How to build the Albatross Sail Plane

THE ALBATROSS sail plane was built over a year ago and is still taking an active part in the M.A.C.V. week-end flying meetings. This model holds the present Victorian duration record for gliders of 6min. and unofficial record of 19min. out of sight.

Its large wing span and light loading enable it to take advantage of the slightest up current, while its stability and slow speed have doubtless accounted for its long "life."

Fig. 1 shows a general plan of the model. We will start with the construction of the fuselage, a side elevation of which is shown in Fig. 6 and detail construction in Fig. 5.

The first step is to make a jig in which to build up the two sides of the fuselage.

Mark out a full-size drawing of the fuselage side on a flat board showing the position of each cross strut. Next tack ¼ x ¼ strips of wood round the edge of the drawing, then proceed to constructing one side of the fuselage. Four lengths of 3-16 x 3-16 balsa are required for the longerons. Place two of these in the jig and hold them apart hard up against the jig strips by means of balsa wedges.

As will be seen from Fig. 5, the top and bottom longerons meet at the nose. The top longeron is in two pieces, one running from the nose to No. 14 vertical strut, and the second from No. 14 strut to the tail block.

Longerons in Position

WHEN the longerons are in position cut a supply of ⅛ x 3-16 and 1-16 x 3-16 strips for cross struts, ⅛ x 3-16 being used for struts Nos. 2 to 8, with the exception of No. 5, and 3-16 x 1-16 from No. 10 to the tail block.

Cut these strips to length and cement them in place, making sure that the struts are a good fit without forcing. The junction of the top and bottom longerons at the nose is reinforced by a triangular piece of 3-16in. balsa 1in. from front to rear.

The second section of the top longeron butts up against the rear of No. 14 vertical strut 3-16in. below the level of the end of the front sections, and the junctions of both sections to the vertical strut are reinforced by triangular pieces cut from 3-16in. sheet balsa. Fig. 8C. Nos. 5 and 9 struts are cut from 3-16in. sheet balsa and are ½in. wide and are hollowed out on the inner side with a gouge. See Fig. 5B.

These wide struts are fitted to give extra strength at the points of attachment of the main plane, and the rear set also allows of a good finger grip when hand launching.

When the first side has dried, remove it from the jig and build up the second side in the same manner.

Joining the Sides

THE width of the fuselage at various points and cross strut positions are given in Fig. 1, the sections of the various struts being the same as the corresponding vertical struts.

Cut the struts to length in pairs, one top and one bottom. Fit Nos. 5 and 9 top and bottom, first passing pins through the longerons into the struts to hold the framework rigid until the cement has set. Next fit the front bulkhead shown in Fig. 5. This is cut from ⅛in. sheet balsa. Then fit the tail block. Fig. 5C and Fig. 8C. File a semi-circular groove in the rear of the tail block to take a 1in. length of ⅛in. celluloid tubing, this being the socket which takes the rear fin post.

After the main struts, front bulkhead and tail block have been fitted, the fuselage sides will take a natural curve from nose to tail, and the remaining struts can be cut to length and cemented in place. Rubber bands passed round the fuselage will hold the struts in place until the cement has set.

The stringers which convert the cross section of the fuselage from rectangular at No. 4 strut position to circular at the nose (Fig. 5) are of ⅛in. x 1-16in. balsa. The dimensions of the formers of 1-16in. sheet balsa which carry these stringers are shown in Fig. 7 A. Two of each are required, one set for the top faring and one for the bottom.

In the case of the bottom faring, in addition to the three stringers, two ⅛in. strips of 1-16in. balsa, ⅛in. apart, run from the bulkhead back to No. 5 bottom cross strut. The skid, Fig. 2 C, is cemented to the under side of these strips.

Shaped from Balsa

THE skid is shaped from ⅜in. balsa, and is reinforced on both sides by sheet aluminium plates cemented to the sides of the skid. A hole is drilled through the plates and skid to take a 1-16in. split pin, which anchors the 20-gauge steel wire launching hook 3in. from the front of the fuselage. The launching hook is shown in Fig. 2 D.

