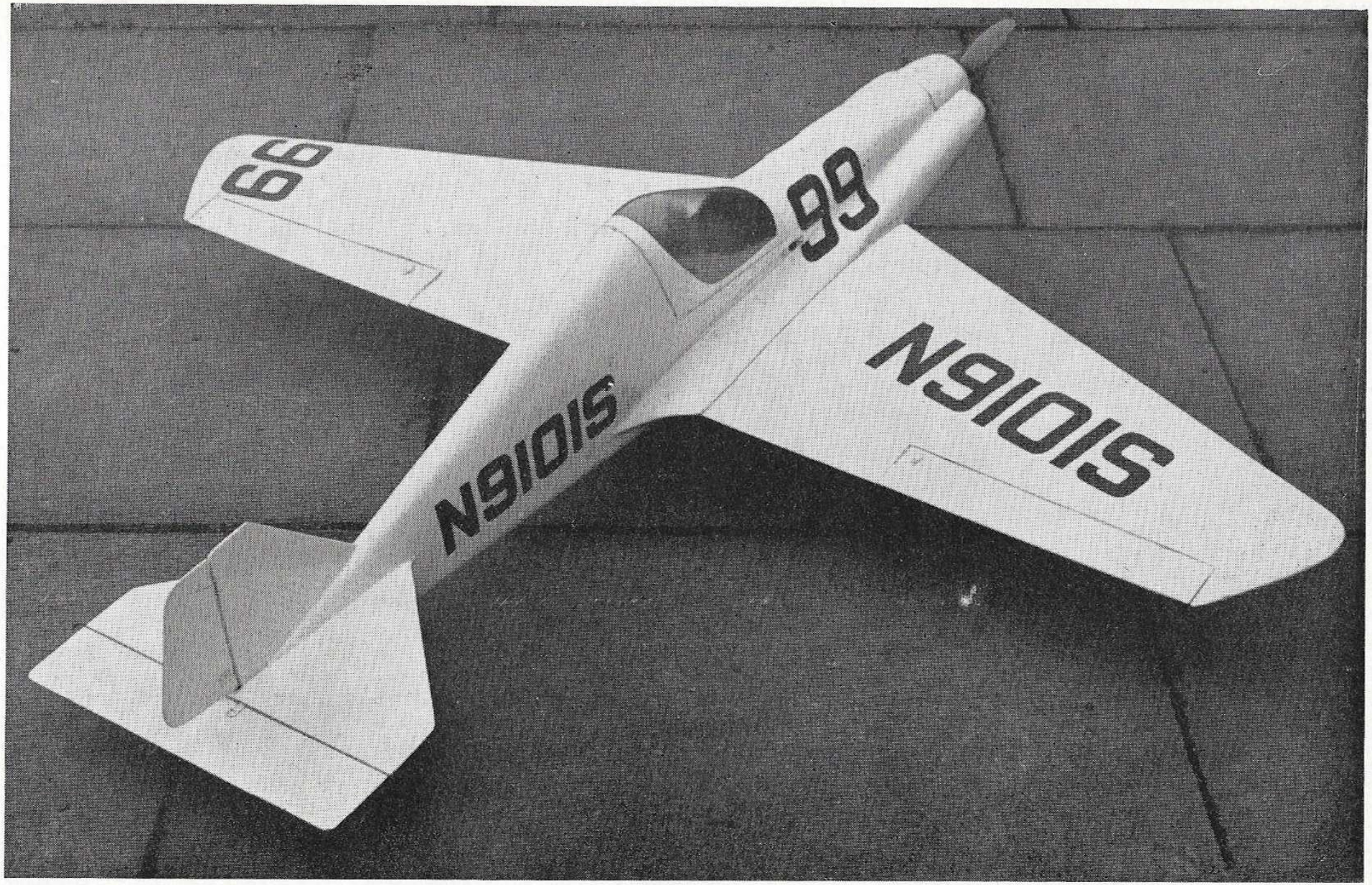
