

# PROJECT '66

## Part 2



by Ron Warring

Last month we built the hull with the aid of the free full size plan; that was PHASE 1.

This month we add the finishing touches and install the power unit.

Next month in PHASE 3 we will present a second free full size plan showing no fewer than SEVEN different power boats that can be adapted from the basic hull. Finally, PHASE 4 in the April issue, will show how you can fit any of these boats with radio control.

## ELECTRIC OR DIESEL?

If this is your first model powerboat, you will find it much easier to build the electric-powered version. The standard Meccano Power-Drive motor is ideal for this model and is not too heavy on batteries.

A diesel-powered boat is faster, and perhaps rather cheaper to operate in the long run. BUT far more skill is required to install a diesel engine, and great care must be taken to completely fuel-proof the inside of the boat, to prevent the fuel waste and exhaust gases from destroying the paint.

The noise of diesel operation often limits the number of places where the boat can be operated. Even with a 'silencer' the engine can be very noisy. Another point to bear in mind is the possibility of running out of fuel with the boat out of reach of dry land! An electric motor will continue to run, and eventually bring the boat within reach—even though the battery may be getting flat, but a diesel engine just stops—take your pick!

IN this article we shall describe how to complete 'Brave Moppie' as a working model with either electric motor or diesel power. The choice of power unit is, in fact, wide open. The more powerful the motor the faster the model will go. Thus if you decide on electric motor power, choose a reasonably powerful motor like the biggest models in the 'Orbit' or 'Mabuchi' range. If these are too expensive, buy the largest of the alternative sizes or makes you can afford.

In the case of diesel power, the hull will take any size of engine from 0.5 cc up to 1.5 cc. We have shown the DC 'Spitfire' on the installation drawing and we consider this, or the DC 'Merlin', an ideal power unit for this size and type of hull. Alternatively, if you want more speed, try a 1.5 cc motor.

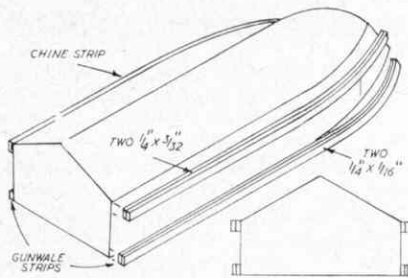
Before fitting out the model, however, there is still some work to do on the hull. The hull has already been prepared virtually ready for painting if all the stages described in part (1) have been completed. The next thing is to fit the chine strips and gunwale strips, as shown in Fig. 1. Two strips are used in each case since these can readily be bent to the curve of the hull where a single solid strip will probably break. Cement in place securely and hold with pins until dry. When set, lightly round off the edges of the gunwale strips but round off the uppermost side of the chine strips to a complete quarter-circle section.

Each bottom panel now has four  $\frac{1}{4}$  in. square balsa spray strips cemented along it, as shown in Fig. 2. These run parallel to the keel, with each strip spaced  $\frac{1}{4}$  in. apart. Carry them round the curve of the bow up to the extreme bow or chine

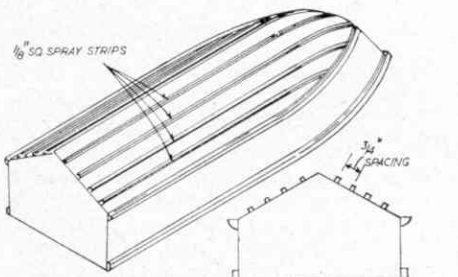
line and trim off neatly. It does not matter how the curves of the strips run at the bow, provided they are the same on each side.

Next make and fit the hatches—Fig. 3. These plug into the opening left in the hull. The forward hatch top will protrude above the deck and so must be sanded down to blend into the curvature of the deck. Both hatches should be a nice 'plug' fit in position. It is advisable to cement reinforcing strips of  $\frac{1}{4}$  in. square or  $\frac{1}{2}$  in. by  $\frac{1}{4}$  in. balsa under the edges of the permanently fitted afterdeck pieces along the hatch line to support the decking in this region. This need not be done if the model is to be diesel powered since there is no need to gain access to the rear part of the hull once the steering has been linked up and so the aft hatch can be cemented in place permanently after ballasting. If the model is to be converted to radio control, however (to be described in the April issue), the aft hatch must be removable.

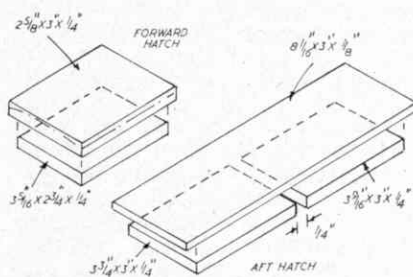
At this stage the propeller shaft tube and rudder tube should be fitted. There is already a 'channel' in the keel unit to take the stern tube and the position of this can be located by measuring  $4\frac{1}{4}$  in. along the bottom of the keel from the extreme stern. If the stern tube is more than  $\frac{1}{4}$  in. diameter this 'channel' should be opened up with a round file or a similar tool, until the stern tube can be slid up in position until it reaches bulkhead 4. A hole will then have to be cut in bulkhead 4 to allow the stern tube to pass through to its final position. Fill the bottom end of the 'channel', if necessary, with scraps of balsa driven in place and then thoroughly seal the area where



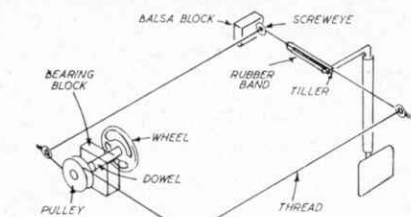
**Fig. 1**



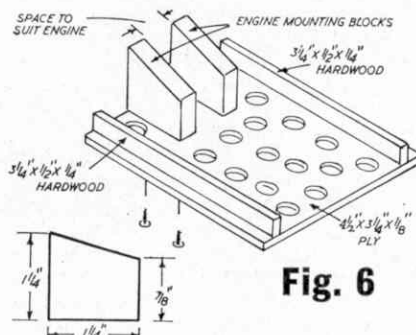
**Fig. 2**



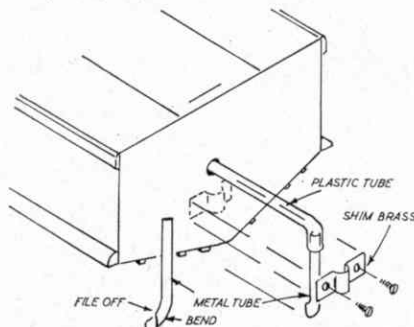
**Fig. 3**



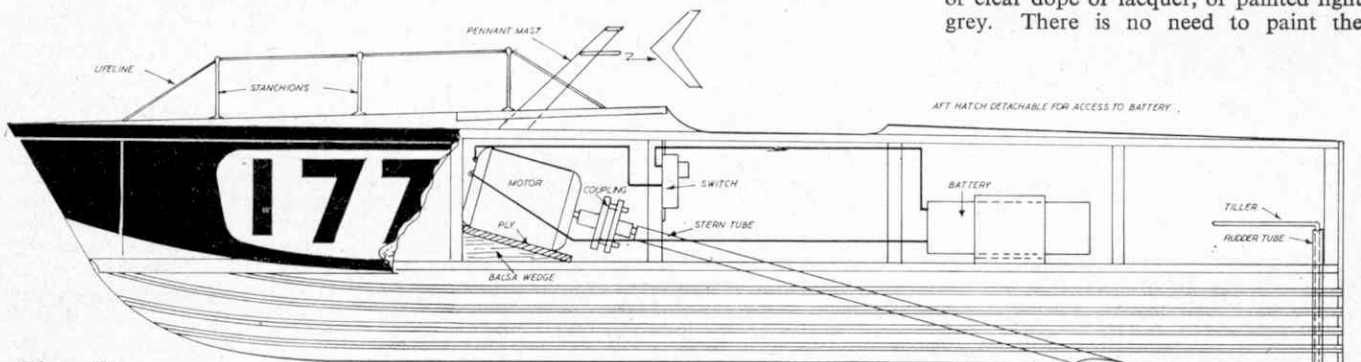
**Fig. 4**



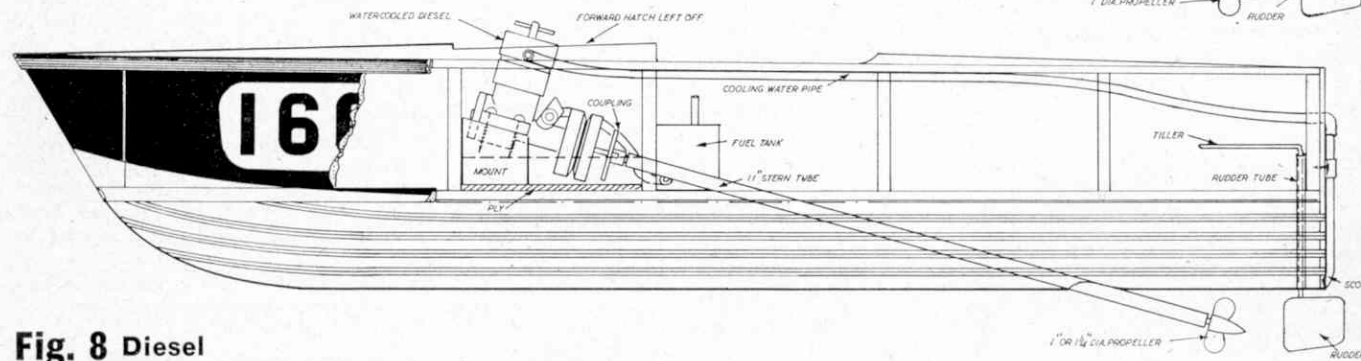
**Fig. 6**



**Fig. 7**



**Fig. 5 Electric**



**Fig. 8 Diesel**

the stern tube emerges from the bottom of the hull with a generous coating of cement or Araldite.

