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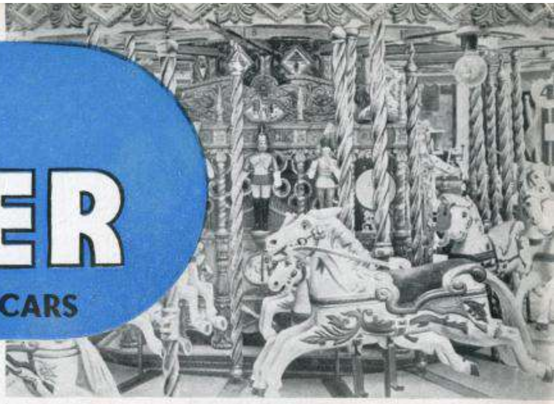

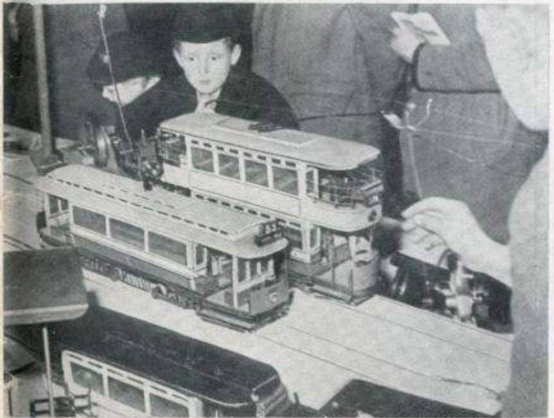

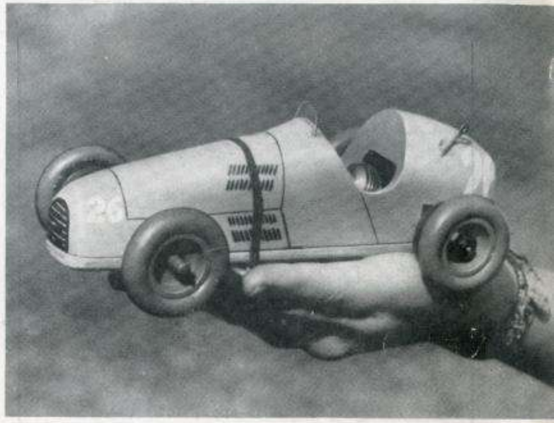

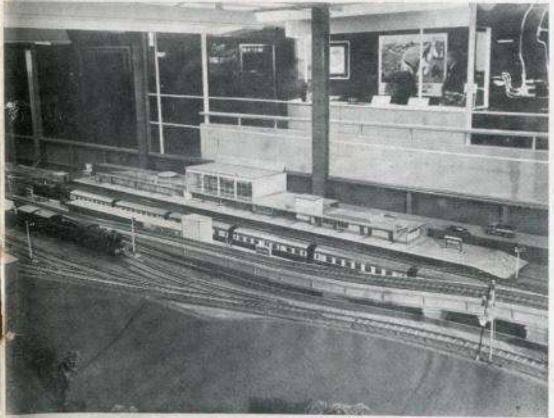

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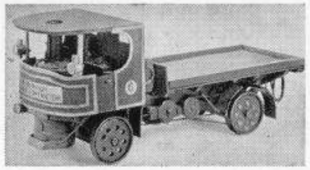

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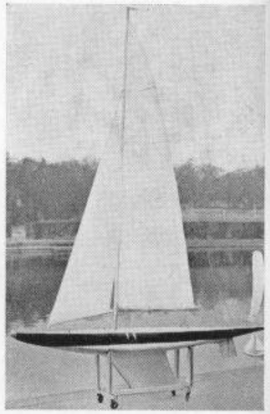

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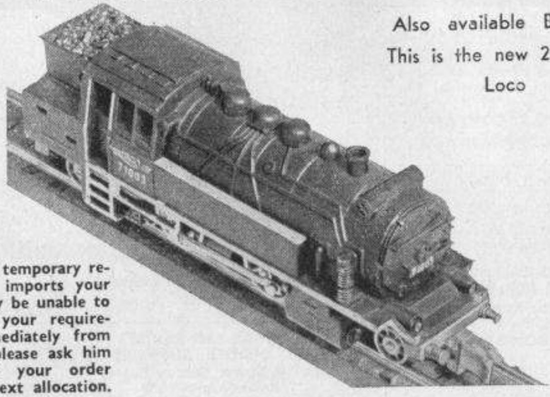

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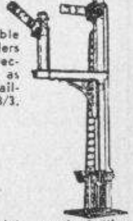

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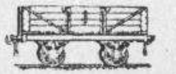

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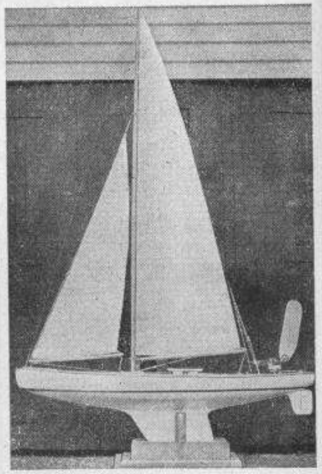

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Co-Editors :
G. H. DEASON
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Contents

Something for Everyone

MONTH by month we are in the habit of publishing plans of models, the construction of which often occupies several instalments in subsequent issues. Full-size working drawings of all designs likely to attract more than a transitory interest are available to our readers, who frequently prefer them to the necessarily reduced size plans published in our magazine.

In all too short a time model makers will be settling down to their winter building activities — the railway modellers perhaps with a sigh of relief that they will no longer be badgered to get on with the garden, other outdoor protagonists with a regret that sedentary rather than active enjoyment is their lot for the next few months. It seems an excellent time, therefore, to invite readers once again to gather round with ideas on the sort of plans they would most enjoy during the next six months.

Our cabin cruiser *Deglet Nour* is completed with the instalment in this issue, but a new and exciting craft in the shape of a $\frac{3}{4}$ in. to the foot *Admiral's Barge* makes its appearance, and should be assured of a popularity second only to those ever-young Air/Sea Rescue launches which have enjoyed many years of demand. For the first time we are offering step-by-step detailed instructions on the building of a high performance 5 c.c. Speed Model Car, from the board of that successful record breaker—he may indeed be again a record holder by the time these words are read—Ian W. Moore.

In the realm of model yachts, we can look back with some pride on our Marblehead *Festive*, examples of which, varied a little according to their builders' tastes, are already making their mark on various sailing waters : and on *Halceyon* our 10-rater which has aroused considerable enthusiasm amongst knowledgeable yachtsmen. In this issue we offer something new for model yachtsmen in the shape of a new series of articles on model yacht design approached from a different angle. The author, a well-known skipper and designer from Newcastle-upon-Tyne, devotes his first article to basic principles, but further articles will be using his new Marblehead *Polaris* as their subject, and plans will be available for would-be builders, who will learn exactly why every curve is where it is and why it is desirable.

What can we offer of comparable fare for our wide model railway readership ? We are happy in that A. H. Dadd has promised to continue his prototype series, and will be writing of modern vans and rolling stock, with even a locomotive or two in the near future. New articles on sub-miniature scales will also widen our scope, with a series on $2\frac{1}{2}$ mm. construction from A to Z. We should however, welcome really expert contributions on small locomotive construction, either scale or freelance, to make our appeal even more widespread.

ON THE COVER . . .

Top : Close-up detail of H. Slack's trophy winning working model roundabout, at the Northern Model Exhibition. Photo by A. Hamer. Centre left : Working model trams on G. Oakley's track were a great attraction. Centre right: The 0.5 c.c. "Novices' 50" race car described in this issue. Bottom left : A British Railways picture of their fine layout. Bottom right : A naval model for radio control, the Admiral's Barge, for which a series of constructional articles by the builder, E. G. Cocks, starts in this issue.

Modelling British Prototypes in 2½ mm. Scale

By Michael H. Bryant

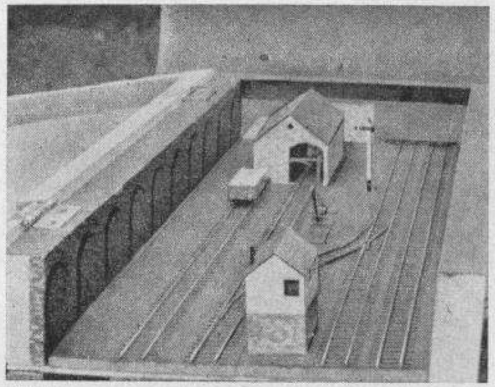


Fig. 4

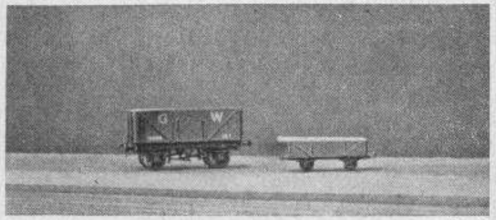
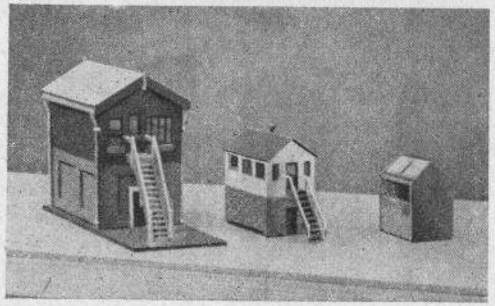


Fig. 3

WITH the Editor's permission, I propose in this series of articles to go fully into the possibilities which the new scale of 2½mm. to the foot and 12 mm. gauge opens up to the average modeller. Already in the *Model Maker*, Manxman's monthly feature has stressed the importance of the new scale, and has emphasised the excellence of the Rokal products which are now being imported into this country in increasing quantities. But I believe that many modellers who might be interested in 2½ mm. scale are at present being deterred from launching into it by the apparent lack of commercially produced components with which they could build British prototypes. Rokal is excellent, but many people do not like or want Continental types of locomotives and rolling stock, and believe the smallness of the scale would render home-produced locos and stock beyond their capabilities. This I think is quite untrue; certain 2½ mm. locos and all stock, are quite within the capabilities of nearly all modellers.

Perhaps at the beginning of these articles, to set the minds of any Doubting Thomases at rest, I had better tell you what my qualifications are—or perhaps it may be easier to say what qualifications I have not got. I am *no* engineer and have no workshop. My bench is a table in the living room, my tool kit is a comparatively small one, I have never used a metal-turning lathe in my life and the only power tool I possess is a Wolf Cub and its accessories; and, I might add, I have not used *that* yet in any work connected with 2½ mm. scale, although doubtless I could have done had I thought about it.

Fig. 1



At present, commercial products for 2½ mm. scale are few and far between, but there are available some of the basic necessities for making a start—sleepering, rail, wheels, coach kits and coach bogie castings give one quite a lot to go on, and it is amazing what can be improvised with very little trouble. We can moreover, hope that as interest in the new scale grows so the manufacturers will start slowly to supply the demand.

In case any reader is thinking that the prospects of having to make everything himself is going to deter him, let me outline what I consider to be the possible alternatives with 2½ mm. scale. Firstly, you can start with Rokal locomotives and rolling stock (there are now two locos and a very good range of stock, all Continental in flavour, available commercially), and build the track and scenic work either to British or Continental pattern. Secondly, you can purchase your locomotive and either modify it to approximately British outlines or leave it as it is; track rolling stock and scenic effects can then be to British standards. Thirdly, you can make British locos, stock and accessories, from the parts which are available. This last course is by no means so impossible as you might think, because standard 00 mechanisms can be used in building certain common types of British locomotives, as I shall show in a later article.

Many people will say, "But the size is too small to work satisfactorily", or "The size makes modelling in this scale merely an outline job—there can be no detail and precious little accuracy". Let me answer these objections in turn.

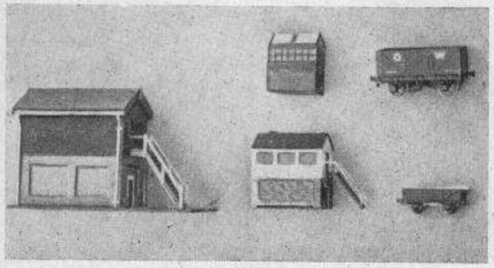
First, reliability. I think the best answer to this complaint are the Rokal products; ask any person who has experience of them and you will find that he will tell you that they run perfectly hour after hour with gay abandon, with no tinkering, with no faltering and that their controlability is excellent. I know one dealer who put a Rokal set in his window and ran it day after day for weeks; it never needed attention. Provided certain basic standards of accuracy are adhered to, it is quite possible to achieve the same level of reliability in the home-produced article.

Second, lack of detail. I fully admit that 2½ mm. scale cuts down the amount of detail that can safely be incorporated; if a modeller is keen on having super-detailed models, then he will have to go to a bigger scale; even 4 mm. is really too small, and most people choose 7 mm. if their demands for detail are fastidious. No, to my way of thinking, 2½ mm. scale is ideal for the modeller who wants to produce completeness—railway, railway surroundings and scenic details. In such a scale he can aim for, and achieve, a whole picture remarkably quickly, and with precious little space at his disposal. Such a complete picture, which in this size can only be produced in broad outline, must be accurate in general proportions or it will look wrong. With much of the smaller detail omitted, there is little or nothing to conceal out-of-scale components; a locomotive too broad in the beam, or a signal with too large an arm will show up much more in this small scale than it would in a larger. Here there can be no mass of detailing to hold the eye and to gloss over an error in general dimensions; here there is no such refuge.

Whilst on this subject of detail, I should like to point out that there is quite an art in knowing what to try to include and what to omit, but it is an art which seems to be easy to acquire. One advantage is that, with omitting small irrelevant detail, the job is finished much more quickly—a Goods Shed which might take six to seven hours to make in 4 mm. scale, takes two to three in 2½ mm. To omit most of the detail in the larger scale would produce a bad model with which one would be dissatisfied; in 2½ mm. the general proportions and a little detail will catch the atmosphere of the real-life article much more surely.

At this point I should like to go into the question of the size of models in 2½ mm. compared, say, with 4 mm. scale, and into the possibilities which such a reduction in size makes. "Manxman" has already written on this subject in *Model Maker*, and the reaction which he reports from some readers makes it clear that many people have little idea of the effect of reducing one's scale by 1½ mm. Perhaps this table of comparisons may help—the dimensions are approximate: —

Fig. 2

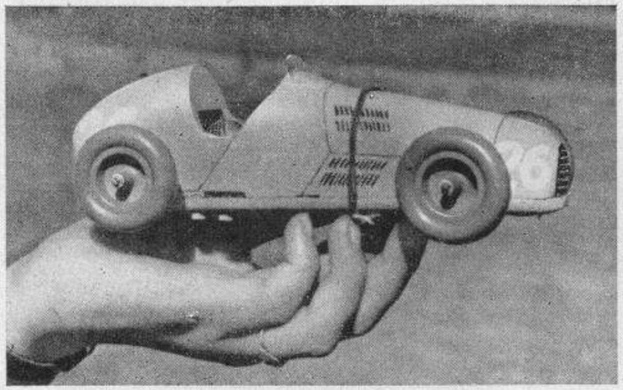


	4 mm. Scale	2½ mm. Scale
Track	3 ft. radius becomes	1 ft. 10½ in. radius
Ditto	2 ft. radius becomes	1 ft. 3 in. radius
Points 3 ft. radius ...	9 in. long becomes	5⅝ in. long
Crossover	20 in. long becomes	12½ in. long
Baseboard Width		
Single Track ...	2 in. becomes	1¼ in.
4-4-0 Loco & Tender	9 in. long becomes	6 in. long
0-6-2 Tank Loco ...	5¾ in. long becomes	3½ in. long
Main Line Coach ...	9 in. long becomes	6 in. long

Figures are sometimes difficult to digest, so I have included some illustrations to show the relative differences in size. Fig. 1 is of three Signal Boxes in 4 mm., 2½ mm. and 2 mm. scales. Let me hasten to say that both the 4 mm. and the 2 mm. ones are unfinished—indeed the 2mm. box is a skeleton only, merely to give you some idea of the difference in size. The three cabins are not models of the same prototype box, the general overall dimensions are the same, i.e. height, width and length, so the comparison is a true one. Perhaps even more startling is the difference in size of the two trucks in 4 mm. and 2½ mm. scales which are shown, as well as the signal boxes, in Fig. 2, although I regard this photograph as somewhat misleading. This is because it is taken directly from one side, and produces, in effect, almost a two dimensional picture. Fig. 3 gives a better idea of the relative sizes of the two trucks. The 4 mm. model is, needless to say, one of the excellent Trackmasters fitted with scale wheels. I was sorry not to be able to produce a 2 mm. one for comparison, but time was too short and the photographs had to be taken.

Finally, to get a complete picture, I have included Fig. 4—part of a small Goods Yard adjoining a Main Line. The overall dimensions, including the box itself, are only 2 ft. long by 10 in. wide. The same layout with the same spacing in 4 mm. scale would need a box 3 ft. 3 in. long by 16 in. wide. A folding baseboard which opens out to measure 2 ft. 6 in. by 6 ft. is small enough in all conscience for 4 mm. work. "One small country station and yard" would be the verdict of most sensible modellers. But a board 2 ft. 6 in. by 6 ft. for 2½ mm. working is the equivalent of one 4 ft. by 9 ft. 8 in. in 4 mm. scale —which is an entirely different proposition.

(*Continued on page* 532)



NOVICE 50

A SIMPLE DESIGN FOR THE NOVICE WITH THE FROG 50

BY R. H. WARRING

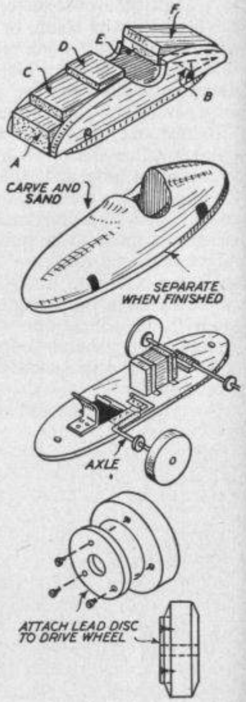
THE appearance of reliable half-c.c. motors on the market gives anyone the chance of making a simple, cheap model race car—no frills and no great pretentions of high speed performance, but a model that looks, and runs, like its bigger brothers. Using such a small power plant too, "model engineering" type of construction can largely be avoided. This model, in fact, is based largely on aircraft practice with the use of wood predominating. Wood, after all, is very much easier to work than metal. Apart from the balsa block, almost all the materials required should be found in the average model maker's workshop.

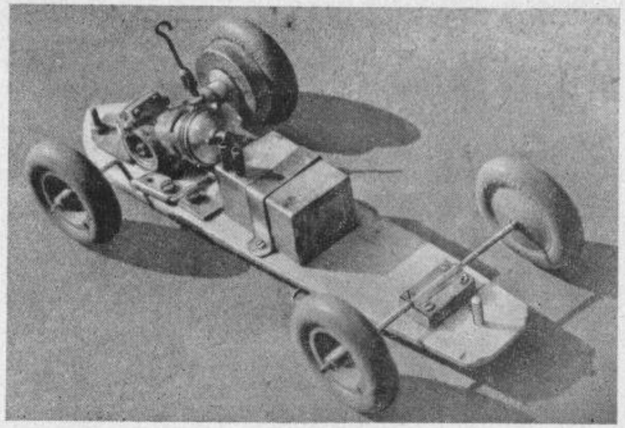
Plans of the model are given full-size, so that the various patterns can be traced direct. The whole of the "works" — motor assembly and wheels — is mounted on the ply base or pan. The shaped balsa body is readily detachable for access to the motor although starting, filling the tank and normal running adjustments can readily be made with the body in position.

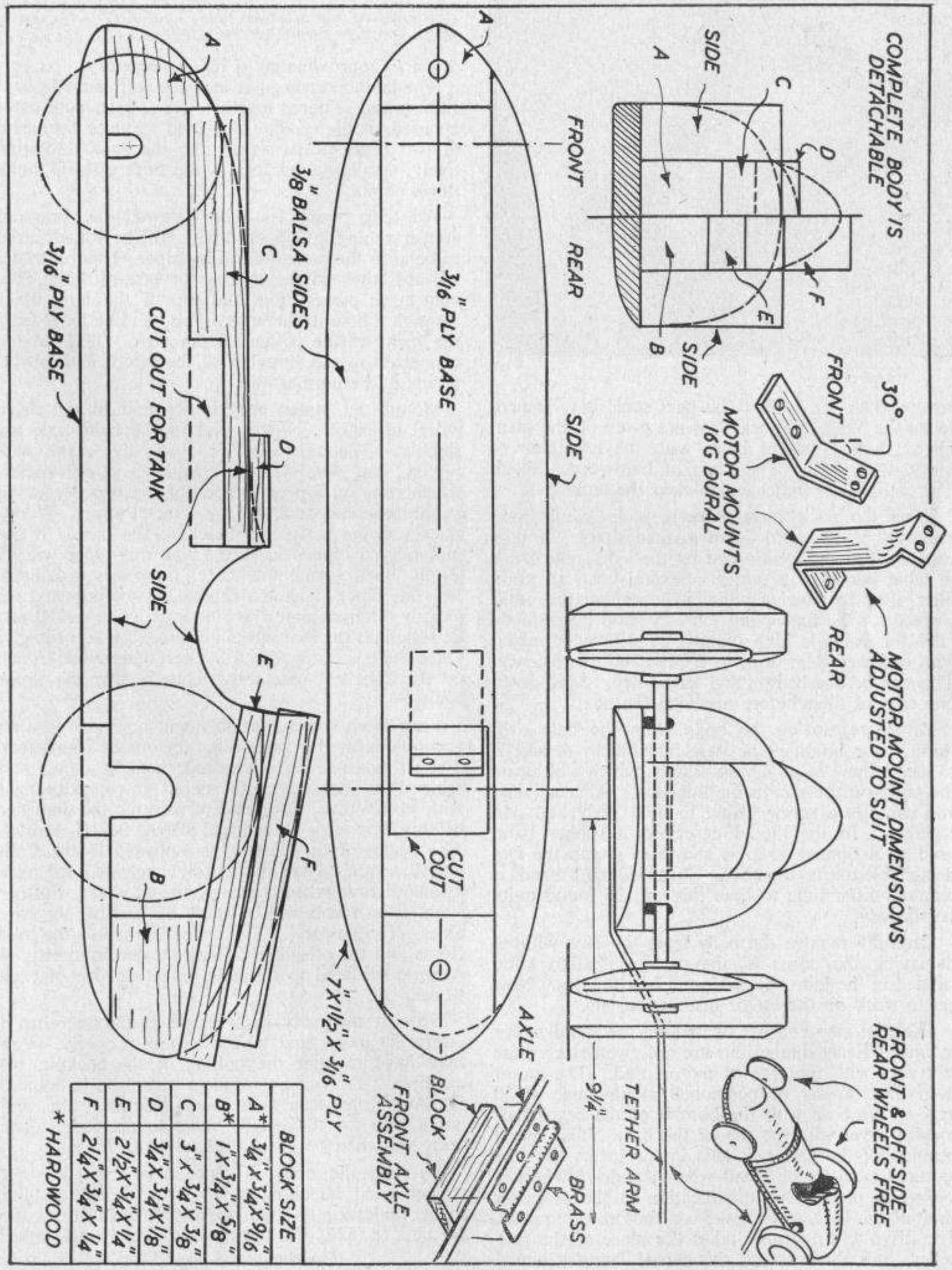
Commence construction by cutting the base from 3/16 in. ply. A small panel is cut out to accommodate the motor lugs and holes are also drilled in each end for the locating dowels. The body is now built up around this base, carved and finished and then removed for the installation of the wheels and motor.

Two sides are cut from 3/8 in. thick sheet balsa to the outline shape given on the plan, and lightly

Model Maker built the Novice 50 in a couple of evenings, using the tools likely to be found in any novice's toolbox. Note that some liberties have been taken with body lines, and a temporary tank fitted, having vent and filler on the wrong side.

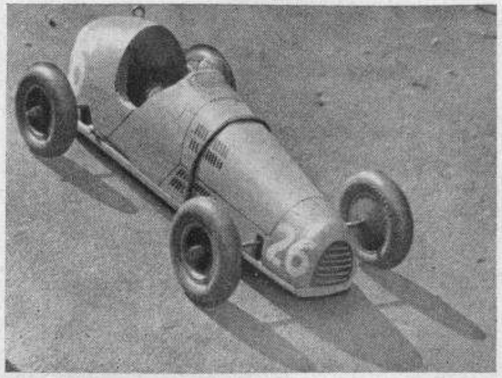






BLOCK SIZE	
A*	3/4"x3/4"x9/16"
B*	1"x3/4"x5/8"
C	3"x3/4"x3/8"
D	3/4"x3/4"x1/8"
E	2 1/2"x3/4"x1/4"
F	2 1/4"x3/4"x1/4"

* HARDWOOD



Another view of the completed model, showing how a little judicious panel lining with thin dope adds to the appearance. In this case the general lines of the Gordini have been copied.

cemented to the base. The next stage is to cement in all the blocks. Block sizes are given on the plan, all of these being of balsa with the exception of blocks A and B. These are of hardwood. Block C is stepped, as indicated, to clear the tank.

When the blocks have properly set the whole body is carved and sanded down to final shape. Follow roughly the outline afforded by the sides, and work in what curves you prefer. Several coats of grain filler after the final sanding will prepare the outer surface for the final paint job A good home-made filler for balsa is high quality baby powder mixed with ordinary clear dope to a fairly thin consistency. This can be brushed on and left to dry. Sand down one coat of filler before applying the next.

Before separating the body from the base drill through the holes in the base into blocks A and B to locate the $\frac{1}{8}$ in. dia. stub dowels, which will locate the body on the pan in the final job. Alternatively, you can use a screw fitting to hold body and pan together. In the model described a rubber band used as a bonnet strap is shown to clamp the two detachable parts together. Provided this band is renewed from time to time this will be found quite satisfactory.

Carefully remove the body from the base without damaging the edges of the wood. A thin knife slipped in the joint will be found best for this. Now get to work on the motor installation, etc.

The first step consists of making the dural motor mounts. Exact dimensions are not given since these will vary with the type of motor used. The motor itself must finally be positioned at an angle of 30 deg. to the base with the bottom of the crankshaft roughly level with the top of the base. The lateral position of the motor is also important so that the required track is obtained when the drive wheel is locked in place. No modification to the propeller shaft of the E.D. or Frog 0.5 c.c. motors is required. The drive wheel simply takes the place of the propeller, hub thickness of this wheel being trimmed down to approximately $\frac{3}{8}$ in., if necessary.

The tank is rectangular in shape, and is made from shim brass, soldered together. A smaller tank could be used, if preferred. It is held in place by means of two brass straps screwed to the base. Alternatively, simply solder lugs to the tank sides as hold-down points.

All tank piping is $\frac{1}{16}$ in. internal dia. brass or copper tubing. Copper tubing will be found easier to bend in the case of the filler pipe. This protrudes upwards through the cockpit for ease of filling. The vent tube passes from the top of the tank down through a hole in the base. The fuel line feeds from the front offside corner of the tank. This tube is connected to the spraybar of the motor with plastic tubing in the normal way.