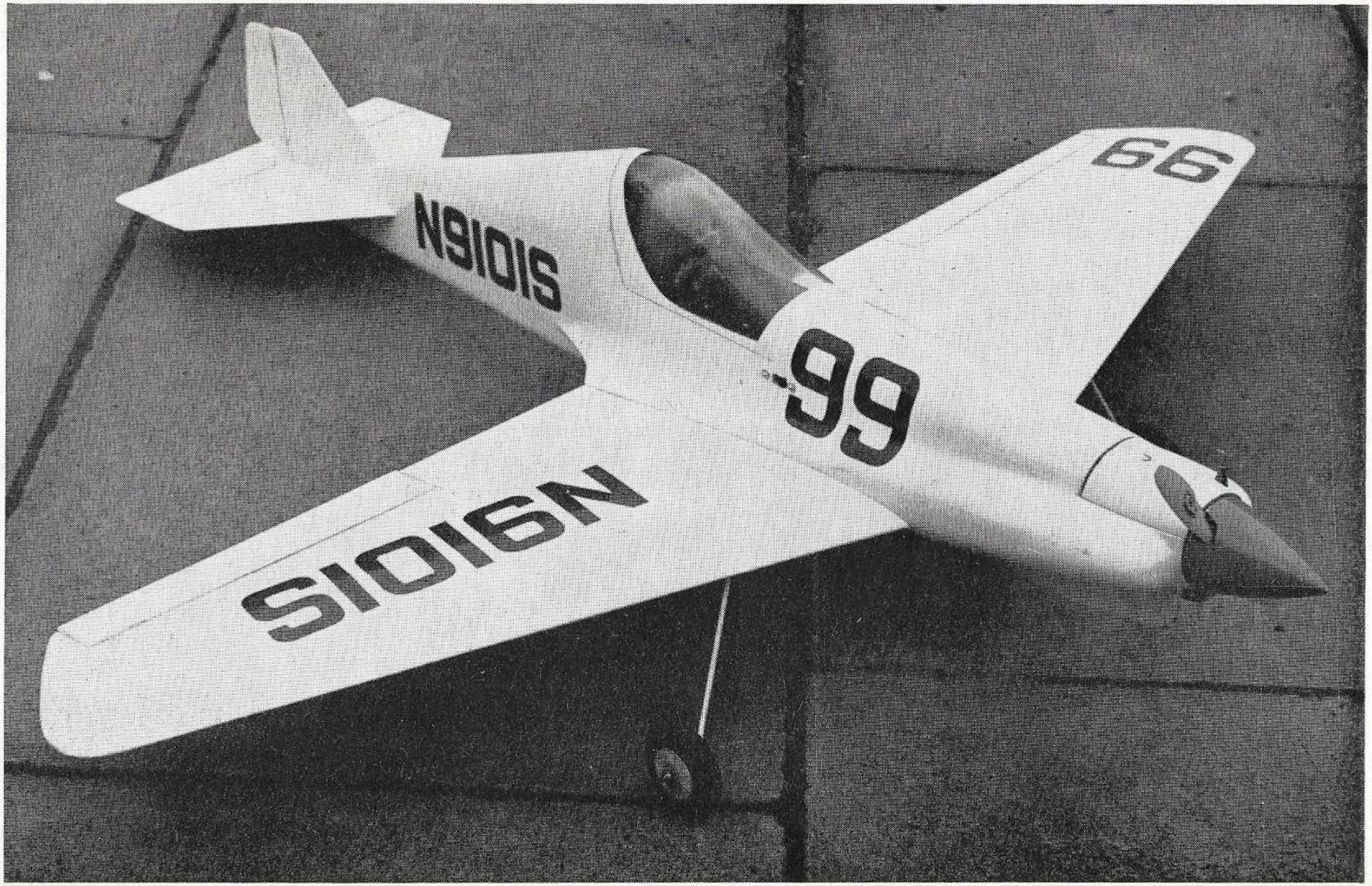


