

THE FROG "STRATOSPHERE"

A HIGH PERFORMANCE DURATION CONTEST MODEL

SPECIFICATIONS.

Wingspan	-	42in.	Fuselage wt.	-	-	1 3/8 ozs.
Length	-	28 3/4 in.	Wing wt.	-	-	1 1/2 ozs.
Propeller dia.	-	1 5/8 in.	Rubber wt.	-	-	1 1/2 ozs.
Motor	-	8 strands 1/4 in. x 1/16 in. rubber strip.	Total wt.	-	-	6 3/8 ozs.

STRATOSPHERE INSTRUCTIONS

In common with all other 'Frog' products this model has first been designed to give the most efficient performance in its class, then the constructional methods have been carefully worked out to enable even the beginner to make a simple and satisfactory job.

The skeleton of the Stratosphere is nearly 100% balsa wood, so that the few unshaped parts may be prepared with the minimum amount of labour. It is also interesting to note that if due to accidents in building or flying, parts are broken, they may be jointed together with the cement supplied and it is unlikely that a break will occur again at the joint.

Another feature of the 'Frog' kits is the full scale working drawing, comprehensively numbered and detailed for easy reference with the instructions, so that you can place the drawing on a soft wood board or old table, and build the various parts of the model on the drawing by pinning the parts to it, carefully cementing every joint, and leaving for about 30 minutes to set before removing. Small pins may be pushed right through the pieces of balsa, to keep them in position, without causing any damage.

Bearing these points in mind, and referring to the notations on the drawing covering sub-assemblies, it is only necessary for us to give a recommended sequence of assembly instructions with special reference only to unusual points which might arise, as follows.

FUSELAGE.

Upper and lower keel (each in two parts, see sketch stage 1).
Prepare bulkheads 7 and 8 of ply and balsa. Relative position of ply shown dotted.
Prepare bulkhead II (two joined together).

Assemble half bulkheads 3 to 11a, using the half of each which is slotted in the centre to take keels. Check that they are vertical. Stringers into bulkhead slots but fit centre stringer first. Three pieces 23 sandwiched against 11a. Cut away 3 centre stringers between 11 and 11a. Insert 24 (double thickness). Remove half shell from drawing. Add remaining half bulkheads 3 to 11a. Add 23's and 24's as before. Trim off all stringers neatly at 3, sandpaper face of latter smooth. Add No. 2, balsa, and No. 1, ply.

Form front wing securing hook from straight wire and cement to upper keel.
Parts G, H, I, 12, wing platform 13 and balsa blocks 20 and 21. These blocks are sand-papered to general streamlined shape of wing pylon.

UNDERCARRIAGE MOUNTING.

Force brass tube through hole in balsa block. Cement paper tube to front edge. Cement assembly in place between 5 and 6, and appropriate stringers with ample cement.

Fill space immediately above and below the block with sheet balsa cut from scrap.
Fill all spaces between stringers around nose, between 3 and 4. Taper 23's on both sides to 1/4 in. thick at tail end.

FIN.

Owing to the convex shape of fin ribs Nos. 26 and 27, the leading and trailing edges, 25 and 29 must be lifted up on pieces of scrap balsa above the drawing. Complete the frame with two 25's (double thickness), 30, three 28's as sketched and No. 27 with part cut out as shown, and the two pieces 31.

When all joints are thoroughly dry cut through 28 and 29 to detach the rudder and refit to fin with aluminium foil let into slits in 31 in the positions shown. Fix dowels into holes in 28. Add 22 to fuselage.

TAILPLANE.

Cut leading edge supplied in half, bevel slightly, rejoin again with cement at X. As for fin, pin down parts, lifted above drawing.
Complete frame with trailing edge Nos. 14, 15, 16, 17 and composite centre rib of 19 sandwiched between two 18's.

PROPELLER.

Liberal cement blades into hub as sketched. Convex side of both blades should face forward. When nearly set rotate on shaft to align blades. Add back facing ply disc A. When set sand paper blades smooth and balance in horizontal plane by sand papering more off side which may tend to drop. Round off any edges left flat.

