

# Electric R.T.P. Flying

Part One — with full-size plans of Vic Smeed's "WATTSNAME"

**E**LECTRIC ROUND-THE-POLE FLYING dates back a few years—possibly the first large-scale demonstrations were at the Dorland Hall exhibitions in London twenty-five years ago. However, these models required specially built motors, and despite occasional attempts by individuals, and one kit model in about 1947, interest languished until in 1968 various of M.A.P. staff experimented with slot car motors and an assortment of prototype models to see if a simple combination could be found for demonstration at the Model Engineer Exhibition.

It took about a dozen models by four or five different people before success was achieved, but once the path to follow was found, few succeeding models had much difficulty. Since that time, several clubs have taken electric flying up, and as a result a fair amount of development has taken place. Our original aim was to fly on 12 ft. lines, but one club now flies on lines up to 46 ft. long and finds that the longer the lines, the less exacting is the model required.

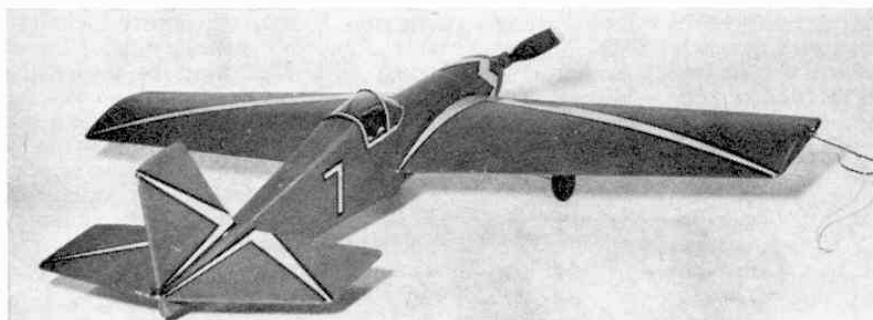
We will come on to the lines and the pylon head in the second half of these notes, next month, but for those who have heard little of this type of flying, we can perhaps mention that the pylon head is mostly simple Meccano and that besides aircraft, lines, and pylon the only requirement is a controlled power source, which can either be a 12v car battery and model slot car hand controller, or a model railway transformer/rectifier able to deliver  $1\frac{1}{2}$  amps. Also needed is a space large enough to fly in, and we recommend a minimum circle diameter of 20 ft., so unless your house has very big rooms, flying must take place in a church or school hall, Scout hut, or similar, or in

the open air, provided there is very little breeze and a smooth surface on which to land and take-off.

Now to the model. This was the fifth design by the writer, based on experience with the previous four (and some from many years ago), and also observation of a number of other models. The original was built and heavily used at the 1969 M.E. Exhibition, where it was easily the fastest model of the twenty or so flown. It survived rough handling by novice pilots and flew again in 1970, when it became so battered that it was retired. A second model was built for this year's show, and again proved the fastest of a large number of models, even when re-engined by a "cheap" motor. It therefore seems that the design is responsible for the performance, rather than a good motor in the first model. The two points contributing most are light weight—just under  $2\frac{1}{4}$  ozs. complete—and the tapered nose, which allows all the propeller area to be effective. A fat-nosed model blankets much of the prop, and though larger props can be used, it is then better to use a gear reduction which makes the model a little more complex.

Initially, we used Rikowhip motors, costing close to £2 each and, we understand, no longer made. Actually, any good 16D size slot car motor should be suitable but we would suggest that a figure of about 60p should be the minimum you should expect to pay. Anything costing less than this is unlikely to have a high enough performance. The inexpensive motor we found very successful was the Rikochet, available at the time at about 65p.

What you need, then, is the motor, two sheets of  $\frac{1}{8}$  in.  $\times$  3 in. balsa (one very soft, one medium to soft),



Pictures on this page show the original model. Only difference, apart from the colour scheme, is the cabin construction, made up of two pieces of acetate instead of one single wrap-round piece. If you prefer it, simply cut the top rear  $\frac{1}{8}$  in. panel off at the back of the cockpit and fit the overhead acetate first. Leave to dry before adding the front screen.

The second model, with cabin as on drawing. Operations on the nose to change motors rather spoiled the lines. The first motor burned out after repeated dunkings in the pool round which it was flown at the M.E. Exhibition, due to inexperienced flyers climbing it too high and hitting an overhead sign!



a Cox .010 3 in. propeller, a stub of 12 g brass tube, a pair of wheels, a few inches of 20g. piano wire, a small piece (about  $12 \times 1$  or  $6 \times 2$  in.) of very soft  $\frac{1}{4}$  in. balsa, two press studs, a couple of feet of fine hook-up wire, washers (to hold the wheels on), cement, sanding sealer, colour dope, and just a dab of epoxy glue.

