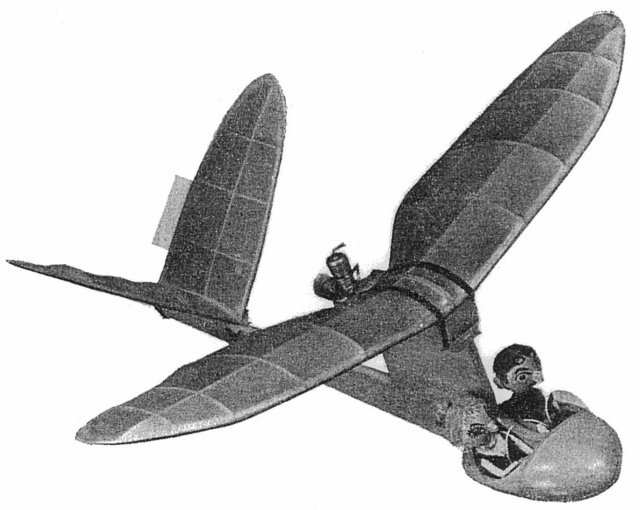
PUSH-UP



A CARTOON THAT FLIES!

Designed by RAY MALMSTROM

AN aerobod friend suggested recently that it would be fun if I turned one of my cartoon drawings of a comic model aeroplane into an actual real-life model. The idea seemed good, and I certainly did not tell him that quite a lot of my aeromodelling pals already hold the opinion that ALL my models are cartoon jobs anyway! However, with the approach of Christmas and the festive season I took the plunge—*Pushup*, complete with George and girl friend, is the result. The *real* joke is, of course, that *Pushup* flies, and flies well, urged aloft by an E.D. 46. I must add that George and his little lady are not essential to *Pushup's* performance; heave 'em out, or pop 'em in, take your choice.

Seriously, if you are looking for a small job, suitable for the 0.5 c.c. power group, want a change from the eternal " prop-in-the-front " job, and like landings that always leave the prop in one piece—get going on a *Pushup*. Your pals may smile at her comely lines, but they'll sneak off home to build one when they see yours riding the airwaves.

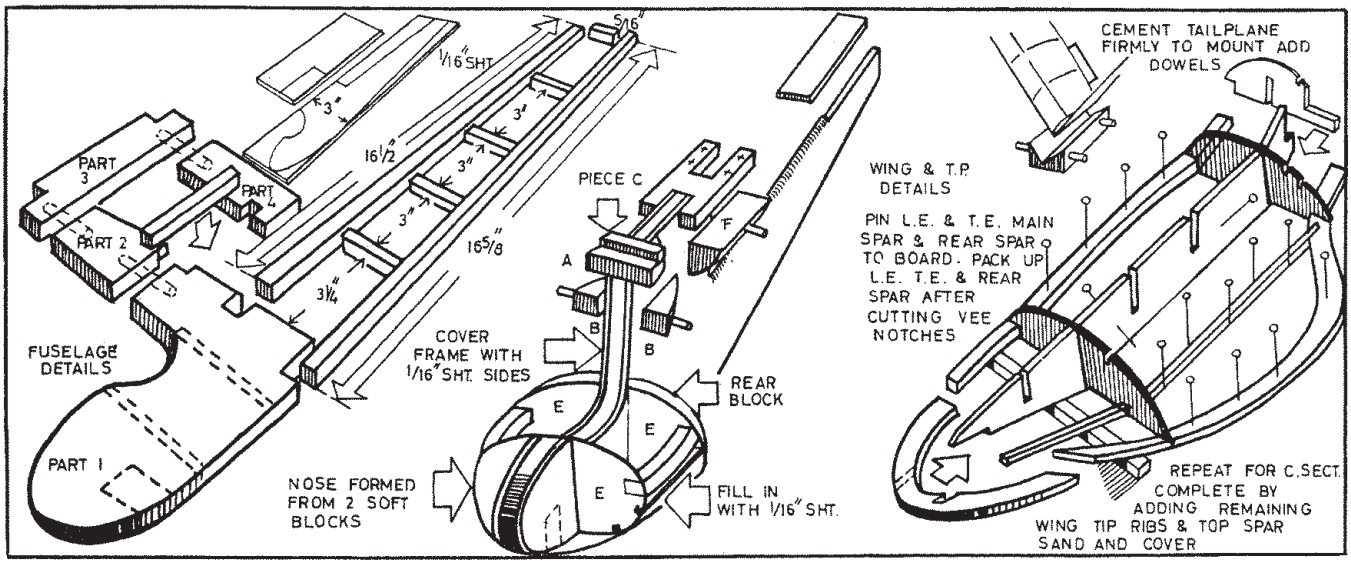
The plan shows *all* parts full-size. Sketches below give the stages in construction. Drill the mounting holes oversize for the Dart and Frog 50 to provide sidethrust adjustment. Cut tank from a toothbrush container, blank off end, drill for feed line and filler ; mount at rear of centre-section. Two coats of dope, colour trim, and one coat of fuel proofer for fuselage, one coat of dope for wings and tail. Fuel-proof centre sections. Build butterfly tail in two halves. A normal tailplane and fin of appropriate area may be used if you prefer. Twin windscreens from sheet celluloid are optional.

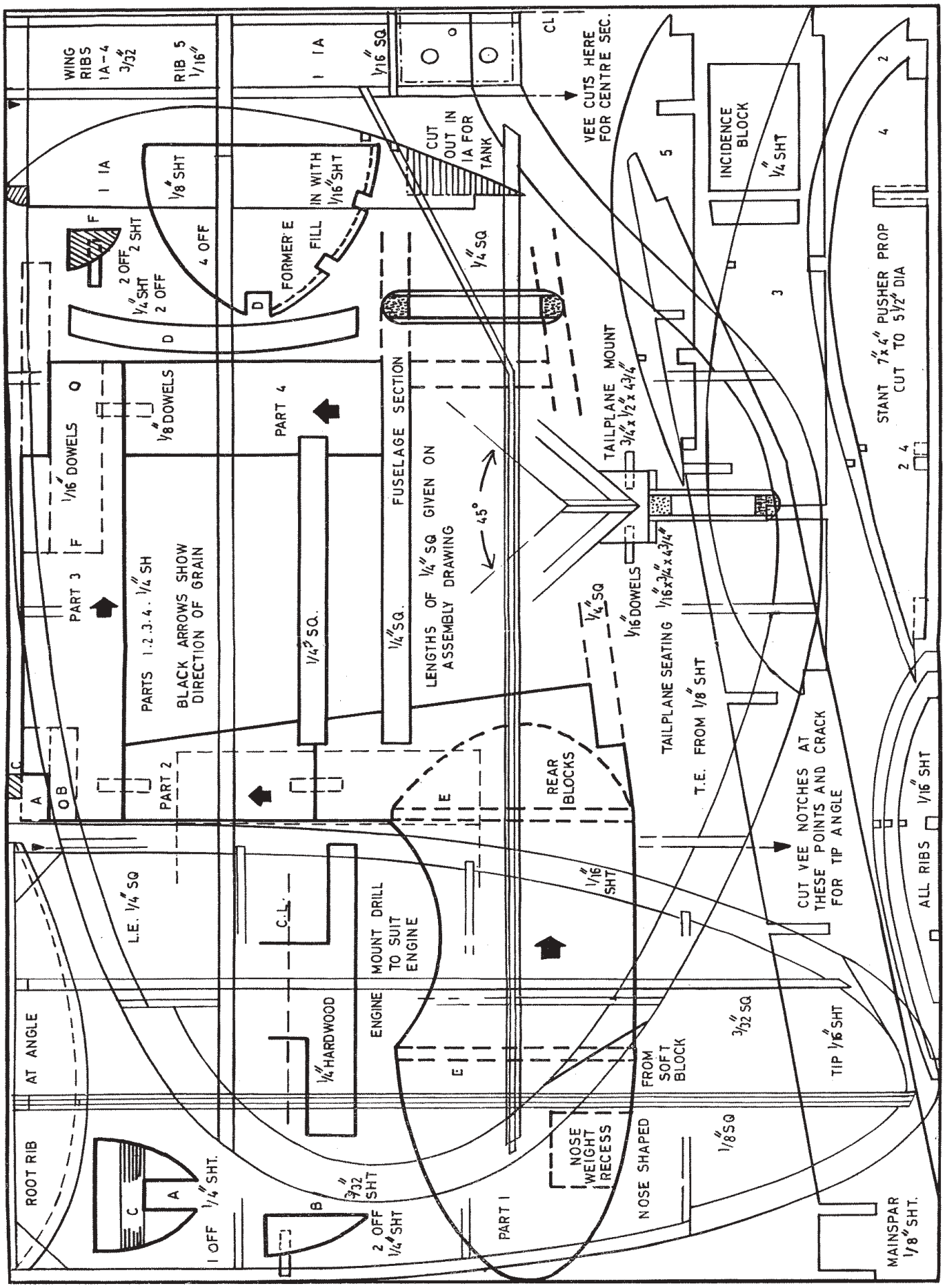
Flying

Add weight to recess in nose until the c.g. falls approx 3½ inch back from the leading edge and, testing over long grass, obtain a flat straight mounting glide. Give 1/32 downthrust packing under rear of lugs.

