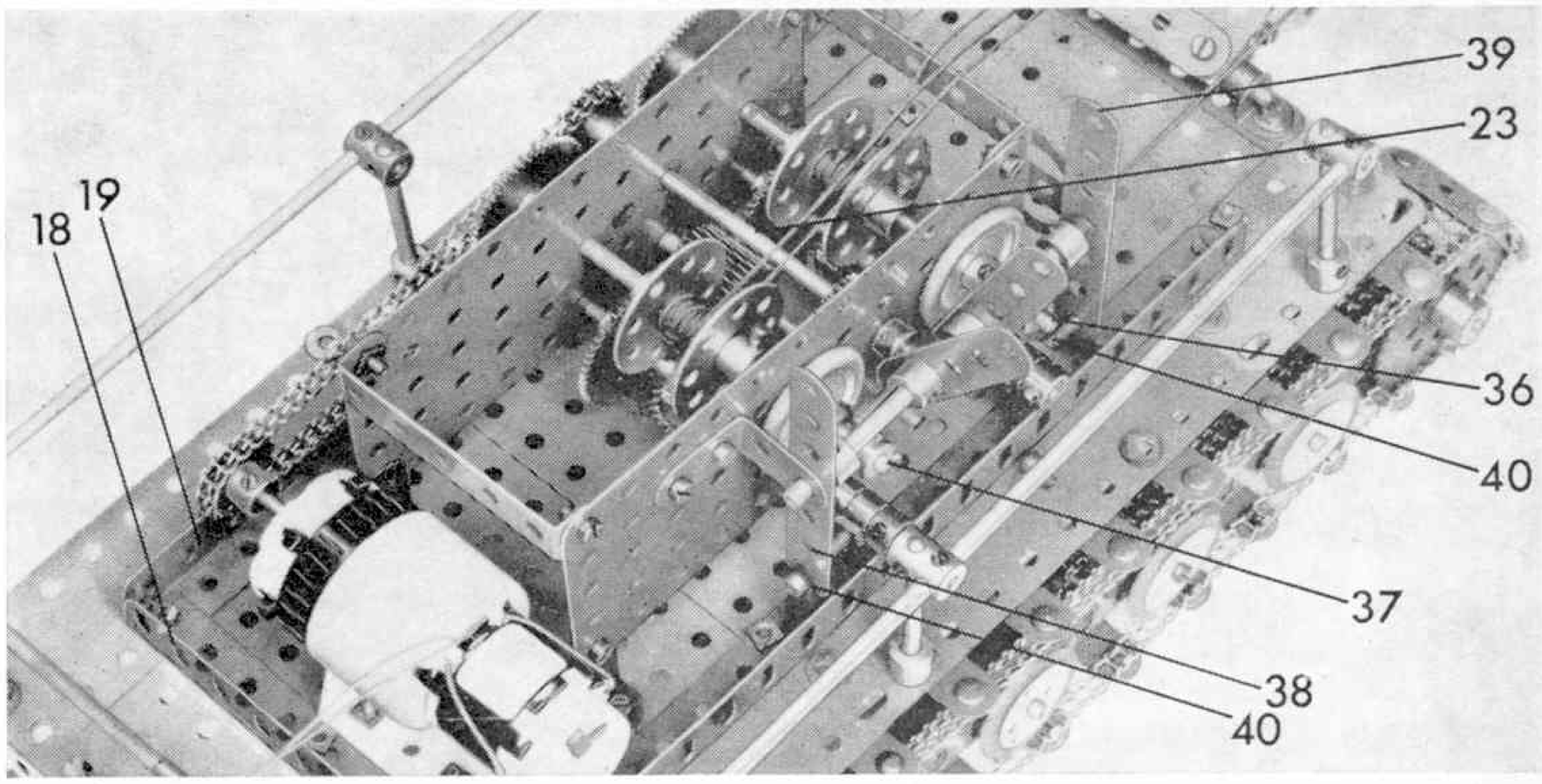
The bottom of the shovel is built from two 2½ in. by 1½ in. Flanged Plates 64 and a 2½ in. by ½ in. Double Angle Strip. Each side is built by bolting a 2½ in. by 2½ in. Triangular Flexible Plate and a 2½ in. by 1½ in. Flexible Plate to the Flanged Plates 64. Two 2½ in. by ½ in. Double Angle Strips 65 and 66 are secured to the top of the Flexible Plates, supported by a 1½ in. Strip and two Fish Plates are lock-nutted to the Triangular Flexible Plates. A Double Bracket is bolted in the centre of the Double Angle Strip 65. The U girder is attached to the latter by a ½ in. Bolt and Nut. Two 1½ in. Strips 67 bolted to the U girder are fastened by Rod 68 journalled in a 1½ in. by ½ in. Double Angle Strip secured to the Double Angle Strip 66. The back of the shovel is formed from a 2½ in. by 2½ in. Flat Plate with a Double Bracket and a 1½ in. by ½ in. Double Angle Strip bolted in position. To the lugs of the Double Angle Strip secure a 2½ in. Curved Strip extended by a Fish Plate, which, in turn, is pivoted on the Rod 68. The back of the shovel is locked by a 1 in. Rod and two Collars which fit into a Fish Plate bolted to the Flanged Plate 64. A length of Cord is attached to the 1 in. Rod and fastened to the Trunnion on the gearbox. Two 1 in. Pulleys and three 1 in. loose Pulleys are placed on the Rod 69, which is held in position by Collars.

The Cord from the Rod 36 is now led over one of the loose Pulleys 70, around one of the Pulleys 71 and 70, then around the other at 71 and 70 and finally tied to the top 2 in. Strip on the jib. The other two Cords from Rod 37 go around the fast 1 in. Pulleys on Rod 69, over the 2 in. Pulleys on Rod 61 and are then tied to the Fish Plates on the shovel. To stop the cab from slewing when driving the creeper tracks a Rod should be placed through a hole in the cab base and another in the chassis.

Spanner

Parts required:

2 of No. 1b	2 of No. 20a	2 of No. 90
4 of No. 2	5 of No. 22	5 of No. 94
7 of No. 2a	13 of No. 22a	8 of No. 95
11 of No. 3	5 of No. 24	6 of No. 96a
7 of No. 5	1 of No. 25	2 of No. 103
2 of No. 6	1 of No. 25b	6 of No. 103a
55 of No. 6a	5 of No. 26	2 of No. 103b
2 of No. 7a	1 of No. 26c	2 of No. 103k
4 of No. 8	4 of No. 27	2 of No. 110a
8 of No. 8a	1 of No. 27a	5 of No. 111
2 of No. 8b	1 of No. 27b	2 of No 111a
7 of No. 9	1 of No. 27d	10 of No. 111c
5 of No. 9a	2 of No. 29	4 of No. 120b
2 of No. 9c	2 of No. 30	1 of No. 126
2 of No. 9d	5 of No. 35	2 of No. 133a
6 of No. 9f	243 of No. 37a	11 of No. 155j
5 of No. 10	201 of No. 37b	1 of No. 168a
6 of No. 11	72 of No. 38	1 of No. 168c
8 of No. 12	2 of No. 48	6 of No. 179
3 of No. 12a	5 of No. 48a	7 of No. 188
2 of No. 12b	2 of No. 51	4 of No. 191
2 of No. 13	4 of No. 52a	2 of No. 192
1 of No. 14	1 of No. 53a	1 of No. 195
2 of No. 15a	19 of No. 59	1 of No. 196
6 of No. 16	2 of No. 63	1 of No. 213
4 of No. 16a	5 of No. 63d	4 of No. 214
2 of No. 16b	2 of No. 70	2 of No. 223
11 of No. 17	2 of No. 72	1 of No. 235
1 of No. 18a	8 of No. 77	1 Power Drive Motor



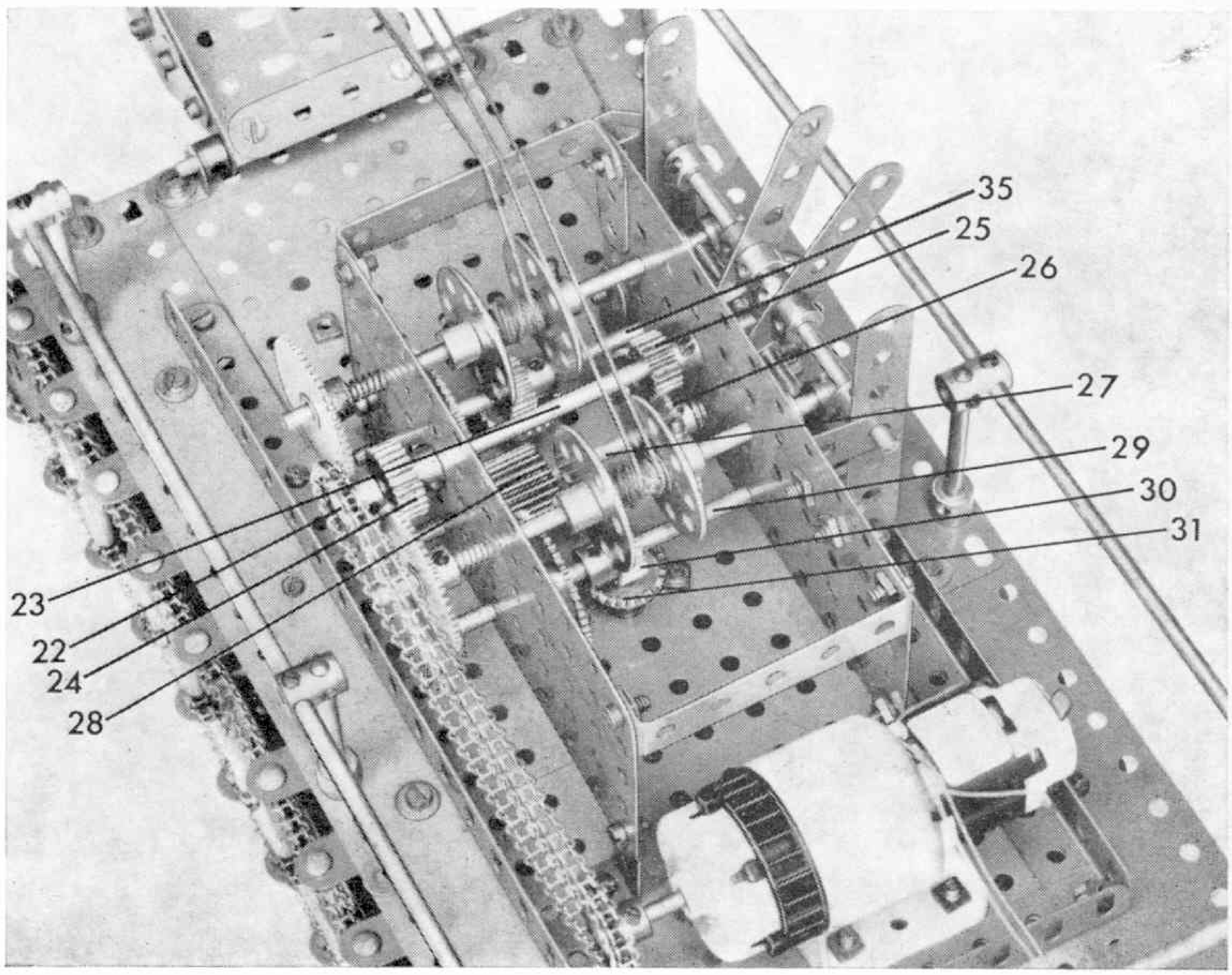


Table Top Battles

By H.L.D.

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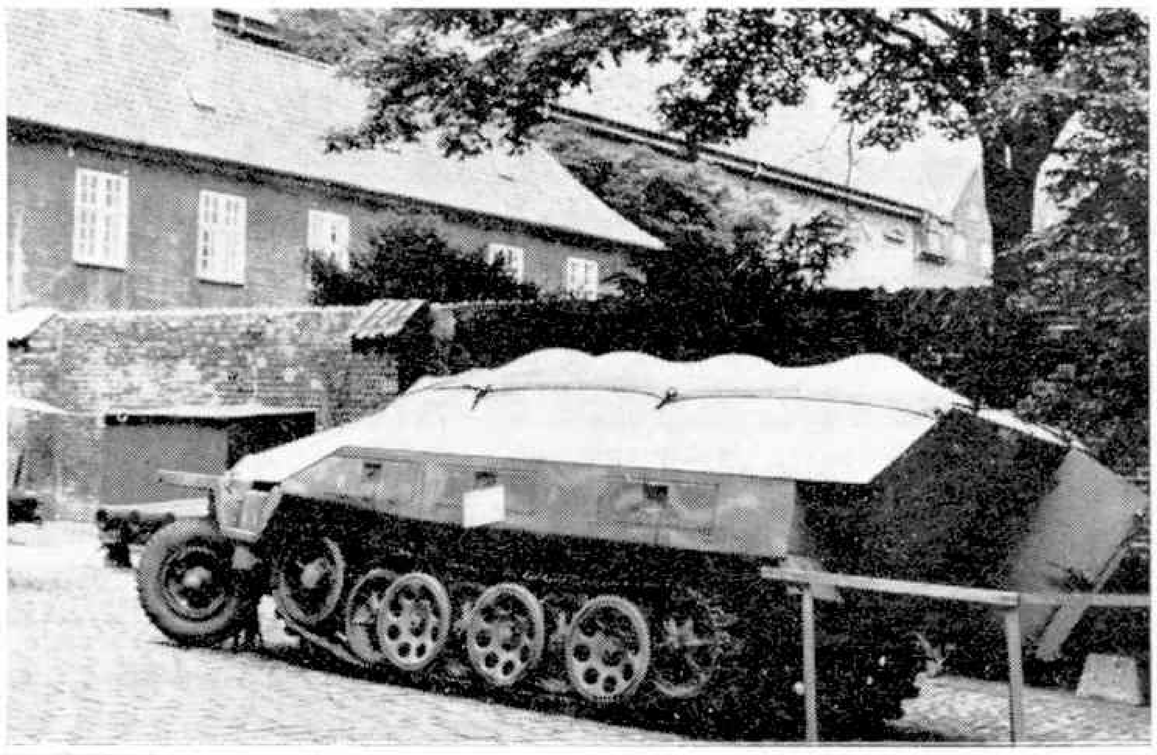

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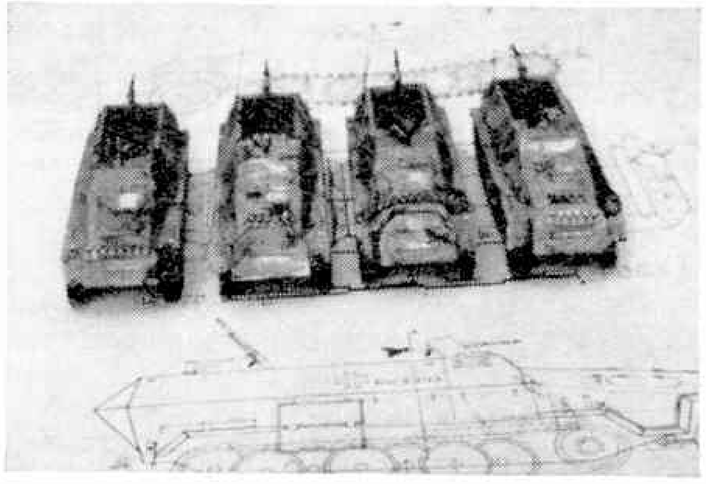

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JUST before the invasion of Poland in 1939 the first of the 3 ton semitracks (Mittlerer Schutzen Panzerwagen, abbreviated m. SPW) medium armoured troop carrier, SD Kfz 25/1 entered service with the German Army. During the course of the War they were produced in ever increasing numbers. They were used, in addition to their design purpose, for virtually every light service required by troops in front line areas where there was danger from high explosive blast or small arms fire. By the end of the war there were twenty-two officially listed versions ranging from ambulances to Flakpanzerwagens (anti aircraft).

Any attempt to reproduce a realistic German Army in model form will be incomplete without a considerable number of these SPW's equipping the Panzer Grenadier battalions of both Panzer and Grenadier Divisions. No manufacturer has as yet marketed a kit of this vehicle. The serious modeller, only requiring a model for display can, however, tackle this, using the Bellona Print. Unfortunately it is rather impractical to build sufficient of these vehicles from scratch for use in Battlegames.

Roco Minitanks produce a range of models of the German S. W. S., a heavy 5 ton Military Tractor which appeared just before the end of the war. These are quite accurate, but unfortunately to 1:89 scale and are a bit small for use in their original form by an 00 scale enthusiast. Comparison of this model to a 1:76 scale SD Kfz 25/1 shows that it has the same general dimensions. The superficial appearance of one of the armoured versions is not that much different except for the rear plate, from the SD Kfz 25/1's built after 1943.

The Infra-red Searchlight vehicle (No. 129) costs only 1/6d. Thus if converted so as to be utilized by 00 scale Battlegamers as suggested in this article, the cost per unit is not high. If, at some later date, an accurate kit of the m. SPW is released one will not have wasted too much money or time.

Taking any of Roco Nos. 129, 130, or 131, disassemble and discard the swivelling equipment. Carefully cut away the central roof plates to give an open topped compartment. No driver's hatch is fitted, so file this down flush with the roof. The bulkhead can now be fitted to separate the engine compartment; strips of card 4 mm by 50 mm are cemented along the sides of the superstructure to cover the gap left, when this is fitted to the chassis. These can be made wider (6 mm) so as to extend further into the vehicle forming seats should these be desired.

