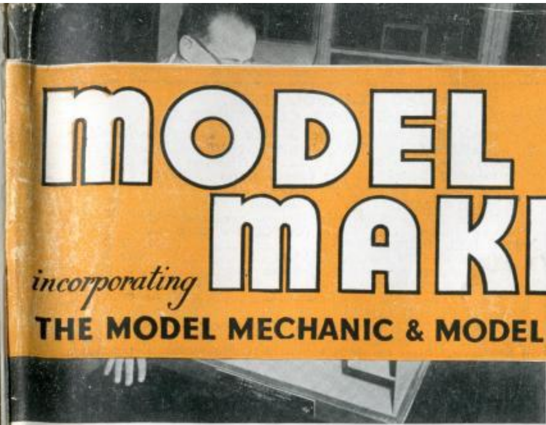

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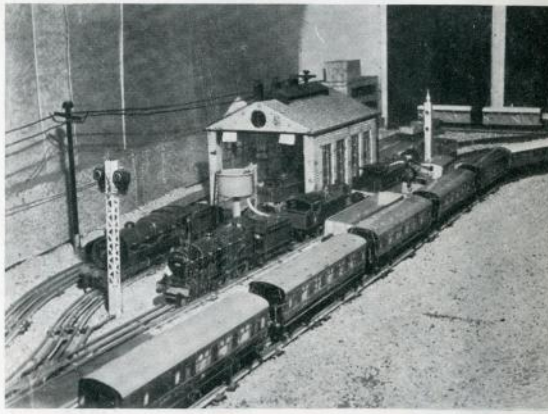

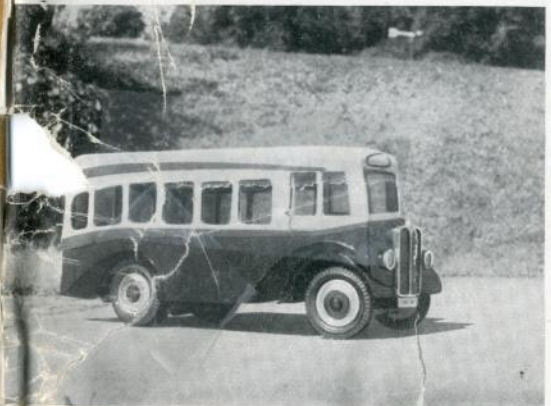

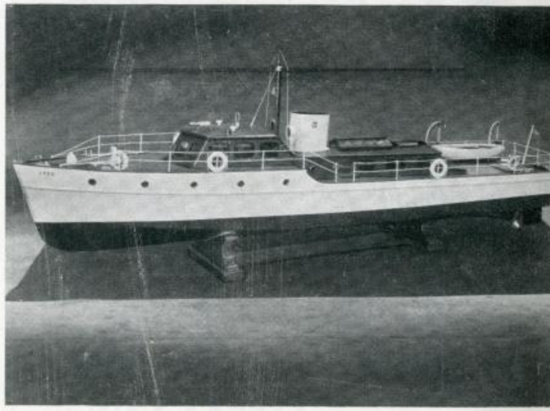

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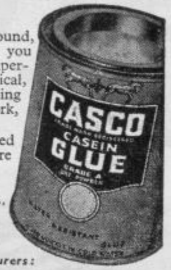

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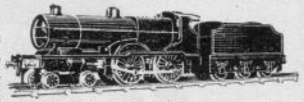

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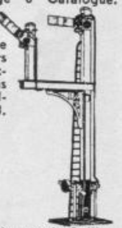

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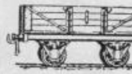

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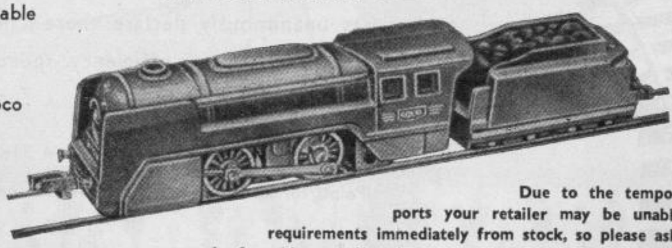

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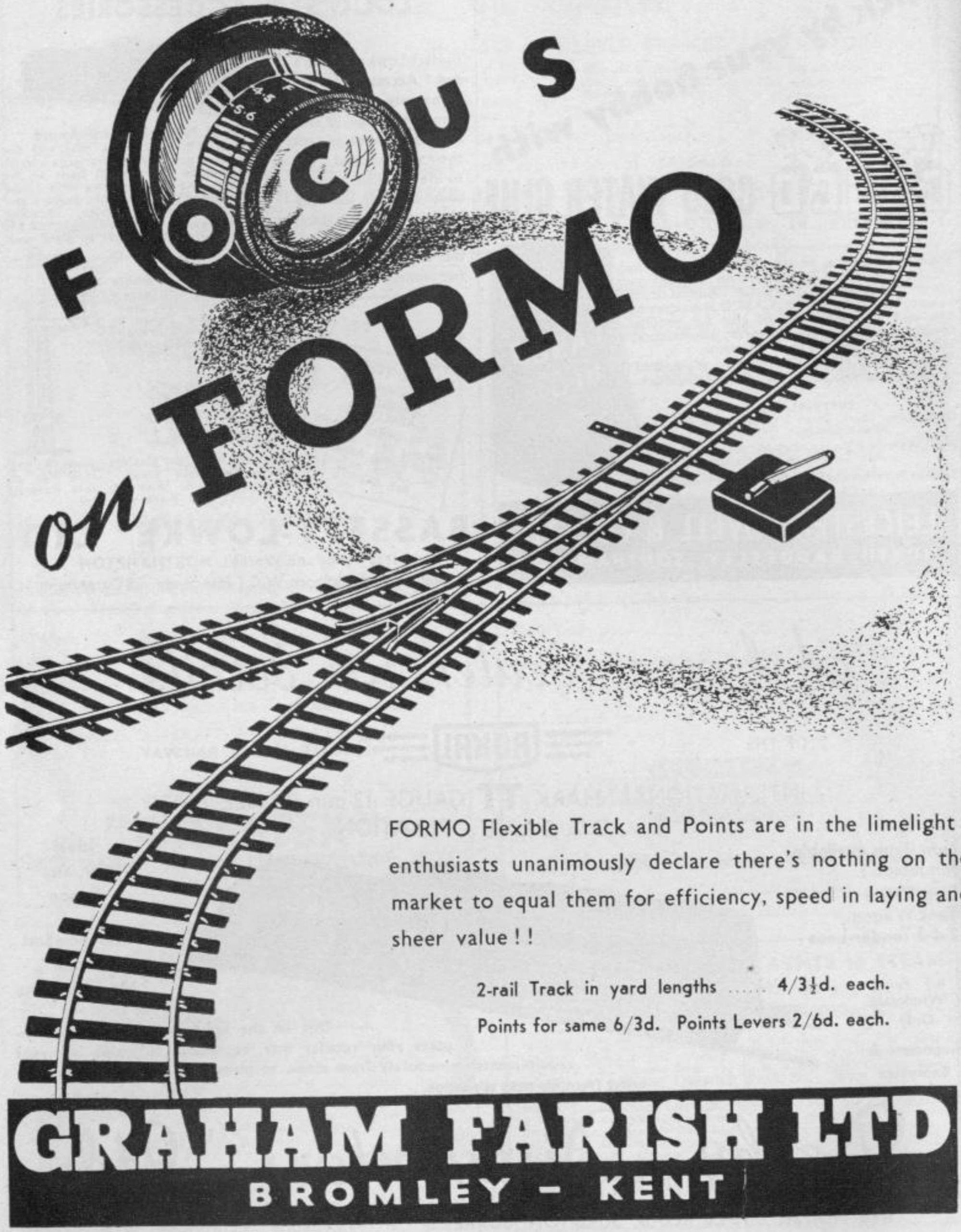

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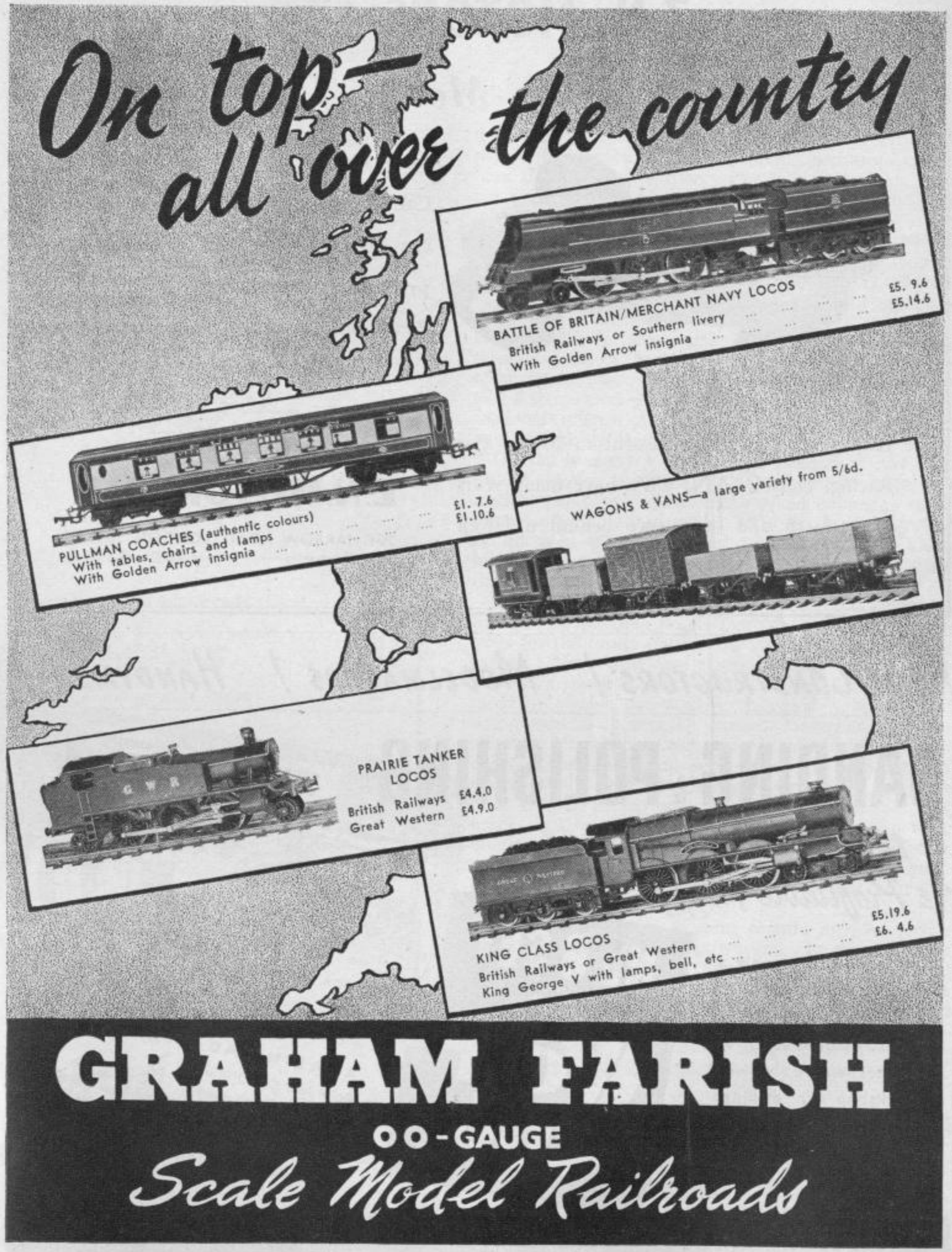

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Published monthly on the 1st of the month. Subscription Rates - 25/- per annum prepaid, or 13/- for 6 months prepaid.

Editorial and Advertisement Offices :
THE AERODROME, BILLINGTON ROAD
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Contents

"Data Hounds at Work . . ."

THIS month our Editorial post has been enlivened by an avalanche of Readers' Survey Forms, now in the process of analytical dissection. It is early, of course, to have reached any definite conclusions at the time this is being written, after only four days' post has come in, but already certain trends have become manifest.

Most interesting is the struggle for power between four established section leaders in the popularity poll, Boats, Cars, Railways and Model Engineering, all running neck and neck with a photo finish in prospect. By adding Yachts to Boats, and forming an aquatic section, then we have a clear lead: or again by adding relevant parts of Architecture to Railways, they could come to the front: while by splitting Trade and Contest Reports and giving their votes to their particular sectional interest, Cars or Model Engineering could equally take the lead.

On the readership side we are pleased to note that *Model Maker* averages, at the moment, over two readers per copy: some hard-worked copies go to as many as half a dozen readers, and the hardest worked of all goes through twelve pairs of hands! These high figures permit a few aristocratic copies to remain the exclusive property of a single reader.

About one in five forms submitted are accompanied by letters expanding points therein, or making suggestions for the future outside the immediate scope of the survey. New ideas are legion: we are urged to dare a 00 live steam locomotive, to devote more space to model tramways, non-working ship models, plastics and new processes in general, commercial vehicles, colour schemes for shipping companies, and P.S.V.s—indeed every conceivable slant seems to have been touched upon. While suggesting so many new things, we have been cheered by the many readers who have said how much they have enjoyed the fare provided, and were offering new outlets in a creative and not a carping spirit. Then again, we have the enthusiasts who would like more of their own speciality—in particular the model yacht and boat groups.

Here, as we confessed some months ago, we realise the immediate need for expansion. In this issue we offer W. J. Daniels on Sailmaking, a novel model Kayak Canoe by P. W. Blandford, A.I.N.A., and a waterline model article, and other good things are in hand for the future.

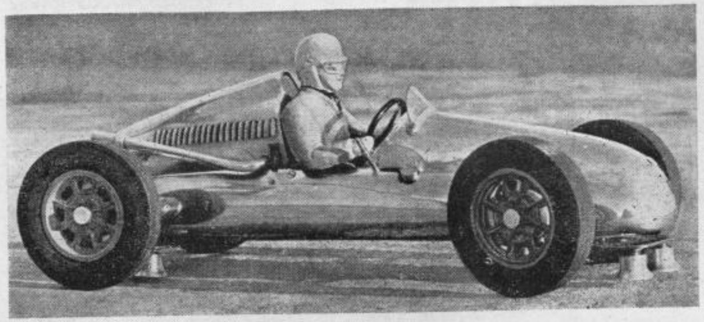
Now we must return to our statistical duties—an interim report of which should be ready for our next issue.

ON THE COVER . . .

Top right : A magnificent model of the famous "Caliph" by J. H. Frye of Chiswick, shortly to be described in "Model Maker". Centre left : John Parker's remarkable Frog-engined Cooper 500 model. Centre right : A view of the Stanton Model Railway, another forthcoming treat for readers. Bottom left : C. A. Garnett's realistic freelance bodied A.E.C. Bottom right : Flashback to the Northern Models Exhibition showing J. W. Greenhalgh's prize winning 4 ft. steam-driven Cabin Cruiser.

A RAIL RACING COOPER

JOHN PARKER'S NEW FROG ENGINED MINIATURE



Left : Although the builder is modest in his claim to scale proportions, the little rail-racing Cooper has a very authentic look, to which the driver contributes his share. Below : The rear view shows the Mark V type bodywork to advantage.

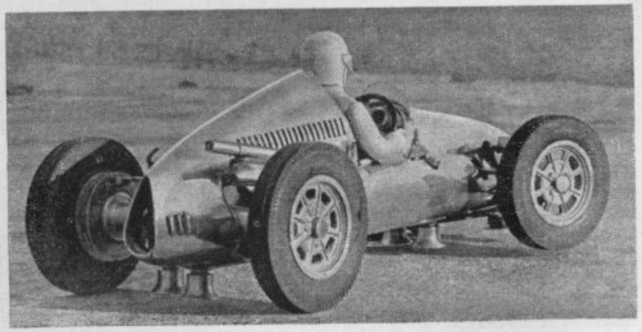
JOHN PARKER, pillar of the Meteor M.R.C.C., is nothing if not versatile in his model making, but although he has built model racing cars in all shapes and sizes, it is as a specialist in the smallest capacity diesel-engined jobs that he has had most of his success. He won the M.G. Trophy decisively in 1949 with a very fast little E.D. engined car, the Parker 500, and has been playing variations on this theme ever since. When the Meteor Club commenced operations with their Grand Prix Rail Circuit, John was immediately and deeply involved, first on the construction of the track, and then as a keen competitor with a Baigent designed model of the type used by the Club for their initial trials.

It wasn't long, however, before the urge for individuality led to a search for a new subject for a rail-racer, and at the same time it was decided to embody a number of experimental features. The engine chosen for the new car was a 1.5 c.c. Frog diesel, which has been giving very good results since its introduction, and after some thought the Mark V Cooper 500 was plumped for as a prototype. This is undoubtedly a happy choice for an engine of this size, although, of course, since the maximum engine size for this type of racing is 1.5 c.c. and the aim is to promote full Grand Prix races, the choice of a Formula I car would be equally legitimate in this instance.

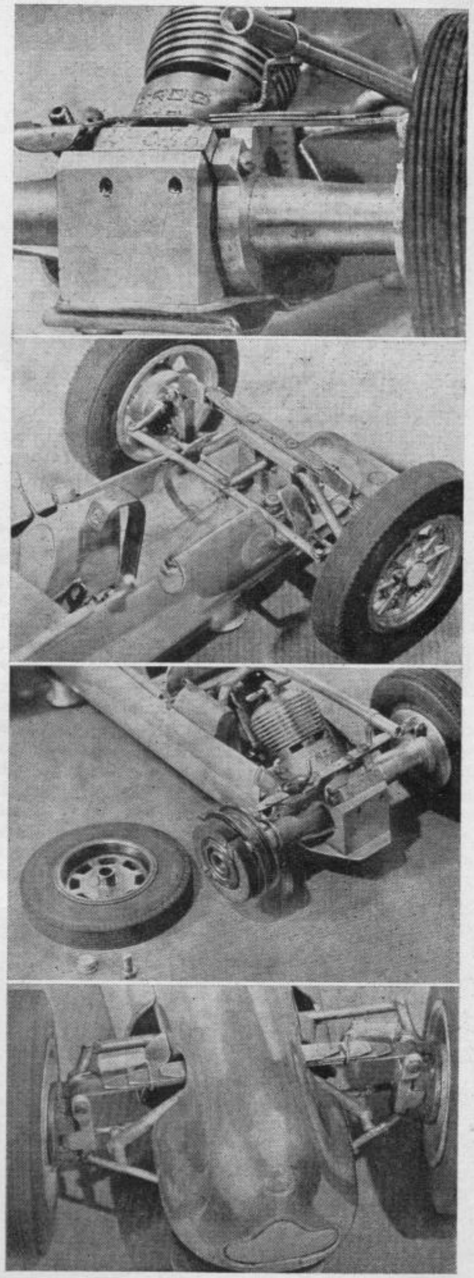
Great emphasis is happily being placed on realism in the new circuit racing, and as much detail as possible was to figure in the Cooper's specification, so to this end as many photographs as possible were studied, together with the "Phototype Parade" of the Mark V in *Model Maker*. The Cooper's suspension system is one of its most attractive and distinguishing features, and this was to be included in full, but in view of the fact that a fixed guide rail and fixed rollers prohibit up-and-down movement of the car, the springing had perforce to be for show only.

The backbone of the model is a flat strip of dural, $1\frac{1}{8}$ in. wide and some 9 in. in length, the material being 18 g. The complete underbody is then completed by the addition of the two curved side panels of aluminium, beaten to shape and riveted to the edges of the flat base, the half-round section of the side pieces giving considerable additional rigidity to the structure, as well as following faithfully on the full-sized job. Normal practice with rail-cars is to mount the engine horizontally facing forward, but in this instance the engine has been set at 45 deg. to the base by means of a specially shaped engine mount, screwed to the extreme rear of the flat plate, and so designed as to give support under the crankcase and to provide a stout platform for the rear engine lug, and into which the holding-down screws are threaded. The support for the forward engine lug is again a specially shaped block, which performs the dual purpose of engine mount and bearing for the rear guide plate pivot bolt which passes downwards through its centre, and is brazed into the guide plate.

The near-side rear wheel is driven through a particularly neat clutch, which utilises the inner surface of the wheel rim as a drum. The shoes are made in their entirety from friction material and are very narrow. Being light in weight no springs are required, and this arrangement is very suitable for rail racing. The wheel itself runs on a ballrace and is



(Right, reading from the top) : The special offside rear wheel mounting is bolted through the crankcase lugs of the Mills 150 ; details of the guide-rail controlled Ackerman steering and the divided track-rods ; the engine-mounted two shoe centrifugal clutch showing the clutchdrum in the rear wheel, also the ballrace in the hub ; and a close-up of the scale front suspension, complete with driving mirrors carried on the transverse spring, tubular wishbones and dummy telescopic struts.

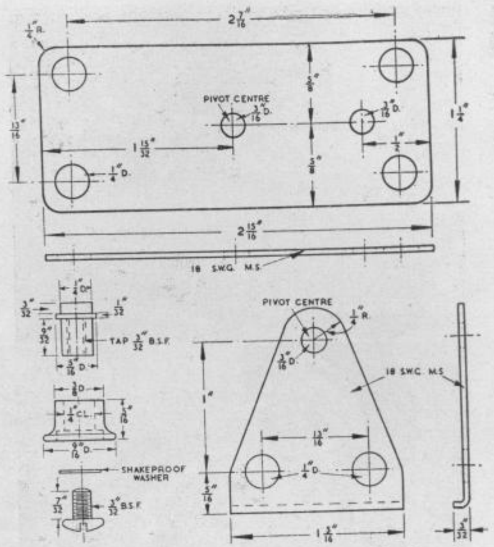


secured by a screw threaded into the crankshaft end, and concealed by a plated cap which in turn screws into the wheel hub. A groove is turned in the brass flywheel, which is $1\frac{3}{8}$ in. dia., and $\frac{1}{4}$ in. wide. The offside rear wheel is carried on a specially made extension, which abuts on the crankcase at its flanged inner end and is bolted through the crankcase lugs A dummy brake backplate is in one piece with the extension, which incorporates attachment lugs for the outer end of the transverse rear spring. The opposite end of the spring terminates just behind the flywheel, to which, of course, it is not attached.

The front end of the chassis is very interesting, as it incorporates experimental Ackerman steering controlled by the front set of guide rollers, and it may be said that this arrangement is reported to work very well, and will probably sound the death knell of the earlier centrally pivoted axle. Being to 1/12th scale and very accurately modelled, the component parts of the front suspension and steering assembly are of necessity on the delicate side, but so excellent is the workmanship in this case that the arrangement is both practical and efficient. There would, however, be no reason why other and less skilled builders should avoid attempting the Ackerman system on a rather more robust scale, since it is infinitely to be preferred in principle to the old crude swivelling beam of the cable tracks. In operation the pivot pin of the front guide plate passes up through a block in the base, and has an arm extending backwards and terminating in a fork. From this fork twin track rods pass to the front wheels via short steering arms. The track rods are tubular, with riveted joints.

The wishbone members and telescopic struts are of piano wire and tube respectively, with soldered joints, and the vertical members carrying the steering king pins are carved from dural. A correctly proportioned transverse leaf spring is attached to the central block and is attached by means of eyes and shackle pins to the vertical members. Regulation rear view mirrors are fitted to either side of the spring, the mirror surfaces being plated and polished.

A feature of the Cooper which has occasioned some difficulty in the past has been the special light



alloy wheels, with their distinctive webbed spokes, without which it is very hard to produce a convincing model. At first sight special castings would appear to be the only answer, and when we first saw John Parker's model we were deceived into thinking that this had been adopted. A further examination showed that he had cleverly simulated the Cooper wheels by a quite simple and ingenious method of his own. The wheels were first turned from brass bar to 1$\frac{7}{16}$ in. dia., to fit H. C. Baigent's "non stretch" tyres. The slots were then cut, and the spoke webs, represented by lengths of wire, and the nuts were laid in and the complete wheel tinned, with the realistic result seen in the photographs. All wheels run on ballraces, and are a little oversize to true scale, to allow adequate clearance for the rail.

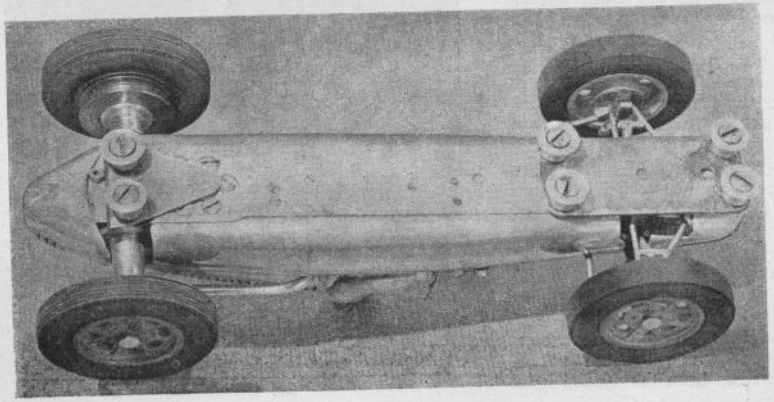
Incidentally, although the springing is at present locked solid, it is envisaged that at some future date experiments with limited suspension may be put in hand, and the conversion to working springing will not be a difficult job.

To complete the chassis a special fuel tank has been made up to fit on the near-side of the baseplate, and this takes the form of two chambers of roughly triangular section, connected by a shallower portion which passes under the driving seat. A filler is fitted in the scale position, matched by a second dummy cap on the opposite side. A vent is fitted to the rear part of the tank, and a crafty piece of linkage couples the fuel cut-off to the gear lever on the driver's right, to which an extension can be screwed for track racing. A dummy hand brake is featured on the near side. The normal rail racing guide plates and single flange rollers are pivoted beneath the baseplate.

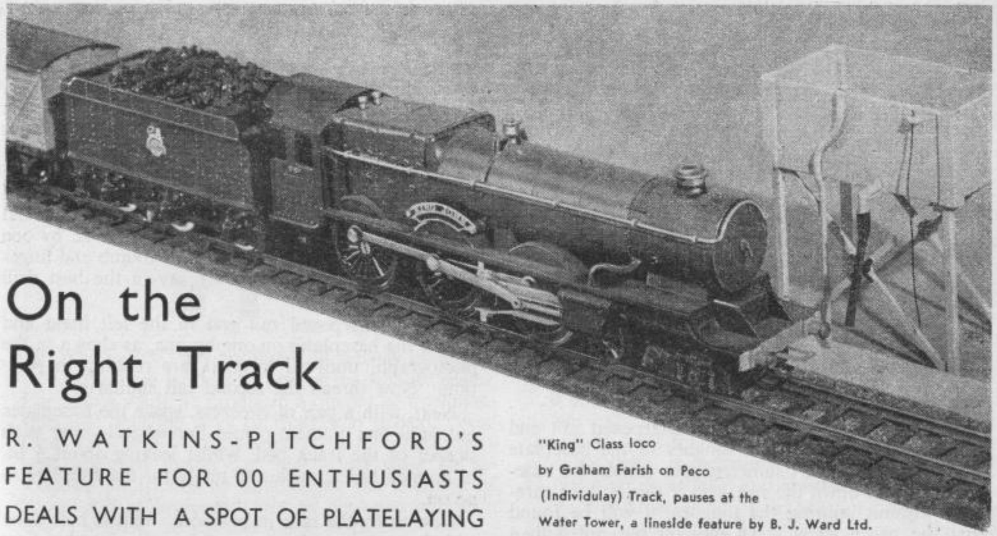
The bodywork is extremely pleasing, and an excellent example of home panel bashing. The builder apologised for the fact that he had no "tidy hard and fast rules to pass on to readers", saying that if he had, perhaps the results would have been more accurate, a piece of modesty we feel to be superfluous; he mentions that in building his B.R.M. model he did go to the trouble of making a set of templates, which were well worthwhile, but in the case of the Cooper this was not done. The body bashing in this case was carried out on a hardwood block, with various contours and hollows shaped therein, the aluminium sheet being beaten from the inside using a light ballpein steel hammer until the desired shape was achieved. The tapered portions of the nose and tail are curved round and completed by the addition of small internal plates riveted in position.

The neatly executed louvres which appear in the rear portion of the body only were, believe it or not, cut with a very sharp penknife blade, and finally finished by file and punch, plus "lots of patience" These were done, by the way, after the body was beaten to shape.

(*Continued on page 216*)



Underside of the Cooper chassis, showing front and rear guide plates and rollers. It is intended to offset these later, to make them less conspicuous.



"King" Class loco by Graham Farish on Peco (Individulay) Track, pauses at the Water Tower, a lineside feature by B. J. Ward Ltd.

On the Right Track

R. WATKINS-PITCHFORD'S FEATURE FOR 00 ENTHUSIASTS DEALS WITH A SPOT OF PLATELAYING

IN the issues of *Model Maker* for December, 1951, and January, 1952, we went over the initial steps in constructing a specimen section of track from the components supplied in our Track Pack. This Track Pack provides for the making up of 3 ft. of track in two 18 in. lengths. Since the procedure for each length is identical, it will suffice if we deal with one of them and the instructions given so far refer to one 18 in. length.

May we have a re-cap? First you may remember we laid 46 sleepers into the slots of the ballast unit —putting them in face downwards—and then, using either the drybond tissue and a hot iron, or by painting over the sleepers and ballast unit with adhesive, we stuck on a binding of grey paper so that ballast unit and sleepers were now bound together in one strip.

This strip was then turned upside down (or rather right way up!) and a bank was imparted to the ballast unit by filing down one (or both) of its edges until we secured something resembling the way the ballast is banked up along a road bed.

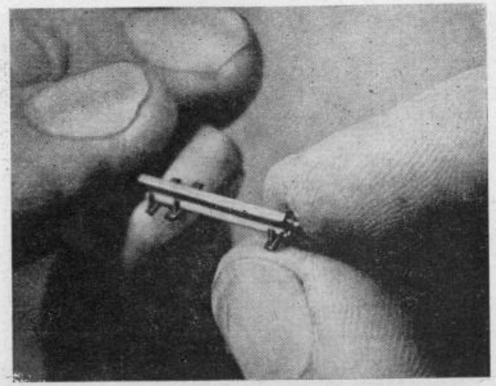
Our next care was to roughen up the surface of the ballast unit around the sleepers, and we saw that by judicious application of a wire brush we could tease up the surface of the cork to anything from a "crushed cinder" to a coarse grade ballast effect.

