

# The Grasshopper

## A diesel or petrol engined pusher by M. BEACH

**T**HIS model has proved itself to be not only a reliable performer but has shown itself capable of holding its own with orthodox models so far as duration on a limited motor run is concerned, and it has demonstrated an ability to fly away on the least provocation.

Of straightforward and robust design, it is easy to build and able to provide its constructors with useful experience with this type of model.

### The Fuselage

The fuselage is of the high-cabin type constructed from  $\frac{1}{4}$ -in. square hard balsa longerons and cross struts cemented together in the usual way and then completely covered in  $1/32$ -in. sheet balsa planking to provide great strength and rigidity.

The two sides are first built on the side elevation in the usual way and then coupled together by the cross members or spacers, the shaped formers for the cabin nose and tail being cemented in position afterwards.

The wing-mount members are extended rearwards to support the engine mounting, which consists of a sheet of  $\frac{1}{4}$ -in. thick three-ply, with a cut-away to accommodate the crankcase and fuel tank, which is reinforced by two hardwood bearers of  $\frac{1}{8}$ -in.  $\times$   $\frac{1}{8}$ -in. section. The ply engine platform and the engine bearers must be well glued to each other and to the fuselage members. It must also be noted that the engine is offset to give 2 degrees of side thrust.

The engine platform and bearers are braced together at their rear ends by a segment of  $1/7$ -in. three-ply which links them with the triangular-sectioned rear vertical strut.

Two pieces of  $\frac{1}{4}$ -in. hard balsa, shaped to the under camber of the wing, are cemented to the top of the cabin upper members to support the wing, which is attached by rubber bands passing over  $\frac{1}{4}$ -in. bamboo pegs, as shown.

A 1-mm. ply strip is let into the upper longeron on a level with the nose of the tailplane to give this component adequate lateral support.

The undercarriage is permanently built into the fuselage and is constructed from 18-s.w.g. piano wire, glued and bound to the appropriate fuselage struts.

When the frame work has been fully assembled, the entire structure is planked with  $1/32$ -in. sheet balsa.

### The Wings

The wings are of straightforward construction with a cut-away at the centre to give clearance for the propeller. They may be built in one piece or made in halves, as desired. The leading edge and two rib bays on each side of the centre are planked with  $1/32$ -in. sheet balsa.

The wing section is N.A.C.A. 6412 and all ribs are cut from hard balsa sheet. Polyhedral is used and the angles are clearly indicated on the drawing.

The wing is covered with heavyweight tissue or with silk suitably doped.

### The Tailplane

The tailplane is built up with multi spars in a similar way to the main plane, and when covered and doped is fitted with circular tip fins made from  $3/32$ -in. soft balsa sanded to a streamline section and covered with tissue to prevent splitting.

The tailplane is held in position by rubber bands attached to the bamboo pegs and passing under the tail-hook.

### The Propeller

A propeller having a diameter of 10 in. and a pitch of approximately 5 in. should be employed if an E.D. engine is fitted, as on the original model. Remember, however, that its pitch angle should be opposite to that usually employed on a tractor layout to enable the engine to run in the normal anti-clockwise direction of rotation. In the case of a diesel engine, it is, of course, immaterial, from the engine's point of view, which way it runs, as this type of engine runs equally well in either direction.

In such cases a propeller with a normal pitch angle can be used and the engine run in a clockwise direction, but the offset for side-thrust must, of course, be in the opposite direction to that shown on the drawing, namely, pointing to the left.

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## CORRESPONDENCE

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but, personally, I shall be very sorry indeed to see all power modelling relegated to circus events, which, again, does *not* improve our knowledge or standard of model flying.

Finally, I would like to enquire if any *radio-controlled* models are really flying in this country and what are the chances of seeing a real practical demonstration. There seems to be a lot of "wait and see" spirit within the movement associated with radio experiments. What about coming out in the open and telling us (or should I say *showing* us) what can be done.

It shouldn't be difficult for a select committee of our best "power enthusiasts" to draft a contest which would at once be *interesting to onlookers, progressive and interesting to competitors*, without bringing fly-aways into it, which once again I *must* reiterate **PROVE NOTHING**.

I am sorry to have spread myself so much, but the whole matter seems so serious to me. Maybe it's old age creeping on?

Yours faithfully,

London, N.14.

C. A. RIPPON.