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1/4

By E. J. THOMPSON

FINDING myself in hospital and 'on the mend' and armed with the A.P.S. 1/48th scale drawing of the *Long Midget,* plus a specification for a miniature racer published by *R/C Modeller* magazine, I set about combining the two to create the offering herewith. My *Sprengbrook* gear with 225 DEAC tips the scales at around 14 oz. and with the OS.15 plus silencer and all other bits and pieces, adding a further 7 oz. the finished airframe including pushrods and linkages would need to weigh in at around 19 oz. to get down to the minimum specified weight of 2½ lbs. The model in the photographs came out 1 oz. under this but the first flight indicated that about this amount of nose weight was required so the model ended up dead on 2½ lbs. The OS 15 and the silencer, however, are both among the lighter ones in this power group, so if a heavier engine is to be fitted, the ballast would be unnecessary.

This model could handle a .19, which, although outside the maximum (.15) specified for the *Quarter Midget* class, would nevertheless be fine for some real zippy sport flying or mixing it in open pylon.

Although only a comparatively small motor is used (by R/C standards anyway) this does not mean that the model is in any way suitable for beginners. Neither should it be 'detuned' by fitting a motor very much smaller than 2½ c.c. because with the ultra thin wing section (7½% at root) and small control surfaces, the power is needed for effective control.

I will not go into the 'how you make it' routine because anyone building this model will, of necessity, have built and flown other models and will no doubt have their own ideas on construction methods and sequences, which in any case I cannot remember!), but I will make a few suggestions for consideration.

Wing and Undercarriage

For the original undercarriage as seen in the photographs I used 12 gauge wire but this just was

Three separate views here of E. J. Thompson's prototype display pleasant lines of famous Midget Mustang racer. Requires lightweight multi propo radio, but can be flown on only two functions for ailerons and elevator controls.

MIDGET MUSTANG

A snappy-looking little model to American small-size racing formula

not up to it. Unfortunately, shaping 10 gauge to the same pattern would, I think, be more than a trifle difficult, so if possible get hold of a wire bending device. Alternatively, a less scale-like but more simple undercarriage similar to that employed for the main wheels on a tricycle set up could be used.

This arrangement has the advantage of torsion bar springing. Next, although it has been written before, perhaps some may benefit from a description of the sandwich method for tapered wings. Start by making templates of root and tip ribs from plywood or something similar between which are 'sandwiched' the ten 3/32 in. sheet balsa blanks for the ten ribs of a half wing. After shaping to contours of templates a set of ribs will emerge with equal reduction from root to tip.

It will be seen that these ribs will have sloping edges because a half wing has been compressed into about an inch so the next step is to draw around the largest side of each of these ribs twice to produce a complete set of accurately tapered ribs. Waste can be almost eliminated by drawing round the smaller rib blanks on to the larger ones.

Please do not skip the webbing of spars and leading edge. Admittedly, this operation is a bit tedious but the resultant wing will be much stronger and very much more rigid. Remember this very thin wing is going to have to slide through the air at a 'fair old lick' so it needs to be well stressed. For the same reason it would be advisable to use a jig to ensure that the wing is true. The faster an aircraft flies, the greater is the effect (adverse) of any inaccuracies.

The jig need not be elaborate – all that is required are sheet balsa cradles to support root and tip ribs and tapered lengths of same for spars, leading and trailing edges set at the correct dihedral angle.