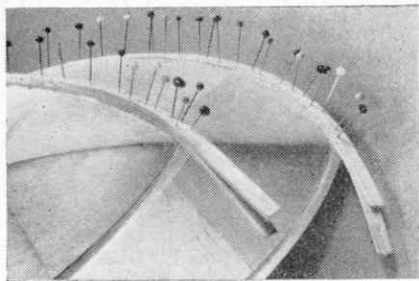
The rudder tube is much simpler to fit. Simply drill a hole up through the keel immediately in front of bulkhead 7 position—i.e.  $\frac{1}{8}$  in. from the outer edge of the transom—and pass the tube up through this hole. Secure in position by cementing, or preferably Aralditing, to the inner face of bulkhead 7. Note that the hole drilled for the rudder tube should be slightly smaller than the tube diameter, so that when the tube is finally fitted it is a very tight, leakfree fit.

Both the rudder tube end and the propeller shaft tube end, incidentally, finish in the hull above the waterline and thus eliminate leakage troubles which are often commonplace with more conventional model boat designs.

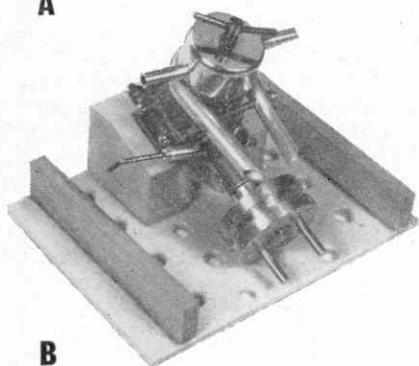
At this stage the whole model can be finish painted. If you are using ordinary cellulose dopes, then these can be applied directly over the tissue or nylon-covered hull. If you prefer to use a modern polyurethane finish—which is thoroughly to be recommended—the hull should first be painted with a suitable polyurethane filler-undercoat, rubbed down with garnet paper when dry. This will provide a good 'keying' surface for the polyurethane gloss coatings to follow.

The colour scheme to use for 'Brave Moppie' is black for the hull sides with the rest of the hull and deck white. The racing number is painted in black on a white panel. You can, of course, equally well use other colour schemes if you prefer.

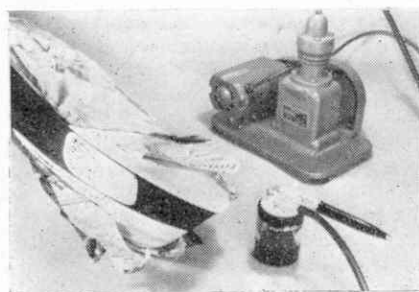
The inside of the cockpit can be left plain, 'varnished' with several coatings of clear dope or lacquer, or painted light grey. There is no need to paint the



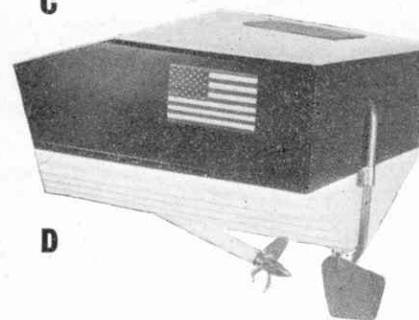
A



B



C



D

A The chine and gunwale strips are held in place with pins until the cement dries

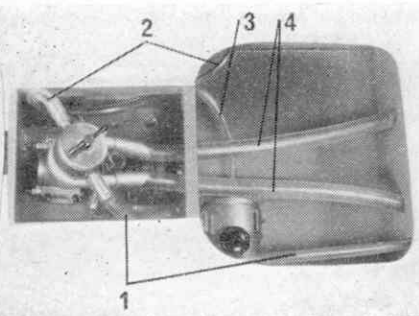
B The D.C. Spitfire securely mounted and ready to install

C The Maxispray unit produces a really professional finish. Spray the entire hull white, then mask the deck and bottom using adhesive tape and newspaper, and spray the sides

D The propeller, rudder and water intake

E The 'plumbing'. 1: water inlet tube, 2: water outlet tube, 3: fuel feed tube, 4: exhaust pipes

E



inside of the hull unless the model is to be diesel powered, when both the cockpit and the engine compartment should be given several coats of light grey dope (preferably butyrate or fuel resistant dope). Do not paint with oil colours as these will be attacked by diesel fuel.

Once finished painting, and with all the paint quite dry, the model can finally be fitted out. Assemble the rudder in its tube and bend the tiller at right angles to hold the rudder from dropping out. It is suggested that you hook up the tiller to a proper steering system, as shown in Fig. 4. This is quite easy to rig. A suitable wheel (e.g. a Ripmax plastic launch wheel) is cemented to a short length of  $\frac{1}{8}$  in. diameter dowel. Drill a  $\frac{1}{8}$  in. diameter hole in bulkhead 4 where you want the wheel to go, and also on a block of balsa to go behind the bulkhead to act as an additional bearing for the dowel. Mount in place with a small pulley on the other end of the dowel, cementing the bearing block to the back of the former but making sure that the dowel is not cemented as well and is free to turn when the wheel is turned.

## The motors

To carry the steering cables four small screw eyes are required, screwed into small blocks of hard balsa. These blocks are cemented to the inside of the hull in convenient positions to carry the cable, as shown. The cable itself is simply a length of stout thread. Tie one end to the tiller, pass through the screw eyes on one side and across to the pulley. Wind about half a dozen turns round the pulley, then take back through the other screw eyes and make off by tying to a rubber band which also fastens to the tiller. Check for easy movement, i.e. the tiller and rudder moving as the wheel is turned, and adjust the tension of the rubber band as necessary. Note: holes will have to be drilled in bulkheads 4, 5 and 6 to pass the cable on each side, but the position of these holes is readily found by 'cut and try'.

Installation details for electric motor drive are shown in Fig. 5. The motor is mounted on a ply plate of suitable size, the plate then supported on balsa wedges to line up with the propeller shaft. The size of plate, and of the balsa wedges, will depend on the size of motor used. Mount the motor on the ply plate first and line up temporarily by 'trial and error'. When you are satisfied with the line-up, cement in place permanently, using plenty of cement. Any type of flexible coupling can be used to connect the motor to the propeller shaft—and again the type used will depend largely on the choice of motor. Alignment should be made with the two coupling units in position (i.e. one on the motor shaft and the other on the propeller shaft) as this makes it easier to establish satisfactory alignment.

The battery for the electric motor can be laid in the space between bulkheads

5 and 6, resting on the chine shelf; or you can make up a simple battery box from balsa sheet to hold in position. Use a reasonably large size of battery, such as a 4.5 volt flat flashlamp battery. Accumulators are better still, if you can afford them. All that has to be done then is to wire the battery to the motor through an on-off switch. This switch should be mounted on the cockpit side of bulkhead 4, where it is easily reached.

With the motor in position there should be no need to have to gain access to this compartment again, so the fore hatch can be cemented in place and the single lifeline supported on stanchions added; also the pennant mast, cut from  $\frac{1}{8}$  in. ply.

Fitting of a diesel power unit demands a little more work for it is most important that the engine be securely mounted. Otherwise it can vibrate loose or, more likely, be pulled loose when starting with a cord round the flywheel. This time, therefore, we need a very robust engine mount, as shown in Fig. 6. This consists of two blocks of really hard wood, at least  $\frac{1}{2}$  in. thick and shaped with an angled top edge, as shown. These are glued and screwed in place to a  $4\frac{1}{2}$  in.  $\times$   $3\frac{1}{4}$  in. ply panel, with the spacing between the blocks arranged to suit the engine being used. In the case of the 'Merlin' or 'Spitfire' the blocks should be spaced exactly  $\frac{1}{8}$  in. apart so that the crankcase of the engine just fits between the blocks with the crankcase lugs resting on the angled faces of the mounts. The ply base piece is further stiffened by two lengths of  $\frac{1}{2}$  in. by  $\frac{1}{4}$  in. hardwood screwed and glued in place about  $\frac{1}{2}$  in. from the edges, as shown. The ply base should then be drilled out with a large number of holes as this will considerably improve the strength of the glued assembly when this mounting unit is finally cemented in place.