This did not look very convincing until we dyed the cork all over with a solution of Indian ink in meths, whereupon, it began to look the part—and this is as far as we had got when the whistle went for time.

And now comes the most interesting part of all, namely, the laying of the rails. You may remember that for this particular experiment in platelaying we decided to use rail of the flat bottom variety. In full-size practice there are several methods adopted for the laying of flat bottom track, and the one chosen depends upon numerous factors such as the locality, the nature of the traffic, etc. The flat base in a Vignoles type rail may be spiked down direct on to the sleeper, or the rail itself may rest on a baseplate and be held down thereto by spikes. In some types these spikes are of a shape somewhat like a shepherd's crook and, being of tempered steel, the crooks have a certain amount of spring, the effect of which is to reduce the tendency for the shank of the spike to be pulled out of the sleeper when the track gives under the weight of passing traffic.

These baseplates with their spring spikes are represented in our Track Pack by a packet of fibre plates having small tongues or leaves punched in them, after the manner of (e) in Fig. 1. Since these fibre baseplates are pretty closely to scale they are, necessarily, very small, and it may at first sight appear a formidable job to thread them on to the rail. But in fact this operation is quite simple and rapid, if the end of the rail is properly sharpened.

In all assembly jobs of this kind, it is advisable to adhere to a regular routine and so we shall proceed to sharpen both ends of both rails as a first operation. Only a few strokes with a fine file are needed to do this and the procedure is indicated in Fig. 1. Here (a) shows the rail end in its natural state. At (b) the two sides of the base have been filed to an edge, at (c) the web of the rail has been filed to an edge and at (d) the base has, in addition,



Showing how the baseplates with imitation spikes attached are slid on to the rails.

been filed to a point.

It will now be seen that this sharpened rail end when pressed between the tongues of the baseplate will splay them apart sufficiently to enable the baseplate to slide down the rail, and if this is done carefully without injuring the tongues, it will be found that the baseplate will not pull off the rail with a direct downward pull, unless quite considerable force is exercised. This means that when the rail is fastened down to the sleepers by these baseplates it will be firm and free from any tendency to lift out or cant on its side.

When all four rails ends have been sharpened, the next operation is to count out the little baseplates into two piles of forty-six each. Place a thick book on a piece of newspaper and on the top of this place a piece of white card. Now scatter one pile of forty-six baseplates on this white card and spread them out so that they can be picked off one by one over the edge of the card with "the thumb and finger of the right hand" as they say in the best drill manuals.

Hold a sharpened rail end in the left hand and thread the baseplates on one by one, as shown in the photograph, until all forty-six are roughly in position. Now thread the second rail similarly.

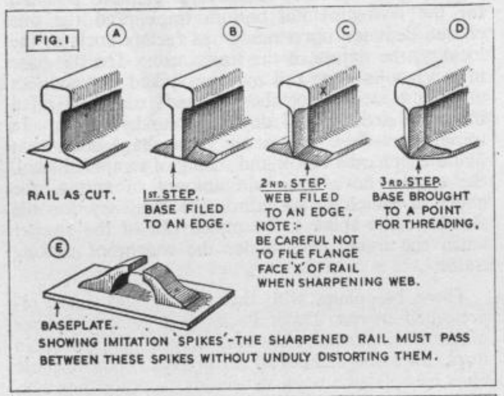
Next, with a pair of tweezers, space the baseplates out until one of them comes immediately over each sleeper of the track bed, whilst leaving about ¼ in. of pointed rail at each end ready for the fishplate to go on.

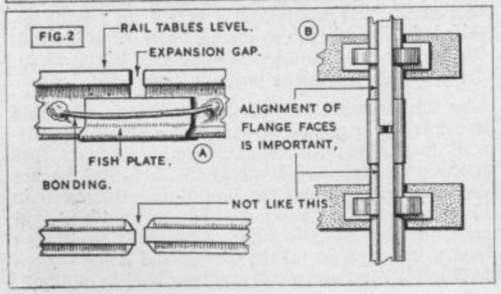
Now to fix the rails in position. This is best done with Seccotine, and it is worth mentioning that Seccotine is best bought in tins of 1 lb. or more at a time, as this is by far the most economical way of using it. Place a dab of Seccotine the size of a shilling in an old saucer, pare down the handle of an old water colour paint brush to a thin blade and use this to put on a small dab of Seccotine on the bottom of each baseplate of one of the rails. Now lower the rail into position on the sleepers so that the baseplates fall into line on the little ridges provided on the sleeper face. Hold the track bed up to eye level, look down the length of the rail and make sure that it lies in a dead straight line. When you feel happy about this, lay the track bed down on a flat surface and leave it for half an hour or so while the Seccotine becomes partly dried out. Then repeat with the second rail; lay this into position and while the glue is still wet, drop a track gauge over the rails so as to make sure that they are parallel and to gauge throughout their length. If the first rail is sufficiently set it will pull the second rail into position when the gauge is applied and, when this is done, place a strip of card or plywood on top of the two rails, weight down with books, etc, and leave to set firm—preferably overnight.

There now remains only what may be called the finishing touches to be done.

When the second 18 in. length of rail has been completed in all respects similar to the above procedure, the two lengths can be joined to make one 3 ft. length, and this brings us to the matter of fishplates. Since all eight ends of our rails will have been sharpened as shown in the sketch, it should be an easy matter to slide on the fishplates. Do not

(*Continued on page* 208)





MANXMAN ON

Smaller & Better Railways in TT

Heading : The latest addition to the Rokal Goods stock—correct to the last detail.

A WELL-KNOWN authority on railway modelling at one time worked in one of the smaller scales. For a long while he produced a quality of workmanship that was the envy of most who beheld. And then, at a time when it seemed that he had pretty well achieved mastery in that small scale he astounded his friends by announcing his intention of adopting a scale nearly twice as big—and today, in this new scale, his name is again "tops".

One day one of his friends asked him what decided him upon making the change. To which he replied, "I've come to the conclusion that if your interest lies in modelling locos and rolling stock, you cannot hope to get results that really satisfy in any scale under about 1½ in. to the foot".

Well, of course, not many of us have either the facilities or the workshop experience to model in 1½ in. If we had we should not, in all probability, have the space even to lay a hundred feet of straight track to test out our loco on.

All the same there is a lot of truth in our friend's claim. If you really want to model so as to reproduce the finer details by which a loco is distinguished, it does mean keeping to the big modelling scales, and it takes you rather into the model engineering than into the model making sphere of the hobby.

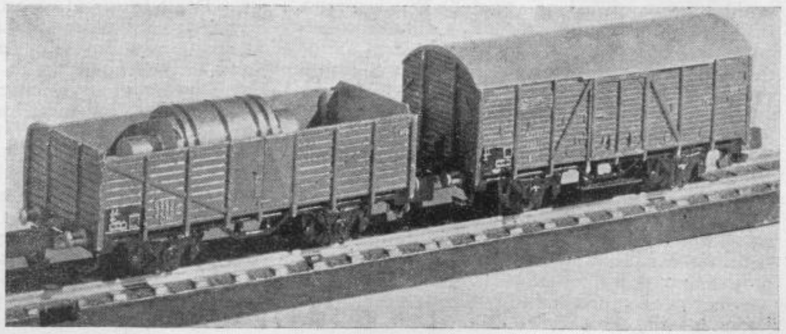
In fact it is rather a melancholy thought that the smaller the modelling scale selected, the less hope there is for the home constructor to secure super detail results.

When he gets into these very small scales, such as are indicated by a 12 mm. track gauge, for example, he finds that scale accuracy and the inclusion of super detail is inevitably and inexorably opposed to operating reliability and general handle-ability.

On the other hand, it is precisely the adoption of these small scales that enables us within the limited space at our disposal to lay down something like a complete working railway system. In other words, as we come down the scale, the centre of interest naturally shifts towards the scenic picture and the operating possibilities of our railway and demands less and less of the detail that we have come to expect in our larger models.

Does this imply that our super-miniature locos and carriages must be crude and lacking in detail? By no means. So great have been the strides taken in recent years in the direction of perfecting the process of pressure die-casting that it is by far the wiser line to cash in on the work that has already been done on our behalf and thus reserve our own time, resources and spare cash against that part of our railway that we must perforce plan and build for ourselves.

In short, since the primary object of the very small scale railway is to provide good operating, it is the



Right : Rokal Goods Stock—a good example of the detail that can be secured by modern pressure die-casting methods.

better part for most of us to buy the locos and rolling stock ready-made and then concentrate our energies upon making our railway as a whole look and behave realistically. In any miniature railway there are three main directions in which we can aim at realism.

We can have Scale Realism—that is to say the correct outline, colouring and detail of our locos and rolling stock. We can have Scenic Realism—that is to say the general setting in which our railway is set to run, including the landscape, feats of civil engineering, lineside and other railway-like features. And we can have Operational Realism—that is to say the running of our passenger and goods trains over our railway system in an orderly and convincing manner, so that they serve the requirements of our imaginary countryside.

And these three kinds of realism are to a large extent mutually exclusive. If we follow up any one of them towards finality, it must, necessarily, be at the expense of the other two, if only for the reason that we each have but one lifetime at our disposal. In TT gauge, therefore, the tendency is towards buying as much as possible of the locos and rolling stock ready-made and devoting one's attention to layout (including, if possible, the fascinating subject of track making), scenic and lineside effects and operating. There is more than enough here to keep the home constructor out of mischief for many a long year to come and those who already have railways in a broader gauge will now have to become accustomed to thinking in terms of the smaller modelling scale throughout. They will, if they are wise, avoid falling into the temptation to use sharp radius curves. It is the sharpness of the curve relatively to the gauge which has for too long cramped our style as railway modellers and has given rise to anomalies such as the 4 mm. modelling scale on the 16.5 mm. track.

The TT gauge offers us the chance to escape from this slavery. We can still afford to use curves of 2 ft. to 3 ft. radius. The overall dimensions of our layout may not be much less in TT than they were in 00, but the saving of space in other respects is a boon and a blessing—trackway narrower, roads narrower, platforms shorter, buildings smaller, sidings shorter. In fact, a greater amount of more realistic modelling at our disposal.

At the moment of writing no one British manufacturer appears to have tackled the subject of producing a complete range of locos, rolling stock, track and control equipment in this gauge, but that is an omission we may hope soon to see rectified. In the meantime supplies of equipment from the Continent are coming through steadily, if slowly, and our retailers are usually able to fulfil orders for customers on their books after a short delay.

ON THE RIGHT TRACK

(*Continued from page 206*)

butt the rail lengths up solid, but leave a small expansion gap, which on a model railway serves the same purpose as it does in full-sized practice. For this reason—namely, to allow your track work to expand and contract with changes of temperature without buckling or losing gauge—fishplates should never be soldered to their rails; they should make a good firm sliding fit, which preserves the rails in alignment both laterally and vertically. But since the fit *is* only a sliding one, it cannot be expected to make a very good electrical contact and, therefore, the fishplate joint should be bonded across by a short length of wire soldered to each rail. Don't be afraid to leave a slight slackness in this bonding wire. If, in the interests of making a neat bond, you stretch the wire tight across the fishplate, it will almost certainly pull one of the soldered joints adrift as the rails cool down after soldering, or when a cold spell of weather comes along.

A word in parenthesis about fishplates generally. Some constructors are apt to consider that if the fishplate keeps the running surface of the adjacent rail ends at the same level, it has done all that is required. But there is another very important matter that must receive attention. The inner face of the rails—where the flanges travel—must also be in the same vertical plane at the rail joint, otherwise the projecting edge will be struck by the passing flange and may cause a derailment, particularly if the projection is facing the direction of travel.

On straight track there is not a great tendency for the rails to get out of alignment in this respect and the fishplate, if it makes a reasonably good fit, can usually be relied upon to preserve this alignment. But if it makes a sloppy fit, and particularly on curved track, there will be a tendency for the rails to make a "dog leg" joint, which will interfere with smooth running. The sketch in Fig. 2 will help to explain. Incidentally, be careful not to injure the table or flange face of the metal when sharpening down the ends to take baseplates and fishplates.

When your bondings are in place, go over the base and web of the rail with a thin coat of Brunswick Black. Treat both inside and outside of each rail. Don't be afraid of getting an odd smear on the rail table, because this should, in any case, be cleaned up with a piece of fine and well-used emery cloth—or, better still, with a special Rail Cleaner—before attempting any running of locos.

Another finishing touch that is worthwhile is to go over the track again with the wire brush, making the banks at the edge of the road bed and the part in the middle between the rails lighter in texture than that around the rail bases.

Your completed length of track can now either be glued down or, preferably, pinned down to the baseboard. If you use pins the track can always be taken up later without damage and transferred elsewhere—the heads of the pins if touched up with Brunswick Black will not be noticeable.

Improving the Model Railway Layout

H. A. ROBINSON'S REGULAR FEATURE FOR 0 GAUGE ENTHUSIASTS

Make a Sand Drag

THE more detail that is added to a model railway, the more perfect a model does it become. Furthermore, numerous and varied items enhance the general sense of reality in rather a remarkable manner—and it is this sense most modellers wish to secure.

Track ends provide a lot of interesting variety. They are anything but standard, their shapes and styles ranging from the massive hydraulic buffers of the main-line terminal station to the elementary turned-up rail ends often found in factory yards.

Here then is considerable scope for the model-railwayist who wants to have a good amount of variety in detail on his layout. A number of different dead-ends can be obtained commercially, and some types are very easy to arrange—as say the simple buffer-plank against a building—but here is a rather novel finish which would give something "different" to most systems. It is the "sand-drag".

In real practice this type of "track end" is usually found on shunting necks and is completed with a buffer stop of some heavy kind, like the stockade. The idea of a sand-drag is to give a grip to locked and skidding wheels. This is effected by covering the rails for some distance from the stop with sand, which is made possible by enclosing each rail in a trough. The sides of these stand slightly higher than the rail, thus allowing of the head being completely with the sand that each trough contains. Skidding wheels propelled into this arrangement in effect then have the useful substance driven right under them, with the greatly increased friction that it always produces. The wheels therefore are checked and any impact on the dead-end greatly reduced. Of if the movement is slow the vehicle or vehicles may be stopped before actually touching. Some systems do not use troughs but cover the end of the track completely with sand or shingle. A typical example of this is to be found on the terminal roads of the Mersey (electric) Railway at Rock Ferry, Cheshire.

This latter method of emergency retarding does not look too well on a model railway as it merely seems to give the impression that you have spilt some ballast and forgotten to clear it away. A trough sand-drag, however, is very effective and quite worth the small amount of trouble taken in the making.

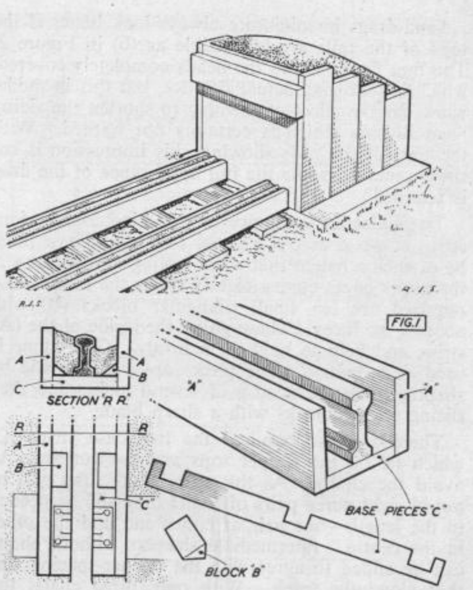


FIG. 1

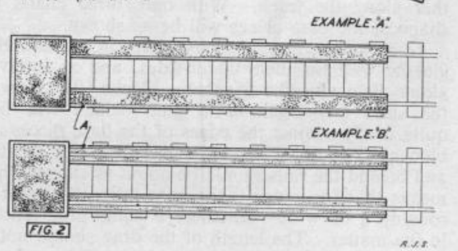


FIG. 2

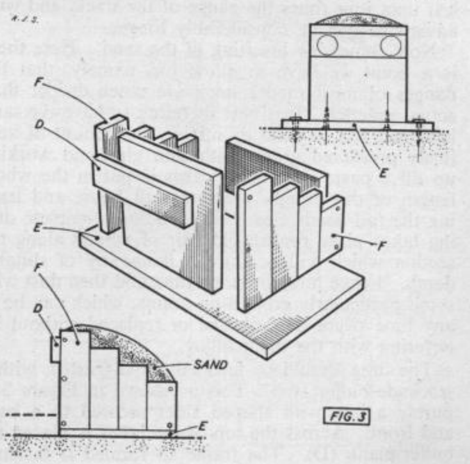


FIG. 3

Sand-drags in miniature always look better if the tops of the rails are left visible as (b) in Figure 2. The first figure shows the heads completely covered, which is following actual practice, but this in model work has the effect of seeming to shorten the siding—an illusion which is certainly not wanted. With the tops of the rails showing, this impression is entirely removed while the full appearance of the drag is retained.

To model an accessory of this kind, obtain four strips of wood as (A) Figures 1 and 2. These must be of such a height that when resting on the sleepers the upper edges comes slightly above the rails. Also required are ten small triangular blocks (B) with about $\frac{1}{4}$ in. faces. These go on the inside of the (A) strips and help to hold them firmly. Glue alone is used as a fixative. The pieces are easiest made by shaping a triangular strip of several inches and then slicing off the blocks with a sharp blade.

There are also required the two base strips (C) which lie on the sleeper tops and are cut away to avoid the chairs. As the rails in the drag will be out of sight, three pairs of chairs only will be needed to the length—one pair at either end and the other in the centre. Intermediate sleepers without chairs can be added to agree with the sleeper-spacing further along the track. With only three chairs the shape of the base-pieces will be as shown.

To assemble, place the base strips in position after glueing well on their under-sides, and at intervals along them glue the triangular blocks (B). Now fit the sides (A)—again with glue—which will hold quite firmly against the edges of the base pieces and blocks. The distance of the (A) pieces in front of and behind the rails should be about as shown which means that for gauge 0 the base strips (C) must be roughly $\frac{5}{8}$ in. wide—but there is some little latitude in the matter. The length of the drag should not be less than four times the gauge of the track, and with advantage can be considerably longer.

Now comes the inserting of the sand. Here there is a point we have to allow for, namely, that the flanges of most model stock are much deeper than actual practice. It is best therefore to have the sand held and this is done by mixing an amount of very finely powdered grains with thin glue and working up till a paste is formed. This is put in the whole length of the trough, pressing well home and leaving the rail heads clear. Then before complete drying takes place run an old pair of wheels along the section which will produce a flangeway of suitable depth. Leave now for some time and then dust with some particularly ground-up grains, which can be at any time swept off, adjusted or replaced without interfering with the main filling.

The drag should be finished, as suggested, with a stockade buffer stop. This as shown in Figure 3 is purely a box with shaped sides secured to a back and front. Across the top of the latter is placed the buffer-plank (D). The frame so formed is fastened to a thin base rectangle (E), with sprigs up from below, which in its turn is secured to the main baseboard by screws through its outer edges. Fill the box so formed either with a little actual cement or some composite preparation as say small fragments of stone that have first been dipped in the glue pot. In either case pile up the top to look like ballast. Paint the sides, back and front, bar the buffer-plank, black or buff. The buffer-plank should be pillar-box red and it improves the look if circles are drawn where the buffers of vehicles will touch—these being painted grey.

Finally with something blunt score down the lines (F) to give the impression that the sides are made up of vertically placed sleepers.

Off-Centre Bogies and Other Track Hugging Ideas

MODEL railwayists seem to fall into two categories, (1) Those who slavishly adhere to scale model vehicles and locomotives despite the fact that their track curvature is not suited to such, and (2) Workers who will happily modify stock to suit their special track.

Personally I think the second get far nearer being pukka engineers. A model railway, taken in the mass, is really a machine with many movable parts and these should each work positively and with precision. Every derailment and bad shunt is exactly as if some item in a big piece of mechanism had failed.

Scale stock without scale curves leads to derailments through the incorrect meeting of vehicle ends. Buffers do not contact properly and couplings have perforce to exert wrong directional pulls. This can always be rectified, of course, by using shorter stock but there are one or two ways that even fairly long stock can be modified to give better running on sharp radii turns.

The modifications will mean stepping out from prototype practice (though actually practice in some part of the world or other). This may again cause a cry amongst the purists, but I still contend that if modifications give better mechanical operation, that is turn the train or vehicle into a better machine, then the modifications are allowable and "good engineering". In actual practice modifications to suit various track conditions are found on railways everywhere.

Thus the huge Virginian locomotives have their whole front set of drivers on a swivel so that they swing well away from alignment with main body of the engine when rounding a bend. Most engines of the "10 driver" class have the middle set of wheels flangeless to fit better on curves, while our own Royal Scot has the whistle placed sideways to bring the over-all height within the construction gauge. Again, the West Region runs coaches of 9 ft. 7 in. width on its trains into Cornwall but has to use 9 ft. 0 in. and 9 ft. 3 in. coaches elsewhere.

All this shows that the railway engineer cuts his coat according to his cloth and if the model railwayist modifies this or that arrangement on his stock to suit the running conditions he is really being a better "rail man" than if he stubbornly sticks to some preconceived notion.

Taking it then that one of the biggest "true engineering" problems that faces the model railwayist is the getting of stock around curves that are too sharp for it, let us consider a simple expedient that will help. It is really a practice found on certain tramcar designs, and it is to set the bogies to a greater or lesser degree off-centre.

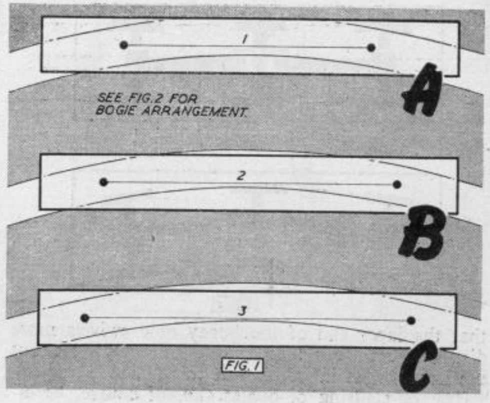
Again, if the purist says that this will not be like the real thing, let him remember that there is barely a model locomotive anywhere that has its bogey slung correctly. Generally it carries no weight and is so fitted that it can turn out at quite an angle to the frame—all of which is in the interests of good running—and fully accepted by the vast majority of model-railwayists.

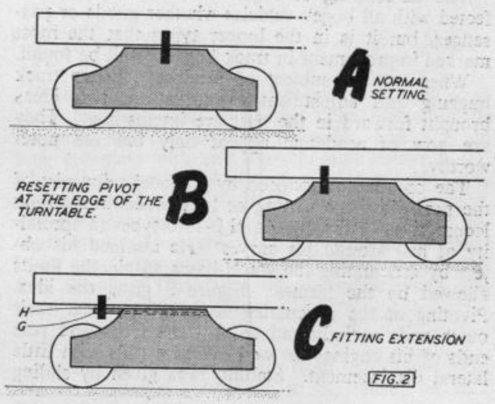
Look at Figure 1. Here we have an ordinary bogey rail-truck. These are to accommodate lengths of rail which are in the neighbourhood of 60 feet. The trucks are also used for tree trunks or any other long and rigid load.

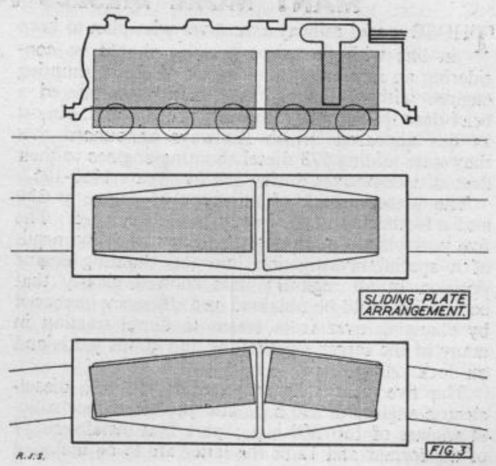
Models of this kind of vehicle, that make no pretence of being scale, often have the bogies set rather close in, which gives an excessive overhang as (A). This practice produces better running if the truck is moving alone, but worse running if operating in a train. Indeed the wrong forces set up on a sharp curve will cause "pulling over" inwards.

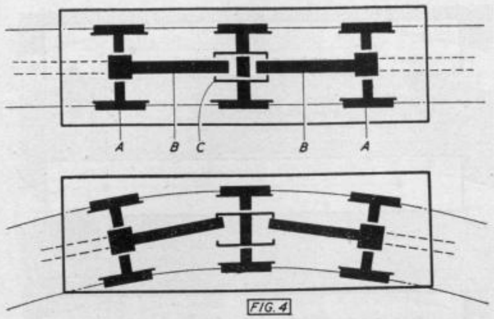
In more scale productions (B) the bogies are set nearer the ends, as they should be, but even then in many cases there will still be considerable overhang. The situation can, however, be greatly improved by pivoting the bogies off-centre as (C). Stability of running will not be impaired given that the new swivelling points fall *within the wheelbases of the bogies.* A slightly greater weight will be carried by the axles nearest to the pivots, but this will not cause any bad running. The effect of the off-centring is to take the swivelling points nearer the ends of the vehicle and so produce better "track hugging"—the ends of the frame standing at all times more accurately over the track, no matter what its configuration. Figure (C) compared with Figure (A) will make this quite clear.

The method used to set a bogey off-centre depends entirely on the make of its frame. Where a long "turntable" is given it may be possible to make use of the outer edge of this, boring and putting a new swivelling point there as (B) Figure 2. With other kinds, or to extend the top of the same type, a strip of tin (G) must be soldered under the frame as (C) Figure 2, with a smaller piece (H) on top so that the "turntable" is extended in one direction. The bolt or other pivot used in the original position can be transferred to the new centre. It should be noted









that the inner end of the bogey now swivels more distinctly *sideways* than it did and nothing about the frame must interfere with this action.

The off-centring of bogies can, of course, be effected with all bogey vehicles whether goods or passenger, but it is in the longer types that the most marked improvement in track hugging will be found.

When on the subject of producing better track hugging and adjustment to curvature, two ideas brought forward in the past are interesting. They are now of academic appeal only but are noteworthy.

The one was introduced by a model-railwayist of the period for the getting of long wheel-based tank locomotives of the 0-8-0 and 0-10-0 types (a speciality of his) around his curves. He attained his object by articulating the wheel-bases within the limits allowed by the frames. Figure 3 gives the idea. Pivoting of the articulated sections was near their outer ends as indicated so that the front and rear ends of his engines sat well over the rails with little lateral displacement. Stability was given by sliding plates at the inner ends of the sections at the position shown. On occasion this gentleman introduced two mechanisms—one to each swivelling units. His tanks ran particularly well and looked very realistic as they stood nicely on any rail formation, the slight cutting across of curves by the frame-centres being unnoticed against the better positioning of the ends. By this method of articulating the worker was able to run "heavy" locomotives on his line that otherwise would have been impossible.

The second idea (Figure 4) has to do with the now almost defunct six-wheeled passenger vehicle and again shows how keen workers at one period were on making their stock adjust itself really well to varying curvatures. This idea has some authorisation in a scheme that was suggested for full-size practice. Here the two end pairs of wheels (a) are pivoted to the main frame directly above the axles and a rigid member (b) is taken at right angles from each in towards the centre axle. This latter has some considerable side play and at its centre there is a box or bearing (c) which takes the ends of the longitudinal members.

The action of the arrangement is that when on a sharp curve and the centre pair of wheels well displaced to one or the other side, the bar connections with the end axles are pulled sideways also. This causes the end axles to turn slightly on their pivots into alignment with the curve as do the front wheels of many road vehicles. Thus it was contended, curves could be rounded with less bind and keeping to the theme of this article, curves of much smaller radii than otherwise would seem possible could be negotiated by any given wheelbase.

The upper diagram of Figure 4 shows a vehicle so treated standing on straight track and the lower the adjustment that takes place when negotiating a curve.

MANY MORE DIESELS FOR BRITISH RAILWAYS

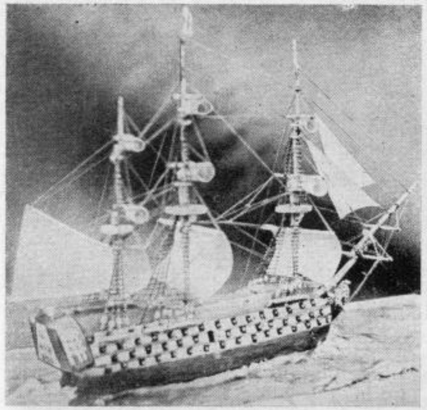
THOSE model railway executives who plan to keep in line with prototype practice should be considering an increase in their stock of diesel shunting engines without delay. Last month we offered a brief description of Mr. Scarlett's model and, almost as this appeared British Railways announced that they were adding 573 diesel shunting engines to their fleet of locomotives during the five years 1953-1957.

The present stock of this type of engine is 130 and a further 84 have already been authorised. The five year plan is additional to these and is the result of a special investigation into the shunting engine position in all regions; this showed clearly that economies could be obtained and efficiency increased by changing over from steam to diesel traction in many of the larger marshalling and goods yards and on dock sidings.

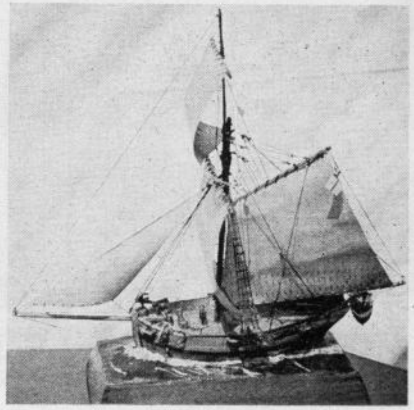
The five year scheme provides for 432 diesel-electric engines of 350 h.p., and 141 diesel-mechanical engines of 150/200 h.p.; as a first instalment 57 of the former and 12 of the latter are to be included in the 1953 locomotive renewal programme. The diesel-electric engines will be of the 0-6-0 type, and there will be two types of diesel-mechanical, namely 0-4-0 of 150 h.p., and 0-6-0 of 200 h.p. Main frames, wheels, cab structure and mechanical parts will be built in the British Railways workshops and the diesel engines and electrical transmission equipment purchased from contractors who specialise in their design.