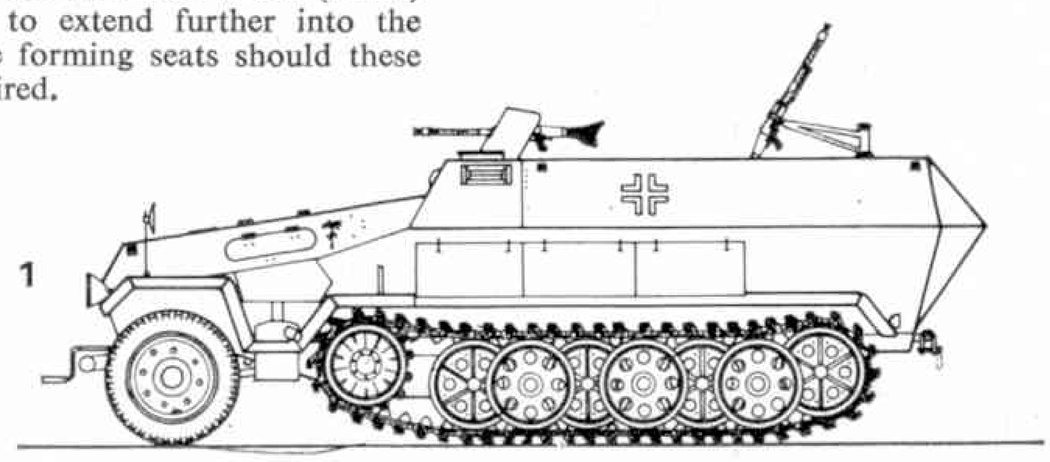
A floor of card can be fitted in the chassis. A driver's seat, from an Airfix Kit, is fitted on the left, but the backrest is cut away. The major components are best painted before reassembly. The basic overall colour of the German AFV's from 1943 was Sand. The tracks are best painted black and later touched up with random dashes of silver.

When the model is in one piece, a shield for the forward machine-gun must be fitted over the driver's cab, 4 mm high and 10 mm wide; it is folded in the middle to form a V. The German machine guns MG 34 and 42 at this small scale are almost indistinguishable from large rifles, so pins etc. can be made to fill this role. Alternatively one could use the guns supplied in the Roco (No. 125) packet of Decals and accessories. A radio aerial of bristle can be fitted to the rear right hand side.

Camouflage of green and/or brown can now be mottled over the basic paint job, if desired. Detailed painting and fitting of markings as on the finished models is now completed. Wehrmacht number plates help, especially the front plate—the only source of these is from the Airfix Armoured Car Kit. General dressing can now be added to give the vehicles a used look. (Petrol cans, tow ropes and spare track—got by cutting a piece of Airfix Sherman track in half.) Finally, to give a weathered look, roughly dab matt earth around lower body and track-work; a dash of silver on odd corners of the superstructure heightens this effect.

For Battlegames, these vehicles are proof only against small arms and machine gun fire, and the blast and shrapnel caused by high explosive artillery fire. The road speed was approximately 30 m.p.h. The crew was five, and ten troops were carried in each vehicle.

1



1 This model of the m.SPW SD Kfz 25/1 was built between 1939 and '41. Drawing is to 1:76 (00 scale) and is reproduced by courtesy of Merberlen Ltd

2 (Heading photo). A Panzer Grenadier column of m. SPW's pass through a Russian city—note stowage of spare track and tow rope.

3 A 1944/45 model of the m. SPW SD Kfz 25/1. with canvas tilt fitted. This vehicle is on display in Copenhagen, Denmark.

4 The additional parts required, from left to right; 4 × 50 mm strips of card cemented to the underside of the superstructure, the engine bulkhead, and finally the chassis with floor and driver's seat fitted.

5 Four completed and painted semitracks built from the Roco models.

6 Completed and painted semitracks built from the Roco models seen here travelling through rough ground.

T For Two

When Henry Ford announced his Model T in the Autumn of 1908, the most incredible motor vehicle the world has ever known was born. In fact, it is hardly an exaggeration to say that the Model T rendered the horse obsolete almost overnight. Built by very advanced mass-production methods, and sold in vast numbers at rock-bottom prices, the austere, gawky looking Fords were soon a universal sight on the roads of America and the world. Apart from its low price and reliability, the real secret of the Model T was its fantastic adaptability.

A TWO-TON truck was merely the standard car chassis, lengthened slightly, and with a few extra leaves in the rear spring! There were 'Model T' fire-engines, ambulances, tipper trucks, school buses, farm wagons, airport vehicles (anybody remember the 'Hucks Starters?') not to mention a host of car body styles. Despite, or perhaps because of, its amazing versatility, the 'Model T' became the affectionate subject of Music Hall comedians and the 'star' of popular songs and early silent films. Even the term 'car' seemed inadequate to describe it, and the 'T's were known by the American public as 'Flivvers' or 'Jitney Buses'!

Throughout its production life of nearly nineteen years, the 'Model T' changed very little, only details like the radiator shell and wings being modernised from time to time. By the mid 'twenties, however, the winds of change were blowing hard in the automobile world, and even Henry Ford was feeling the draught. When the 'Model T' finally ceased production in 1927, outdated, over-bodied, and still with wooden-spoked wheels and no front brakes, over *fifteen million* had been made!

The Dinky Toys 'Model T' represents a pre-1917 car, with a rather dashing two-seat 'Runabout' body, complete with passengers. Finished in dark blue, it is a very pretty little model, and being a 'T', it is a sitting target for the conversion addict. In fact, you could safely give it almost any kind of body—with so many prototypes to choose from, you could hardly be wrong! We decided to transform our 'T' into a typical light delivery van of the pre-first war period. This conversion job proved very easy to do, and, as the photographs show, has completely altered the 'atmosphere' of the standard model. What's more, the job entails no 'surgery' of the original body at all, and the van structure can be made easily removable in order to convert 'commercial' back to 'private' again.

The photographs and sketches will give you a good idea of how we set about building the van body. The sides and back of the body are cut from card in one piece, the rear corners being scored and folded. The two oval door windows in the back panel are best cut out with a sharp knife before folding. At this stage, make sure that the wheel arches in the body sides fit snugly over the car's rear mudguards. Next, cut a 'false' roof from 3/32in. balsa sheet, 1¼ in. wide and 2½ in. long. Make it taper slightly so that it is only about 1⅛ in. wide at the front edge. Fit the false roof to the body, so that the top edges of the panels are flush with the top surface of the balsa (see photo 2).

The roof proper is shaped with sandpaper from 3/16 in. balsa sheet, and the sketches

By John Brewer

will give an indication of the shape required. In plan, the roof is the same shape exactly as the false roof, but 1/16 in. shorter to allow a rebate at the front edge to take the headboard. As can be seen in the full-size sketch, the roof in elevation tapers or drops towards the front, to almost a feather edge, and the corners of the sides of the roof should be gently rounded off with sandpaper to form a tight-radius curve. (Coachbuilders call this edge the 'cove panel'.) When the roof is shaped to your satisfaction, stick it to the false roof, remembering the 1/16 in. rebate at the front edge. The next job is to fill the grain of the roof with sanding sealer, giving several coats and sanding between each. Try to get a really super finish on the roof —small models are usually viewed from above!

The mouldings on the body side panels, which on the full-size van covered the joins in the various sheets, are cut from paper in one piece (see photo 4). The mouldings are 1/16 in. wide, and all your reserves of patience will be required here! Use good quality paper and a *sharp* knife. When sticking the mouldings to the body sides, be very careful not to get cement in the wrong places.

The headboard and rear-board are now cut from card and cemented in place, and a short bulkhead fixed inside the body to strengthen it. The almost completed van body should slide easily onto the car 'chassis' and the transformation is almost complete. The car's windscreen will need extending upwards to meet the roof, and this is easily done using celluloid sheet with a card frame. We painted our van body with blue enamel to match the bonnet and doors of the car. Mouldings were picked out in black, and edged with a fine yellow line, applied with a Rowney No. 1 brush. Unfortunately, the lining has entirely disappeared in the pictures! The roof is finished in white, and the name boards along the sides in bright red. 'Period' posters, from which names can be cut, are available, but our local model shop was shut, so we made up a name by cutting up a matchbox! Whatever you do, don't use modern lettering, as it would look quite wrong.

Model T Ford Technical Specification.

Maker's horse power:	20.
Number of cylinders:	4.
Bore and stroke:	3¼ in. × 4 in.
Engine Capacity:	2.9 litres.
Valves:	side.
Wheelbase:	8 ft. 4 in.
Forward Speeds:	two.
Tyres:	760 × 90.

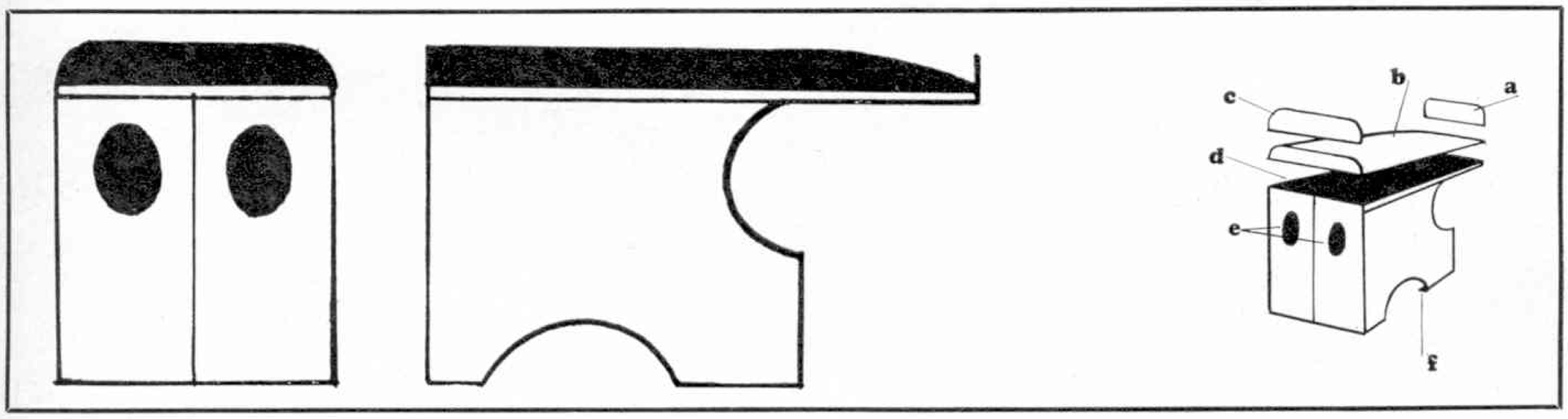
1 The completed van body standing beside the car. Note the extension of the car's windscreen, and the short strengthening bulkhead between the sides of the body itself.

2 Fitting the false roof of 3/32 in. balsa between the card sides of the body.

3 Applying a coat of sanding sealer to the shaped balsa roof. Note the small rebate at the front edge of the roof to take the headboard.

4 This view shows the mouldings for the body side panels being cut from paper. A really sharp knife is *essential* for this operation and you should always cut such thin strips over a hard, smooth surface. A soft one (such as balsa) will certainly result in spoilt strips.

Below: side and rear elevations of the van body are drawn full size. The exploded sketch shows the general construction. a—headboard. b—balsa roof. c—rear-board. d—false roof. e—oval rear windows. f—tab bent under.



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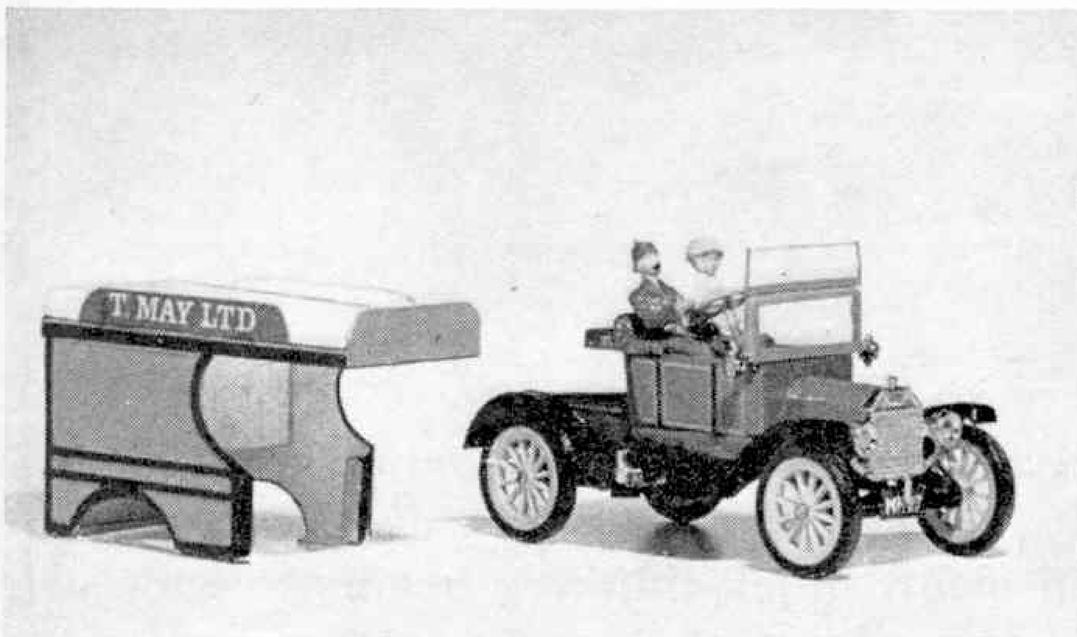

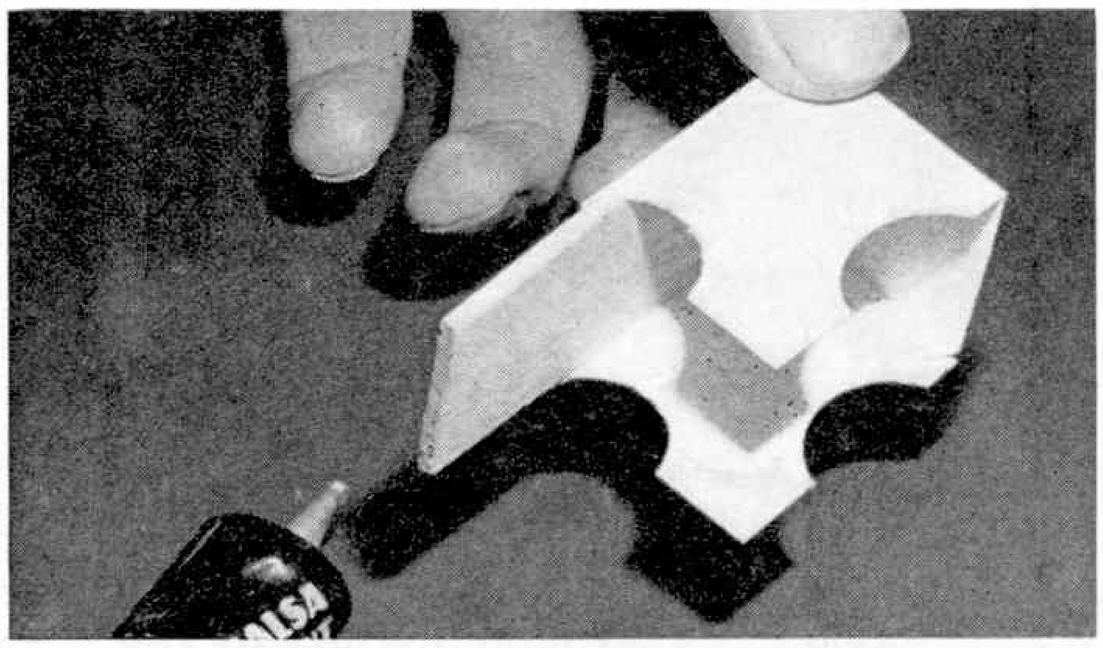

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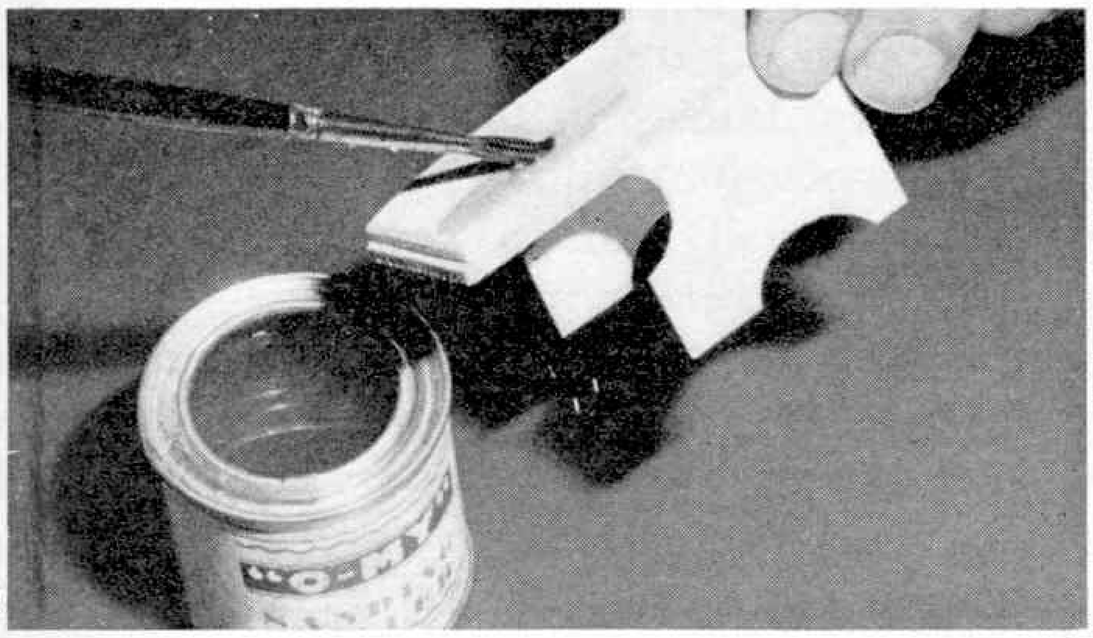

