THE AIRSPEED ENVOY

SCALE : .1" = 1 FOOT. DESIGNED BY H. J. TOWNER

AERO MODELLER PLANS SERVICE LTD.
ALLEN HOUSE, NEWARKE STREET, LEICESTER.

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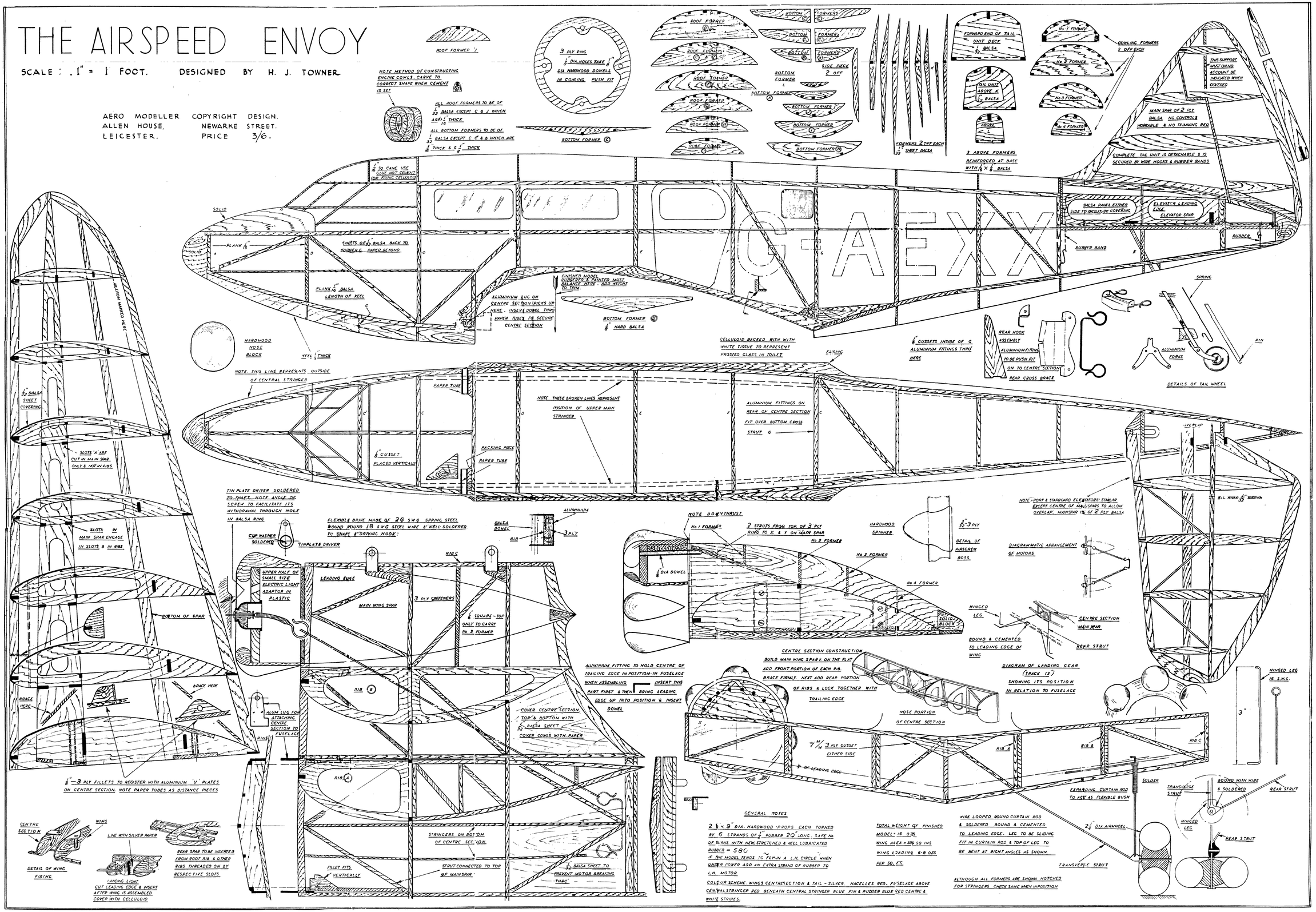

THE AIRSPEED "ENVOY"

THIS particular prototype was chosen because of its adaptability to a simple twin-engine layout by arranging for the rubber motors to work through the centre section ribs and thus eliminate any complicated gear or crank drive. The flexible drive in the cowlings to convert the angular drive to a parallel drive consists of a light spring which is in flexion during the whole of the motor run.

A further object in keeping the rubber motors confined to the centre section ribs is to keep the weight off the tail and thus save adding weight to the nose to obtain trim. The actual model balanced correctly on completion. Naturally, only small motors can be incorporated, but by using long motors, the amount of power bending figure and affect the trim. As a matter of fact, the motor run is definitely obtainable, and with a wing loading of 8 oz. per square foot a satisfactory performance is assured.

Although both airscrews turn in the same direction, torque is not troublesome, and any turning tendency, which should be only slight, is easily corrected by either putting more turns on the left-hand motor or adding a further loop of rubber. The check, too, can be slightly offset.

The construction is straightforward, and the final line-up should be carried out as follows:—

Commence by building the main wing beam of good hard balsa. Build this on the drawing in the usual way, and then add the front portions of the centre section ribs. These six ribs are all made in two halves. Add the leading edge and well brace, thus forming a very strong box girder.