The advantage of diesel operation in Britain is most marked in shunting yards where employment is continuous, but British Railways are continuing their trials with high-powered diesel locomotives on general passenger and freight working. These include four 1,600 h.p. main line express passenger and freight locomotives; an 800 h.p. diesel-electric unit for secondary passenger and freight services, and two diesel-mechanical locomotives — one of 1,600 h.p. for main line and freight services and another of 500 h.p. designed mainly for local freight trips.

MINIATURE SHIP MODELS



On the left: A slightly bigger model — Nelson's "Victory" which has a hull of 7 ins. Many ingenious items from the junk box were utilised for detail effects.



On the right: The little Revenue Cutter with a hull less than 5 ins. long. Old fishing boats were studied to get the authentic weathered effect.

BUILT BY A. J. IRVING

READERS who like their models small will appreciate these two little efforts. Here are the details of the Revenue Cutter: Hull, 4¾ in. overall; beam, 1¾ in.; waterline to masthead, 7⅜ in.; length overall, 7¼ in.

The hull was made from a block of balsa and the deck was finished before fixing the gunwales. The gunwales were $\frac{1}{16}$ in. sheet balsa all but the bow section which was reinforced. These two sections were carved to the bow shape. The bare hull was then painted white, and an old appearance obtained by giving successive coats of thick shellac as if it was heavily varnished.

All the deck fittings were made of hard wood. These comprised from bow to stern: Two bitts for the hauling in of the bowsprit. Square in section ¼ in. high. A horizontal barrel winch with two capstan bars. The winch is complete with square cut holes for the bars. The winch is ⅝ in. long. The bars are $\frac{1}{32}$ in. thick and $\frac{11}{16}$ in. long. A barrel winch on two posts for travelling rails. Made from two upright posts, a length of copper wire bent for handle and shaft with a bobbin-shaped roller on the end. The bobbin is ⅛ in. long.

A hatch cover just behind the mainmast is a piece of balsa ⅛ in. thick, $\frac{11}{16}$ in. long and ⅜ in. wide. A cleek pump made from the part of a watch that oddly enough forms the pump barrels perfectly. Two pins stuck in as the rods and a piece of wire glued across these two to form the double handle. A tiller bar is made from a 1 in. long optician's taper pin. Two davits slung out over the stern made from boxwood. The ship's boat is 1¼ in. long complete with one pair of oars ¾ in. long, and rowlocks made from a piece of wire flattened and split. The six deck cannons were bought from Modelcraft Ltd. The mast and yard arms and gaffs were made from ⅛ in. dowel sanded down to size.

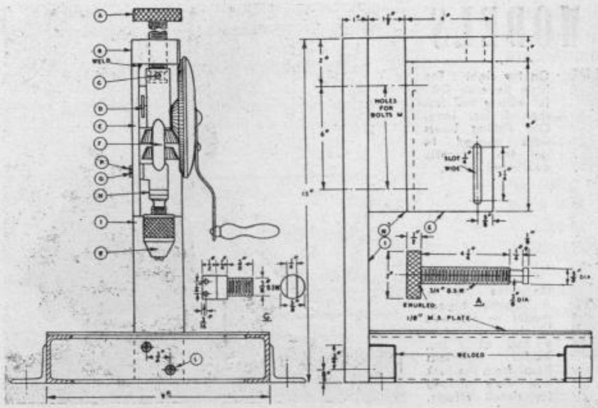
The claws on the gaff and boom were made from sheet lead and filed to shape. The block on the forepeak was carved from boxwood, and is ¼ in. long complete with strop groove and sheave holes. The other running blocks are solder cut into tiny sections and flattened slightly. Two holes punched, and that completes a two-sheave block. The anchors are cut from sheet lead. The sails are made from linen-faced writing paper slightly coated with thin shellac. This takes off the white effect and gives a more uniform effect.

"Victory"

Hull, 7 in.; Overall length from gaff to bowsprit, 10½ in.; Height—waterline to masthead, 6½ in.; Beam, 1¾ in.

The hull was made from a block of balsa. The hold was cut out and a thin deck sheet of $\frac{1}{32}$ in. balsa put on to give the edge of the hold a good finish.

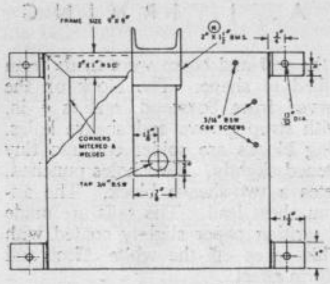
Fitments from bow to stern: The figurehead was a lump of putty and roughly shaped to the actual thing and painted afterwards. Mast bitts square section with crosspieces. Gratings were made of brass mesh. The belfry was made of two uprights and a card roof. The bell was made from hardwood and was ⅛ in. long. The steps to the hold were card bent to form steps. The ship's wheel was a watch wheel covered with thick poster paint to give is thickness. The cannons were tiny nails which have very small heads, making good guns. The stern windows were formed of a backplate and three layers of "Perspex" with balsa layers in between. The lamps were also made from "Perspex" The masts were made from dowel and the tops were from hard balsa. Blocks were made from small glass beads, coloured. The sails are from linen-faced paper left white, and the model was storm rigged.



A Light Bench Drill

HAND OPERATED CAPACITY 1/16" - 1/2"

BY R. G. ILSTON



This simply made adaptation of a normal two-speed breast drill should be of particular value to the many "kitchen table" modellers who lack facilities for more elaborate equipment.

THE machine shown here is based on a slight modification to an engineer's two-speed breast drill, and gives excellent service in return for the slight expense of the materials used, while in addition it takes but a few moments to dismantle and reassemble for its original purpose.

Components

A table 9 in. x 9 in. is constructed of 2 in. x 1 in. RSC mitred and welded at the corners and covered by $\frac{1}{8}$ in. mild steel plate, held in place by $\frac{3}{16}$ in. B.S.W. countersunk screws $\frac{3}{8}$ in. long, tapped into the channel frame at intervals, bench fixing being provided for by lugs of $1\frac{1}{2}$ in. x $1\frac{1}{2}$ in. angle with $\frac{13}{32}$ in. holes in them, welded one at each corner.

The pillar I, is a 15 in. length of 2 in. x 1 in. channel secured to the table by two $\frac{3}{8}$ in. B.S.W. x 1 in. bolts and nuts L. At the upper end of the pillar a drill body fixing consisting of B and E is held in position by two $\frac{1}{4}$ in. B.S.W. x $2\frac{1}{4}$ in. bolts and nuts M, passing through E, N and I. Packing N is merely 8 in. of 2 in. x $1\frac{1}{2}$ in. B.M.S.

B is a piece of B.M.S. 1 in. thick, $1\frac{7}{8}$ in. wide and 4 in. long with a hole drilled in it and tapped $\frac{3}{4}$ in. B.S.W., and which is case-hardened before welding on the top of angle E, this being an 8 in. length of 4 in. x 2 in. x $\frac{1}{4}$ in. angle with a slot cut in it as in the sketch.

A feedscrew A and slidescrew G are both of case-hardened B.M.S., and the retaining screw C is of hardened steel $\frac{1}{4}$ in. B.S.F. x $\frac{3}{8}$ in. long.

The drill body is a two-speed breast drill with breast plate and shaft, and side handle removed, with a hole drilled and tapped $\frac{1}{4}$ in. B.S.F. through one wall of the shaft socket at the front.

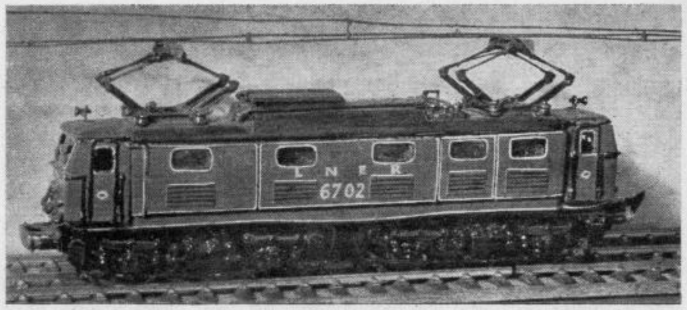
Assembly

Building of the machine is as follows: The pillar I is bolted to the base, and the packing piece N and body fixing EB are fixed. Next the slidescrew G is screwed into the side of the drill body where the side handle was originally, and having screwed A through B the parallel cutaway of G is fitted through the $\frac{1}{2}$ in. slot. The body is then lifted until the feedscrew A enters the shaft socket where screw C retains it by seating in the recess machined on A, and two silver steel pins $\frac{1}{8}$ in. dia., $\frac{3}{8}$ in. long are firmly pushed through the holes in G so as to project $\frac{3}{16}$ in. at either side. Lastly C is adjusted so that A can be turned freely, a coat of paint is given to the completed assembly, a touch of oil to thrust race H, screws A and G, and the machine is ready for bench mounting.

Action

A drill is put in the chuck (capacity $\frac{1}{16}$ in. to $\frac{1}{2}$ in.), the workpiece is clamped to the table in the usual way and drilling begins, the drill being fed downwards or upwards with the left hand by A while turning the handwheel with the right. Gear change is effected by D, and steadiness of upward and downward movement is governed by G riding in the slot, a total up or down feed of $2\frac{1}{2}$ in. being possible.

FOLLOWING A. H. DADD'S RECENT ARTICLES ON ELECTRIC LOCOMOTIVES E. COLEBY GOES INTO DETAIL



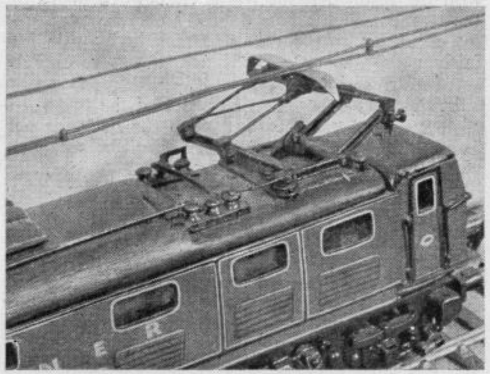
PANTOGRAPH FOR ELECTRIC LOCOS.

THE following description and the accompanying photographs and drawings of an electric locomotive which I built some years ago may interest those readers of *Model Maker* who are considering a real electrification scheme for 00 gauge railways, following the lead given by Mr. Dadd's recent articles on the construction of Eastern Region Electric trains.

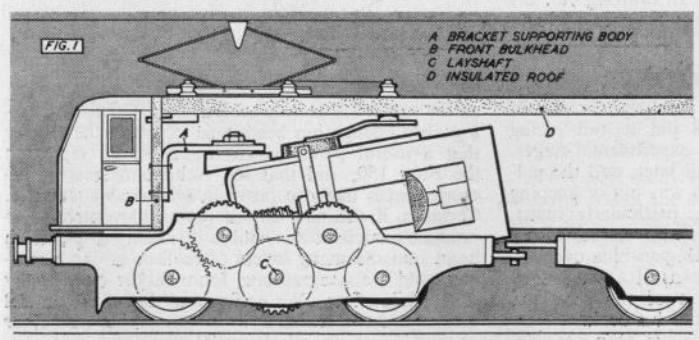
My locomotive was built shortly after the prototype locomotive, No. 6701, was completed for the Manchester-Sheffield-Wath lines of the L.N.E.R., the electrification of which on the 1,500 v. D.C. overhead conductor system was commenced about 1938.

Only one of the bogies is motorised and drawing No. 1 is a rough diagram showing the layout of this bogie. The other bogie merely supports the other end of the body. It will be noticed that the buffers and draw-gear are attached to the bogies and not to the superstructure.

The chief interest in the locomotive is centred on the two pantographs, both of which act as collectors so as to space any gaps there may be in the overhead conductor for sectionalising the system, e.g., at crossings from "up" line to "down" line.



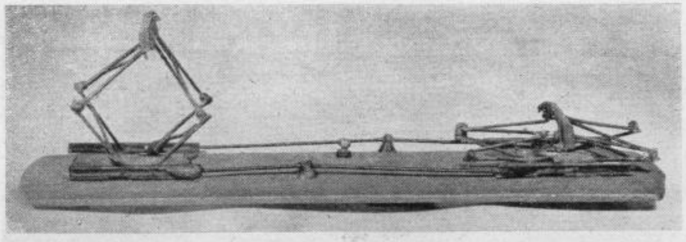
The detail work involved in constructing these pantographs may be considered too much like watch-making for many readers, but the results are well worth the trouble—it is quite fascinating to watch the collectors rising and falling to keep in contact with the conductor wire. For smooth running it is,



Heading shows the author's 00 version of prototype locomotive No. 6701 as built for Manchester-Sheffield-Wath lines of the L.N.E.R. (Photo No. 1)

Below: A close-up of the pantograph and collector on the model. (Photo No. 2)

Left: Fig. 1 showing the arrangement of electric motor and method of current collection and driving of bogie wheels. (Photos by J. R. M. Bryce)



Further details of the successful pantograph arrangement. (Photo No. 3)

Below : Fig. 2 gives diagrammatic layout of the pantograph.

of course, essential that they should do so.

My first experiment in constructing a pantograph was a failure because I did not connect the two lower pairs of arms together so that they moved in unison—unless they are so connected what happens when current is switched on is that the locomotive moves forward, but the collector tends to "stay put" with the result that the whole framework pivots on the rear bearings. This difficulty may be overcome by providing two collector bars side by side but fairly widely spaced. It is not, however, entirely satisfactory and looks clumsy.

In the next experiment I connected the two pairs of lower arms together, but fixed the collector bar to one pair of the upper arms. It will be seen that when the pantograph is fully extended the collector bar is almost edge-on to the conductor wire. To overcome this obvious fault, I had to arrange for the collector bar to remain relatively steady at all heights of the wire. How this is achieved is shown in drawing No. 2.

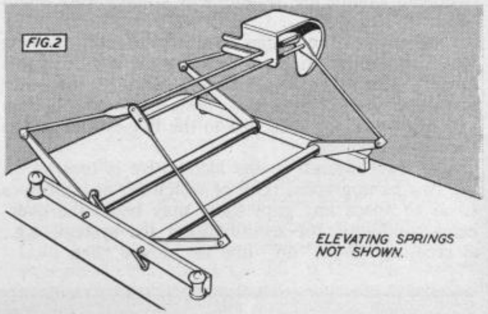
The lower pairs of arms were made of 00 gauge rail filed to shape, and the upper arms of hard brass wire connected by small hinges at the top and bottom ends. The hinge pivots are No. 14 B.A. screws. The top ends of the upper arms are connected cross-wise by brass wires on one of which the brackets depending from the underside of the collector bar pivots. The cross-wire of the other pair of upper arms slides in the slot in the bracket. The result is that as the pantograph moves up and down the collector bar is maintained practically level throughout the whole range of movement. In drawing No. 2 I have endeavoured to show how this comes about, and it will probably be easier to follow than any further description.

The collector bar is kept in contact with the conductor wire by means of springs which are wound round the pivot bars at the bottom ends of the lower arms. It would have looked more in keeping with the prototype if coil springs had been used attached to two little brackets on the pivot bars, but at the time I built the locomotive I could not lay hands on a suitable size of wire.

In the prototype the pantograph is raised by air pressure and unless actually in use is kept in the collapsed position. In the model this is impossible and the normal position is extended.

As there are now so many railways electrified on the overhead system, especially on the Continent of Europe it seems a pity that so little interest is taken by model railway enthusiasts in this country in that system. The overhead equipment entails a certain amount of extra work but there are many advantages. The conductor wire does not require to be fixed within such precise limits as does the third rail and there is far less chance of a short circuit blowing the fuses.

FIG. 2



A RAIL RACING COOPER

(*Continued from page 204*)

It was originally intended to paint the car, but in view of the punishment meted out to rail racing models, particularly in the early experimental stages, it was decided to defer this until later, and the polished aluminium is in fact in no way out of keeping with Cooper practice and looks particularly smart.

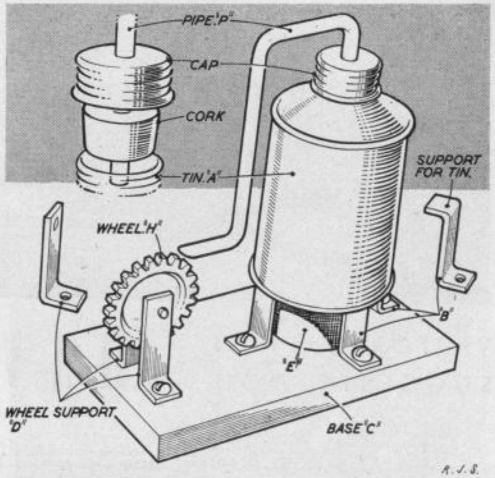
A final and happy touch is the driver, nicely carved in balsa and garbed in Bugatti-blue overalls. He is retained in his seat by means of a wing-screw which passes through the back of the seat and threads into a brass plate let into his back.

So far only brief track trials have been possible, as the rail track is only erected for "Official" meetings, but enough has been done to satisfy the builder that a useful performance should be on tap from the Frog 150, and that the Ackerman steering arrangement is likely to prove in every way successful. Certainly if the new circuit racing movement is to produce models of this calibre it is likely to put fresh heart into the many lovers of realism in car modelling, and we congratulate John Parker on a really worthwhile effort. We understand that a new model is on the stocks, a clue to its identity being the colour of the Cooper driver's overalls!

MAKE IT FOR JUNIOR—I

MODEL REACTION ENGINE

BY H. A. ROBINSON



THE model-maker, if anybody, should be able to turn out an occasional working toy for the smaller members of the family circle. Here, therefore, is a simply-made steam engine which will give hours of pleasure to any youngsters who like to see "wheels go round".

Things required in the making are—(1) a liquid metal-polish tin, (2) length of small-bore brass piping, (3) medium-sized cog-wheel from an old clock, (4) a flat boot-polish tin, (5) a rectangle of wood about 6 in. x 4 in., and (6) a piece of tin cut into ½-in. strips and several short screws.

First take four of the tin strips which should be about 3 in. long and bend as (B). These have a hole put in the turned-out foot and are fastened by a screw each to the wooden base. They are so arranged as to make a holder for the metal-polish tin as shown. The height of this piece should be about 1¼ in., which allows a small boot-polish tin to fit in between, with a little space above.

Take two more of the strips, and in this case giving to each a single bend as (D), mount them in front of the group already fixed. Before screwing down, however, pierce a hole near the top of each which will just nicely hold the cog-wheel by the ends of the spindle. Some care must be taken to get the holes (which act as bearings) exactly level or the wheel will run askew.

As with (B) these uprights are screwed to the base with a single screw each. Their distance apart depends on the length of the spindle. When finally set up the wheel must run very easily, but not loosely, in its supports.

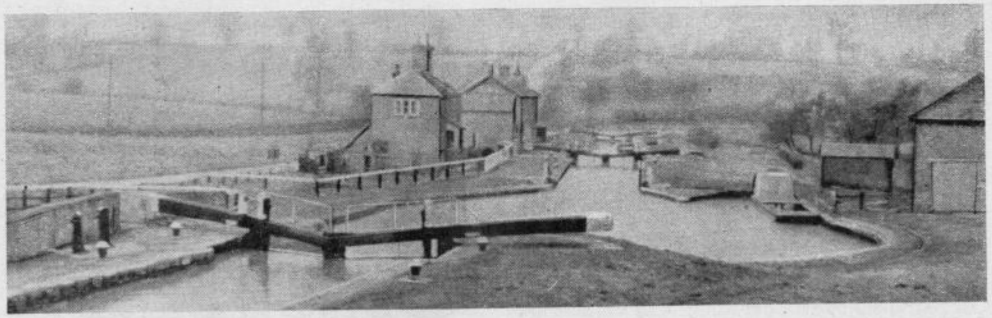
At this juncture make the lamp (E). This is the flat boot-polish tin, which must be of such a size as to go between the uprights (B). Punch a hole in the lid, pack the lower half with cotton wool and pull a tuft through the opening. Filled with methylated spirits, the tuft it will be found acts as a wick, and when lighted gives off a hot little flame which is quite capable of producing steam in the tin boiler above.

Now comes the jet. To make this, the pipe (which must be of very small bore) is bent to the shape (F) as shown and so proportioned that the top end will go into the stopper of the metal-polish tin and the lower end come just against the upper edge of the wheel. The best way is to make a pattern first from soft copper wire, which can be easily bent and re-bent till the correct fitting is obtained—the brass pipe then being shaped to this pattern. Note that at the top the pipe is of sufficient length to go pretty well down into the "boiler". The lower end is filed away to an angle and carefully positioned till it just lies over the teeth of the wheel.

The pipe is secured to the tin by a cork forced into the neck, through which it passes as (K). A fairly long cork should be used and one that will be well compressed when pushed home. A hole is pierced in the metal screw cap and through the cork which holds the end of the pipe firmly.

With the pipe gripped this way no further support is necessary. The joint so formed is quite steam-tight to the small pressure that is raised, moreover it will be found that the pipe so arranged can be lifted or dropped a little to give accurate adjustment over the cogs, lateral accuracy being obtained by turning the boiler as a whole on its stand.

All is now ready and the metal-polish tin is filled with hot water, the cork being temporarily removed to do this. Cork and cap replaced, the lamp is lit, and in a few moments steam issued from the end of the pipe. As the jet gets stronger the cog-wheel starts to revolve—going quicker and quicker till it is just a blur. This continues till the lamp or water runs out. For a neat finish the whole engine can be painted.



VICTOR SUTTON SUGGESTS YOU

HAVE A CANAL ON YOUR LAYOUT

Heading : Looking down on a series of three interconnected locks. Note "lay-bys" to enable passing of up and down traffic.

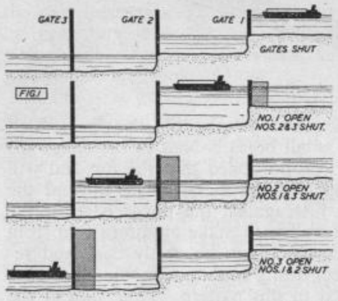


Fig. 1 : The process of going 'downstairs' shown in progressive stages. This need not of course be in working order in a scenic model.

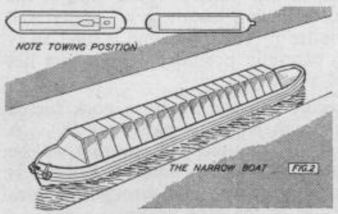


Fig. 2 : Details of towing position, and typical appearance of narrow boat. Photos on opposite page give more details of living accommodation.

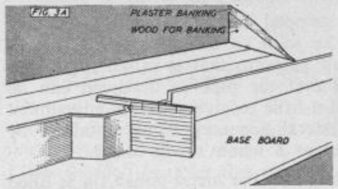


Fig. 3a. : Cutaway sketch showing how the lock can be simply fabricated in plaster and board for a convincing model layout.

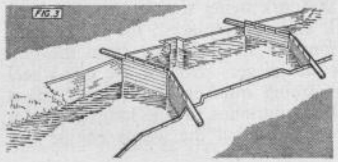


Fig. 3 : General arrangement of a single lock—note how the gates meet at an angle, facing upstream.

THERE is no reason why you should not have a canal section on your lay-out. It would be unusual, effective but needs a little careful thought first. To be really realistic it should have some locks on it. It should also have the right types of boats. Canals have boats entirely of their own type and, like all true model-making, they must be right. Incidentally, the boats and the canal should cost very little. I have made all this set-up from scrap wood and all manner of oddments well and truly assorted.

Historical notes first may be welcome. There are forty canals in Great Britain of approximately 2,500 miles. The canal people refer to their craft as "The Narrow Boats" and these are the backbone of the commercial side of our canal system. All canals are sanctioned by Act of Parliament. Before the coming of the railways the capital invested in canals was £10,000,000, an enormous sum for this period. In their work a new name was added to our vocabulary and that word was "Navvy". Men working on the canals in their construction were known as "Navigators".

Locks are numerous. On the Worcester and Birmingham Canal there are 58 in 30 miles. On the Kennet and Avon there are 106 in 86½ miles. The highest point on any canal is at Foxton on the Leicester branch of the Grand Junction and here the water is carried to 418 feet above sea level.

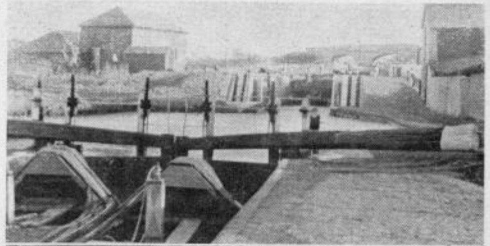
Note how the locks work together to bring the boat "downstairs" and this is shown clearly in the illustration and should be quite simple to make once you have the base of the waterway. A separate picture shows the design of the lock gates which are mostly of wood and in which you can use up some of the oddments you have by you.

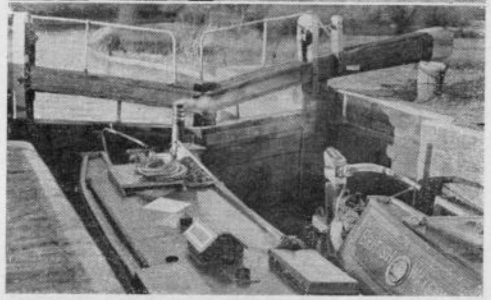
In sketch No. 2 is shown the "narrow boat" converted into the living quarters. Simple to make and should be gaily painted. It is sometimes known as the "Monkey Boat". Monkey boats work in pairs. The leading vessel is powered by a diesel engine of about 18 h.p. and it tows a similar craft behind. The leading boat is always referred to as "the motor boat", the trailing one as the "Butty boat". The boats are of wood or steel, or both and are 70 ft. long and 7 ft. beam. When loaded their draught is just under 3 ft. Between them they can carry 60 tons, 25 in the first and 35 in the second. This will help you to get your loads correct in design. Never refer to these beast as "barges"; they are not. Barges must be 14 ft. wide to be correct and are not seen on many narrow waterways. The Grand Union Canal Carrying Company own 380 narrow boats. Their livery is red, white and blue.

Get your loads correct and these can range from sand, ballast, coal, hay, grain, tea and general case goods. The latter would mostly operate where you have a cargo ship on show. Most of these cargoes are covered with tarpaulins in transit. Also, used often are what are called "runner boards" and these give that triangular look so much seen in canal districts. As a rule the "waterman" controls the motor boat whilst his wife steers the butty boat. Horses are still used for towing, particularly in stretches where there are many locks. Horses used in toy farm sets will do for this, length of lead is quite 80 feet.

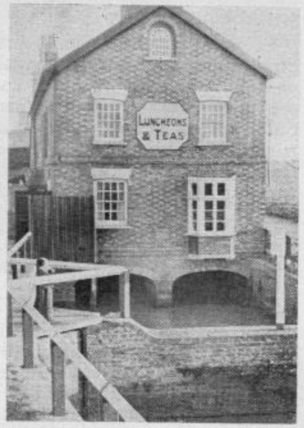
In a series of three or more locks one should provide, on one side of the canal a set of small ponds from which the locks will feed. This is an important point in a lay-out.

The canal section should be planned so that it is built in its own part and this must mould into the surrounding country. For the purpose of this article I have shown the single lock section. Note how this is built up and the opposite side is a repetition of the same thing. The base is set on a piece of panel board and the sides built up with thick cardboard or thin wood. For the sides one could use a model plaster or "Pyruma". If this is a fairly peaceful area (not a dock scene) then the finishes to the side-walks and other verges can be finished with dull

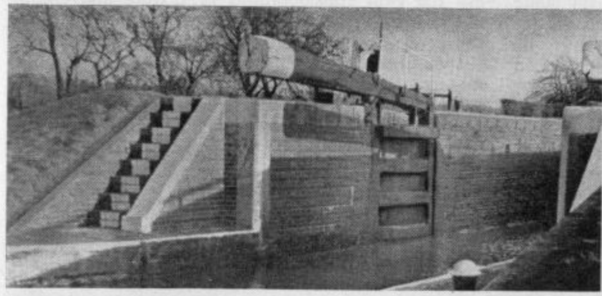


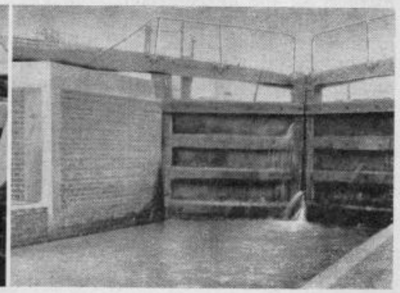


Above : Details of the lockgates, a motor boat and butty are just going through. These boats are very colourful and add a picturesque touch to any layout.

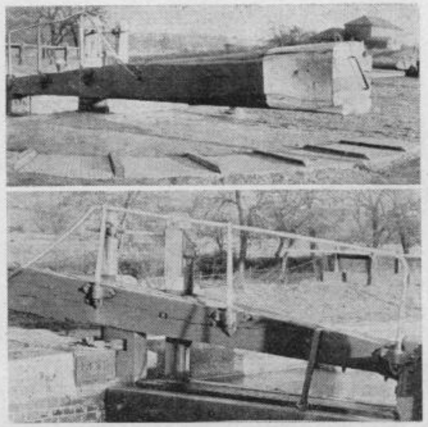


On the right : Lock-keeper's cottage—where refreshments in this case can also be obtained—showing also the 'pound' holding reserve of water in case of need.





Below : Detail of gates open and shut. Note how the open gate recesses into wall to give maximum clearance. The steps are duplicated each each side.



Details of the lockgates—or paddles. Note raised brick treads to assist in swinging the paddle. Lower picture shows the rail attached to central part of handle to enable it to be used as bridge.

green paint mixed with sawdust. Most locks and the approaches are lined with bricks of the very old red type shaded off with brown and green and certainly not looking all spruce in red. Most locks have little steps running down and these should be carved out in wood and well worn. A dirty grey wash should be used for this.