Throttle back for first power-on flights, or put prop on backwards (estimated reduction of 25 per cent. thrust). Model will turn to the right. Counteract this by bending the left tail-tab DOWN and the right tab UP. Both wing and tail incidence is fully adjustable. With the powerful 0.5 Dart some sidethrust may be required to control turn.

Finally, a free offer! If any reader would like to make *Pushup's* crew, write me c/o MODEL AIRCRAFT. I will send them general arrangement drawings of George and his girl friend. Genuine offer, chaps. Happy landings!





Enlarge 117.5% to appear full size.

'Dualair'—a dual-purpose model

'DUALAIR' features the author's own 'lifting type' fuselage that contributes to the models excellent performance both as a glider and as a rubber-driven model. By fitting the 'propeller-nose' assembly it is converted from a glider to a rubber-driven model in a few seconds, so that glider and powered flight experience can be had during the same afternoon's flying. Keen to get building? Of course, so here goes.

The fuselage sides must be carefully enlarged from the reduced scale drawings on the plan (Fig. 23). Do your enlarged drawing on tracing paper, noting carefully the angle or slope of former F1A. This gives the power version 'downthrust' and must be accurately drawn. With the aid of carbon paper trace the fuselage sides on to $\frac{1}{16}$ in. sheet balsa and cut out. Trace the full-size formers F1A, F2, F3, F4 from the plans, transfer to sheet balsa ($\frac{1}{8}$ in. sheet for F1A, F1, F2, $\frac{1}{16}$ in. sheet for F3, F4). Cut out the formers and cement accurately, between the fuselage sides, as on the constructional diagram. Make liberal use of modelling pins to hold the parts until the balsa cement has dried. Cement the rubber anchoring dowel pieces A in position. Cover the top of the fuselage with $\frac{1}{16}$ in. sheet. Bend the tow-hooks from 18 S.W.G. wire and bind to $\frac{1}{16}$ in. sheet piece B. Cement this between formers F1A and F1. Enlarge piece C from the plan and cut from $\frac{1}{16}$ in. sheet. Cement in position. Cover the remainder of the fuselage with $\frac{1}{16}$ in. sheet, again holding with modelling pins until the cement has set. Note the space left under the rubber anchoring dowel. This gives access to the dowel peg when inserting the rubber motor. Check that your construction has been accurate with a set-square and that the fuselage is not twisted.

The most important part of the main wing assembly is the mainspar. You will find this on the plan, again (due to space) in three parts. Carefully trace and join the parts to form a complete half-wing mainspar (Y joins to Y, Z to Z). It is essential that this joining should be done accurately and a ruler should be used to see that the inner and outer mainspar base lines are level on your drawing (see sketch on plans). Transfer the tracing of the mainspar on to $\frac{1}{16}$ in. sheet balsa. Cut out and pin inner part of mainspar to your building board. Cut out eight ribs from $\frac{1}{16}$ in. sheet and slot them in to the mainspar, checking that they are at right angles to it. Add the leading edge ($\frac{1}{8}$ in. sq.) and trailing edge ($\frac{1}{4}$ in. $\times \frac{1}{16}$ in.). When set, remove, crack the leading and trailing edges at the dihedral point and build outer wing panel in the same way. Cut triangular pieces of wood (gussets) and fit where shown on diagram. Carve the wing tip from soft block or laminated $\frac{1}{4}$ in. thick balsa sheet. Sand paper leading and trailing edges to the section shown on the plan. Now build the opposite wing half in the same way and then cement the halves together. Check for equal dihedral on the outer panels. Cover wing with lightweight modelspan tissue. Cover top and bottom centre section panels first, then top and bottom of both outer panels. Allow about $\frac{1}{8}$ in. overlap on the top pieces of tissue, as this is then cemented round the leading and trailing edges and makes a neat job. Brush (or spray) a coat of water over the tissue in the same order as covering and pin to board to avoid warps. Place small blocks of wood under the leading and trailing edges, while the separate panels dry, as this prevents the wet undersurface sticking to the board. When the wings have dried repeat the process with a coat of thin clear dope brushed on with a soft brush.

Make both a glider and a propeller nose block. The recess in the glider nose block is used for a small amount of balance weight which should be firmly wedged and cemented in and the hole covered with tissue. For the power version the propeller is a $7\frac{1}{4}$ in. diameter K.K. Plastic ($10\frac{1}{2}d$). Note 18 S.W.G. brass bush to ensure accurate and smooth running of the driving shaft. The cabin is built in the same way as the fuselage and firmly cemented in position. Small holes are bored through the cabin sides into TF1 and TF2. Rounded pieces of match or $\frac{1}{16}$ in. dia. dowels are firmly cemented into these holes. Cut out the fin, fairing and tail-plane from $\frac{1}{16}$ in. sheet. Give one coat of clear dope, pinning down to avoid warps. Cement in position. Note the cut in the trailing edge of the fin to enable adjustments to be made. The fuselage edges can be sanded round, and the fuselage and nose blocks given two coats of clear dope, sanding lightly between each coat. Both versions *must* balance as shown in the diagram (Fig. 28).

FLYING

Glider Version

Test over *long* grass on a *calm* day. Obtain a shallow glide and check that it is straight. (Bend the rear of the fin slightly to correct a bank.) Use about 75 ft. of thread for tow-line. Tow up *slowly* using front hook. (Rear hook for windless days.) If model turns sharply left or right drop the tow immediately.

Rubber-Powered Version

Use 72 in. of $\frac{3}{16}$ in. strip rubber in two loops of 18 in. length for the rubber-powered model, well lubricated. Choose a calm day and obtain a straight glide before attempting a powered flight. For a first powered flight put about 175 turns on the motor. Launch smoothly into wind. Do not *throw*. Model should climb slowly, turning gently to the left. Steep banks are corrected by increasing the off-thrust. Increase number of turns with each successful flight to a maximum of 550.

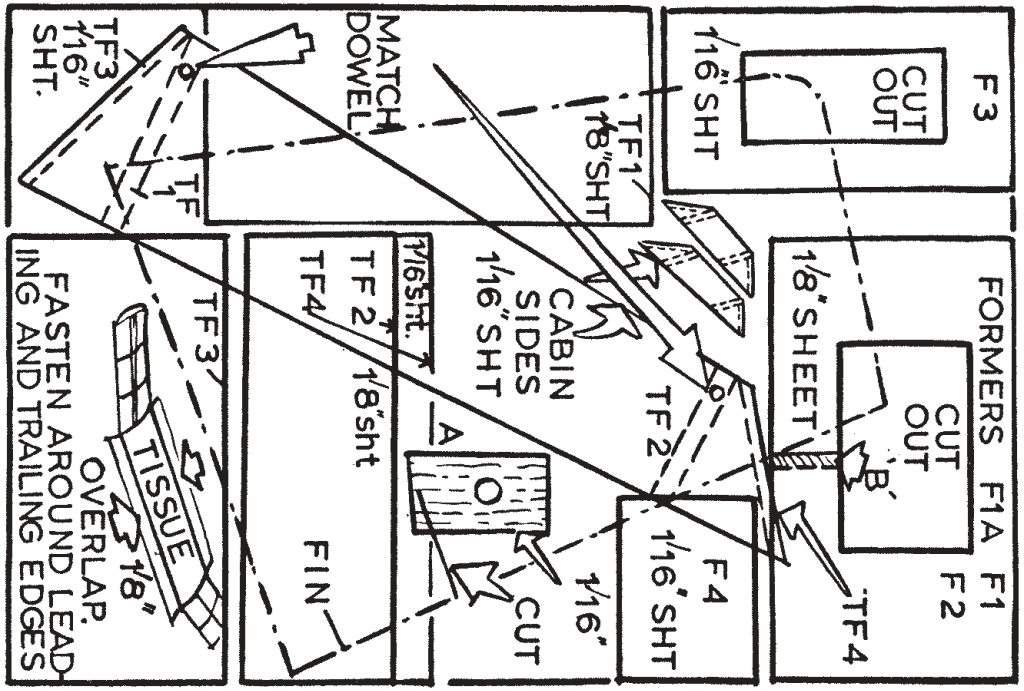


Figure 24.