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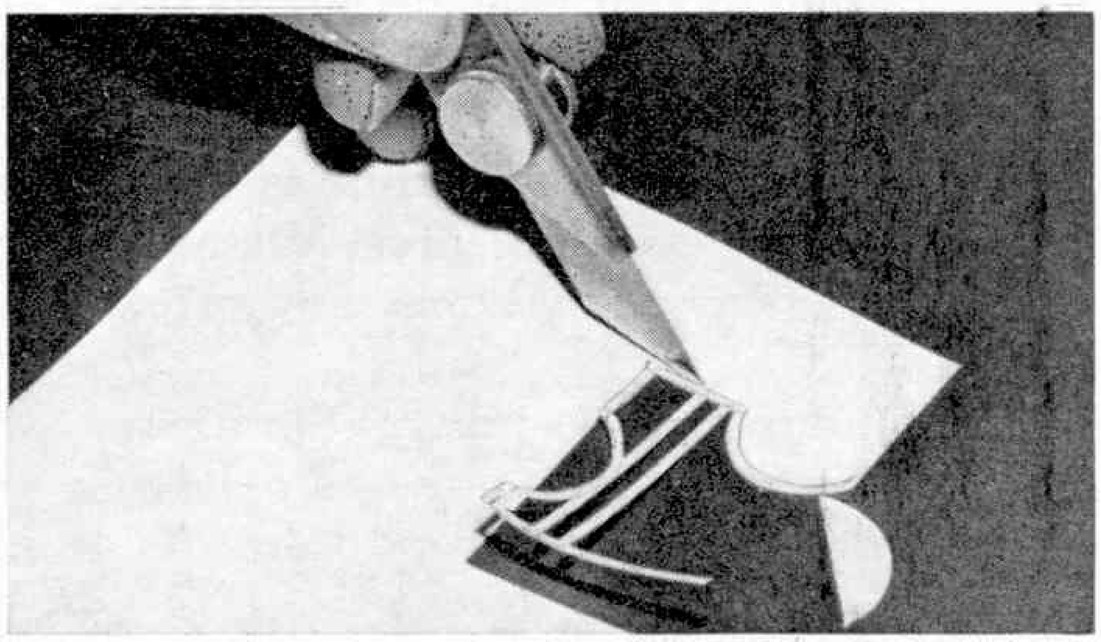
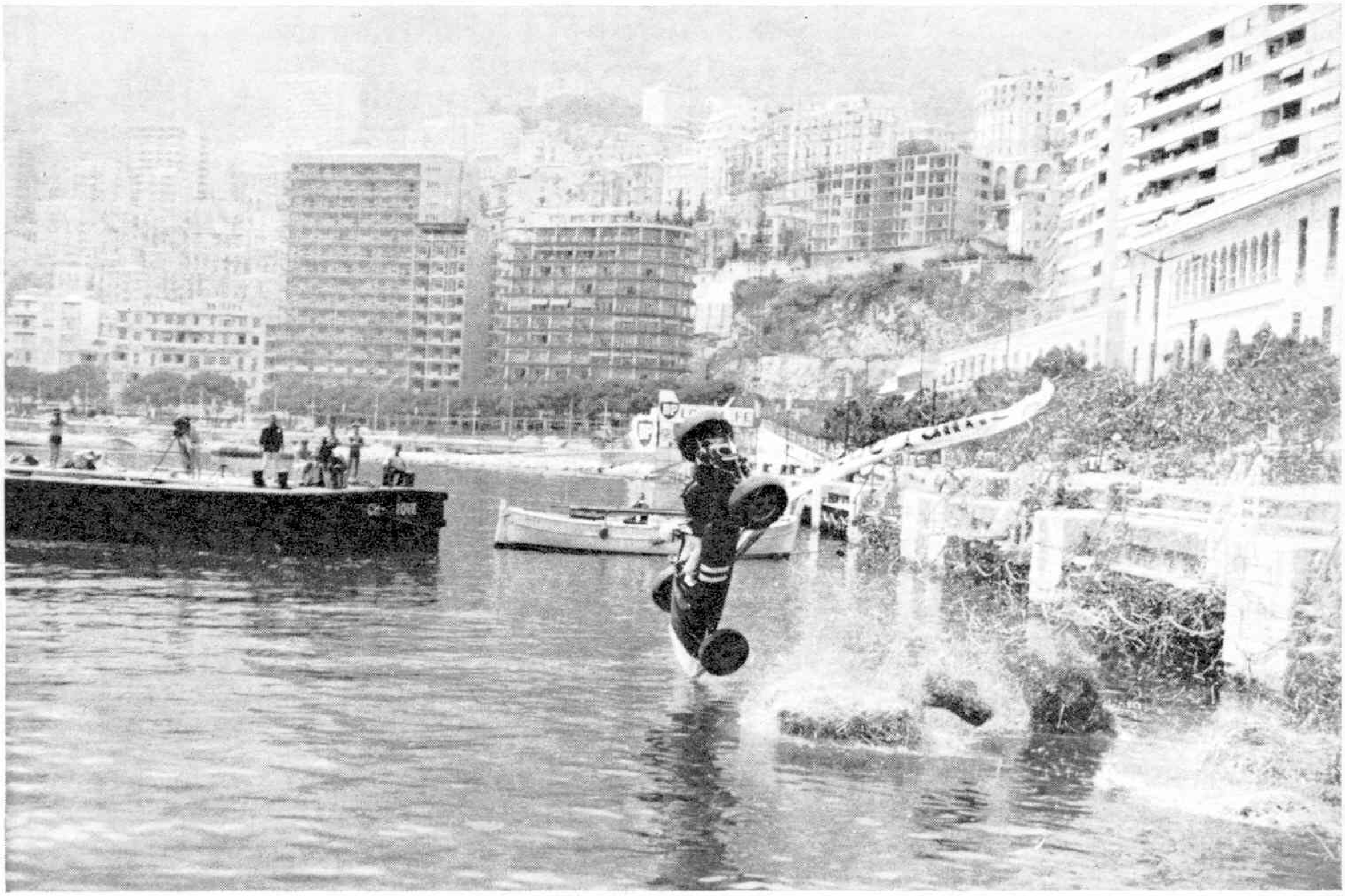


4

BLOWOUT



The Grand Prix racing driver, like the sky-diver and the mountain climber, risks his life as part of the game. Confined in his tiny cockpit, he makes dozens of gear changes during the course of one lap, and every corner or hazard he approaches may mean a split-second life-or-death decision—there's not much time to think at speeds of 150 miles per hour plus! Mistakes at the wheel are always dangerous, and often spell death.

There are so many dangers inherent in high-speed motor racing that both cars and drivers must always be in tip-top condition. GP drivers rarely smoke or drink, as they must have athletic constitutions, excellent eyesight, and clear, quick-thinking brains to cope with the hazards of their hair-raising profession. However skilled a driver may be, the danger of a mechanical failure in the car is always present. A suspension failure or tyre blowout at speed can easily mean 'curtains' for the unfortunate driver—and it all happens in split-seconds. All this sounds extremely dangerous which, of course, it is, but if motor racing were completely safe, it would lose its glamour, and nobody would be interested.

BY PITMAN

WE slot-car racers, of course, can comfort ourselves with the knowledge that, however diabolical our driving, we are unlikely to end up dead! High-speed prangs do have their excitement, though, even in $\frac{1}{32}$nd. scale, and the sight of a brand-new car hurtling off the track onto the floor is usually enough to make its owner's heart miss a couple of beats or so! Quite apart from accidents, do you sometimes wish that you could run your opponent off the road during a hotly contested race? This question requires a really honest answer, as 'cutting up' is a most ungentlemanly practise, and not really practical on most slot circuits unless plenty of chicanes are available! However, if you do harbour vicious desires to see your opponents off the track, you *can* do it in a fair and sportsmanlike manner—with a Scalextric Blow-Out track section.

The Blow-Out section itself is basically a standard Scalextric two-lane track section, but with a slight rise in the middle, like a rather shallow hump-backed bridge. Strong cardboard support walls are included with the section to give the 'hump' adequate support. A white arrow between the slots indicates the direction of travel of the cars (the Blow-Out will only operate in one direction) and just before the 'crown' of the hump, also between the two slots, are two red flaps lying flush with the track surface. The offside wheels of the car on the nearside lane run over one of the flaps, and the nearside wheels of the car on the offside lane run over the other flap. Each flap is hinged at its rear edge, and can be fired upward or 'open' by means of a very neat hand controller on the end of a long, plastic sheathed, Bowden cable—one controller for each flap. No electrical connections are needed, the action being purely mechanical. If a flap is 'fired' directly under the front wheels of a speeding car, you can imagine the result—crash! The car leaves the track at an angle, and usually comes to rest upside down.

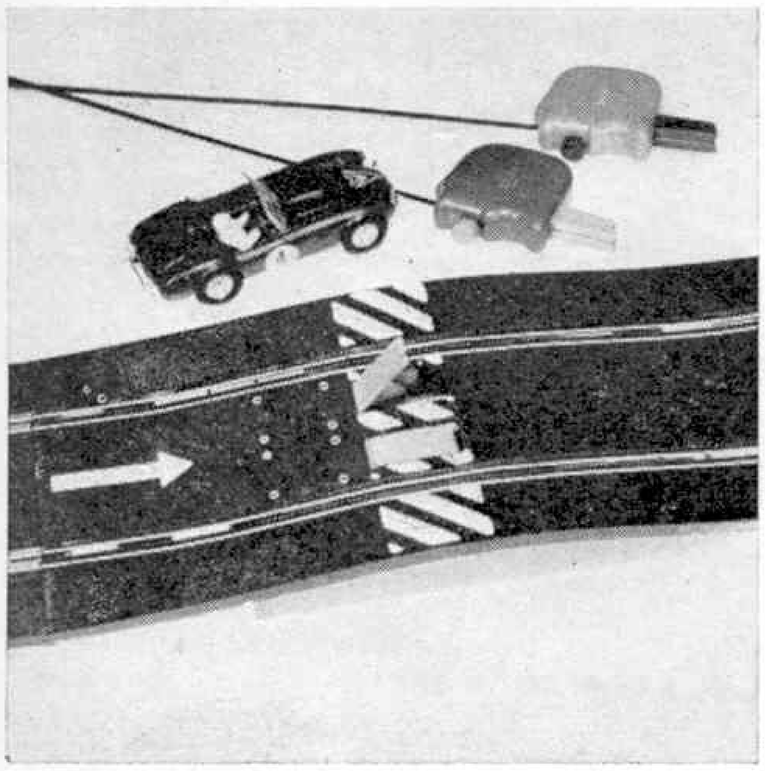
Stop sniggering with glee, at the back there! It's not *that* easy to put your opponent out of the running with the Blow-Out. The spring mechanism which fires the flap must be 'set' or 'cocked' by pressing the thumb button on the controller. With the mechanism set, pressure on the small finger button will 'fire' the flap, which jumps up and then returns immediately to its 'shut' position flush with the track surface. As all this happens in less than a second, very accurate timing indeed is needed to fire the flap directly under your opponent's front wheels. If your reactions are slow, the flap will probably lift after he has passed the Blow-Out section altogether, or if you are 'trigger happy' and fire the flap just in front of the car, the flap itself will be lying harmlessly flat by the time the car's wheels actually pass over it! Remember that, while you are concentrating on all this, your opponent will be going all-out to catch *you* on the 'Blow-Out' section. If you alter the speed of your vehicle several times as you approach the 'Blow-Out' section (best placed on the end of a long, fast straight) you may succeed in upsetting your opponent's sense of timing—but beware the moment of inattention!

Films about motor racing are few and far between—the film makers always seem to favour aircraft enthusiasts—but MGM's 'Grand Prix' will send all you racing types scurrying to the box-offices. Certainly the most incredible motor racing film ever made, it was filmed at Monaco, Spa, Nurburgring, Clermont-Ferrand, Brands Hatch, Zandvoort, Rheims, Monza, Watkins Glen and Mexico City. Several spectacular crashes feature in the action, and I've included three photographs taken during the filming. The car diving into the water is, I think, particularly exciting. Who's for a $\frac{1}{32}$nd replica of Monaco harbour?

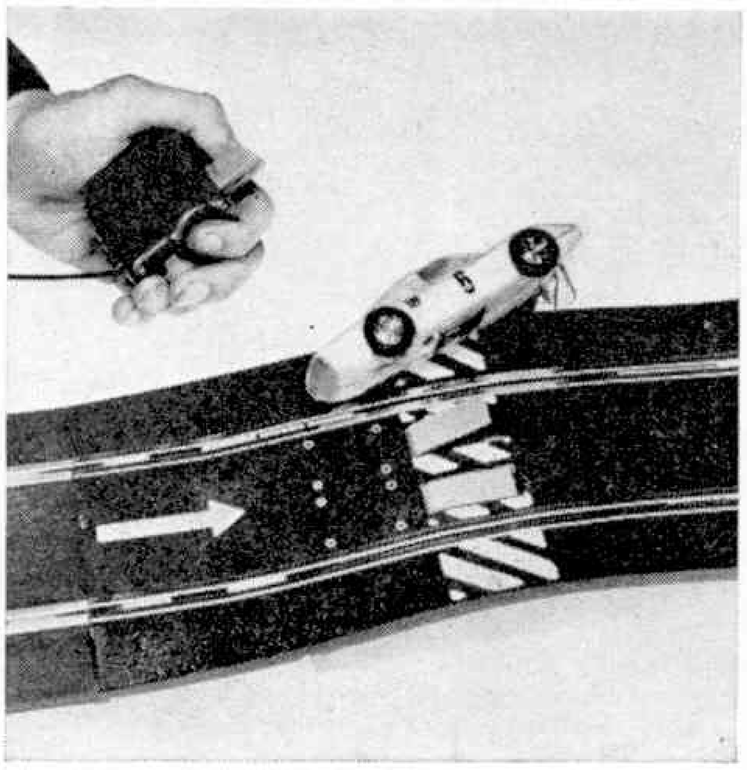
CIRCUIT SAYINGS . . .

A shunt . . . collision.
Full bore . . . foot hard down on the accelerator.
To buy the orchard . . . go off the road and into the trees.
Brew up . . . to overheat.
Carve up . . . to cut in on another car, causing it to brake.
A dice . . . close racing between two or more cars with constant changes of position.
Hairy . . . exciting, dangerous, even frightening.
To lose it . . . go out of control.
Planing . . . in heavy rain, cars sometimes 'float' over waterlogged surfaces.
Very Hairy . . . (see above).
The ton . . . 100 miles per hour.
To run out of road . . . self explanatory.
To come unstuck . . . lose adhesion.
Back marker . . . final row of starting grid, or a car falling well behind the leaders.
Pole position . . . pride of place on the grid.
brake.

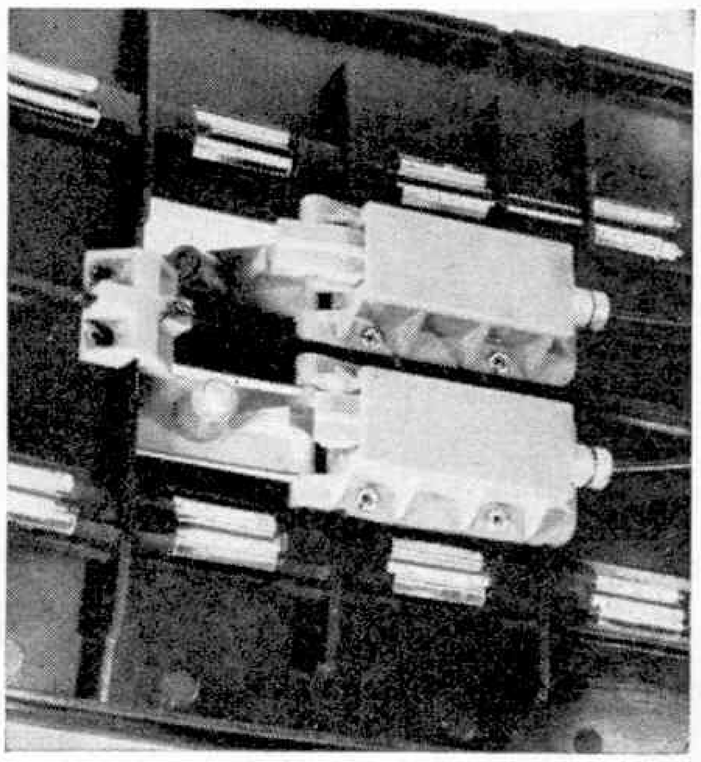
The Blow-Out section, showing the two hand controllers and operating cables. One of the flaps is shown in the 'up' position. The car, the Scalextric AC Cobra, is not included with the Blow-Out.



The finger button on the controller has just been pressed, causing the flap to 'fire' and the Porsche to hurtle off the track. The white arrow indicates the direction of travel of the cars.