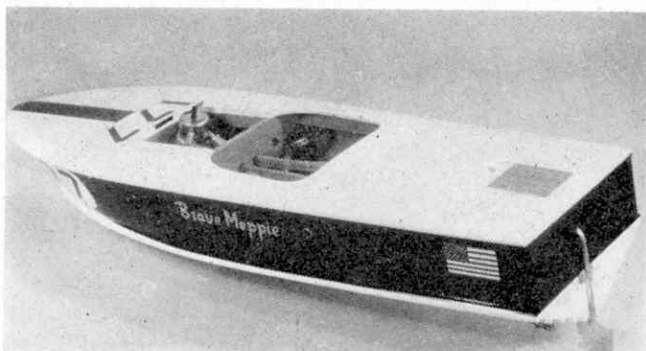
## Accuracy is essential

Do not cement in place until you have checked that the motor lines up correctly with the propeller shaft. First, lay the mount in position resting on the chine shelf, lay the engine on the mounting blocks and see if the alignment is satisfactory. If all is well, secure the engine to its mounting blocks with steel wood-screws at least  $\frac{1}{2}$  in. long and recheck that the alignment is OK. Then 'flood' the floor of the hull with cement and press the mount in place, making sure to line the motor up with the propeller shaft before leaving to set.

If the alignment is not satisfactory, then see if it can be improved with washers under the engine lugs. If so, proceed as above, with the alignment washers in position. If still not right then you may have to trim the engine blocks to get the correct alignment. Time spent in getting the engine alignment as near perfect as possible will be thoroughly worthwhile as the engine will run with less vibration and develop more power.

Continued on page 35

# "PROJECT 66" See Page 10

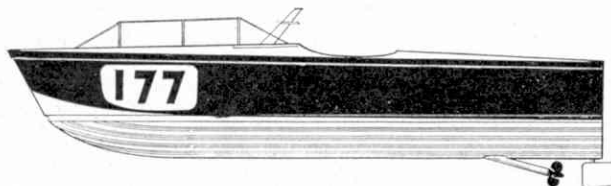


## Solarbo Balsa

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|--|---|
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| <input type="checkbox"/> 2 off 36" x 2" x 3/8"       | <input type="checkbox"/> 3 off 36" x 1/4" x 3/32" |
| <input type="checkbox"/> 3 off 36" x 3" x 1/8"       | <input type="checkbox"/> 6 off 36" x 1/8" sq      |
| <input type="checkbox"/> 2 off 36" x 2" x 5/8"       | Other materials required include                  |
| <input type="checkbox"/> 6" length 2" x 1 1/2" block | 1/16" ply, balsa cement, tissue and pins.         |
| <input type="checkbox"/> 6" length 2" x 2" block     |   |

**REMEMBER!** . . . next month 'Meccano Magazine' is giving plans for making SEVEN MORE MODELS based on the 'Project 66' hull! Make sure you have stocks of Solarbo Balsa ready to start building! The material list above shows the requirements for making the hull.

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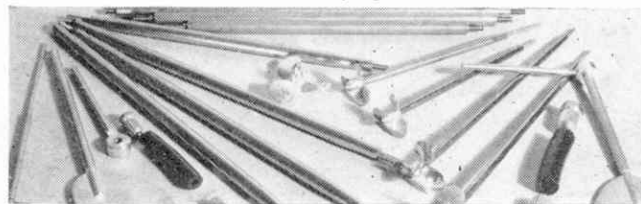
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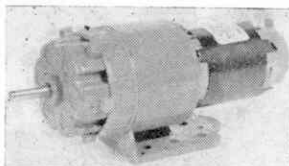
See page 10



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- ★ MA.40 Rudder Assy. . . 4/6
- ★ C.741 Ball Coupling . . . 5/6
- ★ MA.31 Fuel Tank . . . 7/11
- ★ MA. 27/2 Silencer . . . 8/6
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- \* Suitable for 'Project 66'

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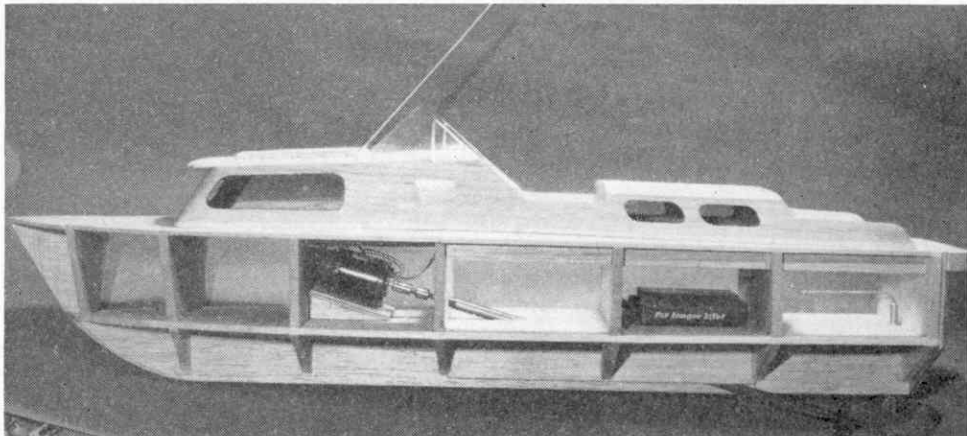
# PROJECT

## '66

### PHASE - 3

#### BY

#### RON WARRING



# 7 SUPERSTRUCTURES

**Huntress  
Ranger Tropical  
Surfrider  
Thunderbird  
Christina  
Coronet  
Dell Quay Ranger**

In the January issue of Meccano Magazine we gave you a free full size plan to make the hull of Brave Moppie. Last month we showed you how to instal diesel or electric motors. This month there's another free full-size plan with details of seven superstructures that can be added to your hull to represent other famous power boats. Next month we will show you how to fit any of these models with radio control!

If you missed either of the earlier issues, they can still be obtained from our back-numbers department price 2/- each including postage.

**T**HE full size plan this month shows the parts required to make SEVEN more models based on the same (Brave Moppie) hull—all well known high speed craft. These, together with 'Brave Moppie', make up a complete fleet of off-shore racers. You can build them all—or, perhaps better still, get together with some other chaps and each of you build a different racer for trying out against each other on the local pond.

Remember, the hull and fitting out details are exactly the same as described in Parts 1 and 2 for all the models. It is merely a case of 'converting' this hull by the addition of a cabin and related details, the cabin shape being different, and differently placed, in the seven models shown on this month's plan. Having done this it may then be necessary to remove some of the original after decking so as to produce an open cockpit. Details like this are given in the individual descriptions of the various models.

The method of building up the further models is the same in each case. Two cabin sides are required, traced or copied off the full size outlines given. These

are then joined by formers and the cabin unit then cemented in place on the hull, the after part of the sides coming over the deck beam position so as to leave the aft side decking intact. The exact position for fitting the sides can be determined from the full size plan.

Motor installation (diesel or electric motor) should be completed as described in Part 2 *before* fitting the cabin in place and the original forward deck hatch can be left off as this area is covered by the cabin. In the case of an electric powered model the cabin roof can be cemented in place permanently. With a diesel powered model the cabin roof must be made detachable, in order to get at the engine for starting.