Colouring of the water is something to be very carefully studied. Many model-makers fall down on this. Water has no colour and canals if anything are more difficult because there is little current. Cathedral glass cannot be used as it would look too much like a pond. I have been successful with painting the bed with blue-green oil paint and then applying a couple of rather thick coats of clear decorator's varnish. If anything, one must confess that water in a canal mostly looks dark grey, especially in well built-up areas. Distemper in deep blue, well mixed with green and tinges of brown seem to have been my most successful experiment. If anything, and on careful study one imagines that the darker shades are nearest the bank and graduate out to the centre with characteristic washes of scum near any projecting brickwork.

Lock gates can very well be treated to a coat of brown solignum and the ends of the lock handles are mostly white. There are rails across the top as shown and a ratchet arrangement which controls the sluices. A water gauge is also fitted on the wall side.

Other accessories you must provide include small life-belts made from curtain rings or if not small enough you can make them up with stick solder. Then you have to put up the usual notice board with instructions.

Study the banks near the lock because here you will find paving stones and cobbles, relics of the good old days.

A lock-keeper's cottage with a neat garden and a small timber hut would add interest, especially on a series of locks. Mooring posts are mostly fixed in the water just near the bank and several would be found just below the lock.

Generally speaking canals are fairly straight and long stretches are of uniform width opening out into wider basins where several boats hold up for re-loading. Nearby, in these cases would be buildings and warehouses.

"THE OLD BLUE BOAR"

(Continued from page 221)

such an exposed position, they have by now usually decayed and been replaced by plain boards (when indeed they are replaced at all).

The model is completed by a cobblestone pavement and rough "stone-sett" roadway, modelled in plastic material, and by two "period" figures carved in wood.

This study in decrepitude is a most fascinating exercise for the model-maker. It poses, in acute form, a problem which faces us as soon as we try to model anything which was not "built yesterday", the problem of "period finish" which I have often mentioned before and which I make no apology for returning to again, since it lies at the very heart of all "period" modelling. I have, elsewhere, ventured to refer to the "plumb-craziness" of many modellers, and to point out that Nature abhors, not only a vacuum, but also a straight line. Look at any old building and you will see what I mean. Here, the line of a roof sags, there a corner of the wall has crumbled; elsewhere a door head has curved, a wall bulged. This last, especially in timbered buildings, for a timber-framed wall is much more flexible than a brick or stone one. And apart, altogether from the work of Nature, let us remember that the old craftsmen were not enamoured of straight lines either; timbers for instance were not trued on their edges but left with the undulating edges produced when they were sawn from the tree.

That is part of the story, but no less important are the twin considerations of texture and colour. Look again at that old building. Notice, this time, the lovely textures of old bricks and tiles, the way the natural grain of the timbers contrasts with the texture of the plaster. Notice how, with the passing years, a myriad subtle and delightful tints have come to add further variety to the already infinitely varied and subtly blended tints of the original materials.

And having noticed all this, you will surely not be content until you have used all the art of which you are capable to reproduce it in your models. And you will care little if an untutored and thoughtless observer considers the finished model drab and prefers the "doll's house" finish of a less careful worker!

THE OLD "BLUE BOAR"

A STUDY IN DECREPITUDE

BY P. R. WICKHAM

THE cult of the "picturesque" ruin, if it did nothing to stimulate the preservation of old buildings, at least inspired a number of artists to record (and often, indeed, they were only just in time to record) the appearance of many fine buildings before they finally collapsed or, becoming too decrepit even to be classed as "picturesque ruins", were demolished to make way for something more modern and, therefore, naturally in every way to be preferred! One such artist it was who produced the book which has come to be well known in my home district as "Fowler's Views of Leicester", and one of the best known prints in this work is that which shows the old "Blue Boar" Inn. The print shows it to have been a fine example of that timbered style which flourished in domestic buildings for so many centuries but which is now inevitably linked in the popular mind with the Tudor period, when certainly it reached its zenith.

The "Blue Boar" was saved from all the awful possibilities of modern conversion, but it was saved only by the fact that it was allowed to disintegrate and was eventually demolished. It is rather reminiscent of the case of Cardinal Wolsey who, according to the schoolboy, "saved his life by dying on his way to his execution". But at least we have Fowler's print to remind us of a building which, even in an advanced state of decrepitude, must have been a thing of beauty.

Some time ago, I was able to fulfil a long-standing ambition and translate Fowler's print into model form, and the photograph shows the result. In the absence of details of any part of the building except the front, a "frontage" model seemed the best medium. A reproduction of the front of the building a bare 2 in. deep, was built up on a painted back scene and a modelled base, this being quite an effective treatment and producing a most decorative model.

The backscene and base are of $\frac{1}{8}$ in. hardboard, suitably battened. Sky, clouds, and the suggestion of buildings on the right were painted on in oil colours.

The actual building consists mainly of hardboard, on a wood frame. From the print, the lower storey walls were plastered over brickwork, and this is simulated on the model, using superimposed layers of roughly torn paper. When carefully painted and "weathered" in all sorts of tints, with the bricks showing through here and there where the plaster has flaked away, this gives a most realistic effect, to which the camera has not done full justice. Windows and doors are quite normal in construction and call for little comment.

It will be seen that the timbered upper storey is "jettied" at over the lower walls (that is to say projected) in the characteristic manner of timbered buildings. This wall is faced with card to give the correct texture for the plastered surface. Timbers are scored in and the whole carefully painted. Notice how the plaster has peeled away here and there exposing the "wattle" on which it is spread. This makes a most effective touch in the model.

The window is a little unusual, as the actual window is flat but with a wide projecting sill, supported on corbels (projecting brackets) and linked to the projecting gable above by iron bars; thus giving a "bay window" effect.

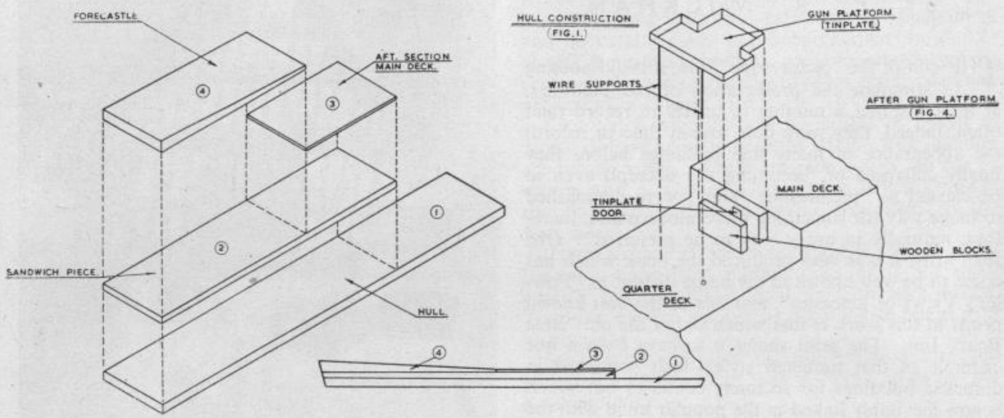
Roofs are relief modelled with overlapping card strips, to reproduce the original stone slates. An important point, characteristic of all such roofs, is the way the slates diminish in size from eaves to ridge. Notice, too, how the texture is broken up by "chipped off" corners to the slates, and here and there a "slipped" slate.

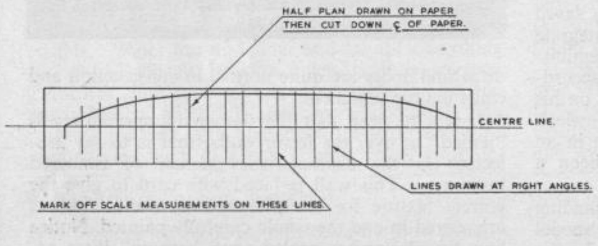
One of the gable barge boards was already missing in Fowler's day and the other was broken, and this is faithfully produced in the model. These boards were often most beautifully caned and pierced but, unfortunately, being rather delicate and placed in

(Continued on page 220)

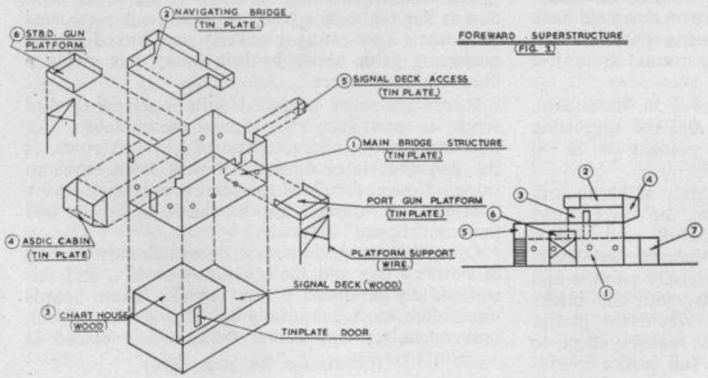
A GUIDE TO WATERLINE SHIP MODELLING

PART ONE OF A PRACTICAL ARTICLE ON THIS POPULAR CRAFT BY J. A. MURRELL





METHOD OF LAYING OUT PLAN OUTLINE (FIG. 2)



ALTHOUGH this article deals with the building of a model Minesweeper (Algerine Class) it is hoped that the description of methods of construction of the hull and ship's fittings will be of use to readers interested in this form of model-making.

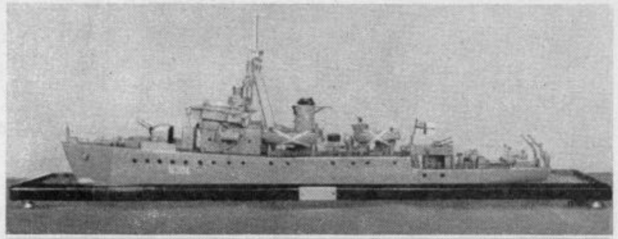
It is also hoped that the article will give encouragement to would-be model ship-builders for the model shown in the photographs has been built by two thirteen-year-old boys, under instruction.

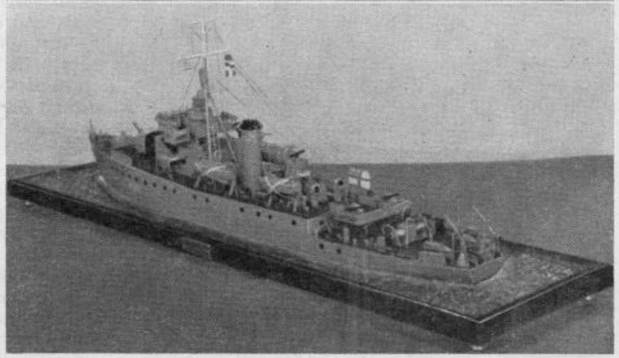
Furthermore, no plans or drawings were available, so the model was built entirely from photographs and some small personal knowledge of H.M. ships.

With reference to the above, should any minesweeper personnel notice any glaring mistakes, I should be pleased to hear from them, though perhaps they will accept my apologies beforehand.

To the newcomer I would like to say that excellent "Waterline Plans" are available for most ships of the Royal Navy and working from drawings, of course, is much easier than from photographs.

This model is built to a scale of $\frac{1}{8}$ in. to 1 ft., but few measurements are given in the sketches, for as stated above this article is intended as a general description of Waterline Modelling, and sizes will depend on the scale used.





For the hull a piece of straight grained medium hardwood is necessary. Woods such as lime, pine, sycamore and mahogany being excellent if obtainable.

For the model in question, however, Agba was the wood used, this being more easily obtainable. This wood is a medium hardwood, straight grained, and easy to work.

The hull was made in four pieces so that the slope of the forecastle deck could be formed without too much carving. As shown in Fig. 1 the main hull is planed to correct thickness, then the sandwich piece, then the wedge-shaped forecastle, and then the thinner aft section. The pieces were then glued together after checking heights above the waterline.

The forecastle deck was then glass papered until the slope was changed to a gentle curve up to the bows.

The next job was to mark out the plan outline. This was done first by marking out half the plan on paper as shown in Fig. 2, and then cutting along the centre line of the paper. This half plan was placed in correct position on the hull and used as a template. After drawing a line round it, it was turned over and the other half marked out. This method ensures that both sides of the hull are alike.

A "Waterline Plan" was now drawn on the bottom of the hull making sure that it was perfectly in line with the deck plan.

Roughing out was done with a saw and then a plane, curves and flares being cut with gouges and files.

No hull section drawings being available the flares and curves, etc., were worked in until they looked right when compared with photographs. If drawings can be obtained then templates should be made and the hull worked to these.

The hull was finished by glass papering until smooth and then given two coats of grey undercoat, the first coat being rubbed down.

This finished the hull apart from portholes and hawsepipes which were put in later.

Superstructure

Thin sheet metal such as tinplate is the best material to use for superstructure as these sometimes are quite complicated.

The exploded diagram (Fig. 3) shows the forward structure of this vessel and as can be seen it consists of a box-like structure with a winged bridge and two gun platforms.

First a block of wood was cut to shape and glued and screwed to the deck. This formed a positioning block for the rest of the structure and also made the signal deck. On top of this another block was glued, this being the wheelhouse, etc. Tinplate doors were glued on and portholes were made with a steel punch. These had to be done first as it was impossible to get at this piece later. Next the main structure was cut from tinplate bent to shape and soldered on. The gun platforms were made next from tin plate bent to shape and soldered. The access platform was soldered into position and also the Asdic compartment. The gun platform supports were made from wire as shown, and these were let into the deck and glued.

The main structure was now lowered over the positioning block and held fast by four small nails. The gun platforms were soldered to the supports and this made the structure rigid. The navigating bridge was cut from tinplate, the sides soldered on and the bridge was then nailed to the top of the charthouse. The ends of the bridge were now soldered to the main structure. A top was soldered on the Asdic cabin and this completed the forward structure for the present.

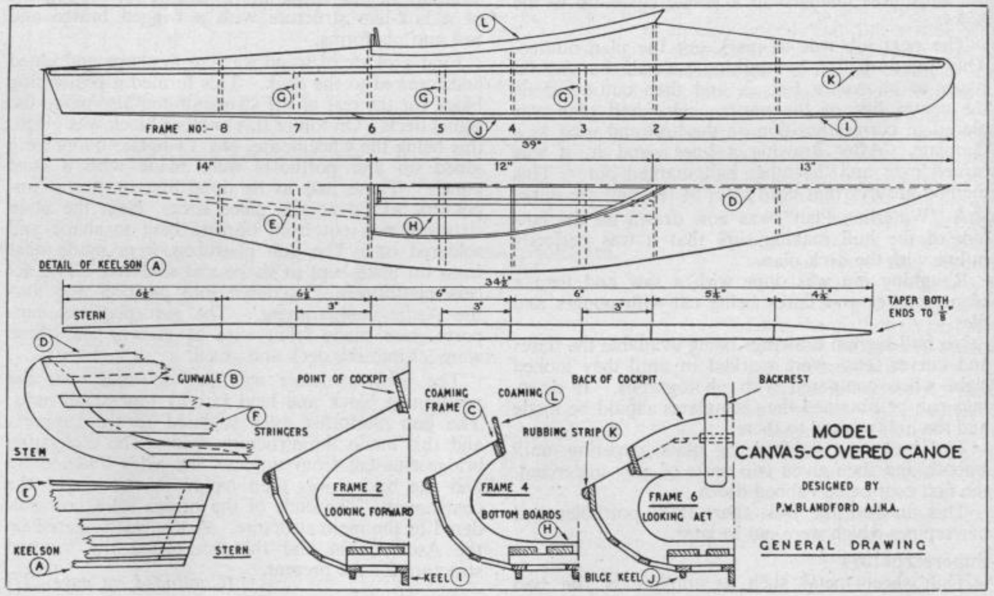
(Continued on page 227)

A MODEL KAYAK CANOE

A QUARTER SCALE SAILING CANOE BY P. W. BLANDFORD, A.I.N.A.

THOUSANDS of amateurs have built canvas-covered rigid kayak-type canoes and used them on all sorts of waters, from little streams to rapid rivers and the open sea, but this is believed to be the first time that a design for a model of one of these craft has been published. This is a quarter-size model of a 13 ft. single-seater—a popular type of craft for paddling and sailing. At this scale it is possible to keep the sections to scale, yet retain adequate strength. The same design may be used to make a one-eighth-size model, but if it is to be anything but a show-case example, sections of the lengthwise parts should be kept a little over scale.

The cross-frames are made of plywood, but the other parts may be of any of the usual strip woods. Balsa is easy to use, but not very strong. Obechi—often called "balsa substitute"—is rather better, while mahogany or other good hardwood will produce a very good-looking craft. All of the parts are joined by glueing—preferably using a synthetic resin glue, such as "Aerolite" or "Casco-Phen". Joints may be cramped while glueing by tying temporarily. I found the spring-type paper clips make very good cramps. If nailing is considered necessary, the head ends of domestic pins are suitable. To avoid straining other joints by the shock of hammering, it is best to push the pins into holes made with a pointed awl and squeeze them home with pliers.



Make the frames first. Draw a grid of ¼ in. squares and copy the frame shapes from Fig. 1, dealing with each frame separately and drawing both halves. Trace this on to the plywood and fretsaw to shape. Glasspaper the inner edges to a rounded section, but leave the outer edges square. Cut the stem from the same wood, but whittle the stern post from a solid piece (Fig. 2).

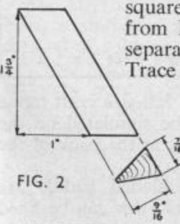


FIG. 2

The keelson (A) is the most important member of the canoe. Make it from your straightest piece of wood (see General Drawing). Fix 2½ in. strips to take the bottom boards to both sides of frame 4 and one side each of frames 2 and 6. Fasten the frames and end posts to the keelson and temporarily nail the assembly to a flat stiff board (fig. 3). Stretch a string between the end posts and see that everything lines up and the frames stand square.

Fix the gunwales (B) next, doing both at once and progressing a little at a time each side from the centre to the ends. At the stern, lap the gunwale over the stern post and cut off. At the bow, bevel the inner edge to fit against the stem post.

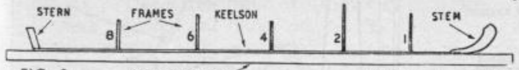


FIG. 3

Fit deck stringers D and E, and spring the coaming frames (C) into place. Fit the top stringers (F) in the same way as the gunwales. At this stage the framework should be strong enough to be removed from the board and turned over while the other stringers are fitted. Do not twist the lower stringers excessively at the ends, but bevel their inner surfaces to fit against the end posts. The three bent frames (G) are sprung into place and cramped at the gunwales while the glue sets. In the full-size craft the bottom boards are removable, but in the model they can be glued to their bearers on the frames. Finish the framework with two coats of varnish after glass-papering.

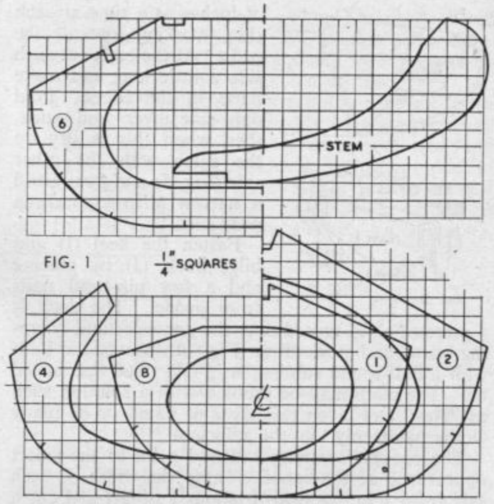
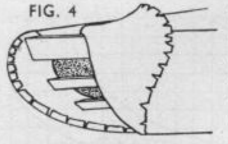
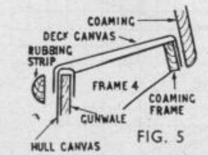


FIG. 1 ¼" SQUARES

The skin may be any closely-woven light cloth. As a guide—handkerchief material is about right. To cover the hull, stretch the cloth along the framework and pin to the end posts. Put a few dabs of adhesive along the keelson. For fabric-to-wood joints a tube glue will do, or you can copy full-size practice and use "Bostik" C or 252, or "Copydex". At the beamiest part of the boat pull the cloth over the gunwale and glue inside, using pins to maintain the strain while the adhesive sets (Fig. 4). Do a couple

Heading picture shows the single seater canvas covered canoe—in its fullsize version—under sail. On the right: a Sea Scout paddling the prototype canoe with the typical double-bladed paddle.





of inches at a time at each side, working towards the ends. At the ends cut each side a little long and make darts in the edges. Fold one side over and stick, then when this is dry do the same with the other side (Fig. 5) and finally add a narrow strip to make a neat joint.

Fasten the keel (I) and bilge keels (J) by glueing and a few pin-head nails from inside. The deck is a piece of cloth turned over the gunwales and coaming frame and stuck there (Fig. 4). Cover the joint with a half-round rubbing strip (K) glued and nailed on. The cloth may be proofed with a solution such as "Nev" and given two coats of paint, or on many cloths paint only may be sufficient.

The cockpit coaming can add a lot to the smart appearance of the canoe. Taper the width of each side from 1 in. forward to about $\frac{3}{4}$ in. aft and cut a neat raking mitre at the forward end. Round the top of the back of the cockpit. The full-size craft has a pivoting backrest, but this can be simulated on the model by two slats on a cross-bar at the back of the cockpit.

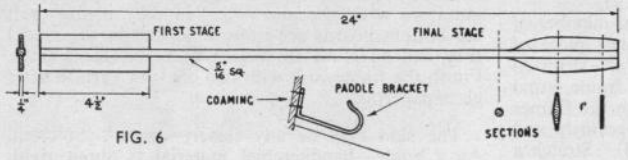
TIMBER SCHEDULE (All sizes are in inches)

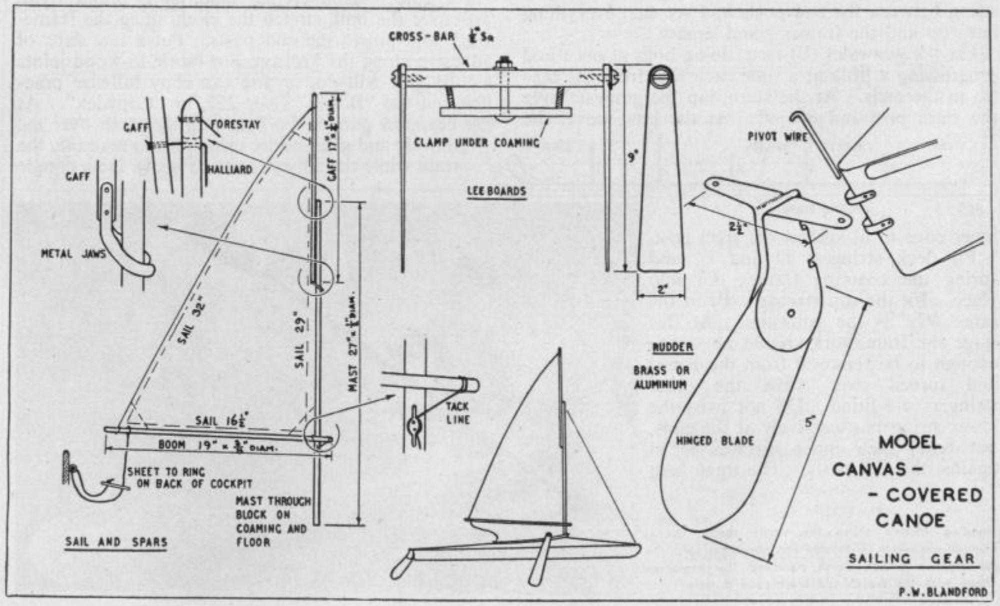
Part	Name	No. off	Length	Width	Thickness
A	Keelson	1	35	$\frac{1}{2}$	$\frac{1}{8}$
B	Gunwale	2	40	$\frac{1}{2}$	$\frac{1}{8}$
C	Coaming frame	2	14	$\frac{1}{4}$	$\frac{1}{8}$
D	Deck stringer	1	13	$\frac{3}{8}$	$\frac{1}{8}$
E	Deck stringer	2	14	$\frac{1}{4}$	$\frac{1}{8}$
F	Stringer	6	40	$\frac{1}{4}$	$\frac{1}{8}$
G	Bent frames	3	11	$\frac{1}{4}$	$\frac{1}{16}$
H	Bottom boards	8	6	$\frac{1}{2}$	$\frac{1}{8}$
I	Keel	1	38	$\frac{3}{4}$	$\frac{1}{4}$
J	Bilge keel	2	14	$\frac{1}{4}$	$\frac{1}{8}$
K	Rubbing strip	2	40	$\frac{1}{4}$	$\frac{1}{8}$
L	Cockpit coaming	2	14	1	$\frac{1}{8}$
—	"	1	5	$1\frac{1}{4}$	$\frac{1}{8}$

Cut sawn frames and stern from $\frac{1}{8}$ plywood, about 10 square.
Mast: 27 x $\frac{1}{2}$ round rod.
Boom: 19 x $\frac{3}{8}$ round rod.
Gaff: 17 x $\frac{1}{4}$ round rod.
Leeboards: two pieces 9 x 2 x $\frac{1}{8}$, one piece 7 x $\frac{1}{2}$ x $\frac{1}{2}$.

The sizes for a scale double-bladed paddle are shown in fig. 6. A bracket to hold this can be fixed to one side of the cockpit.

Sailing gear consists of a mast at the point of the cockpit, with a gunter-rigged main-sail. The rudder is operated by foot pedals on the full-size craft, but if the yoke lines are taken in a continuous length fairly tightly around the point of the cockpit, there will be sufficient friction to hold the rudder at any pre-set position.





As a canoe has very little draft something has to be done to prevent leeway. On this type of craft the usual arrangement is a pair of lee-boards. These pivot stiffly on screws through a cross-bar. The cross-bar clamps to the coaming so that it can be moved fore and aft to get the best sailing trim. For sailing, the model will need some inside ballast, fastened to the bottom boards. This may be anything with a fairly concentrated weight. Experiments will have to be made to find the best position and weight, but for a start a weight of about 2 to 3 lb. with its centre just aft of frame 4 should be tried.

Note.—Although this is a faithful scale model in all major respects, certain modifications in construction have been made to suit the model size, and readers are warned against scaling up this model to build a full-size canoe. The author will be pleased to advise anyone interested on the choice of designs for full-size canoes (c/o The Editor—s.a.e. please).

WATERLINE SHIP MODELLING (*Continued from page* 223)

The after structure (Fig. 4), was tackled next, this being a simple platform with sides soldered on. A method of soldering superstructures is shown in Fig. 5. Two wooden blocks were glued on. Two wire supports were soldered to the platform and holes drilled into the deck to take these. The platform was lowered into position and fixed to the wooden blocks by two small nails, the supports being glued in the holes provided.

Breakwater

(Fig. 6.) This is a strip of tinplate cut to the correct height and bent to shape. A short piece of wire is soldered in each corner and at each end. The deck is drilled to take these wire pegs and the breakwater is placed in position; a smear of glue on the pegs sets the breakwater firmly on the deck.

Mushroom Ventilators

(Fig. 7.) These were the next items to be made. For this ship 22 small ones and two larger ones were needed. The small ones were $\frac{3}{8}$ in. x $\frac{1}{8}$ in. copper snap-head rivets with the heads turned down as shown. The larger ones were $\frac{3}{16}$ in. brass rivets also with the heads turned down.

Ventilators

(Fig. 8.) The larger types of ventilators of which four were required are rather an awkward shape. An easy way round this, however, was to cast them in lead. A plasticine model was made and from this a plaster cast. A few odd scraps of lead were melted in a ladle, and we had four good ventilators. These were cleaned up with an old file and glued into holes in the deck.

The hawsepipe holes were drilled from the deck and from the sides to ensure that the hole was in the correct place. Four brass eyelets were squeezed to an oval shape and glued in position.

For the portholes or scuttles a small punch was made from a suitable size piece of wire, the ports were marked out and then the depressions were punched in.

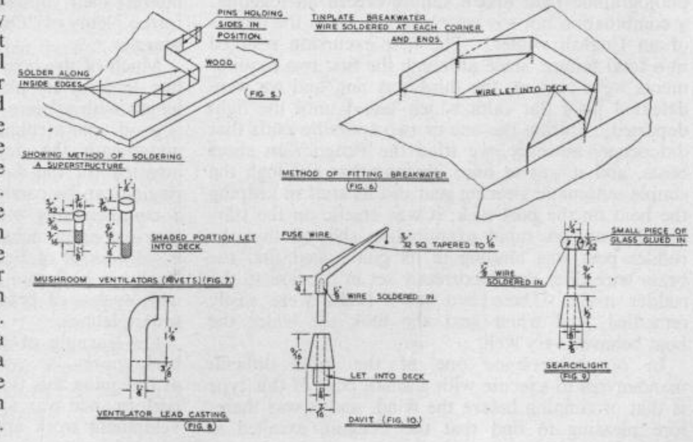
Searchlights

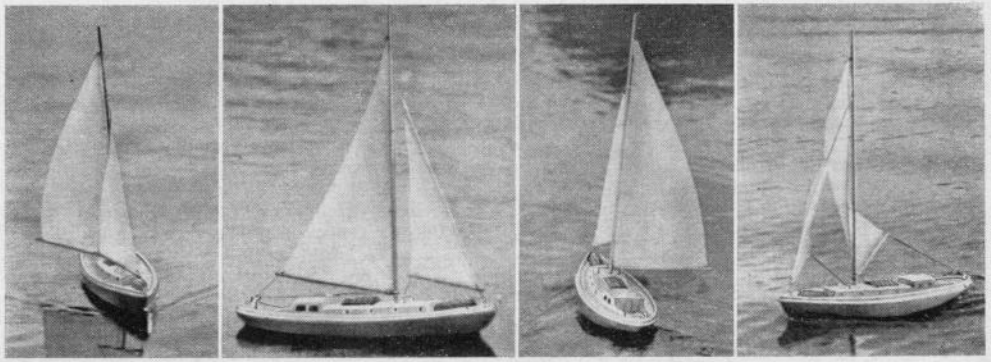
(Fig. 9.) These were made from brass wire though wooden dowel rod can be used if no lathe is available. The searchlight itself is a piece of $\frac{3}{32}$ in. wire $\frac{1}{4}$ in. long. A short length of $\frac{1}{8}$ in. wire is soldered into it as shown. The base turned as shown is drilled $\frac{1}{8}$ in. for the searchlights to fit in. The base is glued into position and the searchlight is free to swivel. On this ship one searchlight and two signal lamps are fitted, the signal lamps being made in the same manner as the searchlights, only smaller throughout, of course. Small pieces of broken glass glued in the searchlight housing give added realism.