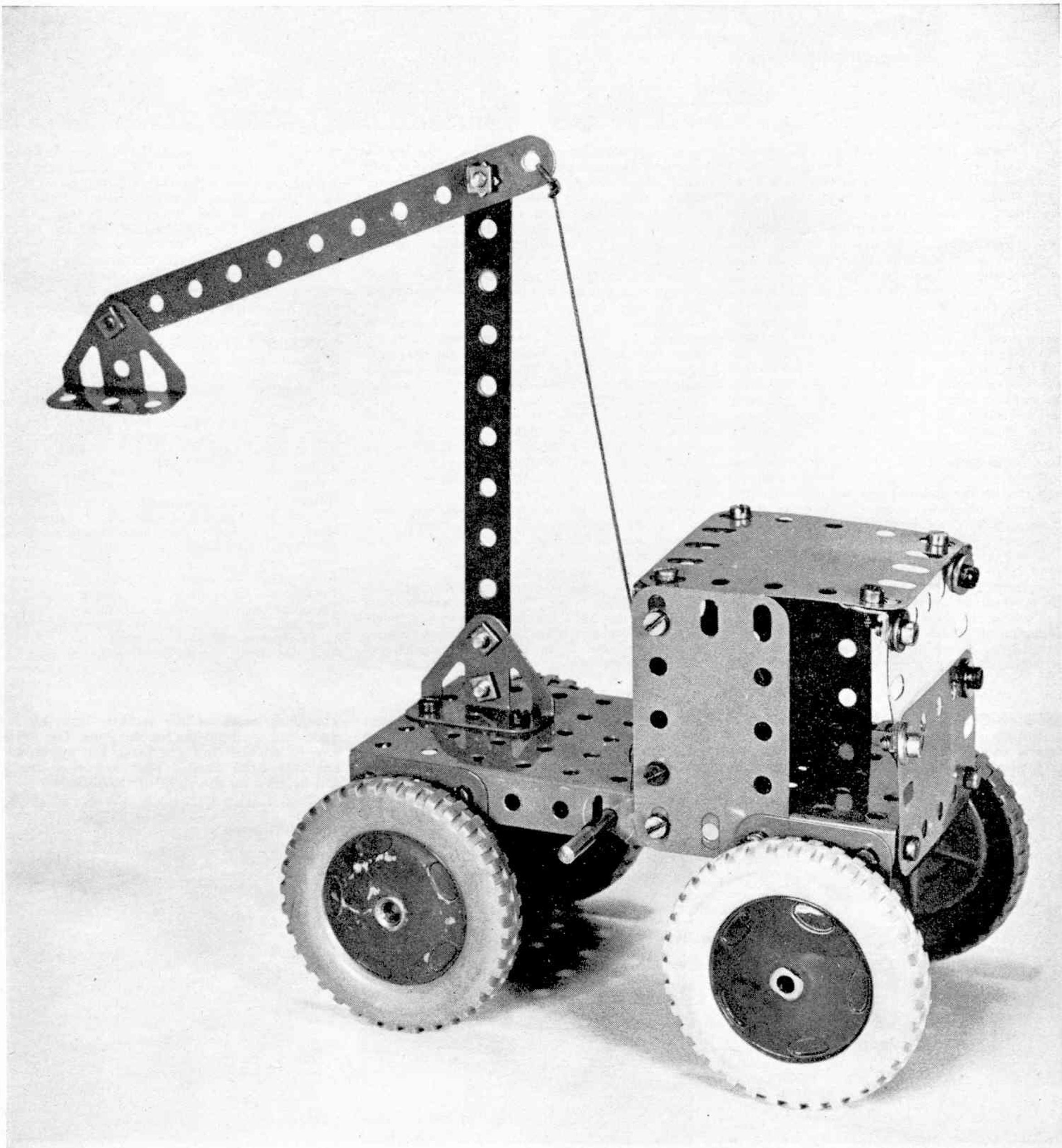


The underneath of the section, showing the operating mechanisms for the flaps. The lower flap is 'cocked' but not fired, the upper one has just been fired. The operating cables can be seen on the right of the picture.



Among the Model Builders with

Meccano models of all sizes have the same fascination. Compare the little Service Van on this page with the giant model of 'Evening Star' opposite. Quite a contrast in size, but both models are the result of intelligent use of parts.



'Spanner'

ALTHOUGH details of many fine Meccano models of steam engines have been sent to us in the past, we must admit that we have rarely seen a model built to such a high standard as 'Evening Star' shown in one of our photographs. Built by Mr. B. W. Rowe, of Newton Abbot, Devon, this is over 11 ft. long and apart from a few aluminium pieces to maintain the correct proportion, Meccano parts have been used throughout. As many readers will be aware, the real 'Evening Star' was the last steam locomotive to be built by British Railways, and it was constructed in Swindon Works.

Valve gear on the model is fully operational from the cab and the whole mechanism runs exceptionally smoothly because of the careful lining up and reinforced bearings. The model is raised from the track so that the works can be examined while in motion. Built up from Flanged Rings, Face Plates, Gear Rings and a very large quantity of Strips, eight of the ten driving wheels have flanges, as on the real thing. Coupling rods are correctly joined to allow for, on the prototype, any unevenness in the track and the necessary vertical movement of the sprung driving wheels. Not content with that amount of detail, Mr. Rowe has built a fully detailed cab and has also gone to great pains to make the boiler totally enclosed. Done by overlapping Strips and Flexible Plates with the liberal use of Nuts, Bolts, and Washers to fill up all exposed holes, the boiler is well over 4 ft. in length. The model is operated by a special mains electric motor mounted between the chassis frames. Mr. Rowe confesses that he is a Great Western enthusiast and has already built 'The Great Bear,' 'King George V,' 'County of Devon,' and 'City of Truro'—all Great Western Engines.

Another of our photographs this month, sent by Mr. D. Higginson, of Stevenage, Herts., shows three of the fascinating models that he has built. Included in the three are the popular robot and traction engine, which I am sure nearly every Meccano enthusiast must have had a try at building at some time. Many of Mr. Higginson's constructions have appeared in shop windows and we thought readers may be interested in seeing these three very fine models. In addition to those shown however, Mr. Higginson has also built an octopus roundabout and a marine engine, which he unfortunately could not include in the photograph.

Readers, I am sure, will be interested in a rather unique remote control gearbox built from Elektrikit and Gears Sets. Sent to us by Timothy Ward, of Horfield, Bristol, and illustrated in our photo, the gearbox is capable of driving either of two shafts. Done quite simply, by the action of two coils at each end of the gearbox, the operation of changing the drive from one shaft to the other can be done by energising either coil to move the lay shaft, which has an Elektrikit Core Coil mounted at each end. The drive is transmitted from the input shaft, which has two No. 26 Pinions mounted on it, to the lay shaft near Coil B, which has an 8-Hole Bush Wheel bolted to a 57-Tooth Gear which engages with the two Pinions. At the other end of the lay shaft another 57-Tooth Gear transmits the drive to the first output shaft by a No. 25 Pinion. A similar arrangement exists for the alternative output shaft situated opposite the input shaft.

The coils are bolted to 4½ in. by 2½ in. Plates, as shown in the photo and these are in turn bolted at the top to 3½ in. by ½ in. Double Angle Strips. Mounted in the middle of the gearbox is a Flanged Sector Plate bolted to a Double Angle Strip at the top and a Flanged Plate at the bottom. The base of the gearbox is made from two 3½ in. by 2½ in. Flanged Plates bolted to each other in the centre and to the 4½ in. by 2½ in. Plates at each end.

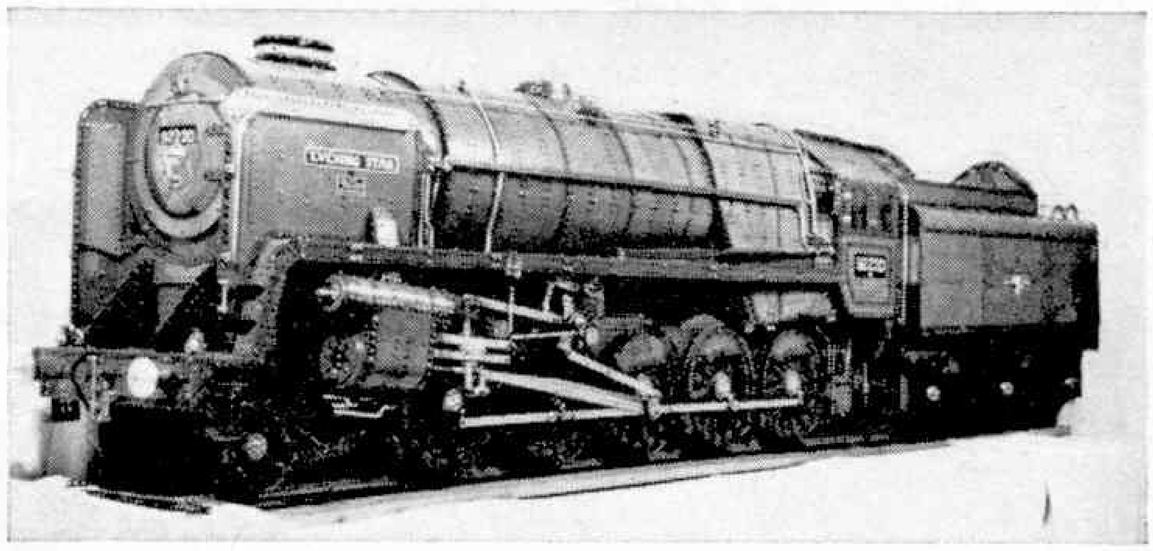
The end of the lay shaft near Coil A has a Coupling No. 63, with a Threaded Pin No. 115 fitted in the end of the Coupling and on to the Core of the Coil. The end of the lay shaft near Coil B has only a Threaded Pin fitted in the 57-Tooth Gear and again on to the Core of the Coil. The wiring for the gearbox is simplicity itself and I am sure nobody will have any difficulty with it. We show this diagrammatically in a drawing. Without a doubt a most useful construction that will find service in many different types of Meccano models.

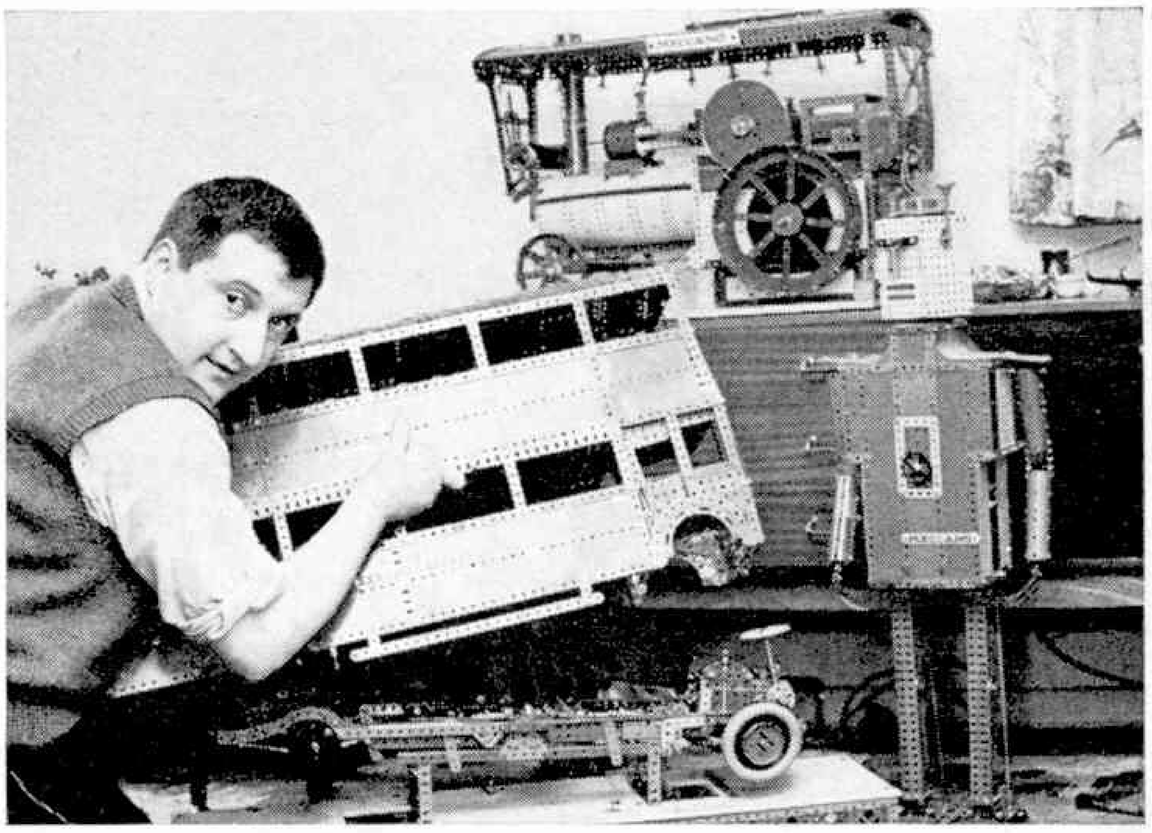
Finally, an interesting model sent in by Mr. Kenneth Czmeiduch, of Kippax, Leeds, who has made a simple but effective model of a Service Van of the type used for examining overhead lights on roads. Construction of this is quite simple and the chassis is made from a Flanged Plate 5½ in. by 2½ in., to which is bolted four Flat Trunnions 126b, one at each corner. The cab is made from a 2½ in. by 1½ in. Flexible Plate and a 2½ in. by 1½ in. Transparent Plate bolted together to form the front of the cab, joined by an Angle Bracket, to a 2½ in. by 2½ in. Flexible Plate which acts as a roof. As its front end is a 2½ in. by ½ in. Double Angle Strip, bolted to its underside and two 2½ in. by 1½ in. Flexible Plates, one on either side, bolted on to the Double Angle Strip at the top and the Flanged Plate sides. One further Flexible Plate is required for the back of the cab and this is joined to the Flexible Plate at the sides by two Angle Brackets.

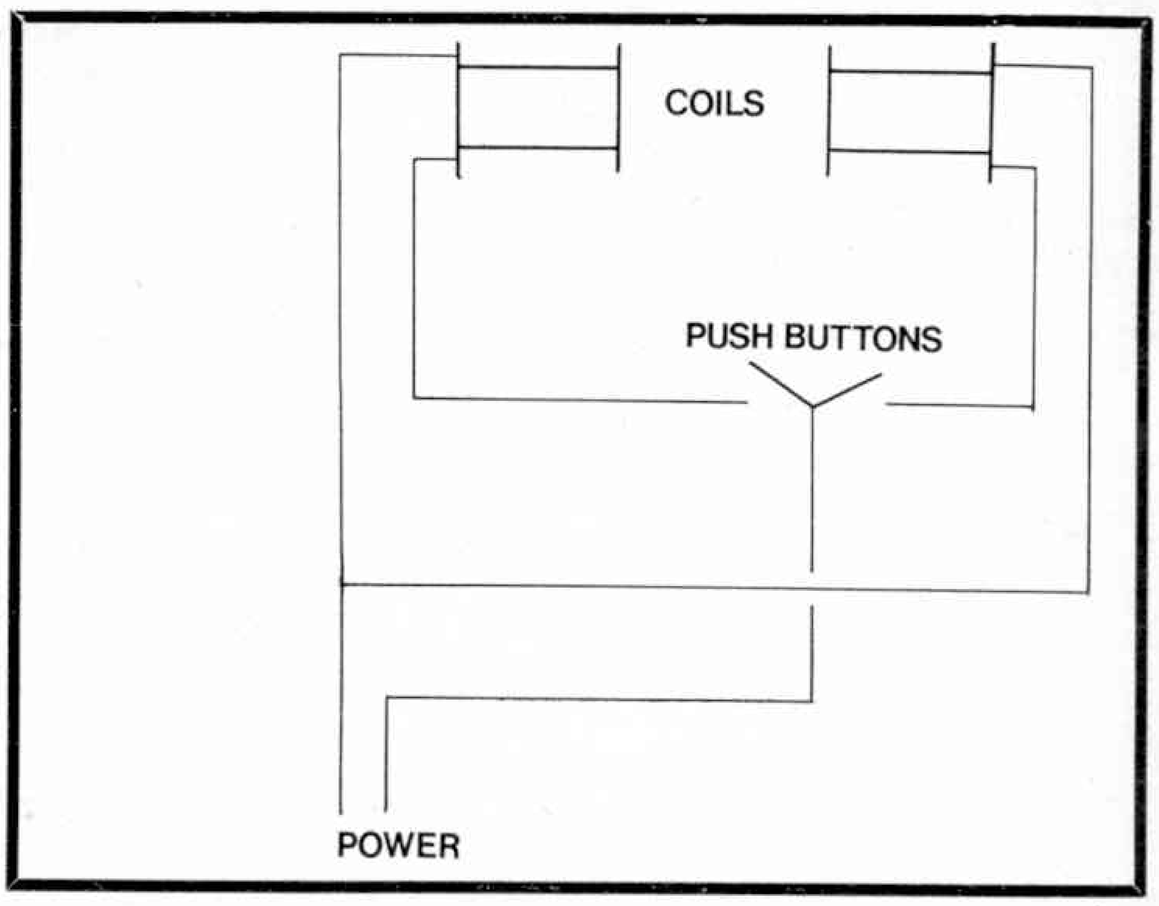
The remaining part of the van is a lifting boom which is built by bolting a Trunnion, No. 126 to the Flanged Plate with a Perforated Strip 11 joined to the outside of the Trunnion. Another 5½ in. Strip is then joined to the first, by its second hole, to leave one hole for fastening. A further Trunnion No. 126 is bolted on the end to act as a platform. All that now remains to be done is to fit a crank in the Flanged Plate and to connect it up with the boom with a short length of twine. The four Road Wheels, No. 187, are then fixed on to 3 in. Axle Rod.

