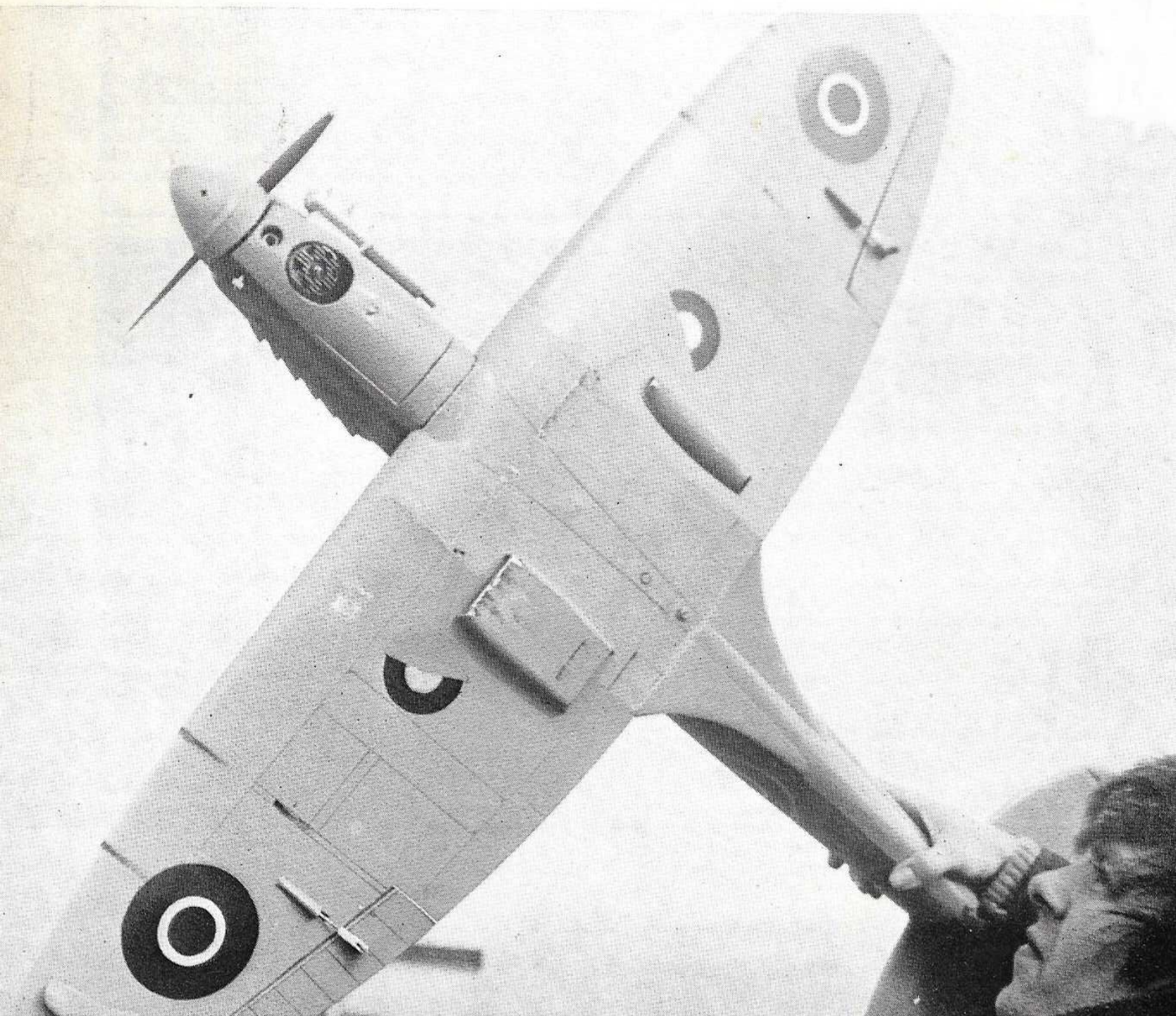


Spitfire

Mk XII

***A handy-
sized
little model***

by MAL KINNEAR





This .29 powered version of the 'clipped-wing' Spitfire spans only 42½ inches. It's for hand launching (no ulc), handles beautifully and really looks "right" in the air!

