A ROBUST MODEL OF APPEALING ASPECT AND PERFORMANCE SPAN 68 INS.

THE "BOWDEN CONTEST"

BY LT.-COL. C. E. BOWDEN

DESIGNED AS THE IDEAL PRIMARY PETROL PLANE FOR RUBBER MODELLERS

THIS petrol model is designed to suit the man who requires a hard-wearing, stable, and easily operated machine that is easy to build and can confidently be put into the major petrol competitions for next year's "great revival" of petrol interest.

I imagine that there are many people who have been building rubber models in the past but who will be thinking of trying their hand at petrol models now that engines and coils will soon be with us again. These people are mainly experienced or fairly experienced builders, but are in need of a little guidance over petrol matters, and want a foolproof design to commence with. Here, then, I can safely say, is the answer. I have called the model the "Bowden Contest" because I hope it may lead a number of people to have a crack at the "Bowden International Petrol Trophy" and the other major petrol competitions next year. If the reader will build the model accurately, trim it as instructed, *and ensure that he can operate his engine without fail*, I feel sure he will have a darned good run for his money. The model flies with great ease and stability and its glide is just what the doctor ordered!

The Fuselage.

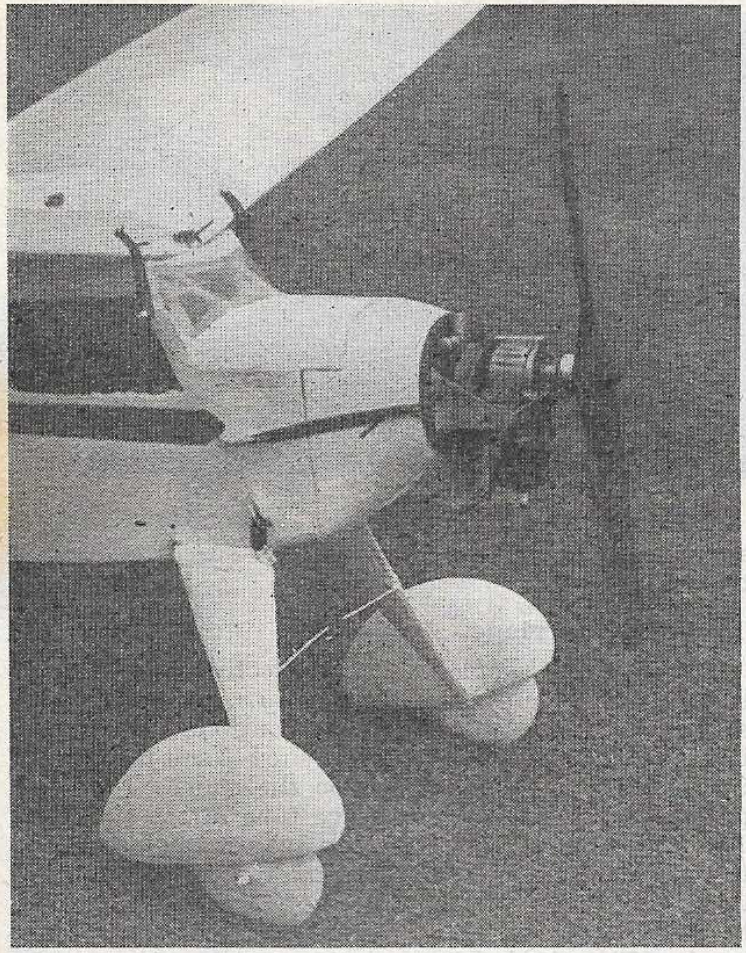
Although I now almost always produce monocoque fuselages for my own amusement, there is no doubt that the old slabsider is more simple to build for the newcomer, and is a *very stable type for competitions*. This model is built by a method that I evolved a number of years ago. It is very easy to construct; automatically forms accurate angles of incidence, and when built is almost indestructible—all big points for a competition aspirant, or even for a general purpose flyer. This method has been used on one of my old record models and also on a Sir John Shelley Cup winner, so it has been well tried in a practical manner and I recommend it to all.