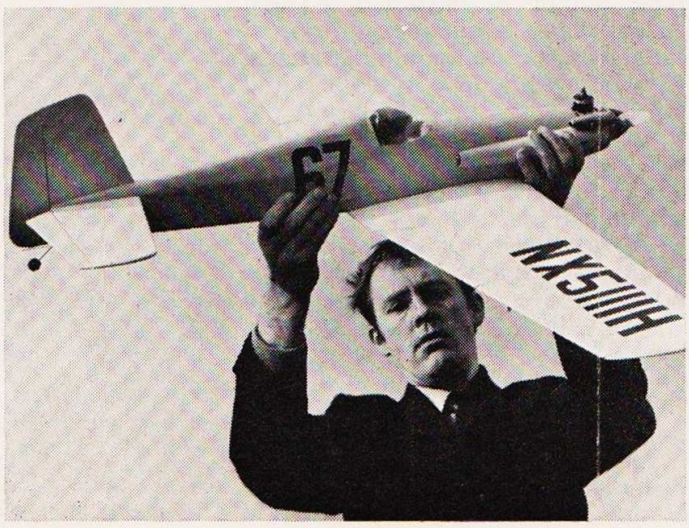
Fuselage

It will be seen from the plan that part of the rudder servo is aft of the wing trailing edge position – this being the only way that I could get it in. If, however, your gear will fit within the wing opening, so much the better. The slight forward shift of the weight mass will probably assist in arriving at the correct balance point. Also, if the aileron servo's overall length is no greater than the internal width of the fuselage, then access can be from the usual hole in the top side of the wing. If not, then resort to a hatch beneath the dummy air intake-cum-servo cover. I do not intend to go into much precise detail about installation because of the many differences in equipment, except to suggest that the total throw of the ailerons be limited to half an inch initially and the elevators three eighths of an inch, both measurements taken at the trailing edge at the inboard end, i.e. the widest point. To achieve this end, servos that have a rotary output have an advantage as using an inner hole on the output disc will gear down the pushrod travel. In the case of ailerons further reduction can be achieved by connecting the pushrod from the servo to the outer hole in the bellcrank and the horn actuating rod to the inner one. The plan also details a steerable tailwheel assembly but as this is only required for taxiing can be dispensed with in favour of a wire skid.

Taxiing a taildragger on a less than perfect strip can be a bit hard on props. Finally, use soft wood for the decking rear of the cockpit. This can be pre-curved by first wetting, then held by rubber bands until dry. Fit this section and reinforce with a film of P.V.A. adhesive on the inside before planking the bottom.

Finishing

As I tend to use different finishing methods for different models and as most modellers I would think, have their own ideas on the subject anyway, I will confine my remarks to what I consider to be a good tip, gleaned from the proprietor of my local model shop, for the basic preparation of the fuselage. After sanding smooth a fifty-fifty solution of P.V.A. adhesive and water is liberally applied which permeates in to the surface producing a tough outer skin. About five or six coats will be

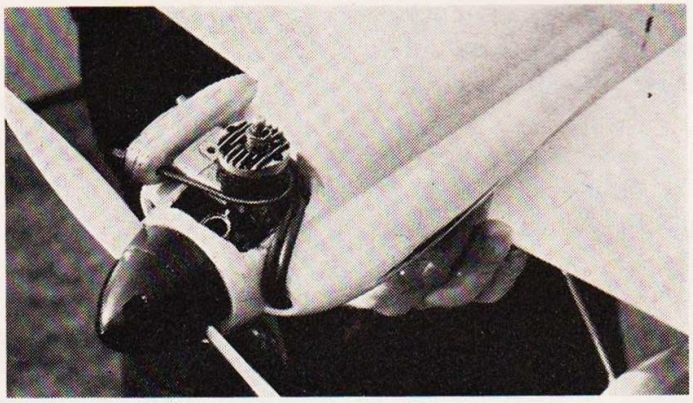


necessary but as this preparation dries quickly and is easy to apply, this operation does not take very long. Although this on its own does not completely fill all the grain, it does create a good seal and this saves weight by preventing the wood from absorbing the heavier dope.