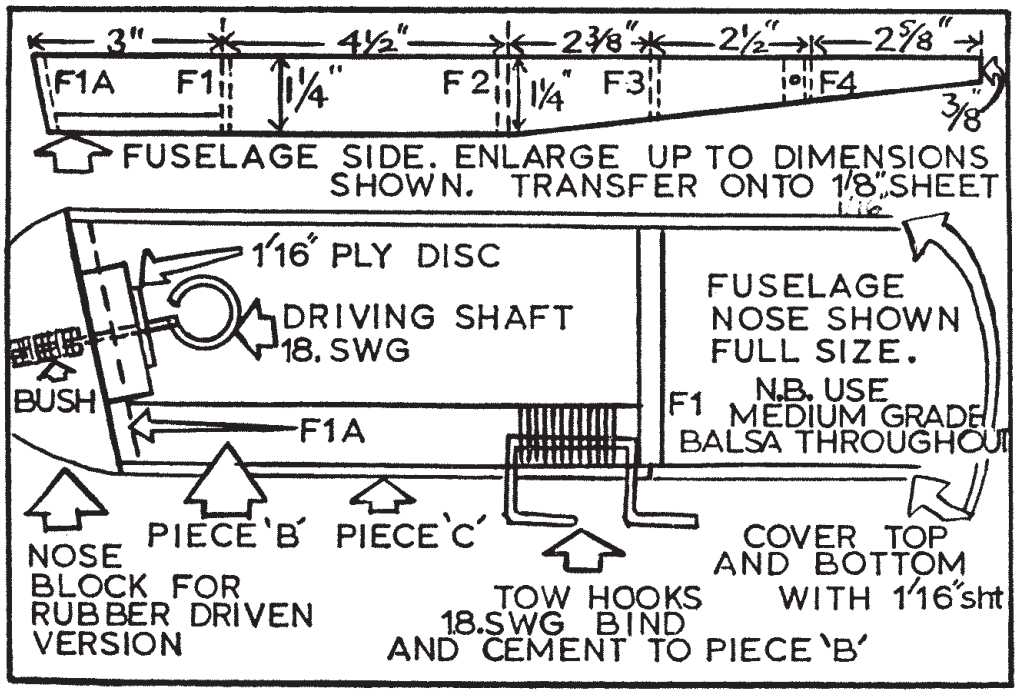


Figure 23.

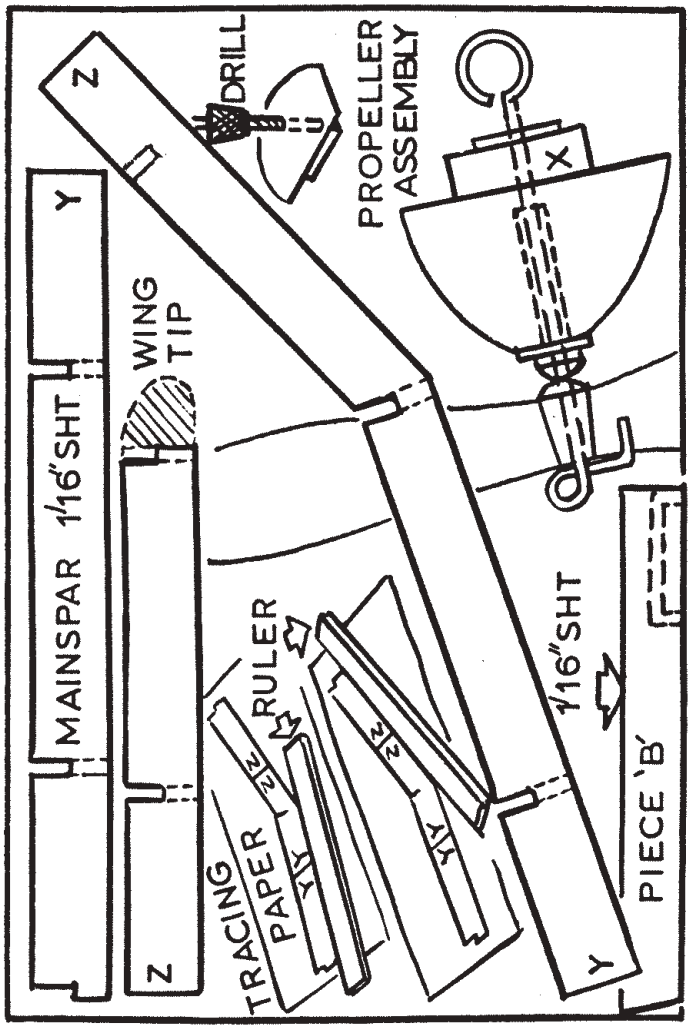


Figure 25.

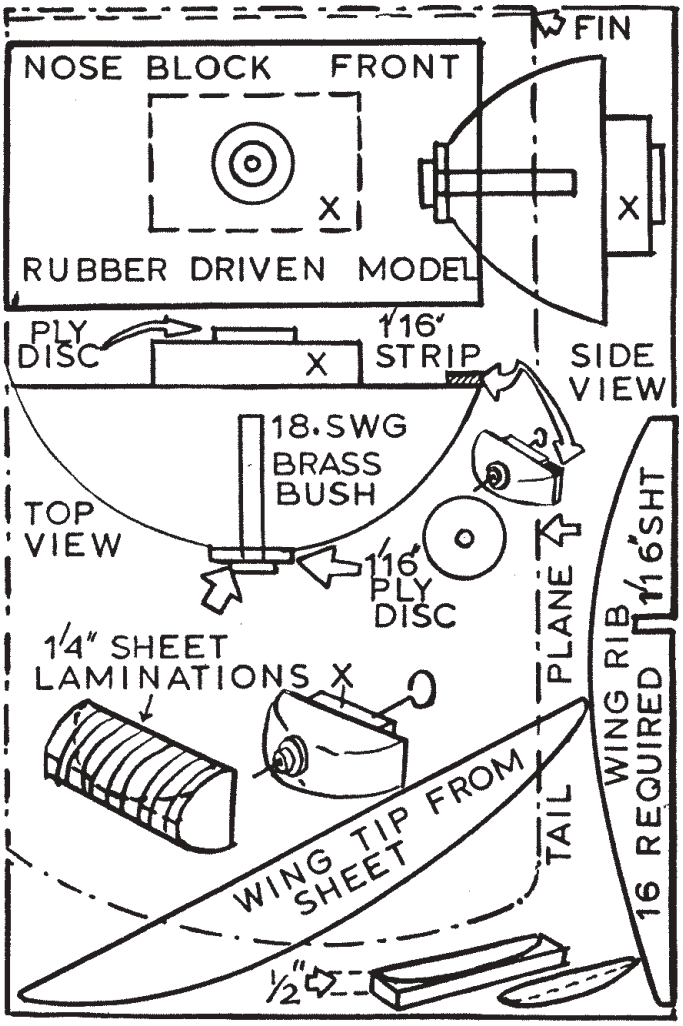


Figure 26.

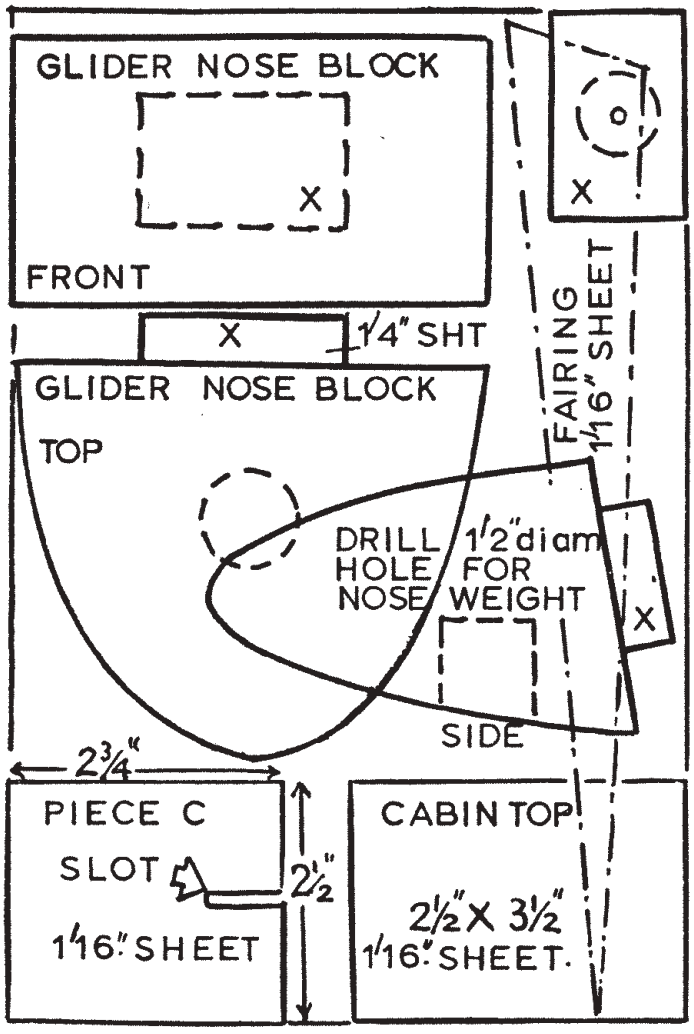


Figure 27.