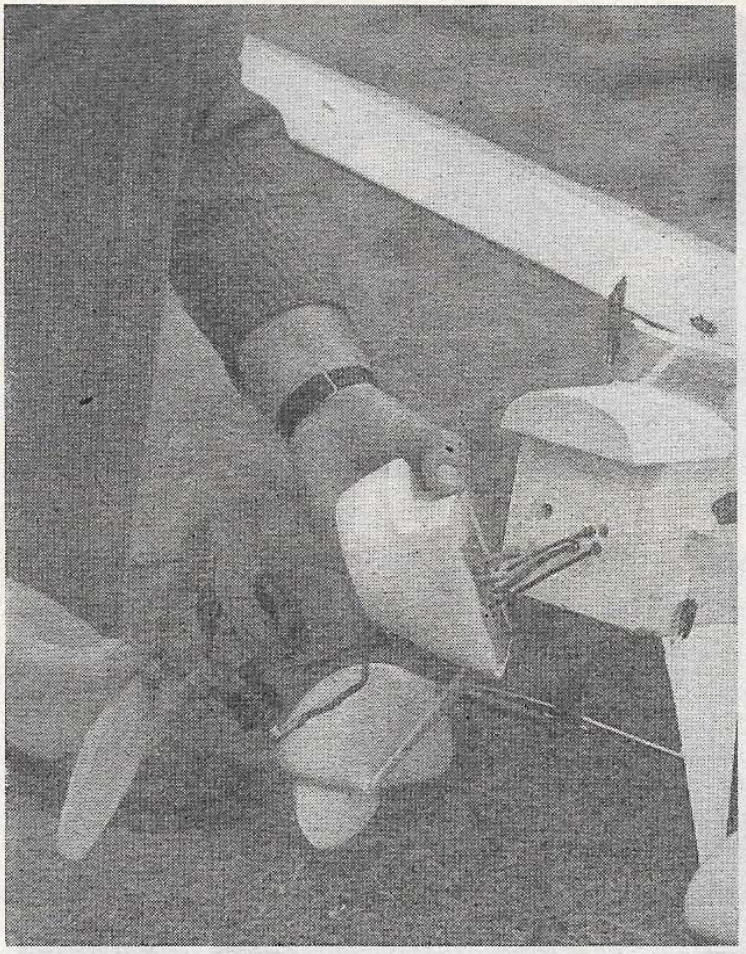
Take a look at the plan. First put some 1/16 in. balsa sheet on a building board or the kitchen table, and if the sheet is not wide enough for the depth of the fuselage then smear cement along the edges of several 2 in. or 3 in. wide sheets and join them together; whilst drying, weight them down to keep them flat to the kitchen table—in order to keep in with the wife do not forget to put some grease-proof paper on the table first!

Now we can start. Stage A on the plan. Place some copying carbon paper over the sheet 1/16 in. balsa, lay the side elevation of the fuselage shown on the plan over this, and trace carefully the outline of the fuselage with a pencil. Trace in the positions of the uprights and remove the plan and you will find a blue outline of your model on the 1/16 in. sheet with correct angles of incidences of wing and tailplane all automatically aligned. Now cut around the outside edges with a razor blade, then cement 3/16 in. by 3/16 in. balsa lengths all around the edges, smearing plenty of cement on the sides of these lengths, and keeping them pinned to the 1/16 in. sheet sides with ordinary women's household pins, until dry. The pins can then be removed. Now cement in the uprights. Keep the whole affair weighted down flat until dry to prevent warping by the glue.

Glue in the celluloid cabin windows, being careful to make the two sides *with longerons and uprights INSIDE!* We now have two sides ready. Cut out formers Nos. 1, 2, 6 and 10 from $\frac{1}{8}$ in. sheet to the size shown and cement them to one side as shown on the plan (stage B), again using pins as a temporary fixture.

We now glue on the other side. When the cement is dry, add all the top and bottom crosspieces of 3/16 in. by 3/16 in. balsa (stage C on the plan). Hooks, dowels, etc., are now put in. Hooks and dowels for engine retention and wing and tail retention by rubber bands, add undercarriage tube and hooks are fitted as described on the plan. The top and bottom is covered with 1/16 in. balsa sheet. *Plastic wood reinforcement*, a very important item in all my models which are designed to last and give the minimum of trouble, is applied where shown on the plan. The whole fuselage is now rubbed down with sandpaper, covered with silk or bamboo paper or "Planefilm." Silk is far the best covering for petrol models if you can get it. Dope with *full strength* clear glider dope. No other type of dope is worth while on a petrol model or large glider—model dope is "utterly





The photos above give a good impression of one of the types of engine mountings detailed on the plan. This type utilises the "Distance Piece" mentioned below.

useless," to quote L. G. Temple.

We now have an immensely strong box-like structure leaving no wiring, etc., inside our fuselage to give trouble on the field! If that outfit does not last you for many flying hours, happy or otherwise, I will eat my hat. Of course if you fly it into a brick wall or deliberately stamp on it in a rage, I withdraw that offer!