OVER the years, enough superlatives have been written about the *Spitfire* to sink the proverbial battleship, and I certainly don't intend to add my ha'pennyworth to them in this article; instead I will confine myself to a brief description of the origins of both the model and the full size.

The full size

The Mk. XII came into being as a hasty counter measure to the then new and superb Fw.190, these German fighters attacked low and fast over the South Coast (usually operating in pairs) and the R.A.F. pilots soon found that even their *Spitfires* were out-matched, and their hard-won air supremacy was very seriously threatened. It was only the *Spitfires'* extremely tight turn that saved them from being massacred on several occasions. As the new *Spitfire IX* was not then

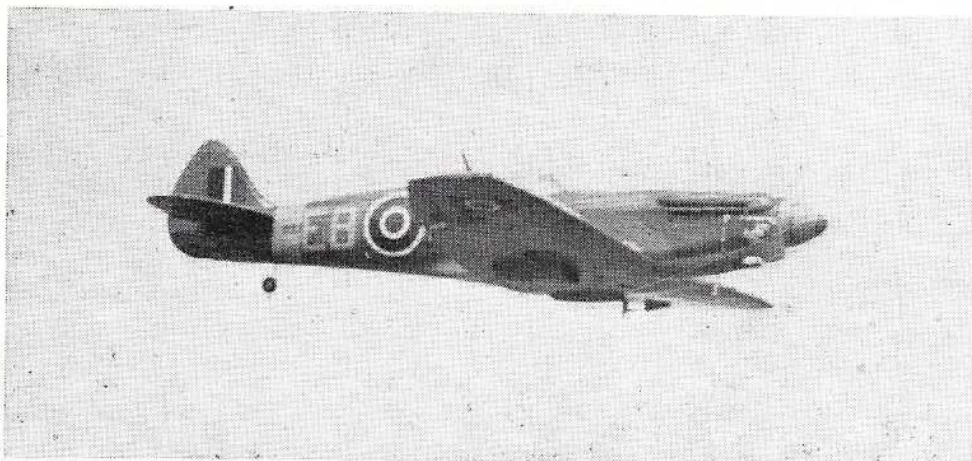
coming off the production lines, it was obvious that something had to be done quickly. Vickers Supermarine took a basic Mk. V airframe and married the new Rolls Royce 'Griffon' engine to it. A larger pointed rudder and clipped wing tips completed the basic conversion, and this aircraft proved to be the answer to the current problems. Once again, the *Spitfire* met the enemy on equal terms.

The model

As your esteemed Editor knows well by now, my pet 'hobby horse' is the small scale model, and I feel that this type of model is definitely a viable proposition for the experienced week-end flier. As the *Spitfire* had the reputation of being a bit 'hairy' when reproduced in model form, I felt that success with a small model of this famous aircraft would go a long way to proving my point.

Well, successful it certainly has been. It has now had many flights, and has survived an inverted pile-in from about 8ft. up (pilot error). In flight, the model is a picture of realism and the glide in a power-off situation really has to be seen to be believed. One of these days I'm sure it's going to catch a thermal!! An undercarriage has been omitted in the interests of realism, drag and —of course—our old enemy weight. Being very clean, aerodynamically speaking, and lightly loaded, the model has plenty of power on only an Enya 29, and in fact has a fair turn of speed, but it can be slowed down considerably without any fear of the dreaded tip-stall. The prototype model uses very little ply in the construction, but despite this is strong where it matters.

Only three servos are used (no rudder) to save weight, and consequently aerobatic manoeuvres us-



ing this surface are out, but then you don't see *Spits.* cavorting around the sky like a *Pitts Special*, do you? This model should, at all times, be flown in a scale-like fashion, as it is not stressed for violent aerobatics—but more of this later. If you've always wanted to build a *Spitfire* to fit in the car in one piece, now's your chance...