NOSE ASSEMBLY.

Cement B, C, D, E (plywood) and two F's together. Fit moulded bush. Push through shaft from F end. Slide on one cup washer. Follow with propeller, free wheel spring, and bend over tip of shaft as shown. Solder top of spring to shaft. At this point see note on rubber tensioner.

UNDERCARRIAGE.

Solder together two formed wire fittings as shown, making left and right handed, bind with fuse wire and re-solder.
Sandpaper legs smooth, slot one end to take soldered joint. Bind securely. Bind U shaped part of wire axles to lower end of each leg. Remainder as instructed on drawing.

WING.

Each half is made separately as follows:—
Ignoring the polyhedral angle for the present make the complete half wing frame by pinning down leading and trailing edges, parts No. T6 and T7, both double thickness, and T8. Do not cement T8 to trailing edge. Add ribs T1A, T2 (ply) all the T3's with exception of two forming wing tip joint, T4 and T5. Add mainspar from T7 to T1A, one piece. Add ribs T9.

When set cut leading edge and main spar at wing tip joint and remove wing tip only. Bevel leading edge on both faces of joint, cut small piece of mainspar away as required. Add two ribs T3 sloping inwards. Use pattern template on drawing as directed to give correct angle. Cement wing tip back to wing. If set correctly the two T3's should come flat together. Support tip while setting with 2in. block to give correct polyhedral angle.

Remove wing. Add T1 in plywood. To one wing half add the three dowels. Taper ends to simplify inserting into opposite half.

Finally cover section shown top and bottom with stout paper.

COMPLETING THE FRAMEWORK.

Sand paper wing tips to smooth round contours. Repeat for tailplane and fin, rounding the leading edges, and tapering the trailing edges to the same section as the wing.

Sand paper whole framework to remove surplus cement, irregularities, etc.

COVERING AND DOPING.

Use a flour and water paste as an adhesive. Do not attempt to pull tissue tight. Water spray and dope will do this. Aim at covering each piece uniformly with no deep wrinkles. The following is a recommended sequence of parts to cover.

Wing under-surface in one piece. Wing top surface in two pieces from wing tip joint each way.

Tailplane top surface, followed by under surface. Fin one side, followed by other side. Fuselage in convenient sections, eight for main body and three small sections on each side for wing pylon.

Spray water lightly over all the tissue. Handle carefully while wet. Pin down wings, tailplane and fin, as for assembling, to prevent warping while water dries.

Finally give one coat of clear dope and again pin down.

RUBBER MOTOR.

Make up motor with a skein of 8 strands, 26in. long of 1/4 x 1/8 rubber. Keep each end secure with small rubber bands bound round skein. Apply a liberal application of castor oil to preserve rubber, and make it capable of taking more turns without breaking. Attach one end to hook on propeller shaft. Lower through fuselage and secure at rear end with birch dowel through parts 24 and through the skein.

When flying build up turns gradually by an extra 50 each flight up to approximately 600.

RUBBER TENSIONER.

This is a vital necessity for competitions and consists simply of a wood-screw, screwed into the back of the nose block, as shown on the drawing. As the free wheel spring pushes the shaft forward, the right angle projection on the rubber hook engages the head of the screw thus retaining the last few turns on the motor. This serves the double purpose of preventing the motor bunching in the tail and the nose piece falling out. When bending shaft in front of free wheel spring (see nose assembly) make sure that the hook is in the correct relative position to the screw so that it rides forward a sufficient distance to engage it.

