Radio control Models and electronics

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INSIDE – PLANS FOR THIS OUTSTANDING MULTI MODEL

R.C.M.&E. DIGITAL SERVOS

Model on the cover

Stuar Foste

EQ

THE birth of the Equaliser really began about three months prior to the team trials, when it became evident to me that the *Thunderstormer* I was flying at the time was becoming rather heavy (7½ lb.) for competition flying, especially in the power manoeuvres such as the 'Top Hat'. So I decided to follow the general trend towards smaller, lighter models.

I must say, at this point, that I do not profess to be a brilliant designer, but I do know a good model when I've flown one. However, with only a few weeks to go before the trials, I really had to get moving. I had a good idea of what I wanted to incorporate in the design, such as a tapered wing with a swept leading edge to help cure tail wagging and improve grooving in rough weather. A relatively long moment arm was used for smooth elevator response, and I now believe, after flying the model, that this also helps considerably in the tail-slide. I also decided to keep to a reasonably small tailplane. I agree that a large tailplane helps a great deal for landing and low-speed manoeuvring, but it can be a great disadvantage during high-speed aerobatics, especially in windy conditions, and after all, you only land once in the schedule, but there are a great many other manoeuvres equally, if not more important. A thick section fin was decided upon mainly for appearance sake, although it may have helped the 'Slow Roll' somewhat.

These then were the main thoughts I wanted to incorporate in the finished design. However, apart from these, it seemed logical to me to include some of the many good points from other designs, which I had flown or seen fly. Having decided on all this, plans were drawn up accordingly, and some five weeks later the first Equaliser was completed. This is the history of the Equaliser, and how it materialised from various ideas.

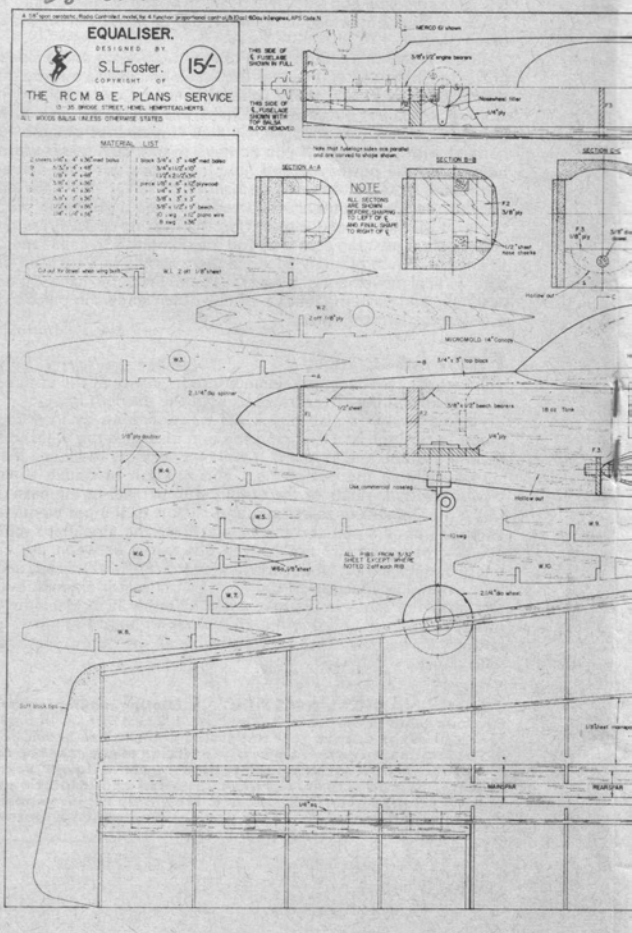
I must add at this stage that it is a very fast flying competition aeroplane, and should only be attempted by a modeller who has built and flown similar aircraft successfully. It is for this reason that I consider it unnecessary for me to go into the construction of the model in great detail. Although I should like to point out one or two details, and also a few home-made accessories which may be useful to anyone building the model.