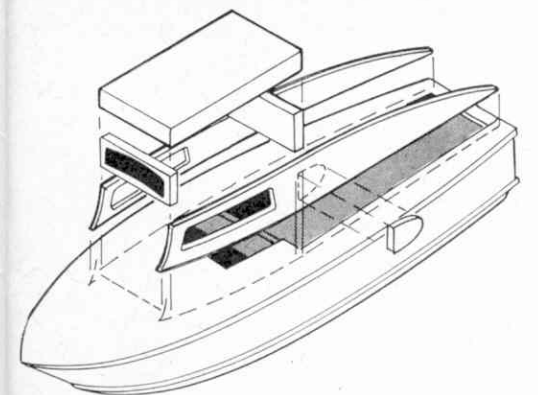
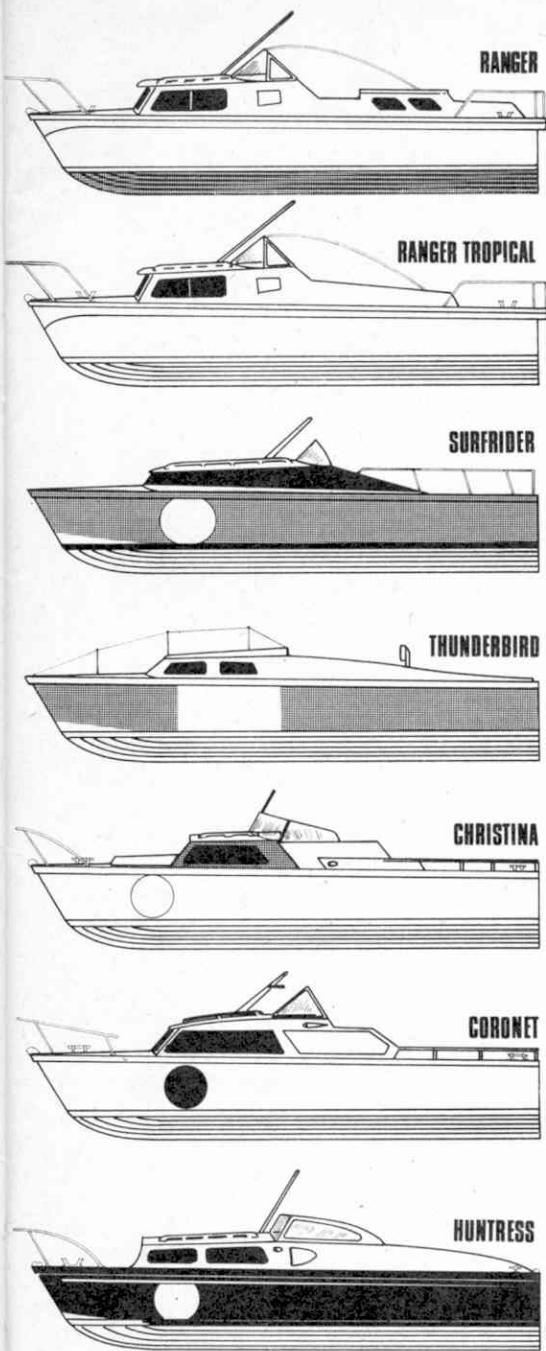
Glazing of all cabin windows is done with clear plastic sheet, which for best appearance should be cut to the shape of the window, but slightly oversize, and cemented on the outside. Alternatively, cabin windows can be painted on in black (or cut out from black paper cemented in position). This is necessary in the case of the 'Coronet' cabin windows in any case because of the large window area. To cut out windows of

this size would weaken the cabin sides unduly.

Many of the models employ a wrap-around windshield, which should be cut to shape by trial and error from thicker plastic sheet. The metal frame outline and vertical struts can be indicated by painting on in silver.

Further details such as the pulpit, side rails (where appropriate) and deck fittings such as cleats and fairleads, can be added to the model after painting in the form of plastic fittings. These will add considerably to the realism of the model and the cost of such fittings is usually only a few pence each. You can use your own ideas as to what fittings to add and where to position them. For guidance on this subject, study photographs of the full size craft. There is really no standard layout for deck fittings, etc., and individual owners have their own ideas on this subject.

Note: The full size patterns for the sides and formers, etc., are to approximate size (slightly oversize) to allow for chamfering to fit snugly and accurately on the deck. It is impossible to give exact sizes as individual hulls may vary



The simple construction of the 'Huntress' superstructure is fairly representative

slightly in deck curvature. In all cases, therefore, a certain amount of trimming up is required on the parts to ensure accurate final assembly. This is quite a straightforward job and should present no difficulties.

In all cases the sides are cut from  $\frac{1}{4}$  in. soft sheet balsa, except where noted (e.g. 'Christina' sides 2 and sides 3) and for 'Huntress' (sides from  $\frac{1}{8}$  in. sheet).

### Dell Quay Ranger

Full size patterns are given on the plan for cutting the following parts needed to complete this model.

- 2 'Ranger' cabin side pieces cut from  $\frac{1}{4}$  in. sheet balsa.
- 1 Cabin roof from  $\frac{1}{4}$  in. sheet balsa\* (note pattern is half plan of the shape required).
- 1 Aft cabin roof  $\frac{3}{16}$  in. sheet balsa\* (half plan shown).
- 1 Off each bulkheads R1, R2, R3 and R4, from  $\frac{1}{4}$  in. balsa sheet.
- 1 Deck extension cut from  $\frac{3}{8}$  in. sheet.
- 2 Grab rails cut from  $\frac{1}{8}$  in. sheet.
- 2 Air scoops from  $\frac{3}{16}$  in. balsa;  $5\frac{1}{2}$  in. length  $\frac{1}{16}$  in. dia. dowel; fairly thick celluloid or acetate sheet for the windshield.

\* Cut two pieces each from 3 in. wide sheet and cement together.

The cabin sides need to be slightly chamfered along the bottom edge to conform to the curvature of the deck and stand vertically. Assemble by cementing formers R1, R2, R3 and R4 between the sides. Note that R1 needs to be chamfered top and bottom and is cemented only just inside the front edges of the two sides. This joint is then backed up with scrap lengths of  $\frac{1}{4}$  in. sq. balsa and the front of R1 sanded to a curved shape. The whole assembly is then cemented permanently on to the deck in the position shown on the plan.

Trim the tops of the formers flush with the sides, as necessary, and fit the two roof panels in place. In the case of a diesel powered model, do not cement the front cabin deck in place but cement a frame to the underside to make it a plug fit between R1 and R2. In the case of an electric powered model, the aft cabin roof should be made detachable to get at the battery compartment.

Round off the two cabin roofs, shaping the ends as necessary, and sand to finish flush with the cabin sides.

Cement the deck extension piece on to the transom in line with the top of the deck.

Windows should be 'glazed' by cutting out pieces of clear plastic sheet to the same shape as the window cut-outs but slightly oversize and then cementing in place on the outside. In the case of a diesel model, do not glaze the side windows of the forward cabin.

The superstructure is finished by cementing the two grab rails in place to the cabin top, shaping the scoops from  $\frac{3}{16}$  in. balsa and cementing in place and also adding the wrap-around windshield

cut from thicker clear plastic sheet. The pennant mast is a length of  $\frac{1}{8}$  in. dowel pushed into the cabin roof and held with a touch of cement.

Other details such as the pulpit and rails, anchor, cleats, etc., can be added in the form of plastic fittings obtained from any model shop.

Suggested colour schemes:

Hull—white, dark blue or light green; with red, green or blue bottom.

Decks—white, natural wood or stained with a light coloured wood dye.

Superstructure—all white.

### Ranger Tropical

This is very similar to the 'Ranger' except that the shape of the sides is different from behind the windscreen and there is no aft cabin. The sides must be cut to the dotted line aft and R3, R4 and the aft cabin roof are not required.

The model is fitted up in a similar manner as before. When completed the after decking is cut away right up to the sides from R3 to a distance of 1 in. in front of Bulkhead 6 position in the hull. Bulkhead 5 should then be cut away down to floor level to provide an unobstructed cockpit area.

Suggested colour schemes: as for 'Ranger'.

### Surfrider

This is the 1964 Power Boat Race winner featuring a low cabin shape and no windows. Parts required to complete this model are:

- 2 Sides cut from  $\frac{1}{4}$  in. balsa sheet to the shape shown.
- 1 Each S1, S2, and S3, from  $\frac{1}{4}$  in. sheet.
- 1  $1\frac{1}{2}$  in. sq. panel of  $\frac{3}{16}$  in. sheet (hatch).
- Pennant mast cut from  $\frac{1}{16}$  in. ply.

S1 has to be chamfered to line up with the front of the sides, and the bottom edges of the sides must be slightly chamfered so that they conform to the curvature of the deck. Join the sides by cementing S1 and S2 in place. S3 is cemented into the hull itself through the cockpit reaching right down to the chine shelf. When this is fitted, cement the side assembly permanently in place.

The cabin roof is shaped from an  $8\frac{1}{2}$  in. by  $5\frac{1}{2}$  in. panel of  $\frac{1}{4}$  in. sheet balsa, rounded off as shown and trimmed down flush with the edges of the sides. The hatch is sanded to a concave shape on the underside to fit snugly on to the deck and cemented in place. Add the pennant mast, and the simple windscreen cut from thin clear plastic sheet.

The whole of the decking from bulkhead 5 right aft to the transom (bulkhead 7) is now cut away between the sides, i.e. in line with the deck beams. Bulkheads 5 and 6 are also cut away vertically right down to the chine shelf to produce a completely open cockpit. Colour scheme: blue or green hull with white bottom. Decks and cabin sides and top white, with colour band in same colour as hull topsides or darker colour. Authentic racing number '66'.

## Thunderbird

This was the second place boat in the 1965 Power Boat Race, close behind 'Brave Moppie'. Construction is very similar to that of 'Surfrider' except that the cabin sides are longer and extend well aft to protect the occupants from spray. Join sides first with T1 and T2 (after chamfering T1 and the bottom edges of the sides) and then cement to the hull and line up with the position of the deck beams.

The cabin top is shaped from a  $5\frac{1}{2}$  in. by  $5\frac{1}{2}$  in. piece of  $\frac{3}{8}$  in. sheet balsa (join two 3 in. wide pieces) and either cemented in place or made a plug fit.

Cut away the after decking back to the point shown on the full size plan and cement in a reinforcing piece of  $\frac{1}{2}$  in. by  $\frac{1}{2}$  in. strip running between the two deck beams. The backrest is made from  $\frac{1}{2}$  in. by  $\frac{1}{2}$  in. strip with four lengths of  $\frac{1}{8}$  in. strip cemented in place. When set, cement in place to the reinforcing strip previously fitted. Colour scheme: hull topsides—yellow, hull bottom, deck and cabin sides and top—white. Authentic racing number '283' in black on white panel on each side, and in black across the cabin roof.