Al Greenwood's "RIVETS"

'Goodyear' class pylon racer

THIS ATTRACTIVE, FAST AND EXCITING MODEL IS THE LATEST ADDITION TO THE R.M. PLANS RANGE!



Designer Al Greenwood holds for Doug Spreng, watched by timekeeper Peter Gardner at South Coast Rally.

THE full-size *Rivets* began life in the late 1940s as a Continental-powered racing aeroplane, with "prone-pilot" layout. Built by owner-pilot Bill Falck, it somewhat resembled the aeroplane as presented here, except that it had a lower fuselage profile, sporting a long "greenhouse" of a cockpit canopy extending very nearly to the nose, and a taller, pointed, fin and rudder. The rules laid down by the Goodyear Company, who sponsored this event, however, outlawed this pilot position.

Modifications to allow the machine to comply with the rules produced the aircraft we know today, which had its first success in 1950 with a 6th place at Pennsylvania at a speed of 167 m.p.h, and then a 2nd place at Detroit in 1952 with 194 m.p.h. All the Goodyear racers were now going much faster, with much cleaner airframes and wheel spats becoming almost mandatory, and success followed success, with no less than five firsts, three seconds and two third places between 1952 and 1960.

There was then a lapse in Goodyear racing until about 1965, since when *Rivets* has again proved almost unbeatable. This class is now known as the Continental Racer, due to Goodyear's ceasing to sponsor it, and has now a tremendous following in the U.S.A., where speeds well in excess of 200 m.p.h. are commonplace. The T-tail version (as shown dotted on the plan) is the latest development, the modifications having been made during non-racing years in the early 1960s. The engines are flat four cylinder aircooled types of approximately 190 cu. in. or about 3,200cc.

Building the model

The Wing. This is built upside-down on the plan. First join the 1/16 x 4 in. soft sheet balsa, as suggested on the plan, to cover the entire wing. Make two identical panels for top and bottom. As the trailing-edge curvature is only slight, it may be left straight at this stage, to be trimmed to the correct outline later. The rear sheet and middle triangular-shaped piece go straight through from end to end, with the grain parallel to the trailing edge, and the front sheets join at the centre line, with the grain parallel to the leading edge.

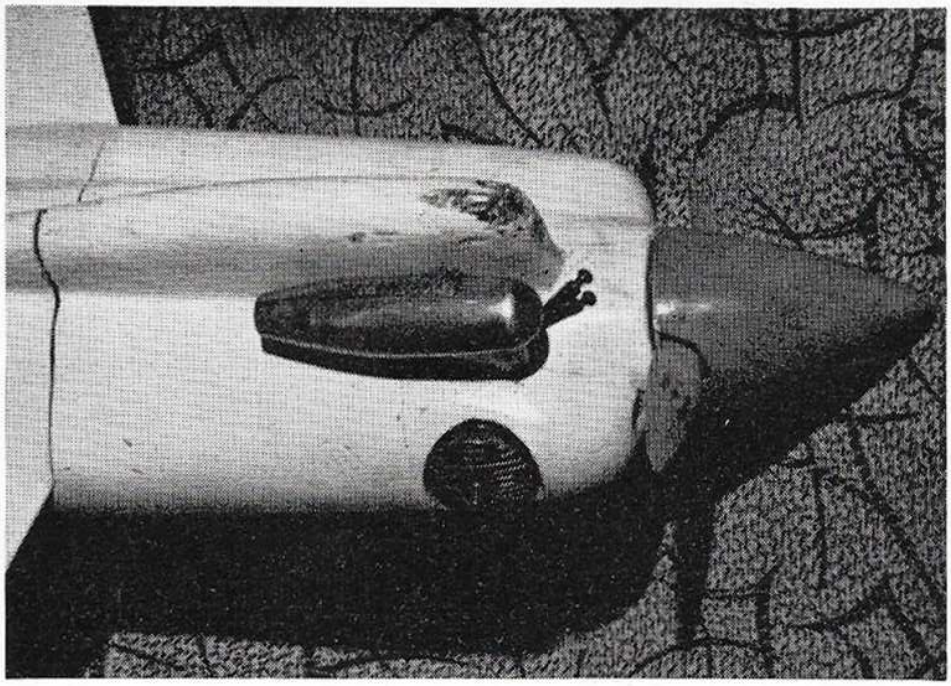
Use a very flat board for joining the wing panels, and have it covered with greaseproof paper or polythene sheet to prevent the assembly sticking to it. When joining sheets, they should be pulled together with masking tape and weighted down while the glue is drying. The underside is the finished surface and should be the smoothest side of the sheets. (Incidentally, if MonoKote or Solarfilm is to be used as a final covering, do not use white resin glue, as the heat from the iron softens it slightly making the joints show up, although otherwise I recommend it throughout.) Sand the panels smooth, so that sanding is kept to a minimum on the finished wing.