The 20-gauge steel wire fitting, shown in Fig. 5 D, is cemented and bound to the under-side of No. 5 bottom fuselage cross strut. The arms project 3-16in. on either side of the fuselage, and are then bent up at right angles. These projecting arms anchor the wing bracing struts to the fuselage.

The cockpit decking, Fig. 7 C, is cut from 1-32in. plywood and is cemented on top of the fuselage bay formed by the top longerons and Nos. 4 and 5 top cross struts.

The pilot's seat, Fig. 3, is cut from 3-16in. sheet balsa, the back being of 1-32in. plywood. The seat back is cemented to the ⅛in. x 3-16in. intermediate strut between the front pair of wide vertical struts shown in Fig. 5, while the legs of ⅛in. x ⅛in. balsa rest on the bottom longerons.

The ballast container is shown in position in Fig. 5 and in detail in Fig. 7 D and E. This container is in the form of a trough, the sides being cut from ⅛in. sheet balsa and the trough of sheet aluminium bent round and cemented to the sides.

When completed, it is filled with molten lead, the rear being then covered in with a lid of 1-16in. sheet balsa cemented to the balsa sides.

Fit the trough, when loaded, firmly into the nose of the fuselage and cement in place.

The nose block, Fig. 8 A and B, is shaped with a knife and sand-paper from 1in. block balsa, and is hollowed out as shown in B. When the block is still slightly oversize, cement it to the front of the fuselage bulkhead, Fig. 5; then smooth off and finish with fine sandpaper. Next drill a 3-16in. hole in the top of the nose block, through which shot can be dropped when balancing the model for flight.

Run cotton stringers from the nose to the tail on each side of the fuselage, touching the junction of each vertical strut and the cotton with cement. See Fig. 6.

Cover each side of the fuselage separately with Japanese tissue paper and give the covering two coats of dope.

The tail, Fig. 2, is double surfaced, and care should be taken to keep the structure weight of this and the fin and rudder as low as possible. Draw out a full-size plan of the tail and build up the framework on the plan.

First damp a strip of 3-16in. x 3-16in. balsa for the leading edge and bend it to shape on a former. When dry, pin the leading edge on the plan.

Next cut a supply of 3-16in. x 1-32in. strips for ribs; pin down the bottom set on the plan, butting and cementing their four ends to the leading edge.

Now cement the stringers, spar and trailing edges on top of the bottom set of ribs and ¼ lengths of 3-16in. x ⅛in. balsa on top of the front end of each rib up against the leading edge.

Cement Side Strips

NEXT cement the top set of rib strips in place; then splice and cement the split bamboo sweeps to the leading and trailing edges and trailing edges and centre ribs. When fitting these sweeps,, stick pins round the curves on the drawing to hold the bamboo to the correct shape until the cement has set. When the framework has been completed, round off top and bottom front edges of the leading edge with sandpaper. Cover the tail on both sides with Japanese tissue paper, and give one coat of dope.

As soon as the dope has dried sufficiently to prevent the paper sticking, pin the tail plane down on a flat surface till it is thoroughly dry.

A plan of the fin and rudder is given in Fig. 4 B and constructional details in Fig. 4 A.

As in the case of the tail plane, build up the fin and rudder on a full-size plan.

The fin and rudder are joined by ⅛in. x ⅜in. sheet aluminium strips, which pass through slits cut with a razor blade in the main uprights, these hinges being then cemented in place. When fitting the trailing edge of the rudder, it must be raised on balsa blocks 1-16in. above the plan, so that it falls half-way between the top and bottom edges of the 3-16in. cross pieces when lying on the plan.

After the framework has been removed from the plan, the rudder cross pieces are tapered by sandpapering from 3-16in. at the main upright to 1-16in. where they butt up against the trailing edge.