Construction starts with the wing, which requires the sheet of very soft  $\frac{1}{8}$  in. Trace or pin-prick the outline and cut out; the bottom panel should be just a shade under the full width of the sheet. Use this panel to mark out the second, which is the full width. The slight difference in width allows for the curve of the top panel. Trace and cut out the six ribs and cement them to the bottom panel, pinning it down on a flat surface. Nick the ribs to allow the two wires to pass, and cement them in place, poking the ends out through two small holes so that they can later be soldered to the press studs which will be cemented on the outside. Make sure you put them in the right wing! The wing will have to be pinned down with its tip projecting over the edge of the board once the wires are through. Leave a couple of inches spare on each wire at each end. Also fit the wire tethering eye, which needs to be firmly cemented in place.

Now sand the bottom panel to a chamfer all the way along the leading and trailing edges, sanding the ribs as well if they happen to be a little long. Run cement right round the outline and across each rib, then place the top panel in position and pin down with either weights or pins pushed through at a slight angle, every inch or so. Make sure that the two panels are in smooth contact all round, and leave to dry. Note, incidentally, that the wing has no dihedral, i.e., it is flat from tip to tip.

Trace and cut out the fuselage sides from medium to soft  $\frac{1}{8}$  in. sheet; be careful to get the wing and tailplane seats accurate to the drawing. You can also cut out the tailplane, B1, the fin, and sub-fin from this sheet.

Cut a short length of 12g brass tube (length as on plan) and file the ends clean. Scrape inside one end with a piece of wire, then put on a tiny amount of epoxy resin and slide it on to the motor shaft. Don't let resin get near the motor case. Run the motor on a dry battery (or up to 12v power source) to check that the tube is dead in line, and leave in a warmish place for at least 24 hours.

Now unpin the wing and sand it lightly with fine glasspaper, rounding the top surface at leading and trailing edges as shown on the section. Check that the centre cut-out just accepts the motor. The fuselage sides must now be slid on to the wing, one from each end. Place the motor in the wing cut-out and slide the sides up to it; slip a rubber band or narrow strip of adhesive tape round the sides and motor to keep it in place temporarily. Cement B1 in, then cement

the fuselage sides in position on the wing, tight up to the motor. Leave to dry thoroughly after first checking that both sides are "square" to the wing and that the tail ends are level.

Cut the  $\frac{1}{4}$  in. block that fits under the wing centre and cement in place, also the  $\frac{1}{8}$  in. cockpit "floor" if required, then bend up the undercarriage. Start bending from the middle, which makes it easier to get a good fit and also to get both legs the same. The wheels can be soldered on before attachment to the fuselage, or later.

Remove the band or tape from the motor, slide it round, and solder the two wing wires to the brush terminals—it doesn't matter which goes to which. Just a quick touch with a really hot small iron and resin-cored solder is all that is needed, but check that the joints are good, as it is not easy to get to them without cutting the model up once it is finished. Solder the other ends of the wires to the two No. 2 press studs, cement the studs in place, then try the motor on a dry battery to see that it spins.

Push the motor back in position and replace the band or tape, then cement the undercarriage in place. Make a thorough job of this. The bottom of the fuselage can now be covered with  $\frac{1}{8}$  in. sheet (remember to take the motor band or tape off) and the tail ends cemented together and held by a pin or clothes peg at the tip.

Cut some very soft  $\frac{1}{4}$  in. filler pieces for the nose and fit in place; cut the top front  $\frac{1}{4}$  in. piece and cement in at the same time. Lay the tailplane on its seating and check that it is parallel with the wing when viewed from the nose. Trim the seating carefully if not. Cement in place, checking it is square from above. Cover the rear underside with  $\frac{1}{8}$  in. and finally fit the  $\frac{1}{4}$  in. top rear decking. Leave to dry, then carefully pare and sand the fuselage to finished shape.

Cement on fin and sub-fin, checking that these are truly vertical and aligned properly fore and aft.

When dry, sand the entire model with very fine glasspaper or garnet paper and apply one or at most two coats of sanding sealer. Sand off the sealer almost completely, and apply one coat of thin colour dope. Paint the inside of the cockpit to contrast, and add a pilot, if required. A suitable pilot can be made from a 1/24 slot car driver.

Now cut a paper pattern for the windshield and when satisfied cut out a very thin acetate copy. Cement in place carefully. Add any colour or transfer trim but avoid adding too much weight.

All that remains is to epoxy the propeller to the shaft and then we can turn our attention to the pylon head, to be described next month.