Next build the basic framework, omitting the aileron spars. Mark centre lines on all ribs and the leading edges, as it helps in lining up, later. When the framework is dry, block up the leading and trailing edges (still inverted) so that the centre lines of the ribs are parallel with the building board, and the top of the main-spar is flat on the plan. Cut u/c stock and check for fit, not forgetting the 3/32 x 5/32 in. groove for the u/c legs. Saw halfway through the u/c bearer and crack it to give the correct dihedral angle. Trim the front edge of it to follow the contours of the ribs, checking with a straightedge before fitting permanently in position.

Now glue the bottom sheet in place onto the jigged up framework. A slight crack about 2 in. long on the centre line will help the sheet to go round the trailing-edge vee. Allow to dry enough to be firm, but not too long or the sheeting will tend to warp before you get the top sheeting on. Flip the wing over, trim the trailing edge to correct sweep-back and sand to follow the top rib contour. Jig the wing up again, this time upright (the dihedral will show up now, as it's all on the lower surface), as before. Add the small u/c anchor blocks, trimmed to top rib outline. Now add the aileron spars, carefully cutting away the ribs, along with riblets 4a and 8a. Mark the outline of the ailerons by cutting through the bottom sheeting in several places — short slots so that they may be cut away accurately later. Hinges may now be added, recessing and pegging them to the aileron spars.

Mount the aileron bellcranks on 1/16 in. ply and glue in position, tucking under ribs 4, and cutting the push-rod outlet holes in the wing sheeting. Fit the 16g push-rod, servo mounts, etc. Horn connections are fitted later. When satisfied that all the internal structure is complete, cover the top of the wing in a similar manner to the lower surface and, when completely dry, add the tips and carve the leading edge to final profile. Peg the u/c bearers to the leading edge with ⅛ in. dia. balsa dowel and smooth to leading edge shape. Finally, the ailerons may now be cut completely away, and hinged.

Fuselage. Cut the sides from ⅛ in. sheet and butt join 3/32 in. top sides, with the resulting



Engine cowling and silencer detail.

"step" on the outside. Contact cement (Evo-stik) the 1/16 in. plywood doublers in place and roll down (a rolling pin is fine) for perfect adhesion. Note that the right hand doubler is about 3/32 in. shorter than the left hand one, to allow for sidethrust. Add the ½ x ⅛ in. tailplane supports, as shown. The firewall (former 2) should be pre-drilled for engine mounts, fuel pipes and throttle linkage holes, and have blind nuts fitted in place. Assemble the formers and spacers at the wing trailing-edge position and curve the top sides over—damping the wood if necessary. Cut out the spine or upper top decking from ½ in. sheet, making two saw cuts for the fin slot— but leaving the wood in place for the moment.

Plank the top front of the fuselage with 3/16 in. sheet or, alternatively, make from soft block and hollow right out to 3/16 in. thickness. Add the nose doublers and top cowl block, but only tack this in place whilst shaping, as it is removable. The entire top of the fuselage above the datum line is now carved and sanded to shape, after which the tailplane may be added. This is made either from soft, *light* ¼ in. sheet, or built up from a ⅜ x ⅛ in. framework covered with soft 1/16 in. sheet each side.