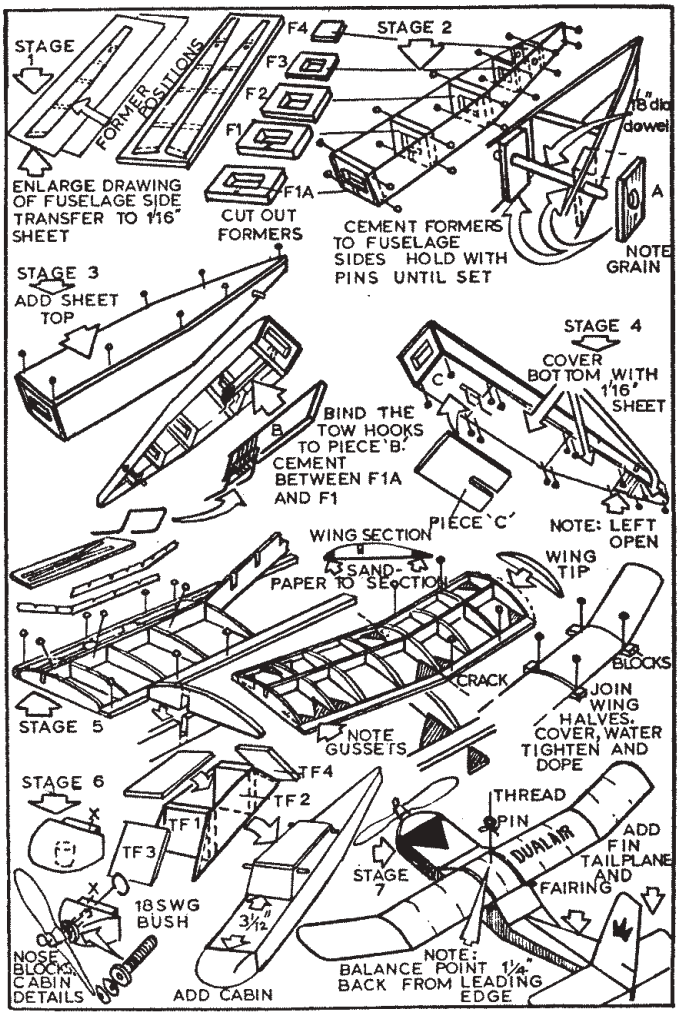
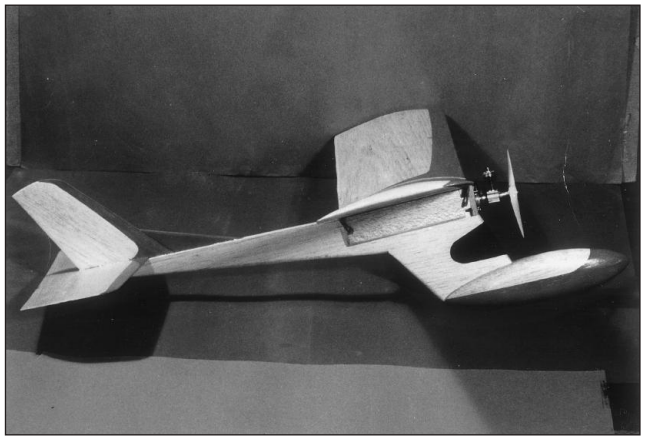
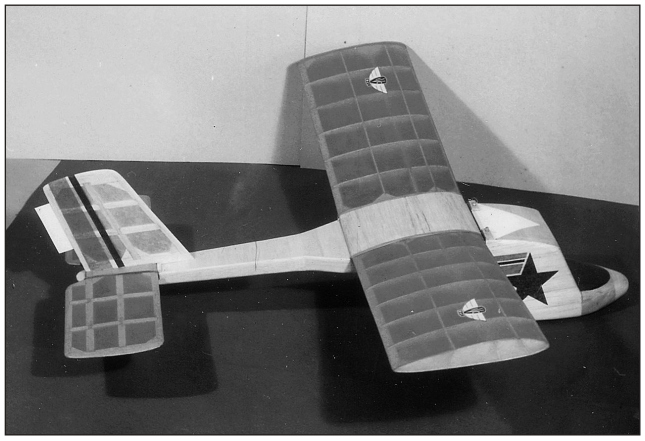


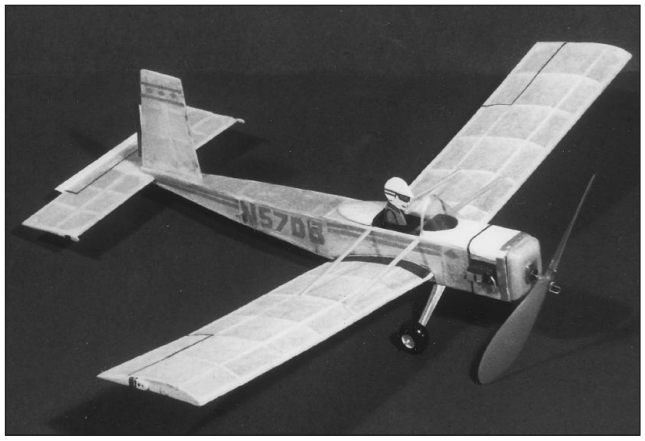
Figure 28.



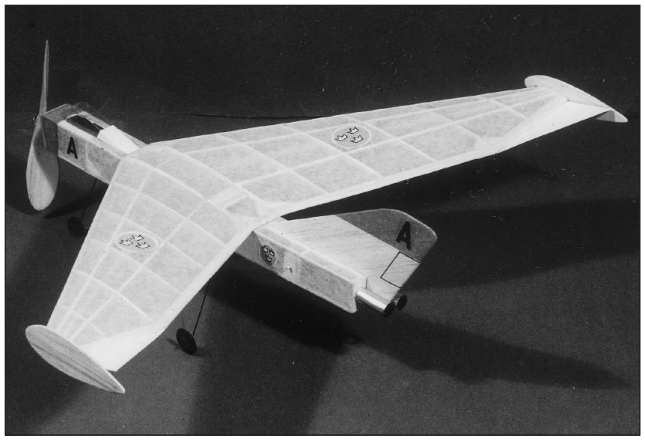
Skyrida – *American Aircraft Modeller, October 1969.*



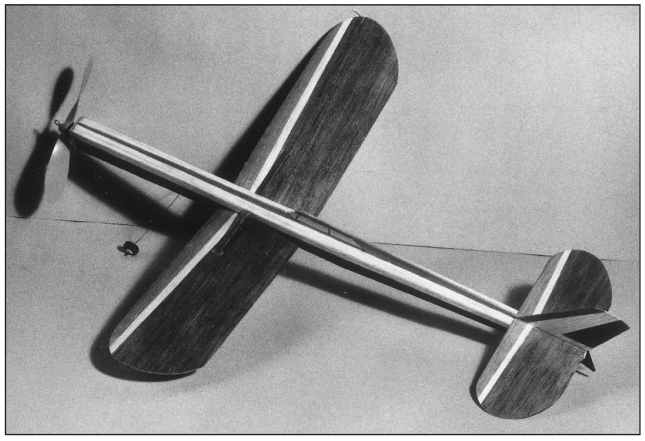
Starstream – *Aeromodeller, December 1987.*



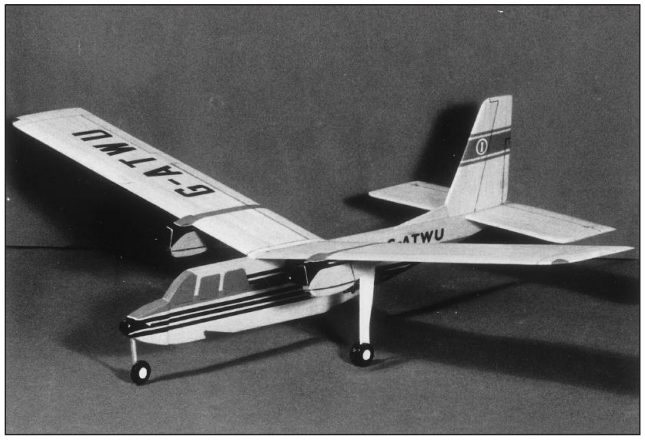
Evans Volksplane V.P. 1. – *Unpublished.* Plan redrawn by John Wynn.



Fli-Wing – *Aeromodeller, September 1974.*

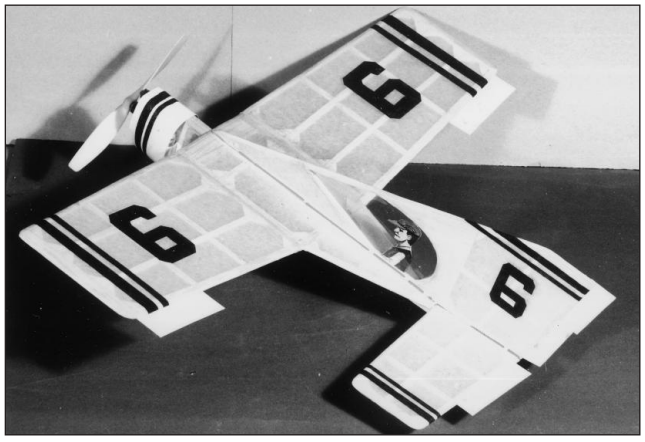


Long John – *Aeromodeller, May 1969.*



Islander – *American Aircraft Modeller, October 1970.*

Boeing 737 – *Unpublished.*



Arrowair – *Model Maker, June 1980.* Plan on pages 76 and 77.