## Christina

A 'Christina' won the first Cowes-Torquay Power Boat Race and remains one of the 'classic' craft of its type, noted also for its attractive styling.

Parts required to complete this model are:

2 Side 1's from  $\frac{1}{4}$  in. balsa.

2 Side 2's from  $\frac{1}{4}$  in. balsa.

2 Side 3's from  $\frac{1}{4}$  in. balsa.

Formers C1 and C2 from  $\frac{1}{4}$  in. sheet.

6 in. by 4 in. by  $\frac{1}{2}$  in. balsa block (for front cabin).

Two 11 in. lengths of  $\frac{1}{4}$  in. by  $\frac{1}{8}$  in. spruce or obeche for handrails.

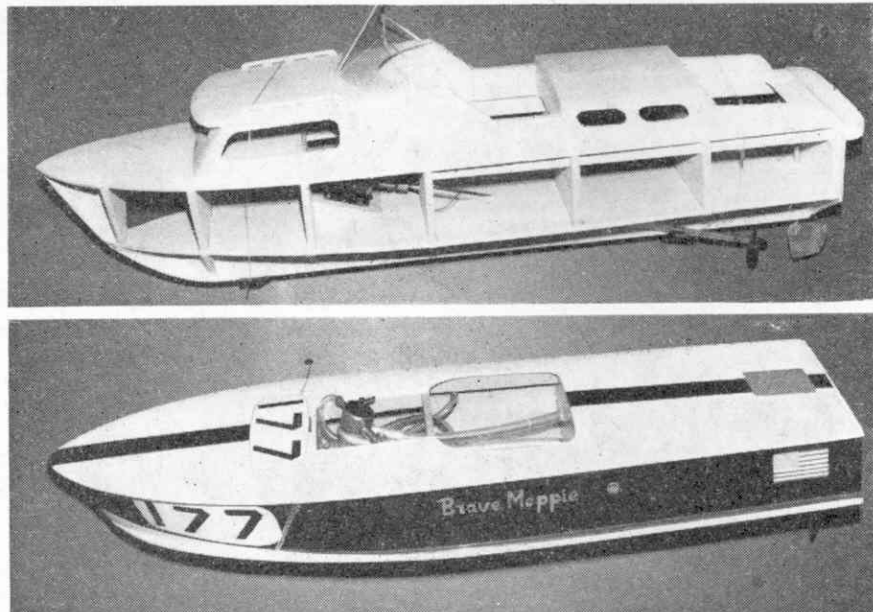
About 4 in. of  $\frac{1}{8}$  in. or  $\frac{3}{16}$  in. dowel; celluloid for windshield.

Start by fitting former C2 in the position shown on the full size plan. Note that this former extends right down to the chine shelf and fits between the deck beams. Fill in between the sides of this former and the sides of the hull below the deck line with scrap sheet.

Now fit the cabin sides and C1, chamfering C1 to angle back correctly, and also chamfering the bottom edges of the sides to conform to the curvature of the deck. Carve and fit the front cabin block, shaping the top curve to match the curve of the front window.

Cement the two Side 2 pieces in place; and the two Side 3 pieces outside them, as shown. Complete by adding the hand-rail supported on short lengths of dowel. For greater security of fixing the deck can be pierced to insert the dowels which are then levelled off and the handrail cemented on top.

The cabin top is covered with  $\frac{1}{8}$  in. sheet balsa. In the case of a diesel powered model the top will have to be cemented to a built-up framework so that it is a plug fit and can be removed for



As thousands of readers saw them at the Schoolboys and Girls Exhibition. The Editor's completed, diesel powered Brave Moppie, and above, the 'un-skinned' hull, with Dell Quay Ranger superstructure temporarily fitted in position, as described in this feature

access to the motor for starting. With an electric powered model simply cement the  $\frac{1}{8}$  in. sheet cabin top in place.

The whole of the aft decking between bulkheads 5 and 7 should now be removed, out to the position of the deck beams. Bulkheads 5 and 6 are then cut down vertically in line with the deck beams and the centre parts removed to leave a completely unobstructed cockpit.

Colour schemes: hull usually white with red, green or blue bottom.

Decks: natural wood or stained with a light coloured wood dye, or painted white.

Cabin: Sides 3 and front cabin part, white. Sides 1, mahogany. Sides 2, very pale blue or green. Cabin top, same as Sides 2, or white.

Wrap-around windscreen: blue or green tinted celluloid.

## Coronet

This model has a fairly deep cabin with large windows. The windows should be painted on rather than cut out, otherwise construction is similar to the other models, except for the cabin roof. Since the cabin shape is 'square', the roof can be planked with  $\frac{1}{4}$  in. sheet balsa with the grain running from side to side. The edges are then rounded off with sandpaper.

The second former (G2) is shown fitted between the deck beams roughly 1 in. behind bulkhead 4. If preferred, this can be extended down to the chine shelf and filling the complete space between the hull sides to blank off the cabin completely.

The windscreen is built up as a complete framework of  $\frac{1}{8}$  in. sq. balsa which is then covered with panels cut from clear plastic sheet after cementing to the cabin top. Note that the cabin roof

finishes just behind G2.

The two rails extending back to the transom are of  $\frac{1}{4}$  in. by  $\frac{1}{8}$  in. hardwood strip (spruce or obeche mounted on  $\frac{1}{4}$  in. sq. uprights (balsa or obeche). This rail does not extend across the transom.

Cut away bulkheads 5 and 6 level with the deck beams to give an open cockpit from G2 aft.

Colour schemes: hull—white with red, blue or green bottom (or all white).

Deck, cabin sides and top—white.

Racing number in white on black circle.

## Huntress

Designed and built by Fairey Marine, the 'Huntress' is a well known offshore power boat racer together with its larger counterpart, the 'Huntsman'.

The cabin sides in this case extend backwards almost to the transom, but the whole of the cockpit is open from F3 (fitted over bulkhead 4) to the transom. The sides are cut from  $\frac{1}{4}$  in. sheet.

The cabin roof for this model is cut from  $\frac{1}{4}$  in. sheet carved and sanded to a well rounded shape. The front window is painted in F1. Note that F1 is vertical and does not slope backwards.

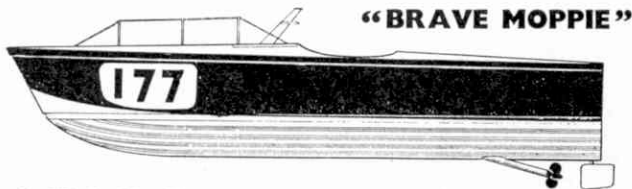
The windscreen sides are cut from  $\frac{1}{8}$  in. ply and cemented directly on to the main side pieces in the position shown. The windshield assembly is then completed by covering both sides with celluloid (or thin plastic sheet) and adding a curved windscreen front. The complete screen (sides and front) can be cut from a single piece of celluloid on a trial and error basis, if preferred.

Typical colour scheme: hull topsides—dark blue; bottom—red or white. Cabin sides and top—white.

Racing number in black on white circle.

# Solarbo Balsa

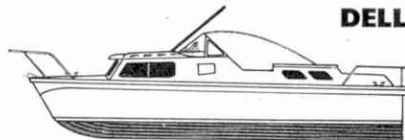
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**"BRAVE MOPPIE"**

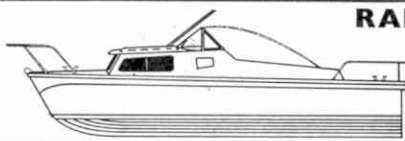
- |  |  |
|--|--|
| <input type="checkbox"/> 4 off 36" x 3" x 1/4"       | <input type="checkbox"/> 1 off 36" x 1/2" x 1/4" |
| <input type="checkbox"/> 1 off 36" x 3" x 3/8"       | <input type="checkbox"/> 3 off 36" x 1/2" x 1/8" |
| <input type="checkbox"/> 2 off 36" x 2" x 3/8"       | <input type="checkbox"/> 3 off 36" x 1/2" x 3/8" |
| <input type="checkbox"/> 3 off 36" x 3" x 1/8"       | <input type="checkbox"/> 6 off 36" x 1/8" sq     |
| <input type="checkbox"/> 2 off 36" x 2" x 1/8"       | Other materials required include                 |
| <input type="checkbox"/> 6" length 2" x 1 1/2" block | 1/8" ply, balsa cement, tissue and pins.         |
| <input type="checkbox"/> 6" length 2" x 2" block     |  |

## DELL QUAY RANGER



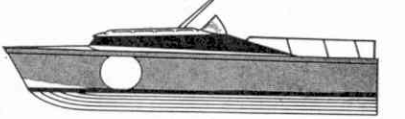
Hull materials as for 'Brave Moppie' plus 1/4" sheet for cabin sides and 1/4" and 1/8" sheet for fwd and aft cabin tops.