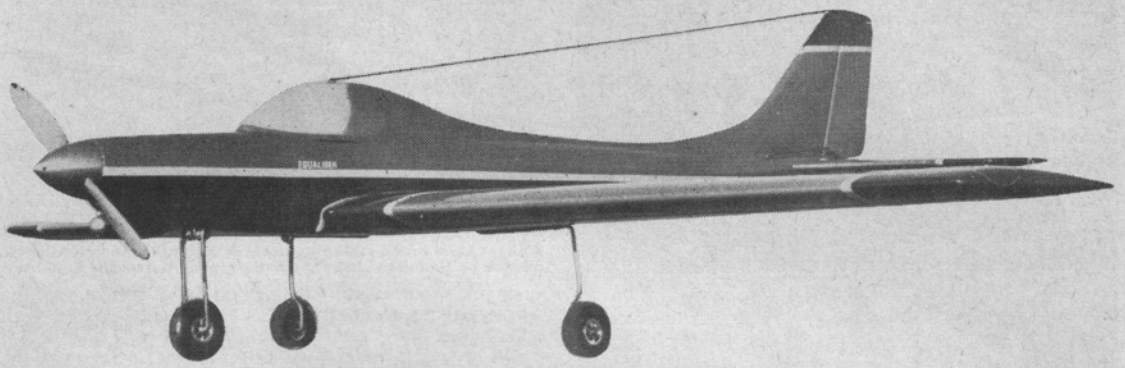
The fuselage

The nose of the fuselage and engine bay is typical *Twister*/*Thunderstormer* construction, as I believe this to be one of the strongest and most vibration-free methods

Full-size copies of this 1/6th scale reproduction are ava