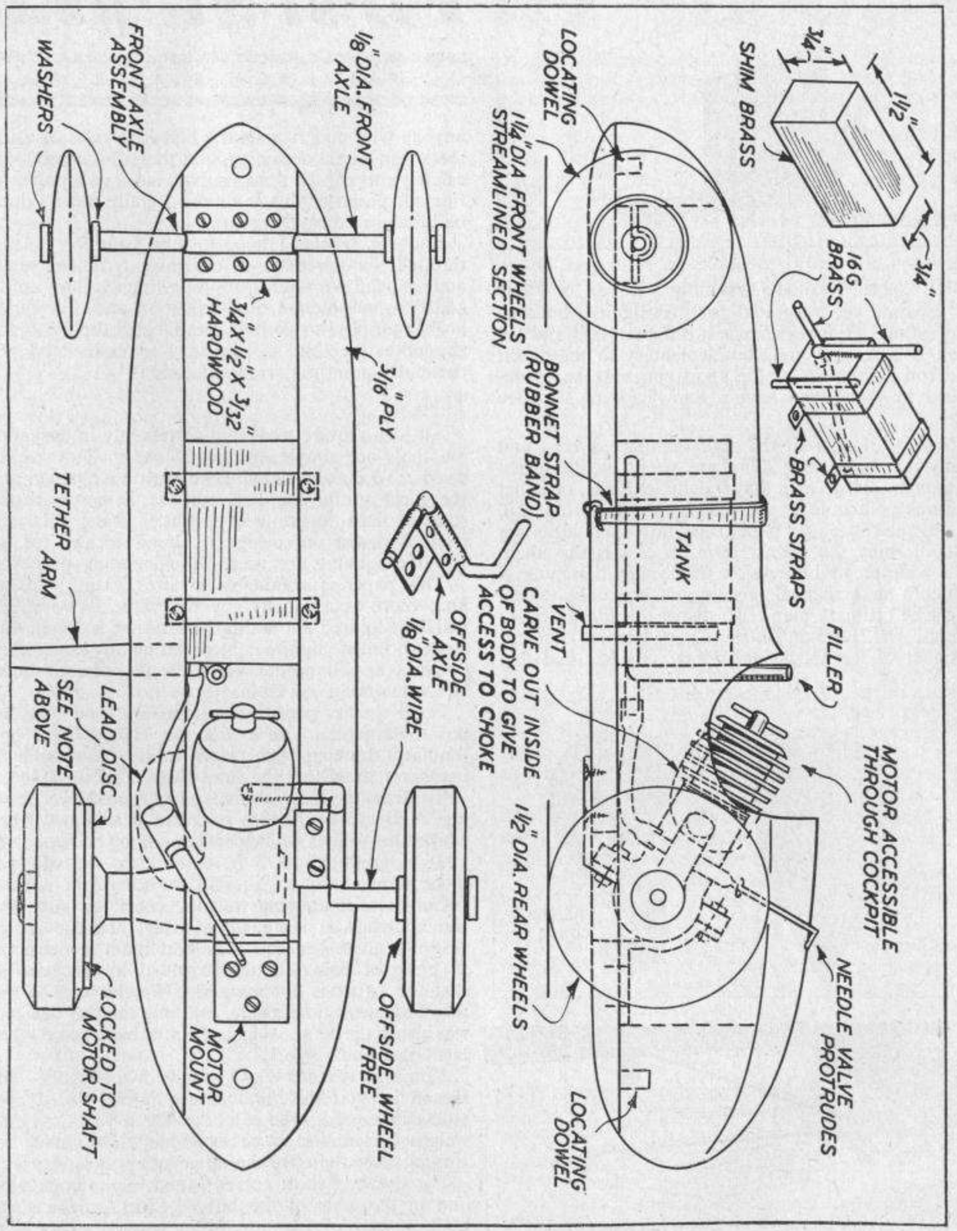
Mount the motor temporarily and fit the drive wheel in place. Now attend to the front axle assembly. The axle itself is $\frac{1}{8}$ in. dia. piano wire ($\frac{3}{32}$ in. dia. wire will be adequate, if you prefer) which rests on top of a block of hardwood secured to the base and anchored by a metal strap. Woodscrews secure strap and block to the base. If the motor is positioned as in the plan this block will be $\frac{3}{32}$ in. thick (using the wheel diameters specified). But this block thickness can readily be adjusted for slightly different motor positioning. The model can be rested on the rear wheel and lined up accordingly. Once the correct spacing has been determined, finish off the front axle assembly. Then remove the motor again.

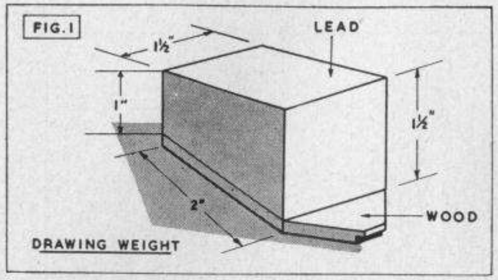
Your front wheel assembly will now give you an accurate datum for assembling the offside rear wheel. This is mounted on a wire axle bent as shown and secured to the base with metal straps, positioned with woodscrews. For ease of working the diameter of this wire can be reduced to $\frac{3}{32}$ in., if desired. The height of the "crank" is adjusted to the front wheels so that when the motor is reassembled once again all four wheels rest on the ground. Further slight adjustments can be made by bending the wire axles, if necessary. The "free" wheels—the two fronts and the offside rear—are located by means of washers soldered to the axle on either side of each wheel.

Now fit the body back in place and see that it clears the motor and tank assembly properly. You may have to alter the outline of the cockpit, for example. Trim away wood to clear the bottom of the tank straps near axle, motor assembly, etc., and cut a hole for the needle valve to protrude. The body can then be given its final paint finish.

To hold the body in place, use a single stout rubber band attaching to 20 s.w.g. hooks secured to the underside of the base, as shown in one of the sketches (p. 529). For tethered running a single tether

(*Continued on page* 549)



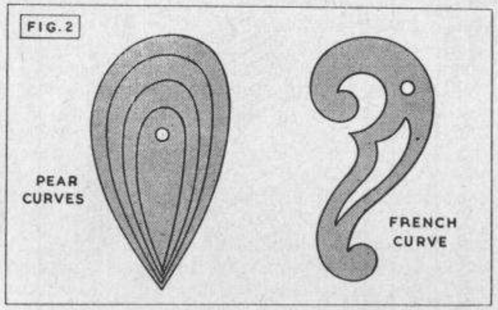


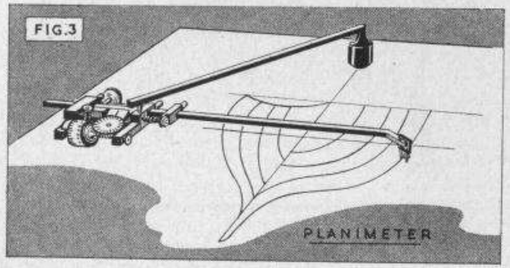
First Steps in MODEL YACHT DESIGN

PART I. BY H. E. ANDREW

THE sport of model yachting consists of three separate yet integrated parts, designing, building and sailing. Each demands a different skill and yet each is necessary and complementary to the other, and full enjoyment of the sport can only be appreciated by those who have a knowledge of all three parts.

Nearly all men in the sport can sail a boat and many can build, but there are very few designers. Although many men have definite ideas of what features constitute a good boat they lack the skill to put their ideas on paper, and thus their ideas are lost. I think the main reason for this is that there is a widespread impression that yacht designing is a highly mathematical process and not to be understood by ordinary men. To dispel this idea, I quote the late Dr. Harrison Butler, a very talented amateur designer of small cruising yachts. He has said that anyone who understands the first four rules of arithmetic can tackle designing, and that all the necessary calculations can be done on both sides of a postcard. For our purposes this is almost literally true so don't be discouraged on this score.





In these articles I hope to take you step by step through the processes of designing a model yacht, and we shall not use any more arithmetic than simple addition, subtraction, multiplication and division. I do not propose to go into complicated theory to any greater extent than is necessary to understand any particular point under consideration.

Tools

All jobs require tools and fortunately in designing the tools are simple and easily obtained or improvised. To make a drawing we must have paper, and the most useful for our purpose is graph paper, squared into inches and tenths. Using this, the framework for our design is already drawn for us, and the squares are used for calculating purposes.

This paper is obtainable in sizes 30 in. x 20 in. and, more occasionally, by the yard. Two sheets will be required for a Marblehead or a 36 in. Restricted, but if you are contemplating any larger class yacht, you will need four sheets in order to make two, each 60 in. by 20 in.

Good quality pencils are necessary, and they are now obtainable. Use a soft one, HB or F for preliminary drawing, for much rubbing out will be necessary, finalising the lines with a 2H or 3H.

To draw the long curves you will need two drawing "splines" or battens and five drawing weights. Make the splines of lancewood, or of boxwood, of straight grain, about 3 ft. 6 in. long, the stiff one to be about 3/16 in. x 1/8 in. and the other 1/8 in. square.

Commercial drawing weights cost a fair sum, but can be made at home quite easily, and the sketch (Fig. 1) gives you the idea and main dimensions. A piece of baize should be glued to the base so that the paper is not marked. Weights can be improvised even more easily, and one famous designer was using the loose weights from a baby scale when last I saw him at work.

You may wonder why I specify five weights. The reason is, that this number accurately placed provides the correct type of curves for a yacht. Three weight curves are to be avoided, while curves requiring more than five should never appear in a yacht.

For drawing short curves found in the body plan and in the ends of the buttock lines on the sheer plan, a set of "pear curves" is necessary, but they are both expensive and hard to get. "French curves" must be used if you cannot obtain the "pears". Both types are shown in Fig. 2.

Finding the areas of surfaces bounded by curves forms a large part of designing, and in this series I have confined myself to counting squares for this purpose (another reason for using graph paper), but if you can afford it, a planimeter saves a lot of time. This gadget looks like a rather curious pair of compasses, and by anchoring one leg on one corner of the area to be measured and moving the other round the lines bounding the area it automatically does a sum in calculus, and records the answer on the scale at the hinge. They are usually calibrated to read directly in scales of 1 in. to 1 ft., so if you get one you will have to adjust your answer to the scale you are using. I have illustrated one in use in Fig. 3.

In addition to these special tools you will need an accurate straight edge and a set of 45 deg. and 60 deg. set-squares, a pair of compasses, and a 2 ft. rule. You will also need a drawing board or table of size suitable to the paper you are using.

This completes the list of tools.

Reading the Plans

Before we can start to draw our own plans we must obviously know how to read a set of plans, or "lines" as they are called, and to know what all the curves on the various drawings mean, and we will now look at the drawings of *Polaris*.

All yacht plans are drawn in three planes of reference. The "Sheer Plan" shows the profile of the yacht, and the lines of the buttocks drawn on planes set at equal distances out from, and parallel to, the centre line of the yacht. The water lines and section lines appear on this plan as straight, horizontal and vertical lines respectively.

The "Half Breadth Plan" shows half a hull looking directly upwards from underneath, and shows the shape of the deck line, the load water line (L.W.L.) and all the other waterlines spaced at equal intervals up and down from the L.W.L. On this plan the waterlines appear as curves and the buttock and section lines as straight, horizontal and vertical lines respectively.

The third view is the "Body Plan". This shows the shape of the various cross-sections of the hull, spaced at equal distances along the length. In this drawing the waterlines and buttocks appear as straight, horizontal and vertical lines respectively.

It will be seen that by reading these three drawings together we can obtain a very accurate idea of the shape of a yacht or of any individual part of it.

The long curved lines opposite the half-breadth plan and the diagonal lines of the body plan call for explanation. These lines are used to check the fairness of all the others, and they are the views of the cut surface of a hull if it were sawn in a fore and half direction on the plans indicated by the diagonal lines on the body plans.

It will be realised that in order that all these lines accurately show the shape of the hull all points of intersection must be the same on all the drawings, and in your drawings you must exercise great care to see that this is done.

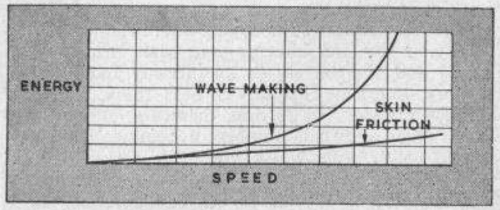
The sail plan and the curves of areas will be discussed later.

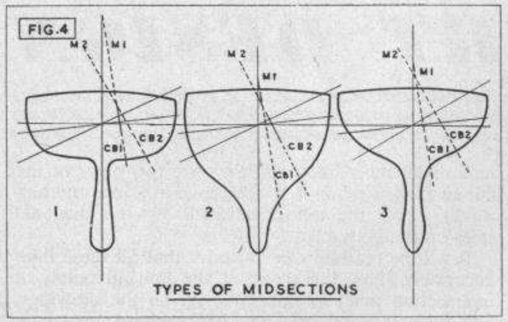
Classes and Proportions

A study of the yachts in your club house will make you realise what effect a rating rule has upon the shape of a yacht quite apart from its size. Closely restricted rules like the "A" Class rule and the I.Y.R.U. rules have produced boats which, provided they are built over a similar period, look very much like each other at first glance, while the 10-Raters and Marbleheads, particularly the latter, show wide differences in form.

This is because designers have to take advantage of any loopholes in the rules to get the fastest boats possible. The rule makers know this and frame the rules so as to leave as few loopholes as possible. The "Length and Sail Area Rule" of which the model 10-Rater alone survives, was killed in the full sizes because it had such few restrictions and the yachts became uninhabitable racing machines, twice as long on deck as they were on the load waterline. The old model 10-Raters were the same, and it was only the necessity of having a powerful hull to support modern sails plans which has caused them to become a reasonable shape again.

It is obvious, therefore, that our first consideration must be the class to which we are designing, and what proportions are necessary in order to get a successful boat in that class. Here observation and experience must be your only guide. Check as many designs and as many boats as possible, and then decide what main dimensions you are going to use. Remember, however, that it does not usually pay on a first attempt to stray far away from the accepted





dimensions of the other boats in the class, for the other designers have probably found what proportions pay best.

While it is true that long sailing length means higher potential speed, it is also true that length in most rules has to be paid for by sail area, and in the "A" Class and I.Y.R.U. classes by extra displacement as well. Hence all designs must be a compromise between these three factors. Additionally these latter two classes restrict sailing length by indirect measurement of overhangs.

Midsections

This brings us to a consideration of the midsection, the most important line in the design. It is upon the shape and size of this section which mainly depends the displacement, the initial stability, and how soon the boat attains her maximum speed.

Three typical mid-sections are shown in Fig. 4. No. 1 is that of an old-fashioned 10-Rater, and without the fin keel is very like that of a modern racing dinghy. This section produces a very easily driven hull, but unless very deep is a light displacement section.

No. 2 is a typical modern cruising yacht of fairly heavy displacement. This produces an easy, sea kindly hull, which sails at a moderate angle of heel with reasonable initial stability, but a boat with this section takes a long time to attain maximum speed because she creates a deep wave system and the deeper the wave system the more energy is needed to attain maximum speed.

Oddly enough, she is probably faster in light winds than No. 1 because her fuller hull has less wetted surface, and at low speeds it is surface friction which retards a boat more than wave-making. The graph illustrates this point.

No. 3 is the type we are mostly concerned with in our models, and you will note that it combines the sea-kindly shape of No. 2 with the speed potentialities of No. 1. All models and most full-size racing yachts have sections of this type.

I must now introduce you to the "Metacentric Height" (denoted "M" on the sketches in Fig. 4). This can be termed the measure of initial stability and it will be seen that in Fig. 4 (1) it is very high at low angles of heel, but falls rapidly as the heel increases, while in Nos. 2 and 3 it is low to start with but remains fairly steady at all reasonable angles of heel. This is the condition we must strive for in our designed mid-section.

MODELLING BRITISH PROTOTYPES IN 2½ MM. SCALE

(Continued from page 525)

"Manxman" has argued for a change to 2½ mm. scale whilst keeping radii the same and thus achieving broad sweeps and nearer-to-prototype running. This is a very nice prospect for those who have the space to play with, but there are many modellers with all the component parts for a layout stored away because they just have not got the space to lay down even the smallest of country stations. Let those who have the space decide for themselves; I am concerned with a whole new group of people who before the advent of 2½ mm. scale either had never started railway modelling, or had become what I call "stored-layout modellers" (they build to store and not to run) simply because they have never had the space for a layout. This series of articles will I hope, give them an idea of the possibilities which exist in 2½ mm. scale.

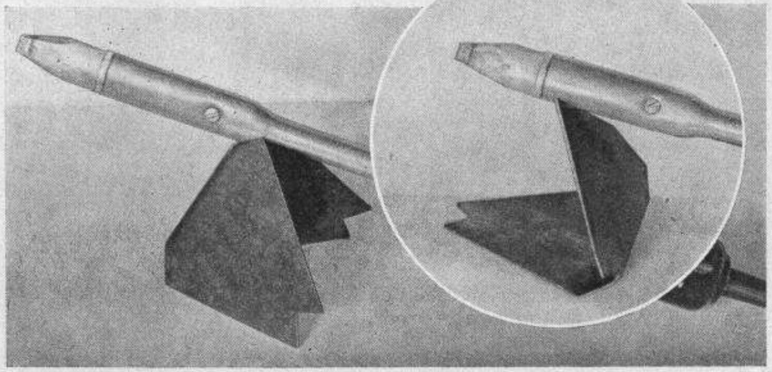
The inevitable question will doubtless be asked, "Why, if you are reducing your scale from 4 mm. to 2½ mm. do you not go all the way and work in 2 mm. scale?" The answer is, I think, perfectly straightforward. In 2½ mm. there are, even at this early date, a certain number of commercially produced components which are made for this scale, and with careful planning certain 4 mm. mechanisms can be adapted for use in home-built locos. In 2 mm. everything, as far as I know, has to be made by one's self or for one's self (a comparatively expensive process) and commercial mechanisms are too big to be used. The mechanism question is vital to a good number of modellers, I fancy. Nearly all the fraternity will not draw the line at fiddling, making-do and improvisation, but there are comparatively few modellers who do not (rightly or wrongly) consider making a mechanism beyond their powers. Added to all this, the reduction of scale by ½ mm. makes a vast difference to the skill needed to produce the models—a divergence out of all proportion to the apparent small reduction in scale, and the model maker has to acquire not a little of the watchmaker's skill and cunning.

The scope of the articles will, if sufficient people are interested, be wide and fairly comprehensive. Baseboards and Tracklaying will be covered, as well as Motive Power, Rolling Stock and Lineside Details. Working drawings (full-size for this scale), detail and constructional sketches and notes on construction will always be given. I hope they will be of use not only to the man who intends to build his 2½ mm. layout from scratch, but also to the Rokal owner who wants to turn his original set into a fully detailed layout.

An Infallible Soldering Rest

The problem of where to put that hot iron neatly solved

By L. C. MASON



MOST workshop addicts have no doubt bewailed from time to time the fact that they have only two hands. Clips, clamps and assorted fixtures can go a long way towards remedying that deficiency for holding things, especially when small parts have to be held together in a fixed position for soldering. The fun starts when you want to get at another part of the job, at the same time manipulating a large and very hot iron. The situation is then ripe for emergencies. Maybe something drops off that was until recently nicely soldered in position, or you very effectively brand yourself. Whatever the cause of the flap, the one thing you want to do with all speed is to get rid of the iron. So you put it down. If you happen to be using a nice clean electric iron in the dining room, the result can lead to hard words.

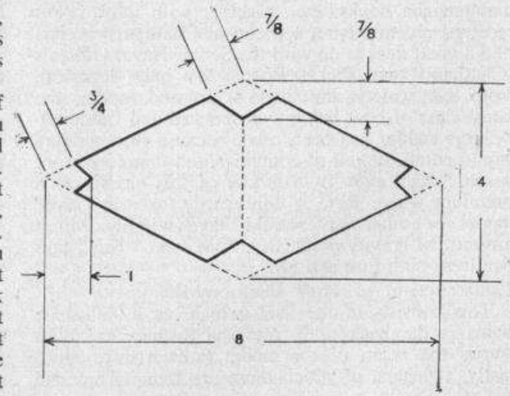
Partly to obviate such a possibility, and for general convenience wherever soldering was being done, the design for the stand shown was produced. It is quick and easy to make, it is foolproof, and it thrives on rough treatment.

The idea is that it behaves like a pyramid, all of whose sides are equal. If you had a solid pyramid you could stand it on any one of its sides and it would always rest on a firm base with one point upwards. If you then provided a generous notch at each point you would have an iron rest that could not fall over, and which would always provide a position for use.

The bent sheet metal one does just that. You can stand or toss it on the bench anyhow, and as it comes to rest so it is usable. If you happen to knock it over in putting the iron down hurriedly, you just use the corner that pops up. Another virtue is that it does not get even appreciably warm in use, as the two small points in contact with the iron do not transfer enough heat to warm up the mass of metal.

Making it is simplicity itself. It is merely cut out and filed up from a piece of stiff sheet steel, brass or dural. Somewhere about 20 g. is suitable, or you can use thicker material depending on your capacity for bending. Probably stout sheet tin would be quite satisfactory, if you soldered a short stiffener across the open ends inside, just below the bottom of the notches.

When you have it shaped up in the flat, as shown in the drawing, bend it over to a 60 deg. angle across the middle, making a nice sharp corner. In the flat the notches at each end of the bending line appear bigger than those at the other two points. This is so that they will all finish up approx. the same size—bending closes up the larger notches slightly.



A 45 FT. ADMIRAL'S BARGE

Part 1 of a detailed constructional article on the building of a ¾ in. to 1 ft. Naval craft, specially designed for radio control.

By E. G. Cocks

Introduction

IN this article I hope to give all details of the construction of an excellent type of model for the enthusiast who is primarily interested in detail, combined with true scale results, from the building of the hull to the final finish on same, and then a description of all radio control gear used, and its installation. A Royal Navy craft was chosen because of my past association with this Service, and indeed the present also, I am a member of the R.N.V.R., and during the last war had experience of this type of craft. General model practice has been adhered to throughout the building of the model wherever possible.

The construction of this ¾ in. to 1 ft. scale Admiral's Barge, combines a good scale, fast model, which allows plenty of scope for detail, is roomy, and can be used for R/C, making all gear readily accessible. The model can be powered by either petrol ignition engine or electric motor, either type of propulsion is ideally suited to R/C. The plans were drawn up from photographs, sketches, and outline drawings of this class of craft taken from maintenance books, etc., together with information received recently from a friend at Chatham who has had a great deal to do with the Senior Naval Officer's (Chatham) own Picket Boat. My only departure from true scale is the single screw and rudder, the latest class of boat being twin-screwed and ruddered. A large rudder has been used, because twin rudders would entail the use of couplings and therefore more space, which even in a model of this size is at a premium where R/C is concerned, for every boat, model or otherwise, should have weight centred around the gravity point, to ensure even "trim", and liveliness both fore and aft.

Construction of Hull Framework

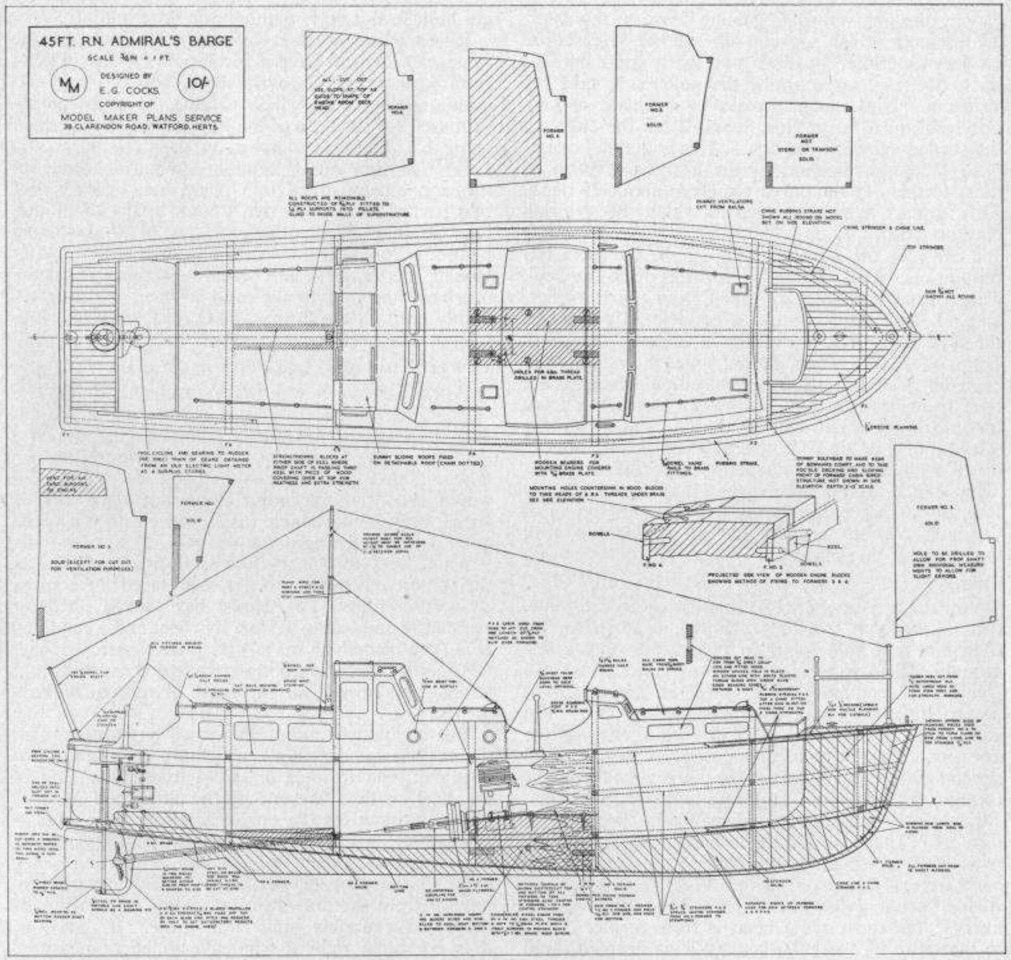
This consists of the keel (which, as in full-scale boats is the backbone), and the formers are built across the beam of the model (athwartships) and, lastly, stringers, of which there are four. They run from stem to stern, two upper and two lower, the latter form the "chine", and are fixed into notches cut top and bottom on both sides of all the formers.

The Keel

This is traced from the drawing on to ½ in. *waterproof* ply, making sure to mark accurately the positions of all formers. The keel is then very carefully cut out using a fretsaw with medium blade. If there should be a bow in the keel, it must be taken out. I had this trouble and it was remedied by placing the keel on to a flat surface and then placing firstly a larger piece of wood over it and then a heavy weight on top of all. I left this for 24 hours and it did the job. Plywood was chosen for this purpose because of the possibility of a weak point where the propeller shaft passes through the keel. However, no trouble was experienced drilling through at the required angle, except that it was a two-man job. Any possible weakness only lasts here until formers and stringers are fitted, when the whole becomes one strong unit. The keel may now be sanded to a finish, and the cutwater at the stem can be shaped as shown on the drawing. To drill the hole in the keel, fix between two pieces of wood in a vice leaving the pre-marked drilling angle showing. Start the hole with a bradawl, then with the help of a friend to assist with sighting the angle of the drill, bore very carefully. *This is very important*, because any deviation to port or starboard will mean a thrust in this direction by the screw.

Formers

Trace formers from drawing on to the ¼ in. ply sheet, starting with former No. 1, which is the smallest one. It will then be found that one or two of the larger former may be traced around Nos. 1 and 7, thus saving wood. There are seven formers in all. These are as follows: Fore Peak, rear of Bowman's Comp.; Rear of Forward Passenger's Comp.; Rear of Wheelhouse; Rear of After Passenger's Comp.; and lastly, at Stern. After tracing out, carefully cut out the formers with fretsaw (fine blade)



FULL-SIZE WORKING DRAWINGS, SCALE ¾ IN. TO THE FOOT, ARE AVAILABLE FROM MODEL MAKER PLANS SERVICE, 38 CLARENDON ROAD, WATFORD, HERTS. PRICE 10/- POST FREE.

List of Materials

½" waterproof ply for keel.
¼" waterproof ply for formers.
3/16" x 3/16" spruce for stringers.
1/16" x ¼" strip obechi for fo'csle and quarter decking.
1/16" ply for hull skin, and catwalk decking.
(1 mm. ply would be preferable if obtainable.)
3/16" x 3/16" mahogany used for top and Chine Rubbing Strake, continuing round the stern.
1/8" ply used for sides of all compartments (an unbroken length used for each side), also used for forward ends of compartments that run athwartships.
1/8" balsa or spruce used for all compartment deckheads, made in form of lids to lift off where necessary.
Good Scotch glue used throughout, substantially reinforced with ⅛" or ¼" brass pins.
1/16" celluloid used for windows.
1/16" white plastic thread used for window fillets (obtainable from Woolworths), inside and outside windows fixed with Croid tube glue NOT balsa cement as this attacks celluloid.
Scuttles (or portholes as these are mistakenly called) were obtainable from my local model shop, as were steaming lights, searchlights, etc.
All brass handrails made from brass wire, Jack Ensign and mast steppings were turned from brass rod on a lathe. Jack and Ensign staffs and mast made from ¼" dowel.
Hull is covered with rag tissue stuck on with clear dope.

leaving the line showing, sanding down to this later. The notches which are cut out for the keel should be very carefully cut, and must be a good tight fit on to the keel, as must be the notches to take the stringers. Now sand formers to a finish, making provision on formers Nos. 1 and 2 for the curve of the stringers toward the bow. This will entail chamfering the four notches at the corners of each of these formers to the curve required (about 25 deg.). This ensures a good surface to which the stringers may be glued.