Davits

(Fig. 10.) The arm of the davit was a piece of $\frac{5}{32}$ in. square wire filed taper to $\frac{1}{16}$ in. sq. as shown. The arm is bent to shape and a piece of $\frac{1}{8}$ in. wire soldered in the end. A small hole is drilled in the small end and a piece of fuse wire is passed through. One end is soldered to a small scrap of brass plate and then soldered to the arm. A small blob of solder on the other end completes the job.

The base is turned and drilled as shown. The deck is drilled and the base glued into position. The davit arms fits into the $\frac{1}{8}$ in. hole and is free to rotate.





MODEL MAKER SAILS THE PENGUIN OCEAN RACER

WHEN Mr. J. R. Vanderbeek of Lines Bros. Ltd., sent us a Penguin Ocean Racer for review recently, he urged us not only to examine and photograph it, but to take it to any handy stretch of water and *sail* it. Now most people's experience with "toy" sailing boats is probably much the same as our own; however pleasant they may look in the shop window, they rarely live up to expectations on the water, and depress us by bobbing about aimlessly at the mercy of any breeze that blows, and behaving quite unlike their big sisters.

The Penguin, although a most handsome little craft, still comes into the "toy" category simply by reason of its surprisingly modest price, for 39/6 is certainly little enough to pay for a well finished scale model. For this reason alone we did not expect too much of its sailing trials. These were delayed for some weeks, since it was a question of finding the time, the photographic light and a sailing breeze all together, a combination not too easy to come by in the depths of an English winter. The first excursion resulted in a total failure, since although the first two requirements were present, the third was not, and we were defeated by a flat calm which lasted until the light departed. During the one or two sporadic puffs that did occur, however, we tried the Penguin on short beats, and it was at once obvious that although the simple automatic steering gear did its stuff in keeping the boat on the port tack, it was erratic on the starboard beat. A rapid examination showed that the rudder post was binding in its guide, and that the brass wire tiller was incorrectly set in relation to the rudder itself. These two small faults were easily remedied, and when next she took the water the boat behaved very well.

In our experience one of the most difficult manoeuvres to execute with a small boat of this type is that of running before the wind, and it was therefore pleasing to find that the Penguin excelled in this. She was sailed on the second occasion on a wide stretch of the Grand Union Canal near Stoke Hammond, and on a long diagonal run from bank to bank it was found that she would hold a dead true course from the skipper's hand to the "mate" on the opposite bank some way beyond, without the necessity for him to move from his chosen spot.

Both reaching and beating were tried, and although the wind was light and intermittent, both were successful within the limitations of the simple steering gear provided, and we were more than satisfied that Lines Bros. Ltd., had produced a very practical little sailer which should teach the keen youngster the elements of model yachting and give him a great deal of pleasure without any of the sense of frustration so often occasioned by small craft in this price bracket. We can thoroughly recommend the Penguin to keen model yachtsmen who want to interest their youngsters in their own hobby, and can forsee plenty of "One-design" races on the ponds this summer.

Much of the boat's success doubtless is due to the fine lines of its plastic hull, which is 16 inches in length with a beam of 4⅝ in. Deck and cabin detail is good, and a rubber drain plug for the hull is fitted underneath the detachable plastic dinghy, carried inverted on the foredeck. Stepping the mast and rigging can be carried out in less than a minute, and a commendably clear sheet of rigging and sailing instructions is included in the carton. The mainsail is, of course, of Bermudan type, with a well curved leach; a jib-boom is fitted, and both sails are fitted with eyelets of brass. Total area is just under 100 square inches.

On learning of this successful test Mr. Vanderbeek wrote: "... very gratifying as the whole point of designing this type of yacht was to ensure that its performance was also 'to scale' ... months of development work appears to have paid dividends!"

SEAWORTHINESS

FURTHER DESIGN PROBLEMS SOLVED BY A. M. COLBRIDGE

THE model power boat has inherently to be more seaworthy than its full-size counterpart. With no 'live' control it has to have a greater degree of self-correction and stability, if it is to operate successfully under varying conditions.

Now stability is only achieved as the result of a compromise, or rather a series of compromises. For example, in a high speed hull maximum length is desirable, if the hull is of the wave-making type, with narrow beam and a semi-circular cross section. For model work, in particular, a generous beam is required and stability in roll precludes the use of a semi-circular hull section.

Considering only the displacement of wave-making type of hull a circular section is one which would possess neutral stability—Fig. 1. Its performance could be improved, without too great a loss in efficiency, by modifying the section as shown in the second diagram, but only at the expense of a more complicated structure. This form, however, would be better than the practical adaption of the circular hull shown in the third diagram. The usual compromise is to employ a more rectangular section with rounded bilges, preferably, in model work, as near true rectangular as possible.

Unfortunately such a hull form has relatively high resistance in a wave-making hull. At the same time there is another point on which stability and efficiency conflict—Fig. 2. For two hulls with the same displaced volume and the same overall length the one with the greater beam will be the more stable. At the same time this hull will have greater water resistance and require more power to drive at the same speed.

The best solution is, if the hull is to be driven at any reasonable speed, to depart from the pure wave-making hull and design a hull with the ability to plane and thus be able to retain a reasonable beam width (for stability) without excess drag. The principle of planing is simply that the hull shape is so arranged that as it is driven through the water an upward or lift force is developed, sufficient to support part of the total weight, so that the hull actually rises as it is moving forward. If enough power is available to continue this process by increasing the speed there comes a point where the bottom of the hull is developing almost the entire 'lift' or upward thrust and is barely touching the water. This principle is widely used in full scale power boat practice where high speed craft—not racing craft—generally have a hull of hard chine form—Fig. 3. There are many modifications of this layout. Some use one or more steps in the bottom of the hull, for example, although it is the modern trend to eliminate the step in hulls of this type, except in the smaller sizes. Water resistance is relatively low (at speed) and, as the diagram shows, the desirable 'rectangular' section can be used with a reasonable beam width.

The 'rectangular' section hull resists roll very well, which is a matter of some importance to the model

FIG. 1

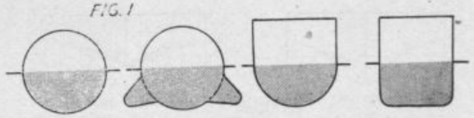


FIG. 2

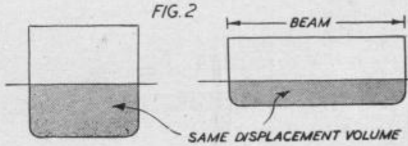


FIG. 3

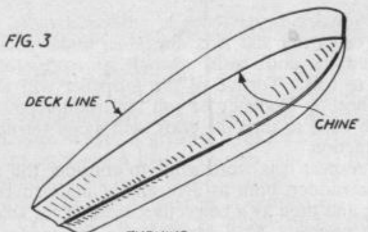


FIG. 4

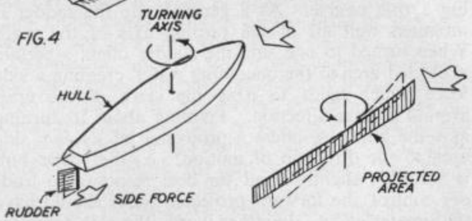
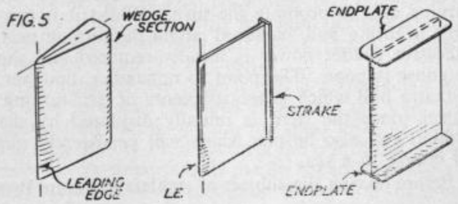


FIG. 5



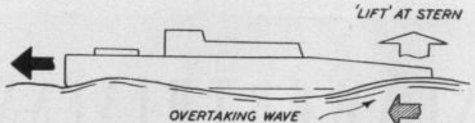


FIG. 6

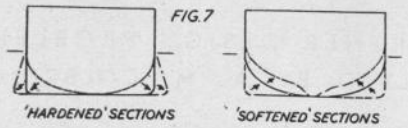


FIG. 7

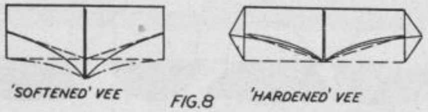


FIG. 8

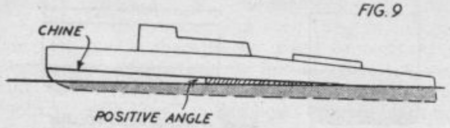


FIG. 9

designer. A rolling tendency is induced by the action of a cross sea and it is desirable, under such a course, that the craft resist strongly an exaggerated tendency to roll. Torque of the propeller will also induce a heeling tendency or roll and rudder power, also, when used to turn the craft, will again set up a heeling reaction.

In this respect it is worthwhile to consider the action of the rudder, both as a means of manoeuvring or turning and used as a corrective medium for steering a true course. As a general rule the rudder is mounted well aft of the turning axis of the craft. When turned to one side the rudder offers a certain projected area to the oncoming water, creating a side force which tends to drag the stern of the craft around in that direction. Pivoting about its turning axis the hull now offers a projection of its own side area to the direction of motion, i.e., the whole hull is skidding slightly—and for best response to 'rudder control' the forward projected areas should have the greater effect. In other words the side force resulting from the sideslip should be ahead of the turning axis to promote the turn. Whilst it is possible to turn a hull 'balanced' about the turning axis, excessive rudder power is usually required and the response is poor. The point to remember, however, is that a hull which generates plenty of 'self-turning' power (once the stern is initially displaced by the rudder) can also be one which will persistently run off course in a sea.

Before leaving the subject of rudders there are two interesting points of design which are worthy of thought, particularly to designers of model sailing craft where automatic rudder control is used to hold a set course. It appears that the most efficient rudder is one employing a 'back to front' section, like a wedge with the sharp edge forward—Fig. 5. This is contrary to popular belief where the usual practice is to employ a flat plate rudder or a thin symmetrical section with the trailing edge tapering off to a knife edge. A rudder of this latter type would undoubtedly be far more efficient if fitted with a trailing edge strake, as shown in the diagram, which would result in little, if any, increased drag. In fact it should be possible to reduce drag since a smaller rudder area would suffice. A further way in which it should be possible to improve rudder power is shown in the third sketch—fitting small endplates to the top and bottom of the rudder to prevent tip losses or water spilling around the outline.

Returning to the tendency of a hull to be displaced in a sea, if the sea is following the craft waves will overtake it, periodically lifting the stern—Fig. 6. The reaction to this displacement depends very much on the hull lines. With a long, narrow hull of the displacement type the bow lines will be slim and fine and there may be a marked tendency for the bows to dig into the next wave ahead, which will considerably increase resistance, slowing the craft and aggrevating the effect of the following wave lifting the stern.

Almost inevitable the stern will now be displaced to one side or the other and may be swung right round until the craft is side-on to the waves and rolling badly. The chief cause of the trouble is loss of forward way due to the bows digging in, causing the craft to 'broach to'.

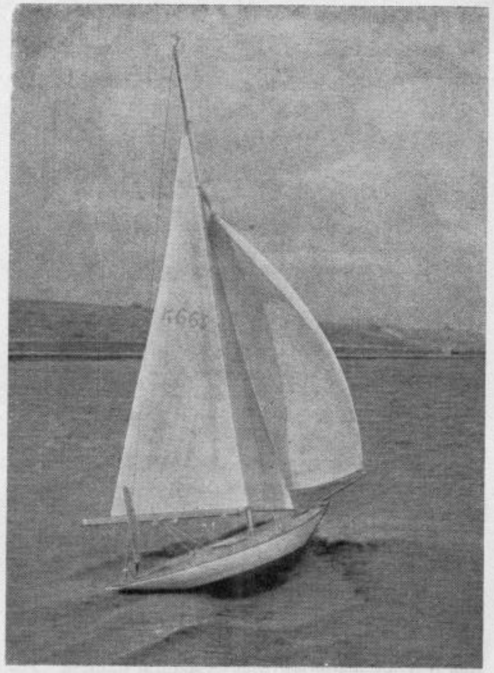
A hull which is prone to exhibit these characteristics requires the forward sections 'hardening' and the aft sections 'softening'. This means, in effect, offering a broader, more flat plate bottom forward to resist ploughing in and the opposite effect at the stern end to reduce the 'lift' of the following wave—Fig. 7. On a completed hull where it is not possible to carry out such modifications, small outrigged 'planing surfaces' forward should have an improving effect, if rather unorthodox.

Just like designing for good rudder control, however, this feature must not be overdone for in driving into a head-on sea a particularly 'hard' forebody can cause the craft to 'slam' or bounce up off oncoming waves due to its inability to penetrate and part the water smoothly. To this end the vee of the forward sections can be elongated to afford a better entry, flaring into an almost flat bottom farther aft to provide increasing resistance to bow-down pitch with increasing penetration—Fig. 8. This V-form of underbody is very desirable with a hard chine hull and fits in well with the desirability of keeping the flat run of the chine at a positive angle to the normal load water line—Fig. 9.

SAILMAKING

AN AUTHORITATIVE ARTICLE BY W. J. DANIELS

"Zenith", designed and built by the author, and entered in the A Class Championships last summer by R. Scott-Freeman. In spite of Vane misfortunes on the first day of the finals she finished 5th. In this shot by French entrant Boussy of a run before the wind, note particularly the perfect wave formation—with hardly any indication of a wake—that exemplifies his final remark that the hull must always be the master.



General

DURING the past fifty years there has been a general trend towards an idea that sail area could be reduced to a minimum, and that length of hull would compensate for the reduction. Up to a point this may be true, but sail is the engine that drives the hull and, as in a power driven vessel, it is necessary to have sufficient power to develop speed however perfect the hull form. It is obvious that there must be a limit to which the size of the hull can be increased and the sail area reduced.

The main reason that under-canvased models are encouraged is, firstly, that the championships are generally sailed in coast towns where strong winds mostly prevail, and, secondly, by the method of sailing on the tournament system.

Under the latter system it is not possible to carry on a race if the under-canvased boats cannot complete their heats, and the race is held up until there is sufficient wind for them to do so. The result is that, although there may be one or two models that can easily complete the course, they have to wait until conditions suit the hard weather boats. If it was simply a match between two models the boat that could not complete the course would have to tow up after her opponent was over the line.

The method by which sail area is measured in most rating rules has lent itself to abuse in many cases. Excess unmeasured area has been obtained by treating the cloth to stiffen it and thus the limits that are put on the length of the battens in the leach of the sail do not control the amount of unmeasured sail area as was intended. Results, however, do not seem to show that any great advantage has been gained. Apart from this, it is felt by the writer that nothing should be allowed in model yachting that is impracticable in the full-size craft; and as it would not be possible to reef or furl stiff sail cloth on a full-size yacht nothing is added to the furtherance of yacht design, which the average model yachtsman claims to be attempting.

It has been generally stated that the order of importance for a successful yacht is first, the skipper, second the sails, and third, the design. It must be obvious, however, that all are of equal importance. However perfect the hull may be, however skilful the skipper, the yacht cannot perform her best unless the sails are up to the same standard.

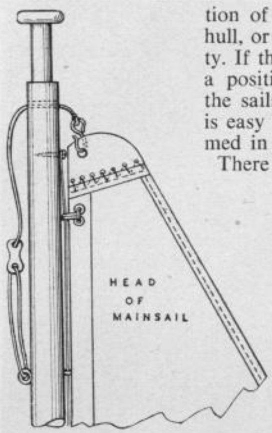
Sail Plans & Material

There is no doubt that for any given area the most efficient form of sail plan is the Bermudian. To start with it is the greatest area of sail that can be set up on a given length of spar. It has the further advantage that top weight of fittings, etc., that was necessary in the old gaff rig is eliminated. The form that the mainsail takes is much more efficient by being much closer winded, as the head of the sail does not sag off as in a gaff sail.

The further trend in sail plans is to get height. This, of course, can only be obtained by sacrificing length of base, and, as in most things if pushed to excess, the sail plan starts to get less efficient owing to the difficulty of controlling the sails. It is also harder to reproduce the sail trim which has been found most efficient.

It is easy to make the mistake of using too light a cloth for the size of a model. Whereas a cloth of 3 oz. to the square yard is suitable for a three-footer, nothing under 4 oz. will maintain its shape in a Marblehead or 10-rater, and even slightly heavier in the case of an A-Class model.

The most efficient form of sail is a triangular one set on a wire stay. If correctly sheeted the wind will automatically make it take the most efficient form. The distance out on deck from the centre line of the yacht is very important. If the jib has to be used as a steering sail there is something wrong with the posi-



tion of the sail plan over the hull, or the hull design is faulty. If the yacht is held in such a position that the wind fills the sails when close hauled it is easy to see if they are trimmed in unison.

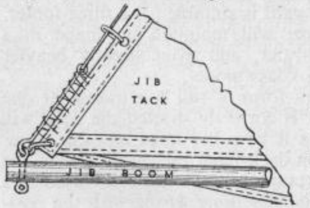
There is a point to which the sails may be close hauled, but if trimmed closer efficiency falls away rapidly and the yacht will not point as high.

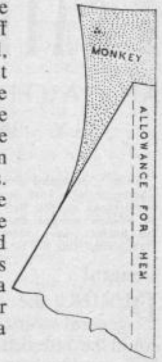
Therefore, it will be seen that for a model to give her best performance perfect sails are necessary. Firstly, a suitable cloth must be used, and secondly, the tape for binding the raw edges of the cloth must be linen of the best quality. It must be of sufficient strength to prevent the edge of the sail from being stretched beyond the natural length of the cut edge of the cloth.

Cutting the Cloth

First pin the cloth down on a flat surface and see that it is not distorted from its natural flatness. The next step is to mark the leach of the mainsail. Measure off the length of the leach at points in from the selvedge that will allow for the amount of outward bow shown on the sail plan, plus an allowance for the hem. The hem will reinforce the leach of the sail. On no account bind the leach or introduce a cord of any kind. If you do, directly the sail gets wet or even damp from the atmosphere, the sail will become a bag.

Then set in at the head of the sail the point of the head board and using two rules find the point where foot and luff meet at the tack of the sail. Draw the luff as a straight line but the foot must be a concave curve, the nature of which must be parabolic with the deepest point nearest the mast. The amount of depth that is given to this curve will determine the amount of draught the sail will have. It will be found in practice that for an A-Class sail a $\frac{1}{2}$ in. of depth will give a nearly flat sail after it has been used a few times. If it is intended to have a loose-footed sail a bonnet must be drawn at the foot in which case the line for the taping of the foot must be a straight line.





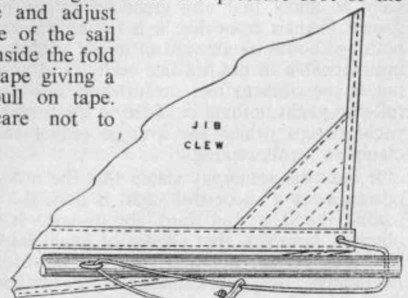
The jib or headsail must be marked out in the same manner off the other selvedge. It will be found, if several suits are to be made, that considerable economy can be made by arranging the sails so that there is a minimum wastage of cloth. The outward curves of sails are drawn with a spline held down with weights. In cutting out it is necessary to leave what is termed a monkey on the cloth. This is to start the hem and will be cut off after the edge has been hemmed. However expert a seamstress may be the hem can never be turned over as perfectly as a sewing machine will do it.

Hemming the Sails

A $\frac{1}{8}$ in. hemmer should be used and the tension of the cotton should be just right so that the stitch neither puckers up or is loose. It is necessary to hem the foot of the jib first, and similarly in the case of a loose-footed mainsail. The monkeys for these hems can then be cut off and the leach of each can be hemmed. The mainsail must be turned in at the head for the headboard to be attached. It is the general practice to reinforce the corners of sails and this is best done before the hemming is completed. A triangular piece of cloth must be cut to the correct angle for each corner. The base of the triangle should be selvedge. This should be sewn on and bound down by rows of stitches about $\frac{1}{4}$ in. apart. When the hems are sewn the raw edges of these reinforcing pieces will be turned in with the hem on the leach and covered by the binding on the foot.

Binding with Tape

Having cut out the sails and hemmed them the raw edges must be bound with tape to prevent them being stretched. The tape, which should be $\frac{5}{8}$ in. wide must first be folded and carefully creased over an edge. Fold in an inch of the tape at the end, place the edge of the sail in the fold of the tape and bring the needle of the sewing machine down through the tape at the inner edge. Raise the pressure foot of the machine and adjust the edge of the sail nicely inside the fold in the tape giving a slight pull on tape. Take care not to stretch the edge of the cloth. Lower the pressure foot and sew for about 3 in. and repeat. The start should be made at the clew of each sail. When the foot of the mainsail has been taped it should be cut off raw at the tack, and a fresh start made up the luff, folding in an inch of tape as before. The foot of the headsail must be reinforced by stitching flat tape from tack to clew in a straight line. This tape will be found to curve upwards after a time as the wind makes the sail take its natural form.



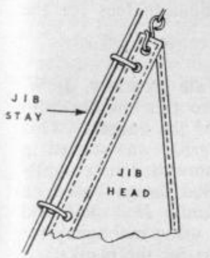
Batten Sleeves

Having bound the edges of the sails the sleeves to take the battens must be sewn on. Be careful not to pull on the tape as it will cause a pucker. Rather give a slight pull on the cloth. The tape should, of course, be folded in at each end for about 1 in. When inserting the battens which must be of thin strips of split cane, care must be taken that the inner end of the batten enters the fold in the tape, or it will wear a hole in the sailcloth.

The jib is a plain flat sail, and as before stated will, if correctly sheeted and the luff set bar hard, give a perfect aerofoil.

Fitting Sails to Spars

In order to fit the sails to the spars the best practice in the case of the mainsail is to fit hooks to the luff and foot. These are attached to a jackstay which can be either a wire passing through small eyescrews on top of boom and on the after side of mast. Another method is to have small eyelets equally spaced on luff and foot of sail, and for the sail to be laced spirally to the spars. This latter method may be practicable for smaller classes, but is not good enough for A-Class models as the strain of the more powerful yachts quickly chafes through the lacing.



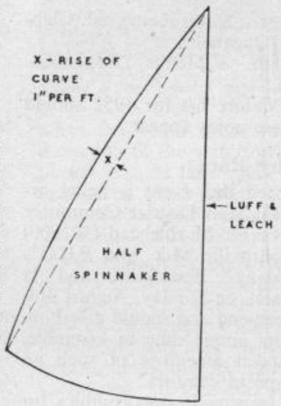
The luff of the jib should be eyeletted with small rings in the eyelets. The sail should set on a stay and have a separate uphaul as it is not good practice to put too great a strain on the tape.

Suitable sail hook eyelets, etc., can be obtained from Messrs. Arthur Mullett, of Brighton, as advertised in *Model Maker*.

The Spinnaker

With the greatly reduced sail areas at present in vogue the spinnaker has become a very important sail when sailing off the wind. For sailing in a quartering wind, that is, when the wind is half way between a beam wind and dead aft, best results will be obtained from a flat sail set inside the jib with the spinnaker boom well forward. If, however, the wind is dead aft a sail with a fair amount of draught will pull harder.

The flat spinnaker must be taped along the luff and foot, the selvedge being the leach. But, in making the spinnaker for a dead run before the wind, the following procedure is the best to adopt. Excessive draught is useless as the extra weight of cloth will not allow the sail to fill. The cloth should be folded with the two selvedges together. Half the spinnaker is then marked off. The fold will be the centre of the sail. Mark off the length of the luff and leach along the selvedge. Find the point where half the length of the foot and the greatest depth of the sail meet. Place a batten on the point of the head of the sail and on the point found at the foot, and bend the batten to half the amount of draught that it is desired to give to the sail. This curve should be as near as possible an arc of a circle. A line is drawn with a soft pencil along the batten. Keeping the cloth folded, a line of stitching is run along this line. Then cut outside the stitching fold over the seam and run a line of stitching along the cut edge.



The cloth can now be opened out and the foot marked. This should be an arc of a circle. Allow $\frac{1}{2}$ in. for the hem of the foot; the corners of the spinnaker should be reinforced with triangles of heavier cloth as in the case of the jib and mainsail. An eyelet should be fitted at each corner. A hook at the leach and one of the lower corners must be fitted; a sheet of plaited cord with bowser and hook at the other corner of the foot.

Miscellaneous Points

The hooks on foot and luff of mainsail are sometimes fixed with eyelets, but if sewn on with thread will be just as satisfactory. These should be arranged to hook on alternative right and left. The spacing should be 5 in. on luff and 3 in. on foot.

Should the air become damp or it rain during sailing, sails should be immediately slackened off. Always dry sails thoroughly before putting away.

The reason that the leach of jib and mainsail must only be hemmed is that the hem will stretch and shrink equally as the sailcloth.

Be careful not to haul out sails too hard on the spars, but let the wind stretch them to shape gradually and take up the slack as the sail shows signs of puckering.

Never sail the model over-canvased. The hull must always be master.

MODEL YACHT CLUB NOTES

BY "COMMODORE"

Model Yachting Association

The M.Y.A. National Championships for 1952 are now confirmed as follows:—

May 31st-June 2nd.—Marblehead (50/800) Class, Witton Lake, Birmingham. O.O.D. Mr. Hague.

August 9th.—12 Metres, Paisley. O.O.D. Mr. Cunningham.

August 11th - August 16th (inclusive).—International A Class, Gosport. O.O.D. Mr. Bell.

August 25th-August 29th (inclusive).—10 Raters, Fleetwood. O.O.D. Mr. Andrew.

September 20th and 21st.—36 in. Restricted, Clapham. O.O.D. Mr. Quennell.

September 27th and 28th.—6 Metres, Dennistoun. O.O.D. Mr. Richie.

The official club and fixture list for 1952 should be ready by the time these notes appear.

"Model Maker" Trophy Race

As previously announced this event is being organised in 1952 by the Midland District Committee of the M.Y.A. and will be for Marblehead (50/800) Class. Venue is the Bournville M.Y. and P.B.C.'s water at Valley Parkway, Bournville, and is scheduled to start at 11 a.m. on Sunday, August 3rd. This is Bank Holiday week-end and should give both contestants and spectators ample time to assemble, enjoy the racing and social amenities of such an occasion, and return home in comfort.

This race is intended to provide opportunities for the not so famous, and will be open only to Midland District members who have not previously sailed in a Marblehead Class event of National Status. A maximum of three boats per M.D. club will be accepted, numbered 1, 2, 3—and all entries will be required to furnish a valid rating certificate.

As the event will be completed in the one day, the O.O.D. will reserve the right, if he thinks fit, to accept only boats numbered 1 and 2, should the entry be such as to make its completion in the time allotted problematical.

The winner will hold the *Model Maker* trophy for one year, and vouchers to a value of Five Guineas will be awarded to 1st, 2nd and 3rd skippers. There will be no entry fee, but entries can only be accepted via affiliated clubs in the Midland District of the M.Y.A. Unattached enthusiasts, or indeed, those in other parts of the country wishing to enter, must therefore join one of the appropriate Midland clubs to qualify.

It should be pointed out that every boat sailing will therefore have been measured, weighed and checked—an inescapable condition for all M.Y.A. events, and by limitation of entries to a number that can comfortably be raced will ensure that every skipper is capable of sailing a good course, and not fouling his opponent, as might happen with an indescriminate number of "unknowns". Enthusiasts and would-be entrants of the future should certainly be able to learn a lot from such an event sailed competent skippers who have not quite made national status in the past.

Secretaries should write to Mr. M. Fairbrother, The Boathouse, Valley Parkway, Bournville, Birmingham, for entry forms and further particulars.

Each year the *Model Maker* Trophy will be sailed in a different part of the country, and even for a different class of boat. In 1953 it will be for 36 in. restricted Class and will take place on the National Coal Lake, Woodlands, Nr. Doncaster, with the Doncaster M.Y. and P.B.A. as organisers.

Midland District Committee

Midland District fixtures have been arranged as follows:

May 4th	36 in. Restricted	Wicksteed
June 15th	Marbleheads	Bournville
July 20th	6 Metres	Bournville
July 27th	10 Raters	Birmingham
September 21st	A Class	Birmingham

At their first regular meeting of the New Year, under the Chairmanship of F. W. Pitt, when the above programme was decided, it was also announced that district race fees would be reduced to the nominal charge of 5/- per race, and that clubs would not be required to forward district affiliation fees for the year 1952.

Trent Vale M.Y. & P.B.C.

We are indebted to Trent Vale secretary, J. W. Metcalf, for the heading picture this month, who sends it along for "the good of the cause". This interesting A Class yacht *Shangri-la* was started in 1939 though "other business" prevented its completion until 1945. It is a modified design based on E. G. Wade of Fleetwood's *Vanity II*. Rib and plank construction is employed, using mahogany for keelson, and Western Red Cedar for the planks. It was first raced in 1947 in the National A Class at Fleetwood, and came 14th in a thirty-six yacht entry. Laid up until 1949 when she won the club championship. Again laid up until 1951 when she came out to take the M.D. Championship at Birmingham. The boat has proved easy and fast even in very light weather. Skeg and rudder were modified in 1948 to take Vane steering, when an earlier difficulty in gyeing was effectively cured. Technical details: L.O.A. 78.75 in.; L.W.L. 52.88 in.; Beam on L.W.L. 15.4 in. No Q.B.L. penalty. Sail Area 1618.74 sq. in. Rating 39.01. *Shangri-la* has now been taken over by a fellow club member and should be seen out again this season.

Poole Model Yacht & P.B.C.