## RANGER TROPICAL



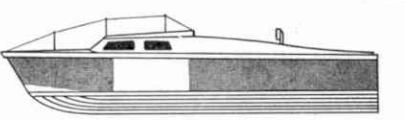
As 'Moppie' plus 1/4" sheet for cabin sides and 1/4" sheet for cabin roof. Same as 'Ranger' without rear cabin.

## SURFRIDER



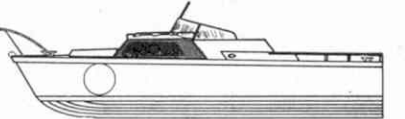
Basic hull materials will leave enough sheet for cabin sides, etc., 1/4" sheet panel will be required for cabin roof.

## THUNDERBIRD



Cabin sides, etc. from spare basic hull materials. 5 1/4" x 5 1/4" x 1/4" panel for cabin roof.

## CHRISTINA



You may need some extra 1/4" sheet for cabin sides and rails; also 1/4" x 2" x 6" front cabin block and 1/8" sheet for cabin roof.

## CORONET



Some additional 1/4" sheet may be required; also 1/4" sheet for cabin roof and 1/8" sheet overlay panels, plus strip for rails.

## FAIREY HUNTRESS



Sides can be cut from 36" x 2" x 1/4" sheet. Cabin roof is 12" x 3" x 1/4". Wind-screen sides from 1/8" ply.

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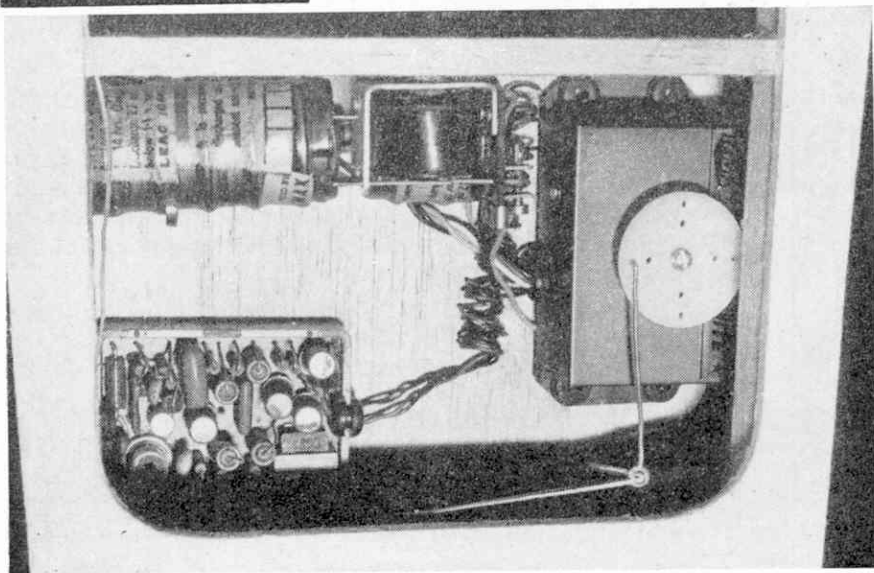
# PROJECT 66

## ..ADDING RADIO CONTROL

This month, Ron Warring completes his four-part model powerboat series by showing you how to install radio control in any of the eight model powerboats which have been featured in his three earlier articles. Copies of the January, February and March issues with which two free, full size powerboat plans were presented, are obtainable from the back-numbers department, Meccano Magazine, St. Alphage House, Fore Street, London, E.C.2., price 2s. each including postage



Above: A Meccano Magazine reader works on 'Brave Moppie' built from plans in the January issue. Below: Suggested component positions for a single channel installation. Note the slave relay fitted between the batteries and the actuator



WHICHEVER version of 'Project 66' you have built, adding radio control is a logical step for getting the most satisfaction from your model. This is, of course, an expensive addition—but it need not be *too* expensive. If you are prepared to build the transmitter and receiver from prefabricated kits you can complete these for about £8-£10—and once made they can be used for other radio controlled models as well, of course. The same applies to ready-made radio equipment, although this will cost anything from about £14 upwards for the transmitter-receiver combination.

On top of this you will also need an actuator (which must be bought as a ready-made item), plus batteries. There is, unfortunately, no cheap way of obtaining reliable radio control—but the extra satisfaction you can get out of a radio controlled model is well worth it.

The simplest—and cheapest—form of radio control is *single channel*. This means a transmitter-receiver combination capable of giving a *single* 'on-off' signal, which is turned into 'muscle power' by the actuator in the form of a *sequence* movement. That is to say, if the actuator is used to move the rudder, *one* signal from the transmitter will move the rudder to the right and the *next* signal will move it to the left. With *no* signal, the actuator returns to neutral and centralises the rudder.

You just have to remember which rudder position was signalled last as the next signal given will produce opposite rudder movement. The modern actuator, however, does simplify this system by working on the principle that *one* signal from the transmitter, held on, gives one rudder position (say, right rudder), whilst a 'double signal' always gives the opposite rudder position. As far as making the actual signals are concerned, this means that 'press and hold' on the transmitter button always gives, say, right rudder. 'Press-release-press and hold' always gives left rudder.

The actuator may also be a 'compound' type which gives a third 'selective' signalling position—either a quick blip on the transmitter button, or 'press-release-press-release, press and hold'. This can be used to operate *another* actuator providing the power to operate another control (usually engine speed).

### The choice

The alternative system is 'multi-channel' where the transmitter can produce two (or more) separate signals, each of which operates a specific control. Normally *two* channels are used to operate *one* particular control. Thus a two-channel system would be used to operate rudder only. Movement of the transmitter key one way will *always* produce right rudder; and movement of the key the other way will *always* produce left rudder. As with the single-channel system, the actuator automatically returns the rudder to neutral once the transmitter signal is released. Further

services, such as engine speed control, need additional channels to operate.

Multi-channel is a much better system for working, and gives a better form of control, but it will cost considerably more than single channel. Even a two-channel radio will cost more than twice single channel and still only give rudder control. It is worth going into, however, if you can afford it.

A lot will also depend on how much control you need. With an electric-powered model which is not capable of reaching high speeds, normal single-channel radio is quite adequate for steering (rudder control)—Fig. 1. You can also use the 'third' position on a compound actuator to operate a motor switching control via a 'changeover' or three-position non-neutralising secondary actuator. This can provide two or more switching positions for the motor circuit, arrived at in sequence. Thus a two-position secondary actuator could give motor 'on-off-on . . .' A four-position secondary actuator could give motor 'forward-stop-reverse-stop-forward', etc., in sequence (Fig. 2). Note: This diagram shows 'mechanical' switching of the main motor circuit. Some secondary actuators incorporate switching contacts in the actuator itself and so the wiring can be made direct to the motor contacts instead of using the actuator to drive an external switch. Either method—just rudder only or rudder plus motor switching—is a practical system with single-channel for an electric powered boat. It would need three channels of 'multi' to perform the same functions (two for rudder and the third for sequence switching of motor).

## Diesel Power

With a diesel powered boat using engines up to 1.5 c.c. throttle controls are comparatively rare. We need, therefore, only consider rudder control, unless the motor used has got a throttle. In this case it can be operated via a 'change-over' type secondary actuator off a 'compound' main actuator in the case of single-channel; or from the third or third and fourth channels with multi-channel control (the first two channels being used for steering). Since the diesel powered boat will be fast, multi-channel control for rudder will be better than single channel, but we can still get by quite all right with single-channel if we do not want to go to the extra expense. With single-channel, however, we would recommend forgetting about any form of engine throttle control.

As regards the actuator, a motorised type is recommended (and essential with multi-channel operation anyway) as being simpler to install and providing all the power necessary to move the rudder. Aircraft-type escapements are not suitable for this job.