3" COX  
PROP  
EPOXIED  
TO TUBE

FUSELAGE SIDES  
1/16" SHEET

SOFT 1/4" SHEET

MOTOR

FILL WITH  
1/4" SCRAP

1/4" SHEET BENEATH WING

LIGHT CHAMFERS ON  
LOWER WING PANEL

12 G. BRASS TUBE  
EPOXIED TO  
MOTOR SHAFT

TRUE LENGTH  
2.3/8"

UNDERCARRIAGE  
20 S.W.G. WIRE

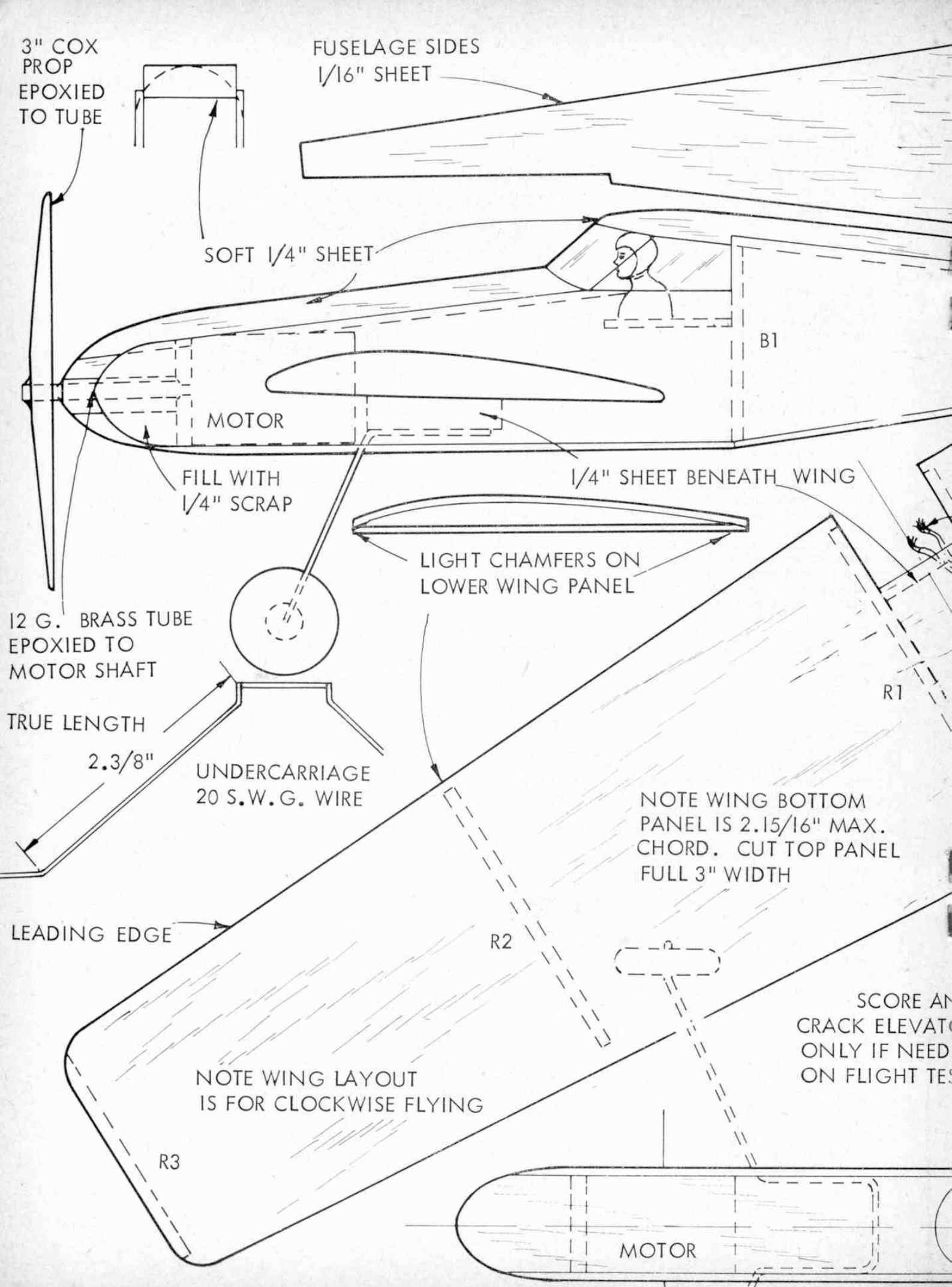
NOTE WING BOTTOM  
PANEL IS 2.15/16" MAX.  
CHORD. CUT TOP PANEL  
FULL 3" WIDTH