The front and rear fin posts are of ⅛in. round reed spliced, cemented and bound to the fin leading edge and main upright respectively.

The front post fits into the hole drilled in the fuselage cross piece immediately in front of the tail, and the rear post into the celluloid tubing attached to the tail block. (See Fig. 8 C.) The fin and rudder are covered on both sides with Japanese tissue paper and given one coat of dope.

The construction of the main plane of the Albatross and assembling and flying instructions will be dealt with in the December issue of Aircraft.

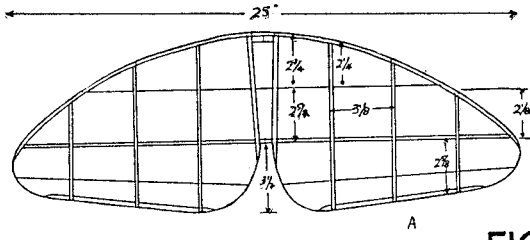
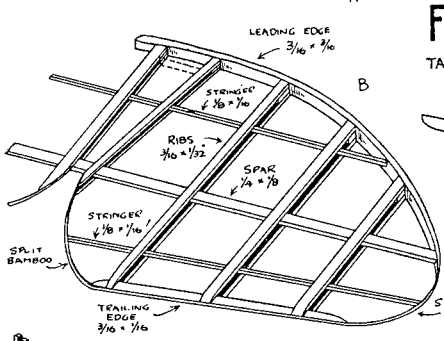
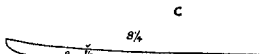
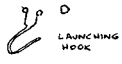
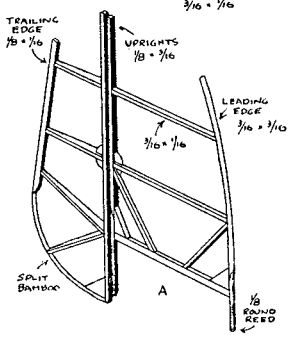


FIG. 2
TAIL PLANE









FIN

FIG. 4

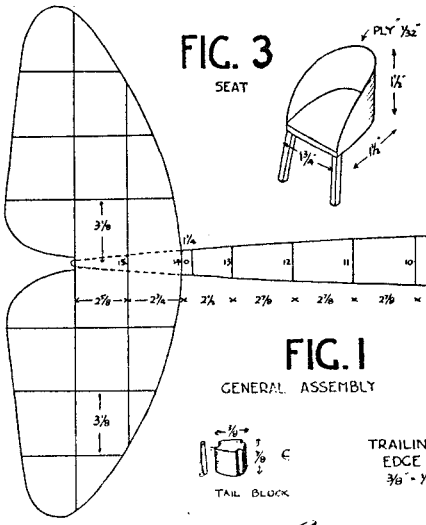


FIG. 3
SEAT

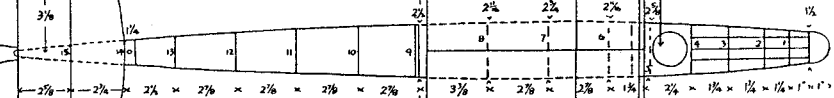
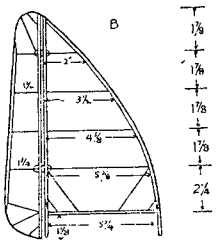


FIG. 1
GENERAL ASSEMBLY

TRAILING EDGE 3/8" - 1/8"