For our model we have chosen the 'Minimac' single-channel receiver and the RMK 'Dynamik' single-channel motorised actuator as thoroughly reliable

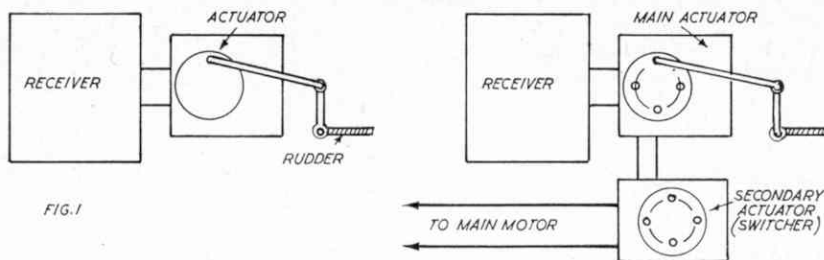


FIG. 1

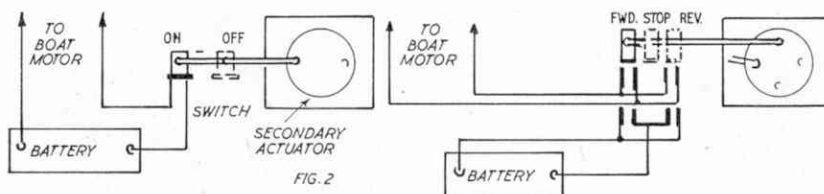


FIG. 2

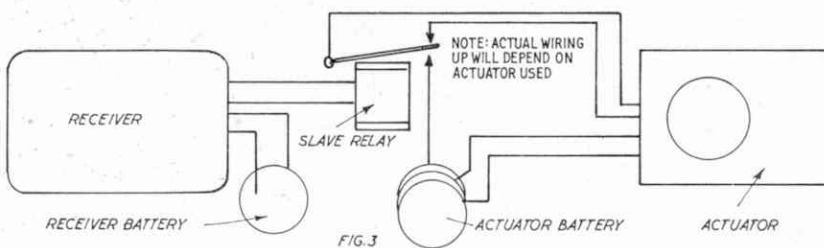


FIG. 3

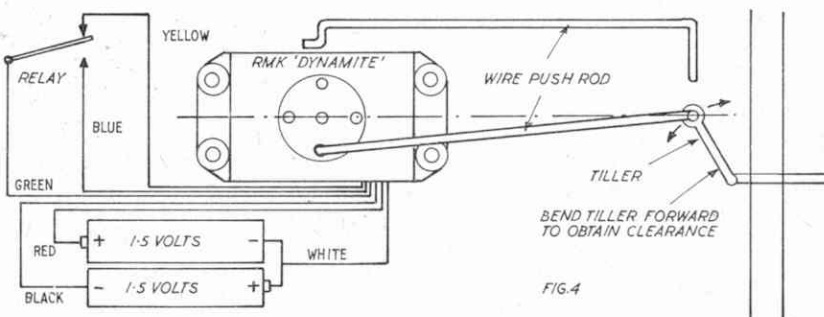


FIG. 4

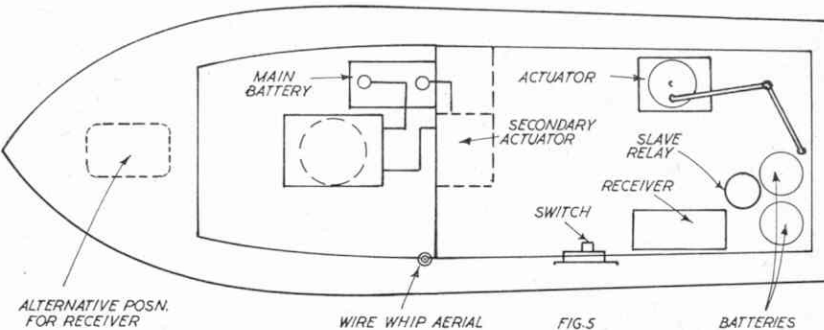


FIG. 5

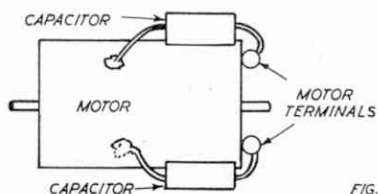
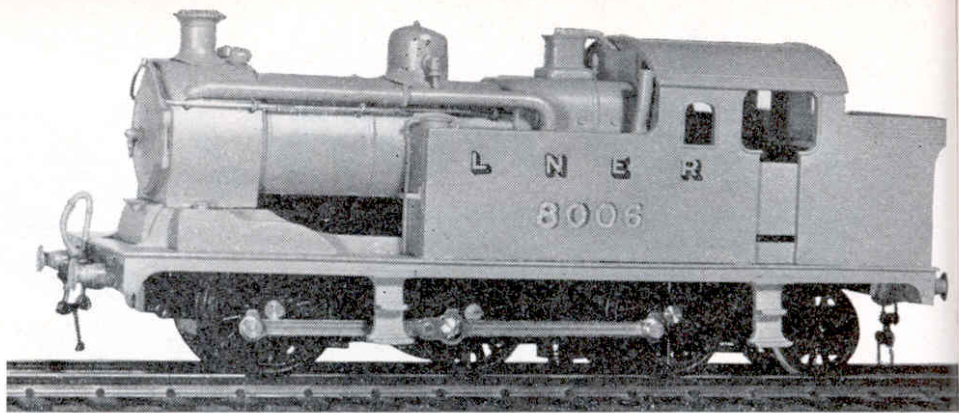
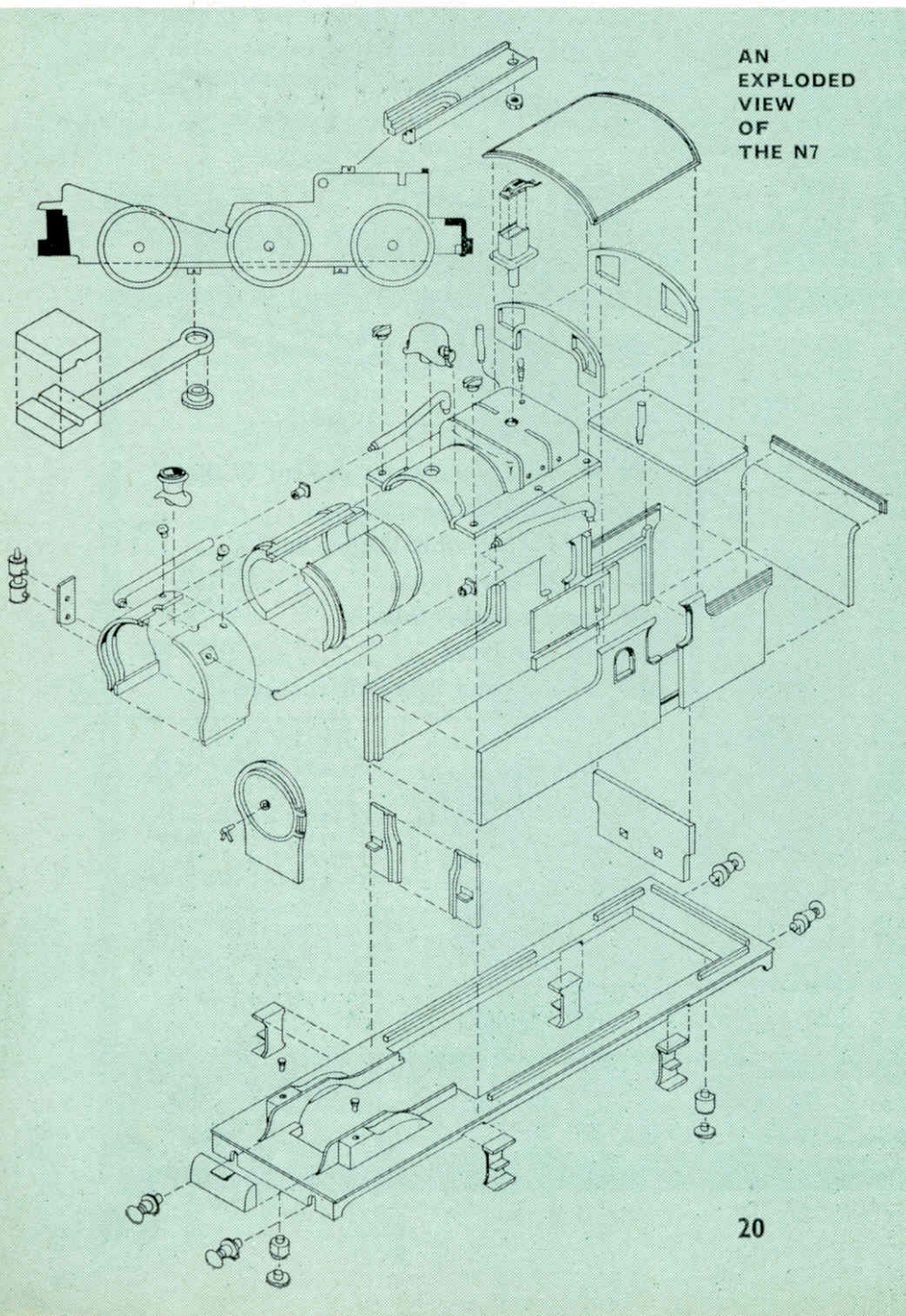


FIG. 6

# MAKE IT IN METAL



Mike Rickett takes a closer look at metal loco kits—particularly this Wills kit for an N7. It's suitable for almost any layout.



AN  
EXPLODED  
VIEW  
OF  
THE N7

PLASTIC kits have become, in recent years a recognised means among even the most experienced of enthusiasts, of acquiring many of the essential accessories that a model railway needs. Kits are now made for nearly every conceivable item including a wide variety of locomotives, which can be most useful for building up a more individual locomotive stud than would be possible with ready-made locomotives. But this feature is about *metal* kits. Their method of assembly is basically identical to that of plastic kits except that different adhesives must be used. More than fifty models are produced for 00 gauge by three firms that specialise in metal kits—Wills, Gem and K's—and I intend this month to describe the construction of the recently introduced Wills L.N.E.R. N7 0-6-2T locomotive body kit.

