

# THE CONTESTOR



by Bill Dean

**FLYING MODELS** is pleased to present this Wakefield model by one of Great Britain's outstanding designers, featuring a novel method of fuselage construction. Plans of this model are published by permission of Keilkraft Kits and copyright 1948 by E. Keil & Co., Ltd., 195 Hackney Road, London, E. 2, England

● An advanced Wakefield design of semi-scale appearance, the Contestor is capable of flights of three to four minutes—in still air. Several new building methods have been developed to both simplify construction and ensure accurate assembly. The original was shown at the 1946 National Model Aircraft Exhibition in London, gaining third prize in the Wakefield class.

**BUILDING THE FUSELAGE:** The essential features of the fuselage construction are sheet nose longerons to prevent distortion at the nose, "W" bracing to eliminate power twist, and assembly formers to ensure a dead square section.

The sheet longerons that outline the nose and cabin are pinned down over the side view of the fuselage and the  $\frac{1}{8}$ " square longerons joined to them. Build the second side over the first and separate with a razor blade when dry. Bind and cement the u/c (under carriage, landing gear) to former 1 before joining the two sides by

means of formers 1 and 2. Taper the insides of the sheet rear post and join at the tail end. Pull in at the nose and cement in the sheet cross brace nose supports followed by the upper and lower spacers.

Add the nose formers (S1-S7), nose stringers and upper stringer, in that order. Cartridge (Bond) paper is used to cover between S5 and the dashboard. Make a pattern for the windshield and then cement the celluloid windshield in place. Only the rear peg reinforcements, and the wing and tailplane (tail surface) dowels remain to be fitted.

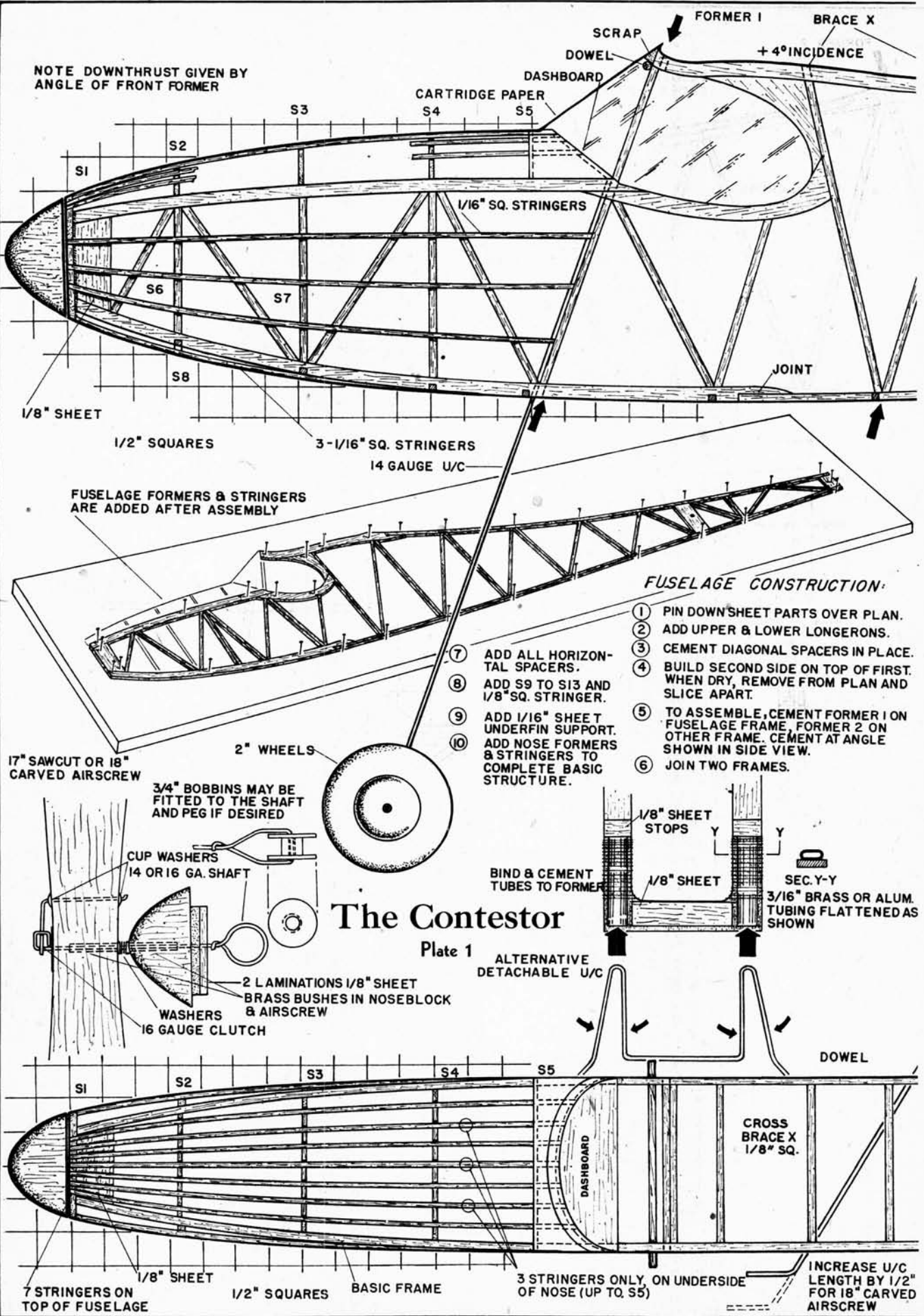
**BUILDING THE NOSE-BLOCK AND AIRSCREW (Propeller):** Lightly cement the nose block to S1 and carve to the approximate shape, finishing off with fine sandpaper. Cut away again and cement the  $\frac{1}{8}$ " sheet plug to the rear face—then screw the bushing in at right angles. The freewheeling device is conventional and should be started at the rear hook end.