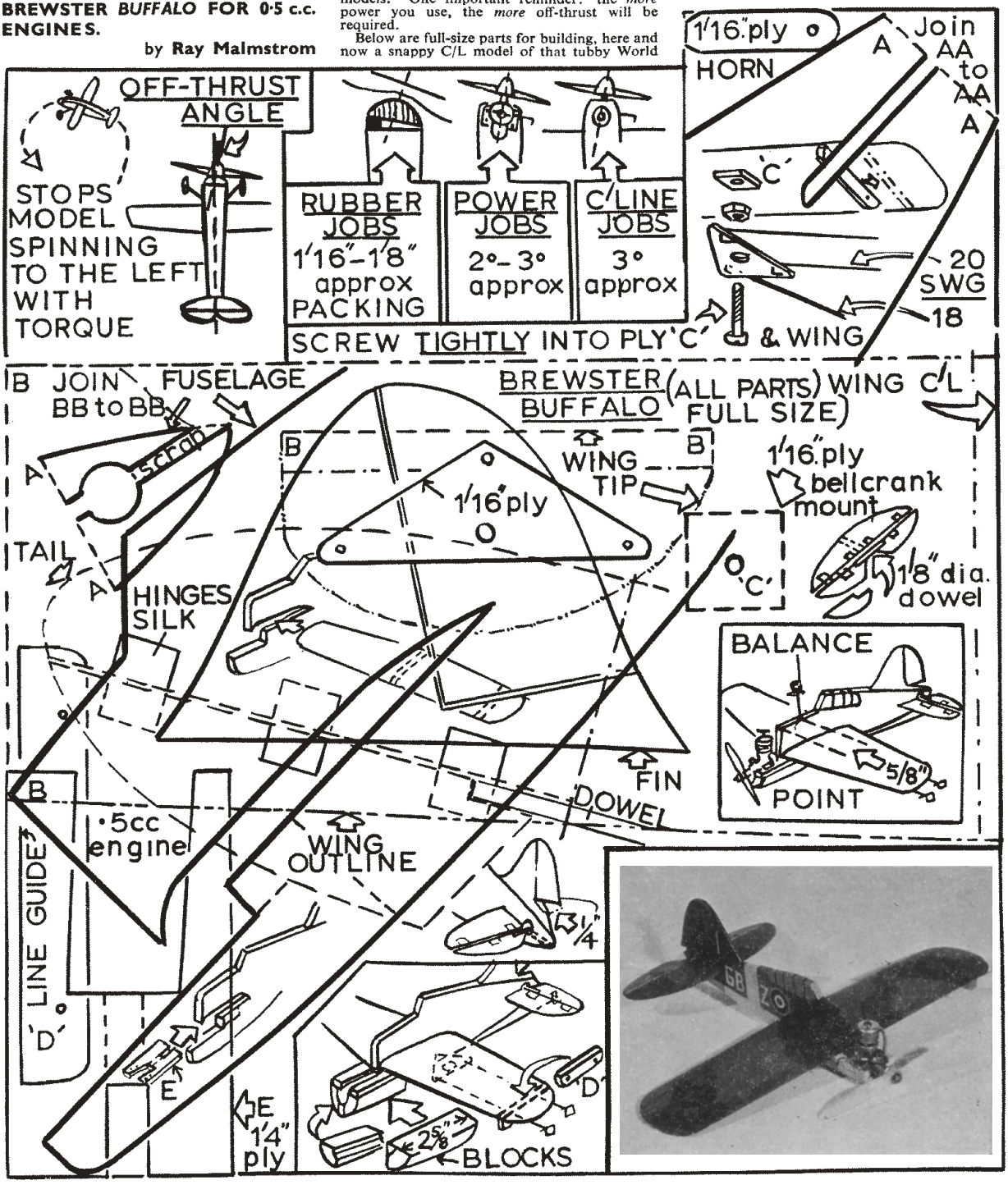
Model 'n Tip

A special instructional feature for wingmen on the off-thrust angle, with FULL-SIZE plans to build a flying model **BREWSTER *BUFFALO* FOR 0·5 c.c. ENGINES.**

by **Ray Malmstrom**

ONCE the propeller is revolving under power, any model aircraft becomes subject to the demon of the piece—*torque*. This is a twisting action that often causes the model to bank so steeply to the left, that it ends up with its nose buried lovingly in Mother Earth ! The cure is simple—point the propeller driving shaft to the *right*. The angle the prop shaft now makes with the centre or datum line of the model is called the *off-thrust angle*. The amount the shaft must be pointed to the right must be found by test, and depends on the power being used, but below will be found useful amounts and degrees of off-thrust for rubber driven and power models. One important reminder: the *more* power you use, the *more* off-thrust will be required.

Below are full-size parts for building, here and now a snappy C/L model of that tubby World War II fighter—the Brewster *Buffalo*. The entire model is made from ¼ in. sheet, except where noted. Tailplane and elevator of ⅛ in. sheet and the lower blocks are from laminated ¼ in. sheet. You will notice the off-thrust angle has already been incorporated in the engine mount. Build it accurately, finish in colour dopes, adding transfers and a coat of fuel-proofer. Balance as on the plan and fly on 18-22 ft. lines. Use any 0.5 c.c. motor (E.D. .46, D.C. Dart, Frog 50). This little *Buffalo* (15 in. span) has "pep and performance plus," and really can be flown in the back garden ! A larger tank can be fitted if desired. Happy landings.



InVicTa

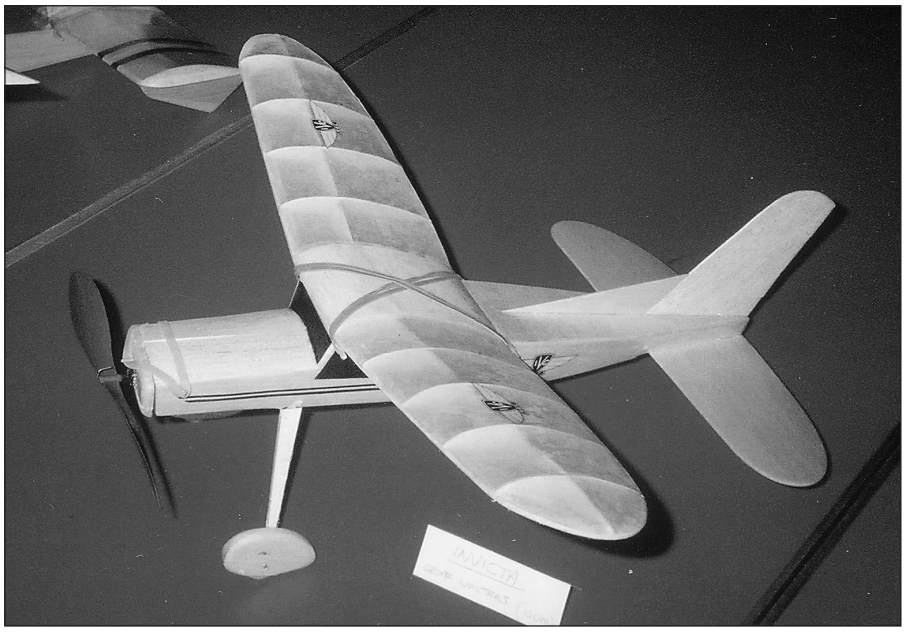
ARTICLE & BUILDER: GEOFF WATERS.
PHOTO: JOHN VALIANT.

I found this original Invicta plan while looking for something to build.

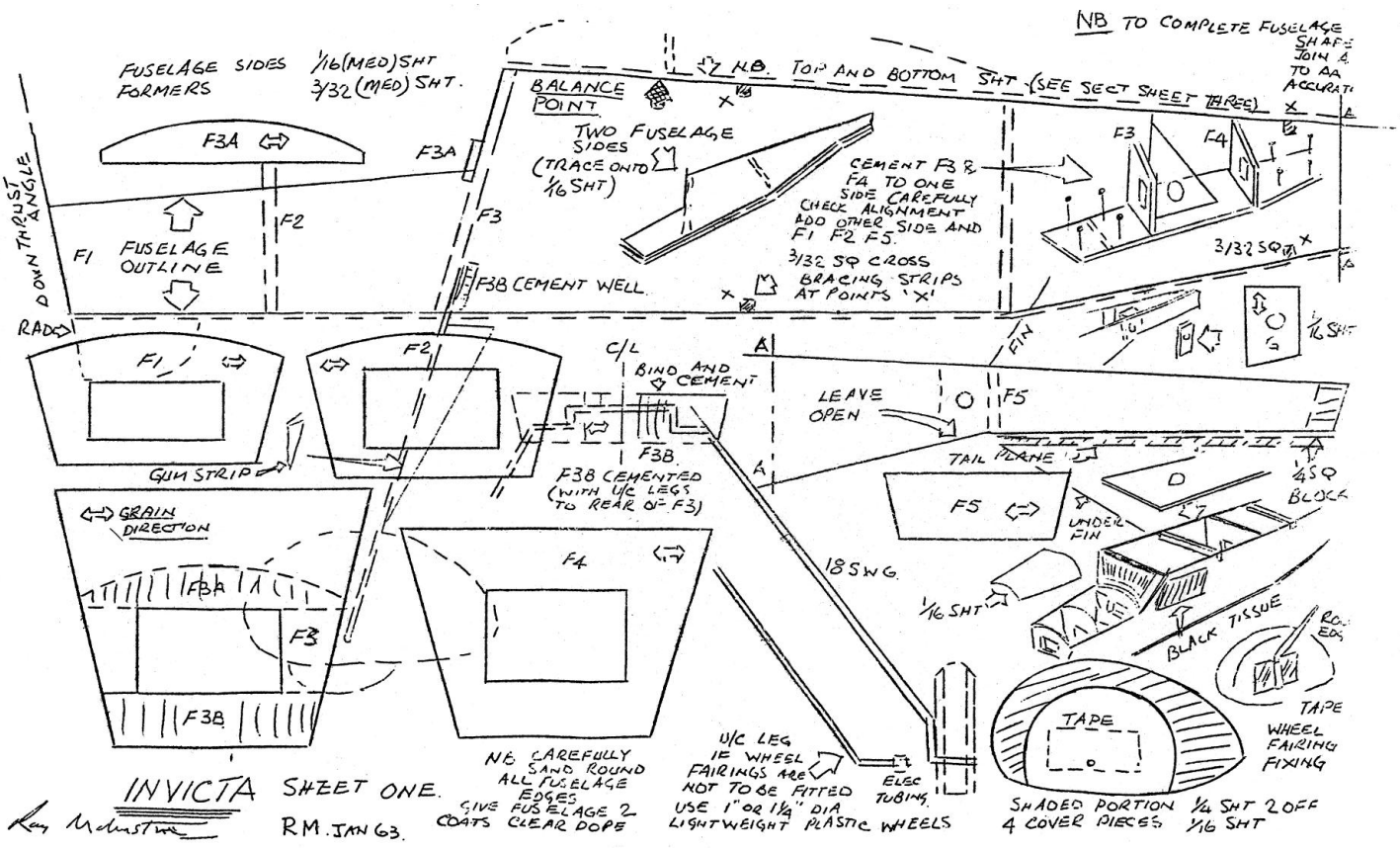
It was designed by Ray for our club "one model" competition in 1963 – the IVC of Impington Village College being used in the model name. The plane was designed to be made from one sheet of 1/16 and one sheet of 3/32.