Whereas a number of kits are designed to be used with separately available chassis kits, this kit is one of a large number that are intended to be used with a standard Tri-ang 0-6-0 chassis. These can usually be bought separately from a Service Agent without the corresponding bodies. Slight modification is necessary before the chassis can be used for the N7 by cutting away the shaded areas shown on the exploded drawing.

The tools required to build a white metal body kit are quite simple and have been mentioned before. The most important items are a fine needle file, either round or flat, a modelling knife, a backsaw or razor saw, fine emery paper, drills for cleaning flash from inside holes, an abrasive detergent such as Vim, and a stopper paste. For adhesive any of the contact adhesives such as Evo-stik, Bostik, or Uhu are quite suitable, although, an extra strong bond can be made with Araldite. This does, however, have the disadvantage of being expensive, and it is also very slow setting, unless the join is subjected to a certain amount of heat. Obviously, since the melting of the white metal itself is quite low, too much heat cannot be used but considerably accelerated drying times can be achieved by placing the components over a radiator or similar heat source, the positions of the parts being maintained with Sellotape.

Although no special skills are required in the building of the N7 kit, care is a pre-requisite in every stage of construction. Do not rush the assembly of the kit, for time taken in the beginning will be amply repaid in the finished result.

The Wills N7 kit costs £2 16s. 0d., and includes all the parts required to build a well-detailed locomotive body. Before

beginning assembly, check that no parts are missing and that no pieces are broken or malformed. It is unreasonable to expect the manufacturer to replace or repair a kit that is already half built, and it is worth checking beforehand. Parts that are slightly bent or twisted can easily be dealt with yourself, but do not try to twist the parts back to shape when cold. Immerse them in water as hot as your hands can stand, and then gently persuade them to the correct shape. Once all parts have been checked with the list at the bottom of the instruction leaflet, the cleaning of flash from castings can proceed. Although Wills kits are remarkably free from flash, small pieces of surplus metal are present on many parts, which if left, would mar the appearance of the finished model, and would also make the job of assembly rather more difficult.

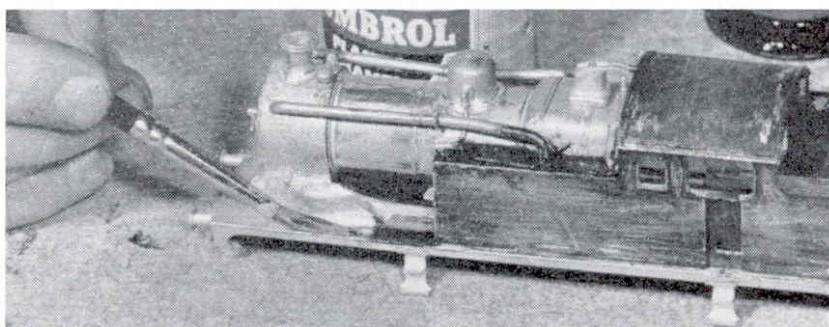
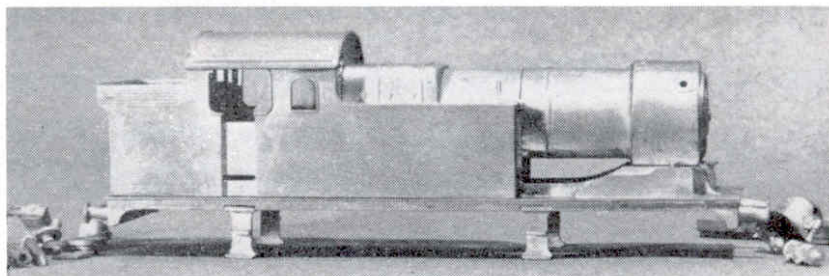
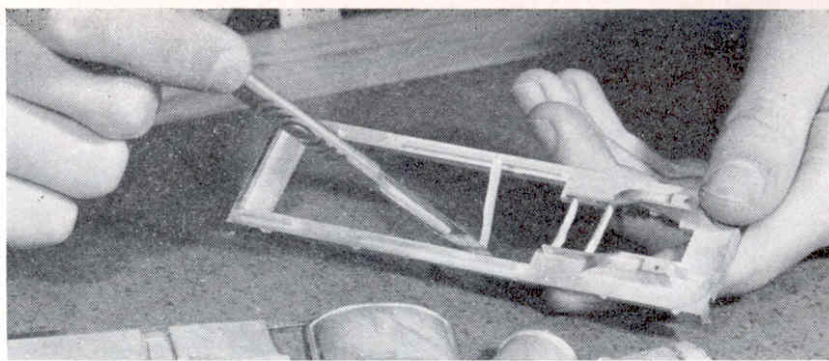
The more important parts of the kit that are to be used in the first stages of assembly should be dealt with first. These include the footplate, two cab sides, cab roof, firebox top and the two Tri-ang chassis boiler halves. The flash round the edges of the cab roof should be filed off and any raised portions of metal on the roof surface filed down to make the surface smooth. The beading, or raised piece of metal running round the roof surface can be improved by lightly running the file along both sides of the beading to make it more prominent. Detail of this sort often tends to become slightly obscured when the model is painted, and extra care in making it a little more noticeable is well worth while.

## Flash

The two cab sides can be dealt with in a similar manner, and the flash on the bottom edges—of the sides can be pared down with the modelling knife, and then filed. The appearance of the coal rails at the top of the bunker will be improved by carefully deepening the grooves with the knife. Detail such as beading round the cab windows and doors should once again be rubbed gently with the needle file, and the corners of the slit at the bottom of the cab doors filed square. Also clean the tank and bunker ends at each side of the door with the file. Turn both tank sides over to ensure that no projections exist on locating strips of metal running along three sides.

Substantial amounts of flash will be found at both ends of the firebox top, and it will be necessary for this to be cut and filed away at the boiler end of the casting. Both the inside and outside of the boiler must be completely flush, to allow the two boiler halves to be inserted, and for their corresponding upper surfaces to be smooth. The boiler bands on the firebox should be treated in the same way as the beading, especially the one immediately in front of the firebox which is a little indistinct. Blocked holes in the tank tops might also require drilling or gouging out with the end of a needle file.

Flash in the ends of the two boiler halves must be removed with a knife and file, and any projecting pieces of metal on the two boiler bands very carefully filed away. The three pieces of surplus metal between the two sides of the footplate must be removed with a knife, and the pieces of flash on one footplate edge carefully filed down. Some flash will



Top picture shows flash being cut away from the footplate. Centre: the complete superstructure with the boiler fittings and other small parts ready for assembly. Above: Primer paint being applied to the completed locomotive body before painting with Humbrol Railway Colours

also be found on the inside faces of the splashers.

The first step in the assembly of the model is to glue the two tank and cab sides to the footplate making sure that the bottom edges of the sides lie flush with the footplate. The mechanism mounting bracket can also be inserted at the same time. When using a contact adhesive, remember to spread the glue onto both surfaces, and then after a period of time—usually about 15 min., press the parts together. When the glue has set, the bunker back and coal plate, which may need cleaning with a file, can also be added. When fitting the bunker back be sure that no large gaps are left between it and the bunker sides, by pressing the two sides inwards. The bunker coal plate is fitted behind the cab onto the two strips of metal on the bunker sides. The other important parts, once all extraneous material has been disposed of, can be glued into their respective positions in this order—rear spectacle plate, firebox top, front spectacle plate, and cab roof.

While this assembly is drying, a number of other operations can be attended to, including the assembly of the safety valve lever unit to the safety valve base and the two pipe units to pipe unions. These small parts must be cleaned beforehand with the file—especially the raised lines of flash to be found on many castings. You might also find that the pipe unions will need the hole that runs through them widening to allow the pipe to be connected. These

assemblies may also be set aside to dry, and the two tank fronts cleaned and glued into position.

The next step is to glue one of the two sets of boiler pieces together—one for the Tri-ang chassis, and one for a scale chassis. The smoke box castings, including the smokebox door, when glued together, is fitted before the boiler pieces, and I found that it was better to assemble the two boiler halves and the smokebox separately, and then to glue the two pieces onto the loco.

## Finishing

It is probably easier to fill all cracks in the locomotive at this stage than to wait until it is complete. For this a stopper such as Belco Cellulose Putty is ideal, and should be placed in cracks with a pin, afterwards smoothed over, and when dry, filed flush. An epoxy stopper such as Plastic Padding or Bondafiller is also highly recommended.

Other parts can now be added in any order, and a 57 drill used for holes in the boiler for handrails. Once all parts have been added, and excess glue cleaned off with a file or pin, the complete locomotive can be given a scrub up with a stiff solution of Vim rubbed on with an old toothbrush. This removes the inevitable finger-deposited grease which will prevent good paint adhesion.

When the locomotive is dry, the first coat of paint is applied. This is only intended to act as a primer, and you may

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