I consider the next operation to be the most important one of all—fixing the formers on to the keel. The correct positions are taken from the drawings, and all must be upright. A good idea is to place the keel in a vice, protecting it at each side with strips of wood. Then, *before glueing*, each former must be affixed in its correct position. Now is the time to make sure that all formers are in line from forward to aft. This can best be checked by placing a length of $\frac{1}{8}$ in. or $\frac{3}{16}$ in. balsa along top and bottom of all formers in the notches cut for the stringers. They should all line up and the balsa must fit tightly into all notches naturally, as it follows the curve of the hull. When satisfied that all is under control glue formers into place.

Stringers

Whilst the formers are setting (using Scotch Glue, this takes about five or six hours to set hard, although it will hold joints in place after only a few minutes), the stringers may be steamed to shape. Using 3 ft. lengths of $\frac{3}{16}$ in. x $\frac{3}{16}$ in. spruce this is not so difficult a task as one would expect. The shape can be obtained from the plan view of the drawing. The lower or chine stringers were shaped approximately by holding the spruce near to the formers, and gradually steaming to shape, any slight adjustments being made when fixing stringers to formers. There is no need to steam the slight bend from aft forward to former No. 3; this section will bend naturally, but only from No. 3 forward to the stem. Steam a few inches at a time, and do not hurry. The most acute bend is from former No. 1 to the stem. To get the last $1\frac{1}{2}$-2 in. steamed, hold the extreme end in a pair of pliers, and when the required bend has been achieved hold the spruce until it is cold and the bend has set. Now carefully cut top stringers to flush fit at either side of the stem post, and then drill a small hole in them $\frac{1}{4}$ in. from the stem, to take a $\frac{1}{2}$ in. brass pin. Then glue stringers into place in the notches in the formers, starting from the bow and working aft. When the curve of the bow has been glued as far aft as former No. 3, tap a brass pin through stringer at hole ready for it into the stempost, making a good strong fixing at the most vulnerable point. Carry on glueing the stringers on towards the stern, where another brass pin may be located. Do not cut any overhang off until the glue has set. No other pins were thought necessary in the stringers: pins will be used at a later stage when fixing the skin. All four stringers are built in this way, pinning only fore and aft.

It was found necessary on my model, when using $\frac{1}{16}$ in. ply skin, to have a further two short stringers from former No. 3 to the bow, between top and bottom stringers on which to glue the strips of ply skin used for the flare of the bow, and also for added strength. These are shown on the drawing.

I found that one operation, such as cutting out formers, glueing them into place, etc., took myself best part of an evening that I could spare for modelling, so that usually the glue got 24 hours to set before I could again work on the model. After glueing the stringers into place, next day, cut off the overhang and then finally sand stringers and formers lightly until all are flush. All is ready now for skinning at a later stage.

Power Unit and Installation of same

When the model was first considered, it was decided to use an electric motor as a means of propulsion, however it was finally settled to use a petrol ignition engine instead, for the following reasons: It would save a considerable amount of weight, and would also drive the model along at a more realistic speed, and would enable (as would electric) a speed control to be arranged for the R/C at a later date.

An E.D. 246 (Racer) diesel was finally chosen as the power unit, and an order was placed for a spark conversion unit. The engine has proved ideal for the model and, using a 5 oz. flywheel and a modified E.D. two-bladed $1\frac{3}{4}$ in. x 4 in. pitch water propeller is very flexible, a walking pace speed is easily obtained, also speeds far in excess of normal requirements.

The engine was mounted on two large blocks (for dimensions see drawings), which are glued and dowelled between formers 3 and 4 and either side of the keel, with a cut-out at the after end of each block to allow for the engine to drop down into its position. This makes a very strong fixing, as it must be to withstand the stresses of starting. The angle of the propeller shaft can be taken with confidence from the drawings, providing, of course, the model is accurately built from these. If, however, it is not quite right it will have to be re-measured and lined up to suit the builder.

For mounting the engine a $\frac{1}{16}$ in. brass plate was fitted over the blocks also with a piece cut out to allow the crankcase of the engine to fit down to the engine lugs level. These are incidentally on the centre line of the crankshaft of the engine. The engine is fixed to the brass plate with 6 B.A. steel metal threads and nuts, and the plate is screwed into the blocks with $1\frac{1}{4}$ in. No. 7 brass R/H wood screws (six in number). This method allows for easy removal of the engine for maintenance etc. The flywheel is fixed on to the engine shaft and locked in place by one half of the universal coupling, the other half being fitted to the propeller shaft. There should be about $\frac{3}{32}$ in. end play in the coupling. This is taken up when the model is moving through the water. (*Continued on page* 539)

AN UNUSUAL CANAL FEATURE

P. R. WICKHAM PRESENTS HIS IDEAS ON CANAL BUILDING

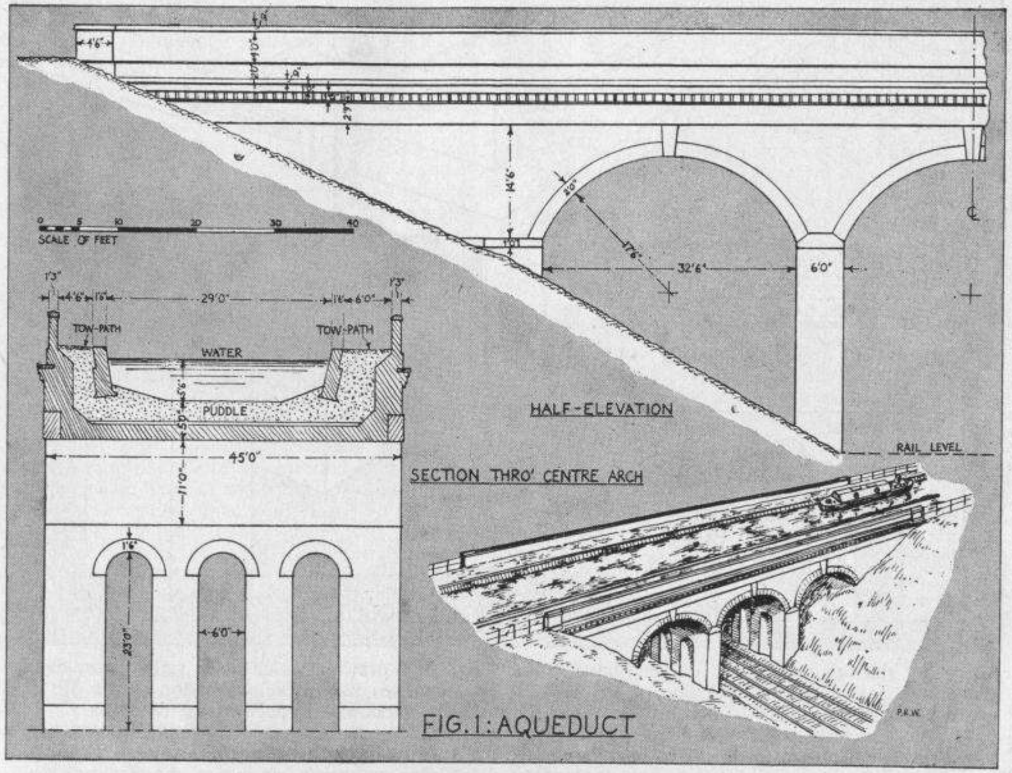
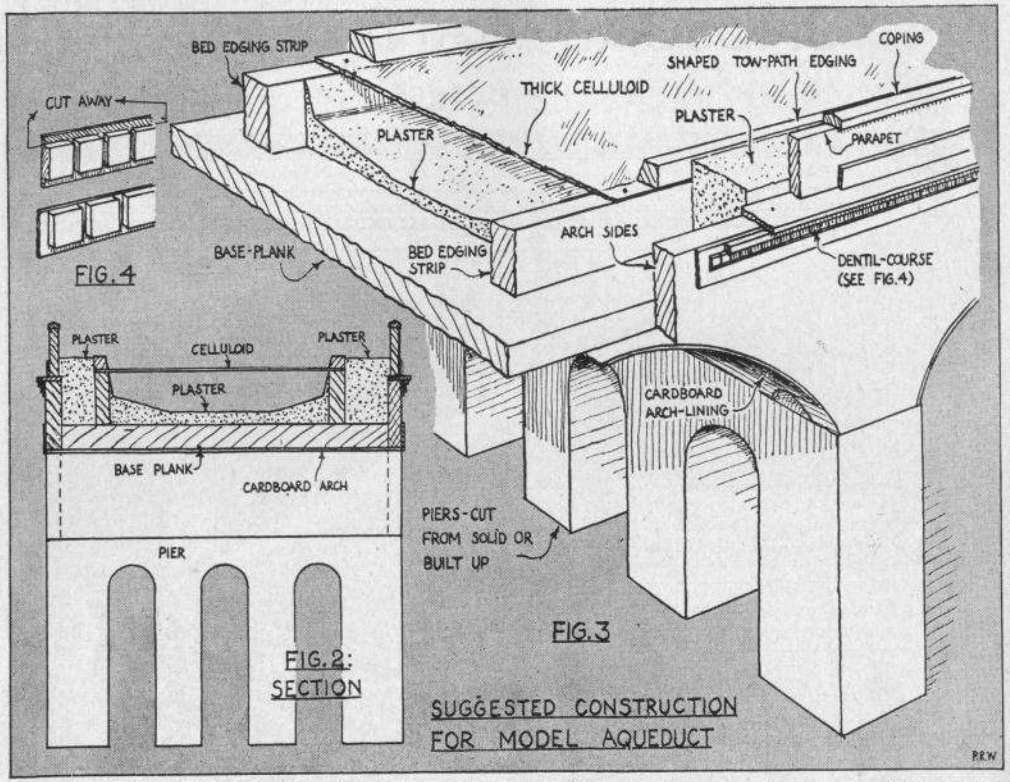


FIG. 1: AQUEDUCT

"HAVE a canal on your layout" suggests Mr. Victor Sutton in the March *Model Maker*, rightly pointing out the happy scenic possibilities of such a feature. Which prompts me to suggest the possibilities of a "canal" feature which I have never yet seen modelled, an aqueduct. Of course, the layout must be properly planned to provide scope for it; like any other worthwhile scenic feature, it cannot be added as an afterthought after all the tracks are laid; but, with the high-level crossing of the railway by the canal carefully planned to look convincing, it would make an unusually attractive "set-piece", much more original and arresting than the ubiquitous road overbridge. How the aqueduct was fitted in would, of course, depend on the individual layout plan. One might, for instance, have the canal carried along on an embankment, to cross the line at a convenient corner (and such an arrangement might well serve also to provide "cover" for a lie-by siding or loop connection to which it is preferable that viewers' attention should *not* be drawn). Or, on a line which already has two levels, a canal on the higher level might be arranged to cross a valley in which the low-level line runs. The possibilities for working out a really effective scene are considerable.

Perhaps, however, anyone whose thoughts may have turned in the direction of an aqueduct as a model feature may have been deterred by the lack of an accessible design. If so, I can now make good the deficiency. That the design in Fig. 1 is authentic can be vouched for; it is taken from a plate in a work on railway engineering published nearly 100 years ago—during the period from which many of the finest civil engineering works on our railways date. The drawings are modified in two respects only; the omission of foundation details not needed by the modellers, and the substitution of straight



SUGGESTED CONSTRUCTION FOR MODEL AQUEDUCT

arches for the original "skew" design (that is with the arches at an angle to the line of the bridge) which would be needlessly complicated to model. I have added a little perspective sketch to help in visualising the finished effect. The elevation and section are dimensioned and scaled in *prototype* feet and inches, so they can easily be enlarged up to any desired scale by using a suitable scale rule.

The details of construction of the *prototype* are shown in the section; for model purposes we can modify it somewhat as suggested later. The section designated as "puddle" is a stiff clay cement mix used to "seal" the trough in which the water flows. (It is recorded that Brindley, the great canal pioneer, once gave a practical demonstration of the process of "puddling", in no less august a place than the House of Lords, to a sceptical enquiry commission.)

Now we can turn to the practical problems of modelling an aqueduct, and the remaining drawings show a suggested construction which could be adapted to suit individual requirements. First, the modified section (Fig. 2) should be noted, the modification to allow of fairly straightforward building up having no effect on the external appearance. The idea is further developed in the sectional perspective (Fig. 3) a drawing which looks rather intimidating, but contains plenty of information if you are prepared to follow it through to the bitter end!

Assuming that the necessary foundation structures of embankments, etc., have already been built up, according to site requirements, the first task is to prepare the two piers. By far the best and simplest way to make these would be to have them cut out from solid wood of suitable thickness (approx. $1\frac{1}{4}$ in. for 4 mm. scale and $1\frac{5}{8}$ in. for 7 mm.). These thicknesses, however, would make the cutting out of the arch openings rather a task if one only has hand tools. Actually, it would be well worth while to put out this job to someone with woodworking machinery; but, failing solid piers, they could be built up like shallow boxes, with the open edges of the arch openings lined with card or thin plywood strips bent round and glued in. The finished piers could now be erected on the baseboard, taking great care to align them properly. This job can hardly be done without an assistant to hold the piers in place from above while one inserts screws up through the base from below (of course, if the assistant were sufficiently (a) obliging or (b) "well-tamed", one could delegate to him the back-breaking work below,

while one's self performing the more highly skilled—or at least, less arduous—work of supervision above!)

The base plank would next be installed, supported at the ends and by blocks mounted on top of the piers. Arched sides of plywood or hardboard would now be cut with the fretsaw, and mounted either side of the base plank, the undersides of the arches being filled in with curved card. The various strips which build up the parapets would then be added. Fig. 4 (top sketch) gives an idea for making the "dentil-course" ornamentation from a type of machined wood moulding sometimes to be had from woodworkers' shops, with one edge "flange" trimmed off. Failing this, it would have to be built up from separate wood blocks glued to a card backing strip as shown in the lower sketch in Fig. 4.

Proceeding to the building up of the canal bed, the edging strips would next be installed. For moulding the bed I would thoroughly recommend plaster-of-Paris rather than any of the "fancy" modern modelling mediums which all manage to mingle serious vices with their undoubted virtues. Plaster-of-Paris has no vices, or rather it has only one which is easily allowed for and mitigated—it's very quick setting time. If a small proportion of ordinary "plain" (i.e. *not* "self-raising") flour is mixed with the plaster, this time can be extended sufficiently to give reasonable time for modelling. The proportions used depend on the job in hand but, for general scenic work, a mixture of one part flour to three of plaster seems satisfactory. Of course, one should not mix too much at once as it cannot, once mixed, be saved for another job. Fortunately, plaster-of-Paris is cheap enough for a little wastage not to be unduly serious. The shaping of the bed to section would be a straightforward modelling job, and when set it should be painted a light fawny-grey, shaded with greens and browns to give a slightly stained effect. The "water" could now be fixed; for which a heavy celluloid is needed (at least, heavy enough to avoid any danger of warping), and if it is a rather "unclear" material all the better. Before fixing rub over the underside with a rag moistened with brown oil colour to obscure it slightly and prevent the bed showing through *too* clearly. The celluloid is cemented and pinned to the tops of the edging strips. On top of the edges of this celluloid are pinned the shaped strips forming the edges of the towpaths, carefully lining them up to the edges of the bed below. The towpath troughs can now be filled up with more plaster and smoothed off.

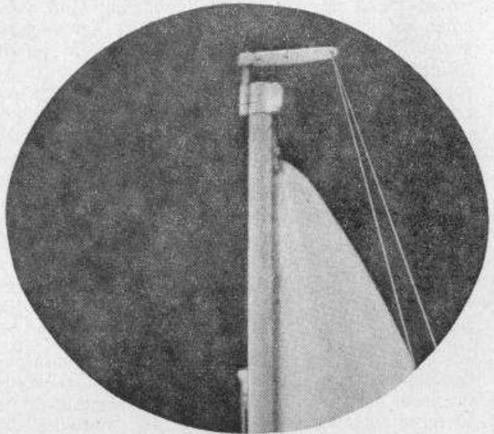
The finish of the aqueduct could be brick, stone or concrete. For brick or stone building paper would be used, with arches and string-courses painted in to represent matching or contrasting stonework. A concrete structure would only call for a coat or two of flat oil-colour of suitable shade. In any case, the structure should be carefully "weathered" with oil paints to take away its pristine newness, not forgetting the appropriate "smoke" effect on the arches over the tracks.

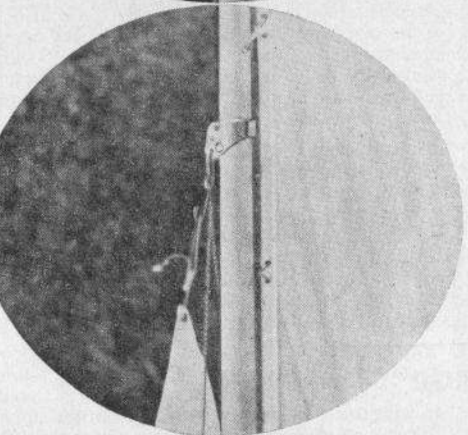
I have only tried here to give an outline of one possible construction for a model aqueduct. All sorts of variants are possible. One could, for instance, make a much simpler canal effect by mounting the base plank at water level, mounting the celluloid directly over its painted surface, and superimposing strips on the edges for the towpaths. However, the built-up bed gives a sufficiently good effect to be well worth the extra work.

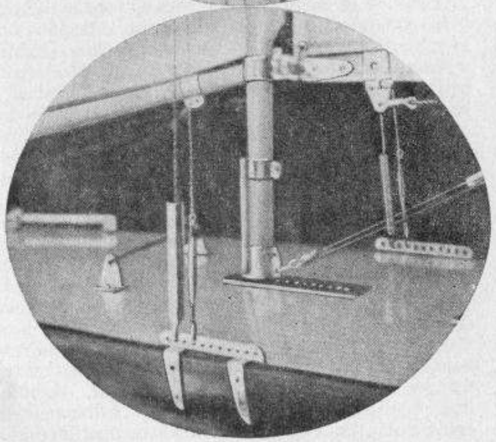
A 45 FOOT ADMIRAL'S BARGE

(*Continued from page 536*)

As materials are now rather hard to obtain, the choice must be left with the individual modeller. The propeller shaft and tube can usually be obtained to the length required from the local model shop, or from one of the large model engineers suppliers in London, the shaft must, however, be one large enough on which to cut a 2 B.A. thread at either end to take a $1\frac{3}{4}$ in. x 4 pitch E.D. propeller and universal coupling. The propeller tube is fitted into the keel through the hole drilled at an earlier stage, and can be threaded on the outside at either end to enable it to be tightened down on to the keel. On this model, however, the outboard end of the tube has been sweated into the skeg, as can be seen from the drawing. The tube was packed tight with heavy grease inside, and punch through the keel and packed tight with a good glue round the outside (this has proved very efficient). The skeg is at the same time pulled close up to the underside of the model with four 6 B.A. metal threads (brass) and nuts, the latter of course are inside the model, and the rudder is also fitted into its shafting at this stage, and taken up with the skeg, as can be seen from the drawing. The bottom of the skeg is the bearing for the rudder. The rudder, shaft and tube can again be decided on, as materials allow. The top of the rudder shaft is threaded 6 B.A. for the rudder drive wheel (part of the rudder gearing which will be mentioned at a later date). The length of the shaft should be increased by $\frac{3}{4}$ in. and threaded from the top down to a depth of $1\frac{1}{16}$ in. The rudder shaft tube passes through the keel and is cut flush with the underside of the boat. Where the tube enters the keel a small brass plate is sweated (the tube passing through the centre of it). Drill two small holes, one fore and one aft of the tube over centre line of keel, and the whole is well glued and fitted into the keel, fixed with two $\frac{3}{8}$ in. x 4 in. wood screws. Pull the tube down finally to the keel. The top of the rudder tube must be supported by a small deck (below the top deck), which is built round it, of $\frac{1}{8}$ in. ply, so taking up any top movement of the rudder shaft. A bulkhead is then built across the inside of the boat to enclose the rudder gear in its own compartment,







ROTATING MASTS

BY JOHN A. LEWIS

ONE of the chief offenders in lowering the efficiency of the available sail area of model yachts is the mast, the reason being that considerable turbulence in the air flow is induced and the sail cannot therefore produce the thrust that a more nearly laminar flow would make possible.

The degree of turbulence will depend on the size and shape of the cross motion of the mast (Fig. 1). It will be seen that the greatest turbulence is created on the leeward side of the sail, this being most unfortunate as the greater part of the driving power of the sail is derived from this low pressure side.

The first obvious way of improving the flow of air is, of course, to reduce the diameter of the mast to the minimum. The trouble then arises with the complex rigging required to hold up the mast straight and the attendant difficulties of setting up the mast when travelling from one venue to another. It is my opinion that the extra windage involved in complex rigging goes a long way to offset the advantage gained in improved air flow over the sail and the above-mentioned practical trouble imposes definite limits as to how far one can go in that direction.

Another device which achieved some popularity about 15 years ago was the Bipod mast. With this mast the sail was carried on a wire stay supported between two small section spars which were stepped on each gunwale and joined at the top. Thus there was no mast to interfere with the air flow (Fig. 2)

I experimented for some time with a mast of this type on a 36 in. restricted yacht and found that it was necessary to move the sail plan forward to a considerable extent. This indicated an improved efficiency in the driving power of the mainsail, but due to several faults which are listed below it was not possible to judge whether the overall performance of the boat had been enhanced. The main faults in the system were : —

1. The extra weight of two spars as compared with one reasonably slender conventional mast.
2. The higher centre of gravity of the two spars detracting from the stability of the hull.
3. The difficulty of maintaining sufficient tension in the wire stay to prevent it taking up a curve and spoiling the set of the sail.

Probably the most effective way of reducing mast interference with the rules of sail area measurement as they are today, is by making a mast of streamline section. It is a waste of time using such a mast unless it is allowed to rotate and take up alignment with the sail (see Fig. 1 (c) and (d)). Rotating masts have been used on certain full-size yachts for some years, and we must look to them for the lead in this technique.

In the rotating mast schemes used by Uffa Fox, before the war on the 30 sq. metre class, the mast was mounted on the deck on a ball and cup fitting and the shrouds were attached to the mast near to the leading edge. The windward shroud, being under the heaviest stress, applied a twisting movement on the mast which caused it to swing into approximate alignment with the sail.

I tried this system on a 10-rater and immediately came up against several problems, the main one being that the shrouds needed to be set up so tightly in order to provide adequate support that there was insufficient give in them for the mast to rotate of its own accord. This ruled out the basic idea of the Uffa Fox system, and it became obvious that a gooseneck with movement in a vertical direction only was necessary, and to use the driving force of the sails to rotate the mast. This is not ideal for, to obtain maximum efficiency, the mast should rotate through a greater angle than the boom.

The first attempt, which was to some degree successful consisted of the system shown in Fig. 3. The mast was wooden and of rather small dimensions, being $\frac{7}{8}$ in. x $\frac{1}{2}$ in. as it was felt that the minimum size of mast would always be advantageous. The mast step, consisting of a brass plate with a row of countersunk holes in it for adjusting mast heel, was plugged with brass and similarly drilled. A single rustless ball bearing was placed between the keel and the step. The mast was held up entirely by two shrouds, a forestay and twin backstays. This form of bearing for the foot of the mast seems to be foolproof, for even I have never had any trouble with it coming unseated despite deliberate misuse.

The shrouds, being fastened to eyes near the leading edge of the mast, and the forestay carried from a bridle with a similar bridle for the backstays, produced a beautifully simple rig which looked as though nothing could go wrong. Troubles soon became apparent and began the very first time the boat was made to sail before the wind. It is now obvious that in the running position the mast receives very little support from the shrouds in a fore and aft direction and that only the backstays are effective in preventing it from going over the bows. Furthermore the strains imposed have to be carried across the smaller dimension of the mast, i.e., $\frac{1}{2}$ in., and the amount of bowing of the mast needed seeing to be believed. It was therefore decided that diamond stays be fitted from the hounds to the heel. The spreader had to be built short in order to pass inside the shrouds, and really the diamond stays were not as effective as desirable. However, they did their job and the mast never broke, although top suit was carried in very heavy winds in order to try and break something and sort out the weakest link. When I finally did have a failure it occurred in a hook which attached one of the shrouds to the mast. It was found to possess an old crack in the metal, but the result of the failure was interesting

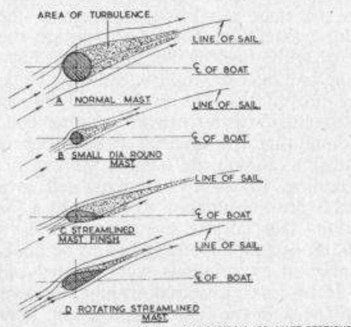


FIG. 1. COMPARISON OF MAST SECTIONS.

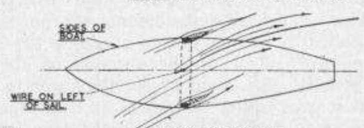


FIG. 2. PLAN OF BIPOD MAST.

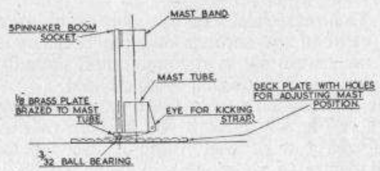


FIG. NO. 5. DETAIL OF MAST HEEL FITTING.

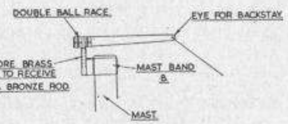


FIG. NO. 6. DETAIL OF MAST HEAD FITTING.

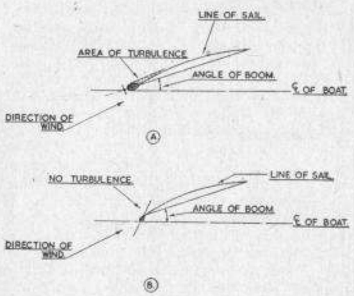


FIG. 7. COMPARISON OF MAST ROTATING AT SAME ANGLE AS BOOM 'A' WITH MAST ROTATING THROUGH GREATER ANGLE THAN BOOM 'B'

in that due to the sudden release of the compression forces in the mast it sprang up clear of the boat and alighted safely in the pool alongside the hull. I thought that the heel of the mast might have skidded off the ball bearing and dug into the deck.

Having proved that the mast could be made to stand satisfactorily under heavier weather conditions it was found that the greatest trouble occurred in very light airs. Again the trouble was when reaching or running, for when the wind fell away the boom had a position tending to return to a fore and aft position. Of course this was hopeless under fluky conditions and something had to be done.

A number of experiments were carried out with different forms of masts and fittings. There were two main faults in the first system which now seem quite obvious, of course. These faults were: —

1. The points of attachment of the shrouds needed to be modified to minimise the "winding up" effect of the shrouds as the mast rotated. The tendency for the shrouds to untwist was quite powerful and returned the boom to a midships position except in winds of over about 6 m.p.h.
2. The mast heel bearing, the point of attachment of the shrouds and the backstay attachment were not in alignment, and some different arrangement needed to be devised.

The latest result so far is the system of rigging as shown in Fig. 4. Here it will be seen that a modified form of mast heel fitting is used so that the actual centre of rotation is in front of the leading edge of the mast. There are several advantages in this fitting, not the least of which is that the tube over the bearing forms a very convenient spinnaker socket, and as it is on the axis of rotation the thrust of the spinnaker boom has no reacting effect on mast rotation.

The shroud problem seems to have been solved by joining them together and hooking them to a simple mast band by means of a single hook into an eye on the leading edge. The shrouds are given a very slight drift aft, say about $\frac{3}{8}$ in., so that the mast can rotate a considerable amount before bearing up against them.

The mast head fitting consists of a simple socket arrangement into which a piece of $\frac{1}{8}$ in. bronze rod carrying two small ballraces is plugged. The swinging arm is simply clamped around the outside of the ballraces. Do not braze the $\frac{1}{8}$ in. rod into the fitting as it will be softened too much to stand the strains when running before the wind.