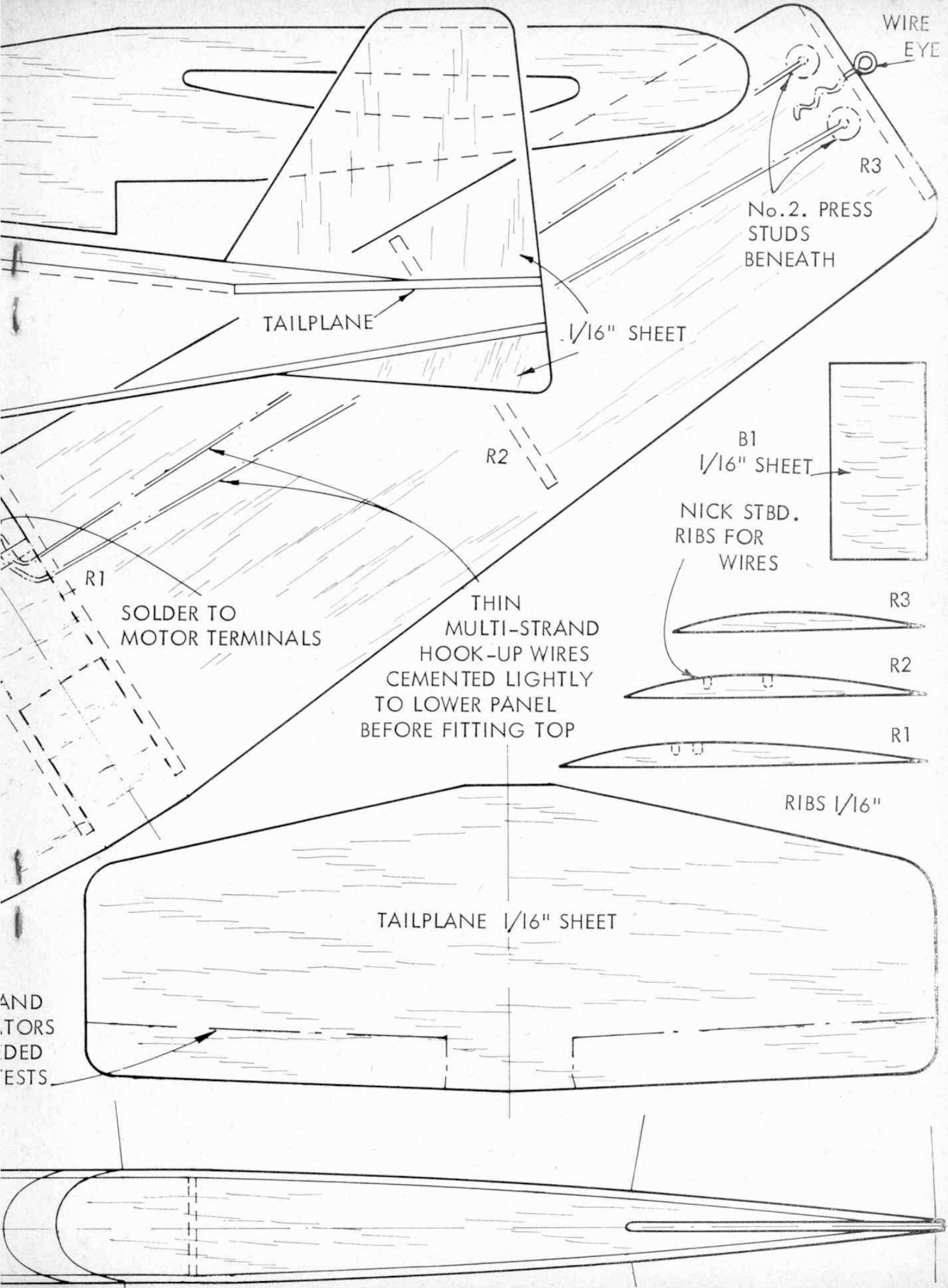
LEADING EDGE

NOTE WING LAYOUT  
IS FOR CLOCKWISE FLYING

SCORE AND  
CRACK ELEVATOR  
ONLY IF NEED  
ON FLIGHT TEST

MOTOR





WIRE EYE

R3

No. 2. PRESS STUDS BENEATH

TAILPLANE

.1/16" SHEET

R2

B1  
1/16" SHEET

NICK STBD. RIBS FOR WIRES

R3

R2

R1

RIBS 1/16"

SOLDER TO MOTOR TERMINALS

THIN MULTI-STRAND HOOK-UP WIRES CEMENTED LIGHTLY TO LOWER PANEL BEFORE FITTING TOP

TAILPLANE 1/16" SHEET

AND TORSION DEFORMED TESTS