58" SPAN





QUALISER

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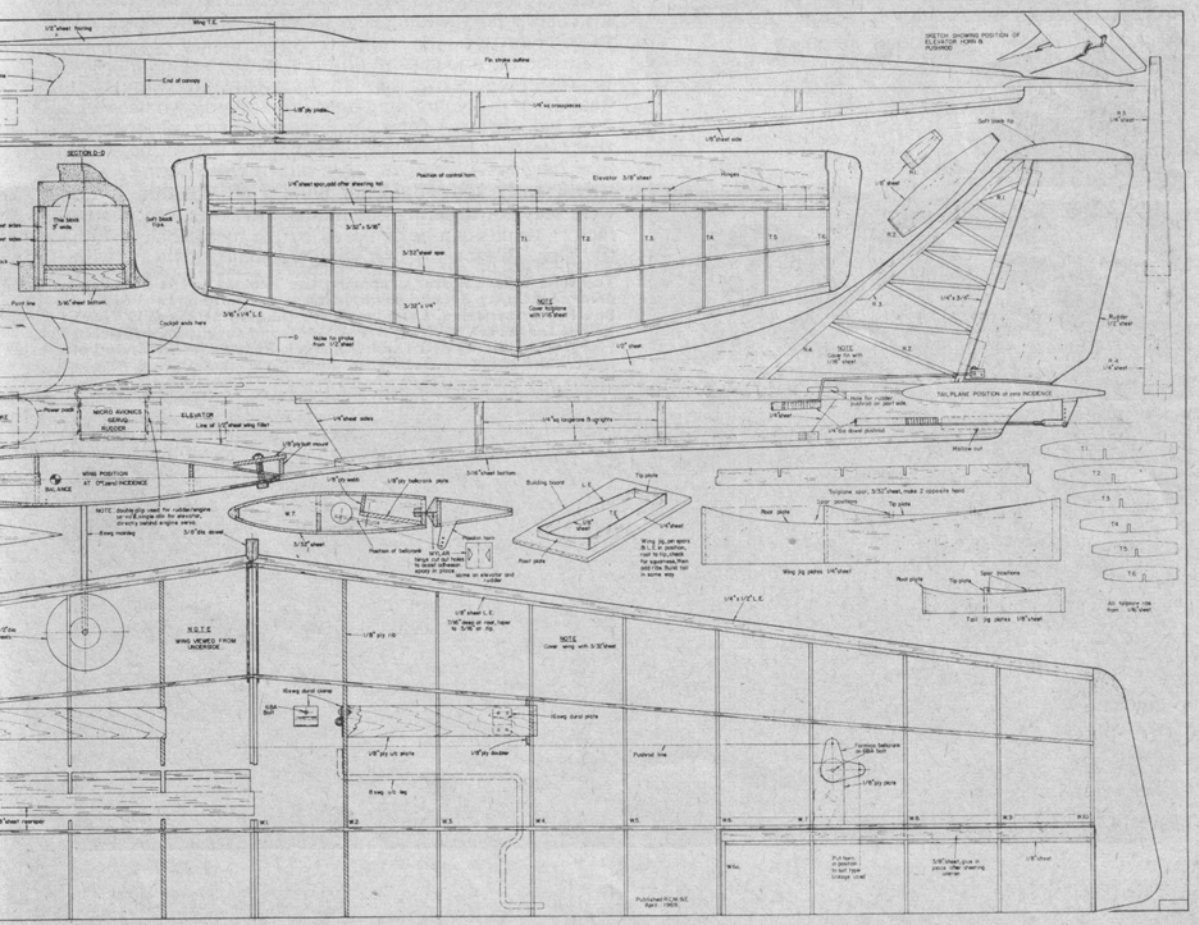
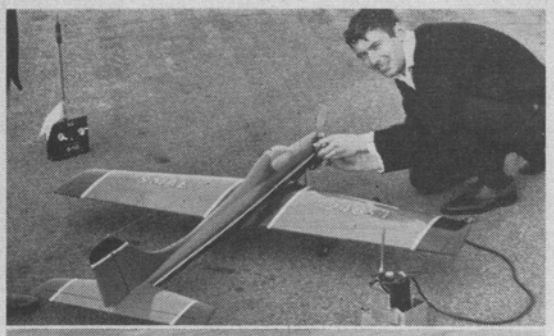
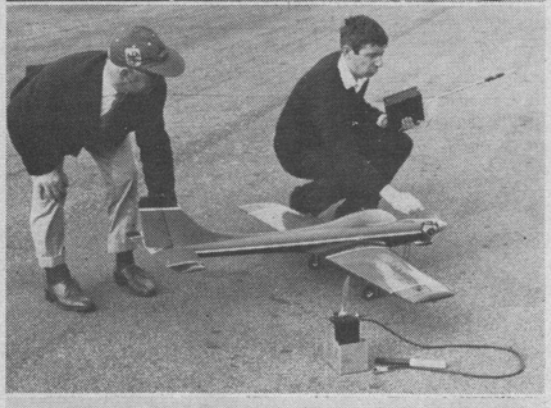
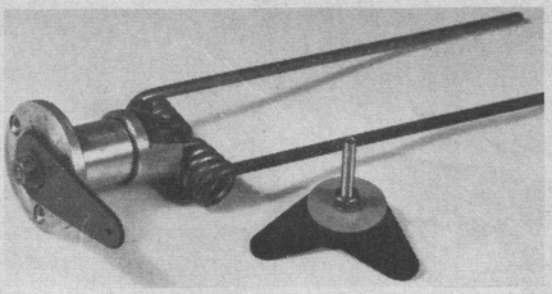