With the above arrangement it is possible to position the three swivelling points in alignment and to assist in this direction the mast is given a straight taper up the leading edge. The mast is made of sufficient cross-sectional area to make elimination of spreaders and diamond stays possible; it is a solid pine spare $1\frac{1}{4}$ in. x $\frac{11}{16}$ in. thick, and tapers down to $\frac{3}{4}$ in. x $\frac{3}{8}$ in. at the head. The diameter at the heel fitting is $\frac{11}{16}$ in. I realise that this is a heavy spar, but it is serving well for experimental purposes. It is intended to make a hollow spruce mast $1\frac{1}{2}$ in. x $\frac{11}{16}$ in. when time is available, with a considerable reduction in weight.

With the present rig the boom is neutral with regard to swinging back to the centre line over an arc of about 100 deg., i.e., 50 deg. either side, and this does seem to be the answer to light weather sailing. The mast must not be set up with too much rake or the weight of the boom will cause the same unwanted effect.

I am trying out the rig on a new 10-rater, and it has proved capable of standing up to considerable misuse and strong winds, but it is rather difficult to measure the value of increased performance. It may be necessary to equip *Halceyon* with the rig to see exactly what difference it makes.

However, previous experiments on boats of known performance have convinced me of the following: —

1. The sail plan needs to be shifted further forward.
2. The mainsail sets better on a rotating mast due to its greater fore and aft rigidity.
3. There is less tendency for the jib to backwind the mainsail.
4. There is a definite improvement in downwind performance.

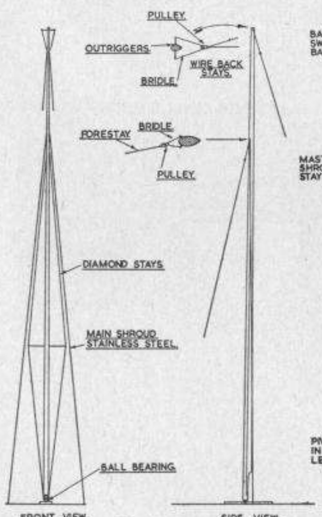


FIG. NO. 3

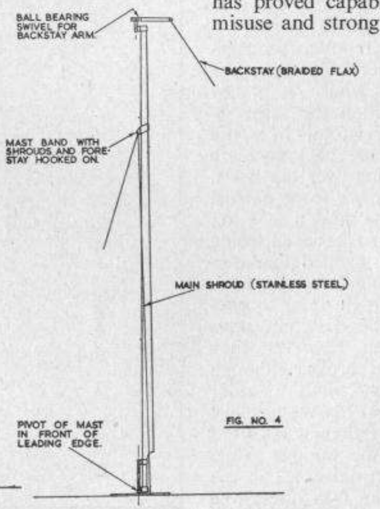


FIG. NO. 4

MODEL YACHT CLUB NOTES

By "Commodore"

MOST encouraging sign for model yachtsmen everywhere must undoubtedly be the appearance of the *M.Y.A. News* in printed form under the new editorship of Major G. B. Lee, Racing Secretary of the Y.M.6m.O.A. While reports can be just as interesting in a duplicated format there is no doubt of the great value and increase in status that a properly printed publication provides. While this first new-style number was necessarily devoted in the main to introductory matter we were pleased to see a letter from Admiral Turner, taking up the cudgels on behalf of designers old and young. The Admiral raises a number of pertinent points by demanding which style of boat he should copy for the future. If we may, as outsiders, enter into a discussion of this sort, we would urge the worthy Admiral to close his eyes to this and that sort of boat which may have achieved some transitory success in the post war years, and settle down at his board to produce a *Turner* design as he has in the past. We are sure that such a boat, uninfluenced by fashion, based solely on sound design principles would, in capable hands, be able to hold its own. That advice, too, is offered, for that matter to all designers—let them produce only designs that they are confident will be a little better than the best, and from that basic design refine and refine until they have the boat of their dreams.

Doncaster & District M.Y. & P.B.A.

The Northern District 36 in. Restricted Class Championship took place on June 22nd on the Barnby Dun water (some 250 yds. long). This was the first major event to take place on this water since the club took it over earlier this season by arrangement with the N.C.B. A silver cup has been presented by the *Yorkshire Evening Post*, who have also provided another for purely club competition.

The event began inauspiciously with heavy rain, but this fortunately cleared up leaving a stiff breeze at the beginning, which moderated later, and fell away during the evening. Sixteen boats came under starter's orders, and produced eight hours racing to decide the winner, H. Short of Bradford with *Bjax* ($41\frac{1}{3}$ pts. out of a possible 50). Second place also went to a Bradford entry, H. Chadwick's *Curlew II* ($38\frac{1}{2}$), and third to J. Palin, Birkenhead, with his *Myra*. This last effort was particularly meritorious as the entrant is only 14 years of age. Best local club place was Vice-Commodore L. Aldam, who came fifth with *Katinka*.

Thorne Sea Scouts gave valuable assistance by manning a field telephone between starting and finishing lines, and by mating two of the winning boats, a tribute to their Lt.-Commander J. Farrel, Commodore of the Doncaster Club, who acted as starter with Chairman John S. Reeves.

Readers will recall that the Doncaster Club will be organising the second *Model Maker* trophy race in 1953 on these waters for 36 in. Restricted Class yachts.

Paignton M.Y.C.

We hear from Commodore Donovan Pinsent that the club has given up Saturday evening racing during the summer as winds are usually non-existent, and thereby obtained some reduction in their rent. They are concentrating on their remaining summer time allocation of Sunday mornings. After twenty-two years of active existence this is a retrograde step to be deplored, but to some extent forced upon them. However, the club members still retain their enthusiasm and hope to maintain their position in the south.

On their usual summer visit to Exeter they were able to collect 58 pts. to the home club's 24 pts., with Commodore Pinsent in the fore, as usual. L. Bending of Exeter was top individual scorer of the day with 27 pts., and *Trixie* gained Paignton's best with 24 pts. Members are now busy fettling up their craft for the Gosport A Class Championship in August.

Birkenhead M.Y. & P.B.C.

We have received a very friendly testimonial from Commodore A. R. Andrew, whose *Floreana* won the National Marblehead Championship at Birmingham. "I had a very happy time at Birmingham, as I always do," he says; "they are a grand lot of sports, having known them since the first race for the Macdonald Trophy, when the late Mr. Savage won the cup and I was second. I have been to their club nine times and always find them willing to give all a good time."

Commodore Andrew goes on to say that Birkenhead now numbers over one hundred members, with quite a large number of new 10-Raters this year. They boast four designers, and quite a large number of builders though, strangely enough, only Mr. Andrew builds "bread-and-butter" yachts. In addition to his M Class *Floreana*, he built *Flora*, a 10-Rater for Mr. Blackshaw, which came in second in last year's championship, and which he has high hopes of seeing first this year.

Midland District 50/800 Championship

Ten entries came under starter's orders, restricted to two each from Bedford, Birmingham, Bournville, Leicester and Nottingham at Valley Lake, Bournville, on Sunday, June 15th, to compete for the second annual Rolffe Trophy.

A light fitful breeze veering N. to N.E. gave some trouble to competitors in the first four heats, owing to fluky airs caused by surrounding trees and shrubs. However, it settled down after lunch from the north with an all-round improvement in the sailing. Sheer sailing ability contributed much to the winner's success in the shape of *Golden Eagle* (J. Lapsley, Nottingham) with 34 pts. He was followed home by the two Bedford boats *Wanda* (D. Green) 29 pts., and *Wilhelmina* (G. Dixon) 28 pts. Best local boat was J. H. Cunningham's *Cunimar* (24 pts), which, incidentally, is a modified version of *Model Maker's Festive* design by Bill Daniels.

Eastbourne M.P.B.C.

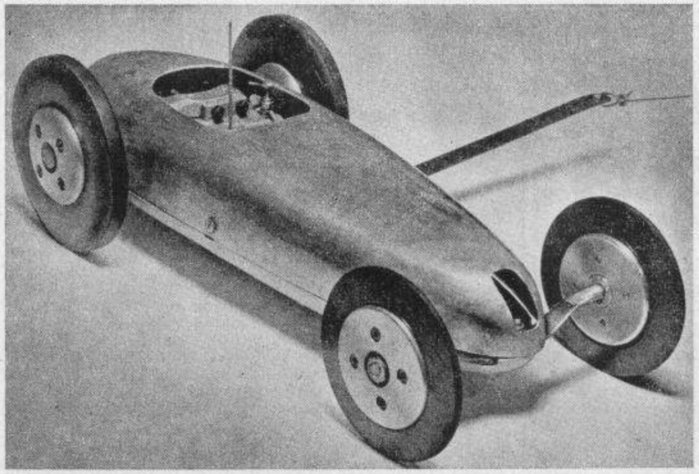
We were recently down at Eastbourne to watch trials of E. G. Cock's radio controlled Admiral's Barge, on the water shared by the club and the Eastbourne M.Y.C. On the Sunday morning some fine A Class boats were out, doing well in almost non-existent wind. It seems that here is an opportunity for the two clubs sailing the same water to get together to form one powerful combined club for their mutual benefit, rather than exist by mutual tolerance. Local authorities are keen to support their activities, and between them they could be a big force in local sport and entertainment.

Bournville M.Y. & P.B.C.

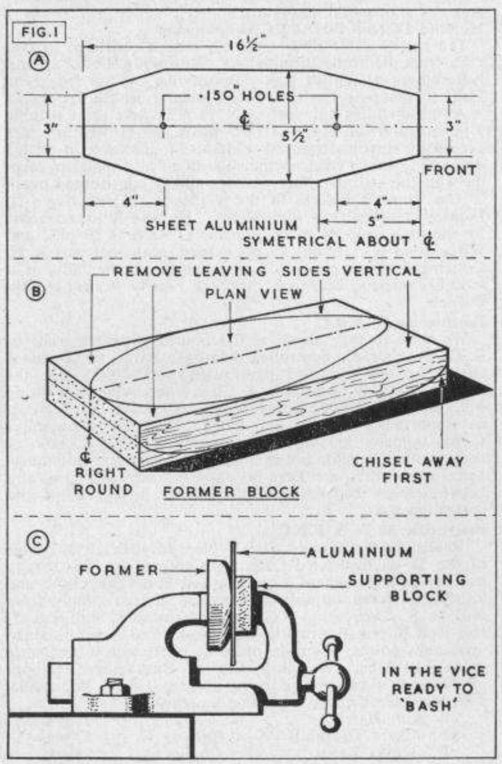
Bournville Shield Open Competition, July 5th, 1952. Yachts of the 36 in. Restricted Class were entered for this trophy by City of Birmingham, Coventry and Bournville clubs, and although a fresh variable wind veered disconcertingly from N.E. to S., competition was keen. By sustained skill and effort Ron Harris, Bournville Club, who sailed *Argo*, obtained maximum points. Next in order of merit with a creditable score was Albert Thornhill, City of Birmingham, skipper of *Enigma*, a close third being George Leeds, Bournville, with his yacht *Chance*. Leading scores: —

1	Ron Harris	*Argo*	35 pts.
2	Albert Thornhill	*Enigma*	27 pts.
3	George Leeds	*Chance*	25 pts.

Ian Moore's 5 c.c. SPEED MODEL Part 1



THE Editors' request for "a fully detailed design for a high-speed '5'" caused no little thought to be given to the various alternatives possible. The final decision which was made — to describe a quite conventional spur-drive car — was dictated by a number of purely practical reasons, since I had built both bevel and spur cars. At the time of writing all commercial parts used are easily available. The choice between types of gears was made on the score of availability and price, the spurs costing under 10/- per pair as against a minimum of 30/- for suitable bevels. The spur gear drive unit is also less critical on machining (and can, in fact, be done entirely without a lathe if absolutely necessary). A good range of suitable sizes of tyre is available, so that drive ratio can be matched to the particular engine used within close limits. The same basic engine bracket casting can be used for almost any engine which is likely to be available, and details are given to cover the E.T.A. 29, McCoy 29, and Dooling 29.



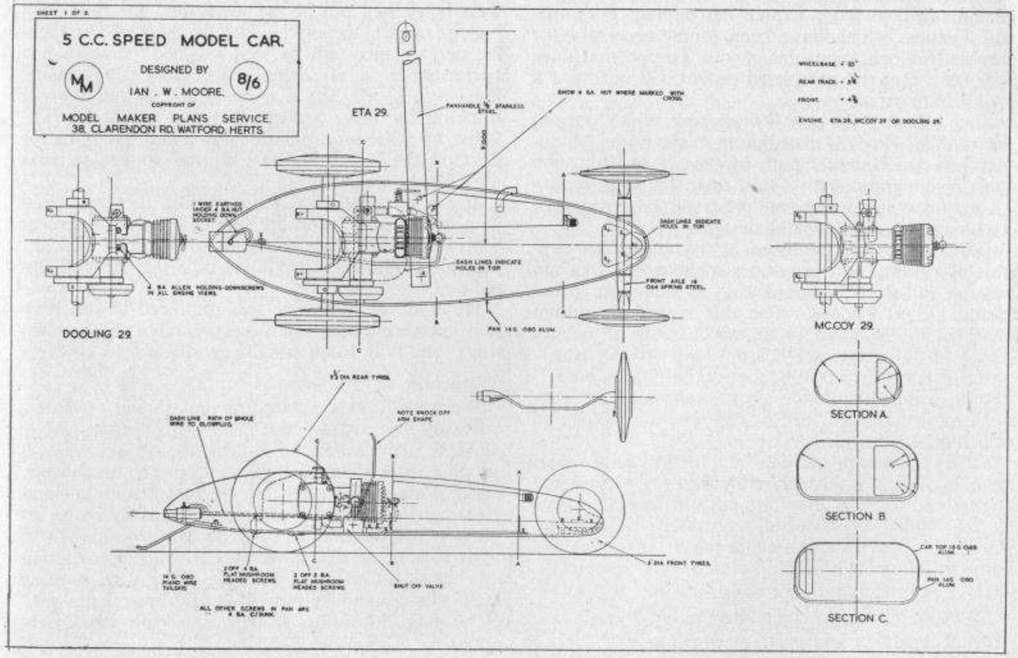
The ratio of 2 : 1 chosen enables comparatively large wheels to be used, which ensures good traction even when running on roughish tracks. A contact-breaker to convert to spark ignition can conveniently be fitted to the rear axle, using a double lift cam and so saving modification to the engine itself. The conversion is quite simple and there is plenty of room available for the coil, batteries, etc. When using fuel containing little nitromethane, the car running on spark ignition is faster than on glow-plug using the same fuel, but as the nitromethane content is increased this difference decreases.

The layout as a whole is simple and only two castings are used, one for the engine bracket and one for the front axle support.

Working on the policy of getting the worst jobs over first we will start with the "underpan", which is the basis on which all the rest of the car is built. This is a fairly straightforward job and cannot really be classed as "beating" when done by very unprofessional methods! These have been found very quick and need little metal-beating skill. If you are an expert metal-beater, have a good laugh and then do the job in a professional manner!

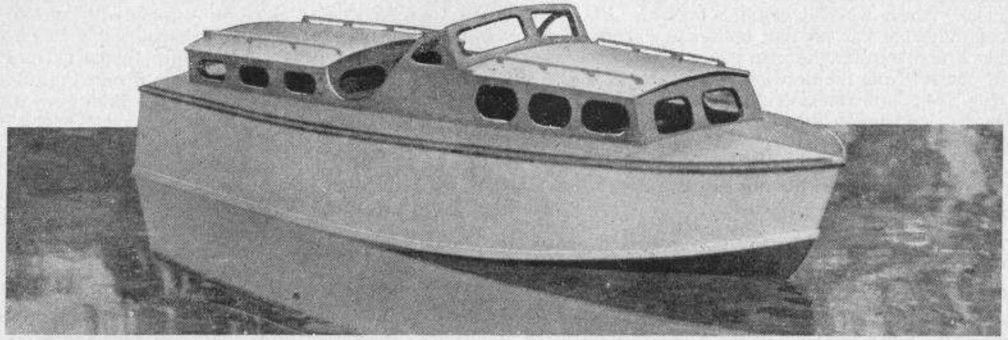
The chief tools required are a $\frac{1}{2}$ lb. ball-peine hammer, a pair of tin snips and a fairly large vice, plus somewhere to make a noise for an hour or so. However, to start at the beginning. The first job is to make a former out of fairly hard wood, a piece approximately 15 in. long, 4$\frac{1}{4}$ in. wide, and about 1 in. thick being necessary. This is somewhat thicker than the pan is deep, for a reason which will be apparent later. On both long edges of this block, mark out the inside side view of the pan, aligning the inside bottom edge with one edge of the block, which we will call the bottom. Mark the centre-line of car on top, bottom and ends of the block and transfer the plan view (taking the inside, of course) from the drawing to the *top* of the block (Fig. 1b). Now saw and chisel away the waste wood in the side view, which will be at the front and rear only, and then cut out the plan view, keeping the sides vertical. Draw a line all round the sides, parallel to the top of the block, and a distance away from it equal to the thickness of the block minus $\frac{1}{2}$ in. This represents the top line of the finished pan. A joiner's gauge is the easiest way of marking this line. The bottom corners can now be radiused as shown on the drawing.

A piece of soft or half-hard aluminium, 14 g. (.080 in.) thick and 16$\frac{1}{2}$ in. x 5$\frac{1}{2}$ in. should now be obtained and a centre line drawn down its length and two holes .150 diameter drilled as shown in Fig. 1a, and the corners taken off roughly as shown. Screw the aluminium to the bottom of the block with woodscrews, centre line to centre line and leaving an equal amount of overhang front and rear. Now for the noisy part! Clamp the block and aluminium firmly in the vice, horizontal and edge upwards, with a piece of hardwood on the outside of the aluminium to keep it flat to the former (Fig. 1c), and hammer the projecting aluminium round the former. It will go easily in the centre, getting progressively more difficult as you go towards the front and rear. At the same time hammer up to the curve on the bottom front and rear. It will be found difficult to work round the ends, and a V-shaped piece should now be cut out at both ends. This should extend $\frac{3}{8}$ in. to $\frac{1}{2}$ in. (as found necessary) past the end of the block towards the middle of the car. Start with a quite narrow Vee and keep beating the metal round, sawing the Vee wider if found necessary until the metal hugs the former closely. This will leave a short crack at both ends which can be welded up later. Now roughly trim off surplus material all round to just below the edge of the block. The final top line of the pan can now be marked on the metal, using the gauge set as before, the same distance below the top. Remove the pan from the block and with hand shears cut off the surplus down to the line and clean up with a file. The slits can now be welded up. Almost any motor body builders will do this for a very small charge (usually 2/- or so). This completes the work on the pan for the moment as it is easier to drill the necessary holes for the fittings as you go along.



MODEL MAKER *Reviews*

The WAVEMASTER LAUNCH



General

THERE are desirable features in a model boat hull that cannot always be found by scaling down a full-sized prototype, unless that prototype is very carefully chosen. It is better, in many cases, to design the boat from scratch embodying those special features which have been found necessary for trouble-free operation of a model, though that does not mean that the completed design will not have a "scale" appearance.

Such a boat is the new *Wavemaster*, which our old friend Alan Hales is distributing to the trade. Manufacturers are Hammersmith Model Shops Ltd., who must be congratulated on this, their first venture into kit manufacture, which will we trust, be but one of a whole series of interesting designs.

Wavemaster was designed as a robust craft capable of running in open water without hazard from passing full-size craft, and able to stand up to occasional hard knocks. For this reason maximum beam is no less than 11 in. which, with an overall length of 34 in., gives a beam/length ratio of nearly 3 : 1, in other words "lifeboat stability". There is a good 4 in. of hull side above waterline, and adequate protection provided by fore and aft cabins and wheelhouse storm protection.

Hard chine construction employing spruce and resin bonded ply throughout makes for exceptional strength. All parts are fully cut out including slots so that lining up the hull accurately presents no problems. The designers claim that it was developed with the following objects in view :

(1) Ease and rapidity of construction ;

(2) Accessibility to engine and radio if used ;

(3) Robustness and good seaworthiness.

We feel that these claims are more than justified in the model as offered.

A boat of this size can, of course, well take an engine of up to 5 c.c. With such a power installation sensational running will be the order of the day, with bows well out of the water and the boat very high planing : those who like this sort of spectacular performance will be well satisfied. But such a performance is, in actual fact, asking a cruising launch to speed like a E-boat, and to our way of thinking far more realistic running would be provided by some more modest power unit, such as for example the E.D.246, where marine conversion parts are already available.

If it is intended to fit radio control, then we would come down heavily on the side of the smaller power unit, for at high scale speeds control will be difficult, bearing in mind the inevitable time lag between signal and response.

However, *Wavemaster* was produced to suit both pure powered craft enthusiasts and radio control users, and will do an equally good job for either.

Materials

We were frankly amazed at the amount of material ready cut to shape that came with the kit. After all, if P.T. must be paid on kits, then it behoves the supplier to provide the buyer with just as much work ready done as he can within the price margin—and Hammersmith Model Shops have really gone to town in this direction. For those with suitable power tools it is, of course, quite easy to cut out parts, but how many of us must struggle along with nothing more than a hand fretsaw—and to this large majority of boating enthusiasts *Wavemaster* will particularly appeal.

A very useful feature that should be appreciated is the pre-cut slot for stern tube. This must, of course, be opened out to take the tube after installation, but its location is fixed and will provide no difficulty even to a man who has never built a boat of this size before. Decksides are also cut out and slotted with a spruce strengthening piece pinned alongside to prevent accidental damage until firmly fixed in place. We would urge some caution with these pieces, as until the windscreen is fixed the necessary cross grain ply on the weaker grain of the sideshields can be knocked off. (This happened with our kit we are ashamed to say !)

Construction

As with most hard chine boats, hull is constructed upside-down on a flat board. The kit is supplied dry, and cements must therefore be purchased. Either that old standby Durofix can be used, or readers may prefer to try one of the gap-filling cold setting resin glues of which several types are now on the market. These are applied in two parts, the glue to one piece and a hardener to the other ; when brought together they have a fixing time of about 10-20 minutes allowing adjustment, and set off hard in anything from one to four hours, according to type.

All formers are ready slotted so that it is just a matter of locating them properly on the building board, butted against strips that have been nailed across the board. Keel is added without clearing the stern tube slot. Deck and chine stringers are added. These are made up of two pieces of $\frac{1}{4}$ in. x $\frac{1}{8}$ in. to make up to $\frac{1}{4}$ in. square, as this avoids any need to steam them to shape. Sand stringers, and add ply skins. This early fitting of skins will prevent any possibility of the frame warping.

When hull is complete propeller shaft and stern tube should be installed. If the E.D. is being used or any similar engine, suitable ready-made marine units are available from Messrs. E.D., or they can be made up quite easily from brass tube. We understand that the manufacturers of *Wavemaster* may be marketing marine units of their own in the near future.

The latest kits will, we are told, have an additional instruction sheet dealing with engine installation, for which two suitable blocks are required on which the engine can rest. These must be glued and pinned to formers, and should be a 100 per cent firm job, as rigidity of engine mounting is essential for trouble free running. Nothing can be more embarrassing than for the whole engine to come away on the first pondside pull-up with the starting string !

Cabin construction is just as easy as the hull, and careful attention to building instructions is all that is needed.

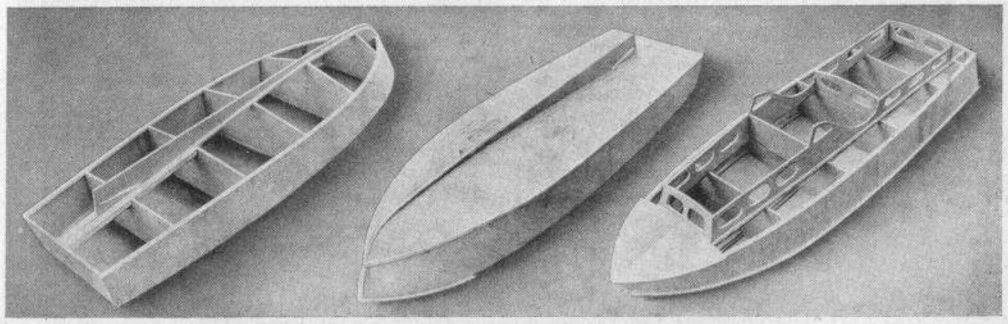
Finishing

Most boats look best finished in light colours, and *Wavemaster* will really shine in white enamel topsides, with underwater hull in a darker contrasting colour. It is usually considered better to use enamel than a cellulose paint if long life is required from the boat, as cellulose forms only a skin under which, in time, water can penetrate. However, for simplicity, we expect many model makers will use the easy-to-apply cellulose paints and let the future take care of itself !

Deck should be lined out, either with a hard pencil to simulate planks or with ruled indian ink lines. This can then be doped or varnished to protect it. Cabin, too, looks at its best when finished in the natural wood. It is a good idea to stain this before assembly, and before any dope or cement has been applied to it, to give a rich mahogany shade.

A number of the leading radio control enthusiasts have expressed their intention of running *Wavemasters* this year, and one has already been over to France to show its heels to some of the best Continental opposition. We may yet have an R/C contest solely for this class ! Anyway, whether for straight pleasure running with a simple engine installation or for more specialised radio control this is a boat that should appeal to all those with limited workshop facilities who want a good looking craft for a minimum of building effort.

Heading picture shows the completed "Wavemaster" afloat, and (below) three stages in the hull construction, showing the simple assembly of keel and formers, hull with bottom skin added, and lastly with decking in place and superstructure part-completed.



Building DEGLET NOUR

Part V & Conclusion

BY BERNARD REEVE

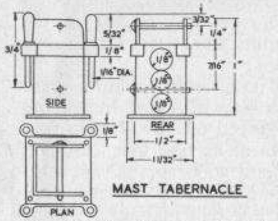


FIG. 18. MAST TABERNACLE.—This calls for patience and nice fitting. Bend up the case from 20 gauge brass, drill lightening holes and holes for hinge bars. Bend up the belaying pin racks and silver solder in place. The case may be sweated to the base plate of 20 gauge brass. The belaying pins are turned from 1/8 in. brass wire, and the whole highly polished and lacquered.

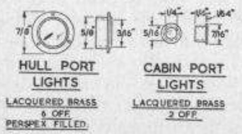
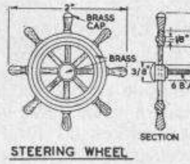


FIG. 19. PORT LIGHTS.—This is a lathe job. The hull port lights are turned from 5/8 in. brass bar over the flange. The part that fits the hull is turned down to 3/8 in., and the whole bored 3/8 in. My method of doing this is to chuck a piece of brass bar 3 in. long and drill this 3/8 in. for the whole of its length. Each port light is then flanged as shown and parted off, the next one finished, and so on, until the full complement of half a dozen is completed. A piece of 3/8 in. "Perspex" rod is parted off into 1/4 in. lengths and inserted in the bore, the front of each section being polished with blue-back emery and finished off with metal polish. The holes for the flange bolts are drilled 1/64 in.

The cabin port lights are made in a similar manner, but on a smaller scale, and rely upon a push fit in a 1/4 in. hole to keep them in place.

FIG. 20. SEARCHLIGHT.—This again is a lathe job, the body being turned from 3/4 in. brass bar, the back domed, the body bored to a shell thickness of 1/32 in. and painted inside with silver lacquer. A lens of "Perspex" is cut and lines scribed on the face with a 60 deg. set square. A rub over with black enamel or black cellulose paint will fill these lines, and when the paint is dry the lens is polished leaving the black grid. The operating handle, bracket and stand are all simple jobs and need no further comment.

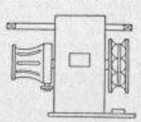
FIG. 21. STEERING WHEEL.—This is probably one of the most difficult of all accessories to make really well. My method, and I do not for one moment suggest that it is the best, is as follows :—



On a piece of 1/16 in. brass plate I scribe a 1 5/8 in. dia. circle, and cut this out of the plate with an abrafile. I drill a 6 B.A. tapping hole in the centre and mount this in the lathe where the outer periphery is turned true to size. The next step is to mark the spoke positions, so take the disc from the lathe and with a 45 deg. set square lay off the eight spoke drilling points; pop mark these on the edge and using the scribed lines on the face as a guide drill 1/32 in. for a depth of 1/8 in.