The rear portions of the ribs can now be cemented into place, cemented together with the trailing edge and cross members.

The fuselage is straightforward; build the two main frames on the flat and instead top and bottom sheet as usual. Well brace where the centre section fits. The whole centre section is detachable for fitting and inspecting the motors. The attachment is quite simple.

Two aluminium spiggots on the centre section trailing edge are bent down up, and rest on the top of the bottom spacer of former G.

The rest of the centre section is now brought up into place and a dowel, hard balsa, is inserted through the aluminium side plates and paper tubes on the fuselage. Note that the rear ends of ribs A extend beyond spar C, and form a register to prevent side play. The rear hook is made up out of aluminium and is a push fit on the centre section trailing edge.

The landing gear consists of a transverse 1/8 in. g steel wire in one piece from axle to axle, with a further 1/8 in. g steel wire well secured to it forming a rear strut. This assembly is well bound and cemented to the leading edge main wing beam in two places. The actual spring is imparted by this assembly, and the rear strut is only for support only. A further leg is bent immediately behind the wheel, and slides in a flexible bush (expanding-curtain rod) attached to the leading edge. The leg slides on load.

The cowlings are built up of 1 in. thick balsa, all joints being mitred, and the whole being finally sanded to form an almost plug fit for the motor, the motor being held at the back.

Note that no downthrust is incorporated. The airscrews were constructed of 3 in. props known as pashonia, a hard, light wood, and work well. The boss and spinner being added.

The wing construction is unusual, but very strong. A main spar is made the full depth of the wing and notched at the rib positions.

The ribs have the centre cut best and are slot slotted to accommodate the spar. The spar is now inserted through the ribs horizontally, and then turned through an angle of 90 deg. when the spar and ribs all lock together.

I have found on the usual type of slotted spar and slotted ribs that the cement on contraction tends to warp the main spar either up or down, but the method used on the Envoy overcomes this difficulty, as the ribs are locked together, and acting force at each joint. No addition of controls of any kind are fitted, as these, instead of helping to trim a model, are generally damaged after every flight, and cause more crack-ups than any other cause when they are fitted.

Most detachable monoplane wings in the past have suffered from either too flexible a wing, which rips out on a bad landing, or too loose, so that the wings flutter in flight.

Shear pins overcome this difficulty, but it is the customary position are difficult to pull out when shoes off hard against the rib face. It was to overcome this difficulty that the vertical shear pin method was evolved. On a pin shearing, a new one is inserted, which pushes the old one out and clear of the model altogether. The pin itself is hard balsa, but not too hard, 1/8 in. square, the hole in the aluminium "U" piece forming the circular section in the pin is punched through.

The cellulose wind-shield is braced with 1/8 in. square cane, strained to shape, and the panes fitted individually, care being taken to use a hard-setting, waterproof glue or cellulose cement so that any surplus does not affect the cellulose.

The whole job is finished in a good quality light tissue, pasted on and over the sheet balsa as well. If put on well and in small sections instead of trying to cover the whole job at once, no wrinkles should appear, and only one coat of dope is necessary. Too much dope is the cause of the tissue wrinkling, and the appearance by giving too much prominence to ribs, longerons, etc. Colour with a thin cellulose finish. Red above waist line, blue beneath, silver wings and red nacelles. The rudder and fin = blue, with a red centre strip and thin white stripes either side. A white tapering line divides the two colours of the fuselage and completes G—AEXX of "The King's Flight."

LIST OF MATERIALS FOR THE ENVOY.

1 in. × 1/4 in. × 3 ft. balsa	8 lengths fuselage
1 in. × 1/8 in. × 3 ft. hard balsa	8 " centre section.
1/8 in. × 1/8 in. × 3 ft. balsa	12 " stringers, etc.
1/8 in. × 3 in. × 3 ft. "	3 " ribs LE. and TE, etc
1/8 in. × 3 in. × 3 ft. "	4 " covering tail
1 in. × 1 1/4 in. × 2 ft. "	ribs, etc
1 in. × 1 1/4 in. × 2 ft. "	1 length spar rib rods.
1 in. × 3 in. × 8 in. "	etc
1 in. × 3 in. × 12 in. ply	1 cowls
1 mm. × 3 in. × 3 in.	Cowl centres.
16-gauge plated piano wire, 4 feet	
18- " " " 18 in. long	
26- " " " 1 coil for flex drive.	
2 Brass-screwed bushes and nuts, 18-gauge hole.	
Aluminium 22-gauge sheet, 6 in. square.	
1 " 1/8 in. square.	tail wheel forks
2 Plastic electric light adaptor tops, small, for crankcases	
2 1/4 in. dia airwheels (Fordart)	
1 1/8 in. dia celluloid tail wheel.	
Expanding curtain rod, 6 in.	

Hardwood for nose-block; 1/4 in. dia. birch dowel, 3 in. long; celluloid, 16 brass screws, 1/4 in. long; cup washers; 1/8 in. square cane; 2 pawlonia hardwood, 3 in. dia.; R.H. propellers. Tissue, dope, cement and cellulose enamel.

Mr. Towner with his model. Span is 34 in., length 34½ in., and weight 9½ oz.

Mr. Towner hand launches his model. With a motor run of 18 seconds, flights of between 200 and 300 yards can be obtained.