This club was re-formed in 1951 and is now very much alive. The culmination of a successful season's sailing came in the form of a dinner at the Dolphin, Poole, with fifty-five members and friends in attendance. Mrs. Miller (wife of the Club's President) presented prizes to winners of the Club Marblehead (50/800) Championship: Miller Shield—Mr. Beech; Runner-up (Hookey Cup) Tony Brook and Silver Spoon—E. Keech. In the Power Boat Section The Rotary Cup went to Graham Moore and the Silver Spoon to Mr. Morrell.

At present the club is racing Marbleheads in more or less open water conditions, but the Poole Borough Council hope to complete a cat-walk for the club in June, thus completely enclosing the water. All being well, it is hoped to hold the South Western Area 10-Rater Championship on this water on July 6th.

Other enterprising work in hand includes the erection of a boathouse and seats for spectators. The local council have proved very co-operative and are including the club fixture list in the current issue of their "Guide to Poole". Hon. Secretary of the Club is: Miss P. Robinson, 37 Valley Road, Bournemouth West.

Mr. J. W. Metcalf's A Class yacht "Shangri-la", started in 1939 and finished in 1945 which is beginning to make a name for herself in Midland District circles.

Paignton M.Y.C.

Our remarks on Paignton M.Y.C. in January and February *Model Makers* have produced a reply from the Paignton U.D.C. written by their Entertainments and Publicity Manager, Mr. J. R. Bultz. We publish relevant extracts from their letter, together with Paignton Commodore Donovan Pinsent's comments thereon, in order that readers may have a complete picture, and to avoid any feeling that may be engendered in that Council that our attitude is one-sided.

Mr. Bultz writes: ". . . Paignton Council has been most generous to Paignton and D.M.Y.C., and is fully aware of its publicity value . . . When Goodrington Park was laid out . . . the Boating Lake was incorporated . . . as a means of obtaining revenue. After some time the Paignton and D.M.Y.C. was formed and granted facilities for using the Boating Lake on Sunday mornings . . . subsequently extended to Saturdays after 5 p.m. although it meant a loss in revenue of several hundreds of pounds . . . The rent charged the Club is purely nominal, as also is the rent . . . for the use of premises as a Club House".

Commodore Pinsent replies: "Re rent—we pay £10 a year for the use of the pond plus £15 for Club House. Nothing has been done to house for 17 years, the roof leaks very badly . . . surveyor put in an estimate for £20 odd we were asked to pay £11 towards the cost. We then got permission to do the job ourselves which we did, materials costing us 10/-".

On alternative water Mr. Bultz says: ". . . is an ornamental and water fowl lake . . . if it were possible to make this available to the Club it would be done as Council would then obtain more revenue from the Boating Lake . . . but alterations would affect the whole feature and deprive public of the attraction of the waterfowl . . . the Surveyor has reported that the lake could only be made suitable for sailing, i.e., with safety to the Club's members at considerable cost, which in these restricted times the Council is unable to expend".

Mr. Pinsent's reply to this reports that the birds make a filthy mess of which everyone complains . . . and that an estimate of £200 was reported as necessary on November 15th, 1951, to put pond in condition for club use. It was claimed that owing to bottom being of mud this was dangerous to model yachtsmen. If that was so it was surely dangerous in its present state and use with a sudden drop of 4 ft. In fact it was left to a member of the club to rescue a child there some years before.

Finally, Mr. Bultz points out that the Council have always taken a live interest in the club, and that the appropriate Committee bears the expenses of entertaining Competitors in some of the important events.

It says much for the optimism of officials that they have decided to recommence sailing on March 1st, and have scheduled the Royal Torbay Yacht Club Silver Rose Bowl event for 10-raters for April 6th, and the South West England 10-rater Championship will be held at Poole on Sunday, July 6th. In view of general uncertainty the full club programme is still under discussion. Officials for 1952 are: President, Sir Reginald Leeds, Bart, R.N., High Sheriff of Devon; Vice-Presidents, T. S. Sharp, Esq., J.P., and Major G. Bentley; Commodore, D. H. Pinsent; Hon. Secretary, L. Mullinger; Treasurer, L. Chenowith; Racing Secretary, F. Austin.

MAKING MODEL BUILDINGS—AROUND THE FARM

VICTOR SUTTON DEVOTES THIS AND FOLLOWING ARTICLES ON A SERIES OF FARM BUILDINGS TO COMPLETE A COMPREHENSIVE FARMYARD

WHEN visiting exhibitions I have so often been asked for details of making farm buildings. Model-makers do rightly claim that there are no plans available but this subject is so wide and varied that it would not be a paying proposition for a firm to make any. However, what is wrong with making up your own? It should mean the using up of far more odd bits and pieces than you need to keep in your shed or workshop, anyway.

A visit round any country will soon make you realise that this is not a dull branch of scenic model-making and I have again recently seen some good prizes go to ardent scenic modellers because their particular farm building model was different. Perhaps the fact that I was one of the judges may have explained it.

One can make a farm scene to go with a model lay-out and in this case I will suggest the best papers to use, or it would be an idea to make a set of buildings suitable for display and enable you to use the farm accessories now on the market in toy shops.

First of all, we have barns. I have never seen two alike yet. The one in sketch No. 1 is sometimes called the "Dutch" barn. It is used for storage (crammed full, apparently) of oats, wheat and other items. The simple structure I have suggested will help you to make it easily. If you have plywood, then I should use this for the ends and on which to fix the "legs". Strength here is important and should be studied. The struts can be from ¼ in. square wood or if you want it very modern make cardboard sections as I have shown and then fit to the wood. You would thus have the strength with the appearance of modern girderwork represented by the cardboard treatment. Always give such a model a base in wood otherwise the legs will bend or break off. Paint this in a dull cement shade as the normal procedure is for the base to be in cement, especially if the construction is ironwork.

The roof is domed and although I have seen corrugated cardboard used for this it is out of proportion if meant to represent the usual corrugated iron. However, that is for you to decide. I favour the roof being covered with thin sheet balsa and the lines scored down with a knife. When given a coat of dull flat red paint this is most effective.

The treatment for the sides is the same as for roof.

Truly picturesque is the barn with the sweeping low thatched roof, short walls and tall centre section. Start this off with the two end walls in stout cardboard or plywood. Plywood is best. When cut out get it fixed up on a panel board for base so that you can measure up the rest. The next part to tackle is the front and rear walls which are low and leave a wide space in the centre which connects up with the large doors and tall roof.

When dealing with this type of roof one always gets in a bit of a flat spin about how to fix it. To obviate this trouble you will see that I have brought up wooden bars which connect with the low outer walls, main roof and the tall section. Note also, the extra upright bearers from wall to top hip section so that your extra heavy roof will not collapse. Get all these parts true before starting on the centre section.

The framework for the middle is next prepared and can be made of odd wood as shown. Make the whole front from thick cardboard so that you can cut out the doors and hinge these on linen to move freely. As a rule these are boarded and very thoroughly tarred practically to the "jammy" stage, so if you plaster yours well it might make another point in the eyes of the judge because it is correct.

Now we come to the tricky part. Fix your sections together. Make the cardboard roof for the centre section. Do not try to cover all this part in because that is where you will come adrift. Don't try and cut all this roof in one because I bet it won't fit any more than the many lampshades I have tried to make. Same problem but different material.

Make the gable end boards separately and then you can get them dead right. Note the addition of the cardboard fillet up the slope and this is to hold it together and save expansion when you "thatch" the roof.

For the thatching I have used plasticine on my models. I layer this on and mould to shape. The ends I shape by pricking with a fine toothed comb. The main part I also streak down with a comb and carry out all the other usual bits and bumps as I go along. As you will see in the sketch this part is quite interesting. The little lacing effects I worked in with the slowly delapidating scullery mat trimmings which are most useful to any model-maker. The conical and slightly rounded ends are also novel and to bind this I let in some little lengths of wire, otherwise it may break and drop.

The colouring I used for this was streakings of yellow, chrome, fawn, brown and a little black. Thatching is very deep and this is an important point to study in making such a model. It should not look like a thin pie-crust—the real ones have to be water-tight.

Outside walls can be treated with dull shades of flat cream paint, fawn, grey and a few cracks in brown ink will help the rural appearance. As an adjunct to this, one could make the enclosure as shown from balsa wood and note the rounded red brick finish at the top.

This enclosure should be made on a base and the wall would probably be in rough brickwork as shown. So often in farm building, flint and other materials is used because it was available locally. Such walls have a panel effect as shown and the edges should be in cement shade.

My next article will deal with some more barns and buildings but if you make these two you have the start to a series which will make a good model, an excellent toy for any youngster or a fine exhibition piece. Preparation of a groundwork at this stage may be helpful if you intend to go on with a lay-out. The arrangement shown in the sketch will show you how to make the entrance to the farmyard.

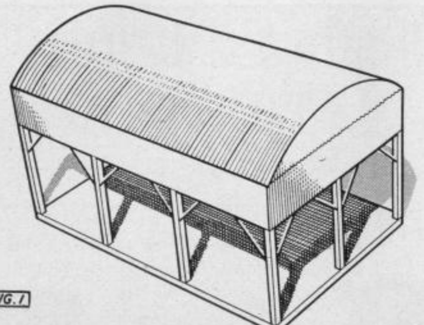


FIG. 1

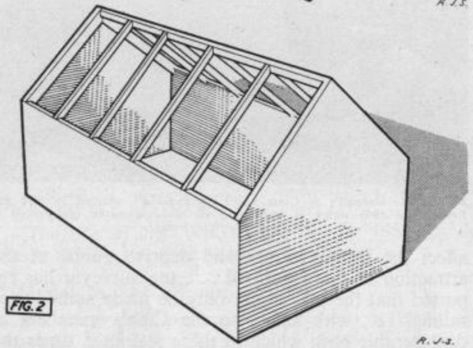


FIG. 2

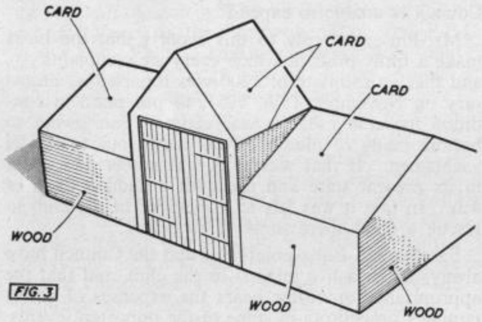


FIG. 3

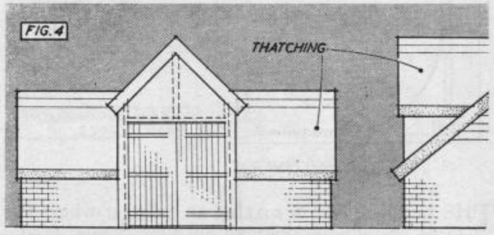


FIG. 4

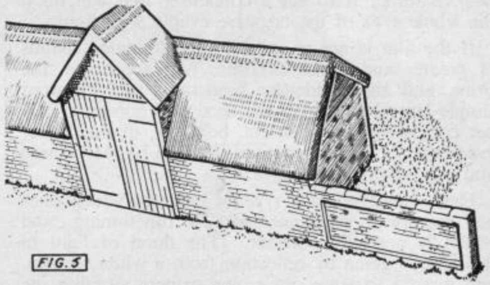


FIG. 5

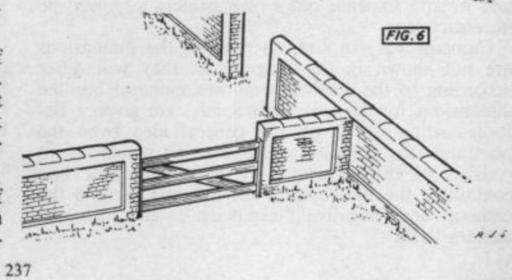
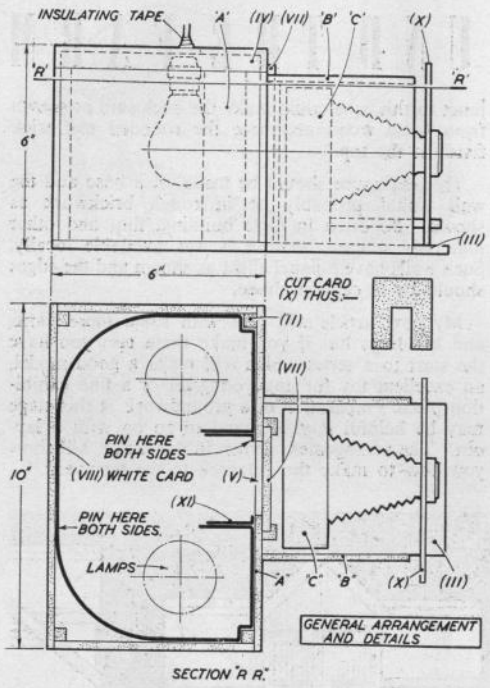


FIG. 6

HERBERT ARNOLD PRESENTS

A Simple Reflecting Enlarger



THE main trouble in making an enlarger which is to be useful with anything but tiny 35 mm. (and less) material, is to get a condenser that will flood the whole area of the negative evenly with light.

If the film is not so uniformly illuminated, bands of greater and lesser exposure will appear on the print, and the condenser (generally two big-sized simple lenses) is to give the necessary corner to corner constancy. Condensers, however, to well cover even $3\frac{1}{4}$ in. x $2\frac{1}{4}$ in. negatives, have to be really large and can be quite expensive.

Here, however, is a type of enlarger which does not require a condenser for its functioning, and which is perfectly efficient. The flood of light in this case is given by reflection from a white surface, and to save expense one's own camera supplies the necessary lens.

Cameras vary in size, so most of the dimensions are not shown in the diagram as they will differ according to the size of your own camera, but the dimensions for the lamp-house, etc., are given. Before starting work, get the general idea from the plan and side elevation. Broadly, the whole layout consists of three parts: (A) the "house" or box containing the illuminants; (B) a frame to hold the camera and negative "sandwich", and (C) the camera itself.

The lamps hang in the box as shown, and by virtue of their position and the white cards behind, cast an even and very intense flood of light on the surface of card (i), and it is this surface which illuminates the negative and so produces the enlargement. Thus, the need for a condenser is entirely eliminated, and this method of illumination gives certain advantages in the quality of the prints produced that are not present when the light comes through condensing lenses. For instance, a reflecting enlarger is always kinder to negatives that have become scratched or otherwise marked—a condenser always seems to make the most of such flaws.

A simple box 10 in. long and 6 in. x 6 in. in section provides the house for the lamps. Any fairly thin material will do for the sides, which are built around the four corner rectangles (ii). The base is made up of three separate pieces, the middle one (iii) coming forward for 5 in. to 7 in. This is to support the camera and hold the frame covering. It also makes the whole instrument into one complete unit.

The top, from which the lamps are suspended, is fitted last. This is of rather thicker wood and has round it the strip (iv)—a length of card fastened by sprigs at intervals. The top thus fits over the walls like the lid of a boot box, and the arrangement gives perfect light tightness, and also allows you to get inside to the bulbs, etc., easily.

From the front of the box take out a rectangle (v) about $3\frac{1}{2}$ in. x $2\frac{1}{2}$ in., if any size negative up to $3\frac{1}{4}$ in. x $2\frac{1}{4}$ in. is to be used. For quarter-plate make the opening $4\frac{1}{2}$ in. x $3\frac{1}{2}$ in. To either side fit the runners (vi). These are each made up of two strips of wood, the one slightly wider than the other, so that when placed together a lip is automatically formed into which slides the card sandwich (vii)—see photograph and diagram—which holds the negatives. The lips are fastened with glue and one or two fine screws taken through into the box.

The lamp-house complete, take a sheet of white card 23 in. long and 6 in. deep and drape it round the whole box as shown, bringing the ends against the opening out at a right angle as (viii). These extensions are to prevent any direct light from the lamps falling on the negative. Two stiffening pieces (xi) go on the inside of the turned-in ends, and glue and one or two small paper fasteners hold the pieces together, the stiffeners being bent to a right-angle at the inside and secured with drawings pins (and again glue) to the wood of the box. If correctly cut, the sweep of the material round the sides and back should hold it here by its own springiness, but if it does not lie well put in a drawing pin at each of the four corners of the reflecting area as indicated.

To get the maximum reflecting effect, and thus the greatest amount of light from the bulbs, the floor and the inside of the lid are covered with white card also, or if desired these surfaces can be given a coat of white paint.

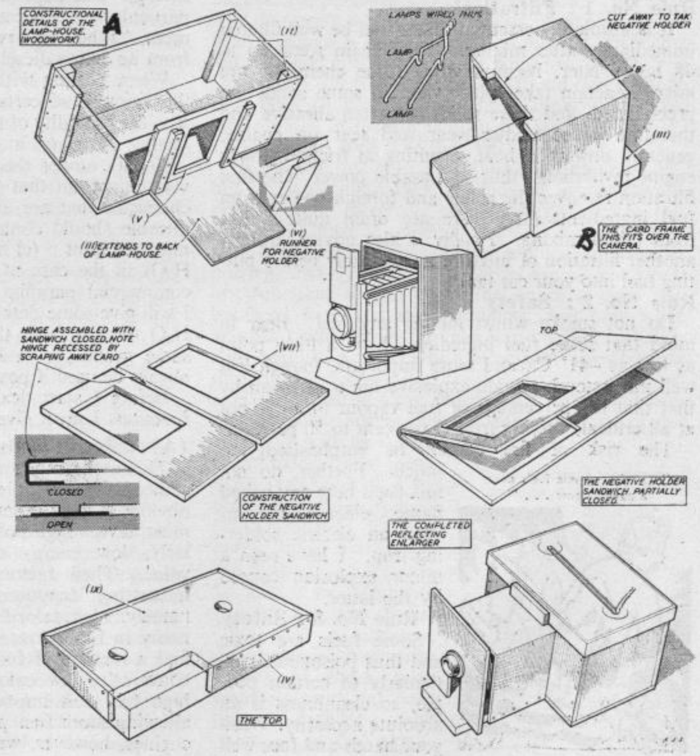
Two holes (ix) are taken out of the top, $2\frac{1}{2}$ in. from either end and $2\frac{1}{2}$ in. from the front. These are for the lamps, which are wired in parallel as shown, and hang by their length of flex at such a height that their brightest point is just level with the middle of the negative opening—which is also the same level as the lens. The correct height found, it is retained by wrapping a piece of insulating tape round the wires at the point where they enter the box, to stop them being pulled in any further.

The frame that goes over the camera is simply a sheet of card bent to right-angles in two places and fastened to the base extension (iii) by screws through its lower edges. This piece should be made to sit as low as possible over the camera without actually jamming it, for the instrument must be capable of sliding in and out for focusing purposes. To fit over the runners and negative holder, cut a rectangle out of the near top edge as shown in the photograph and diagram. Joining thus makes the frame perfectly rigid.

To prevent light escaping forward, the sheet of card (x) is put in position over the front of the camera. There is a slot in this card and it slips over just behind the lens panel. When on, examine from the front for light-tightness, for the only rays to reach the sensitive paper must come through the lens. This is particularly so with a reflecting enlarger as exposures are normally rather longer than with a condenser type.

For holding the negatives we have the simple "sandwich" (vii) which is just two sheets of card hinged with thin tape down the one edge and with two suitably-sized holes taken out. Between these pieces the negative holds quite firmly without the need of going between sheets of glass. This is all to the good for the fewer glass surfaces one has when enlarging the better. The cards for the sandwich must be long enough to protrude above the frame for easy inserting and pulling out, and the openings must be cut so that their centres agree with the level of the lens. To make the taped edge work more comfortably in the runner at that side, scrape the card a little before glueing, which virtually has the effect of countersinking. After putting on the tape place it under considerable pressure while it dries as this helps further to give a very flat edge.

All is now complete and the whole of the inside of the frame, etc., should be given a good coat of non-reflecting matt black. Everything should work easily—the camera in and out of the frame and the negative carrier up and down in the runners. The enlarger will do very nice work, but it is not so intense in lighting as one fitted with a condenser, where, of course, the illumination is direct. This will only be noticeable when a negative is very dense, and here it is best to insert and focus with a thin one first.



JIM DEAN ON . . . . FUELS FOR FANS. PT. I

" . . . I have found out about hydro-carbons . . . "

WELL, fellow fans, I do not profess to being an author, nor come to that of being an expert on the chemistry of fuels, but having had to earn my living, I have during that period of hard labour found out, usually the hard way, certain things about hydro - carbons, etc.

Now I think the best approach to this subject is to say, firstly, I will be as non-technical as I possibly can, because I feel most of you, though understanding this technical jargon, do prefer something easy to read, but more important, something that will help you to make that car of yours go still faster, and run consistently, so herewith some very simple rules, and how important they are! I must stress strict adherence to them if you want (a) results; (b) long life of your engine; (c) consistency; and (d) personal safety.

Rule No. 1 : Filtration

It is absolutely essential that a fuel be well filtered immediately after mixing. Then again some 24 to 48 hours later, because when some chemicals are mixed reaction takes place wherein some solids are precipitated, and these solids are often abrasive and therefore cause undue wear and tear on engine, generate unwanted heat, resulting in friction, lower engine revolutions, thus less usable power. The first filtration removes the solids and foreign bodies from fuel ingredients (and there are often quite a lot) from initial mixing. Finally, I also advise strongly another filtration of mixture immediately before putting fuel into your car tank.

Rule No. 2 : Safety

Do not smoke whilst mixing any fuel. Bear in mind that some fuel ingredients have a flash point as low as –41° C., and more important, though less well understood, a wide explosive limit. I mean by that that the percentage of fuel vapour to air is not at all critical, varying from 2 per cent to 50 per cent.

The risk of fire cannot be emphasised too much. Further, do not mix fuels near any naked flame, electric fire or even an electric soldering iron. I have seen a minor explosion caused by the latter.

" . . . do not mix fuels near a naked flame . . . "

Rule No. 3 : Safety

Some fuels are toxic and thus poisonous, particularly to certain people, so cleanliness is an absolute necessity. Wash your hands and face well after a bout of fuel mixing, paying special attention to cuts and abrasions in case they have become contaminated. Whilst on this subject of cleanliness I would like to stress the importance of always keeping your mixing jars, bottles, beakers, funnels and "what have you", etc., that you use in fuel mixing, as clean as possible.

Rule No. 4 : Consistency

This is a point so seldom appreciated except by those successful car owners. Use only one fuel for your compression-ignition engined cars. Having found, either by experiment or by advice from an expert on fuels, a suitable fuel for your particular engine, use it always and don't keep changing from one fuel to another, as if you do you cannot get the best from your car unit or engine. Only make adjustments to your engine, compression and jet settings one at a time, until the most consistent and highest speeds are attained, and may I add the old saying, "One adjustment—one run" is sound advice, particularly when coupled with Alec Snelling's comment, "When will types realise that Dooling noises from an idling diesel engine don't mean a thing".

When dealing with spark or glow fuels, carrying the amounts of certain fuel constituents is a necessity, the humidity of the weather being the controlling factor ; however, more about this later.

Finally, under this heading of "Consistency" it is very important that (a) you use the best and purest chemicals that are available to you ; (b) where applicable should contain no free acid in the case of nitro-paraffins ; (c) minimum quantity of water (free H_2O) in the case of methol alcohol (Methanol), or commercial paraffin and diesel oils, or ethyl-ether. I will give some details later of methods of removing H_2O (water) from these fuel constituents ; (d) the same grades or makes of fuel constituents should always be used if possible.

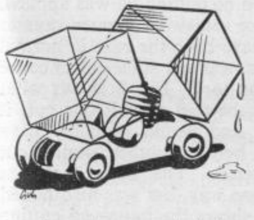
Before I start dealing with fuel descriptions and functions I must give some terms of reference.

(A) Calorific Value or Heat of Combustion

This is the sum total of liberated heat from a substance when completely burned. It is, therefore, obvious that a substance having a high calorific value must have a high potential energy content, and similarly, low energy content indicates low calorific value. These factors also convey one or two other interesting functions regarding fuel ingredients, namely, high calorific value will mean usually economy in fuel consumption, subject to being able to find a method of fully utilising the heat content, or conversely, low calorific value invariably indicates high fuel consumption, *i.e.* larger carburation jets allowing more fuel per stroke. With our miniature engines, however, we need fuels with wider explosive limits than is the case with their big brothers the commercial diesel engine. Thus it will be seen, if we use alcohols which have a comparatively low calorific value we can expect and get a cooler running engine when compared with an engine using petroleum fuel, because, although using a larger volume of fuel, we have a higher self-ignition temperature and wider explosive limit, thus allowing a more efficient utilisation of the fuel heat content.

I would add here that in my opinion miniature engine fans are too concerned about cooling their engines: more, too, about this point later on.

"Calorific value" or "Heat of Combustion" will now be referred to as "C.V."



" . . . too concerned about cooling their engines . . . "

(B) Spontaneous or Self - Ignition Temperature

(To be referred to now as S.I.T.)

S.I.T. is the temperature at which a vapour of the substance in question when mixed with air (in proportion that would normally be considered within the explosive limits) would ignite without the application of spark, flame or pressure, but so that this point is clearly appreciated, S.I.T. is indirectly related to explosive limits, but quite unrelated to "flash point".

(C) Flash Point

(To be referred to as F.P. Temp.) This feature of a substance is its degree or measure of inflammability, and is best described as: If a small quantity of the liquid substance in question is heated to such an extent that the vapour given off reaches a temperature at which, when mixed with air at the lower explosive limit proportions, will ignite or flash if a small flame is brought into contact with such a vapour ; thus, this temperature (below which ignition will not take place) is designated the "Flash Point".

(D) Explosive Limits

This describes or delinates the range of vapour (of the substance in question) concentration that is necessary before effective explosion or burning can take place. Of course, there is an upper and lower limit. As an example: petrol varies between 1 per cent and 4 per cent concentration in air, whereas Methyl Alcohol (Methanol pure) has a much wider range, namely 5 per cent to 22 per cent, with Ethyl Ether a still greater range is found, 1.5 per cent to 48 per cent, hence its usefulness in miniature diesel engine fuels. (This will be referred to later as E.L.)

(E) Ignition Lag

" . . . something easy to read . . . "

When a vapour of a fuel mixture is within the Explosive Limits, and is then compressed so as to attain the Spontaneous Ignition Temperature, an explosion will take place, but, there is a time lag before effective burning and consequential release of energy takes place, and this interval of time is called the Ignition Lag. For efficient and smooth running this lag should be small and still smaller if high r.p.m. is required. To attain the shortening of time lag we can add in small quantities chemicals that have become known as "Dopes", the better known of these being Amyl and Ethyl nitrates, Amyl and Ethyl nitrites, Paraldehyde and Hydroperoxide. However, it is dangerous to overdo additions of dopes because it is, when all is said and done, a form of advancing ignition, and beyond a certain point loss of power is the result ; on the other hand, an addition of dope to a poor running fuel will often improve the fuel and running of the engine to a marked degree.

(F) Octane and Cetane Values

(F.) I will just refer to Octane and Cetane values, but in my opinion they are only of interest to the chemist and, therefore, not of importance to this article. It must be understood that compression factors, crankcase design, volumetric efficiency, transfer porting, and cylinder head design are all contributory functions in the determination of a good and balanced fuel, and its ingredients, and only when all such factors are taken into account in conjunction with heat losses, do cetane and octane values become important.

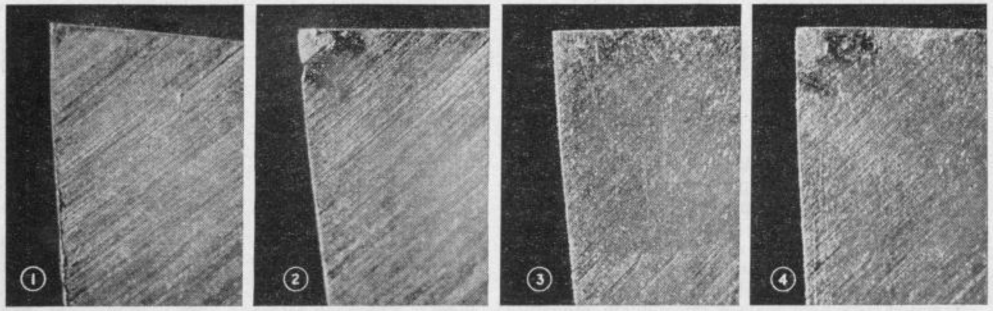
Having dealt at some length with what I consider the somewhat boring but still important part of this article, I will now proceed under three headings: (1) Diesel or compression-ignition fuels ; (2) Glow-plug or hot plug fuels ; and (3) Spark ignition fuels.

" . . . dangerous to overdo additions of dope . . . "

1. Diesel or Compression Ignition Fuels

Basically a miniature diesel engine fuel must consist of three main ingredients : (a) the base fuel : (b)

(*Cont. on page* 242)



FRANK HIGGINS & CAMERA PROVIDE AN ANSWER TO

SHARP CUTTING TOOLS

A CUTTING tool which is not correctly sharpened is a source of trouble, particularly in the lathe where is it exposed to continuous stresses. The tool soon loses its sharpness, thereby overheating both itself and the work and causing inaccuracies, and it involves frequent removal for re-grinding. Apart from obtaining reasonably correct cutting angles, it is important to ensure that the actual cutting edge is as fine and sharp as possible. This gives the edge a longer working life and enables long continuous cuts to be made without difficulty.

It is very advisable to hone the tool on a fine oil-stone after it has been ground; this can be done in a very short time which is more than saved in use. The illustrations show quite clearly the advantages to be gained. An ordinary high speed steel lathe tool, ½ in. square, was ground on a fairly fine grained wheel. It appeared to be sharp, but the enlarged photograph in fig. 1 shows that it was really quite rough. This tool was then used in the lathe to take one cut on a mild steel bar 1½ in. diameter and 10 in. long, the cut being a continuous one .015 in. in depth and with a feed of .005 in. using the automatic tra-verse. The lathe speed was higher than would normally have been used, and no cutting oil was applied, the object being to impose somewhat greater stresses on the tool than would have been the case in normal use. The speed, however, was not sufficient to cause serious overheating of the tool. Fig. 2 shows what happened to the edge of the tool on this one cut; it is obviously giving way and would probably have broken down altogether before another similar cut could have been completed. The same tool was then re-ground in the same way, but was also honed on the oil-stone. Fig. 3 shows the improved cutting edge which resulted. Finally the tool was used to take another cut on the same bar steel, using the same speed, depth of cut and feed. It was obvious that the material was being removed rather more freely, and there was some improvement in the finish given to the material, although the latter was not particularly noticeable. It is clear from fig. 4, however, that this edge would have completed at least one, and possibly several, more cuts of a similar type before being reduced to the condition shown in Fig. 2.