Check the servo push-rod clearances and exit holes. Push-rod drives should be kept as straight as possible. Add the throttle conduit and check the tank fit complete with feed and vents. A 6 oz. tank should be adequate—though an 8 oz. H. B. Precision Products one was used in the original, with its brass tubes replaced by copper ones, as these are more easily bent to shape. The rectangular hole in former 3 helps to keep the tank firmly in place and on its correct level.

Next check the wing and fuselage for mounting alignment. Fix the front dowel in the wing leading edge and stick a small piece of 1/16 in. sheet there to simulate 1/16 in. ply former 3c, which is added much later. The Camlocs are fitted into the wing, on ⅛ in. ply mounts, the brackets being bolted onto ⅛ in. ply pieces of correct fuselage width, so as to clip into the wing. Pack the wing so that the Camlocs are at maximum tension, checking the wing incidence (0°). Also check that there is 1/32 in. clearance for the fairing bases. When satisfied on all these points, glue the ply mounts holding the Camlocs in place, and leave to set with wing in place.

Cheek cowls and wing fairings. Cut two lengths of 1/32 in. ply, cross-grained, slightly longer than shown on the plan, chamfering the edges as shown. Any joints should preferably be near the trailing edge. Now offer the wing up to the fuselage but, before tightening the Camlocs, slip in the lengths of 1/32 in. ply, then tighten and check the alignment once again for zero incidence and, if necessary, trim the fuselage cut-out until this is absolutely accurate. When all is well, tape on some greaseproof paper to the top side of the wing, apply glue to the fuselage cut-outs, place the wing in position, slip in the 1/32 in. ply pieces and tighten the Camlocs. Tape the ply flush with the wing surface to ensure a good all-round fit—and use a slow drying glue so that adjustments may be made if necessary.

Now add all the cheek formers and fairing supports, then the under-wing formers, 3b, 4b, 5b, etc., followed by side pieces complete with ⅜ in. triangular fillets. The soft 3/16 in. sheet bottom is in one piece from former 2 to the tail, and then the front nose block is fitted. Plank the entire cheek with ⅛ in. soft balsa right over the wing opening, bevelling the inside of the planking to fit the wing as shown in the plan view. The top planking is also bevelled off to a feather-edge at former 4. When the nose cheek blocks are carved to shape and hollowed, cut a hole in the side of the fuselage to accommodate the engine cylinder to within 3/16 in. of the cheek profile. It is difficult to do this after the cheeks are glued on.

Next cut two pieces of soft, pliable, 1/16 in. sheet to approximately the shape shown on the drawings for the fairings. Dampen one side and wrap the sheet round a broom handle or similar and leave to dry—making sure you have one right and one left-hand curvature! Fit these pieces by trimming, chamfering and "kneading" into shape, to make a smooth fit against the fuselage and cheeks. When satisfied, glue into place. Cut the ¼ in. sheet rear under-fairing, bevelling the top edge, and glue in place—again "kneading" the top sheet into place. Keep damping the wood throughout these "kneading" operations, as necessary, to keep the wood pliable. When the assembly is thoroughly dried out, sand it smooth, including the ¼ in. sheet under-fairing.

All joints and fillets on the original model were smoothed off with Brummer Stopping (from D.I.Y. stores at about 2s. 6d. a tin). This may be softened easily by warming the tin, and can be smoothed off with a wet finger. When dry, sand and fill again if necessary.