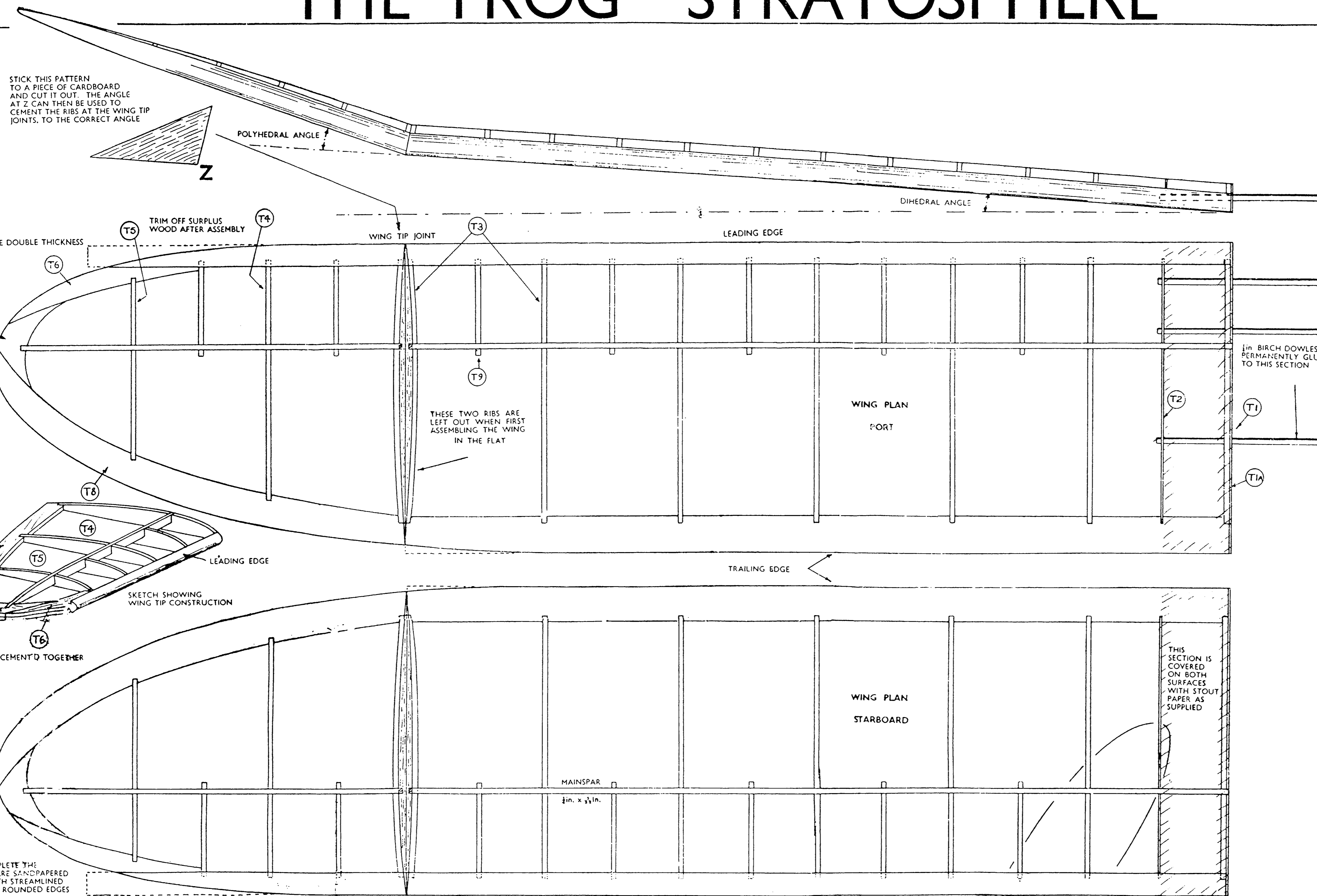
FLYING.

For your first flight wait for a calm day. When assembled ready to fly the model should balance at the point shown. Owing to the varying density of balsa wood, yours may differ slightly. If so, bring the balance to the correct point by cementing inside the nose or tail of fuselage, small lead shots or air gun slugs.

Make one flight with 100 turns on the propeller, and note the performance. If it tends to nose up and stall put a thin piece of card under the leading edge of tailplane. If it goes straight to the ground and shows no signs of climbing, then the piece of card must be put under the trailing edge. Once satisfied that the trim is correct, gradually increase the turns each flight.

ADDITION TO FREE WHEEL.