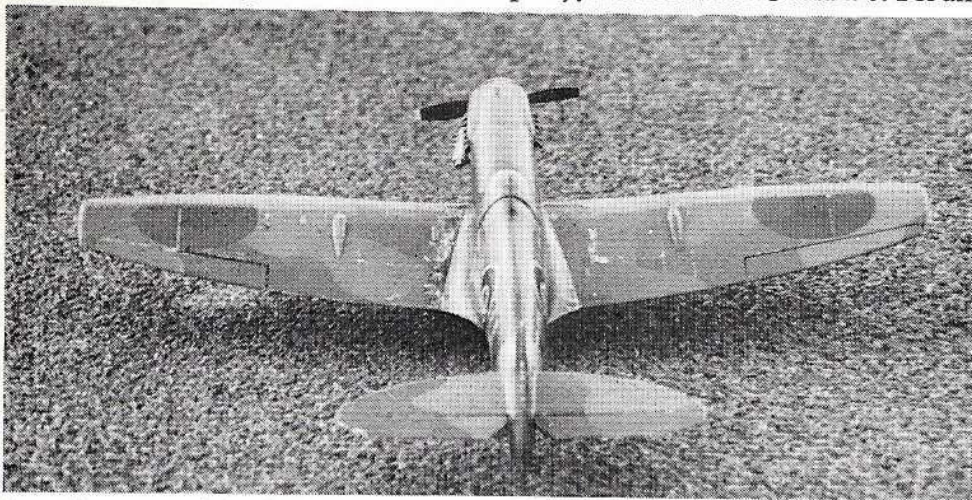
CONSTRUCTION

Fuselage

Time and care should be spent in lining-up all the components. Start by cutting out two fuselage sides from medium/soft $\frac{3}{16}$ in. sheet, and fit all balsa doublers, $\frac{1}{4} \times \frac{3}{4}$ in. nose strips and $\frac{1}{2}$ in. triangular as indicated.

I know you've read it many times before, but *do* make sure you make the side 'handed'. Cut out all formers as specified and glue F4A (which is a planking support former, to F4 as shown. Note that F4 is a balsa/ply laminated former (use a contact glue for bonding here). Using full strength clear shrinking dope, coat the inside of the rear fuselage sides and soak the outsides with water. This will induce a slight curvature, enabling the sides to match the curve of F4 to F6.

When set, draw-in the sides at the tail-end and join together using the $\frac{1}{4}$ in. sheet fin post (note that the rudder post is taller than the fin post); add formers F5 and F6. Fit all



A certain amount of cheating had to be indulged in, to get these two ground shots; as it has no u/c the model was propped up on a box! No cheating for the very realistic air shots, however.



forward blocks, using $\frac{1}{8}$ in. soft sheet and then add the $\frac{1}{2} \times \frac{1}{8}$ in. top crutch back to F6 and the $\frac{3}{8} \times \frac{1}{8}$ in. bottom crutch also to F6 (note that the top crutch has a slight curve down towards the fin). I would advise the use of nylon 'rod-in-tube' pushrods for this model, and they should be epoxied in position at this juncture. When these tubes are securely attached, the $\frac{1}{8}$ in. soft sheet planking strips can be fitted.

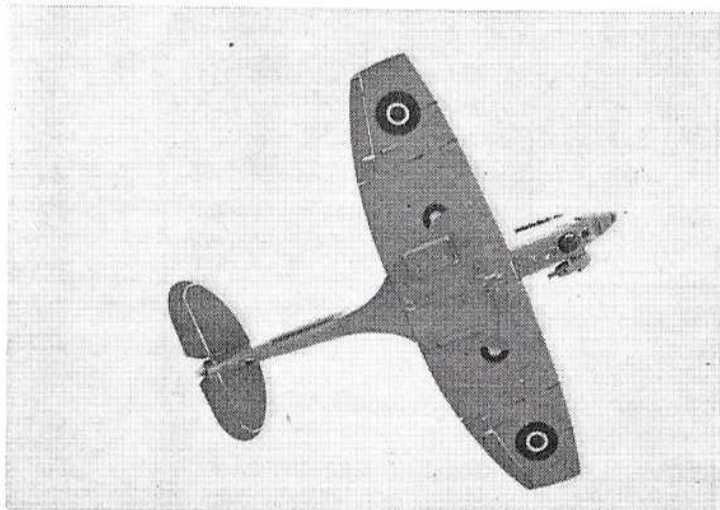
Cut out and fit the tailplane to the fuselage sides and make sure it's fitted square. Glue soft block above and below the rear fuselage, and contour to shape. Add the cockpit floor and, when dry, plane and sand down the fuselage to the correct contours. Be careful you don't break off the fairing supports of F4 when sanding down. (I did—often!). Build up the fin as shown, and take some time to get the fin skin nicely blended into the fuselage itself.