There was the option of using either a hand carved wooden propeller or a 7 1/4" Keil Kraft plastic.

Instructions stated that all sheet parts were to be clear doped with just the wing covered in lightweight tissue. The Invicta flew straight off the board and gave flight times of over a minute.



Invicta was redrawn by Terry King and appeared in Aviation Modeller International/ Aeromodeller, January 2002.



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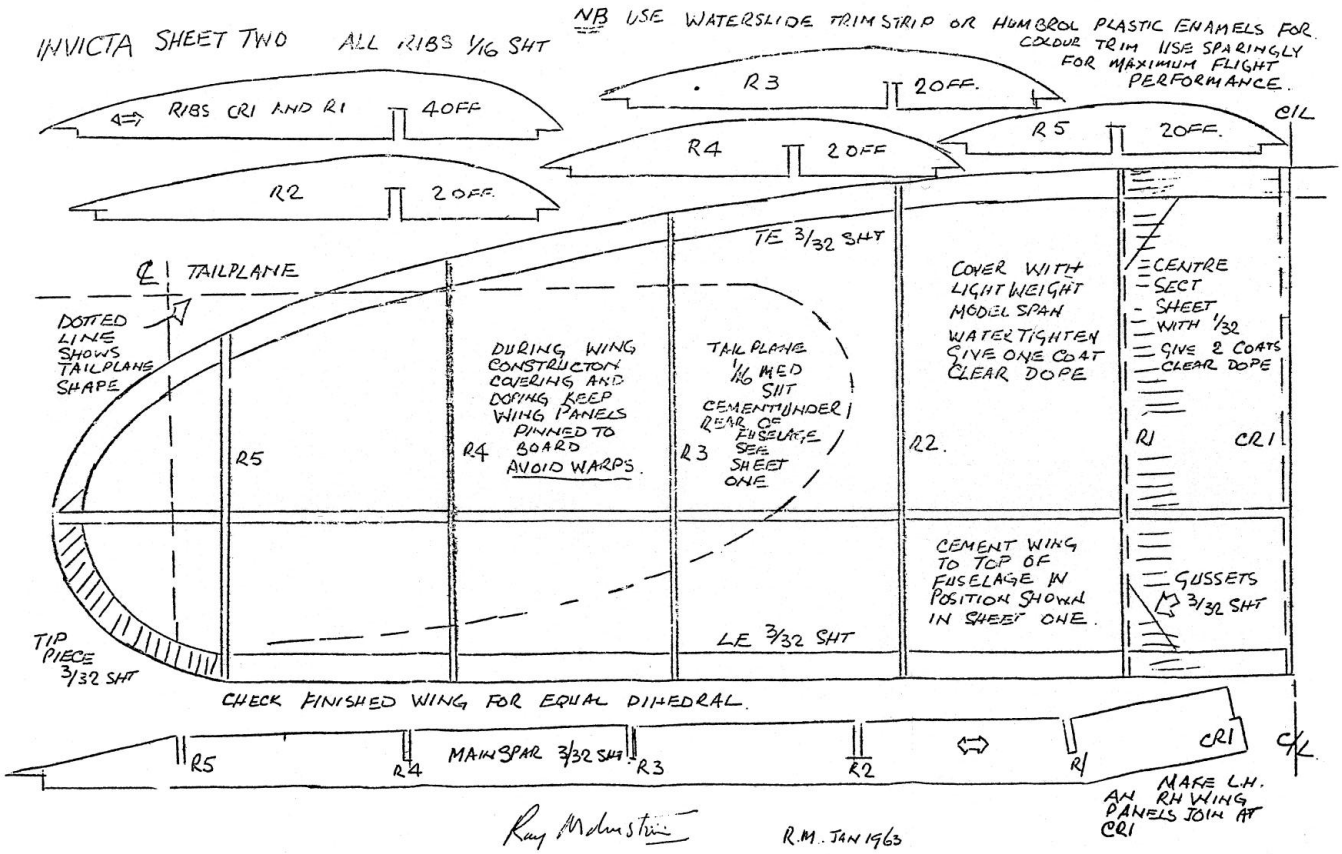

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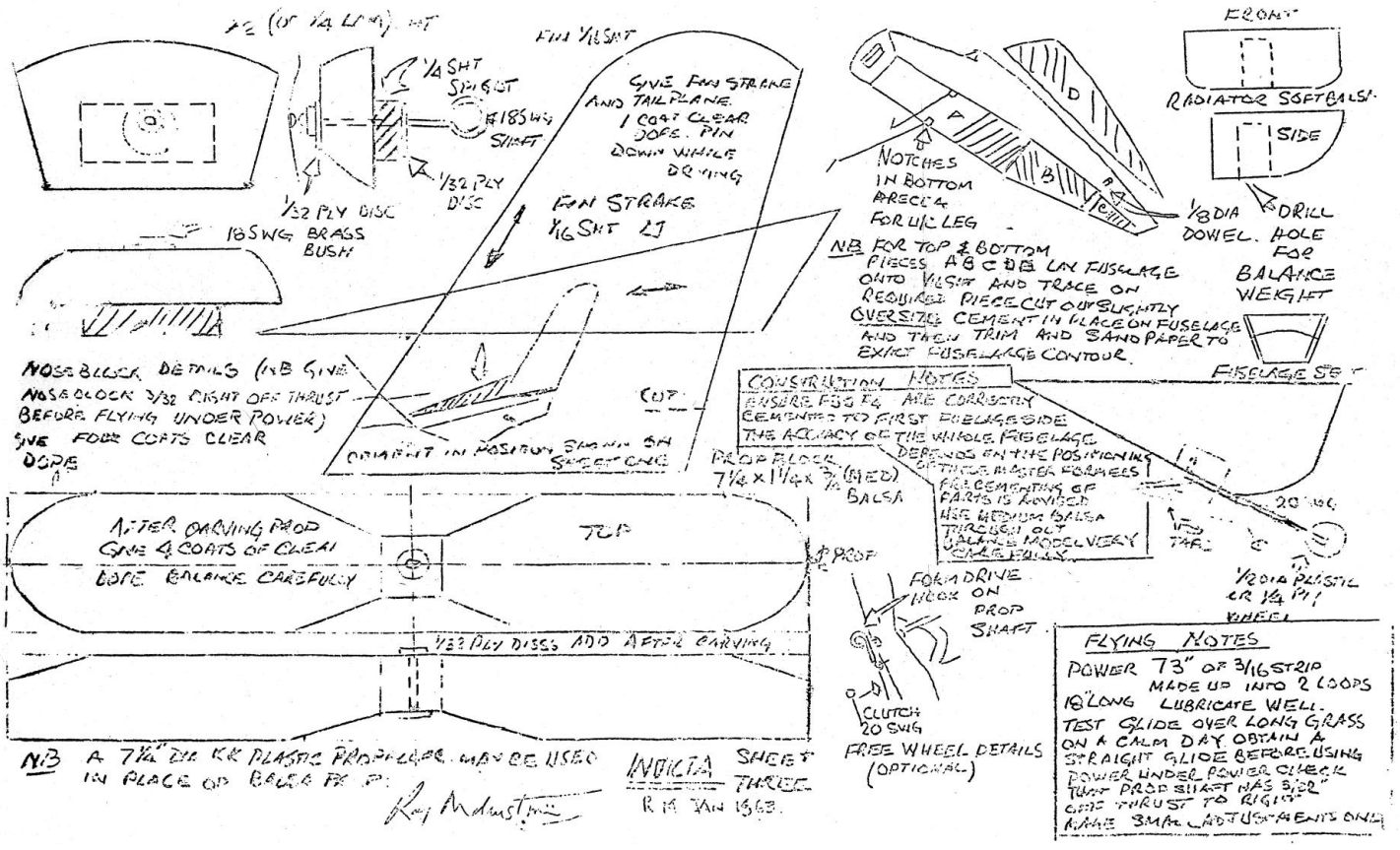
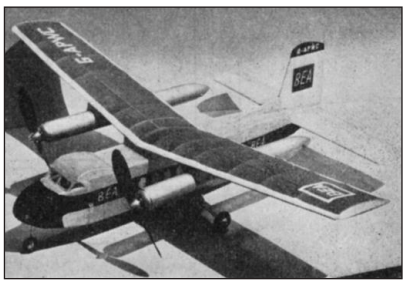