An alternative addition to the free wheel is shown, which is extremely useful if the motor is to be stretch wound with a wheel brace. It consists simply of a small ring, soldered and bound to the bent tip of the shaft (the bent end being shortened). Whilst one person holds the model, a second engages in this ring, a hook held in the chuck of a simple breast drill, stretches the motor out two or three feet and winds it slowly in. As these drills are usually geared up about 4:1 the process is far less tedious than winding by hand.



STICK THIS PATTERN TO A PIECE OF CARDBOARD AND CUT IT OUT. THE ANGLE AT Z CAN THEN BE USED TO CEMENT THE RIBS AT THE WING TIP JOINTS, TO THE CORRECT ANGLE



POLYHEDRAL ANGLE

Z

TRIM OFF SURPLUS WOOD AFTER ASSEMBLY

T4

T5

T6

T7

T8

T9

T10

T11

T12

T13

T14

T15

T16

T17

T18

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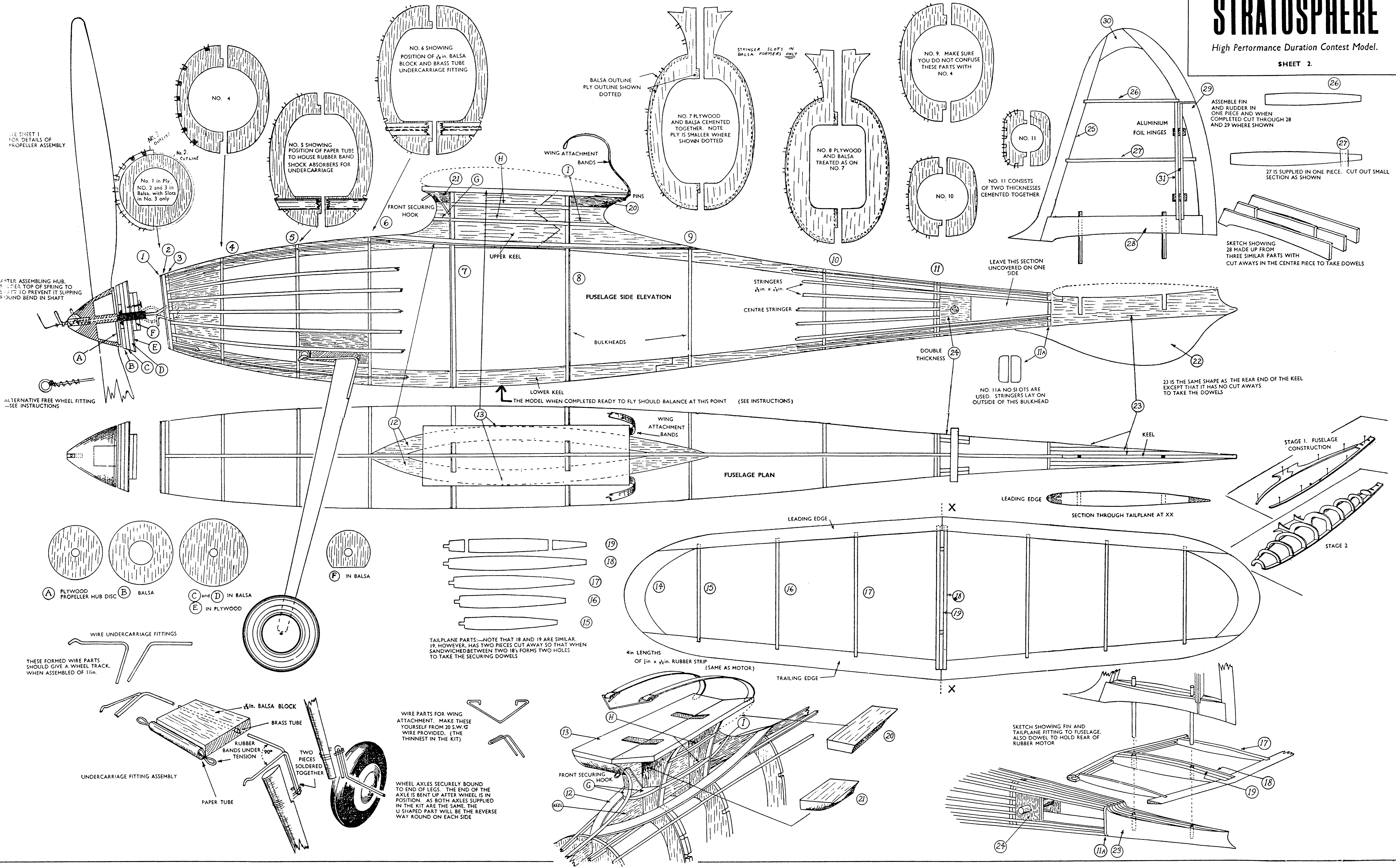
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T17