Cut away planking behind cockpit, paint inside black, fit the block alternator and glaze the area shown with acetate sheet. Add all the cockpit detail you feel necessary (but keep it light); make the canopy from a commercial unit using flat sheet for the windscreen, and fit into position. Now cover the glazed areas with masking tape to protect them, and leave this in position until painting is finished. (In this way the canopy will blend realistically into the finished fuselage).

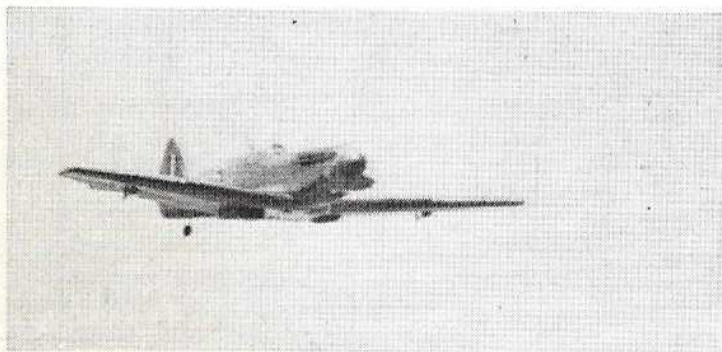
Fit the tail wheel, $\frac{1}{8}$ in. ply shear plate (with gussets), all fairings and give a further sanding down. $\frac{3}{32}$ in. ply wing seats should now be fitted (to shape shown on wing plan), $\frac{1}{8}$ in. sheet fairing supports glued in place together with $\frac{3}{16}$ in. fillet at the rear of F4A. The wing fairings may now be skinned with $\frac{1}{16}$ in. sheet as indicated in the side view. This completes basic fuselage construction.

Wings

The wings are slightly unconventional in that they are constructed directly onto the bottom $\frac{1}{16}$ in. sheet skin. They are built in three separate sections—centre, and two outer panels. I will confine construction notes to one outer panel, the other two units being of the same construction except where noted on the plan. Butt-join two 4 in. wide $\times \frac{1}{16}$ in. sheets of appropriate length and pin to building board, making sure that a correct height packing block is inserted under the t.e. at the tip to induce the $\frac{1}{4}$ in. washout indicated. Mark rib positions in ball-point, glue the main spar and rear spar onto the bottom skin and, when dry, add the wing ribs, making sure R1



We used a standard Enya silencer on our Enya 29, when the model was flown for evaluation and photographic purposes.

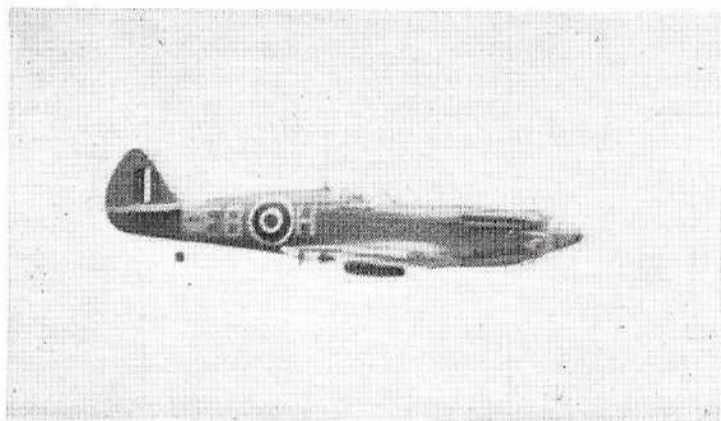


is angled for dihedral.

It should be noted that the ailerons are built integral with the wing, and cut away later. The aileron bellcrank should now be attached securely to the ply mounting plate. When satisfied with this unit (no binding etc.) epoxy the plate in position directly onto the bottom wing skin, having first cut a small hole in this skin to accept the bellcrank bolt head. Fit i.e. by laminating $\frac{1}{8}$ in. sheet; *do not* laminate the sheet before fitting but attach them separately on the ribs and each other. Cut and fit sub-ribs for the ailerons, and glue the horn block in place.