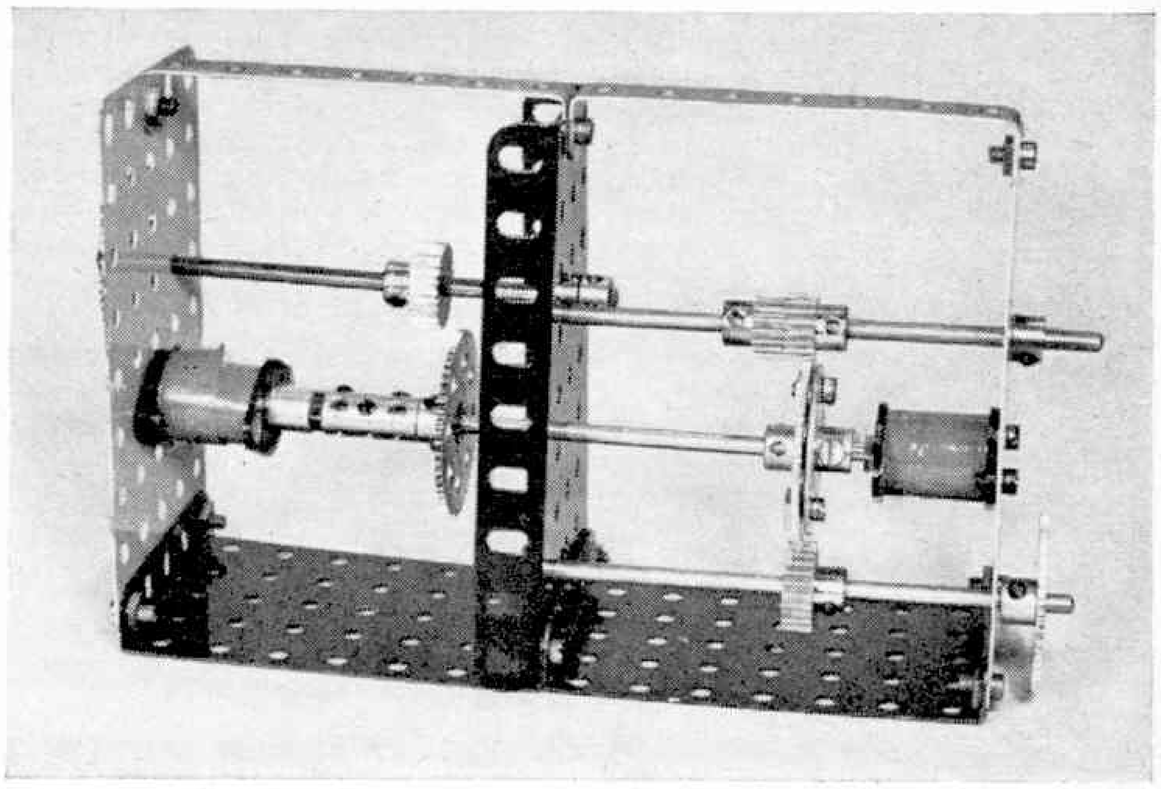
Parts required

2 of No. 2	26 of No. 37b	4 of No. 142c
3 of No. 12	1 of No. 48a	4 of No. 187
2 of No. 16	1 of No. 52	4 of No. 188
1 of No. 19a	2 of No. 59	1 of No. 190
4 of No. 22	2 of No. 126	1 of No. 193
27 of No. 37a	4 of No. 126a	









Contest '67

Big Cash Prizes for your Meccano Models

From this moment on, all you Meccano Model-Builders can stop THINKING of having a go at a new model, but can get down to some serious BUILDING. If you don't, you may be too late to enter in this year's Meccano Model Contest—NOW OPEN! True to more than 50 years of Meccano Magazine tradition, we are delighted to announce the start of yet another competition in which valuable cash prizes are offered to the builders of models which the judges, taking all things into consideration, feel to be most worthy of success.

Open to all

As is customary, the competition is open to every owner of a Meccano Set living anywhere in the world and no limit, minimum or maximum, is set on either the number of entries which may be submitted or the quantity of parts which must be used. Any kind of model is eligible for entry, unless taken direct from a Meccano Book of Instructions, and all will be judged on their individual merits. *The only stipulations are that the model or models must be built entirely of standard Meccano Parts and must be your own unaided work.*

Prizes will be awarded for what, in the opinion of the judges, are the best-built models with particular attention being given to those in which the more unusual parts are put to good use, as well as, of course, to originality of subject. Remember, too, that a small well-built model stands just as much chance of success as a large, unstable example, so don't be put off entering the contest just because you don't own a big stock of Meccano. The competition closes on June 30, 1967, for competitors in the U.K. and Ireland and two weeks later, on July 14, for overseas competitors.

Entries will be divided into two sections, A and B. Section A is for competitors under 14 years of age on the closing date and Section B for competitors aged 14 or over on that date. Prizes in these sections are as follows: Section A, 1st £5 5s. 0d.; 2nd £3 3s. 0d.; 3rd £2 2s. 0d.; 10 prizes of 10s. 6d. Section B, 1st £7 7s. 0d.; 2nd £5 5s. 0d.; 3rd £3 3s. 0d.; 10 prizes of £1 1s. 0d.

How to enter

Once you have built the model, obtain a good clear photograph of it, or, failing this, a reasonably detailed sketch. If you are not an artist yourself, it is quite permissible to have a friend prepare the sketch. It is also advisable to include a short description of the main features of the model with your entry, mentioning any points of interest that you would like brought to the attention of the judges, particularly any interesting mechanisms. Under no circumstances, however, must the actual model be sent.

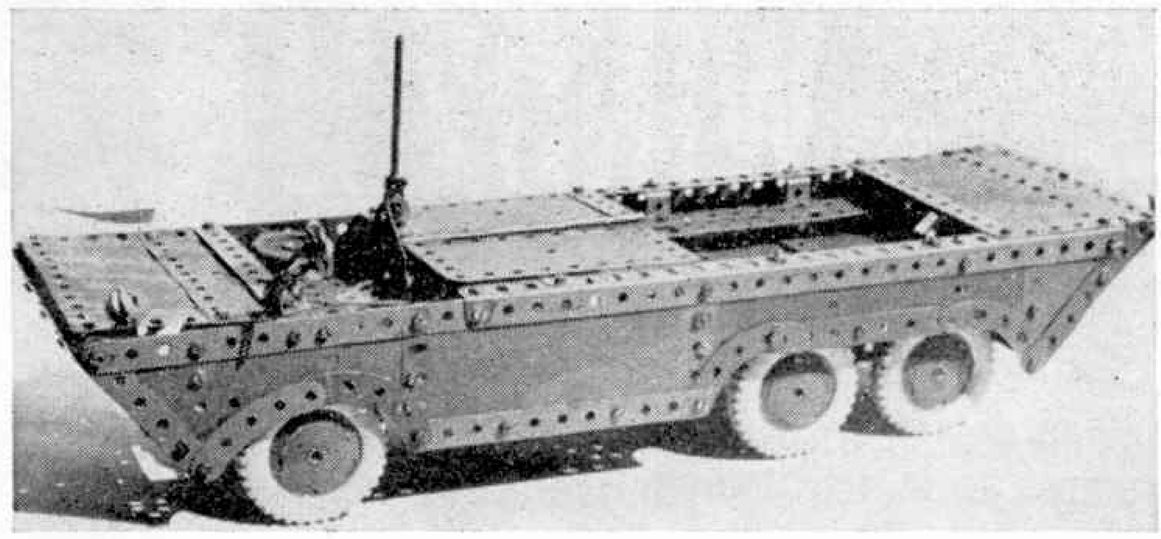
In entering the Contest, write your name and address on the back of each photograph or drawing, together with the Letter A or B, depending on the section for which you qualify, and forward to: Contest '67, Meccano Magazine, Binns Road, Liverpool 13.

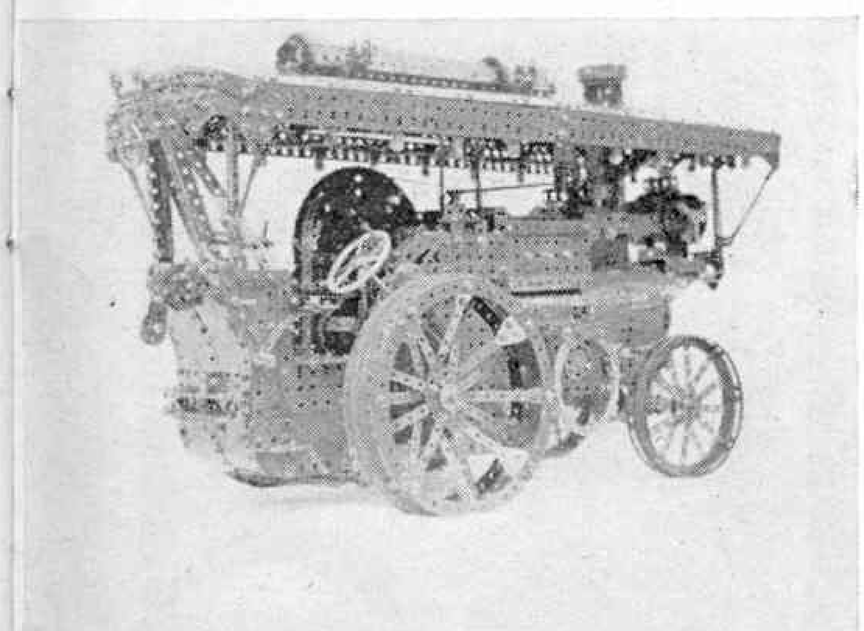
Prize-winning entries become the property of Meccano Limited, but unsuccessful attempts will be returned if accompanied by a suitable stamped addressed envelope or, in the case of overseas entries, a self-addressed envelope and the appropriate International Reply Coupons. It must be understood that entries can be accepted only on the understanding that Meccano Magazine will not be held responsible for any entry damaged or lost and that the judges' decisions are final.

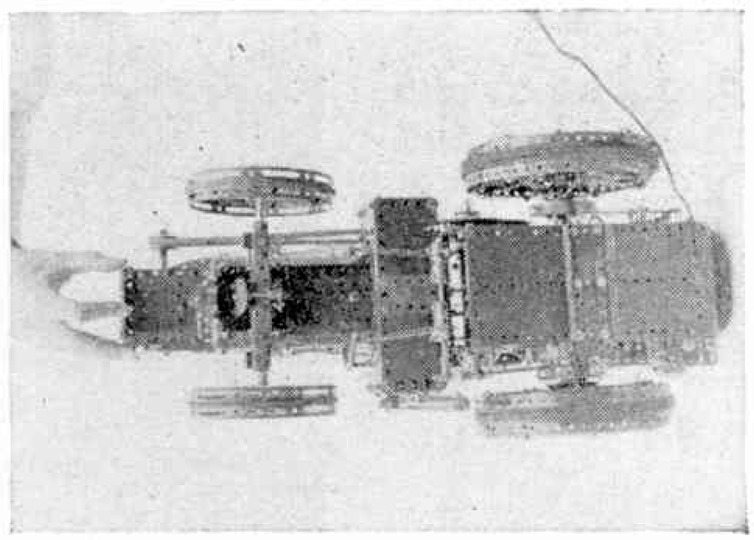
As we pointed out when announcing the last competition, it was surprising how many entrants there were who, in past contests, did not give all the simple details required on the back of their photographs or drawings which, of course, could have meant disqualification. In spite of stressing this in print, however, we still received several incorrect entries, so *please double-check everything* before you finally seal your entry. We look forward to seeing your models!

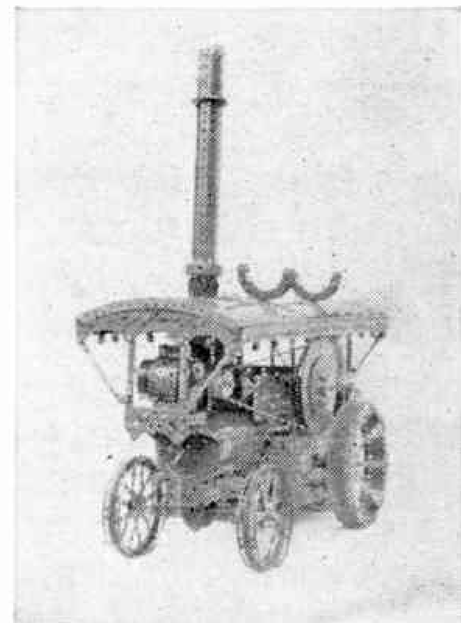
Here, for your inspiration, are some pictures of previous competition entries. Right: a simple, but very realistic, amphibious vehicle by John Smith of Enfield (Section A).

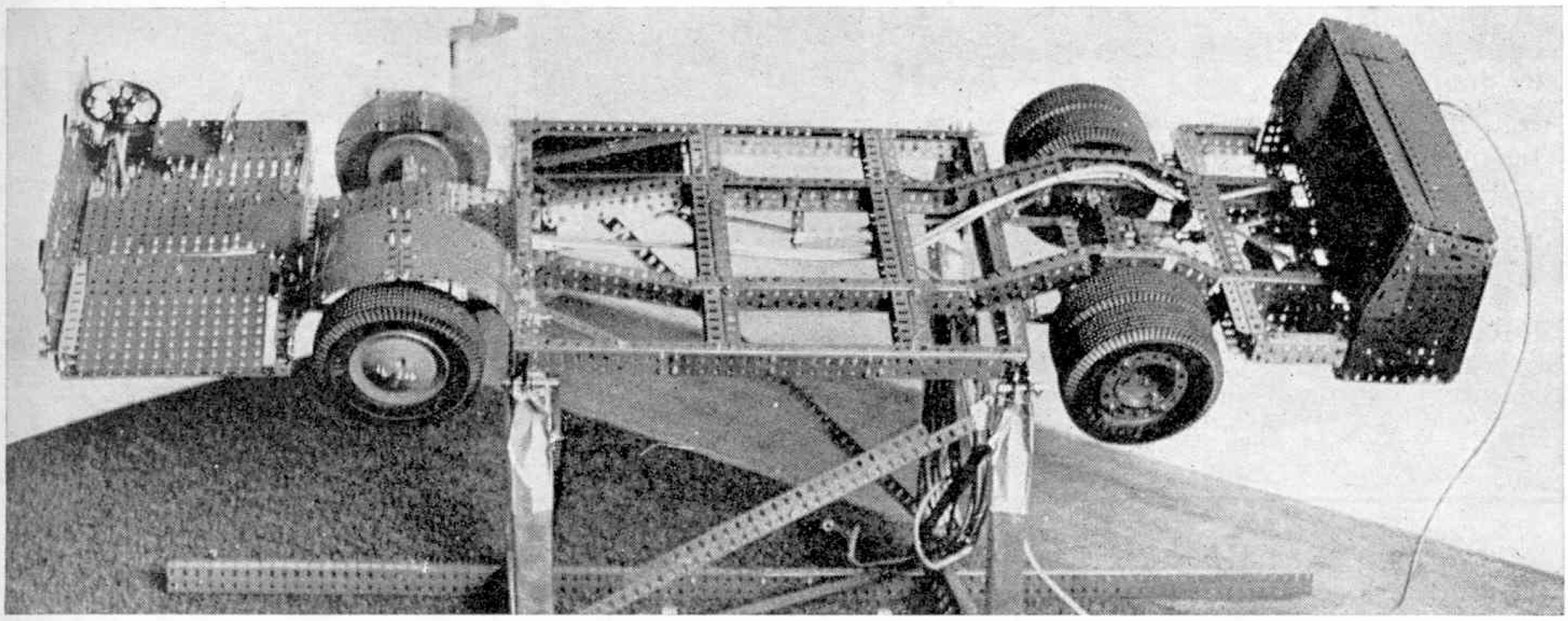
Below: three views of the very fine Showman's Tractor built by J. F. Hulse of Shrewsbury (Section B). Despite its complex appearance, this model is notable for its economy of parts—an economy achieved by clever use of parts for maximum effect. The three lower pictures show details of a Leyland Atlantean Bus chassis by D. J. Allen of Dorking (Section B). Not only is the chassis accurate in appearance, but many of the full-size mechanical functions are also represented.