SEE SHEET 1 FOR DETAILS OF PROPELLER ASSEMBLY

AFTER ASSEMBLING HUB, SLIDER TOP OF SPRING TO SLIP TO PREVENT IT SLIPPING FOUND BEND IN SHAFT

ALTERNATIVE FREE WHEEL FITTING - SEE INSTRUCTIONS

THESE FORMED WIRE PARTS SHOULD GIVE A WHEEL TRACK WHEN ASSEMBLED OF 11in.

WIRE PARTS FOR WING ATTACHMENT. MAKE THESE YOURSELF FROM 20 S.W.G WIRE PROVIDED. (THE THINNEST IN THE KIT)

WHEEL AXLES SECURELY BOUND TO END OF LEGS. THE END OF THE AXLE IS BENT UP AFTER WHEEL IS IN POSITION. AS BOTH AXLES SUPPLIED IN THE KIT ARE THE SAME, THE U SHAPED PART WILL BE THE REVERSE WAY ROUND ON EACH SIDE

No. 1 in Ply. NO. 2 and 3 in Balsa, with Slots in No. 3 only

No. 2 OUTLINE

No. 4

No. 5 SHOWING POSITION OF PAPER TUBE TO HOUSE RUBBER BAND SHOCK ABSORBERS FOR UNDERCARRIAGE

No. 6 SHOWING POSITION OF 1/4 in Balsa BLOCK AND BRASS TUBE UNDERCARRIAGE FITTING

No. 7 PLYWOOD AND Balsa CEMENTED TOGETHER. NOTE PLY IS SMALLER WHERE SHOWN DOTTED

No. 8 PLYWOOD AND Balsa TREATED AS ON NO. 7

No. 9. MAKE SURE YOU DO NOT CONFUSE THESE PARTS WITH NO. 4

No. 10

No. 11 CONSISTS OF TWO THICKNESSES CEMENTED TOGETHER

27 IS SUPPLIED IN ONE PIECE. CUT OUT SMALL SECTION AS SHOWN

SKETCH SHOWING 28 MADE UP FROM THREE SIMILAR PARTS WITH CUT AWAYS IN THE CENTRE PIECE TO TAKE DOWELS

23 IS THE SAME SHAPE AS THE REAR END OF THE KEEL EXCEPT THAT IT HAS NO CUT AWAYS TO TAKE THE DOWELS

NO. 11A NO SLOTS ARE USED. STRINGERS LAY ON OUTSIDE OF THIS BULKHEAD

STAGE 1. FUSELAGE CONSTRUCTION

STAGE 2

PLYWOOD PROPELLER HUB DISC

Balsa

C and D IN Balsa

E IN PLYWOOD

F IN Balsa

WIRE UNDERCARRIAGE FITTINGS

1/4 in. Balsa BLOCK

BRASS TUBE

RUBBER BANDS UNDER TENSION

TWO PIECES SOLDERED TOGETHER

PAPER TUBE

UNDERCARRIAGE FITTING ASSEMBLY

4in LENGTHS OF 1/4 in x 1/4 in RUBBER STRIP (SAME AS MOTOR)

FRONT SECURING HOOK

KEEL

11a

23