RAY MALMSTROM'S

Semi-scale, rubber powered, free flight twin model

HERALD

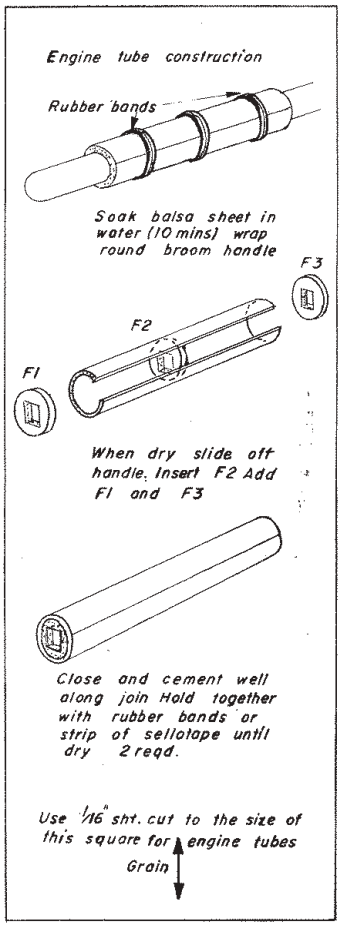
MATERIALS LIST

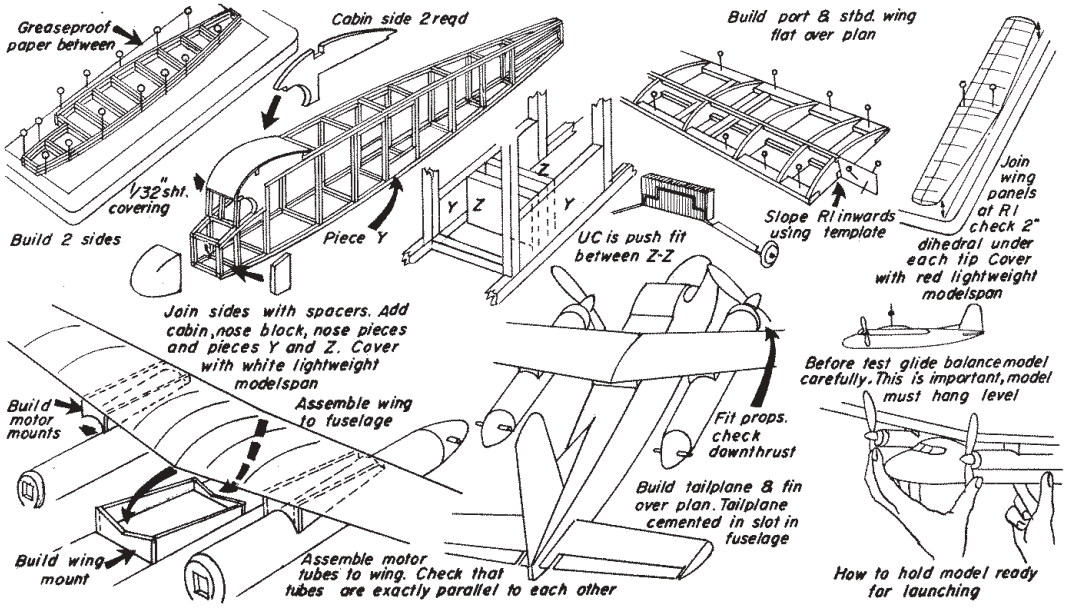
1 sheet 3/32 × 3 × 12 in. Balsa
1 sheet 1/16 × 3 × 36 in. Balsa
1 sheet 1/4 × 3 × 6 in. Balsa
12 strips 3/32×3/32×36 in. Balsa
3 ft. 18 S.W.G. piano wire
2-18 S.W.G. brass bushes
4-18 S.W.G. Cup washers
2-5 in. diam. Keilkraft plastic propellers
2-1 in. diam. plastic wheels
1-1/2 in. diam. plastic wheel
1 sheet White lightweight Modelspan
1 sheet Red lightweight Modelspan
28 in. of 1/16 in. flat rubber
Pieces of soft block balsa; scraps of 1/4 in. sheet balsa; 1/16 in. ply; small piece of thin tin; linen thread; piece of thin acetate; 4 in. length of 1/8 in. diam. dowel rod; 2 in. length of elec. tubing; Cement; Clear dope; Humbrol plastic enamels.

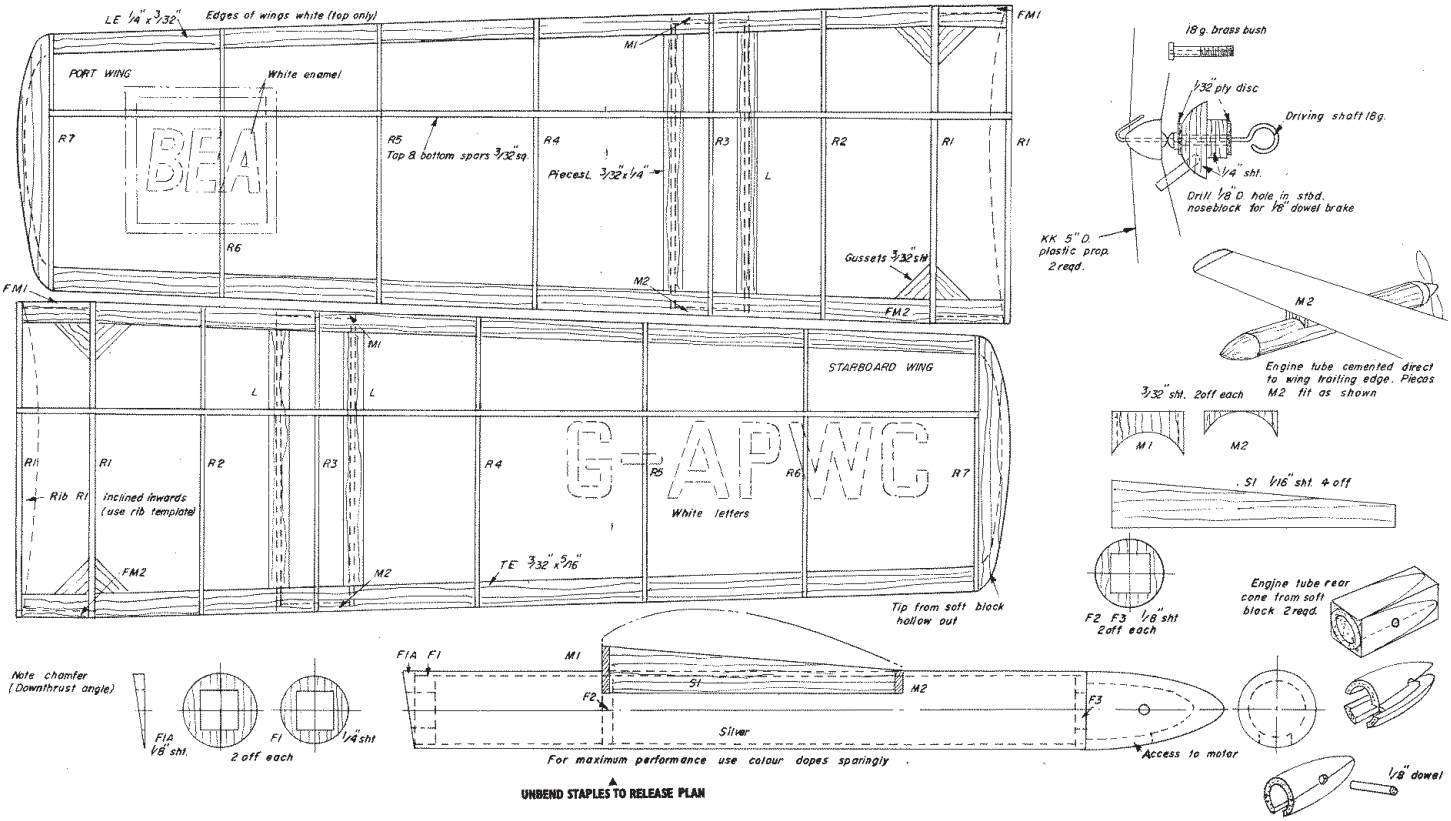
LOOKING for a model that will give you a new flying thrill? Something that will attract lots of attention on your local flying ground? This simple-to-build, smart little twin-motor semi-scale Handley Page *Herald* is *your* model. The plans give you all the information, but these additional notes may be of help.