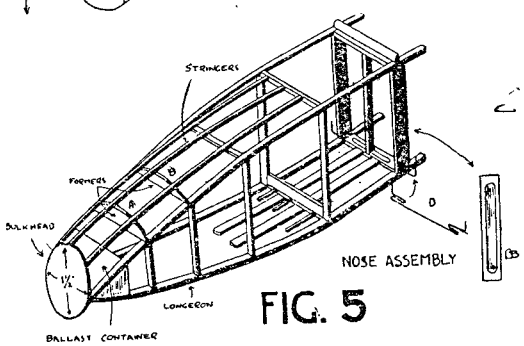


FIG. 5

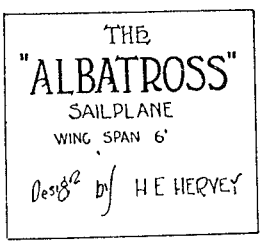


FIG. 6 FUSELAGE SIDE ELEVATION

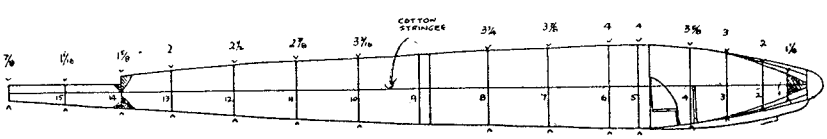


FIG. 7

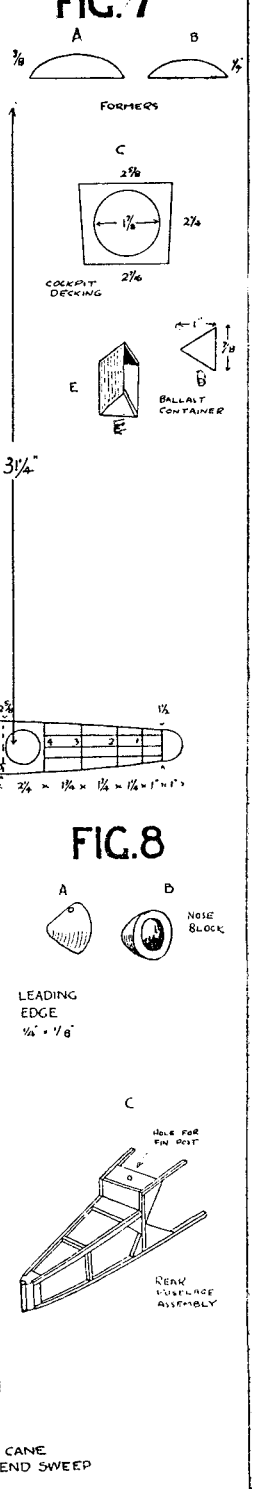


FIG. 8

LEADING EDGE 1/4" - 1/8"

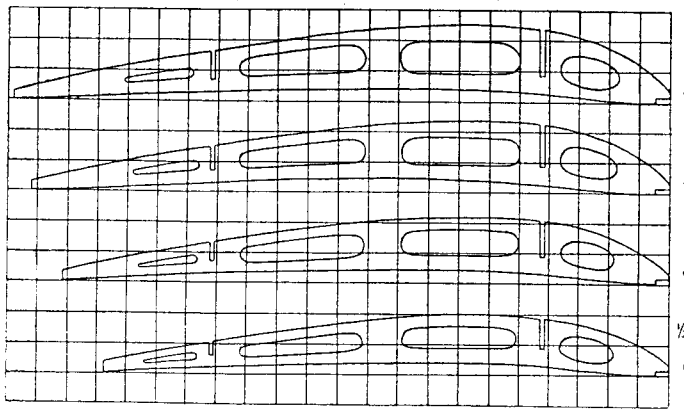


FIG. 9
RIBS

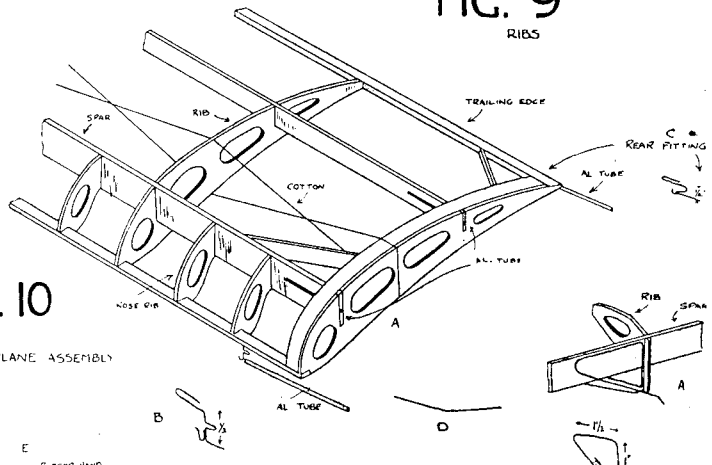
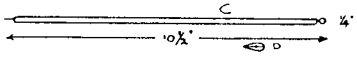