Now chuck the disc in the lathe and turn down the flat face to leave the 1/8 in. rim standing proud for 1/32 in., and 1/8 in. from the outer rim, part off the centre disc. You now have the outer rim complete. From a piece of 3/8 in. brass bar turn the centre boss to the profile shown in the drawing, setting out the spoke positions as before, and drill them to a depth of 1/8 in. The spokes are turned from 1/16 in. brass rod and are 1 1/8 in. long. When finished and while still in the chuck polish, first with finest emery cloth and finally with Bluebell polish. The whole may now be assembled, silver soldering the spokes to the centre boss. Finally, drill the boss to a depth of 1/4 in. and tap 6 B.A., fit the centre screw and our wheel is complete. The rim (with the exception of the raised rim) and the hand grips and spokes are enamelled to represent teak, leaving the top of the king spoke polished brass.

FIG. 22. WINCH.—This is not a difficult fitting to make provided a lathe is available for the drum and gipsy or cable drum. The gearbox I made from a piece of close grained hard wood, boxwood if you have a piece, otherwise beech or ash will serve. Best of all is a lump of aluminium if available, filed to the shape shown and drilled 6 B.A. clearance (No. 32 drill) in the positions shown. Next make the sole plate and screw this to the base of the gearbox with a couple of countersunk screws. The drum and gipsy are turned from 3/8 in. and 1/2 in. brass bar respectively and drilled (No. 43) and tapped 6 B.A. As you will have considerable difficulty in forming the cable pick-up flanges inside the rim of the gipsy I advise you to lightly counterbore eight 1/8 in. holes in the groove; the result is quite effective. The operating spindle is turned to fit the No. 32 drill hole and the ends squared for the handles. (These are stowed away and need not be shown.) The brake arm is quite easy to make, and is simply sweated to the brake drum on the winch drum. The finish for the gearbox is white enamel. All metal parts galvanised, or if you wish for a superfine finish have them satin chromed.



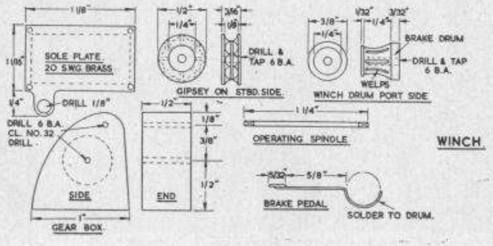


FIG. 23. PROPELLER SHAFT & STERN TUBE.—The shaft is a piece of brass tube of the size shown. This gives an easy fit for the 1/8 in. shaft, but a 1/4 in. brass blank should be turned to fit each end and the end of this accurately drilled 1/8 in. clearance. It is a good idea to fill the tube with hot vaseline before inserting the shaft.

The driver is screwed and lock-nutted to the shaft (personally I prefer silver soldering this component), and the other part of the driver, the one with two 1/8 in. steel pegs 1/4 in. long, screwed to the disc, locked on the motor shaft.

This disposes of the fittings. Now please permit me to offer a word of advice to my less competent or experienced readers. *If any fitting does not please you, scrap it.* I often do and I have been making models for 30 years. It is all experience and you will, at least, have the satisfaction of knowing you have done your best.

I have mentioned silver soldering in this article. If you have never tackled this branch of the jointing of metals now is the time to "have a go". It is quite easy.

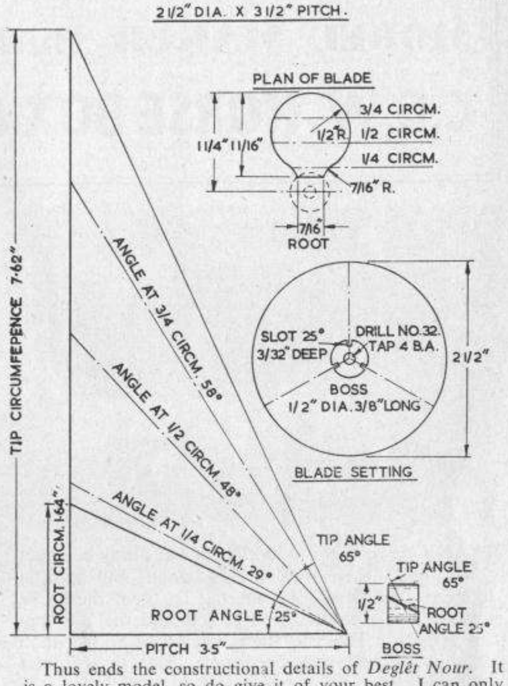
You need a self-blowing gas torch, one of those sold by any good tool shop such as the Target, Spitfire, etc., selling for round about 3/-, 1/2 oz. of silver solder and a small quantity of flux powder, such as "Easiflow". Also, 4 oz. bottle of 20 per cent sulphuric acid solution—any chemist will make this up for 6d. Now take an ordinary brick and place it "frog" up, i.e., the hollow part. Having polished the work and wired it in place if necessary, drop it in the sulphuric acid "pickle" for a few minutes while you connect your torch by tube to the nearest gas point. Take a piece of iron wire to direct your piece of solder, which must be quite small (for a propeller blade a piece 1/16 in. long is ample). Mix up the flux powder into a smooth paste and anoint the joint. Now turn on the flame, not too high at first, place the piece of solder in the flux paste which will bubble and fuse. If this displaces the solder poke it close to the joint with the iron wire. Turn up the flame and the brass will become dull red hot and the solder run into the joint. Let it cool slightly and again drop in the "pickle". Take out and brush off the fused paste with a wire brush and clean, polish and lacquer.

PROPELLER.—A suitable propeller design is illustrated and is a fairly easy proposition to make, but the blades must be silver soldered to the boss. You will notice that the boss is a piece of brass rod 1/2 in. dia. by 3/8 in. long, drilled with a No. 32 drill and tapped 4 B.A. This is marked off with a 60 deg. set square into three equal segments on the flat face and gives the position of the three blades. From our diagram we know the root angle to be 25 deg., and with our previously marked point as a datum we mark on the circular face three lines at this angle. Saw cuts are then made about 3/32 in. deep for the blade roots. Cut the three blades from 20 gauge brass the shape shown in the diagram, gang them up and file together to the exact shape. Locate them in the saw cuts in the boss—they should be a good fit—and silver solder them in position.

Now take a small block of hard wood. Make a shallow saw cut in one end, and twist each blade to its tip angle of 65 degrees.

If you feel this is beyond your capabilities a propeller of this design can be purchased from The Precision Model Engineering Co., of 61 Paradise Street, Liverpool, 1, with whom arrangements have been made by the Editor of this journal and myself to produce a range of fittings for this model, made to the designs reproduced here. This step has been taken as I realise that through lack of workshop facilities and the absence of power tools, some readers may hesitate to carry out the completion of this model to the fullest degree. Do not do this if you can possibly avoid it. *Deglêt Nour* is a beautiful model and worth all you can give her.

PROPELLER FOR DEGLET NOUR



Thus ends the constructional details of *Deglêt Nour*. It is a lovely model, so do give it of your best. I can only hope you get as much pleasure out of making it as I did.

NOVICE '50' *(Continued from page 529)*

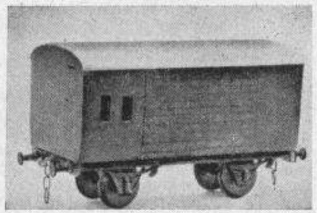
arm is also screwed to the underside of the ply base. This arm should protrude roughly 3 1/2 in. from the near side. The exact fore and aft position will have to be determined by test running as this will vary with the final balance of the model. Start with the position shown and move it forwards if the car shows signs of instability on the line.

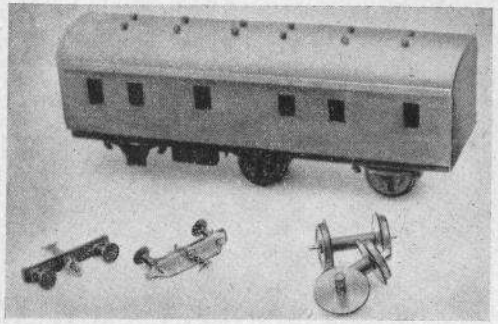
Starting the motor should present no difficulties. Simply use an up-ended bicycle, spin the back wheel and press the drive wheel on to the tyre. This will spin the motor over at high speed. For best results the drive wheel itself, however, needs to be fairly heavy. This will provide the necessary flywheel action. Running with a light wheel may ruin the motor.

The type of wheel used should have a metal hub and solid rubber tyre. To increase its weight attach a disc of lead to the inner side with machine screws, as shown. File away excess lead if this slows the motor too much.

Altogether you should get a lot of fun out of your "Novice's" racer, which should not take more than one full evening's work (outside of the paint job). Body shape can be varied to suit individual tastes and you can add more detail, if you wish.

MODEL MAKER Builds the C.C.W. HORSE BOX & VAN





(Left): The six-wheeled brake van in part-finished state, showing also Rex plastic wheels and buffer beams before assembly. (Above): The horsebox ready for final painting. (Below): Components of the C.W.W. Kits for brake van and horsebox as received.

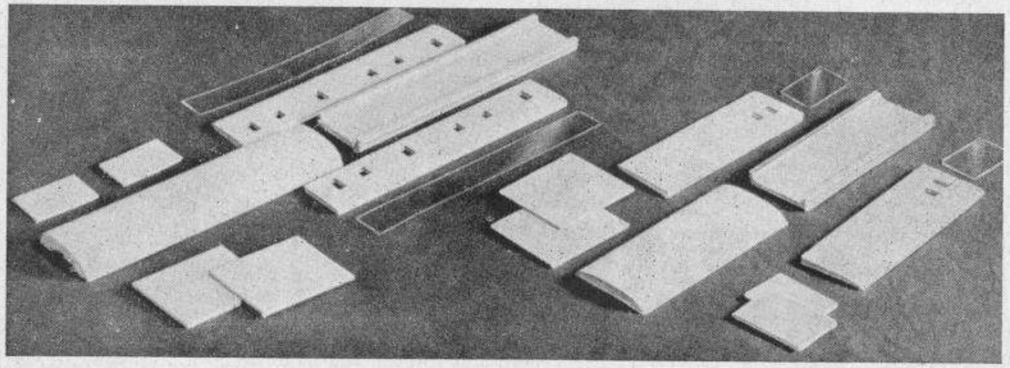
MANY newcomers to model railways may be eager to build their own rolling stock, but a little diffident about making a start. To them the CCW wooden coach construction kits should make a special appeal. The very fact that wood rather than metal is utilised may encourage them to try their hand.

The kits we have chosen for these articles were deliberately selected, first of all, as suitable rolling stock for incorporation in our own layout, and secondly, because they were not readily obtainable ready-made, nor were capable of being built up from ready-made units. The horsebox, for example, has wheels at 10 ft. 6 in. centres, so that standard 9 ft. bogies cannot be installed; while the six-wheeled brake van requires individual wheel treatment in the same way.

The kits as bought comprise floor, roof, two sides, all of which are shaped and require light sanding only; and four pieces of wood to make up the two ends. These pieces allow enough wood to trim to size when the coach "box" is glued up. A special feature is the slotted sides, into which clear plastic sheet may be slid to complete the windows. In building up the coaches the roof is located in place only and not glued up with the rest, so that it may be detached towards the end of the building job to enable these windows to be inserted after paintwork of sides has been done. In this way absolutely sharp windows are ensured.

To make a good job it is recommended that suitable Skinley or other proprietary scale plans are purchased. The code letters on the kits usually correspond to the appropriate Skinley drawing numbers for convenience in getting the right drawing!

So far in glueing up the coaches no troubles should have been encountered. The floors are nicely rebated to allow a good surface for the sides, while the ends have a locating piece stuck on the inside to lock the whole structure together internally. A few rubber bands horizontally and vertically will hold everything in place until dry. Note in particular that length is dead right—only light sanding to remove "whiskers" being needed.



Next comes the pleasant task of sitting down with any good retailers' catalogue and selecting the "hardware" required to complete the models. We deliberately avoided anything which might have involved soldering, so that the completed coaches are entirely glued and pinned—but solderwise readers would probably choose different accessories.

Wheels of 14 mm. dia. are required for both coaches, two pairs for the horsebox and three pairs for the brake van. In these days it may be difficult to get them in metal, but the little Rex wheels in plastic put out by the ERG people which we used are excellent substitutes. Being plastic there are no troubles with two-rail insulation, but if metal wheels are obtained then be sure to have Peco Insulaxes. Dummy axleboxes and springs must then be chosen. These can usually be pinned in place through the bottom of the coach floors with panel pins, which should be clenched over. These boxes have recessed holes on the inside in which the wheel axles can run. This form of fitting may seem flimsy, but in fact, provides a sufficiently stout job to give good service. If axles run a little stiff the wheels should be spun round until they have loosened to a running fit, rather than drilling out the axle boxes.

Some form of V-hanger for outside handbrakes will be required. The standard hanger and brake fitting complete will be too small for these wheels as they are made for 9 ft. centres, though it may be possible to alter them if they are already in the oddments box. For the brake van twelve torpedo shaped ventilators will be required. They are not worth making as they cost only a few pence. Ventilators on the horsebox are not standard, and may have to be fabricated from odd pieces of scrap wood. Eight vacuum pipes will also be required.

Finally, buffers, buffer beams and couplings are needed. The horsebox requires 4 mm. dia. round buffers; the brake van 6½ mm. round type. Buffer beams will already be drilled to take buffers, and slotted for the coupling hook.

These buffer holes may have to be opened out, and the threaded buffers screwed into them. This makes quite a secure fixing as they thread themselves in the soft casting. The buffer beams usually have a lip which can be pinned, like the axleboxes, to the coach floor. Cement these in place: strangely enough the casting will be fixed quite stoutly in this fashion!

The little couplings are bought in pairs, comprising two hooks, two springs, six links of chain and two tiny split pins. If the layout is adapted for auto-coupling then the proper auto-coupling fittings should be installed right away.

While at the model shop it is as well to get the appropriate paints. Midland red, black, and dark grey will meet most needs, though a little yellow for lining and lettering is also necessary. If these can be obtained in eggshell finish cellulose rather than a slower drying paint, so much the better, but the Midland red in its true shade is sometimes hard to find as a cellulose. However, if a maroon as near as possible to colour is bought, the addition of just a little black will dull the shade to an approximation.

Meanwhile, the coaches should have been receiving a little preliminary treatment to take a nice paint surface. The horsebox planking should be lined in with a very hard pencil, and then scribed with a sharp point (a compass point does very well). Other lines indicative of doors, window framing, etc., should be marked in from the scale drawings. Some cement rubbed well in with a finger will give a smooth surface on which paint will take well, but be sure to keep the plank linings scribed out.

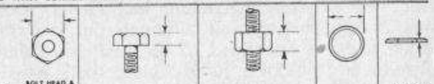
Undercoats may now be applied and well rubbed down. After which the accessories should be fitted temporarily in place. It is now quite clear that some very fascinating little additions are shortly to be made to the rolling stock. Our next issue will deal with finish and final details.

For the TRUE SCALE MODELLER

Part I of a useful table of proportional dimensions for commonly-used nuts, bolts and washers.

Compiled by Ian Craig.

"B.A." SERIES WITH CORRECT PROPORTIONAL DIMENSIONS FOR BOLT HEADS, NUTS & WASHERS



B.A. SIZES WITH 'LONDON' DECIMAL EQUIVALENTS		BOLT HEAD & NUT ACROSS FLATS 1.75 x BOLT DIA.	B.S. 190 .875 x BOLT DIA.	B.S. 193 .76 x BOLT DIA.	B.S. 190 1 x BOLT DIA.	B.S. 193 .875 x BOLT DIA.	WASHER DIA. 1.95 x BOLT DIA.	WASHER THICKNESS .1568 x BOLT DIA.
0	.2362	.4133	.2066	.1795	.2362	.2066	.4605	.0370
1	.2087	.3652	.1826	.1586	.2087	.1826	.4069	.0327
2	.1850	.3237	.1618	.1406	.1850	.1618	.3607	.0290
3	.1614	.2824	.1412	.1226	.1614	.1412	.3147	.0253
4	.1417	.2479	.1239	.1076	.1417	.1239	.2763	.0222
5	.1260	.2205	.1102	.0957	.1260	.1102	.2457	.0197
6	.1102	.1828	.0964	.0837	.1102	.0964	.2148	.0172
7	.0984	.1722	.0861	.0747	.0984	.0861	.1918	.0154
8	.0866	.1515	.0757	.0606	.0866	.0757	.1688	.0135
9	.0748	.1309	.0654	.0568	.0748	.0654	.1458	.0117
10	.0669	.1170	.0585	.0508	.0669	.0585	.1304	.0104
11	.0591	.1034	.0517	.0449	.0591	.0517	.1152	.0092
12	.0511	.0894	.0447	.0388	.0511	.0447	.0996	.0080
13	.0472	.0826	.0413	.0358	.0472	.0413	.0920	.0074
14	.0394	.0689	.0344	.0299	.0394	.0344	.0768	.0061
15	.0354	.0619	.0309	.0269	.0354	.0309	.0690	.0055
16	.0311	.0544	.0272	.0236	.0311	.0272	.0606	.0048
17	.0276	.0483	.0241	.0209	.0276	.0241	.0538	.0043
18	.0244	.0426	.0213	.0185	.0244	.0213	.0475	.0038
19	.0213	.0372	.0186	.0161	.0213	.0186	.0415	.0033
20	.0189	.0330	.0164	.0143	.0189	.0164	.0368	.0029
21	.0165	.0288	.0144	.0125	.0165	.0144	.0321	.0025
22	.0146	.0255	.0127	.0110	.0146	.0127	.0284	.0022
23	.0130	.0227	.0113	.0098	.0130	.0113	.0253	.0020
24	.0114	.0199	.0099	.0086	.0114	.0099	.0222	.0017
"ME" SERIES WITH CORRECT PROPORTIONAL DIMENSIONS FOR BOLT HEADS, NUTS & WASHERS								
INS.								
1/8	.1250	.2187	.1093	.0950	.1250	.1093	.2437	.0196
5/32	.1562	.2733	.1366	.1187	.1562	.1366	.3045	.0244
3/16	.1875	.3281	.1640	.1425	.1875	.1640	.3656	.0294
7/32	.2187	.3827	.1913	.1661	.2187	.1913	.4264	.0342
1/4	.2500	.4375	.2187	.1800	.2500	.2187	.4875	.0392
5/16	.3125	.5468	.2734	.2375	.3125	.2734	.6093	.0490
3/8	.3750	.6562	.3281	.2850	.3750	.3281	.7312	.0588
7/16	.4375	.7656	.3828	.3325	.4375	.3828	.8531	.0686
1/2	.5000	.8750	.4375	.3800	.5000	.4375	.9750	.0784
9/16	.5625	.9843	.4921	.4275	.5625	.4921	1.0968	.0852
5/8	.6250	1.0937	.5468	.4750	.6250	.5468	1.2187	.0980
"METRIC" SERIES WITH CORRECT PROPORTIONAL DIMENSIONS FOR BOLT HEADS, NUTS & WASHERS								
MM.								
3	.1181	.2066	.1033	.0897	.1181	.1033	.2303	.0185
3.5	.1378	.2411	.1201	.1047	.1378	.1201	.2687	.0216
4	.1574	.2755	.1377	.1196	.1574	.1377	.3070	.0246
4.5	.1772	.3101	.1550	.1346	.1772	.1550	.3455	.0277
5	.1968	.3444	.1722	.1496	.1968	.1722	.3838	.0308
5.5	.2165	.3788	.1894	.1645	.2165	.1894	.4221	.0339
6	.2362	.4133	.2066	.1794	.2362	.2066	.4606	.0370
7	.2759	.4829	.2414	.2097	.2759	.2414	.5381	.0432
8	.3149	.5511	.2755	.2393	.3149	.2755	.6141	.0493
9	.3543	.6200	.3100	.2692	.3543	.3100	.6909	.0555
10	.3937	.6889	.3444	.2992	.3937	.3444	.7677	.0617
11	.4330	.7578	.3789	.3291	.4330	.3789	.8444	.0679
12	.4724	.8267	.4133	.3590	.4724	.4133	.9212	.0740
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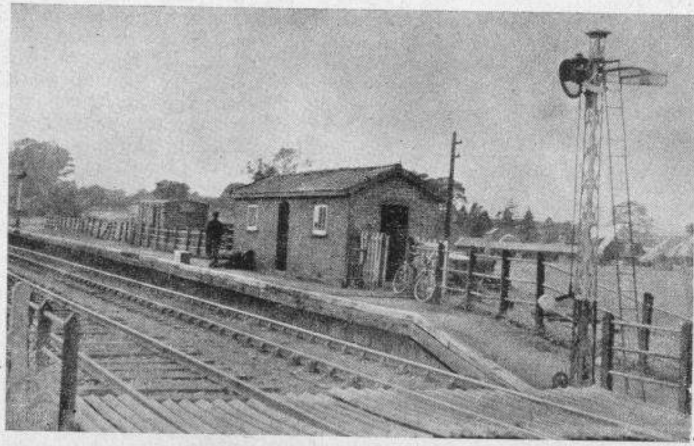


ROLLING STOCK of the East Kent Railway

BY A. H. DADD

THE prototypes selected this month are two of the East Kent Railway's six-wheeled coaches. Number four, a first-third brake, was bought by the Company to provide additional carrying capacity during the period when so many extensions of the line were contemplated. Number ten, purchased from the London, Chatham, and Dover Railway, was a third brake, and although put into service much later, it continued to be used even after the introduction of bogie stock. Until the sidings were cleared of stock in 1949, this coach was to be seen at Shepherdswell, still maintained in good order and representing probably the last remaining L.C. & D. Railway six-wheel coach to be retained in its original condition. A further number of these coaches can be seen on the Southern Region of British Railways either as Camping Coaches or Works Department Vehicles.

Constructional Details

To the modeller, the two prototypes present few difficulties. One, however, will affect mainly those having very small radius curves, a necessity in many cases, but to be avoided if possible. Four wheels will take a very sharp curve with little trouble, but those extra two are bound to cause trouble unless care is taken during the construction of the underframe.

There are two methods of avoiding trouble. The first is to suspend the centre axle on a sliding "bogie" so that it can move in a direction at right angles to the movement of the coach. This is entirely satisfactory providing the "bogie" is sufficiently heavy to hold the track, but does add to the time of construction, and unless well done the appearance of the finished model may be spoilt. A much simpler method is to allow ample end play in the centre axle. If very sharp curves have to be negotiated, this will mean the axle guards being placed further apart than shown in the scale drawing. In addition some form of extension may have to be provided to allow the axle plenty of room to slide to and fro without slipping out of the bearings.

Only trial and error can determine the exact amount of travel required, but even on curves of 2 ft. 6 in. radius, it will be very considerable. If the smallest radius is 3 ft. or larger, it is sufficient to file down the inside of the axle guards—they are usually too thick—and drill the bearing deeper.

There is normally sufficient end play in the remaining four wheels to look after their movement, but this should be tested before the underframe is fixed to the bodywork.

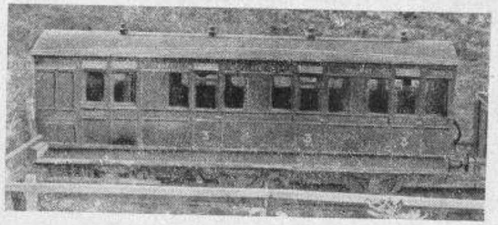
General construction is similar to that described in previous articles in this series and will not be repeated here. A few details are worth mentioning, however. The lamp tops, for example, differ in both coaches, but a sufficiently near type is available on the market. These are turned in brass and can be adapted with the help of a little filing.

The axle guards present a difficulty. There are no castings of these available as far as I know. The nearest are van axle guards, but these are smaller than those on the coaches and the springs are much shorter. The only alternative is, of course, to build them up from brass sheet and strip. This is a job that requires some skill and endless patience, and few modellers consider it worth while. Do not be discouraged, however, van axle guards look very well and few enthusiasts would notice the fact unless pointed out to them.

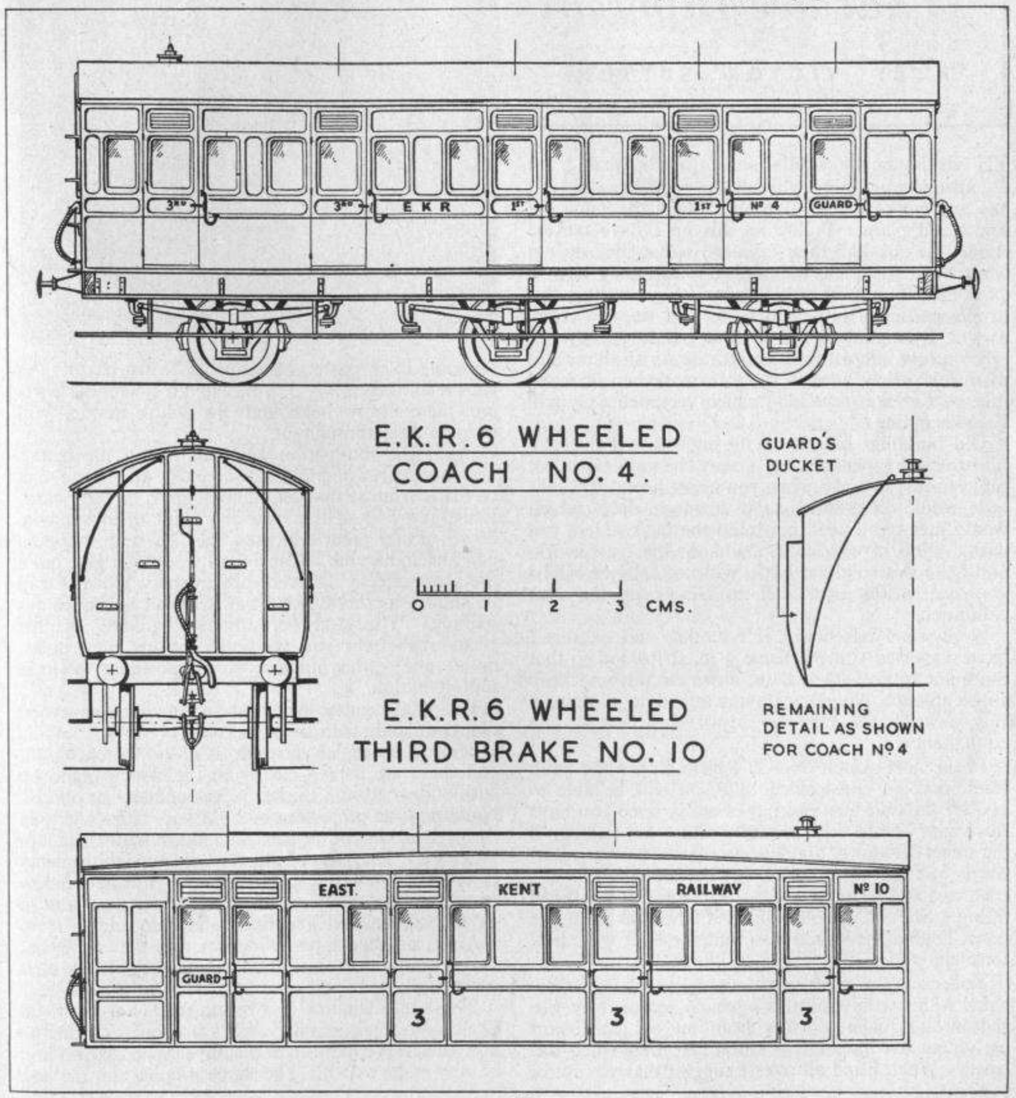
Wheels, buffers and couplings are standard. Note the lettering on the first-third brake number four. On the prototype this is in form of cut-out letters screwed on to the coachwork, and looks vastly different even on a four millimetre to the foot scale model from the transfer type. These small cut-out letters can be made in 4 mm. scale from thin celluloid which is easily cut with a sharp modelling knife. The result will be well worth the trouble involved. Lettering on the second vehicle is by transfer.