Concentrate on drawing up an

accurate air screw (propeller) block, carefully drilling the center hole. Finish off the backs completely before starting to carve the fronts. Check the drawings for cross-section thickness. Cover the finished airscrew with tissue and give three coats of clear dope. A bobbin should be fitted to prevent the rubber creeping over the hook.

**BUILDING THE WING:** The wing has polyhedral for stability and is built in four distinct stages. Build up the main spar flat on the plan to obtain the correct dihedral angles. Thank Carl Goldberg for the neat method of joining on the tip spars.

Pin the left-hand inner panel spar to the plan, blocking up with scrap sheet. Carve the trailing edge to a knife edge and pin in place. Attach the spar joiners, followed by the ribs and the leading edge. When dry, remove the pins and tilt until the tip spar is flat on the plan (support the inner panel with several books). Cement the sheet tips together and pin down, then (Turn to Page 44)



NOTE DOWNTHRUST GIVEN BY ANGLE OF FRONT FORMER

S1 S2 S3 S4 S5  
S6 S7 S8  
1/16" SQ. STRINGERS  
1/8" SHEET  
1/2" SQUARES  
3-1/16" SQ. STRINGERS  
14 GAUGE U/C

FUSELAGE FORMERS & STRINGERS ARE ADDED AFTER ASSEMBLY

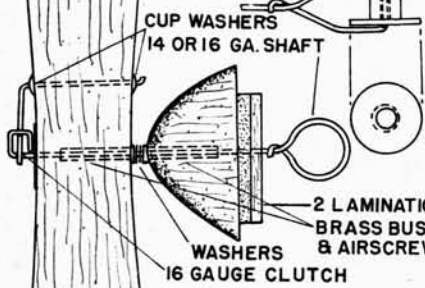
**FUSELAGE CONSTRUCTION:**

- ① PIN DOWN SHEET PARTS OVER PLAN.
- ② ADD UPPER & LOWER LONGERONS.
- ③ CEMENT DIAGONAL SPACERS IN PLACE.
- ④ BUILD SECOND SIDE ON TOP OF FIRST. WHEN DRY, REMOVE FROM PLAN AND SLICE APART.
- ⑤ TO ASSEMBLE, CEMENT FORMER 1 ON FUSELAGE FRAME, FORMER 2 ON OTHER FRAME. CEMENT AT ANGLE SHOWN IN SIDE VIEW.
- ⑥ JOIN TWO FRAMES.
- ⑦ ADD ALL HORIZONTAL SPACERS.
- ⑧ ADD S9 TO S13 AND 1/8" SQ. STRINGER.
- ⑨ ADD 1/16" SHEET UNDERFIN SUPPORT.
- ⑩ ADD NOSE FORMERS & STRINGERS TO COMPLETE BASIC STRUCTURE.