Above: hand made steerable noseleg assembly, and right angle aileron bellcrank made by the author, and used on the Equaliser.

of engine mounting to date, providing, of course, that the whole engine compartment is thoroughly coated with epoxy glue.

On my own model I use 4BA screws for securing the engine with a $\frac{1}{8}$ in. steel plate slipped behind the bearers, tapped out to suit. Self-tapping screws could be used if desired, but from my experiences, I find them difficult to keep tight. As you can see from the plans, the nosewheel is of the *Franklin* type, used in the inverted position. The remainder of the fuselage is quite straightforward, being built up on the top block, which should be well hollowed out, as should all other blocks, dorsals etc., in order to keep the weight to a minimum.

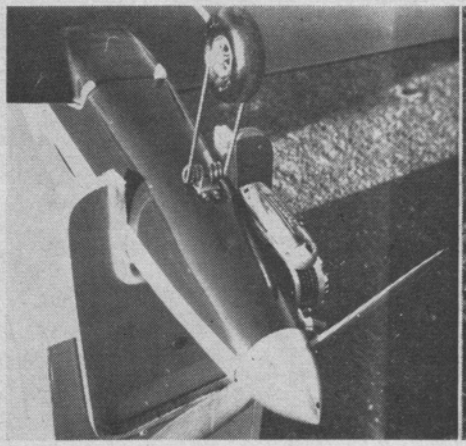
The wing

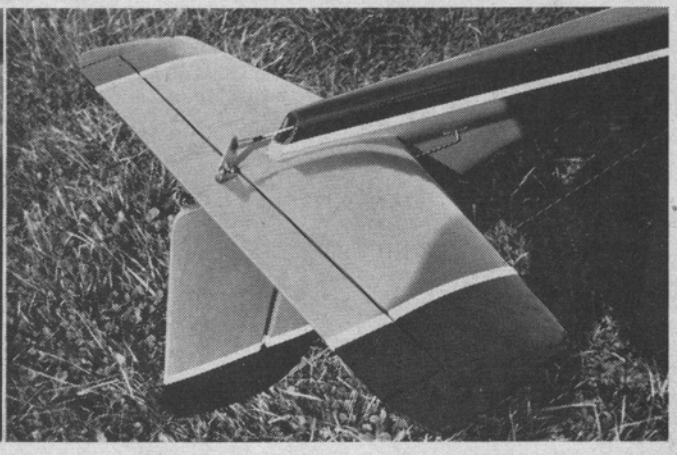
As mentioned before, the wing features a tapered leading edge, with straight trailing edge, and full depth spars are used throughout, half slotted into the ribs. It also uses a false leading edge as all my models have back to *Nimbus* days.

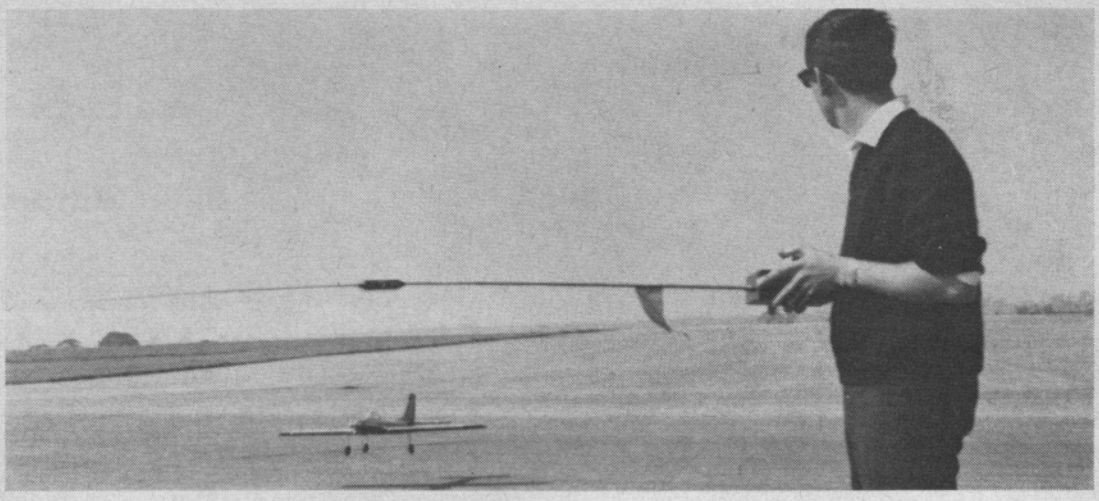
I assemble and cement all the ribs, both spars and the false leading edge over the plan, that is to say, the wing is not held down to the building board in any way whatsoever. You will then see from the accompanying photograph that I use a jig for sheeting the wing, and any warps which may have been there are taken out by the sheeting.

Obviously you would not build a jig like this if you were only constructing one model. However, quite satisfactory results can be achieved by the method shown on the plan. In fact, my first wing was built this way, with

Top left: Stuart Foster preparing the Veco 61 in his Equaliser prior to starting. Second down: just a touch more on the needle – Pop Foster assisting. Left: ready for take-off at the R/C Team Trials. Judges are at right, Derek Giles, and at left, hard-hearted Hargreaves the '69 R/C Team Manager. Bottom left: close-up of nose cone showing steerable nosewheel installation. Note Merco silencer on Veco 61. Below: tail cone detail showing elevator pushrod protruding through fuselage rear.







Flare out. Stuart lands the Equaliser at the 1968 R/C Trials.

complete success. Remember, the wing is the most important part of the aeroplane, even if it is only *slightly* twisted, the model would be useless for position manoeuvres, so a little extra care when constructing is well worthwhile.

There are two other points regarding the wing which I should like to mention. First, is the use of home-made aileron bellcrank assemblies. These are made of 1/16 in. *Formica* and bellcranks of this type have been used in all my models which featured inset ailerons. Carefully constructed they are slop and friction free.