The tube for the steerable tailwheel is bound to a piece of ¼ in. square balsa which is then glued in place. Now remove the piece of wood left in place, to provide the slot for the fin, and fit the fin

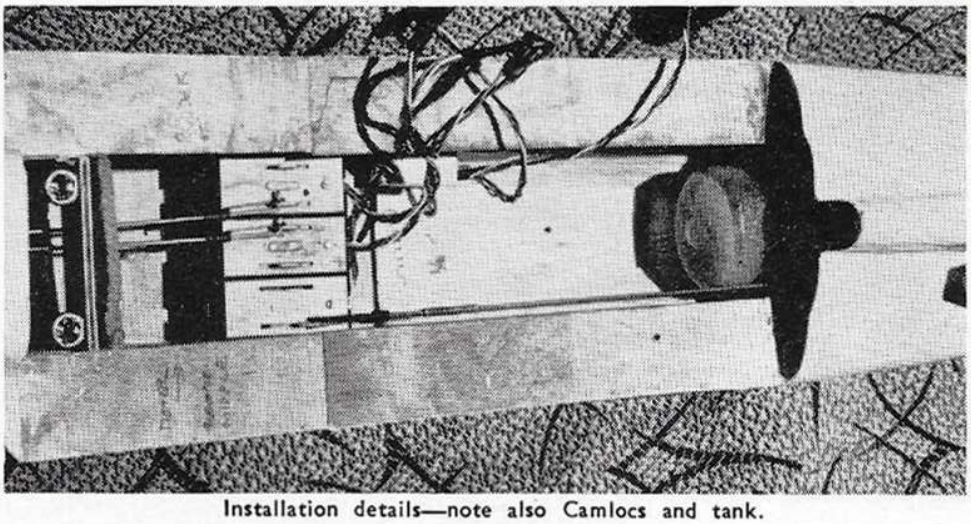
into position, smoothing the joints between fin, fuselage and tailplane with Brummer to form a smooth fillet.

The wing may now be cut away with a fine saw, trimming 1/16 in. off the leading edge, reducing former 3b to $\frac{1}{8}$ in. thickness plus the 1/16 in. ply former 3c glued in place. Carve the under-chin to shape and glue it in place with the wing in position. When dry, Brummer the fillet and then cut away leaving the rear part of the chin attached to the wing. The air outlet, which is a simple 1/16 in. sheet triangular box, is now added to the cheek, as indicated. The tailwheel may now be fitted, with washers soldered top and bottom of the leg.

Carve and sand the elevator and rudder from $\frac{3}{16}$ in. sheet and hinge with polypropylene tape. Add 1/16 in. cross-grained cockpit floor — which looks best painted black, plus a pilot. Trim the canopy to 1/16 in. over-size all round; relieve the surrounding wood by 1/64 in. and fit the canopy flush with the general outline, masking off the transparent area ready for painting.

Finishing

As a primary filler, Brummer Stopping is rubbed into the entire surface to fill the grain and lightly sanded off. The entire airframe is then covered with lightweight Modelspan tissue, doped into place. The original was given two coats of Eggshell polyurethane as an undercoat, sanding wet between coats. Finally, two coats of gloss paint, again wet sanded between coats.



Installation details—note also Camlocs and tank.

Installation

The original has Micro Avionics servos, utilising the neat spring clip screwed to $\frac{1}{8}$ in. ply runners glued to the cockpit floor. For the larger Orbit servos, I recommend $\frac{3}{8}$ x $\frac{1}{4}$ in. pine runners fixed across the fuselage, supported on soft $\frac{1}{4}$ in. sheet from the cockpit floor. The positions of the servos should be adjusted to effect the correct c.g. position. Fit Qwik-links to the ailerons by slipping the cranked arms into the bellcranks from underneath.

Flying

Control surface movements should be about $\frac{1}{4}$ in. each way on the elevator, $\frac{3}{16}$ in. each way on the ailerons, but plenty of movement on the rudder—use the middle hole of the horn.

Apart from the usual swing on take-off, no difficulty should be encountered, the general flight characteristics being much like the average multi aerobatic model—except for the much higher flying speed. When you have become accustomed to this speed, and the increased effect of control movements due to it, you will find that the manoeuvrability can be enhanced even further by using greater control-surface movements, as in fact, Doug Spreng does. But do not try this until you have become used to the model with the movements specified.

See you at the line-up!