The Nosepiece.

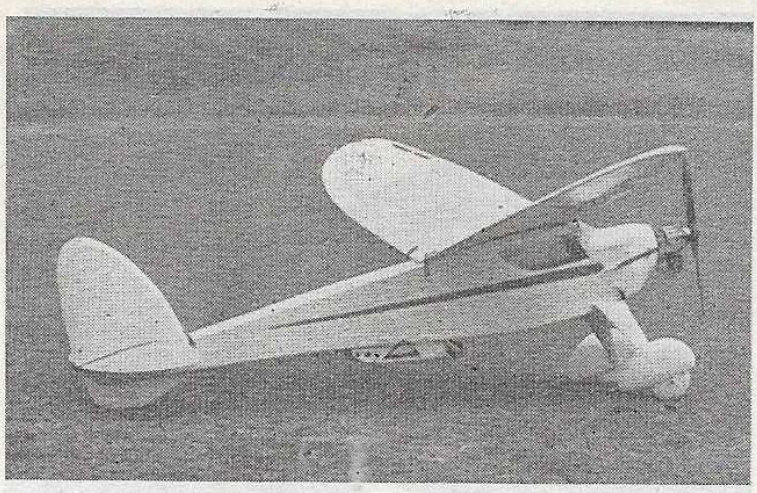
You will notice on the plans that there are no difficult compound bends of the rigid flat sides at nose or tail to cause warping during construction. The model has a flat tail end which gives a grand base for the tail unit which will not shift—a very vital point for competition work. At the nose I have used my old detachable and knock-off engine mounting that saves no end of damage and allows of easy alteration to the engine thrust line during the tuning up period by packing. However, I have introduced a little improvement that is very simple and yet allows one to fit alternative engines and alternative types of engine mounts.

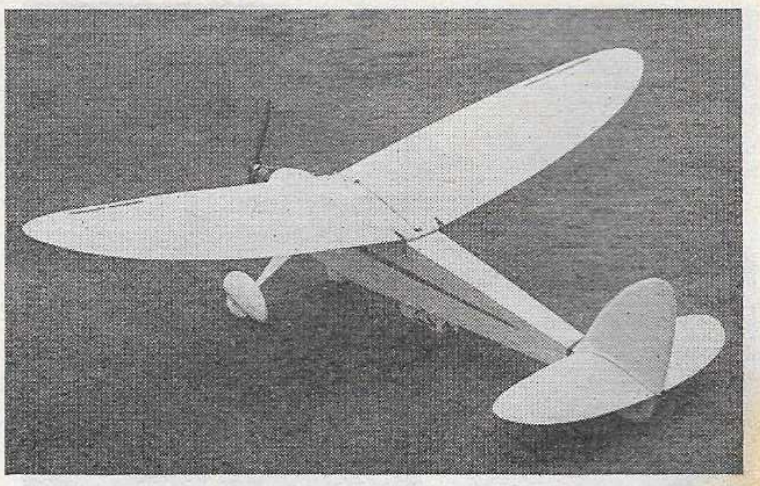
The sketches given on the plan will make the matter clear but briefly one can fit either my old Elektron cast detachable engine mounts, which are now commercially obtainable and save a lot of bother, or one can fit an all-wooden type of detachable mount that I developed some time ago. Both have all the bugs worked out of them. I prefer the Elektron mount owing to its ease of mounting an engine rigidly on the metal bearer arms together with the long induction pipe extension that makes all the difference to reliable engine power output. This is described in Dr. Forster's book on engines and in my new book on petrol models. However, make your own choice, and use whichever best suits the facilities at your disposal. The innovation which I mentioned before is my "Distance Piece." This simple item is merely a detachable laminated balsa block shaped so that it fits between the rectangular nose end of the fuselage and the detachable Elektron engine mount. The laminated balsa distance piece weighs little, but allows of positioning a light 3 c.c. engine well forward to obtain balance, or a heavier 6 c.c. engine closer to the wing. One can also use it to lead in the nose from a circle to a rectangle. On my original model I use a very powerful little "Ohlsson 23," 4·3 c.c. engine with a rather long "distance piece."