Secondly, there is the use of 3/16 in. birch dowel for the aileron push-rods. There is no slop in these and they will not vibrate as much as ordinary 16 s.w.g. wire, therefore, lessening the wear on the bellcranks and reducing the risk of aileron flutter.

Tail cone

The tailplane and fin are quite straightforward, except the tailplane, which, like the wing, is jigged up before sheeting.

The author uses a wing jig to assist wing construction. This is the best method possible of achieving a straight and true wing and is highly recommended for the serious multi competitor.

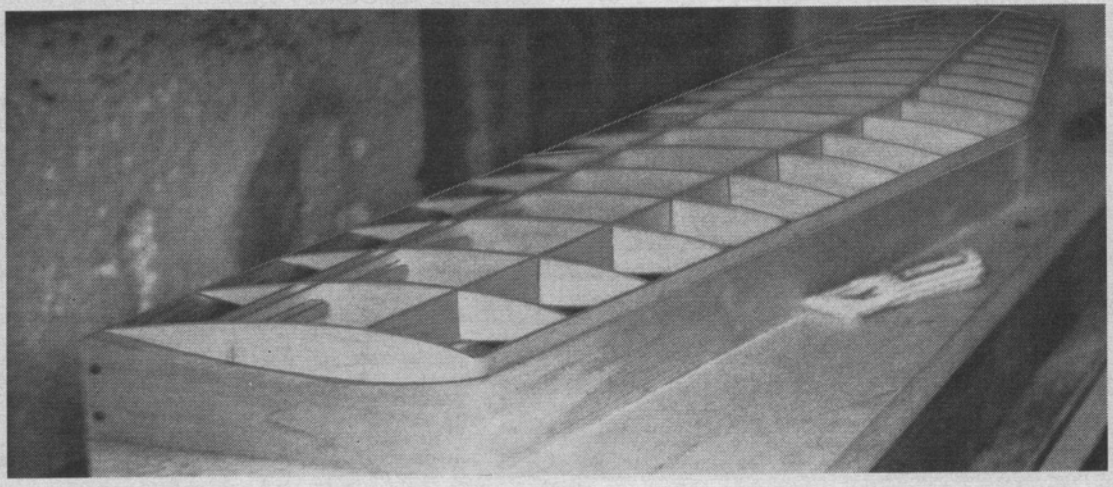
Finishing

With all the construction finished you come to the covering and finishing of the model. There are so many different products on the market today that it is quite difficult to decide which of those to use. I personally prefer the old dope and fuel proofer method, which I have used for several years on many different models.

Each time the finish outlived the life of the model. I start by giving the balsa two coats of sanding sealer and one of clear dope, dry sanding between each. Silk is then doped on to this surface and followed by three more coats of clear dope. After a period of twenty-four hours it is flattened down with fine wet and dry paper. One coat of the appropriate colour primer is followed by two coats of brushing cellulose gloss. After leaving for a couple of days to harden, the finish is completed with one coat of *H.M.G. Hot Fuel Proofer* (this brand you can even paint over white without it discolouring) and there you have a finish that will last many seasons.

Radio installation should not prove to be a great task, although it should be positioned so as to bring the centre of gravity to 4½ inches from the trailing edge of the wing. A standard 12 oz. two-vent clunk tank is used, and with my *Veco* 61, I have approximately 1½ oz. of fuel left