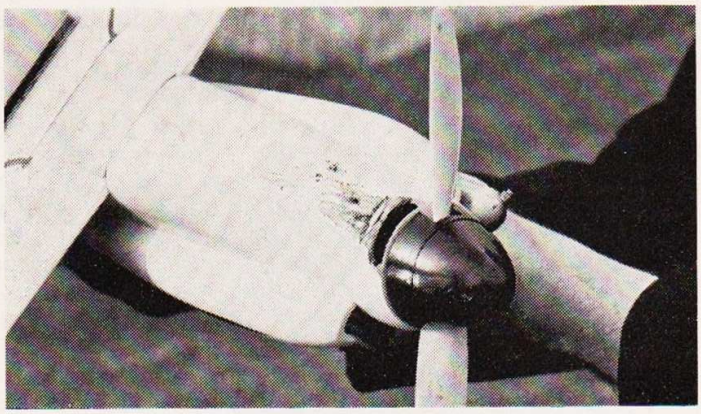
Flying

Before describing this model's flying capabilities may I first reiterate the necessity for limiting primary control surface throws especially if the power is increased. I suspect that many fine models having an excess of power allied to over-sensitive controls (especially ailerons) have suffered the same fate as one or two of my own, cavorting about the sky with each application of the sticks only making matters worse, until the almost inevitable very sudden termination of flight plus equally sudden reduction of the nose moment. When the model is trimmed and the pilot fully familiar with the same then is the time to experiment with more responsive controls and thus avoid having one of those tigers by its tail. The small elevators and movement also makes smooth, even take offs child's play. Reaction to control is instant but entirely devoid of the sudden loop into the air tendency often experienced with high powered models, but rather exhibiting a steady gain in altitude at a consistent elevation.

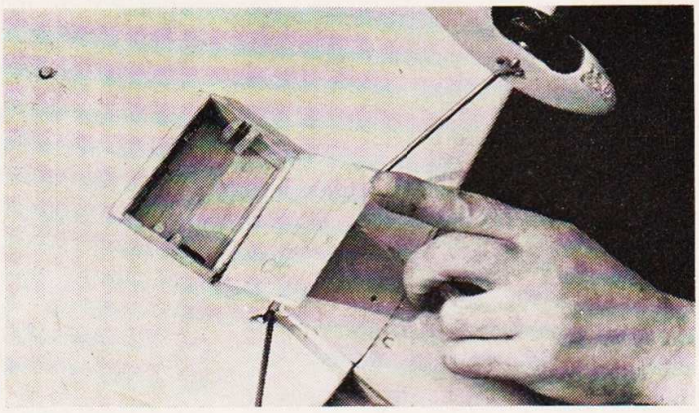
This I consider to be a particularly satisfying element of this model's performance. At full throttle this little aircraft flies quick but is in no way hairy, and low level passes can soon be performed with confidence – always allowing this is consistent with safety of course. Models of this type cannot be expected to float down like a sailplane and approaches therefore cannot be stretched very far with a dead motor. Should you try to do so, it will stall but if it is of any comfort, it will be the nose that will drop and not a wing tip. If executed properly, whether under power or not, the landing speed is not excessive, providing the weight of the model is not excessive too. Here then is a spritely little aeroplane that is appreciably cheaper to make, power and operate than the bigger stuff, and easier to store and transport. So – you racing programme organisers – how about arranging some races for the smaller models. Happy lapping!



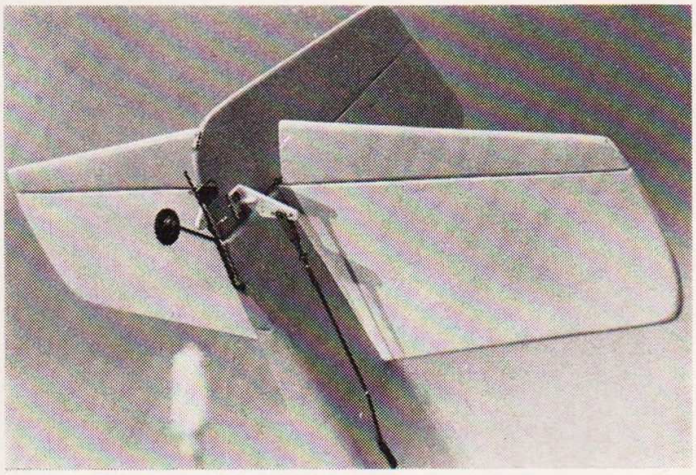
This model takes .15-.19 sizemotors, which fit upright, allowing room for silencer to clear cowl.



Underside of engine cowl showing dummy air scoop. Note scuff marks – result of nose-over landings. Underside air scoop can be glass fibre reinforced for strength.



Aileron servo slides in from wing underside, retained in rails shown. Cover then folds over to enclose servo. Note also wheel pants retained on undercarriage legs by saddle clamps.



Tail cone of Midget Mustang, showing linkages, including yoke assembly for steerable tailwheel. This is not strictly necessary – you'll find that it is the rudder that has the steering effect, not the tailwheel.