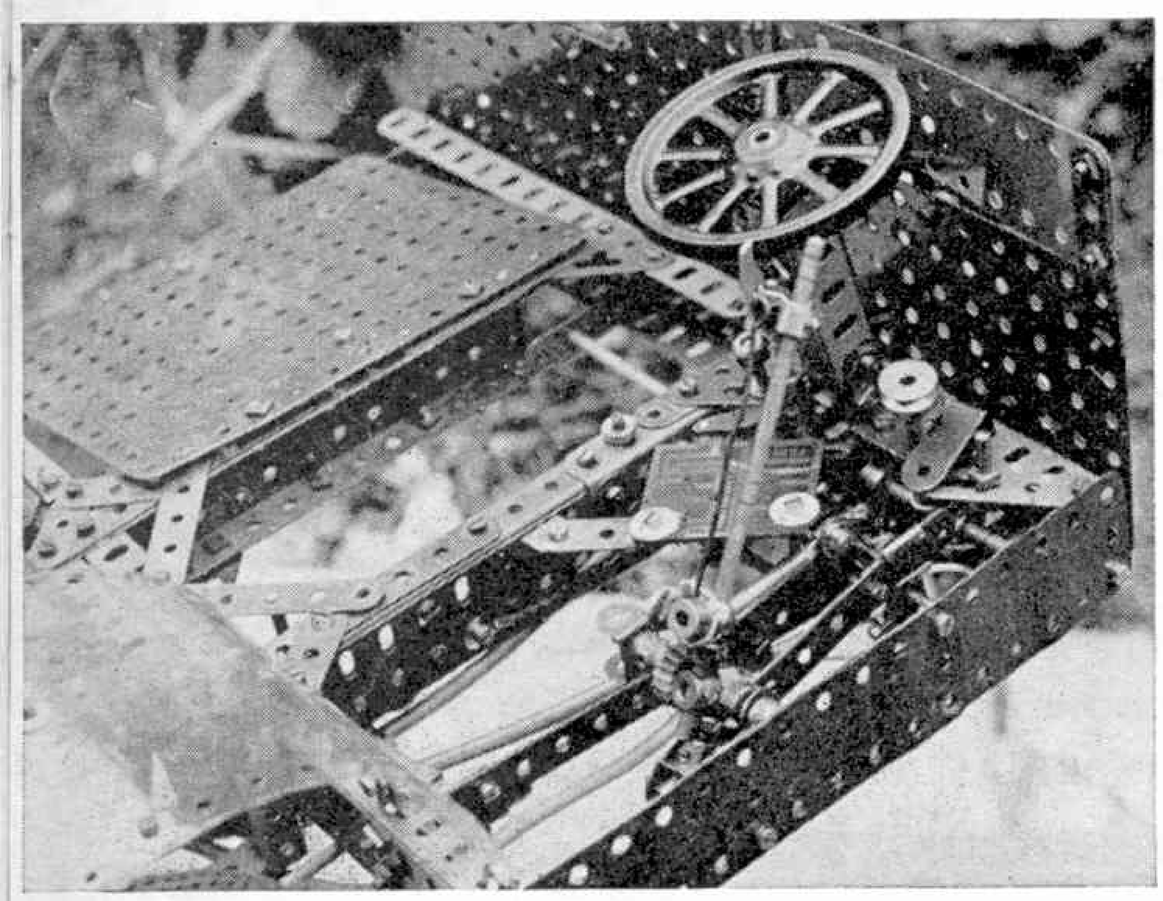


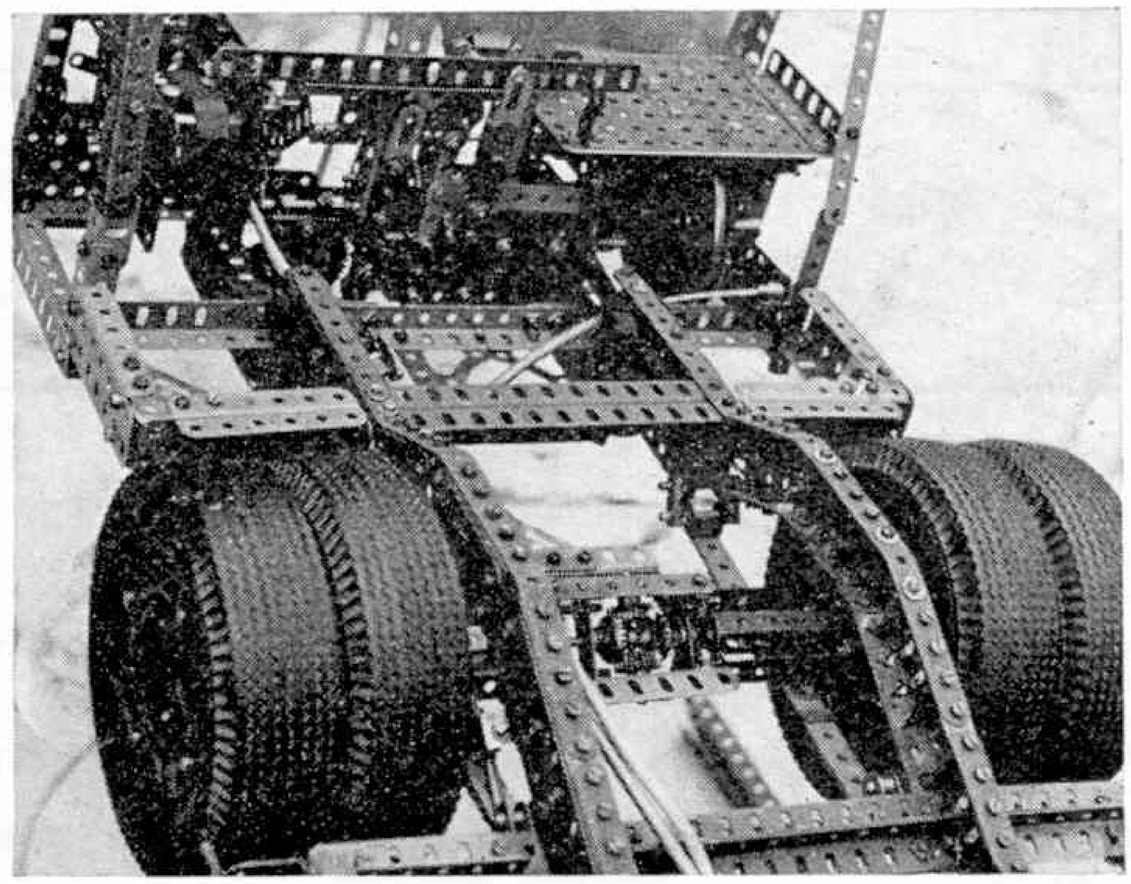












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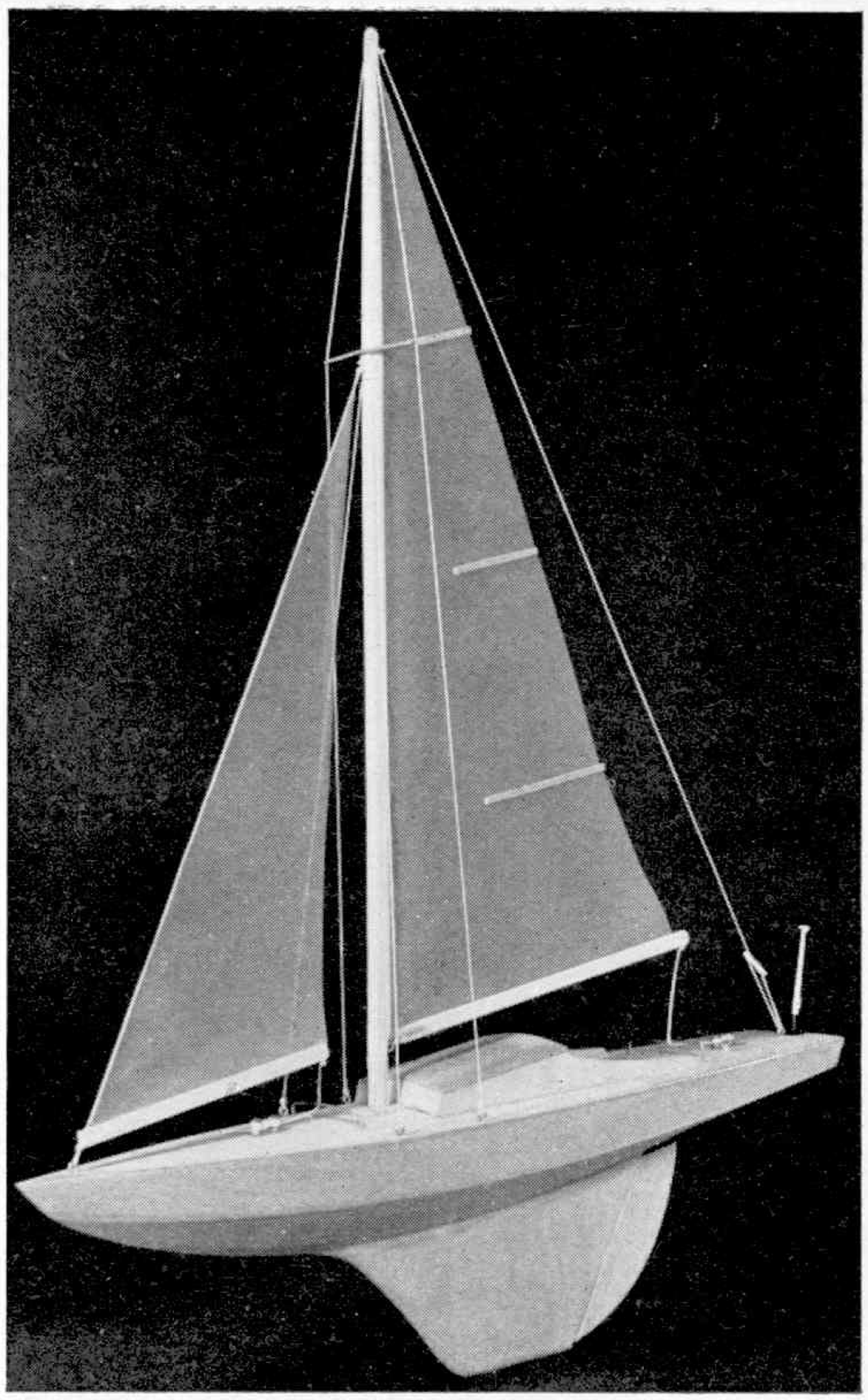

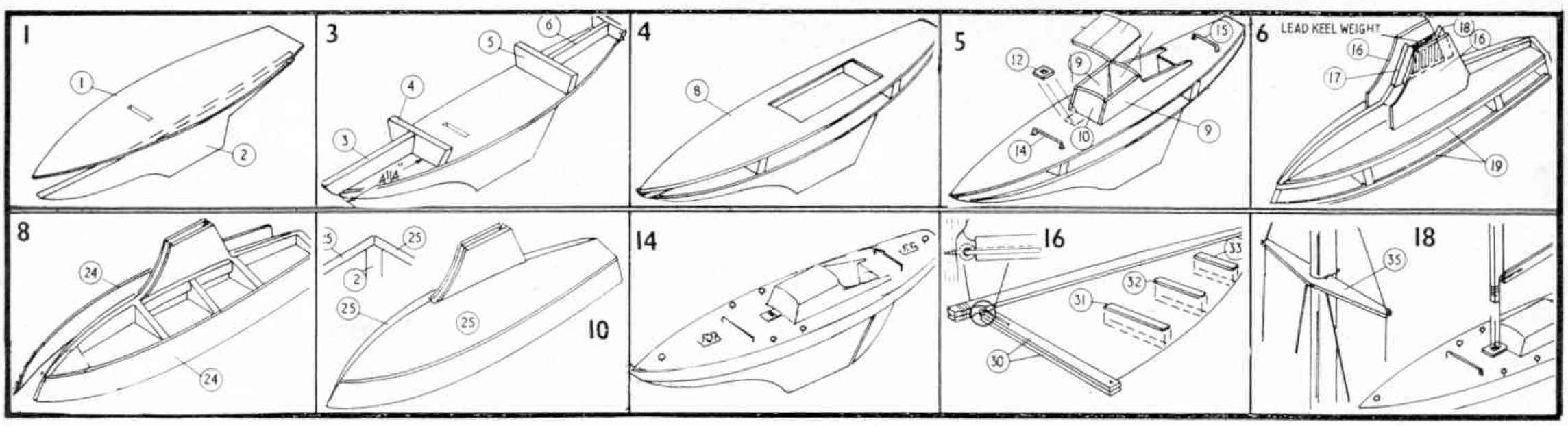

This super prefabricated kit includes all mahogany and ply parts die-cut to shape, lead keel weight, sails, screweyes, plastic fittings, rigging cord . . . even sandpaper.

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Assembly of WINDY II from the kit is described in detail on pages 18-19 of this issue. This is one of a range of NEW SUPER KITS for aircraft and boats in the 'FROGFLITE' range. You can see them all at your local model shop.

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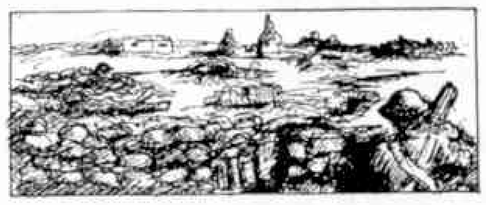

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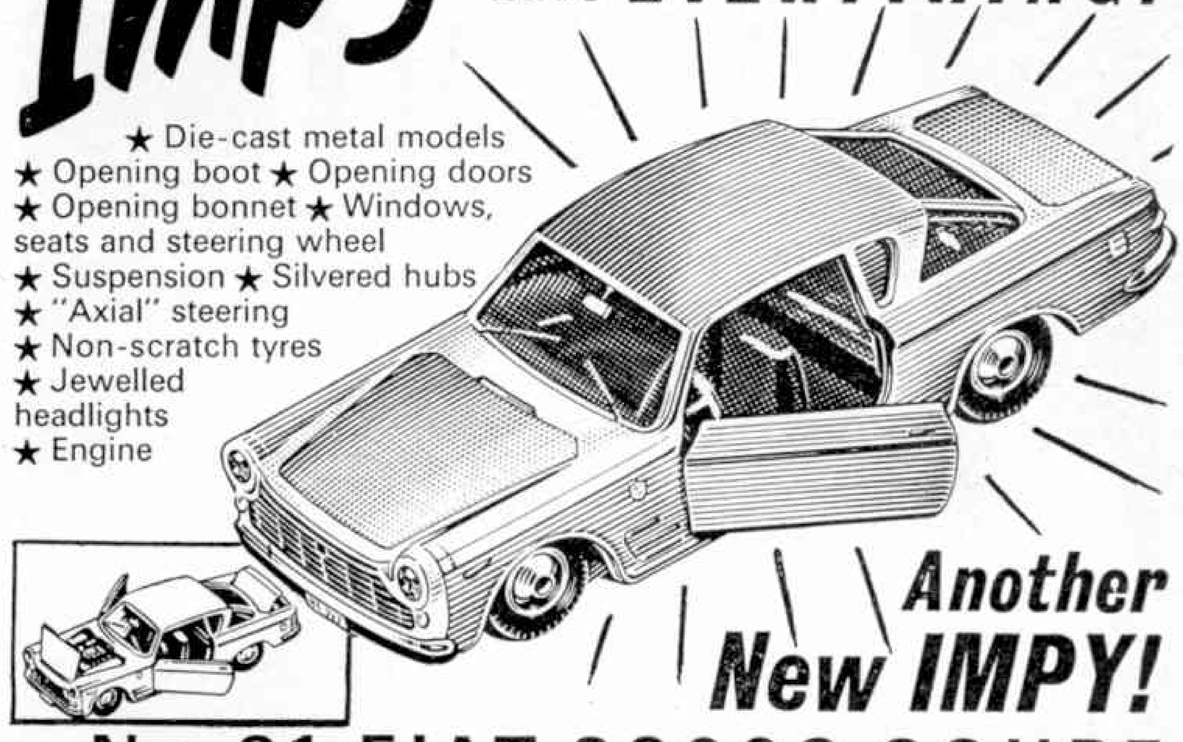

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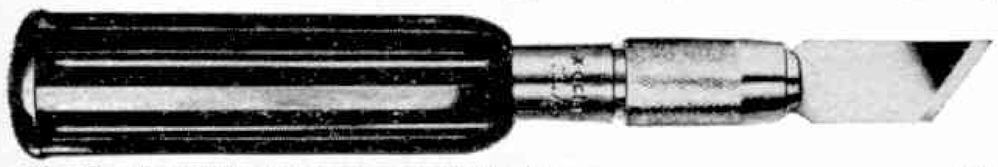

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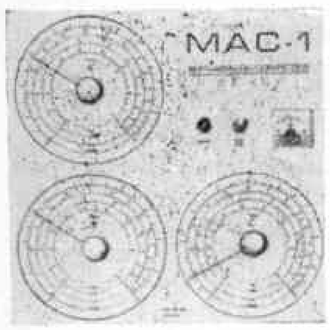

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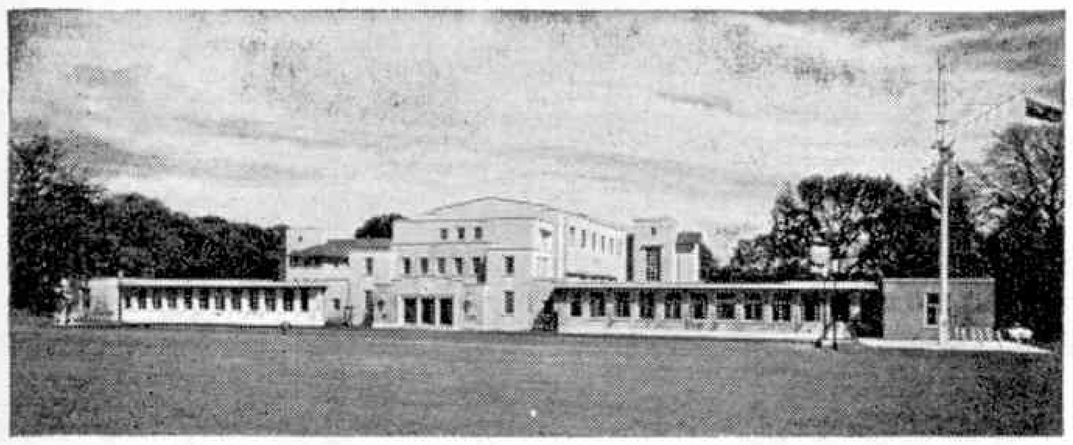

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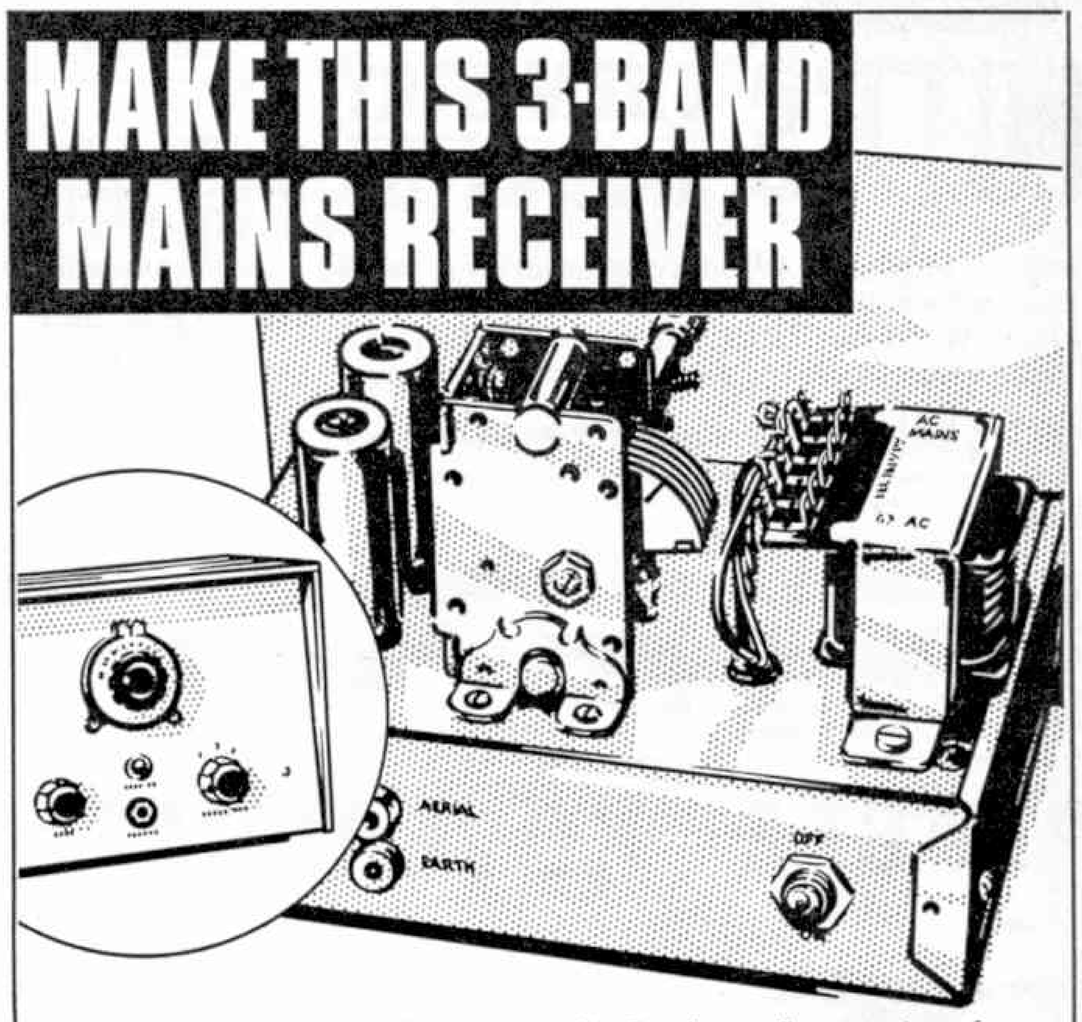