continued on page 233

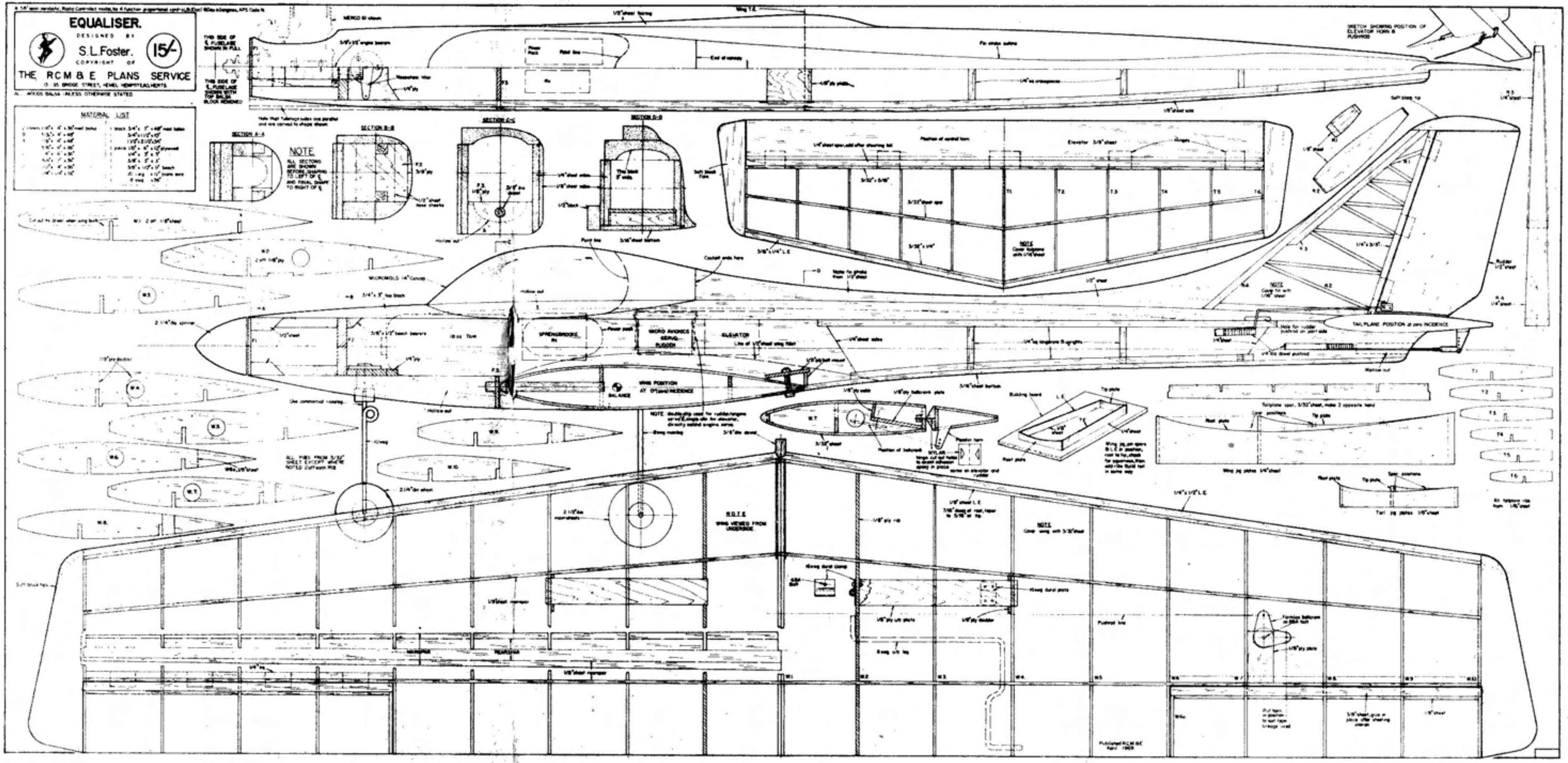


Equaliser *continued from page 229*

after a F.A.I. schedule. Other engines should not vary too much on this.

My first Equaliser with 21 oz. of radio gear and *Veco* 61 tipped the scales to 6 lb. dead. At this weight it performed very well, but I was a little wary on really slow landings for fear of it tip stalling, although this never happened. Even so, I could not bring it in as slow as I would have liked – it was no floater – I think the *Thunderstormer* spoilt me here. However, when I installed a new *Sprengbrook* outfit the model immediately lost 6 oz., and what a difference it made, completely curing all problems, slow tail down landings were now a cinch. So when building this model, try and keep the weight down to 6 lb. or less. I intend to aim for $5\frac{1}{4}$ lb. next time.

That, then, is the Equaliser, a very fast flying competition aeroplane, the performance of which is only limited by the capabilities of the pilot.



EQUALISER.
DESIGNED BY
S.L.Foster.
15/-
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THE RCM & E PLANS SERVICE
MATERIAL LIST
SECTION A-A
SECTION B-B
SECTION C-C
SECTION D-D
NOTE
WING POSITION AT 0° (zero) INCIDENCE
TAILPLANE POSITION at zero INCIDENCE
NOTE
WING VIEWED FROM UNDERSIDE