FIG. 10
MAIN PLANE ASSEMBLY

FIG. 11
BRACING



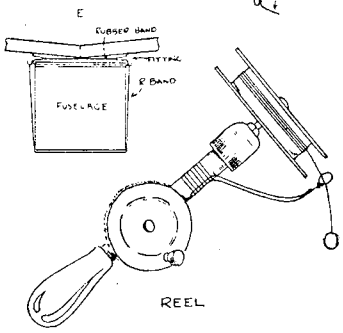


FIG. 13

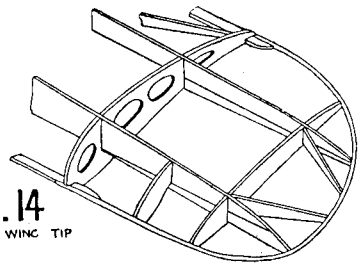


FIG. 14
WING TIP

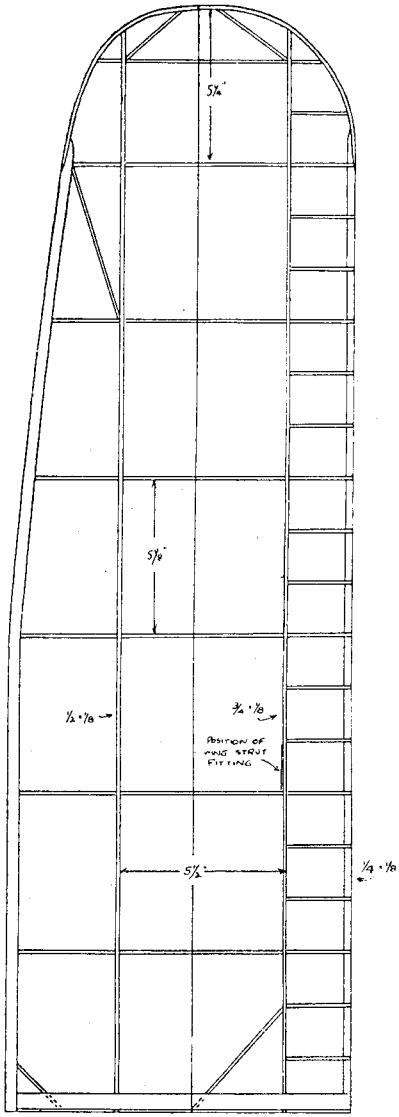


FIG. 12
LEFT MAIN PLANE

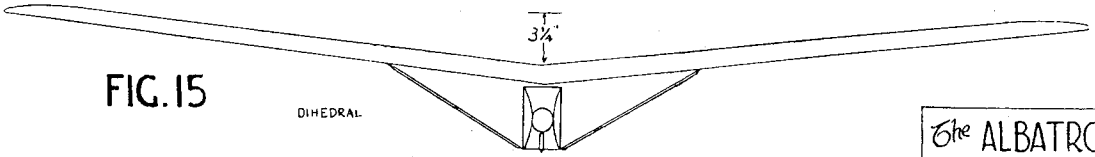


FIG. 15
DIHEDRAL

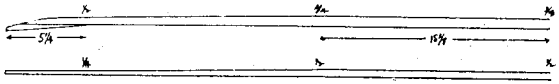


FIG. 16
SPARS

The ALBATROSS
SAILPLANE
WING SPAN 6'
Design'd by H.E HERVEY