FUELS FOR FANS

(*Continued from page* 242)

the lubricant; and (c) the ether or igniter.

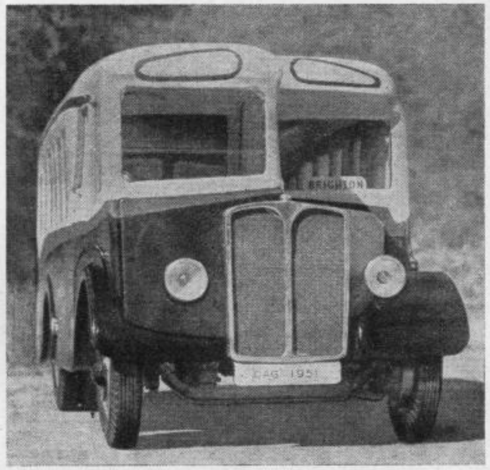
(a) The base fuel usually of a paraffin hydrocarbon, such as commercial paraffin and auto-diesel oil, or a gas oil, made from coal. Such ingredients form the main energy source of the fuel, and consequently should have a high C.V., but a low S.I.T. and usually a rather higher F.P. temp.

If we investigate the virtues and characteristics of the hydro-carbon types of ingredient (which incidentally are derived from either natural petroleum or coal and are usually the high boiling fraction of petroleum), we find there is little to choose between commercial paraffin of good quality, preferably proprietary brands, auto-diesel oil and gas oil. They all have a C.V. of approx. 11,000 calories, a S.I.T of 250° C., and a F.P. temp. of about 65° C. A good commercial quality of paraffin, such as White Daylight, Alladin, or Esso Blue, can claim a slightly higher C.V., whilst auto-diesel has two virtues to its credit, namely it is superior to either paraffin or gas oil by virtue of its high viscosity (natural oiliness) and a slightly lower S.I.T., and due to the former one can safely reduce lubricating oil content of a fuel by 2½ per cent and replace same by a similar amount of base-fuel, *i.e.*, auto-diesel oil, but I cannot recommend such a reduction in lubricating oil where paraffin is used as the base oil. There are, of course, quite a number of other base fuel oils, such as Hexane, Pentane, Heptane and the Creosote group of oils, but these, if used, invariably mean higher cost and less stable fuels, and incidentally raise other problems too involved to discuss in this short article.

ELECTRIC POWERED

A.E.C BUS CHASSIS WITH FREELANCE BODY

BUILT BY G. A. GARNETT



Front view of the completed model bus with freelance coach body gives some idea of its realistic lines and finish.

THIS model was started in January, 1948. Since then I have been steadily working the chassis and coach body, this nearing completion in September, 1951.

This chassis is powered with a small electric motor, which has an input voltage of 8 to 12 volts and will work on either A.C. or D.C. current. The chassis is four-wheeled, with full working mechanism and details; all the material is brass, including cross members and brackets, etc. The road springs and brackets are detailed, the springs being made from stainless steel and other parts in brass.

The front axle is made from brass and again is fully detailed. This axle is the drop type from the stub axle—this is constructed with the hub brake, control rod for brakes, etc. The track rod and some of the steering control, all working parts, are fitted with ball joints, road springs are fitted, the finish being flash tinned. The rear axle is again made from brass, this axle has a direct drive coupled with a 15: 1 reduction gear drive. Hub brakes, controls and road springs are fitted making another unit, again finished flash tinned.

The radiator is a dummy but the design which I used was of an A.E.C. type. This was made from brass strip and silver soldered to shape whilst the finish was of nickel plate and the bonnet aluminium.

The two head lamps have two very small pea bulbs, 2.5 volts, and these are fitted in brass shells. There is a small reflector fitted inside the shell and an aluminium rim complete with glass. These headlamps are finished in black enamel, the rear lamp is the same type of bulb, which is housed combined with the number plate.

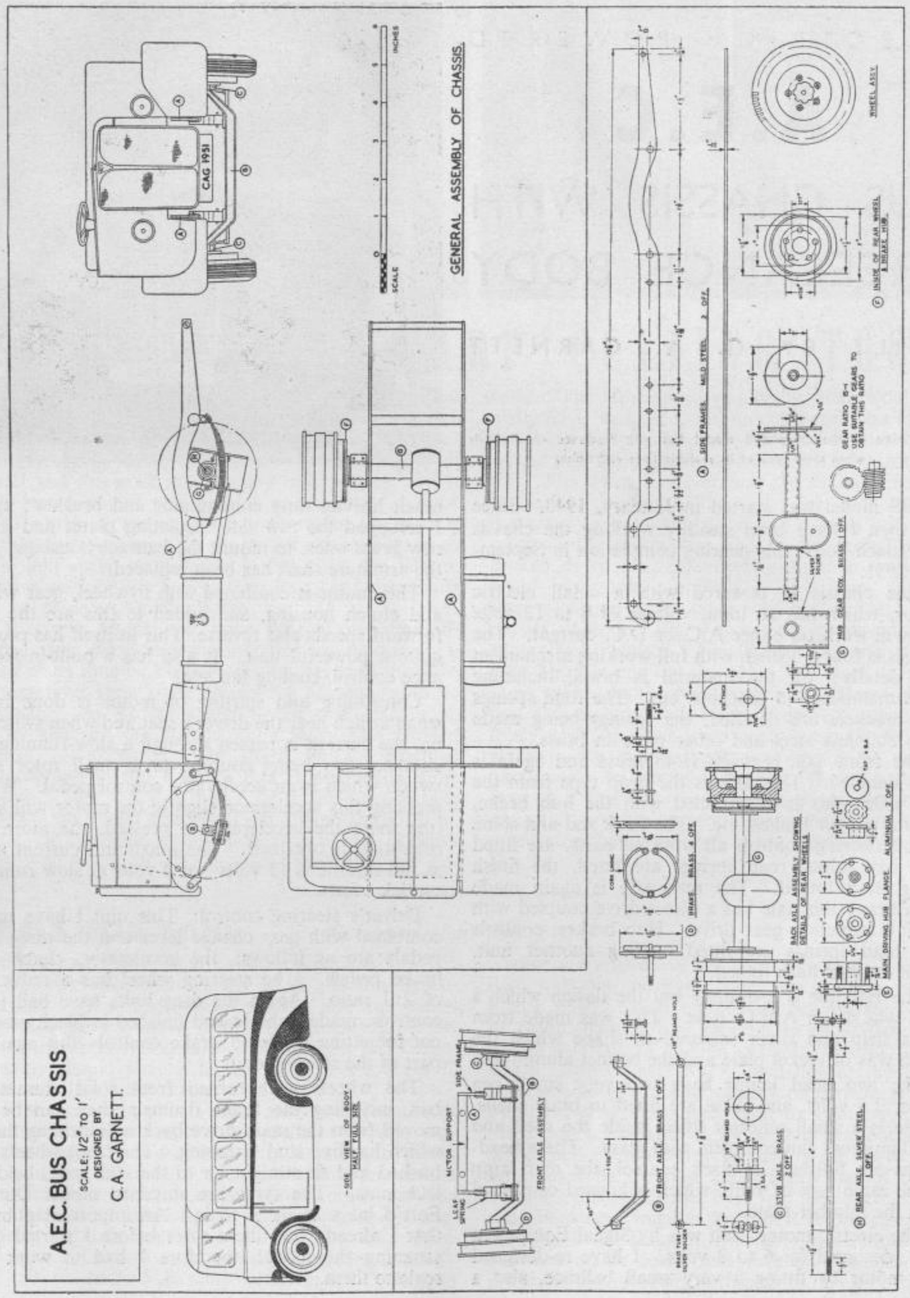
The electric motor itself was by Signal Equipment Ltd., designed for 6 to 8 volts. I have re-designed this motor by fitting a very small ballrace, also a much heavier duty commutator and brushes; again I scrapped the two side insulating plates and fitted new brass ones, to mount the ballrace housings; also the armature shaft has been replaced.

This motor is combined with flywheel, gear wheel and clutch housing, and added to this are the two forward speeds and reverse. This in itself has proved quite a powerful unit. It also has a built-in resistance control, cooling fan, etc.

Controlling and starting of motor is done by a small switch near the driver's seat and when switched on, the current is passed through a slow-running resistance, this being coupled to a small rotor stud switch which is an accelerator control pedal. When pressing this accelerator slightly the motor will start (the more the accelerator is pressed, the more acceleration is obtained. The maximum current used at full throttle is 13 volts—or 4 volts at slow running on tick over.

Driver's steering control: This unit I have made combined with gear change lever and the three foot pedals are as follows: the accelerator, clutch and brake pedals. The steering wheel has a reduction of 2: 1 ratio. Again the drag links have ball joint controls, made in brass and finished in black enamel not forgetting the hand brake control—this again is part of the steering unit.

The wheels were turned from solid aluminium bar, including the brake drums; they can be removed from the main drive back axle driving flange which has five stud fastening. The front wheels are bushed and fit straight on to the stub axle, held by lock nuts. The tyres are standard model Dunlop Fort 5 in. x 25 in. x 16 in. An important point is that I already had these tyres before I started constructing the model, therefore I had to work my scale to them.



The details of the complete chassis as a finished model, which I finally completed in December, 1950, are as follows: —

Length of Chassis overall	15 in.
Length of Wheelbase	$9\frac{1}{2}$ in.
Width Overall	$6\frac{3}{4}$ in.
Weight of Chassis	$3\frac{3}{4}$ lb.

This model has been found to give a satisfactory performance.

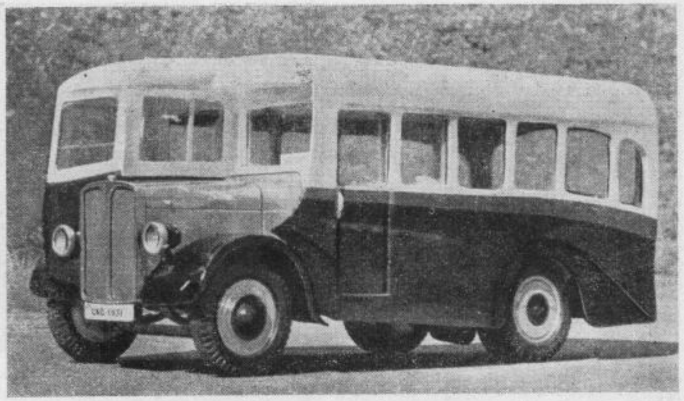
In January, 1951, I decided to go ahead on the coach body and again I had no drawings but only photographs and information that I myself had prepared. The first step was to keep the weight down as low as possible so I decided to use a good quality cardboard and balsa wood.

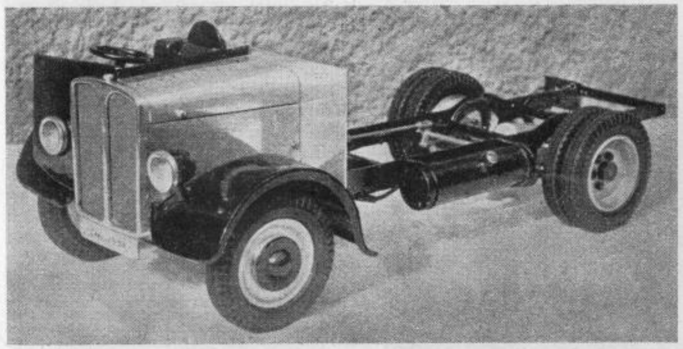
As I had managed to finish the drawing of the chassis it gave me the final scale for the body. The flooring was the first to be made to get the correct height for the seating. This was made from card board strip and the main flooring from a fairly thick piece of cardboard. The strips were glued to the floor. Next came the near and off sides panelling again of cardboard and out of these sides windows had to be cut. Around the windows and doors and rear and front panels I glued strips of $\frac{1}{16}$ in. x $\frac{1}{16}$ in. balsa wood for the inside lining frame. The roof construction was similar but with a sunshine roof and luggage rack fitted inside.

Then came the assembly of all parts. Roof and side panels, front and rear panels, and the floor were finally glued together. They all fitted together most satisfactorily. The driver's cab and roof was two pieces glued together so that I could work my shape of the front of the coach. After some little time had elapsed I started giving it several coats of flat paint, and I then rubbed this down until I got a good smooth finish before applying the final coat. The colour scheme was the bottom half of the coach in pillar box red, whilst the top half was in cream, with the streamlines of the mudguards in black. The inside bottom half including window frames was lined in green rexine and the roof and top-half green.

Other fittings include lights, clocks, seats, and hand rail inside, two sidelights, turn indicators (dummy), windscreen wiper and door handles. Other details can be seen in the photographs and drawings.

The coach body was fitted to the chassis and the complete weight is approx. $6\frac{1}{2}$ lb. As to performance I took the model outside on to the road which is fairly level. First I fitted two temporary bell batteries of $4\frac{1}{2}$ volts each inside the coach between the seats, making a total of 9 volts. I switched the main starter button on, the motor started instantly, I selected low gear and let in the clutch, pressed down the accelerator and away she went. I then checked and recorded the speed as 4 m.p.h. Then I carried out the same test on A.C. transformer with a very long lead and the speed was a little faster than before, including all head lamps and the tail lamp on; the inside light was also switched on; this recorded a consumption of 13 volts total. Also it gave a good performance on low gear on the small inclines; in fact I found there was plenty of power from the motor. The model was finished October 1st, 1951.



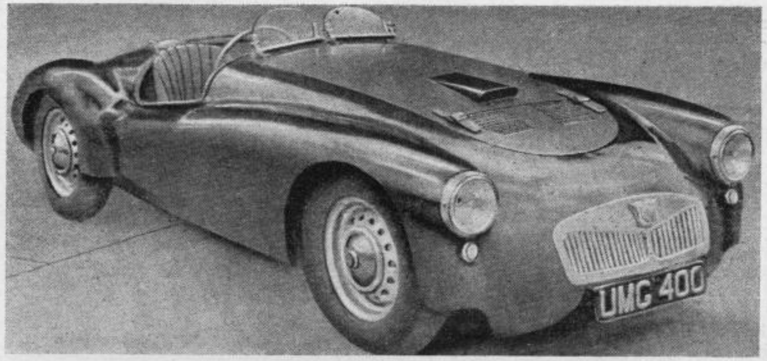


Above : Threequarter side view of the completed model that shows off its modern lines to advantage.

Left : The chassis before mounting the body. A vast amount of detail was incorporated, and the model received an exhibition award when shown at this stage.

·75 c.c. MILLS ENGINED LE MANS TD M.G.

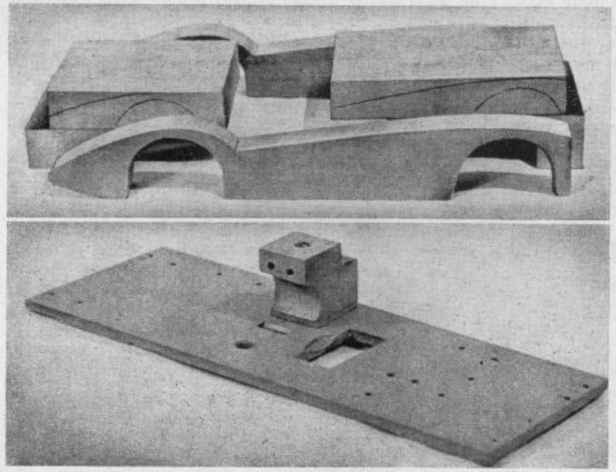
PART I OF A STEP-BY-STEP CONSTRUCTIONAL ARTICLE BY G. H. DEASON



The full sized car is shown here, taken from an "Autosport" picture. Note the clean simplicity of line.

MOST models, and by this I mean car models, are designed with a number of considerations in mind, other than the desire merely to build a model racing car. It may be worth setting down the reasons, logical and otherwise, which led me to produce the model about to be described. In the first place I wanted to try my hand at a model of really small capacity, meaning something under 1 c.c., but since I have an unreasoning dislike for the 6 in. midgets with wheels about the size of a Fordson tractor, which seem to be a *sine qua non* for competition running, my car was to be a sports model pure and simple, with no pretensions of putting up class records for the quarter mile, supposing a class existed for under 1 c.c.s. (Why doesn't it, by the way?) At the same time I wanted a sturdy practical model which would give trouble-free running over any distance in reason, to enable the car to qualify for small club handicaps, nomination races and the more sensible type of Concours in which the competing model must put in a minimum number of laps prior to the judging. Easy starting was a "must", since on the odd occasions when I take part in a club "do" I'm usually doing half a dozen other things as well, and haven't time for prolonged fiddling. From time to time my models have to run in school playgrounds, small halls and even on garage floors cleared for the occasion, by way of an introduction to the hobby, and on these occasions a baulky starter is a pest indeed. Finally, it was to be a good looker, but without the frills that fall off at awkward moments. There lurked in the back of my mind also the possibility of converting to rail track racing at some future date, and that about completes the list of limiting factors.

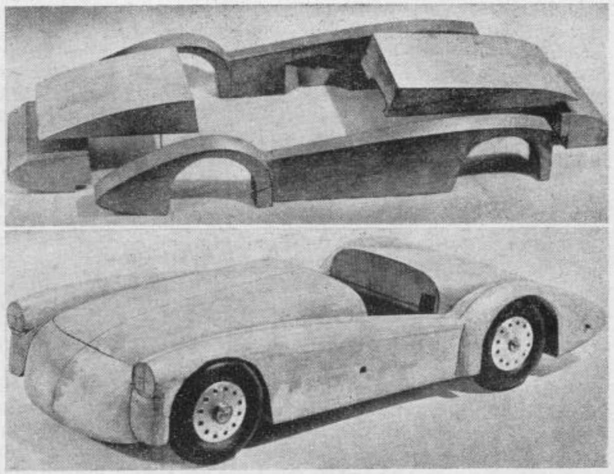
For a small model I like a small prototype, and I toyed for some time with the idea of a half-litre, and in fact have one designed for the job. However, ever since pictures appeared of the special TD M.G. Midget which was built and entered at Le Mans last year by George Phillips and Alan Rippon, the thought of that lovely little motor car stuck in my mind, and was finally selected as an ideal subject. The engine more or less selected itself, for my personal models are usually Mills powered, and I was anxious to try out the latest 0.75 job, as being not only an extremely popular engine, but as docile and adaptable as the old familiar 1.3 c.c. model. Messrs. J. S. Wreford Ltd., of Romford, Essex, market a nice little clutch unit for this model at the reasonable price of 17/6d., and this unit was included in the specification as being well within the means of the average beginner.



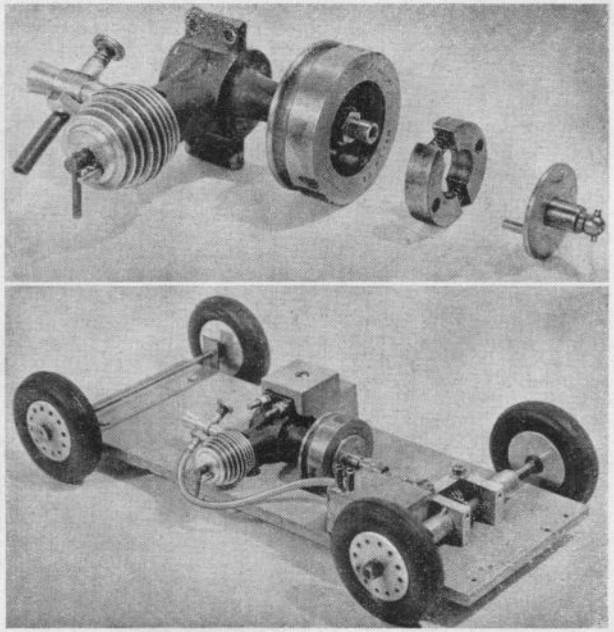
Left : The basic pieces forming the bodywork are shown with the wing panels cut to profile, and the simple plywood base and hardwood engine mount. Both the latter could be of aluminium if desired.

A flat base chassis seemed to fill the bill, and no suspension was deemed necessary for the modest speeds anticipated, apart from which, if a true scale outline was to be maintained, there was obviously going to be precious little clearance for vertical movement under the solid wings. Two inch diameter wheels would be just about right for the size of the model, the original of which is fitted with the pierced disc type as carried by the standard TD Midget, so once more J. S. Wreford Ltd. stepped into the breach with a set of their 2 in. wheels with aluminium discs and brass bushes, which sell for 7/6d. per set of four. No attempt was made to reproduce the dished discs of the original, but by drilling the correct number of holes in the outer discs of the Wreford wheels a reasonable degree of similarity was produced.

No drawings of the M.G. were available, other than the production two-seater, so outline drawings were prepared from photographs published in *Autosport* and *Road and Track*, based on the 2 in. wheels. This gave a model some 11½ in. overall by 4¾ in in width. Some jugglery with a three-view drawing of the 0.75 c.c. Mills engine suggested a baseboard width of 3¼ in., bearing in mind the type of body construction it was intended to employ, by a length of 9⅛ in. The only other cutting required in making the base is the flywheel clearance hole, 1½ in. by ¾ in., taken out with a fretsaw.



Right : Stage two of body construction, showing centre portions shaped, wing panels cut back to rear wings and cylinder head clearance cut. Lower picture shows body assembled and roughly carved.



Above right : The Mills 0.75 c.c. engine, showing the Wreford clutch in its component parts, and, below right : the chassis in all its simplicity, as test run with temporary tether plates added. The front axle is a plain strip steel bracket with ¼ in. dia. axle shaft.

The engine is mounted horizontally, with the main shaft on the centre line of the base, and in this position the cylinder head projects beyond the edge by about 1/4 in. A 3/8 in. dia. hole is drilled in the base in line with the lower exhaust port.

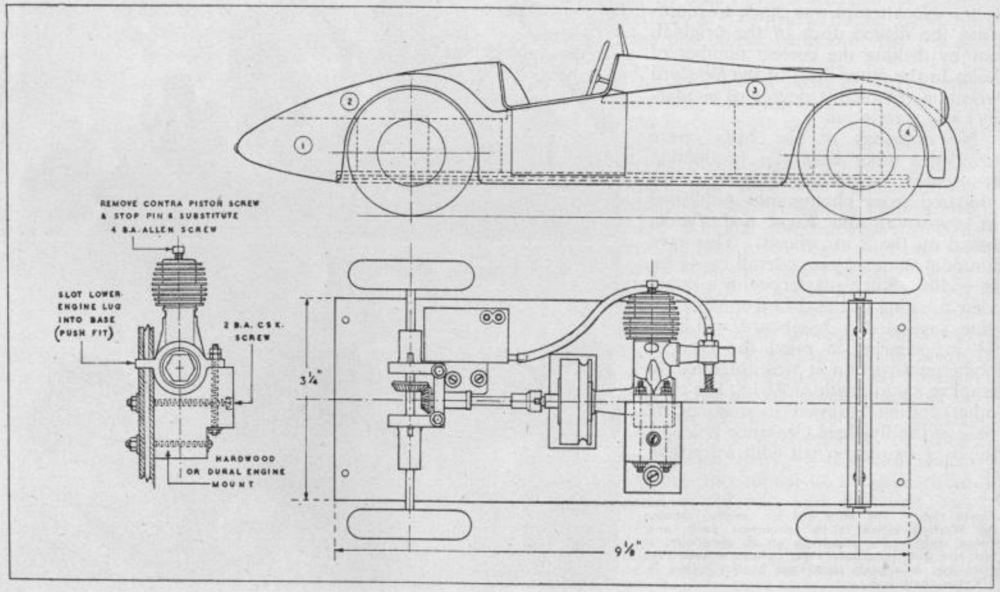
The Wreford flywheel clutch unit has two recessed shoes, as shown in the illustration, and is of the metal-to-metal type with the shoes on the driven side of the transmission, lightly spring-loaded to assist initial getaway. This unit is commendably compact, and in the M.G. model allows a short propeller shaft to be fitted behind the universal joint, which is supplied with it. A Wreford open bevel rear axle unit fits neatly into the scheme, and is again an inexpensive and practical component for a model of this size, selling at 17/6d., with 1.5: 1 ratio bevels. The axle housing is bolted to the base by two 4 B.A. bolts.

It will be noted that I have adopted an apparently retrograde step in arranging the flywheel to appear in the cockpit, when an additional inch or so of prop. shaft would have hidden it discreetly beneath the scuttle. Anyone who prefers this latter arrangement will have no difficulty in modifying the design to do so, but in my own case I prefer the flywheel in the open, for the following reasons. The model will frequently be run where no electric starter is available, and I dislike the necessity of holding the car in mid-air and working a boot lace from below!

Furthermore, the body is designed to remain in position for all normal operation and adjustment (another fad or mine), although it is quickly removable by means of four wood screws.

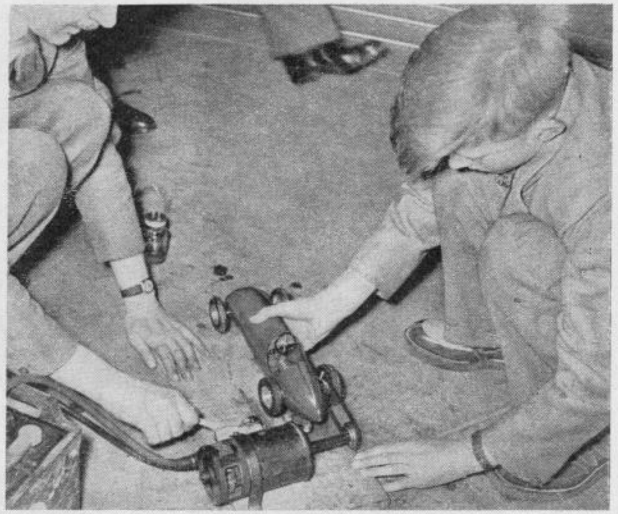
After considerable thought it was decided that since the bodywork is 90 per cent of the charm of a model such as this, it should be made in hard wood. There is no valid reason why those who prefer the more easily worked balsa should not use it, but from past experience I know the time and toil required to achieve the sort of finish I wanted for the little M.G., plus the ever-present risk of disappointment at some later date, when shrinkage and opening joints begin to play havoc with one's work. Actually, this model offers various alternatives, for it could equally well be constructed in metal by those with a taste for metal bashing, or in papier mache moulded over a wooden pattern. My daily work, however, brings me into frequent contact with a small group of professionals whose life work is the construction of those exquisite scale models which the great aircraft and engineering firms keep in their private museums, and the verdict of these experts is "When in doubt, use lime". Now lime is a most obliging wood, in case you don't know it. It is straight grained, free from vices and comparatively easy to work, and it will respond to treatment to provide a first class finishing surface which will neither split nor shrink. A study of the drawings showed that the M.G. body could be made in three pieces, or more economically, in six, so these basic pieces were sketched out on the plan and side elevation, and are as follows. Two side pieces forming the wing panels, 12 in. x 2 in. x 7/8 in., one block for

(Continued on page 256)



NOTES ON A SEASON'S MINIATURE CIRCUIT RACING

BY F. G. BUCK



IT is now about twelve months since a car was released from the starting line to make the first circuit of the Meteor Club's G.P. circuit, and as it may be of interest and assistance to those who have already begun work on a similar venture, or are contemplating so doing, a few notes and comments on the progress made and problems involved may not be amiss at this stage.

Firstly, the track itself. Has it stood the racket of wear and tear, etc.? Well, happily the answer is definitely "Yes". Many pints of wierd diesel fuel concoctions have been strewn upon it, and it has been subjected to much tyre and rail-adaptor pulley friction. It has been trodden on, sat on and tripped over; laid down hastily and taken up even more hastily. It has come through all this with flying colours, and apart from a slight buckle on one section, due to being bent while in storage, and one solitary screw pulling through, it is in fact as good as new. Wear on the track surface is nil, and wear on the guide rail likewise nil.

As to the cars themselves, I am pleased to say that there have been, and still are, problems galore, and whilst we have learnt quite a lot, the field is still wide open for all kinds of experimentation in car construction, engine layout and the clutch and transmission in general. Reliability is, in the writer's opinion, the *main* factor to attain, for when actual races begin a car will be called upon to participate in many more events than its "cable" counterpart.

After the first one or two meetings it was quite obvious that the cars would have to be built really *tough*, for our experimental ones shed their accessories with the celerity of a strip-tease artiste (—er, I imagine!) It also became obvious that the clutch was to come right bang into its own again and to be second to no other component in its importance. The whole performance and reliability of the car depends on the clutch operating smoothly and remaining constant at all times as far as possible.

In the early days of "cable" racing the centrifugal clutch had only one job to do, namely to get the car away *once only* per run. In the case of a G.P. circuit car the clutch is in operation not only on the starting line, but on every corner taken during the course of the race, and if the truth were known, probably most of the way down the straights as well.

On our experimental cars the clutch shoes were all-metal, dural, brass and bronze all being tried, but "picking-up" and seizing were all too frequent. The clutch centre bearing (actually the hub) was also a plain bearing, and despite oil leakage from the crankshaft bearing to help matters in the case of the direct-drive cars, seizing here, too, was very prevalent. Something obviously had to be done about this, and the writer is at present using twin ballraces in the centre bearings, which appear to have cured the spot of bother in *that* department, and he is experimenting with non-metallic clutch-shoes cut from full-sized clutch-lining material, and using these without any springs whatever. Clutch "ferocity" can be adjusted by the use of shoes of different weights, or even by removing one shoe altogether, as they are so light in themselves as to cause no "out-of-balance" effect.

As actual speeds (compared with cable racing) are so low it is evident that a direct drive car's engine has to "plonk" along at extremely low revs. with a corresponding lack of b.h.p., most of which is generally attained at much higher engine speeds, or be allowed to buzz happily by kind permission of a violently slipping clutch, and as this latter component is so prone to vary in its "slipability" (oh dear, a loud Gong for that one!) the alteration of load has a most disturbing effect on the engine, to say nothing of the settings.