Build two identical fuselage sides and join by the centre four spacers first. Hold in position with pins. Check for squareness. When dry add the remaining spacers. Take care to pin down to the building board, the wing panels, tailplane and fin after water spraying and doping. Please avoid warps! Sandpaper downthrust formers F.1A accurately. The correct downthrust angles to the propeller driving shafts is important. When assembling motor tubes to wings check that they are parallel to each other, and the propellers have the same amount of downthrust.

Flying Notes.—Balance the model very carefully, adding a little noseweight as necessary. Test glide over long grass on a calm day. When winding-up have a friend to assist you wind the starboard motor first. The propeller is prevented from turning by a small dowel-rod brake. Hold the model as shown in the sketch while your friend removes the brake rod. Launch smoothly with fuselage approximately parallel to the ground. Have the same number of turns on each motor. Sharp banking is cured by gently warping the fin. It can also be cured by 20-50 extra turns on the motor on the banking side, but do this with caution.







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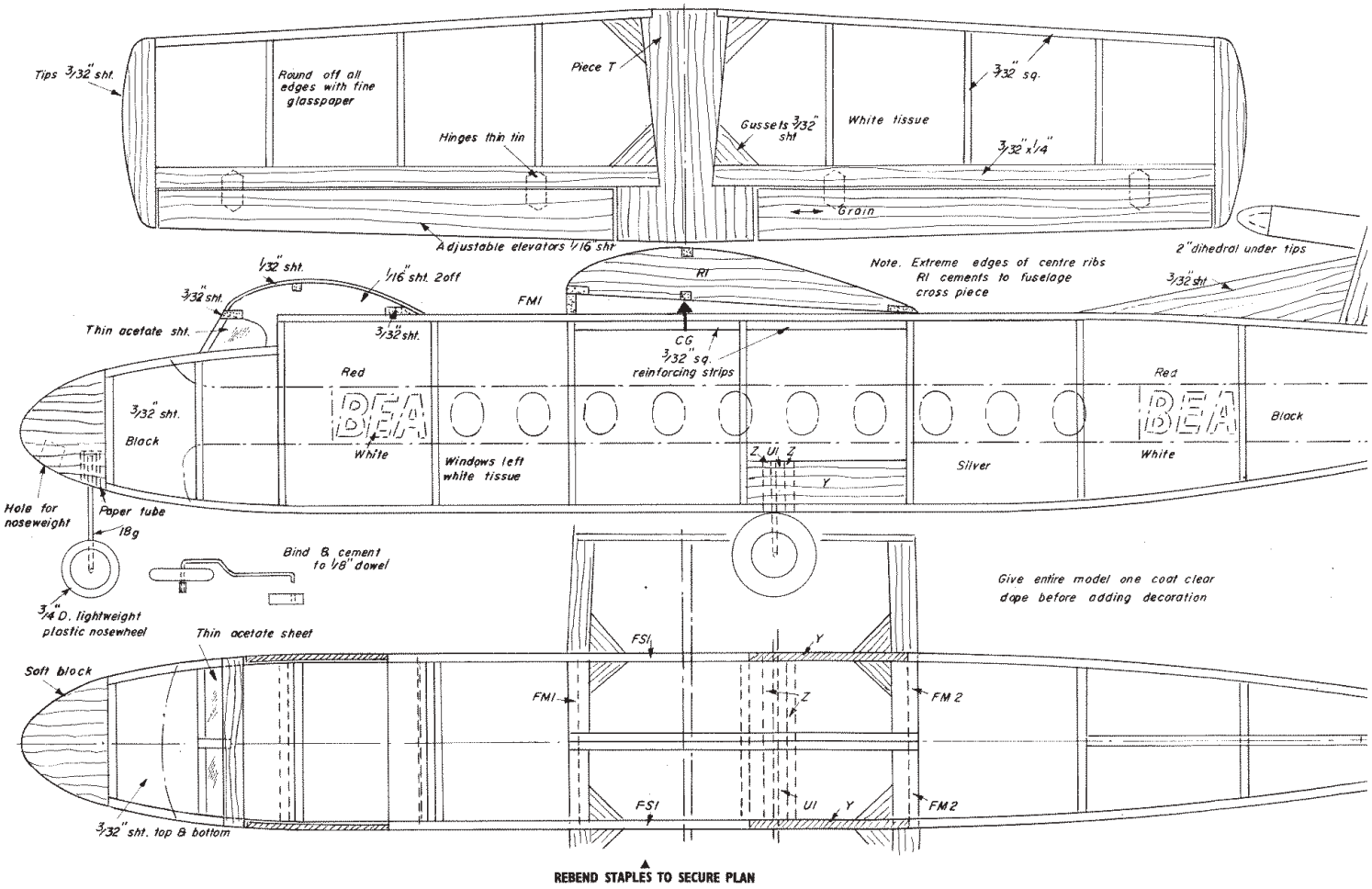

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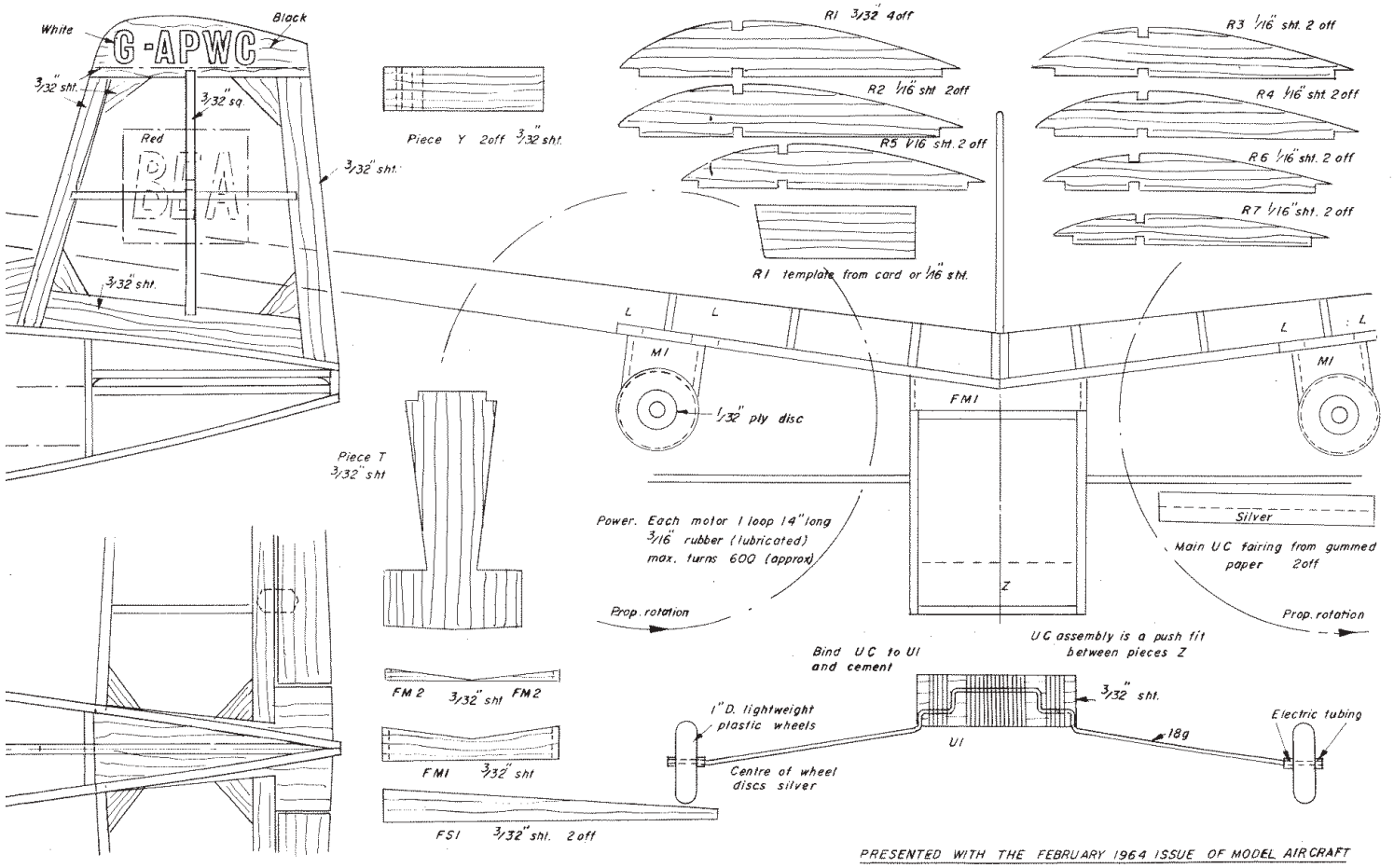

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