Drawings for coach number four show the detail

(*Continued on page* 555)



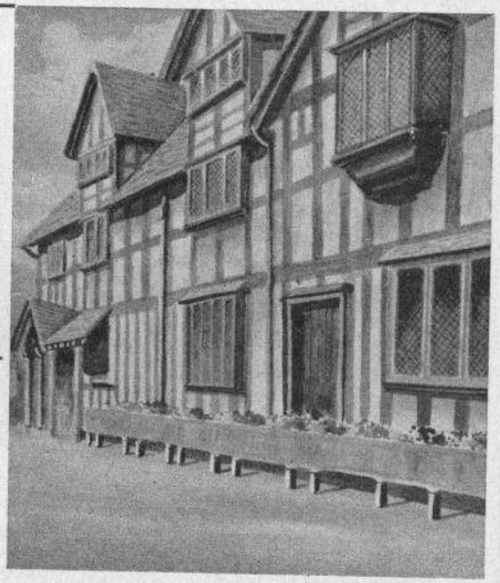
(Above) : Eythorne station, on the E.K. Railway, one of the largest on the system, and an excellent prototype for modellers. (Left) : East Kent Railway Third Brake No. 10, purchased from the London, Chatham and Dover Railway.



MODEL BUILDINGS

That are Different

BY VICTOR SUTTON



IN visiting many exhibitions during a year I am always wondering why all the model buildings I see are more or less alike and follow the same cut and dried plans. Following this up I have tackled model makers and their opinion is that they do not know how to tackle a building unless they have a plan or a kit. With this in view I have written this article particularly to help those who want to break away. By making some of these buildings they will enjoy a new interest in the craft, use up all the scraps of material they have in the loft, workshop or wood pile, and create something which very definitely will be outstanding.

Old buildings always create interest and this one illustrated happens to be a very historic one, but quite simple to make when you know how.

It would be shown as a frontage only, which would mean you need not build the back unless you wish. First of all, let us build up the framework, and have this solid so that it will not collapse whilst you are working or fall to pieces at the first exhibition.

A plywood baseboard is essential, and on this I have suggested you put some ¾ in. stripwood so that the main framework will set down on this and keep shape (Sketch No. 1). If you intend to illuminate this, now is the time to adjust this part of the equipment.

In the next sketch (No. 2) I have shown the main framework so constructed that you will be able to add all the odd bits and pieces easily once you have this right. Note very carefully that I am adding all the queer windows, doors and other oddments afterwards and this means that they can be neatly made, tried out and painted without awkward and difficult fitting. Should you illuminate it, then take out the panel behind the window so that the light will show through.

You can now proceed to cover the whole framework with cardboard, and I see no reason why you should not make all this from an old cardboard carton as it will paint or distemper well when finished. When fitted all over I suggest that you make up some thick paste and strips of brown paper. As shown in Sketch No. 3, you will see that these parts are then firmly held and the whole model will become rigid throughout.

From the illustration you can follow the beams and unusual wood embellishments, and these can be made from stripwood, lighting spills or cardboard. I favour wood so that you can paint them vandyke brown poster paint and then line in with a mapping pen and indian ink. Cardboard would not give quite the same effect. Uneven dips in the woodwork can be shown, as this is not a new Council house we are making. The study of any old building of this period will help you with the various plug holes, bolts and other items so important to true representation.

Fix on the gutter pipe and gutter with strip wood and bent sold sticks or dowel rod.

Make the two lower windows as in Sketch No. 4, and these are shown clearly in the sketch made up with odd wood and thicker pieces of balsa or obechi. Note the little projection over the top. The windows themselves can be in card and lined with the mapping pen. They are of the very old type with plenty of cross-sections. I see no reason why the window panels, each individual one should not be made in cardboard, painted and lined and then added.

Most of the upper windows are the same but shape a little different. Having made the lower ones successfully you will now be able to make these.

The larger window is a bit unusual, but shown in Sketch No. 5, it is only a matter of building this up and the heavy part underneath can be shaped out of any soft wood. The same applies to the top

section of this. When correct in shape add the windows, and in this case there are five.

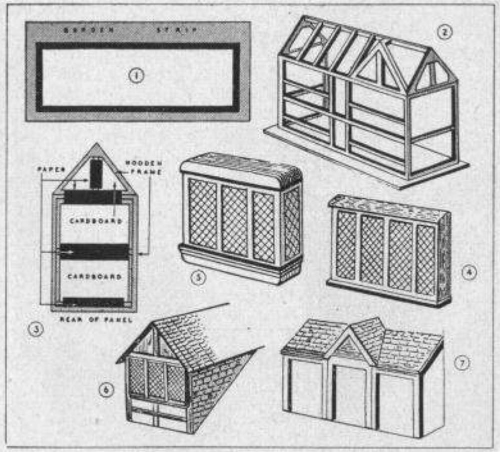
The dormer types shown here are most attractive, and you will have to make them neatly as shown in Sketch No. 6. These can be made up with oddments of thick cardboard and made to fit on to the roof firmly. Note the very overhanging roof section. Windows protrude a little and give a very pleasing effect.

Doors can be shaped out from wood, and this will enable you to score in board divisions with your penknife. To make it simpler the door surround, which is probably very bumpy and worn can also be added. The whole part can then be first painted and fitted.

The outer porch effect is simple to make and again only needs oddments of wood. Here you will see the value of the panel board because you will be able to tackle the "legs" of this part to the panel board and so keep it firm.

I suggest that the colouring should next be done and any oddments of flat grey, fawn or cream paint should be used. Be careful not to overrun on to the beams. Add some silver sand in the paint first and stipple on with a stencil brush. Do not try to make it smooth in finish. Probably you can show some broken patches where the plaster is cracked. Here you show lath strips marked in with indian ink. One can improve this type of model by just underlining the beams beneath each one and on the right-hand side looking at it. I have always done this, and it improves the definite outline without making it look modern, and at the same time makes a very much better photograph.

I suggest that the whole of the roof section is covered with cardboard first and secured. I like the idea of the roof being made in sections as shown in Sketch No. 0. These strips can be made easily in sections on the kitchen table and then added with glue. Neat adjustments can be made where they



fit round the dormer windows and other obstructions. You may get the same effect with cardboard especially if it is of the rough strawboard type. Whatever you do, do not decide to use the standard printed tile paper.

Shading for the roof should be a dull red with streaks of brown, fawn, touches of green and most certainly in some places black. Thick indian ink lines under some tile edges would help immensely to give a better effect.

On the narrow front piece one could make a section of evergreen with some loofah, and this will set the cream background of the building off well without looking too conspicuous.

Window edges may be improved by lining round with white indian ink put on with a fine brush. Do not use any high gloss paint on such a model as this would be quite out of place.

ROLLING STOCK OF THE EAST KENT RAILWAY

(Cont. from p. 553)

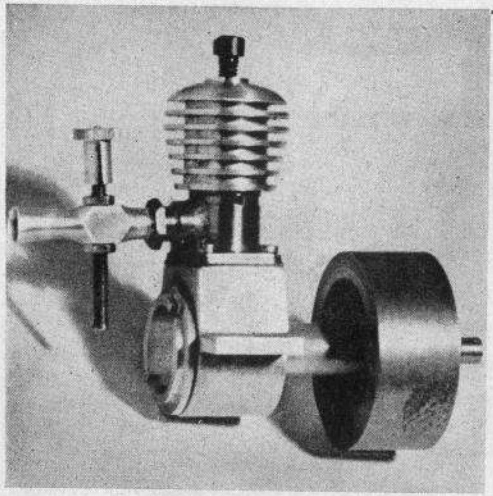
of the passenger end only. The opposite end is similar less the rail and steps but including two look-out windows. These can be easily seen in the accompanying photograph.

The underframe detail for coach number ten is similar to that shown for number four, but note that the full length step board is replaced by a short one beneath the guards compartment only. Although wood in the prototype, these should be made from brass strip on the model. The rather rough treatment our model stock invariably receives makes wood or card unsuitable. End detail is similar to that shown for number four with the exception of the hand rail, details of which are shown on the plan.

Both coaches were painted in olive green when photographed in 1947. This colour, however, appeared to be a shade darker than the standard pre-war Southern colour. Lettering was in gold and ends and underframes black.

During this series, of which this is the last, drawings for a representative selection of the passenger stock of the E.K.R. have been reproduced. Not all of the stock has been included by any means, for the small amount of traffic carried the Company owned a considerable number of vehicles—more coaches than passengers carried in a day during much of its life—but the drawings reproduced should provide anyone building or considering building a light railway with some prototypes really worth modelling.

It is hoped at a later date to reproduce drawings of some of the locomotive stud of this and other light railways, and also a selection of the more interesting goods stock, suitable drawings for which are not easy to obtain.



Building a 1 c.c. C. I. ENGINE

Part III of a step-by-step series on an all fabricated engine for home workshop construction.

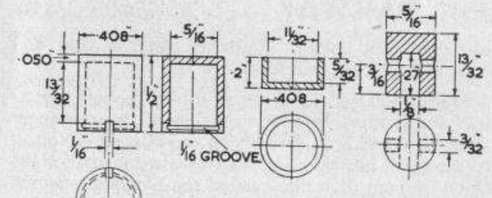
By A. F. Weaver and W. W. Ransom

This concludes the series on the construction of what we feel sure will prove a popular little motor. We shall be interested to see details and photographs from those readers who are building their own.

11. Piston and Contra Piston

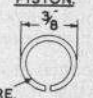
THESE are both turned from 7/16 in. mild steel bar.

Firstly, the piston. Chuck the material and face the end. Turn roughly inside and outside. Finish the inside 5/16 in. dia. and 7/16 in. deep, and turn the recess for the retaining circlip. The tool used for the transfer belt suitably adjusted with a smaller cutter can be used again. The recess is 1/64 in. deep, 1/32 in. wide and is 1/16 in. from the opening. Turn the outside to two or three thous. bigger than the bore of your cylinder, and part off ½ in. long. File a square notch to the inclusive depth of the recess (for removing the circlip).



CONTRA PISTON. PISTON FORK.

PISTON.



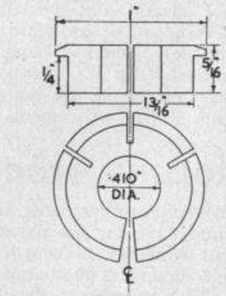
SPRING CLIP.

Secondly, the contra piston. This is treated similarly to the piston without the recess. Inside diameter 11/32 in., depth 5/32 in., outside dia. as piston. Part off .2 in. long.

Now turn a spigot to the internal size of the piston and insert a small steel pin to engage in the notch in the piston and another spigot the internal size of the contra piston.

The piston now requires case hardening as previously described, but the contra piston can be left soft.

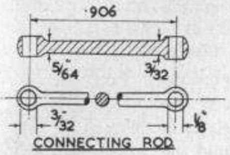
Next make a dural lap as in the sketch and photograph. Place the piston on its spigot in the chuck. Put a short piece of rod in the drill chuck in the tailstock. Fit the dural lap in a dieholder. Now with the work revolving at a low speed traverse the lap lightly smeared with fine lapping paste until a tight sliding fit is obtained with the cylinder. During the lapping operation the tailstock should be slid up to the work so that the rod almost touches the piston. This will prevent the piston coming off the spigot whilst lapping. The size of the lap can be varied by means of the screws in the dieholder.



OUTSIDE LAP FOR PISTONS HELD IN DIEHOLDER AND ADJUSTED BY ITS SCREWS.

Make sure that all traces of the lapping paste are removed before testing in the cylinder.

The process can now be repeated with the contra piston which must be a really tight fit.



CONNECTING ROD

12. Connecting Rod

I would suggest that the best material is a small piece of ⅛ in. gauge steel plate.

Centre pop the centres of the bearing holes .906 in. apart and mark out the contour. Drill the two holes 3/32 in. and ⅛ in. dia. respectively and ream them. File to shape. The connecting rod must be hardened and tempered. First heat it until cherry red and quench it in machine oil. Clean up with a piece of fine emery paper, reheat the centre in a flame until blue colour appears, and quench. The ends should be *dark straw* if this is carried out correctly.

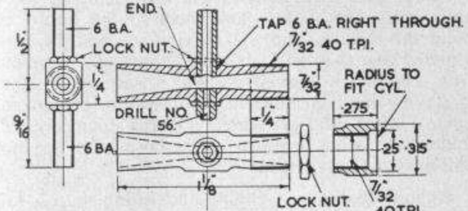
13. Piston Fork

Made from 5/16 in. or ⅜ in. dia. dural round stock. Face the end and turn the material to size. Cross drill through with a 3/32 in. drill at 3/16 in. from the end. The ⅛ in. slot for the connecting rod must now be cut. It is best that this is done with a slitting saw as the bottom of the slot should be radiused to allow play for the end of the connecting rod, but if this is not practical cut the slot deeper than shown in the drawings. Lastly part off the fork 13/32 in. long.

14. Gudgeon Pin

This is simply a piece of 3/32 in. silver steel rod cut to 5/16 in. long and the ends radiused.

The circlip to hold the piston fork in position might also be mentioned here. It is merely a piece of 20 gauge piano wire bent to shape.



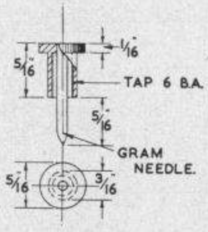
CARBURETTOR.

15. Carburettor

Made from ¼ in. square or hexagon brass or dural. Drill a hole right through with a No. 34 drill. Turn the outside to shape and thread the end 7/32 in. x 40 t.p.i. for ¼ in. Ream the hole half way with a No. 000 taper reamer (this can be made from a piece of silver steel. Turn it to the correct taper and file to half thickness. Harden and temper to dark straw, as for connecting rod.)

Part off at 1⅛ in. long and reverse it in the chuck. Taper ream the other end. Now cross drill through one of the flats ½ in. from the threaded end with a No. 42 drill, and tap the hole 6 B.A. right through.

Two pieces of 6 B.A. screwed rod should now be prepared, one with a No. 56 hole drilled longways through it, and the other with a hole the next number size above the diameter of the gramophone needle with is to be used for the fuel control. These two screwed rods are screwed into the two holes in the carburettor and locked in place with 6 B.A. nuts.

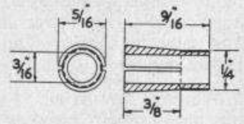


NEEDLE VALVE.

16. Needle Holder

This is best made from ⅜ in. brass rod, round or hexagon. Centre drill the size of the gramophone needle to be used, redrill with a No. 42 drill 5/16 in. deep and tap 6 B.A. Turn the outside to shape and part off ⅜ in. long. Slit the holder for ¼ in. of its length and solder the blunt end of the needle in the top hole, making sure that the needle runs true down the centre of the 6 B.A. hole.

17. Collet for Flywheel



FLYWHEEL COLLET.

This is turned from mild steel 5/16 in. dia. Chuck the material and drill it 3/16 in. dia. and ream. Turn ¼ in. dia. for 3/16 in. and taper turn ⅜ in. with the top slide at 5 deg. Thread the ¼ in. dia. portion ¼ in. x 40 t.p.i. Part off at 9/16 in. long. Slit from the 5/16 in. dia. end ⅜ in.

With the lathe at the same taper setting make a taper D-bit of 5/16 in. silver steel as previously described; harden and temper.

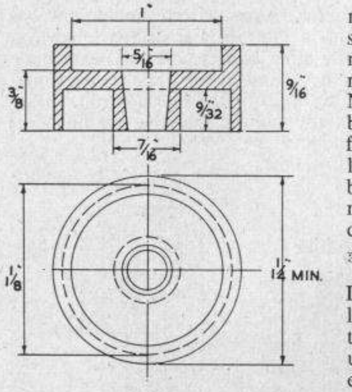
A nut will be required to match the ¼ in. x 40 t.p.i. thread and if one is not readily available it can be made by enlarging a 2 B.A. nut.

18. Flywheel

Made from mild steel bar not less than 1¼ in. dia., 1⅜ in. dia. is to be preferred.

Cut off a piece just a fraction longer than required, say ⅝ in. long. Chuck the material and face the end. Drill a centre hole ¼ in. right through. Turn the outside to the size required as far as the chuck will permit. Now bore the recess 1 in. dia. and 5/32 in. deep. Unchuck.

Prepare a disc of mild steel to fit exactly the recess with a ¼ in. centre hole. This is to be used to avoid distortion whilst turning the rest of the flywheel. Place this disc in the recess and reverse the work on the faceplate, securing it by a long bolt right through the mandrel. True up on the outside machined portion, face the end to finished length and turn the



FLYWHEEL.

rest of the outside portion to match that already turned. Now counter bore the housing for the clutch leaving a 7/16 in. boss and a maximum internal dia. of 1 1/8 in., 3/32 in. deep.

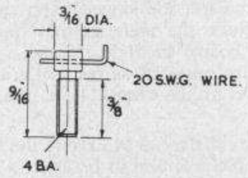
With the taper D-bit previously made, ream the centre hole until the collet enters leaving 1/32 in. protruding. Remember, a little goes a long way with a taper reamer.

19. Contra Piston Control

This can either consist of a 4 B.A. Allen screw or an ordinary cheesehead 9/16 in. 4 B.A. screw with a piece of 1/32 in. silver steel rod through the head and bent to shape. The rod will require heating before bending.

We have now come to the end of all the machining necessary to building this engine, but only to the beginning of fitting and assembly. The process of building this engine has been taken step by step, but in all probability in practice all the machining would be done first and the lapping and fitting done later. These processes are all important, and I feel that it is wrong to give the impression that the engine is the result of machining and will consequently have a temperament. It should be the result of careful fitting with the consequent elimination of temperament.

A final fitting is the lapping of the piston to the cylinder using paraffin and a trace of metal polish until the piston runs smoothly in the bore despite a trace of tightness remaining. It is frightfully difficult to put into words the required fit, but if at first you don't succeed a new piston does not take long to make. Have another go at producing a perfect bore and make another piston rather than waste a lot of time trying to start an engine that would be a dead loss from the beginning.



COMPRESSION LEVER.

Compression leaks *anywhere* are fatal, so don't overlook the possibility of leaks at:

(a) The Contra Piston.
(b) The Cylinder Base.
(c) The Crankcase Door.
or (d) The Crankshaft Bearing.

A cylinder bore gasket should be made of card about .020 in. thick (different thicknesses can be tried as port timing is affected thereby, and engine performance is consequently affected). A crankcase door gasket should also be made of cartridge paper or good quality brown paper. Place the paper on the crankcase door (threaded end) and tap around with a hammer so producing a hole. Screw this up on the crankcase tightly and trim the outer edge with a razor blade.

If the instructions have been carefully carried out the engine will work within the first few attempts. When the correct position for the Contra Piston and Jet have been found note them for future reference.

A fuel is recommended as follows:

40 per cent Diesel Oil
30 per cent Lubricating Oil (Castrol XL)
30 per cent Ether

but it will be found to run well on almost any fuel available. If your engine is really free from leaks with a good piston and cylinder the fuel can contain a greater percentage of diesel oil with advantage (up to 55 per cent) and equal quantities of ether and lubricant. An engine with a slightly leaky piston will be better suited with a smaller percentage of diesel oil and the Castrol oil XL replaced by Castor oil.

I hope that these articles will have tempted some enthusiasts and many newcomers to the hobby to build this engine, and that having successfully constructed one they will get many hours of enjoyment from running it apart from the inward satisfaction of having built an efficient compression-ignition engine. Those who are already model engineers will understand what I mean, and those who are not still have that joy ahead.

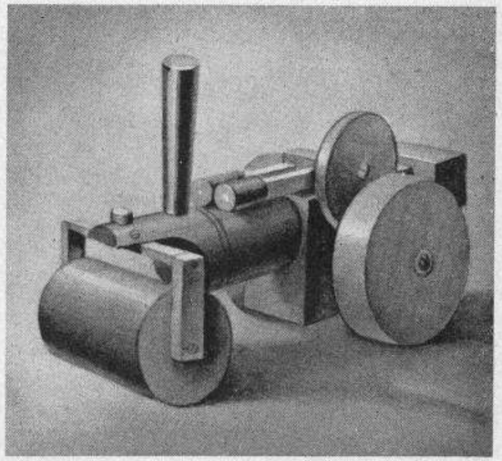
Anyone making an engine and fitting it to a rail car will be welcome to try it out on "The Silverwood Circuit", the Rail Car Track of the North London Society of Model Engineers. Don't be shy—we shall be very pleased to see you.

Correction to drawing in the July issue

The diameter of the cylinder seating hole in the Crankcase is given as 15/16 in.—this should be 15/32 in.

A TRUE-TO-LIFE STEAM ROLLER

Make it for Junior Part II



THIS toy steamroller for junior is not a working model but has the distinction of being very true-to-life yet simple to put together.

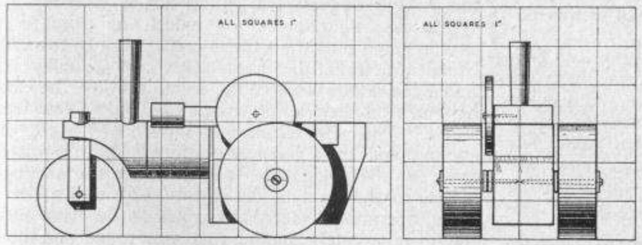
It is made in the main from sections of circular rodding, like discarded curtain poles, etc. No dimensions are given as the toy could be made to any size, dependent greatly on the poles obtainable. The diagrams, however, give clearly the proportions to be aimed for, and the squares could be taken to equal 1 in.

As a guide, back wheels of about 3 in. dia. make a very nice little toy, and these should be secured first. They can be slices cut off some pole of that size. At this diameter the wheels should be 1 in. wide. In the place of wooden discs large tins carefully pierced at the centres could be used.

The front roller (b) is also a section of a pole, and if working to the 3 in. back wheel it should be of approximately 2 in. diameter. From side to side it is rather more than the diameter, as is made clear in the squared diagrams.

Another section of pole does for the boiler. Again working to the proportions suggested this part is 1 1/4 in. to 1 1/2 in. dia., and a length cut from the middle of some discarded garden tool will do well. The boiler in length is two and a quarter times the diameter (or twice the diameter of the roller).

For about three-eighths of its length, the front of the boiler is cut away to form the curved recess to take the roller which is such a marked feature in the full-sized machine. The recess can be taken out



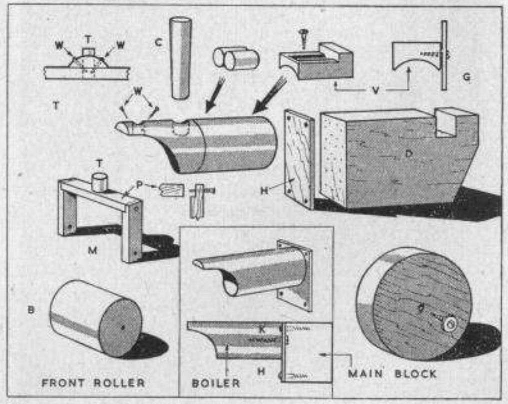
roughly at first and worked on later till it nicely fits the curve of the roller.

Other main sections required are the chimney (c), which is a length of 1/2 in. dowel for the dimensions suggested and the block (d) to form the body. This latter, as will be seen, is just as long as the boiler and not quite as high as the rear wheels, while the width is the same as the diameter of the boiler. The block is shaped as indicated, sloping inwards at the back and with a channel cut across the top to represent the footplate.

A disc of wood equal in diameter to the front roller is needed for the flywheel (g), two small sections of the 1/2 in. dowel for cylinders and a few odd bits of stripwood to be used as described.

Now for the assembling. The boiler is fixed to the back block by the thin intermediate piece (h). A

(Continued overleaf)



An Interesting Miniature Line of the North-West

BY H. A. ROBINSON, B.Eng.

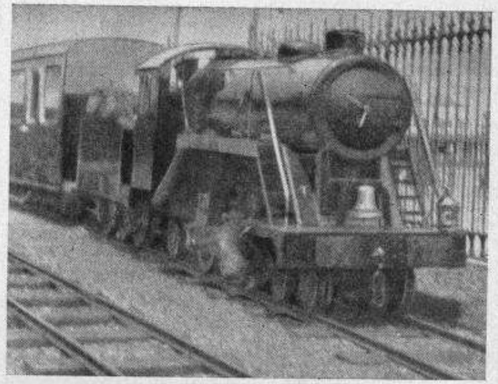
THE miniature railway in the Tower Grounds, New Brighton, is a line that is fast making a name for itself. When originally laid many years ago it was little more than a children's ride with a "mocked-up" engine thoroughly out of scale that merely served to camouflage an oil motor.

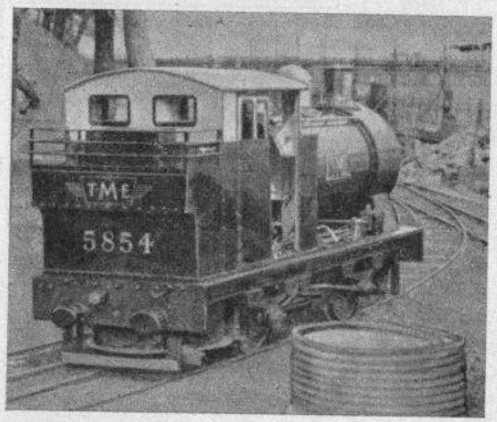
Now the system has two steam locomotives—one a fine "Atlantic" with six-wheeled tender, albeit of freelance design, and the other a four-wheeler equally well proportioned.

Comparatively recently several bogey passenger vehicles were added to the rolling stock. These are superbly finished with saloon type windows, excellent interior fittings and outside livery that leaves nothing to be desired. They run with velvety smoothness, and when put into service the inaugural trip was officiated over by town dignitaries. Indeed, it was something of an occasion. A standard train now consists of two of these coaches and one "toast rack" open vehicle (also bogey).

Space for expansion has always been a trouble with the system, but by quarrying out a cutting the line now has a big circle at the south end. An attempt to lengthen the run was made last year by putting a circle within a circle here, as in the diagram, but the idea did not catch on.

The time of run has been ingloriously lengthened and made more interesting, especially to the model maker. On the far side of the south curve is a tunnel and in this every train comes to a stop with the coaches abreast an illuminated model fair set on a ledge in the wall. The usual "rides" are there as is a fine showman's engine with revolving flywheel belted to the usual dynamo. A set of "galloping horses" go gaily round, emitting the flute-like note of the old steam organ suitably thin in volume. Chair-o-planes are there also, and these took a prize at a model engineering exhibition in the south. Swing boats come in the scene in addition to other well-known items of amusement caterer's equipment.





(Above): The "Atlantic" loco hauling a train on the Promenade Straight on the New Brighton Railway, and (below) a view of the Company's four-wheeled locomotive.

Coming out of the tunnel the train then continues its journey through the rock cutting, and so on round again to the starting point.

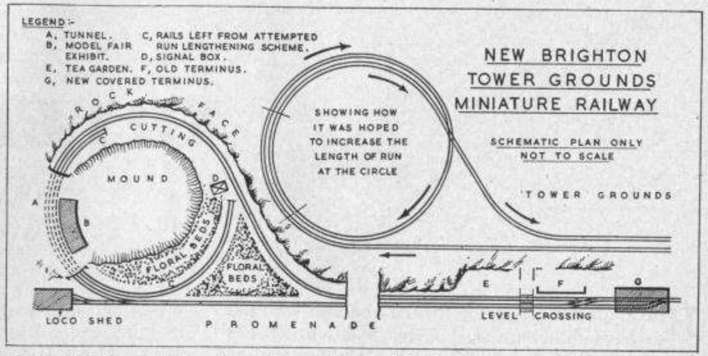
A considerable extra length was gained last year, too, by building a fresh station further back up towards the "figure-eight" — indeed, so close to it that in going forward a little, preparatory to running round the train, the locomotives now actually go under the lattice work of the scenic railway, the cars of which on their lower circuit roar only a few feet above. This new terminus is covered by a curved awning, and has a concrete platform. The run-round road for the engine also comes under the awning.

Due to the form of the layout there is the interesting operational fact that engines do the trips over the line alternately running right way round and then tender or bunker first. It also means that the "toast-rack" on one run in marshalled next to the engine and an the next at the back of the train.

During the peak of the season two trains are always in operation, the one, freshly filled with passengers, leaving the new terminus as the other drawn into the old station, but a few yards away. Traversing a cross-over the outgoing train passes the other on parallel tracks. The main awning-covered station thus being left vacant, an incoming train, after disgorging its passengers, is propelled forward to become a new train ready for departure as soon as train number one arrives back.