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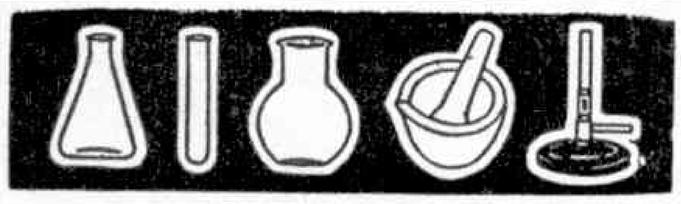

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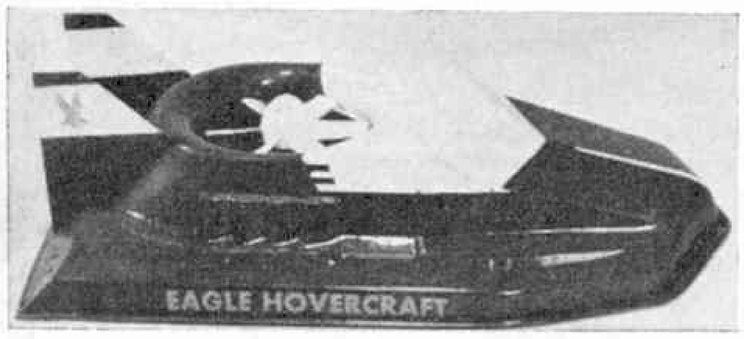
Please turn to page 56 for Wants

"EAGLE HOVERCRAFT"



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Stamps News By F.E.Metcalfe

World Fair

By the time these lines appear in print, the great World Fair will have started its six months run in Montreal. Of course, there had to be a postage stamp to mark the opening on April 28. However, it is greatly to the credit of the Canadian Post Office, that they were content with a single, of low face value, and within the reach of everybody, whereas some countries would have cashed in on such an important event, by issuing a set of stamps which would have knocked collectors back more shillings than the pence the new stamp is costing. I am afraid that most of us will have to be satisfied with the stamp, and just wish good luck to those who will be fortunate enough to visit the 1,000 acre exhibition venue with all its marvels. Ah, well!

Pitcairn Is

It is only just 200 years since Pitcairn Islands were re-discovered, and to mark the event a most attractive set of five stamps was issued March 1. In the year 1767, Capt. Philip Carterer reported that, on July 2, he had discovered what appeared to be a great rock rising out of the sea, Of course, it was the arrival there of the mutineers from the Bounty which gives the islands their appeal. As for these stamps, they are selling, even as I write, just like those hot cakes. Stamps are playing a big part for the islands. There was a time when, bit by bit, the inhabitants, that is the younger end, were leaving and going to places where they had more prospects. However, I read recently that postage stamps were changing the picture, and with the proceeds life was a lot better, and some of those who had left had actually returned. So when you buy one of these handsome 'Centenary' sets you are doing somebody a good turn.

African States

I have been struck lately by some of the really imposing stamps which are being issued by some of the African states. Take the handsome ship stamp from the Gabon Republic. A young collector, whose father works in the office of a large exporting firm, and who has the pick of the mail (lucky chap) recently showed me his collection (the stamp illustrated is one of his many duplicates). I was simply amazed, and it must be a fact that, as is said about Africa, something new (fantastic stamps at any rate) is always coming out of what can be no longer called the dark continent.

Flowers

Collections of stamps with flowers as designs, rank very high in popularity amongst thematic collectors, so it is fairly certain that when these lines appear, our own British flower set will be enjoying great vogue, and from this the postal authorities may think that there was something in the boast of the P.M.G. that our stamp designs are held in high esteem throughout the world. Alas for facts, I have yet to hear of anyone who thought much of them at all. But maybe as time goes on we will catch up with those who have been at the game of attracting collectors longer than we have. Austria, for instance. The illustration shows how that country can produce flower stamps.

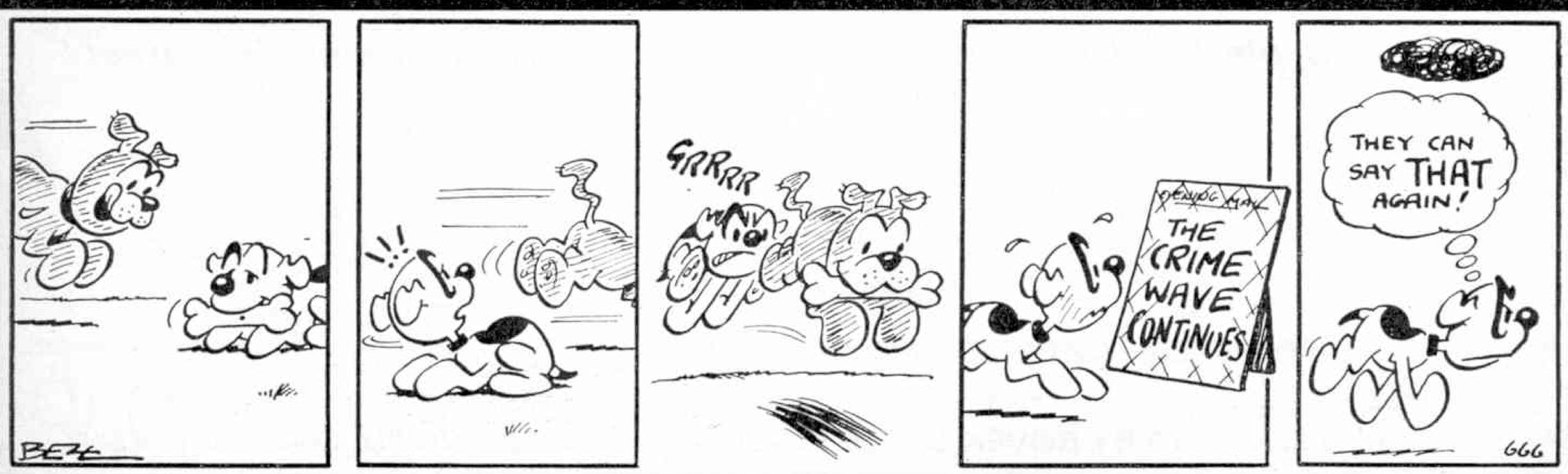
The Tip of the Month

As is known by the many who now go in for our G.B. Stamps (have you seen that wonderful SG Catalogue of Great Britain Stamps Part II?) new designs are in preparation for the regions. It is also known that there have been some recent changes, new values, etc., not to overlook the phosphor lines, which will have a very short life, and we know what that means to prices. We are getting evidence of it now with reference to other G.B. stamps. Now my tip this month is to suggest that you fill up those regional blanks now, and don't overlook the good shade varieties, which are listed in the Commonwealth QEII Catalogue. I think this warning is necessary, for I know first-hand how many missed the 2½d. regionals when they went obsolete. Don't be caught napping again. It can be too costly.

Pacific Games

They seem to have been having a wonderful time away in the Pacific, and the 2nd South Pacific Games, which were held in Noumea, New Caledonia, during last December, resulted, of course, in the inevitable issue of sets of stamps to celebrate the event. Cook Islands joined in, and on January 12 issued a quite striking stamp set, which actually should have appeared in December. But an irregular mail service caused the delay. These 'Games' stamps are widely collected, and shortly we will be having more Olympic Games sets, when the time comes round for the games in Mexico. Maybe a 'Games' collection might be worth consideration.

Chipper



Sensational new game! It's all the rage!

Table-top CRICKET

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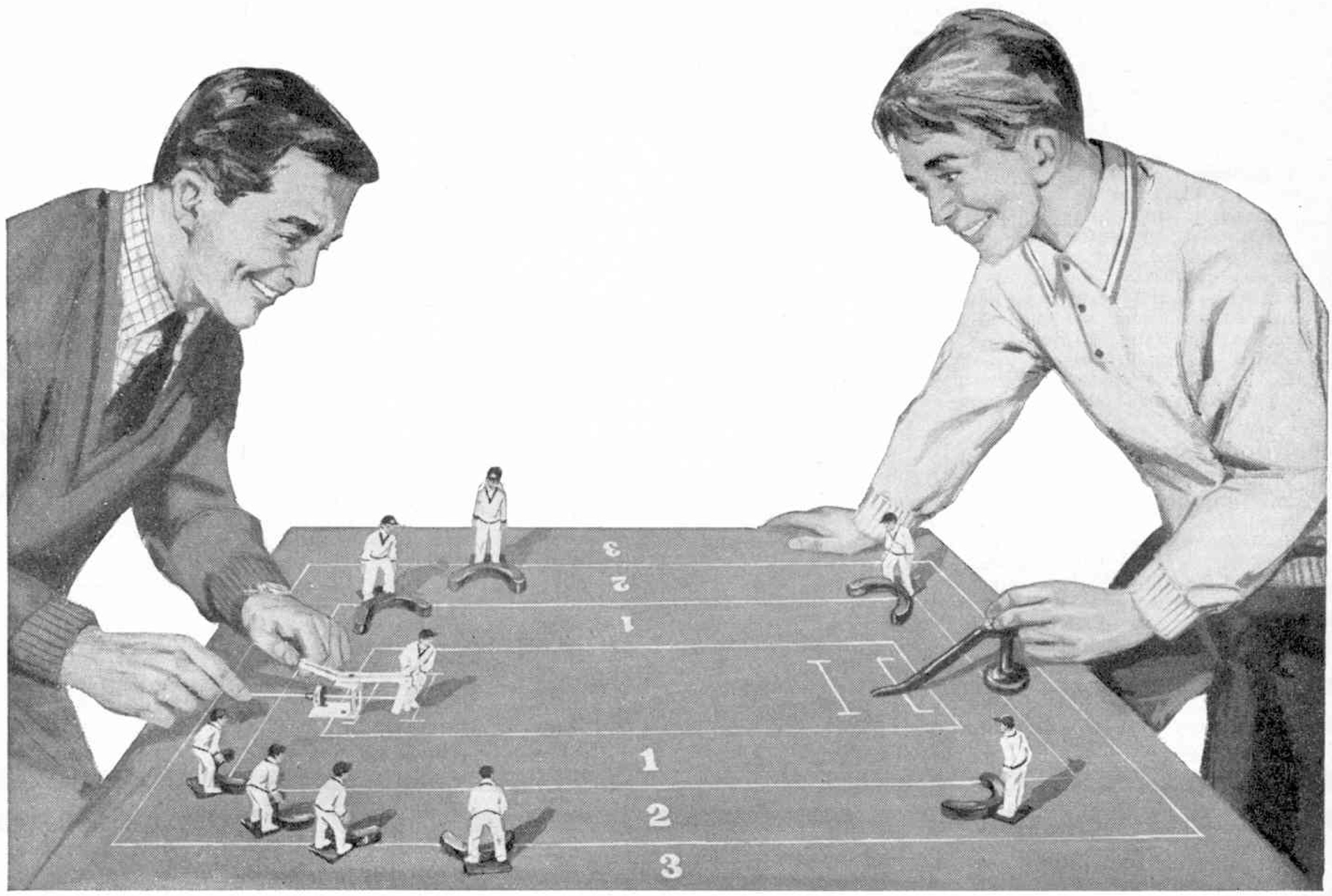

You can play real cricket shots in this fascinating game. It's great!

You will be thrilled by Table-top CRICKET. It's amazing the way this entertaining game simulates the real thing. You'll spend many tense, absorbing, fun-packed hours playing it. Go and see Table-top CRICKET at your nearest toy or sports shop. Ask them to give you the descriptive leaflet.

Table-top CRICKET PRICE £6.2.6.

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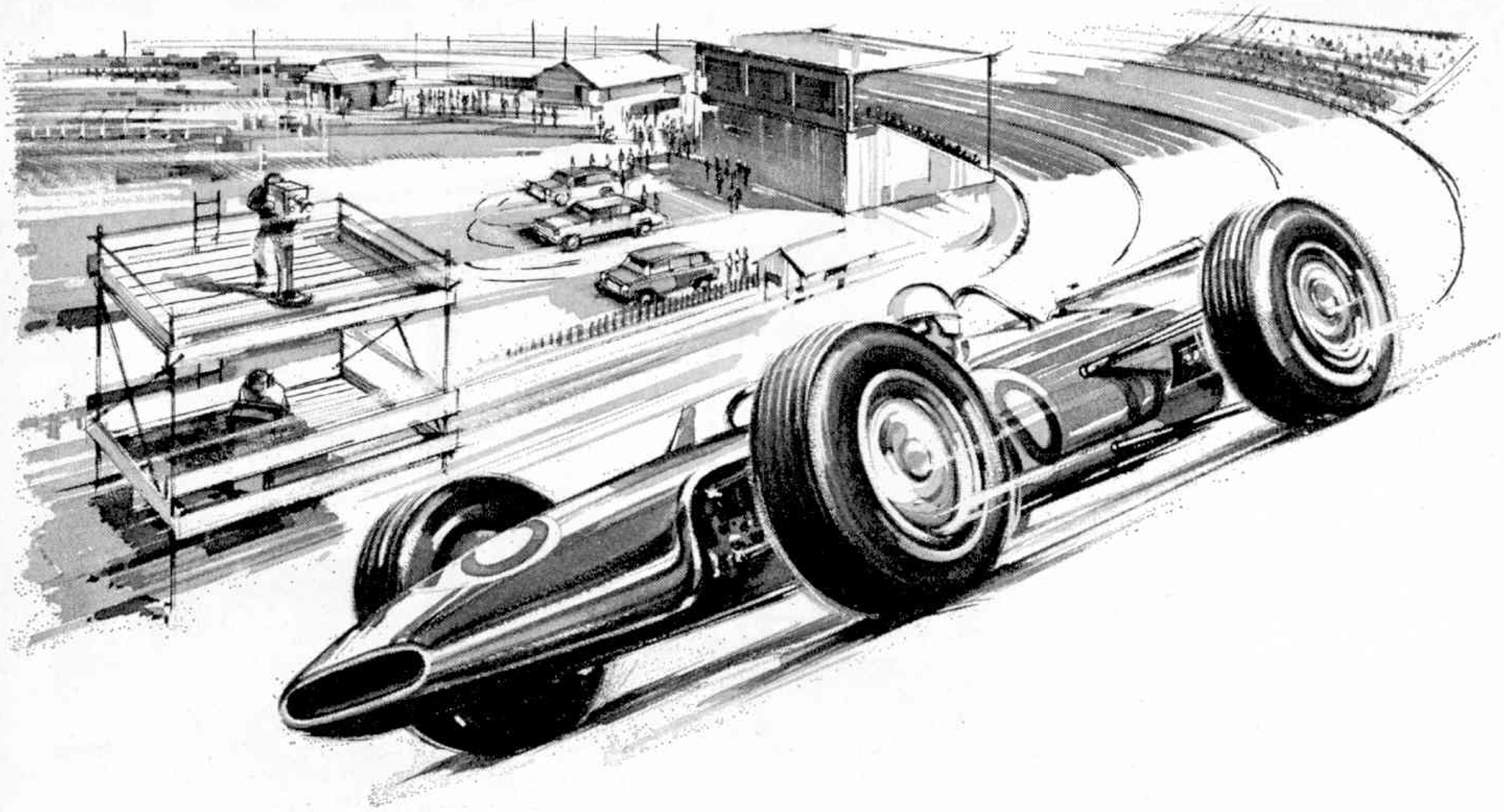

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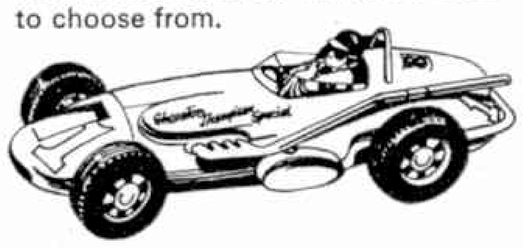