When thoroughly dry, remove

from the board and fit underside i.e. sheet, being careful at this juncture as the wing will still be very flexible, so a constant check on washout should be made. When all three units are dry they may be joined together by cutting away outer panel ribs, where appropriate, to accept the ply dihedral brace. Clamp the brace to the mainspar, using clothes pegs, until dry. Cut pushrod slots and connect up bellcranks, checking for free movement. Cut pushrods for free movement. When complete, the upper wing skin may be fitted. Keep checking that washout! Add soft blocks tips and sand down smooth. Cut away the ailerons and



You can see how wheels hanging down would have spoiled the appearance of the model in flight, especially in this classic pose. Below: the 'Spit' comes in dead-stick—and that glide is very 'floaty' so don't be caught out. (Houses not really that near—it's our 'long' lens!)



hinge them in place temporarily. Offer the wing up to the fuselage and check for fit. Note that the centre-section t.e. is slightly recessed to fit snugly against F4. Make rudder 'profile' from $\frac{1}{8}$ in. sheet and add $\frac{1}{16}$ in. sheet ribs and $\frac{1}{4}$ in. sheet i.e. and sand to section. Finally, make, join and fit the elevators.

Finishing

Although everybody will have his own pet ways of covering this model I will go over the method used for the prototype as it resulted in quite a reasonable finish. All flying surfaces—i.e. wings, tailplane, elevators and rudder—were covered in silver film; fuselage and fin were covered in light-weight tissue and given four coats of clear dope, rubbed down between each. An aerosol can of Holt's grey cellulose primer (for cars) was sprayed on and, when dry, rubbed down with 500 wet & dry paper. This shows up to great advantage any bumps or hollows on the surface. After wiping down, a further coat of grey primer was applied, again being rubbed-down lightly when dry.

For authenticity, the fuselage roundels must be of the narrow yellow and white ring variety, officially known as C.I. (The earlier type of roundels with equal width

Another launch! Though daunting at first, this proved straightforward to Steve and Dave Cronin, who helped us here, with borrowed prototype.



rings is *not* correct. Likewise, the squadron code letters are light grey *not white*). As large C.I. type roundels are not—to my knowledge—readily available, I made mine from a combination of film and enamel. All lettering was applied by hand (alright—I used a brush as well!) Do not aim for a matt finish on this model as the full size was wax polished, and photographs show quite a high gloss all over the airframe. A coat or two of spray fuel-proofer will give a realistic sheen.

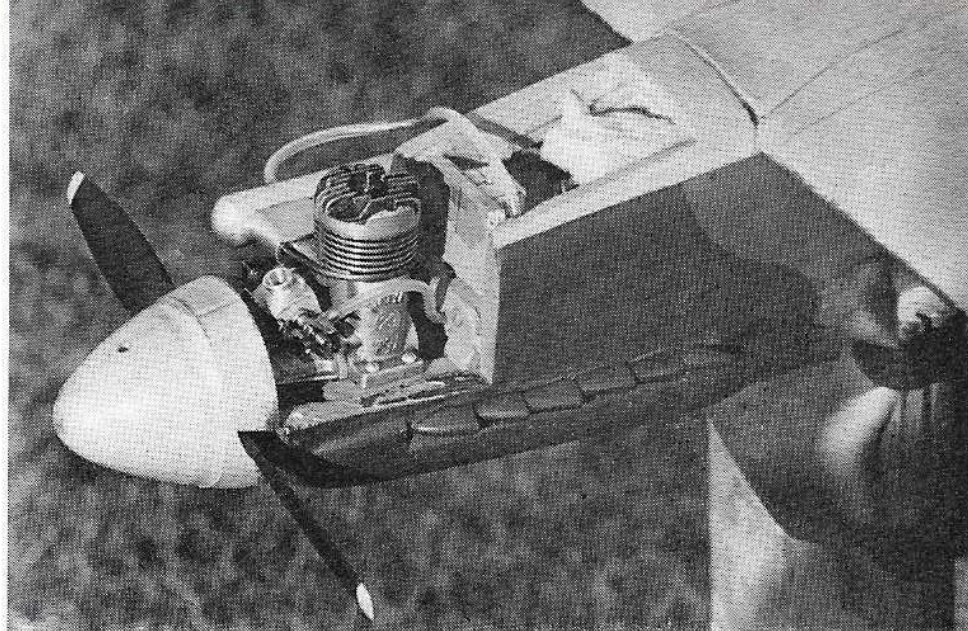
Radio installation

Fit your radio using your own pet method. As only two servos are mounted in the fuselage there should be plenty of room for most equipment. The original model used servo tape for mounting, and this has proved most satisfactory. Mount the receiver directly under the cockpit floor and feed the aerial down the nylon tube one would usually use for rudder control. The aerial should be pulled through and left trailing at the tail. Make sure you plan your installation to bring the c.g. to the indicated position or slightly ahead of it. *On no account* should the c.g. be any further back than shown.