Though still cramped for space the line has been one of steadily growing features since its reorganisation. A loco shed with twin roads has been built off the curve at the south corner just before the new line swings into the tunnel, and at the near side of

the circle a model animated signalman untiringly operates levers in his cabin. Here, too, there is a "bow-string" overbridge inscribed as having a height of 7 ft. 2 in. The upper loop is now tastefully bordered by floral beds, and the most recent lineside effect is a working 5 ft. water-wheel that revolves continuously, splashing water as it does so.



The trip in a train is decidedly interesting for in the comparatively short run so many sharply varied scenes and conditions are presented to the passenger. Drawing out of the station there is the cross-over, the passing of the incoming train on a parallel track, then a level-crossing and a short stretch with the crowded promenade on one side and an alfresco tea garden, backed by a rock face on the other. Continuing with the busy prom. still on the left, the rock face closes near into the track on the right. Then a break out to a more open space with what seems like a branch line coming in from one side. Flower beds, the loco shed and into the tunnel through an artistic portal. The halt inside and interest of the exhibits, and then into the open again in a deep cutting with the locomoive exhaust echoing as it curves away ahead on the wide circle. And so round to the prom. straight, this time travelling in the opposite direction and on the "up" track, and back to the starting point. Not many miniature lines can offer such variety packed into such a small space.

The last word in development of this line (which belongs to the Tower Miniline Enterprises—T.M.E.) has certainly not been spoken. Something may yet be done to increase the actual length of run, and here a very nice problem is presented to the reader interested in layouts on a sort of "how would you do it, chums?" basis.

A TRUE-TO-LIFE STEAM ROLLER (Continued from previous page)

big screw (k) goes through into the boiler at the centre and the thin intermediate piece is then secured to the block by a small diameter, but long screw, at each corner. The back wheels are now fastened in position with their upper points just level with the top of the main block. Fasten with long thin screws (after carefully finding the centres), and assemble with a small washer between the block and the disc, and another on the outside between the screw head and the disc.

The front roller is fitted by the frame (m). This has to be built rather robustly from the stripwood—the top bar (p) being thicker than in actual practice. At the centre of the bar a hardwood piece (t) is fitted which goes up through a hole in the boiler projection and protrudes a little above. There is no suggestion of the roller swivelling so everything can be made firmer still by the two small screws (w).

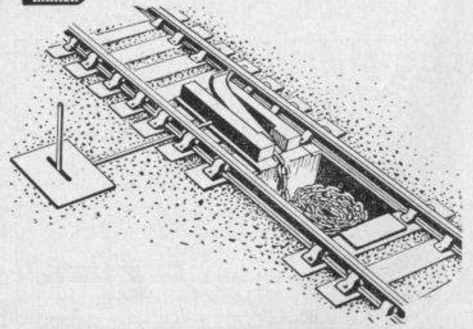
Fix the chimney by taking down the end a little and joining (after being glued) into a similar hole in the boiler top. The position is at the near end of the recess.

Cylinders, flywheel, imitation side-guards (v), and a suggestion of "works" near the flywheel are a matter of artistic effort. Two sections of dowel will provide the cylinders, these being fastened to the boiler by being carefully pierced by a longish pin, each of which is taken through the wood underneath and tapped well home. Piston-guards and suggested cranked axle is given by one block of wood as (v), curved to fit on top of the boiler. It is hollowed out a little on top to give the idea of depth, and is held to the boiler by a single screw.

All that is left now is the flywheel, and this is secured to the block just made by a small screw at the centre. A second screw can be put lower down into the back block to give greater firmness. The back wheel at that side will have to be taken off temporarily to fit the flywheel, and it will probably be found necessary to replace it with a wider washer to give the necessary clearance.

The model is now completed bar some sort of finish. It can be left in plain wood if desired, but good painting improves the appearance. If painting, the boiler should be green, but the smokebox and shelf black. Spokes can be marked out in black on the rear wheels and roller, but the flywheel is solid and painted green, as are the piston-guards and cylinder. Black is used for the chimney while the treads of the roller and wheels look well silver grey.

Finally, to get the very best effect a little lining should be put in. This can be in red or yellow. A border should run round the piston-guard, and the boiler section is similarly suggested. A line round the centre of the flywheel and another round the rim also look well.



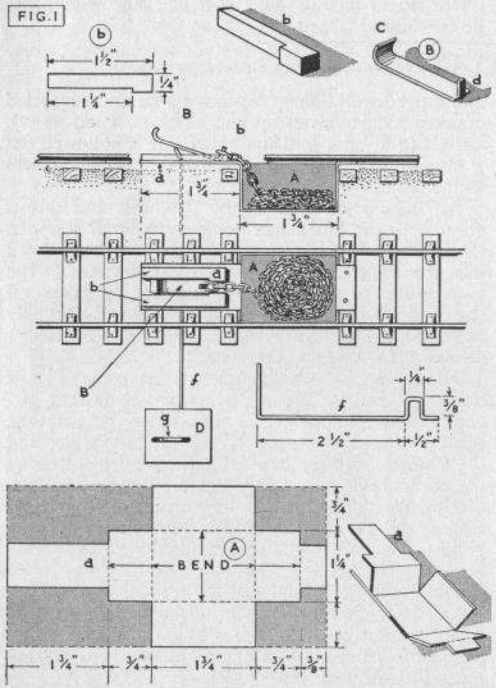
Two NOVEL ITEMS

A CHAIN DRAG AND A SLIDING DEAD-END—BOTH FOR 0 GAUGE

HERE are two novelties for the operator who likes to have rather unusual items on his line. Both are simple to make. The one is a sliding dead-end of the type found in certain West Region depots, and the other is a "chain drag" for checking runaway cuts of wagons—a method which was greatly used at one time in the gravitation marshalling yards at Edge Hill, Liverpool.

To deal with the second item first. "Chain drag" equipment consists of a wrought iron tank set between the rails at some strategic point in the sidings. In this is a considerable length of heavy linked chain. The one end comes up over the edge and to this is attached a bar terminating in a hook.

FIG. 1



Normally the bar lies more or less horizontal, but its outer end can be raised by a lever set beside the track. If trucks are running at a safe rate the hook is just allowed to repose on the ballast where it in no way interferes with vehicles passing above. Should, however, a cut be out of control the shunter can raise the bar. The hook then engages an axle, the bar is pulled forward and with it comes the chain from the tank. As the latter is dragged over the ballast in an ever-increasing length so an *ever-increasing* braking action is produced which eventually stops the runaway.

That this method of checking is sound is proved by the fact that in 206 recorded applications of the drag chain over a number of years it never failed once, and in every case brought the vehicles in question under control without damage to them or the freight being carried.

Fig. 1 shows the layout for a Gauge 0 chain drag. The tank (A) is shaped from a rectangle of thin tin to the dimensions indicated. The lip (a) is made long to take the two strips (b) which are cut as shown and held in position by a short pin or two. Between the strips goes the piece (B) which is cut from the brass contact of a cycle lamp battery. It is just wide enough to go between the strips and has a large curve (c) at one end and the smaller tab (d) at the other to take the link of the chain.

Before fastening down the strip (b) shape and put in the wire crank and lever (f). Measurements for the crank are shown and its purpose is to raise the one end of the "bar" (B) which it will do against the pull of the chain, although (B) is only lying loosely in position.

Put a simple slotted platform (D) around the lever and adjust the slot (g) till, when the lever is pulled back, the hooked end of (B) is just raised to the axle level of a standard truck. At the near end of (B) fasten a length of linked chain (obtainable at any model makers). It is put into the trough by holding it straight up and by lowering the hand, letting it drop in slowly. This is so it will pull out evenly without "knotting".

The chain drag is now complete bar painting the strips (b) white. Although both chain and tank would be dark rust colour, it is better in the model to leave them bright as also the bar (B).

To fit in position a sleeper or so must be removed and a cavity made in the ballast (or baseboard if necessary). The equipment is then slipped into position and secured by a pin at each outer corner to a sleeper, the platform (D) being held either to the base or sleeper end, which ever is more convenient.

The other item is the sliding dead-end. This has been evolved by the ex-G.W.R. for use in some of its sidings where cuts of wagons always appeared to be doing damage to the buffers.

Made up of a concrete box 10 ft. long, 6 ft. wide and 6 ft. high and filled with ballast which gives a total weight of 20 tons, the sliding end merely rests on the rails, being supplied on the under side with steel runners. If the impingeing trucks are moving at a slow rate the block can bring them up dead, but should it be struck with a blow that would damage an ordinary set of buffers the blocks slide backward a little over the rails. The movement is usually quite small but it is enough to absorb the dangerous kinetic energy.

A sliding stop is set at some distance from the end of the siding in question, and when pushed far enough a locomotive is attached and it is hauled back to the original position. Records show that on an average sliding dead-ends are pushed 20 ft. backwards in a week.

Fig. 2 shows details of an end of this sort also for Gauge 0. First prepare the two channels of tin (a). These are $2\frac{3}{4}$ in. long (this being a trifle over scale for convenience), and if for use with scale track will be 3 mm. wide (coarse standard). The channels inverted should just grip the rail heads nicely with no slack, and they can be bent into shape over an existing piece of track. In each channel pierce two holes and pass through pins which are bent to a rectangle at their ends as (b).

Now take two large 5 in. nails and cut each to the length of $2\frac{1}{2}$ in. These, it will be found, make excellent buffers as (C). File out also the slot as indicated.

To shape the buffer-beams (d) with the pressure distributors (e) first drill two holes through a piece of $\frac{1}{4}$ in. wood (A) to take the nails tightly. These must be placed so that the centres are $1\frac{9}{16}$ in. apart. Now trim to a rectangle (B) 2 in. x 1 in. and take out the centre between the blocks. Reduce the beam in the middle so the blocks stand out as blocks as (C) and (D). Also bevel the front corners above and below the buffer shank.

The body itself in the model is completely shaped out of cement, the various items being fitted in as the shaping proceeds. To give the impression of being loaded with ballast a slight rectangular depression is made on the top and filled with fragments of stone glued in position.

First lay the channels on a length of firmly fixed track and temporarily pack up to the underside of the rail heads to give a flat base. Also rig up a rough mould as Fig. 3.

With bent pins (b) in position (which are to anchor the channels) proceed to fill the mould with cement of a fairly stiff consistency—pressing well down on the channels and into the side.

When the block so forming is nearly 1 in. above rail level lay on the buffer-beam assemblage, that is the beam complete with the nails in position and the coupling coming through the slot in the centre—it having a vertical pin at the pivoting end for anchorage. Adjust by pressing down and in a little if necessary till the buffer centres are just 1 in. above the rail. Then continue filling in cement till the final block is 2 in. high. While still damp shape in

(*Continued on page* 566)

FIG. 2

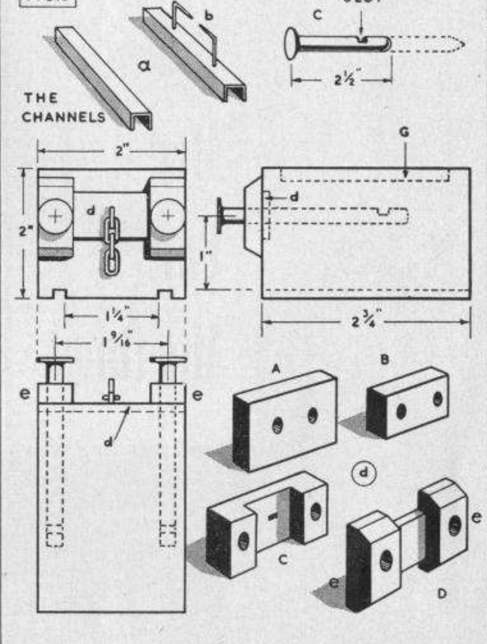
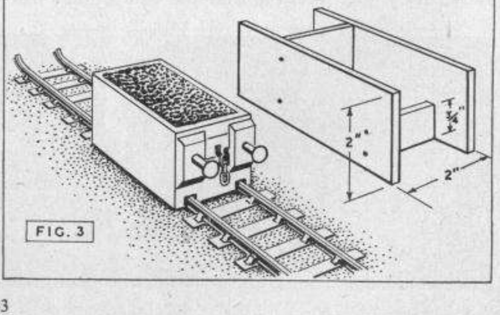


FIG. 3



Recent Model Car Meetings

AFTER a period of inactivity when it seemed unlikely that the Chiltern Model Car Club would be in a position to operate on their Woodside track due to need for extensive repairs, it was good to learn of the Club's energetic action in resurfacing the track and re-forming the club on an active basis. A date for an Open meeting was applied for and granted, and on Sunday, June 22nd, an excellent meeting was run. Fewer entries than in past years was accountable for by reason of overlapping dates and the fact that in the past it was usually arranged to run Open dates on Bank Holidays following Eaton Bray Sunday meetings, competitors staying in the district overnight. However, a nicely representative entry was received, and the competition was run off on a handicap basis, a standard figure of 125 m.p.h. being fixed, and entrants receiving individual bonus figures based on known performances. This scheme appeared to work well, and there was some close and interesting racing.

As usual the smaller classes were well supported, and the 1.5 c.c. class was notably improved in reliability, whilst there were several new models making their debut. Outstanding among these was the 158 Alfa Romeo fitted with a Dooling and run by L. R. Gawley of the home club, two fine B.R.M. models by L. Light of Maidenhead, and a neat little Cooper record car, the first we have seen based on this attractive prototype, entered by Cyril Hart, a past holder of the class record. The 2.5 c.c. class was largely composed of Olivers and Oliver powered models, this class providing the outright winner of the event in the shape of L. Newbold's Oliver. L. R. Gawley took second place, with L. Newbold's 10 c.c. entry third, and H. G. Bassom's 5 c.c. car fourth. After adding handicap figures, less than 2 m.p.h. separated the first four runners, and 10 m.p.h. covered the first eighteen.

Heading picture shows L. R. Gawley with his latest scale speed-model, a 158 Alfa Romeo fitted with 5 c.c. Dooling and spur drive. (Left): A glimpse of the Woodside track, which is newly surfaced and centred with closely mown grass.

SOUTH EASTERN ELIMINATING TRIALS

(Edmonton)

July 6th, 1952

1.5 c.c.

	1st Run	2nd Run
C. Hart	55.65	42.53
G. Laird	68.70	67.16
S. Drayson	67.72	63.33
A. Snelling	70.64	N/R
S. Drayson	69.87	N/R
C. Catchpole	71.42*	70.36

2.5 c.c.

J. Cook	N/R	N/R
L. Newbold	62.54	31.77
R. Flower	74.81	77.78
A. Snelling	79.15	80.00
S. Drayson	N/R	79.08
— Vaughan	67.26	68.38
G. Laird	62.15	73.58
R. Cottrell	N/R	N/R
A. Snelling	79.36	78.26
N. May	N/R	N/R
G. Thornton	N/R	N/R
Mrs. Joan Catchpole	79.36	84.42
C. Catchpole	79.43	65.21

5 c.c.

J. Shelton	88.14	91.46
H. Bassom	79.43	72.69
S. Laird	N/R	67.92
— Hadlow	N/R	N/R
R. Bennett	N/R	N/R
J. Shelton	N/R	87.80
R. Flower	N/R	N/R
J. Dean	90.00	90.00
J. Dean	84.74	92.97
T. Prest	81.44	89.55
L. Harris	N/R	86.87

10 c.c.)

L. Newbold	106.76	106.88
J. Dean	115.53	115.08
R. Bennett	N/R	N/R
J. Shelton	126.40	124.30
A. Thorneycroft	N/R	100.22
M. Vaughan	76.72	N/R
R. Gawley	111.24	111.11
E. Snelling	95.94	N/R
W. Warne	121.45	N/R
— Hadlow	N/R	N/R
L. Manwaring	45.96	N/R
A Poyser	75.12	N/R
A. Tasker	72.00	N/R
R. Cato	83.17	N/R
C. Catchpole	123.96	123.28

*New ¼ Record for 1.5 Class

SUNDERLAND OPEN MEETING

2nd June, 1952

(Open ¼-mile Flying Start Races

1.5 c.c.

NAME	CLUB	1st Run Speed	2nd Run Speed	Winners
A. F. Snelling	Edmonton	N/R	67.16	1
K. Proctor	Sunderland	50.99	55.48	
E. Armstrong	Sunderland	56.39	N/R	
G. Burton	Sunderland	41.82	N/R	
C. M. Catchpole	Pioneer	62.67	61.14	2
Mrs. Catchpole	Pioneer	75.50	75.18	
R. Salmon	Blackpool	63.02	N/R	
Miss R. Eaves	Blackpool	73.83	67.41	
P. Eaves	Blackpool	72.52	60.00	
M. W. Hodgson	Blackpool	65.07	N/R	

2.5 c.c.

J. Yates	Guiseley	N/R	66.66	C
E. W. B. Eames	Sunderland	N/R	W/D	
A. F. Snelling	Edmonton	84.26	74.50	A
C. M. Catchpole	Surrey	Scr.	Scr.	
F. C. Petrie	Sunderland	72.11	71.20	
E. Armstrong	Sunderland	63.06	79.43	B
K. Pell	Guiseley	77.78	72.69	
R. Salmon	Blackpool	N/R	N/R	
J. Shelton	Edmonton	90.18	96.05	
W. Hamilton	Guiseley	N/R	89.40	B
L. Fozard	Ossett	N/R	86.70	C
J. T. Green	Sunderland	72.00	N/R	
J. C. Cook*	Sunderland	99.11	96.35	A
H. Pickersgill	Guiseley	46.35	69.65	D

5 c.c.

— Ellwood	Blackpool	85.47	N/R	
J. C. Cook	Sunderland	90.18	85.47	
T. Prest	Edmonton	83.33	87.63	
J. Dean (J. Shelton)	Surrey	95.23	93.94	
B. Winterburn	Guiseley	79.78	74.07	
M. Bradley	Guiseley	72.17	N/R	
C. M. Catchpole	Pioneer	97.03	N/R	
J. Yates	Guiseley	N/R	98.46	
E. Armstrong	Sunderland	75.00	73.28	
J. Shelton	Edmonton	N/R	126.22	A

10 c.c.

J. W. Riding*	Blackpool	103.44	115.83	
C. M. Catchpole	Surrey	119.84	117.95	
H. Cook	Bolton	102.73	N/R	
J. Dean	Surrey	119.52	122.28	
R. J. Eaves	Blackpool	104.77	N/R	
H. Cook	Bolton	N/R	W/D	
F. C. Petrie	Sunderland	N/R	W/D	
W. Hamilton	Guiseley	N/R	109.22	B
K. Shaw	Ossett	85.95	W/D	C
A. F. Snelling	Edmonton	120.80	N/R	

*New Record

(Above): The Chairman chalks them up. P. D. Macdiarmid was once more in the thick of things at the Chiltern meeting, although no longer running his well-known and unconventional models.

(Right): A visitor from the Maidenhead Club, L. Light, with two nicely built models of the B.R.M., powered with home-constructed 10 c.c. and 2.5 c.c. motors.

CLEETHORPES OPEN MEETING

June 29th, 1952

1.5 c.c.

NAME	CLUB	1st Run Speed	2nd Run Speed	Winners
O. Bellamy	Grimsby			
K. Proctor	Sunderland	44.24	54.05	2
G. Mellors	Nottingham	44.10	N/R	
C. Catchpole	Pioneer	68.02	64.98	1
E. Armstrong	Sunderland	50.00	51.69	
G. Mellors	Nottingham	45.36	43.56	
Mrs. Wright	Sheffield	49.01	49.18	
P. Robinson	Sheffield	41.51	49.55	

A well-known supporter of the 1.5 c.c. class and a former record-holder, Cyril Hart, competing at Woodside with a neat 1.5 c.c. replica of the Cooper record car, which showed a brisk turn of speed.

2.5 c.c.

B. Winterburn	Guiseley	73.83	66.17	
D. Broadbent	Grimsby	62.50	63.92	C
C. Dickens	Nottingham	55.38	55.76	
C. Catchpole	Pioneer	—	78.46	
C. Bonn	Lincoln	67.87	68.80	
K. Procter	Sunderland	61.22	44.33	
E. Armstrong	Sunderland	N/R	71.77	
Mrs. J. Catchpole	Pioneer	85.35	86.04	A
J. Yates	Guiseley	70.25	—	
W. Crow	Nottingham	79.11	79.64	B
B. Jepson	Guiseley	—	—	
G. Mellors	Nottingham	—	—	
F. Pertie	Sunderland	—	73.46	
E. Armstrong	Sunderland	67.11	72.81	
O. Bellamy	Grimsby	55.04	64.98	
G. Moorby	Grimsby	61.64	62.41	
A. Wright	Sheffield	62.24	50.84	
S. Wright	Sheffield	—	62.28	
P. Robinson	Sheffield	59.44	66.66	
A. Staniland	Sheffield	44.55	44.11	
Mrs. Shirt	Sheffield	—	—	

5 c.c.

G. Moorby	Grimsby	72.87	—	
B. Winterburn	Guiseley	77.51	81.08	
H. Pickersgill	Guiseley	—	—	
J. Yates	Guiseley	94.24	—	A
J. Cook	Sunderland	91.83	80.93	
R. Monument	Grimsby	75.31	61.81	
R. Shillito	Grimsby	—	82.56	
R. Page	Lincoln	70.64	—	
K. Pell	Guiseley	80.50	79.64	
L. Fozard	Ossett	—	—	
G. Moorby	Grimsby	—	78.94	
D. Broadbent	Grimsby	80.71	81.44	C
J. Cook	Sunderland	64.93	80.50	
W. Hamilton	Guiseley	88.06	82.94	B
B. Walker	Guiseley	77.12	74.38	

10 c.c.

K. Pickles	Ossett	96.15	75.00	C
P. Hugo	Derby	113.92	112.50	
F. Petrie	Sunderland	105.38	114.64	B
B. Jepson	Guiseley	100.89	—	
C. Catchpole	Pioneer	118.42	117.34	A
K. Shaw	Ossett	111.24	107.14	
W. Hamilton	Guiseley	112.78	109.75	
D. Robson	Meteor	63.15	—	

FINALISTS FOR NATIONAL SPEED TROPHY AT CLEETHORPES, AUGUST 3rd, 1952

10 c.c. Class

N.W.	J. W. Riding	108.56
N.E.	W. Hamilton	113.92
S.W.	B. Hurn	94.73
S.E.	J. A. Shelton	126.40
M.	I. W. Moore	121.95
	C. M. Catchpole	123.96
	A. F. Snelling	122.95
	W. S. Warne	121.45
	F. J. Dean	115.53
	L. Gawley	111.24
	F. Petrie	111.10
	R. J. Eaves	108.04

5 c.c. Class

N.W.	A. Ellwood	79.29
N.E.	J. C. Cook	94.73
S.W.	B. Hurn	84.11
S.E.	F. J. Dean	92.97
M.	Mrs. I. W. Moore	88.32
	J. A. Shelton	91.46
	J. Yates	90.00
	T. Prest	89.55
	L. Harris	86.87
	W. Hamilton	86.53
	J. R. Parker	84.58
	G. A. Moorby	80.50

2.5 c.c. Class

N.W.	M. W. Hodgson	68.91
N.E.	F. Petrie	76.92
S.W.	B. Harris	67.16
S.E.	Mrs. J. Catchpole	84.42
M.	I. W. Moore	73.77
	A. F. Snelling	80.00
	C. Catchpole	79.43
	F. Drayson	79.08
	R. W. Flower	77.78
	K. Procter	75.00
	E. Armstrong	73.77
	G. R. Laird	73.58

1.5 c.c. Class

N.W.	R. J. Eaves	49.61
N.E.	K. Procter	64.28
S.W.	B. Harris	58.44
S.E.	C. M. Catchpole	71.42
M.	O. M. Bellamy	47.31
	A. F. Snelling	70.64
	F. Drayson	69.87
	G. R. Laird	68.70
	C. Hart	55.65
	Mrs. E. Wright	55.21
	E. Armstrong	52.94
	E. Bishop	50.56

TWO NOVEL ITEMS

(Continued from page 563)

the rectangular depression (g) on top which is to take the glued-on pieces of ballast.

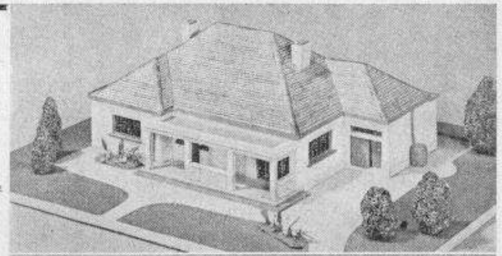
Complete drying will not take long and when effected a very solid block will be formed with all the items held tightly in their various places. The main thing is to work quickly so that the cement locks well around everything.

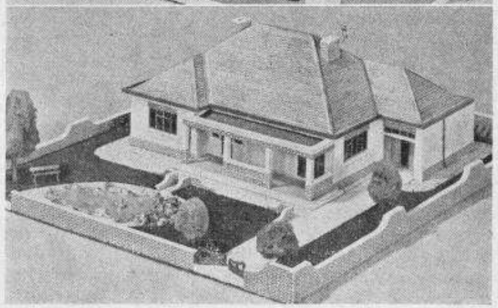
The completed dead-end looks better if the buffer-beam is given a touch of pillar-box red. The buffer-head should be aluminium.

For true accuracy the model should be placed about a scale rail length from the end of the siding, but for space economy it can be much nearer the end than this and still give the right idea of its purpose.

TEST BENCH

A REVIEW OF THE BENNETT BUNGALOWS AND A NEW MINIC AMBULANCE





THERE are model makers who quite firmly and logically maintain that their hobby is a recreation, pure and simple, and that in order that it should provide them with the beneficial relaxation and change from the struggles and worries of everyday life it must remain divorced from any form of commercialism. This is certainly the idealist's view, but in practice it is probable that the greater majority of our number are anything but averse to turning their hobby into a little useful cash, with the proviso that the idea doesn't get out of hand and become a laborious toil. In fact the incentive of a small monetary reward may well add considerable spice to the enterprise without in any way detracting from its recreational value, and may even reconcile the womenfolk to what might otherwise be regarded as a profitless and litter-making activity!

Catering for those who do not scorn to turn their craftsmanship into money are Bennett Models, of 3 Lower George Street, Richmond, Surrey, who specialise in supplying architectural models of bungalows for professional display purposes in the windows of building societies and estate agents. They have submitted details of their scheme whereby they are prepared to supply plans and working instructions for these model bungalows, to private constructors, and to buy the finished models at a prearranged price, subject to their being constructed to a satisfactory standard. Materials are not supplied, but these are of a simple nature, and if required the firm will advise on suitable sources of supply.

It is claimed that the work is equally suited to persons of either sex, and that no special equipment is necessary. The kitchen table or an old bench is the only working space required, and the models can be built with a sharp penknife, one or two used razor blades, a pair of scissors and a 12 in. ruler. Materials consist of Bristol board, plywood, gummed tape, seccotine, commercially produced building papers and sheet celluloid, and the total cost of these for the production of one model is estimated to be 9/-. First-class models are purchased at the guaranteed price of £4/4/-, Bennett Models paying postage charges.

The principal conditions imposed by Bennett Models are the deposit of one guinea for plan and building instructions, which sum is returnable on acceptance of the first model, and a time limit of three months, from date of enrolment, for acceptance of up to a limit of eight models. In the event of a submitted model being below the standard required, the model will be returned to the maker with a detailed report to assist him in correcting the faults.

The finished models themselves measure 8 in. x 5 in. x 4 in., on a base approx. 12 in. square which is set out as a garden. As seen in the accompanying photographs, a most attractive effect is achieved in this scale.

Minic Ambulance

Although not perhaps strictly within the province of *Model Maker*, so many readers have junior members of the family who are ardent collectors of the Minic range of clockwork road vehicles that a recent addition is worth recording; that of the Minic L.C.C. Ambulance illustrated here. Made to the usual excellent standards and, of course, clockwork-powered, this small vehicle has double doors secured with a drop-bar, and a fully-fitted interior, which includes a neat plastic stretcher. Minic collectors will be quick to have this one in the set, the price being 5s. 2d.