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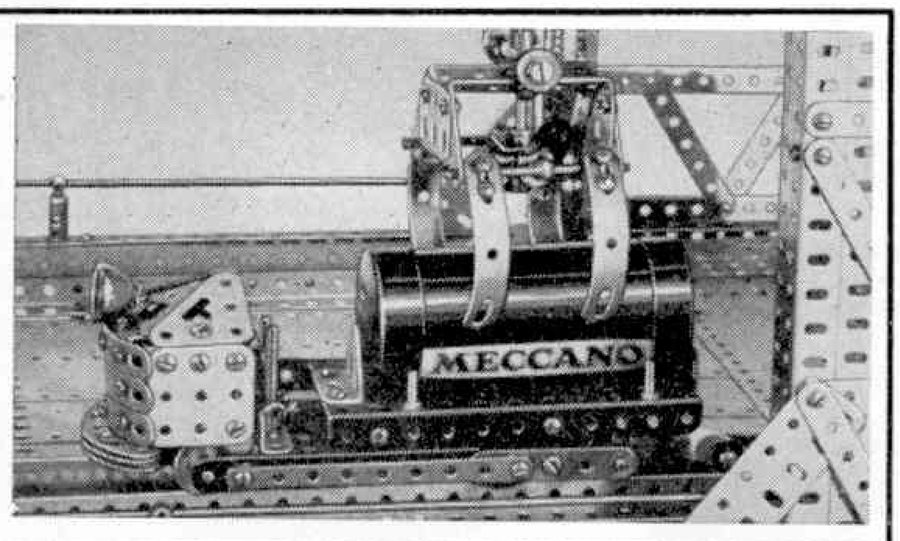
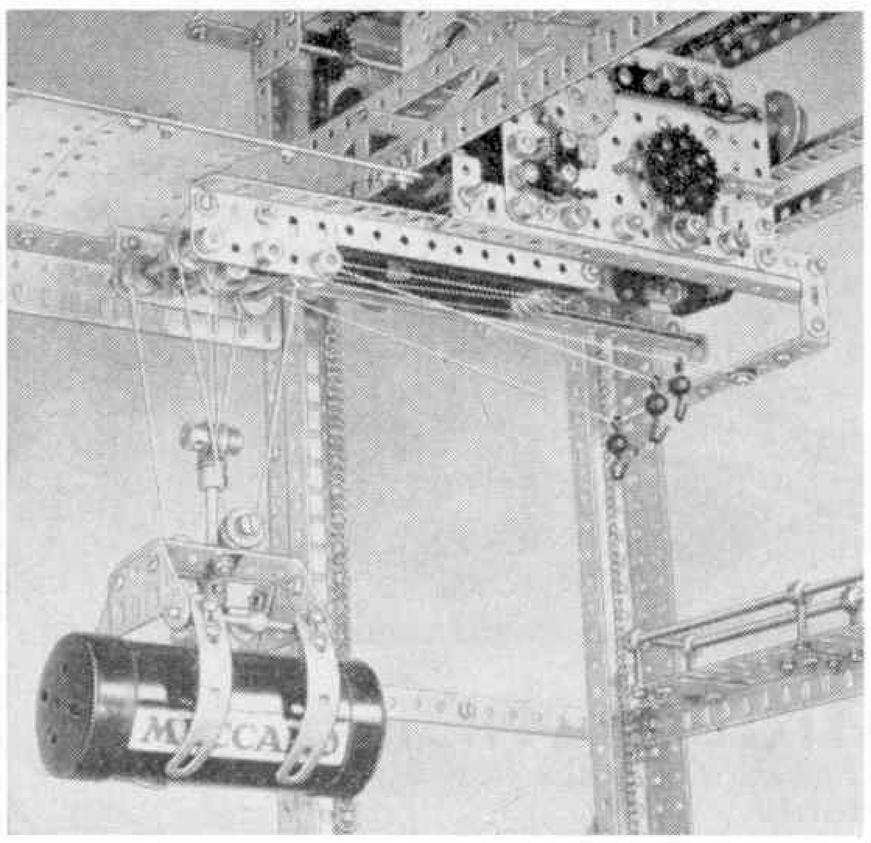
WORLD-WIDE
MECCANO

No 8

A fantasy factory from Piacenza





How's this for real-life engineering in miniature? The builder is one of our Italian enthusiasts who has consistently devised both spectacular and highly practical Meccano models.

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Three Emebo Meccano motors and a 6-speed Meccano motor provide the motive power for all operations. All motors and movements of the model are automatically controlled by a cleverly designed relay system, inverter, gear box and motor concealed in the base. The overall length of the model is approximately 5ft. 6ins.

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Sales/Wants/Swops *(Strike out which is not applicable)*

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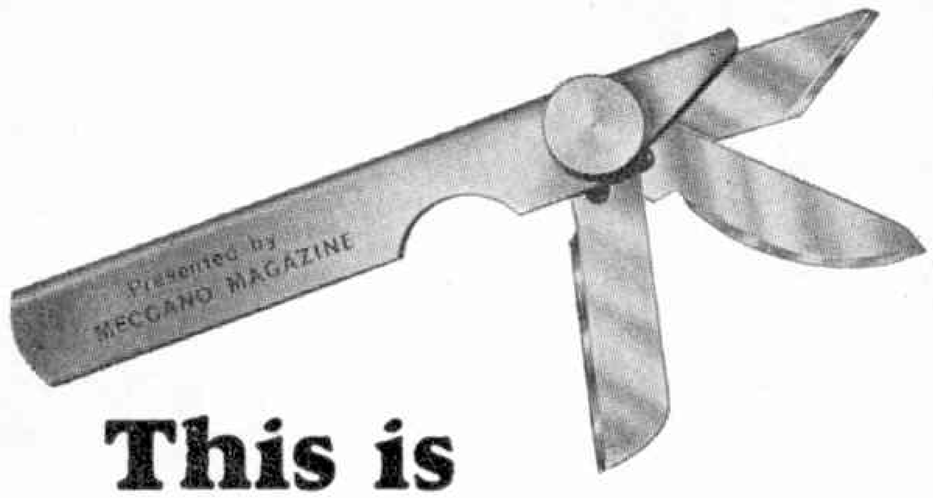

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THIS PART TO BE COMPLETED BY YOUR FRIEND

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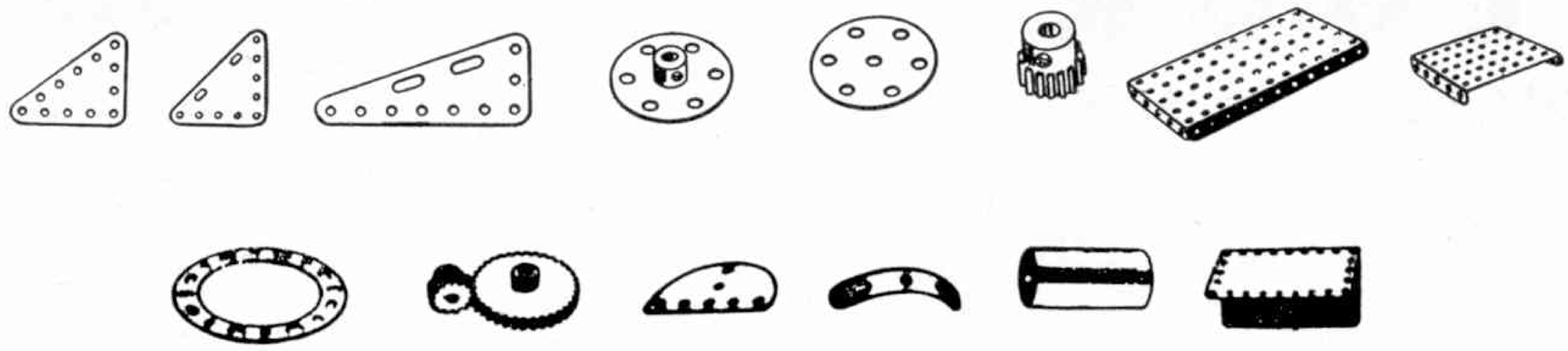

Dealers who specialise in Meccano spare parts

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.

C. G. MARSHALL
Maxwell Road
BEACONSFIELD
Telephone: 4092

BARRETT'S LTD.
2 St. George's Street
CANTERBURY
Telephone: 66161

Cheltenham Motor & Cycle Co. Ltd.
31 High Street
CHELTENHAM
Telephone: 53099

W. PAINE & CO. LTD.
168 High Street
CHATHAM, Also at Stroud and Grays
Telephone: 45215

YOUNGSTERS (THE DOLL'S HOSPITAL)
55 Hallgate
DONCASTER
Telephone: 2831

THE GUILDFORD
DOLL'S HOSPITAL LTD.
13 Swan Lane, GUILDFORD
Telephone: 61331

LUCAS'S (Hobbies) LTD.
7 Tarleton Street
LIVERPOOL 1
Telephone: Royal 7562

BEATTIES OF LONDON
112 & 112A High Holborn,
LONDON W.C.1.
Telephone HOL 6285

H. A. BLUNT & SONS LTD.
133 The Broadway, Mill Hill
LONDON N.W.7
Telephone Mill Hill 2877

JEREMY
16 Princes Arcade, Piccadilly
LONDON S.W.1
Telephone: Regent 1846

F. T. B. LAWSON
New George Street
City Centre, PLYMOUTH
Telephone: 65363

LANE'S TOY SHOP
75 High Street
ROCHESTER
Telephone: Chatham 41870

WILTONS GAMES/SPORTS STORE
Corner House, Canal/Queen Street
SALISBURY
Telephone: 22984

JOHN W. BAGNALL LTD.
18 Salter Street
STAFFORD
Telephone: 3420

LESLIE BROWN
Super Toy and Model Store
95 High Street, Stockton-on-Tees
Telephone: 67616

OVERSEAS DEALERS

AUSTRALIA

Walter & Stevenson Pty. Ltd.
395 George Street
SYDNEY
Telephone: 29 3566

CANADA

ESBE SCIENCE CENTRE
3431 Bathurst Street
TORONTO, 19
Telephone: 789-3161

NEW ZEALAND

BUNKERS LTD.
P.O. Box 58
HASTINGS
(Mail orders from all countries welcomed)

Wants

• Any model buses, except post 1950 English Dinkies. Also any pre 1950 Dinky cars, etc., and models by Crescent, Chad Valley, or similar. R. White, 58 Richardson Street, Carlisle.
• Airfix Magazines, Flying Reviews, pre-war Aviation Magazines, and World War I Flying Books. J. Pothecary, "Mountain Greenery", Pinewood Close, Highcliffe, Hants.
• The following Meccano spares, 171, 118, 20B, 16. Hillcrest, Panteg, Pontypool, Mon., S. Wales.
• Battery transistor radios, any condition for spares. J. Le Maistre, Les Croix, St. Ouen, Jersey.
• M.M. Binders and pre 1960 M.M.s. Condition, price? 11 Chestnut Avenue, Leigh, Lancashire.
• Wanted, Hornby 0 gauge engines, clockwork or electric, needed for boys' club, reasonable. T. Wheeler, 230 Winson Green Road, Birmingham 18.
• Pre-war railway models, English or foreign, anything considered. 14 Wren Avenue, Southall.
• Meccano Gears, Sprocket Wheels, E15R Motor, also sell twin cylinder steam engine. James George, Alderwasley, Whatstanwell, Matlock, Derbys.
• Meccano No. 10, please quote price. Brown, 21 Grove Vale, Chislehurst, Kent.
• Obsolete Dinkies, will pay price for any or all military models, please send list. Tim LaGanke, 1104 Argonne Road, South Euclid, Ohio, U.S.A., 44121.
• Obsolete Dinkies and Tootsietoys, pre-1950. Single models or collections purchased. D. Pinnock, 10 Hurstville Drive, Waterlooville, Hants.
• Meccano Magazines, bound, single, any year. Bearing 167. Critchley, 70 Sussex Road, Ickenham, Middx. S.A.E. or phone Ruislip 9148.
• Meccano gears and other parts, good condition. Briggs, 25 Burnbreck Gardens, Wollaton, Nottingham.
• Electric Motor, totally enclosed main, supplied to trade by Meccano Ltd. for working exhibition models pre-1914 or later. E. Cope, St. Michael's, Bolton-le-Sands, Nr. Carnforth, Lancs.
•Wanted, Dinky Toys "Corporal" Missile Launcher number 666. Good price paid, also Vickers Medium Tank. Cavet, 396 Bitterne Road, Southampton.
• Good prices paid for obsolete die-cast models, Dinky toys, Tootsietoys, etc.; also early clockwork toys. Will buy one or a whole collection. Dr. Gibson, The Green, Anstey, Leicester.
• Illustrated Books about British Army W. W. II. Bryden, 1 Abbey Hill Kenilworth.
• Wanted, Dinky double-deck buses. Tresise, Bareppa, New Road, Swanmore, Southampton, Hants.
• Military vehicles by Britains wanted: Beetle lorry 10s.; Artillery limbers 10s.; 4-wheel, 6-wheel trucks 15s.; Army tender, 10-wheel, Bren carriers, £1; Centurion tank, 30s. Fields Dairy, Six Hills Way, Stevenage, Herts.
• French and English Dinky aircraft wanted, particularly pre-war types. Please state condition and price required. Have several pre-war Meccano Magazines and recent French and English Dinky cars if exchange preferred. A. Dimmock, Andaraie, Nelson Road, Winchester, Hants.
• S.M.L. No. 4; send price and condition to J. Gamble, 46 Cycle Road, Lenton, Nottingham.
• Keys bought; all prices paid. Apply Gerald Davis, 113 Bybrook Road, Ashford, Kent.

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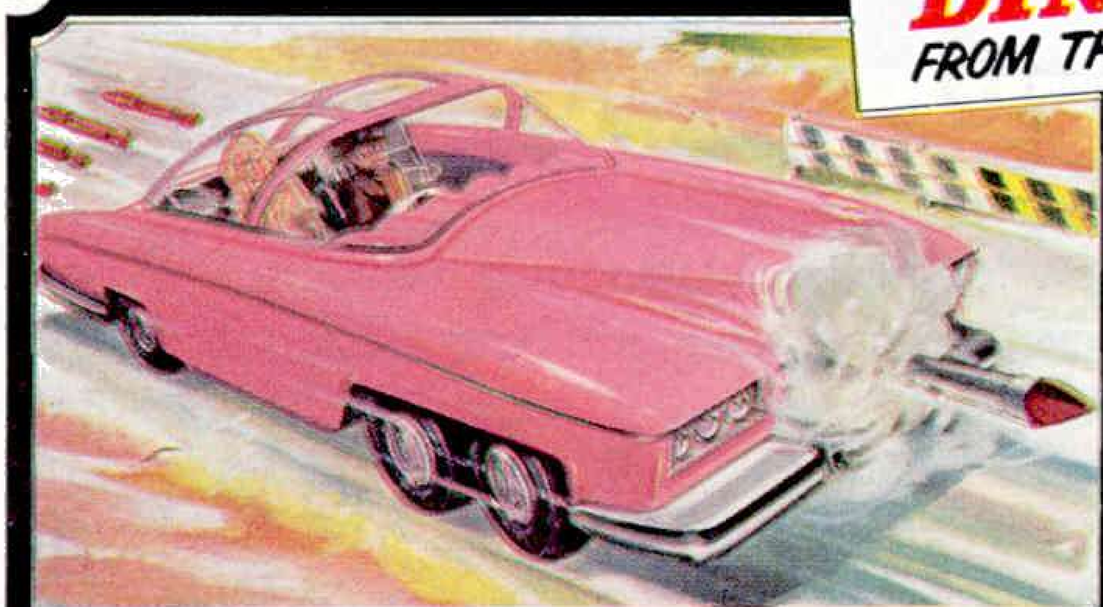
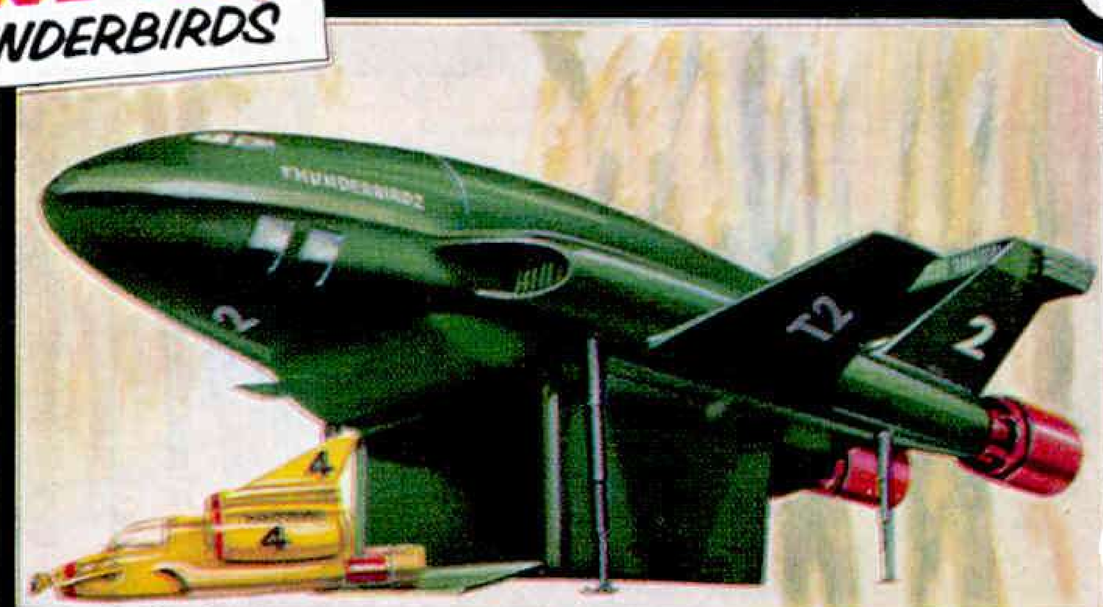


LADY PENELOPE'S ROCKET-FIRING FAB 1 •Fires 5 rockets (Hinged radiator conceals big block-buster, and there are 4 pursuit rockets) •Sliding cockpit canopy •Lady Penelope and Parker •Jewelled multiple headlights •Super Finish •Plated details. Length 5¼"



THUNDERBIRD 2 WITH THUNDERBIRD 4 •Sensational 2 in 1 special from DINKY •Thunderbird 2 has spring released telescopic legs •Pod contains Thunderbird 4 for solo flights to high adventure. •Superb details. Overall Length 5½"

From Hamleys, Harrods, Gamages, Selfridges, and all good toy shops. Manufactured by Meccano Ltd., Binns Rd., Liverpool.

There's always something new from Dinky.

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