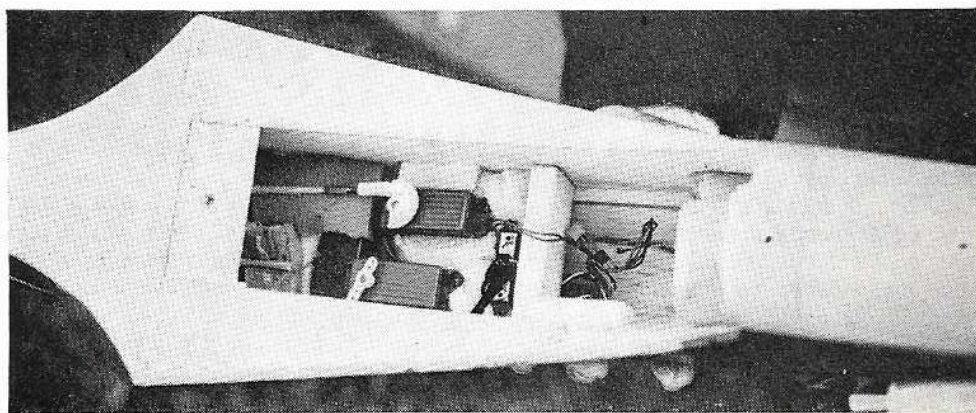
Flying

Select a reasonably calm day for initial test flying because the basically flat-bottom wing section is prone to ballooning into wind, and you will require (as with any new model) a 'familiarisation course' on it before you can get down to a relaxed flying session. The most critical part of flying this model is without any doubt, the hand launch. Make sure your launcher knows what is required of him, and is capable of carrying it out. The *Spitfire* has to be launched fast and straight, with wings level, so a run with the model held above the head is mandatory. Check and double check your engine for reliable running in all attitudes.

Once airborne, the model should be climbed away at a steady, shallow angle and flown to a reasonable height before turning. After you have the 'feel' of the model, and it has been trimmed-out, some mild



Mal Kinnear used pressure feed to his Enya 29, as shown, but we used plain suction feed—no surge trouble on launch. (.29 is the *maximum* size engine recommended—in fact, it's exactly right). Below: installation in original.



aerobatics may be indulged in. A roll is most realistic when about $\frac{3}{4}$ -stick movement is employed, provided that it is initiated after a shallow dive and raising the nose slightly above the horizontal (as per full size). Loops should be started with a shallow dive also, and kept quite large—and don't forget to throttle-off at the top!! Inverted flying is very straightforward—but you don't really see *Spitfires* flying prolonged inverted do you? The model has proved to be very stable in this attitude, but requires a lot of down in an inverted turn, so you're far better off confining this attitude to straight flight. If you lose your motor for any reason there is no need to press the panic button, the model glides beautifully (provided you've kept to the weight limits) and the ailerons are still effective down to very low speeds. You will find that the glide can really be stretched and you'll find yourself overshooting the intended touch-down point, at first.

To say that this, or indeed any model, is a delight to fly is, of course a relative phrase (one man's meat etc.) so I can only say that it represents something of an achievement within my own sphere of experience, and over the months I have found it, well "a delight, to fly!" An undercarriage *could* be fitted, I suppose, and for this reason I have drawn the scale position on the plan. You would, of course, need rudder control added, but I for one wouldn't be prepared to tolerate the extra weight and drag imposed by this fixture—so, if you do fit one you're on your own!!

EDITORIAL POSTSCRIPT—

Mal Kinnear loaned us the airframe, so that we could evaluate the model for ourselves—and get some action photos, which he'd been unable to do. Full marks on both counts. Launching and flying the model proved rather easier than anticipated—and it is one of the most realistic flyers we've seen!