The MINIATURE LOAD

By H. A. Robinson

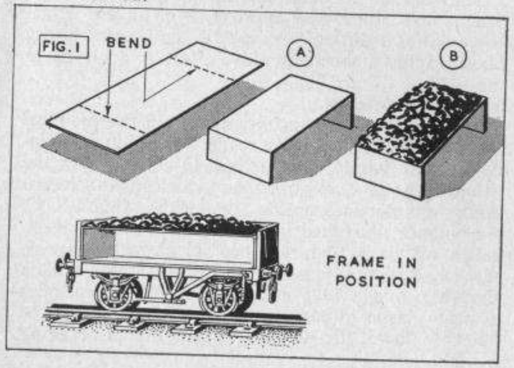
TO have too many railway trucks without loads can give a model layout a strangely desolate appearance. Some empty stock there must be, but on no grid of sidings do they ever command the whole view, except perhaps where the empty coal stock returning to the pits is the order of the day. In the general railway scene the loaded truck predominates, and so a miniature goods yard with every vehicle empty can look very odd—and with a cold, cheerless oddness at that — like a well set table with no food.

Attention, therefore, should be given to the fitting of stock with interesting, fairly correct, and mechanically sound burdens—that is to say, loads that are not too heavy and that in no way interfere with good running.

The younger operator need not feel that he is doing anything extraordinary in becoming load-conscious, for authorities on the model railway hobby, without exception, stress the importance of loading. Thus the author of one comprehensive work says, "Trucks look far better when performing their normal vocation of carrying something, though it is in order for a few to be left empty", while another in his book tells us that a good vehicle can be made better and a poor vehicle helped by a suitable load. All of which, from our own personal experience, is very correct.

The characteristics of a good load are : —

1. Clean to handle and clean in appearance.
2. Not too heavy in comparison with the weight of the truck.
3. Easily detachable yet firmly fixed.
4. Realistic, no matter from what angle it is viewed.
5. Inexpensive, and so readily replaced when it is desired to brighten things up a bit.



The open truck is, of course, the most popular vehicle, and should be considered first. It can carry anything from the smallest item to bulk consignments like coal, coke, gravel and ore, though there are generally now special iron vehicles for the latter.

Bulk loads can be well represented by small fragments of the actual material. Undue heaviness can be avoided by supplying each truck with a card frame as (a) Fig. 1, which just fits inside the body, and upon which the small pieces of the material in question are glued in a realistic pile. The glueing is best effected by dipping the pieces in thin glue and then putting them in position *en masse* as with tarmac on the roads.

Attempting to glue each piece individually is seldom satisfactory. To prevent the top of the load looking too glossy a final sprinkling with a fine dust of the material helps, any loose particles being blown away after drying has taken place. In any case the film of glue around the pieces tends to lose its gloss after a time and may not by some be thought a drawback even in the first case, as it gives a decidedly clean appearance.

If the inside frame is carefully made and the glued material prevented from sticking to the truck sides as it hardens, a load of this type is detachable by the simple expedient of completely inverting the vehicle when, together with the frame, it falls out into the hand. The load will not come out in ordinary derailments, however, and in no circumstances will it "spill", which is one of the main things being aimed for.

Bulk loads that look well are coal (standard-sized lumps), slack (which in model proportions is getting very near dust, gravel, which is actual gravel broken down to very small pieces, tarmac (black painted gravel), and sand.

Iron ore is dark looking, and is usually not in too small lumps. Stone stained to a reddish brown does well here. Ballast is another often dark-toned bulk load.

The open truck, too, can be used to carry quite a number of other loads, and these are often sheeted. When a sheeted load is being represented all that is necessary is some crumpled paper inside to give a certain degree of shape. Sheeted trucks look definitely good, and the acquisition of a number of correctly marked model tarpaulins is well worth while. An imitation sheeting can be made with cellophane, however, painted with art metal black.

A good light load requiring a sheet is hay. This is taken high up to loading gauge limit and is usually held by two "binders" as Fig. 2.

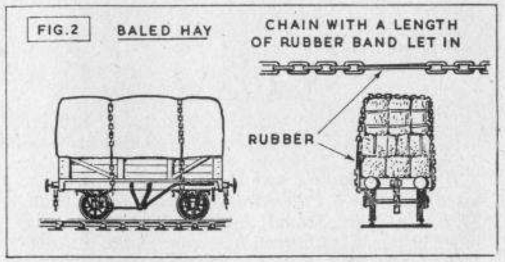
The half-sheeted load as often found with timber consignments of the "plank" variety is easy to copy. The pieces slope in the vehicles as Fig. 3, and are sheeted up as high as possible. It is best to make this load by glueing a number of suitable strips together. Place these in the truck at an angle and pack the space at the lower end with paper, glueing tightly to the wood. Then make everything tight with the sheet. Timber loads of this kind look best when, say, two or three trucks so laden are kept permanently coupled together.

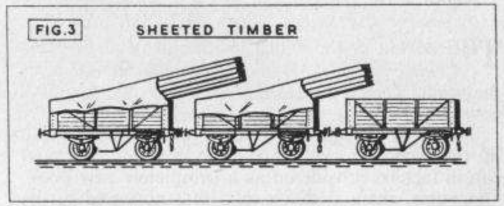
Unsheeted open truck loads can be almost anything that would not be affected by the weather. Discarded pairs of wheels (railway) look well, as do pipes, which can be lengths of dowel lightly glued together. Trucks loaded with pipes usually do not carry too many, so follow suit in any miniature reproductions. Certain crate loads, too, can be left unsheeted as can certain unspecified items that look as though they would not be damaged by being uncovered to the air. Indeed, there is a wide field open to the imaginative worker in the unsheeted load.

As mentioned, loading should not add inordinately to the weight of a model train, but a little additional weight will often improve running quality if the bearings are all kept well greased. In all cases marshal trains with the heaviest loads in front. In all the loads mentioned so far, equal distribution of weight will come about almost automatically, but it is a point that should be carefully watched, as too much overhanging weight at one end can cause derailment of the lighter end, especially if coupling heights do not exactly agree.

Coming to the flat truck, a different type of load is introduced. Here we get agricultural machinery (tractors, etc.), motor cars and other wheeled vehicles. Logs also go on flat trucks as do rails and certain types of machinery. Road vehicles for gauge 0 loading can be any of the remarkably accurate "dinky" toys. The best way to hold these in position is by chains in which have been let lengths of rubber band. These hold the load firmer than would any direct lashing, as the elastic exerts a continual pressure—also it allows of the load being readily removed (again see Fig. 2).

The flat truck can also carry a "container"—a box chained down, which is transferable in its entirety to a road vehicle. The container is readily copied,



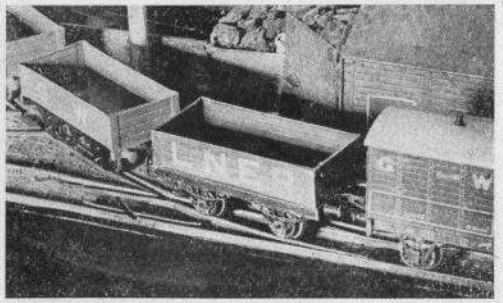


as is the twin flat-truck unit carrying logs or rails. The vehicle must be permanently coupled and each supplied with a swivelling "bolster". Flat trucks, too, are often used to precede an overhanging load and so form part of that load's assemblage.

Finally we get the unusual trucks and their burdens. They include the well wagon, the bogey rail truck and the special heavyweight sets. Relaying trains are now often seen with bogey flats piled high with ready-made lengths of track complete with sleepers. A relay train of this sort looks really well. It is also very modern and comparatively light in weight. The lengths of prefabricated track are simply laid one above the other and chained down, as just described, with a length of rubber in each chain.

With trucks supposed to carry transformers and other electrical gear, there are actual pieces of real electrical equipment that fit nicely on these vehicles, and a search amongst discarded bits from an old wireless set will often produce some ideal pieces.

Too many empty trucks can look very desolate.



A Review of MODEL SAILING CRAFT

By W. J. Daniels and H. B. Tucker; 3rd (revised) Edition. Published by Chapman & Hall, 37 Essex Street, Strand, W.C.2. Size 9¾ in. x 7¼ in., 239 pages. Thirteen half-tone plates, 18 folding plates (17 in. x 9¾ in.), 144 diagrams. Cloth bound with gold blocked title on spine, half-tone, two-colour dust cover. Price £3 3s. 0d.

THE advent of the Third Edition of *Model Sailing Craft* by Messrs. Daniels & Tucker at last gives the model yachting fraternity an up-to-date textbook covering the whole of the sport in detail.

This book is rather more than just another edition of the previous well known pre-war volume, and can in fact be considered as a completely new book. Of course, there is much in it that appeared in the previous volumes; this being justifiable as the general principles of designing and sailing have not changed, but latest developments have been incorporated and the book is completely modernised.

Possibly the first things that one looks for in this book are the designs, and we find one A Class, two 10-Raters, one 6-Metre, one M Class and a 36 in. R. It is by examining designs that the student can obtain the greatest knowledge and understanding about hull form, and if any budding designer can achieve the beauty of line to be found in the designs published in this book then he is a genius indeed.

It is pleasing to find that the Sharpie 36 in. in the first editions has been superseded by a very attractive 10-Rater of true Sharpie type with constant chine angles. It will be interesting to see some of these boats sailing, for I am sure that this design, properly sailed, will prove that there is little difference in performance between a good Sharpie and the more normal type of round-bilged hull. The construction of this boat is very simple and being explained in detail, should be a very suitable task for the novice.

The chapters on design will be of interest to professional as well as amateur designers and contain all the relevant information necessary to produce a good and well balanced boat. The authors do not attempt to make a science of design, but make it obvious that it is an art to which mathematics can only be a guide. It is perhaps a pity that when dealing with the drawing of the lines that it is recommended virtually to base the character of the hull on the main diagonal, as the beginner may have some difficulty in visualising how the main diagonal should appear. Admittedly, this is a matter of opinion, but some people find it easier to draw in a tentative L.W.L. and quarter beam buttock, and use the main diagonal as a check on the lines as they are developed. I doubt whether any two designers go about the job in the same sequence, and I should not like to enter into argument with Mr. Daniels over this point, as he is perhaps the finest designer the model yachting world has seen.

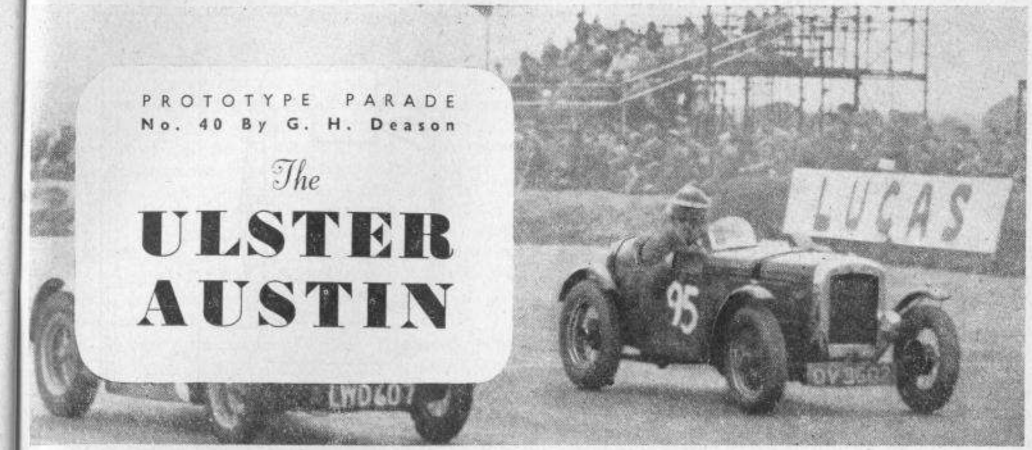
There is some excellent writing on vane steering, Braine steering and the combination of both. All model yachtsmen would do well to read this as many of the faults to be seen in the performance of yachts are explained and the remedies given.

The authors are not blind to the fact that radio control may enter into the model yacht racing sphere and whilst not dealing with it in a technical sense, give a useful guide as to the effects it may have.

There is a very useful chapter on glues and their various types and methods of application. In fact, it is difficult to think of any subject connected with model yachting that is not fully covered by this book.

All seriously interested in the sport should possess themselves of this volume and those who are fortunate enough to have one of the earlier editions should add this edition to their shelves, as there is so much new information contained in it.

The price is 3 guineas, which admittedly is expensive, but considering the amount of technical knowledge and experience that has gone into this book, it is very good value.



PROTOTYPE PARADE

No. 40 By G. H. Deason

The ULSTER AUSTIN

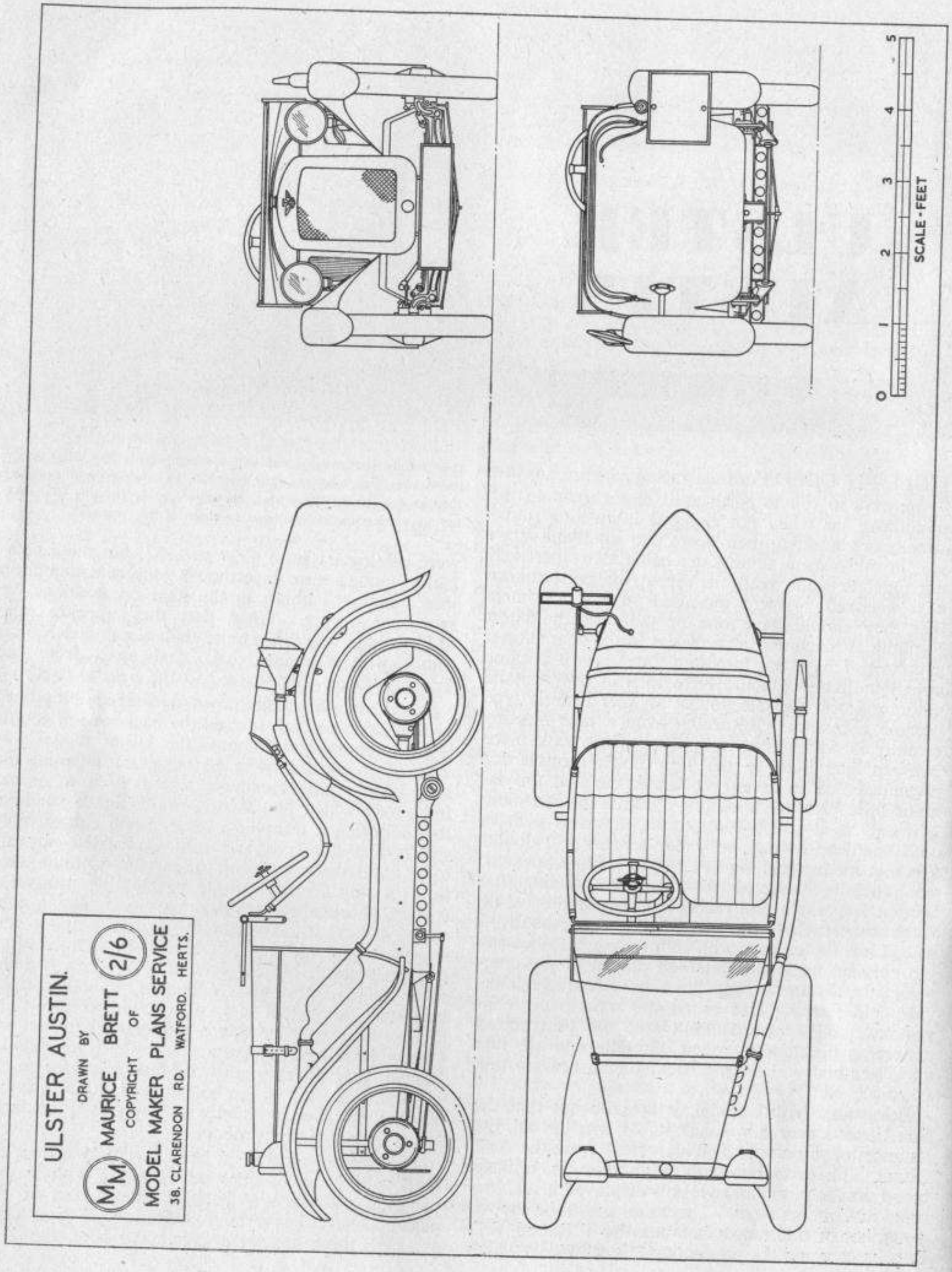
Over twenty years young, and still winning races! The Ulster Austin shown above has been modified in detail, its original condition being illustrated overleaf. The mystery car concealed by the title is another but much more drastically altered specimen of the "marque".

FULL-BLOODED Formula racing cars are not just as easy to run to earth as it might seem to the uninitiated, as when not engaged in rushing round circuits or slamming their noses into sandbanks they are, in mid-season at anyrate, being torn apart and put together again ready to repeat the performance next weekend. Now I promised "P.P." customers that they should have one or more of the latest Formula II machines in the series in the near future, a promise I have not forgotten, but when it became apparent that this would have to wait over till the autumn issues, the selection of another historic type became necessary. Returning from a race meeting recently in which a most spirited affray took place between cars built to the 750 Club's formula for revamped Austin sevens, it struck me that the famous little "Ulster" was long overdue for attention. Not only is it still a force to be reckoned with in club handicap racing, but older readers will doubtless join me in recalling how, when it first appeared, we hopefully inspected our passbooks, feeling that here at last was a real racing car that might just be within our reach to possess. Speaking personally, I passed up the chance with infinite regret, since my job entailed meeting a fat high official of my company at a distant railway junction at frequent intervals, and ferrying him round the area in my conveyance, and I just couldn't face the prospect of cramming his dignity, rolled umbrella and all, into an Ulster body. Looking back, I wish heartily that I had.

Being an "Irish" model, it is quite apt that the first Ulster I ever saw wasn't an "Ulster" at all, but its ancestor, an actual T.T. car, fresh from the Ards circuit, still plastered with mud over its brilliant blood orange paint, and proudly displayed in a showroom in Colmore Row. There are, as will be shown, a number of differences between the T.T. and T.T. Replica cars and the production Ulster models which were catalogued from 1929 to 1932, but these catalogued models were nevertheless genuine competition jobs, ready to submit to the final preparations for sports-car events. When first they appeared the M.G. Midget was little more than a glorified Morris Minor with a pointed tail, and apart from the Triumph Gnat, the Austin had the field to itself.

Based on the well-known U-shaped "top-hat" section chassis which formed the backbone of countless chummies and saloons, the Ulster model was lowered no less than 4 in. by means of flattening the long back springs and the provision of a special front axle which bowed downwards in the middle, thus allowing a transverse front spring considerably stiffer than standard, and with a reversed camber, to be fitted above it. With the number plate in place little of this arrangement is visible, the transverse friction shock absorbers and the spring being concealed behind it. The familiar square radiator surmounted this, and looked more than usually squat and purposeful. The "genuine" T.T. cars had the short hinged Chummy-type bonnet, with the scuttle housing a large fuel tank with an impressive filler cap on top, incorporating a tightening bar, but the Ulsters had the long bonnet and short scuttle, the bonnet having twenty rearward-facing louvres on the off-side. The top of the bonnet is of flattish section, and the rear edge is actually a straight line, the dashboard being square-cornered.

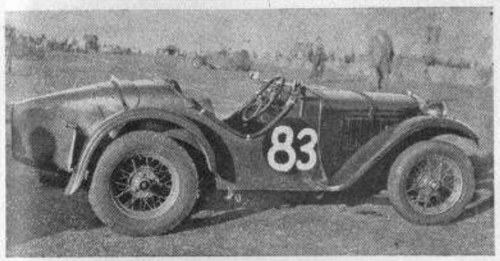
The narrow aluminium body is simply a doorless shell with cutaway sides neatly piped with leather padding, and the seat back is shaped, but in one piece. The tail is a famous feature of these cars, although there are some differences here, the T.T.



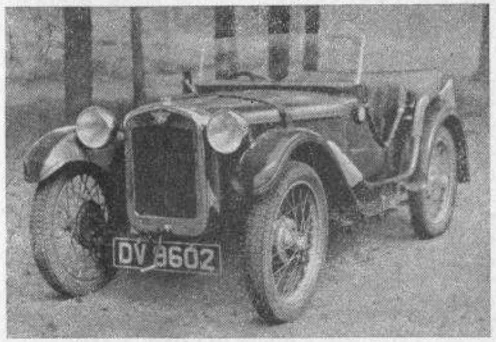
cars being deeper, whilst some of the production models were 4 in. longer than others. The short version measured almost exactly 3 ft. from seat back to tip. In this tail the spare wheel was carried in a transverse well with a detachable cover, held in place by a strap, and the battery appeared through the cockpit floor on the passenger's side. An outside exhaust system was standard equipment, with a flat aluminium silencer, tail pipe and fish tail, the T.T. tail pipes being ever more emaciated than the Ulsters. Very standard-looking wings were fitted, amply covering the 19 x 3.50 tyres then supplied, and "touring" fittings included a fold-forward one-piece screen, combined head and side lamps, and a hood and hood-bag.

The driver grips a spring-spoked 16 in. dia. wheel with the familiar hand throttle and ignition levers and horn button atop, has the long bent-wire gear-lever and standard hand brake on his left, and a simple instrument panel before him, with rev. counter (6,000 r.p.m.) on the right, circular lighting panel and speedometer centrally, oil gauge to the left of these and clock on the extreme left. The supercharged model also boasted a hand air pressure pump.

It is problematical whether the engine itself is of



much interest to model makers, but it was in this department that one found what made the Ulsters tick so lustily. Apart from special heads, bronze on the T.T. cars and aluminium on the production versions, larger and pressure fed crankshafts, lighter and shim-adjusted tappets, pump cooling and special valves and camshafts figured in the modifications from standard, and the blown models had the Cozette superchargers gear driven on the nearside of the engine, lubricated from a separate oil tank. All this spelt some 33 b.h.p., or 24 b.h.p. unsupercharged, and although these figures may sound modest by present-day standards, they gave the satisfying maximum speeds of 75 m.p.h. and 65/68 m.p.h. in top gear without special tuning, and excellent acceleration using the close-ratio three-speed boxes, with a degree of reliability then almost unknown in small sports cars. It is a saddening thought that all this could be bought, shining new, for £185, or £225 with the "puffer". Far greater performances were achieved by factory tuned models, and amid



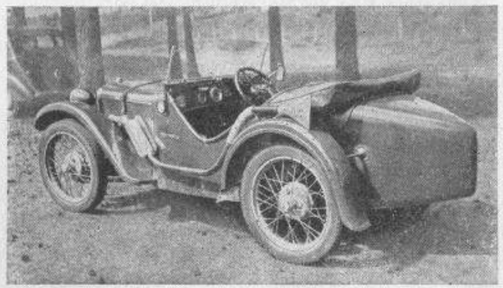
Three views of F. G. Tiedman's "Ulster" in original trim, apart from the rebuilt wheels shown on the left. The transverse well and cover for the spare wheel can be seen, also the somewhat serpentine exhaust system with regulation expansion chamber, tail pipe and fishtail. The body is the short-tailed version, and the lower picture shows the car with full catalogued equipment.

innumerable class wins and places in the classic races of the time, the epic performance of Sammy Davis and the present Duke of Richmond in winning the 1930 500 miles race at the fantastic average speed of 83.41 m.p.h. must surely set the seal on the reputation of this great-hearted and loveable little motor car.

A famous privately-owned specimen of the middle 'thirties was Turner's, which some readers may recall as a highlight of the early Donington Park meetings, where its progress round that difficult circuit was a sight to remember. At one time this car held the lap record for the old course, and was almost unbeatable in short races.

Today there are few specimens in anything like original trim, but I was lucky in finding one through the help of Ken Welfare, secretary of the 750 Club. Its owner, F. G. Tiedman of Harrow, was most helpful, and although the car was in process of being stripped following a win the previous week at Castle Coombe, he kindly loaned several photographs of the car in its original condition.

(*Continued on page* 549)



DOPE & CASTOR

By JERRY CANN

FROM time to time I get into hot water for aiming bricks (generally of all-balsa construction) at the M.C.A., so let me now toss a bouquet to the Association's Records Officer, Ken Procter, who is taking his job seriously and doing it darned well. Time was when it was next to impossible to gather up-to-date gen on who held what and where, but the excuse no longer holds water, information being now made available promptly, and kept up-to-date between official releases. From his latest dispatch I learn that the following new records have been confirmed :—

2.5 c.c. British and Open

¼ Mile Mrs. J. Catchpole—88.23 m.p.h.
½ Mile C. M. Catchpole—88.23 m.p.h.
5 Miles J. R. Parker—66.18 m.p.h.

5 c.c. Open

¼ Mile J. C. Cook—99.11 m.p.h.

10 c.c. British

¼ Mile J. W. Riding—115.83 m.p.h.

All these are most interesting figures, and none more so than the last, for the 10 c.c. figure previously set up by F. G. Buck looked a formidable one to tackle, since many people have felt that it would call for another home-built engine to crack this particular nut. I do not pretend to know how much home modification has been done to the Rowell motor in the new record-holder, but it is heartening to hear that a commercial British engine which has always enjoyed a sound reputation amongst speed-men has proved capable of being tuned to record form. Congratulations, Joe Riding.

The 2.5 c.c. records were all taken at Edmonton, John Parker's car also being Oliver-powered, and both Jack Cook and Joe Riding notched up theirs at Sunderland. Readers will also have noted that the 1.5 c.c. record has taken another crack, this time at Edmonton, when Cyril Catchpole's lined-down Oliver clocked 71.42 m.p.h., a figure which at the moment is unconfirmed.

Meetings are reported thick and fast at this time of year, and it is not always possible to include full results while they are still warm. The N.E. Regionals at Guiseley came to hand from Ken Procter when there wasn't a hole left to pop them into, but here are the highlights. Ken Procter himself scooped the 1.5 c.c. class with a best speed of 64.28 m.p.h., F. C. Petrie, also of Sunderland, took the 2.5 c.c. category with his E.D. Special at 76.92 m.p.h., Jack Cook put in a resounding 94.73 m.p.h. with his Dooling powered car to win the 5 c.c. class, and W. Hamilton took the 10 c.c. class on a re-run with his Dooling Special at 113.92 m.p.h., to strike a blow for the home club against the invading Sunderland warriors.

Turning for a moment from the dust and smoke of the race tracks, to the more academic atmosphere of the exhibition hall, the Staines & District S.M.E. are again holding their annual exhibition at the Kingston Road Primary School, Staines, on September 13th, open to all comers so far as the competition side is concerned, and loan models will be welcomed. A special car section is included, so if you would like to compete or to loan a model, write to R. F. Slade, at 166 Kingston Road, Staines, Middlesex.

Another popular show is the North London S.M.E.'s exhibition, due to be held at St. John's Hall, Friern Barnet Lane, Whetstone, N.20, daily from 4.0 to 9.30 p.m., and Saturday 10.0 a.m. to 10.0 p.m., from August 11th to 16th. The Society has a keen model car section, with the accent on small engines and rail racing, so there is sure to be plenty of interest to model car folk here.

At the moment of writing the British contingent for the Italian Nationals are setting about with a fine selection of speed machinery, which includes most of the record holding models, to see what they can do on foreign soil. The larger classes are to run on a 100 ft. track, which may worry them somewhat unless they have plenty of time to sort out carburation problems, but they should certainly give a good account of themselves. Full report next month.

Rail track enthusiasts who would be interested in taking part in an Open Race Meeting in the late autumn or early winter will be more than interested in a suggestion received from F. G. Buck of the Meteor Club. Knowing that at the moment shortage of suitable tracks is something of a deterrent to would-be circuit racers at the present time, he and his fellow club-mates have had the excellent idea of offering the hospitality of their fine circuit to any builder of a rail-track model conforming to the standards previously set out in these pages. If those interested in the scheme will write to *Model Maker* stating their intention to compete, fuller details will be forwarded to them as soon as these can be finalised, together with a list of constructional requirements which will ensure that their models are suitable for running on the Meteor Circuit. Although it is not envisaged that the meeting will take place for some little time yet, it is imperative that things should start moving at once. S.A.E. with your enquiries, please.

Tramways Exhibition

Following on the abandonment of the last few miles of London's once vast tramway system on July 6th an exhibition of models, photographs, and documents portraying the history of London's tramways will be held on Friday and Saturday, August 15th and 16th, in the Royal Scottish Corporation Hall, Fetter Lane, London, E.C. The exhibition opens at 5 p.m. on August 15th.

There will also be a working demonstration layout showing ¾ in. scale cars working on the overhead and conduit systems. The exhibition is organised by the Tramway and Light Railway Society. The open top car recently seen at the Festival of Britain will be shown working on this layout.

All advertisement enquiries to . . .

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