The answer, again obviously, is gears, but as to what is the most suitable ratio time alone will tell. We have direct drive, $1\frac{1}{2}$: 1, $1\frac{3}{4}$: 1 and 2: 1 ratio cars running, and as the 2: 1 cars are undoubtedly the quickest, so far, that is some guide. The writer feels that an even lower gear, say $2\frac{1}{2}$: 1 or even 3: 1 may be worth trying, but it is very doubtful if the engine could then be started by means of a pulley on the axle, but starting could probably be done via the flywheel rim if allowed to protrude slightly in a convenient spot. Shades of 1945/7 !

The present simple but crude steering system, *à la* toy car, will undoubtedly give way to proper Ackerman-type steering, and the writer's colleague John Parker has already built an extremely fine example of this into his Cooper 500 circuit car. (*See pages* 202-204.—*Ed.*)

The pulleys on the guide plates have shown little wear, considering the hammering they get, but it has been found that the later type of pulley in which the top flange and radius is omitted soon begins to wear a groove in itself due to the resulting "line" contact with the rail, and it is felt that the original type pulley has better wearing properties. Tufnol and similar material has been tried for pulleys instead of the usual dural, and has been found to be quite satisfactory.

We now come to one of the main problems reigning at the moment, namely braking. "Breaking" we have accomplished with no difficulty whatever! In the beginning we were relatively content to see our cars chug round the circuit in about 10 or 12 seconds with but slight change of speed on the bends, but in the course of time, and as the cars are used for racing purposes it was inevitable that speeds should increase. It was then that it became evident that the cars were cornering much too rapidly for the sake of appearance—not that the cars themselves were in any danger—and as one of the features of the system is to try to approach nearer to realism, the problem of how to apply brakes at the right time and in the right places loomed large before us

Hours and hours could be spent in writing about this subject alone, and many and varied are the suggestions that have already been made, but more often than not these have been quite impracticable, and at their best either highly complicated or very dubious as to their functioning at all. Long spring ramps were suggested, knock-off points for opening and closing a throttle, electrically operated brakes via a live rail, etc., and even radio control was suggested by W.B., but how many car owners could manage *that* ? In any case, assuming that a competitor *could* brake his car by remote control, would he be likely to do so in the course of a race? The only inducement for him to do so would be for his car to leave the guide rail if the speed was too high, which would hardly be fair on the car following, as a pile-up would be almost inevitable.

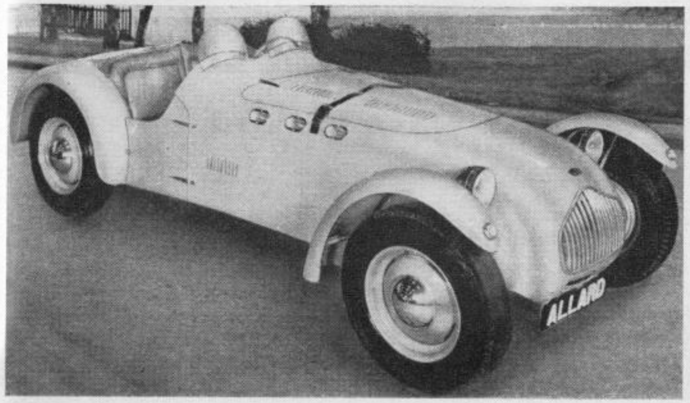
In inviting anyone interested to think up a workable scheme, the following essentials must be borne in mind. (1) The braking system must be comparatively simple in application, and *uniform* to all cars in its application. (2) The braking force *must* be in direct proportion to the speed of the car, so that should a car be travelling quite slowly, no brakes would be applied at all. (3) The brakes should preferably be applied some little way *before* a corner. Of these (1) and (2) are essential, but (3) is highly desirable. It should also be remembered that by poor workmanship a competitor can gain an advantage by not having his car's brakes functioning correctly, so the simpler the scheme the better.

Up to the time of writing the scheme evolved by the writer, and which meets (1) and (2) in the main, and (3) not at all, is to replace the two rear pulleys by brake blocks of ample proportions which grip the rail as the car's tail swings outwards whilst rounding a bend. The faster the car is travelling the greater the tail-swing, so the harder the brakes are applied, and, of course, vice versa. Uniformity could be attained by having everyone use a standard brake-block, and various dimensions would have to be standardised. Experiments are continuing along these lines, but some measure of success has already been achieved. The next trial will be with a plate giving more leverage and consequently even more braking effect, by increasing the distance between the plate pivot and the brake-block pivots. If only No. 3 could be wangled. . . !

At first it was thought that miniature G.P. racing would have a fair measure of appeal to the mere spectator, for what that aspect is worth, but until it becomes more organised, and visible lap counting devices are adopted, the spectator, and to a large extent even the competitor is rather in the dark as to which car is leading, and so on. It is easy to keep track of two cars, but four. . . ! Whilst running an actual race, instead of just "playing about" individually, we have found it best for the four competitors to stand together and call out the number of laps completed by their own car each time it crosses the line, and when handicaps have been applied this often leads to some exciting finishes.

As with so many things, however, it is still mainly the participant who derives the most fun from the game, and for them there is fun in plenty to be had.

As we start on a new season, we do so in the knowledge that while much spade-work has been done already, there is much more to be done before the most can be made of the advantages offered by the circuit system, but more and more cars are being built and interest is increasing continuously. As more folk become interested, so the chances of eliminating the aforementioned problems are improved, but if everything were cut and dried in the first place the appeal would be greatly diminished ; at least, so far as the writer is concerned !



PROTOTYPE PARADE No. 37

J2X ALLARD

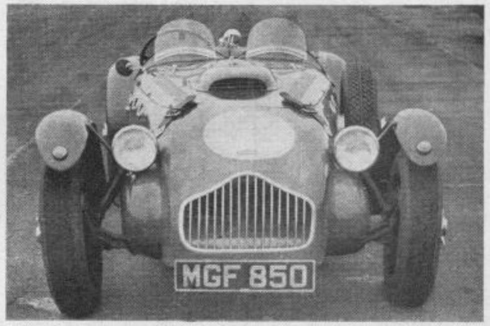
COMPETITION 2-SEATER

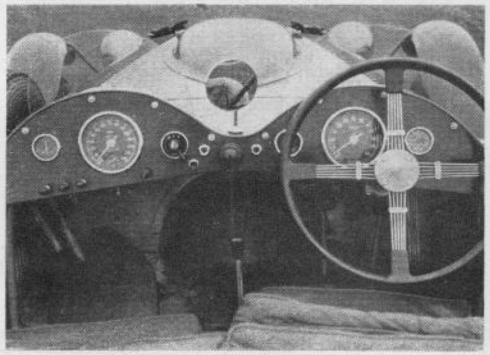
BY G. H. DEASON

THE Allard is an outstanding example of that branch of automobile engineering in which the British "specialist" firms excel ; that of working their own particular brand of magic with the component parts by a larger manufacturer, and thereby producing a thoroughly individual motor car with characteristics quite different to those of the humdrum every-day product. To do this successfully requires an exceptional degree of knowledge, practical experience and personal enthusiasm, and the Allard Motor Co. Ltd., possesses plenty of all three. Sydney Allard himself has long been one of our leading drivers, equally at home in any branch of motor sport, as witness his trials successes and the winning of the Hill-Climb Championship in 1949, whilst, as all the world knows, he has within the last few weeks set the seal on his reputation by winning the Monte Carlo Rally by brilliant and determined driving under appalling conditions, in a car of his own manufacture.

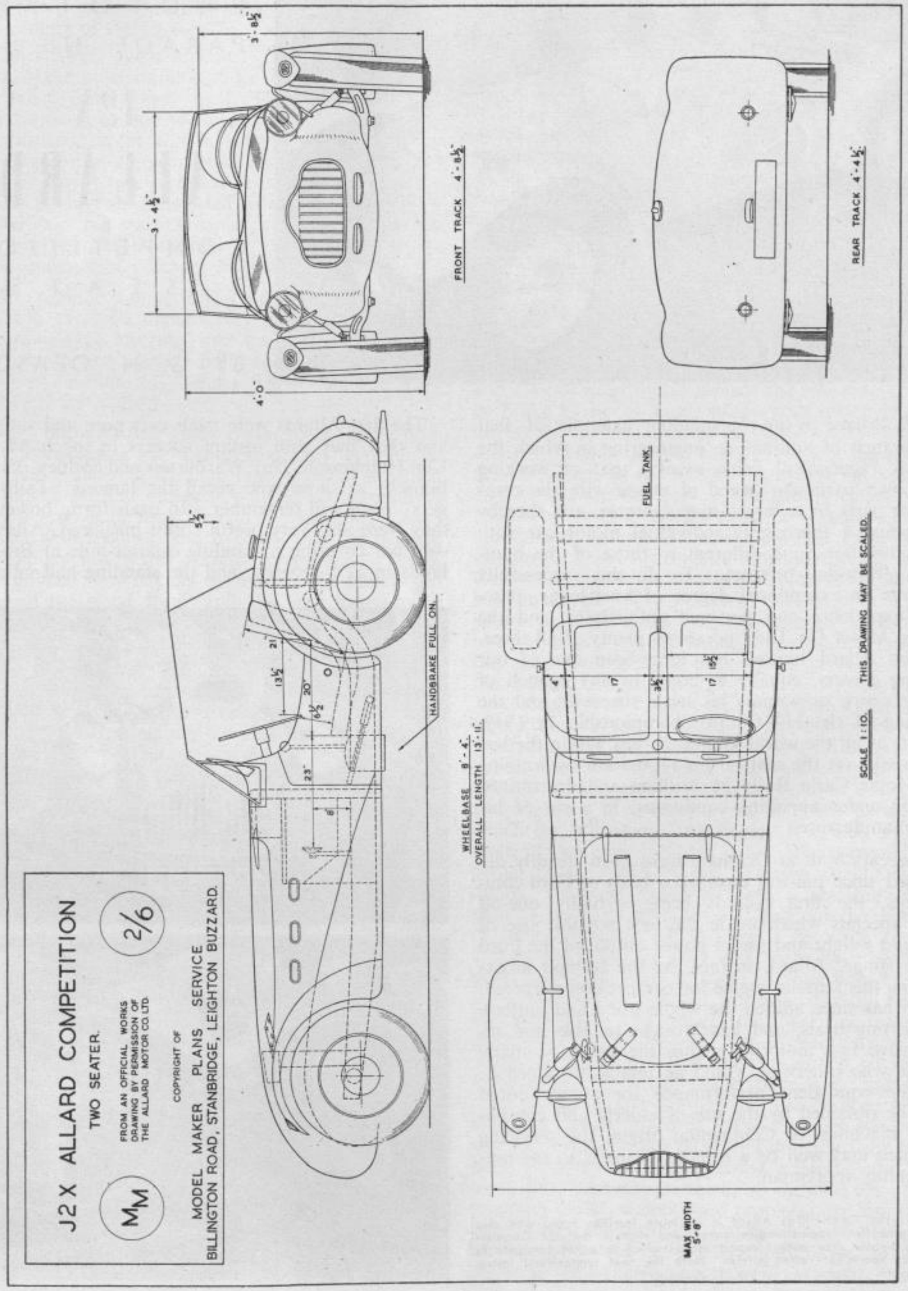
The cars built at Clapham have been steadily developed since pre-war days on a basis of Ford components, the first Allards being virtually one-off trials specials which made the best possible use of the light weight and useful power output of the Ford V-8 engine. Allard, in fact, set the fashion in exploiting this famous engine for competition purposes, which has since altered the whole trend and outlook of sporting trials, and has brought reliable and inexpensive fast motoring within the reach of many people who otherwise would be unable to afford it, for the equivalent performance for money could only be obtained by the use of elderly and complicated machines of Continental origin, the servicing of which may well be a ruinous business to the not-so-wealthy sportsman.

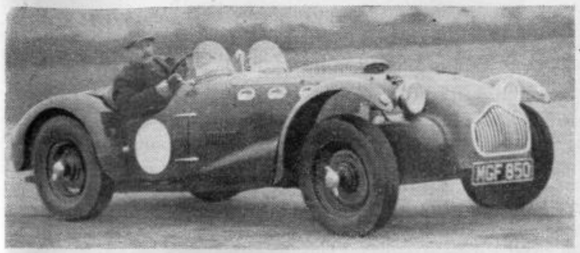
The first Allards were trials cars pure and simple, and they met with instant success in the hands of Ken Hutchinson, Guy Warburton and Sydney Allard himself, as those who recall the famous "Tailwaggers" team will remember. In trials form, however, they were also very useful sprint machines, Allard's own car covering a standing quarter-mile at Brooklands in 17.5 seconds, and the standing half-mile in





Above : The Competition Allard in its more familiar form, with disc wheels and flat topped engine cover, and right : the J2X Chrysler-engined version, the potent export model which is a hot favourite in American sports-car racing circles. Note the neat symmetrical instrument layout. (Photos by courtesy of "Autosport".)





28.9 seconds. Further work on the engine improved things still further, and by the outbreak of war, still with full equipment, 0 to 60 m.p.h. was accomplished in eight seconds, and the flying half-mile at 105 m.p.h.

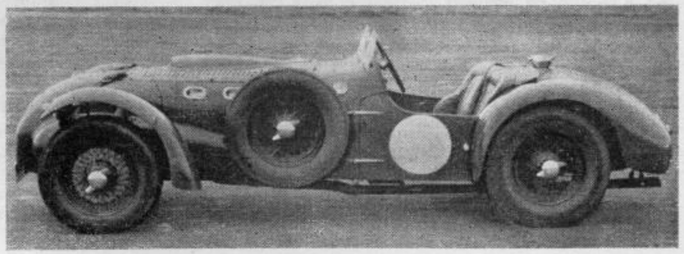
After the war the Allard concern got down to serious production of a range of models which clearly showed the benefits of their strenuous testing period, and the bodywork and clean sweeping frontal treatment became a familiar sight to motoring enthusiasts. The engines retained the side-valve layout, and were fitted with special aluminium heads of British manufacture. A brisk demand from sportsmen all over the world, and notably in America, led to the introduction of the Competition J-Type two-seater, a potent machine devoid of frills and capable of being raced in sports car events. On the American markets the cars were offered without engines, allowing racing and sporting owners to fit a number of more powerful units, the most popular choice being the Cadillac and Chrysler. Ardun o.h.v. conversion sets were also available for the Detroit-built engines, and the Allard began to make a tremendous impression on motoring circles in the States, which were by now becoming very sports-car conscious, and where many sports car races were not only being run, but watched very critically by potential buyers.

The car which is the subject of our drawing this month is the latest and most powerful development of the Competition two-seater, and is designated the J2X. The *Autosport* photographs showing the car being tested by John Bolster for that journal, are of the latest Chrysler engined model, which is fitted with wire spoked centre-lock wheels, has the distinctive bulge on the engine cover, and increased length of front cowl, necessitated by the mounting of the big 5420 c.c. V-8 o.h.v. engine some 7 in. further forward than on previous models. It is interesting to compare this with the Allard engined version, shown with plain wheels and flat engine-cover at the head of this article. The car has a massive frame, braced by tubular cross-members, and suspension is by coil springs damped by hydraulic tubular shock absorbers all round. Allard cars have long used a divided front axle with great success, and this feature is retained in the J2X, together with de Dion rear axle, having a tubular axle beam off-set at the back of the rear hubs. This enables the drive to the wheels to be taken through articulated half-shafts, and the use of inboard brakes, and it will be noticed in the photographs that no brake drums are visible behind the rear wheels. Intending model builders should note that they will be in order in modelling the J2 with the disc type wheel shown in another illustration as the wire type are an additional extra. The brake-drums are of Alfin, and are 12 in. in diameter. Tyres are 600 x 16.

The bodywork is trim and distinctive, and is aptly described by John Bolster in his *Autosport* description as giving the car an air of "almost animal ferocity". The bulge on the bonnet top is provided to give clearance for the fitting of four carburetters for racing purposes, and forms a forward-facing air scoop with a horizontal grille. The alligator bonnet hinges upwards from the rear edge and is retained by two straps at the front. Oval vents are fitted in the bonnet sides. The bodywork is detachable in two parts, leaving all wiring and instruments in place, and normally the spare wheel and a 20 gallon fuel tank are carried in the tail. The car illustrated on test is equipped with a 40-gallon tank, necessitating the nearside fitting of the spare wheel.

With over 170 b.h.p. on tap for a weight of a little over a ton, performance is naturally impressive in the extreme, and yet when required this astonishing motor car will behave with the docility of a town carriage.

I should like to conclude with a word of thanks to the Allard Motor Co. Ltd., and in particular to Tom Lush, who was helpful in the extreme in the matter of data and drawings, despite being in the midst of the excitement and additional work occasioned by the Monte Carlo Rally, which had so successful an outcome.



Above: The J2X Allard being tested for "Autosport" by John Bolster, and right: an excellent impression of the powerful and well balanced lines.

THE WORKS FOR THE SKODA. PT. III

BY G. H. DEASON

THE progress of "Operation Paste Pot", otherwise the building of the aerodynamic bodywork for the little Skoda 1102 Sport which my colleague Dicky Laidlaw-Dickson has been conducting recently has afforded me considerable interest, and has not been without its entertainment value, for there were times when he was seen to be wearing a strained look and assorted paper patches glued to his person, and would be heard muttering strange imprecations in a tongue we took, rightly, to be Czech. It was concealed from me for some time, however, that I was to have the task of building the chassis for this masterpiece, by which time I was deeply involved in my spare moments in developing my own particular pet, the little Le Mans M.G. which appears elsewhere in this issue. Now, lest it be thought by envious readers that the staff of *Model Maker* spend most of their time sitting around making models, let me hasten to disabuse them, for that is the one thing they rarely find time to do, and even when the urge becomes overpowering, there is a tendency to creep about furtively, doing the job in odd corners with one eye on the door, oppressed by the feeling that the Powers-that-Be consider their time better occupied in editing other people's efforts, instead of doing it themselves.

All this, you will say, is leading up to something, and how right you are! It is leading up, in fact, to the confession that I haven't built that chassis yet. This, however, doesn't prevent me from telling you how I would have done it if I had. So now let's take a look at it.

On page 183 of last month's *Model Maker* will be found the plan of the chassis base, which is a simple $\frac{3}{8}$ in. plywood plate $13\frac{1}{2}$ in. long by $6\frac{5}{8}$ in. wide, with cut-outs for the wheels. These cut-outs are $3\frac{1}{4}$ in. x $1\frac{1}{4}$ in. front, and $4\frac{1}{2}$ in. x $1\frac{1}{4}$ in. rear. I have quoted these dimensions as a general guide, but my colleague wisely points out in his original article that it would be advisable to cut the base to suit the finished body, since there may be some slight discrepancy when the body comes off the mould.

The Skoda is, by present-day model car standards, a fairly large model, measuring just under 17 in. in length x $7\frac{3}{4}$ in. over the widest part of the body, and I should be inclined to treat it as a "Sports" model, rather than as a competition car. For this purpose, in view of the light weight of chassis and body, quite a modest sized engine could be employed to propel the car at reasonable speeds, of 30 to 35 m.p.h. If, however, it is desired to have a faster job, capable of piling up speed points in competition with other scale type models, a bigger engine can easily be accommodated, and the design in fact specifies an engine of from 6 c.c. to 8 c.c.

Like so many Continental designs, the original model is driven by belt, which can be a quite practical proposition provided that the ultimate in speed isn't aimed at. In this case a deeply recessed flywheel has a plate with driving pulley integral with it, screwed to the flywheel rim. The pulley groove is $\frac{7}{8}$ in. diameter. A round leather belt is used, driving a 2 in. dia. pulley on the rear axle, and the belt tension is arranged by means of an adjustable jockey-pulley. This jockey pulley is carried on a spindle bolted to an L-shaped bracket, which is in turn screwed to the base, the pulley centre being $2\frac{1}{2}$ in. behind the engine shaft, and $3\frac{5}{16}$ in. ahead of the rear axle. A slot in the bracket allows vertical movement of the tensioning pulley, which is locked in position by a nut at the back. This very simple arrangement means that the drive is virtually direct, and the car must either be push-started or "hand-launched". An alternative would seem to lie in an adaption of the well-tried method used on the Juneero "Bantam", which readers will no doubt remember in kit form. This employed a spring-loaded jockey-pulley mounted on an arm, which could be tripped by the operator from the track-side when the car had gathered speed on a slack belt, and the device worked exceedingly well. I do not think that Juneero Ltd. would have any objection to its being employed "out of its context", so to speak, and they also made a very useful flywheel-cum-pulley to fit several popular small diesel engines, which could be bought separately for a few shillings. The jockey pulley, part n.142, costs 9d., and suitable leather belting in 12 in. lengths, with fastener, costs a modest sixpence.

To give some idea of the types of engine it would be possible to mount in the Skoda, the height available from base to underside of the scuttle, at a point 1 in. ahead of the cockpit, is $2\frac{3}{4}$ in., which will allow for a quite hefty modern engine. Alternatively, it may well be inclined either forward or backwards if required.

Axles are carried quite simply in plain brass bearing blocks bolted to the upper side of the base, the axle centres being $\frac{1}{4}$ in. above the base, the wheelbase being $11\frac{1}{2}$ in., and track $5\frac{1}{4}$ in. The axles themselves are $\frac{1}{4}$ in. dia., but using an engine of, say, 2.5 c.c., these could safely be reduced to $\frac{3}{16}$ in.

There is ample room for tank and auxiliary fittings on the base, which is completed by tether plates screwed to the underside, as shown last month, and flat body fixing plates attached on to the two wooden extremities of the body and under the base, there being two at the rear and one at the front.

Alternatively, still using the flat wooden base, one or other of the geared engine-mounts at present available could well be employed, fitted under the commodious tail, when a much faster direct-drive car would result, with the maximum of simplicity of layout.

DOPE & CASTOR

By JERRY CANN

MANY model racing enthusiasts in and around the London area were given their first introduction to the hobby through visits to the meetings organised by the Pioneer Club in the Royal Horticultural Hall in Vincent Square, and have regretted that activities seemed to have ceased in recent months Membership of the club was strictly limited for some years, and the Pioneers had a considerable waiting list at one time, I believe. It is, therefore, very good news to hear of the old club's active revival. Cyril Catchpole 'phoned me a week or so ago to tell me of the formation of a new committee, which will give the club a new lease of life "under new management", so to speak.

The committee consists of Messrs. Catchpole, Flower, Garrod, Thorneycroft, Thornton and Zere. A. N. Thorneycroft, who is taking on the secretarial duties, is, of course, an old Pioneer committee member, as is E. P. Zere. It is planned to hold at least three meetings in the Horticultural Hall, and the Edmonton club have kindly invited the Pioneers to use their track at Pickett's Lock Lane for a further three meetings out of doors, which makes an excellent framework for a good season's sport.

In view of the financial position it has been decided to increase the subscription to thirty shillings, and to open the list to new members, which will afford many Londoners an opportunity to take part in the hobby on their own doorsteps. The policy of the old club, which aimed to foster the scale type of model and to provide the kind of competition which gave this type every chance to compete on level terms with the speed models, is not to be lost sight of, I am glad to learn, and such events will continue to be organised, *provided that sufficient support is forthcoming*. Now it is an odd fact that despite the large number of letters we receive at this office, lamenting the lack of such competitions, one of the reasons for the near-demise of the old club was lack of support for their scale events, which just doesn't make sense to me, for one. Well, now it's up to London area scale fanciers to make their presence felt and so encourage the new committee to continue to cater for them as of old. If they don't, they have only themselves to blame! Applications for membership or renewal should be made direct to the Hon. Secretary, Pioneer M.R.C., A. N. Thorneycroft, 42 Brixton Hill Court, Brixton, S.W.2.

A cause for regret among many southern and midland racing folk will be the news that the Eaton Bray track will no longer be available for racing or private testing, due to the closing of the Sportsdrome. The first outdoor track of its kind in the country, and scene of the first official B.M.C.C. records, it is still regarded by many as the best surfaced track for high speed work, despite having been laid, as a solid disc, as far back as the spring of 1946. It stood up manfully to the weather, and was the scene of many National records in all classes. These are far too many to catalogue here, but it is interesting to remember that W. P. Jones set up the first record for the track at Whitsun, 1946, with his O.K. engined Alfa Romeo at 57 m.p.h., and that the first event for 2.5 c.c. cars, the M.G. Trophy, was won by B. C. Miles with the prototype E.D. diesel engined car at Easter, 1948, at 41.7 m.p.h. The Eaton Bray track had a great reputation for its record for good weather, and many a cloudless day of happy speed-work will long be remembered by enthusiasts, as will, perhaps, the memorable Austin Trophy meeting held indoors there during the Great Freeze-Up of early 1947, when Gerry Buck succeeded in defeating Jim Cruickshank with a run at 75 m.p.h. on an improvised 14 ft. radius track, which to the best of my recollection allowed about 2 in. of clearance from the containing walls of the building. One of my treasured possessions is a most unflattering photograph of a little group by the trackside, consisting of Bill Boddy of *Motor Sport*, Tom Lush of Monte Carlo Rally fame, and our Editor, all registering unmistakable horror and apprehension during this meteoric run. We did have fun in them days!

Reverting to current affairs, John Hart has relinquished his secretarial duties of the model car section of English Electric and Napiers' M.E. Club, Liverpool, the post being taken over by W. E Hawes, of 40 Merton Crescent, Huyton, Nr. Liverpool, and at Sheffield a new club has been formed, named the Sheffield & District M.C.C., with a present membership of 27. They have only a small test track at the moment, but report that a local engineering firm is taking a fatherly interest in their activities, and there is hope of a piece of ground being allocated to them for a larger circuit. Hon. Secretary is Mrs. Freda Shirt, of 157 Infirmary Road, Sheffield 3, who will be pleased to hear from all model car folk in the district.

The Portsmouth M.C.C. are the latest body to make a start on a rail racing scheme, and I have been able to put them in touch with some steel rail for their purpose. Intending circuit racers in the Portsmouth and Southsea district should get in touch with Secretary C. H. S. Chandler, of 454 London Road, Portsmouth.

Anyone taking his £25 abroad this summer? If in Italy, don't miss going to the Monza Autodrome, where the Milan A.C. have built what must surely be the finest model car track in Europe, alongside the pits and grandstands of the famous motor course itself. Further particulars and pictures of this enterprising venture will appear in a forthcoming issue, but in the meantime, take my word for it that it's quite some scheme, and the Italian model car movement is going ahead by leaps and bounds.

.75 c.c. MILLS-ENGINED LE MANS TD MG *(Continued from page 248)*

the rear decking, 4 in. x 1 in. x $3\frac{1}{4}$ in., one for the bonnet top, $5\frac{1}{2}$ in. x 1 in. x $3\frac{1}{4}$ in., and two lower blocks to complete the nose and tail, $1\frac{3}{8}$ in. x $1\frac{1}{4}$ in. x $3\frac{1}{4}$ in. and 2 in. x 1 in. x $3\frac{1}{4}$ in. These blocks and their comparative positions in the scheme of things will be seen in the first body photograph. In the second picture the initial shaping cuts have been made, and the lower nose and tail blocks have been cut back to form the lands on which the body rests on the baseboard. The upper blocks are cut to profile, as shown by the full and dotted lines in the drawing, and the wing panels are profiled and also cut back diagonally from a point approximately $\frac{1}{2}$ in. behind the front wheel arch to the most forward point of the rear wing, at which point the side panel runs in $\frac{1}{4}$ in. from the outermost point of the rear wing. At the same time a clearance cut-away is cut with a sharp chisel for the cylinder head projection, chamfered off fore and aft to encourage a cooling air-flow round the head. The depth of this clearance is $\frac{7}{16}$ in., and the second body stage photograph will make the shape of the cut-away portion clear. At this stage I also drilled the $\frac{3}{16}$ in. hole to allow an Allen key to be inserted for compression adjustment.

Three further small blocks were cut to fit, one under the offside front of the tail block and one on either side under the bonnet block, the purpose of which was to give additional support to the structure during the final shaping operations, which with hardwood are liable to be rather more vigorous than when working in balsa. Whether they are strictly necessary I do not know, but they give plenty of confidence during chiselling and rasping operations, and may be removed if desired when the body is complete.

Before glueing and screwing the body parts together a certain amount of preliminary shaping can conveniently be done, although discretion is required here, and I would advise that at this stage only the slight curvature of the upper surfaces and the outside roll-over of the wings be shaped, also the semi-cylindrical form of the front wings where they blend into the headlights. This will be seen in the final body picture. The whole body assembly may now be glued and screwed together, using Aerolite or similar glue, and the whole allowed to set thoroughly before any final shaping is attempted. The structure should be carefully checked for truth and for its "sit" on the chassis before the glue sets and the screws are finally driven home.

There may be other minor modifications required, according to the components fitted to the chassis, of course, and in my own case it was necessary to cut a clearance under the tail for the fuel tank vent and filler, since I have installed a 15 c.c. aircraft team racing tank of "Mercury" manufacture, which fitted nicely into the layout and will allow of a correctly positioned filler cap on the tail. Other builders, however, may prefer a larger tank under the bonnet ahead of the engine, and since the car will have an upward hinging engine cover as in the prototype, this will be quite feasible. This engine cover also allows easy access to the needle valve and venturi for choking purposes.

Next month I propose to deal with the finishing of the bodywork and all details, and complete constructional plans for the model with be available at the same time. Enough has been given at this stage to allow readers who are anxious to build a similar model to make considerable progress before the April issue appears, and I shall be pleased to answer any queries addressed to this office in the meantime.

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$4.50 per annum

Made and printed in Great Britain by Bletchley Printers Ltd., Bletchley, Bucks for the Proprietors The Model Aeronautical Press Ltd., Allen House, Newarke Street, Leicester. Published by the Argus Press Ltd., 42-44 Hopton Street, London, S.E.1, to whom all trade enquiries should be addressed. Registered at the G.P.O. for transmission by Canadian Magazine Post.