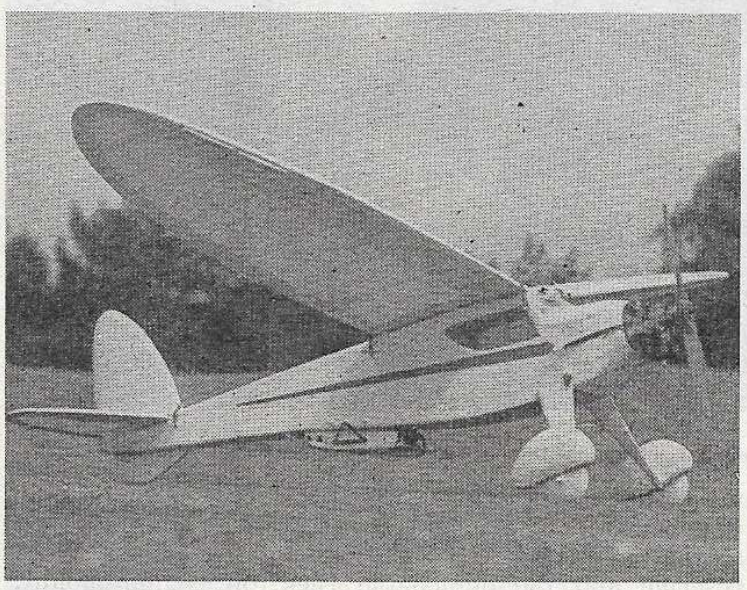
If you decide to use the second method shown on the plan, *i.e.* an all-wooden detachable nose, the "distance piece" will not be required.

The Ignition Hook-up.

I have written much about this from time to time because I know from experience how much trouble is caused by poor ignition and wiring trouble. In order to get really reliable flying from this model, I decided to use the detachable and underslung dummy radiator I introduced a year or two ago, with *all* the ignition bag of tricks in the dummy radiator. It is rather like a "Mustang" radiator, and it contains coil, timer, booster plugs and flash lamp battery. It is slung from the dowels by rubber bands to hooks, and can be used to make slight alterations to gliding trim. The heavy coil and battery cannot damage the inside of the fuselage if the model hits something and stops suddenly, and the electrical heart of the model can be quickly inspected and overhauled. Furthermore, one can use this detachable unit on several models much to the economy of one's pocket. I have placed this radiator *à la* "Mustang" rather far back because in full sized practice it has been found to be best there for aerodynamical reasons. These







The three photos above give a good idea of the general appearance of the model. As can be seen, the original model is finished in the designer's characteristic white enamel colour scheme. The machine's graceful appearance when in flight is well brought out by the photo below, taken just after a demonstration hand launch.

are interesting, but we have not the space to discuss them here now.

The Undercarriage.

This is a very simple affair but effective and light, as it has the two desirable movements, *i.e.* backwards and spreading. These movements are controlled by rubber bands which can be tensioned as desired to suit the model. Construction is fully detailed on the plans. The rear prongs fit into the undercarriage tube in the fuselage. The forward cross wire comes up against the bottom of the fuselage and is held there by rubber bands from hooks, to hooks on the fuselage. The spreader bar between the legs is divided and has two hooks for rubber bands. The wheels I have always used for competition work have been 3-ply and balsa laminated. These are sharp and cut easily through grass when landing and taking off.

For competition work I recommend plain wheels of a larger diameter, and no spats, but for general flying the spats improve appearance and seldom suffer damage due to the very flat gliding angle of this model. The plan shows how the spats are made and fixed.

The Elliptical Wings and Tail Unit.

From time to time my readers will have noticed my holding forth strongly on the advantages of elliptical wings which apart from low tip losses permit of great surface for a reasonably low wing span which helps stability and gives the better airflow over a large chord. On this model, therefore, I fitted elliptical wings, and in order that the newcomer to petrol models shall not be embarrassed by difficulties in construction I will describe briefly a simple method of building elliptical wings.

All one need to do is to trace out the ribs from the plan, cut them out, and number them. Now trace out the wide trailing edge on to 1/16 in. sheet balsa as specified on the plan, and cut it out. Glue a trailing edge spar of $\frac{5}{8}$ in. by $\frac{1}{4}$ in. balsa, also traced from the plan, around the rear edge of this outline, as we did in our fuselage construction. Cement your ribs in position with the two central spars also cemented in, and then add the L.E. spar of balsa as specified. Cover from the L.E. spar to central spars with 1/16 in. sheet balsa top and bottom. Fix in your wing hooks with plenty of plastic wood and sand down your wing edges, cover with silk, and dope with full strength glider dope, keeping wings weighted down to the building board to prevent warping whilst drying. Test flying the model is most important and details are given on the plan which should save the newcomer a peck of trouble.