17" SAWCUT OR 18" CARVED AIRSCREW

2" WHEELS

3/4" BOBBINS MAY BE FITTED TO THE SHAFT AND PEG IF DESIRED



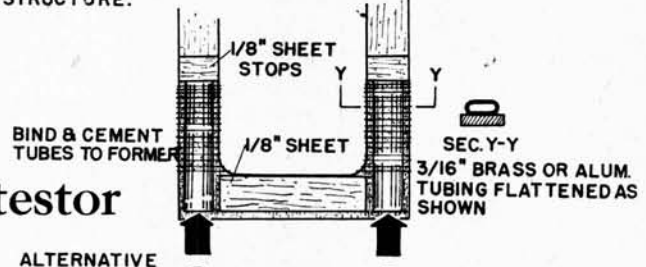
CUP WASHERS  
14 OR 16 GA. SHAFT  
WASHERS  
16 GAUGE CLUTCH  
2 LAMINATIONS 1/8" SHEET  
BRASS BUSHES IN NOSEBLOCK & AIRSCREW



**The Contestor**

Plate 1

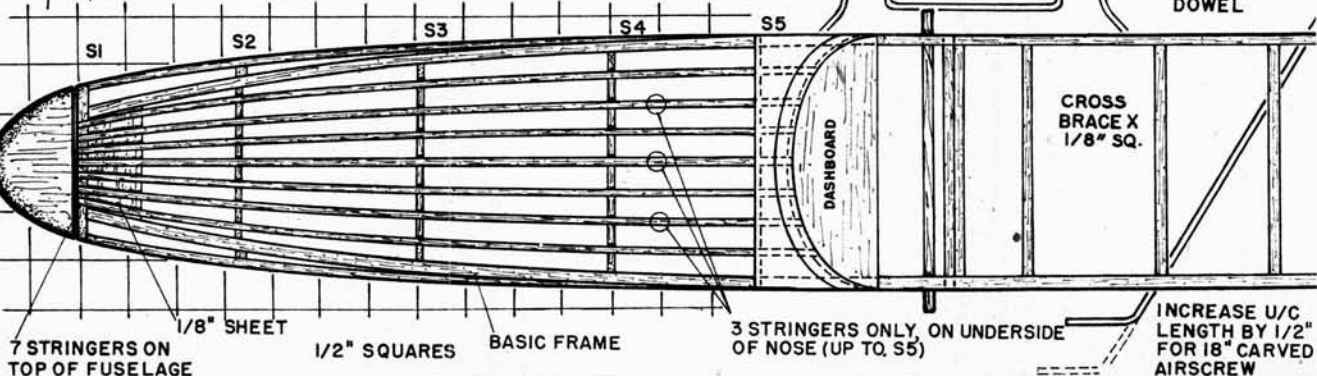
ALTERNATIVE DETACHABLE U/C



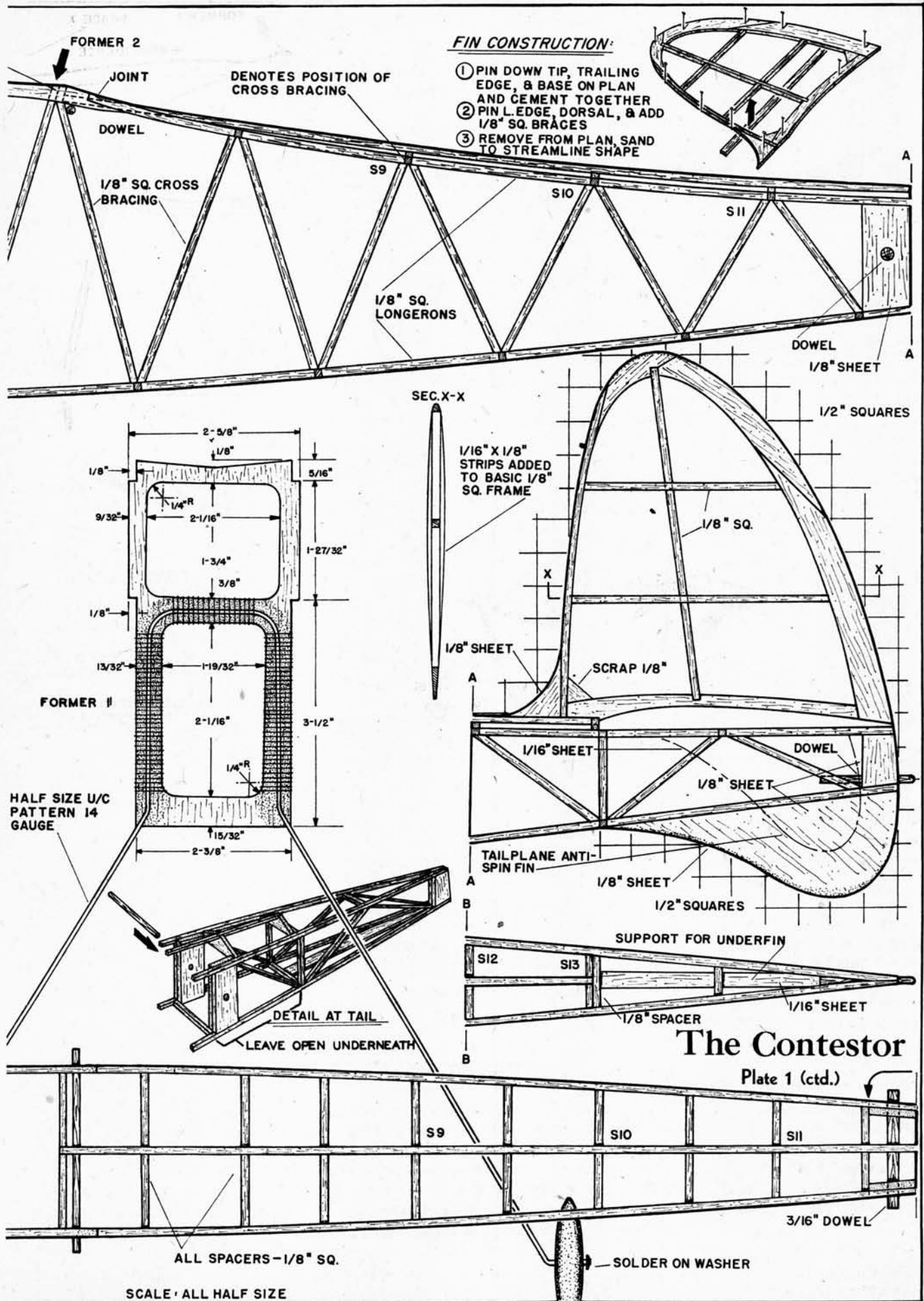
BIND & CEMENT TUBES TO FORMER

1/8" SHEET STOPS  
1/8" SHEET  
SEC. Y-Y  
3/16" BRASS OR ALUM. TUBING FLATTENED AS SHOWN

DOWEL

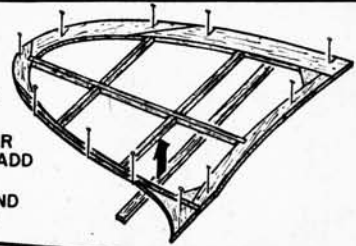


S1 S2 S3 S4 S5  
1/8" SHEET  
7 STRINGERS ON TOP OF FUSELAGE  
1/2" SQUARES  
BASIC FRAME  
3 STRINGERS ONLY, ON UNDERSIDE OF NOSE (UP TO S5)  
DASHBOARD  
CROSS BRACE X 1/8" SQ.  
INCREASE U/C LENGTH BY 1/2" FOR 18" CARVED AIRSCREW



**FIN CONSTRUCTION:**

- ① PIN DOWN TIP, TRAILING EDGE, & BASE ON PLAN AND CEMENT TOGETHER
- ② PIN L. EDGE, DORSAL, & ADD 1/8" SQ. BRACES
- ③ REMOVE FROM PLAN, SAND TO STREAMLINE SHAPE



**FORMER II**

HALF SIZE U/C  
PATTERN 14  
GAUGE

**DETAIL AT TAIL**

LEAVE OPEN UNDERNEATH

**The Contestor**

Plate 1 (ctd.)

SCALE · ALL HALF SIZE

# THE CONTESTOR

(Continued from Page 23)

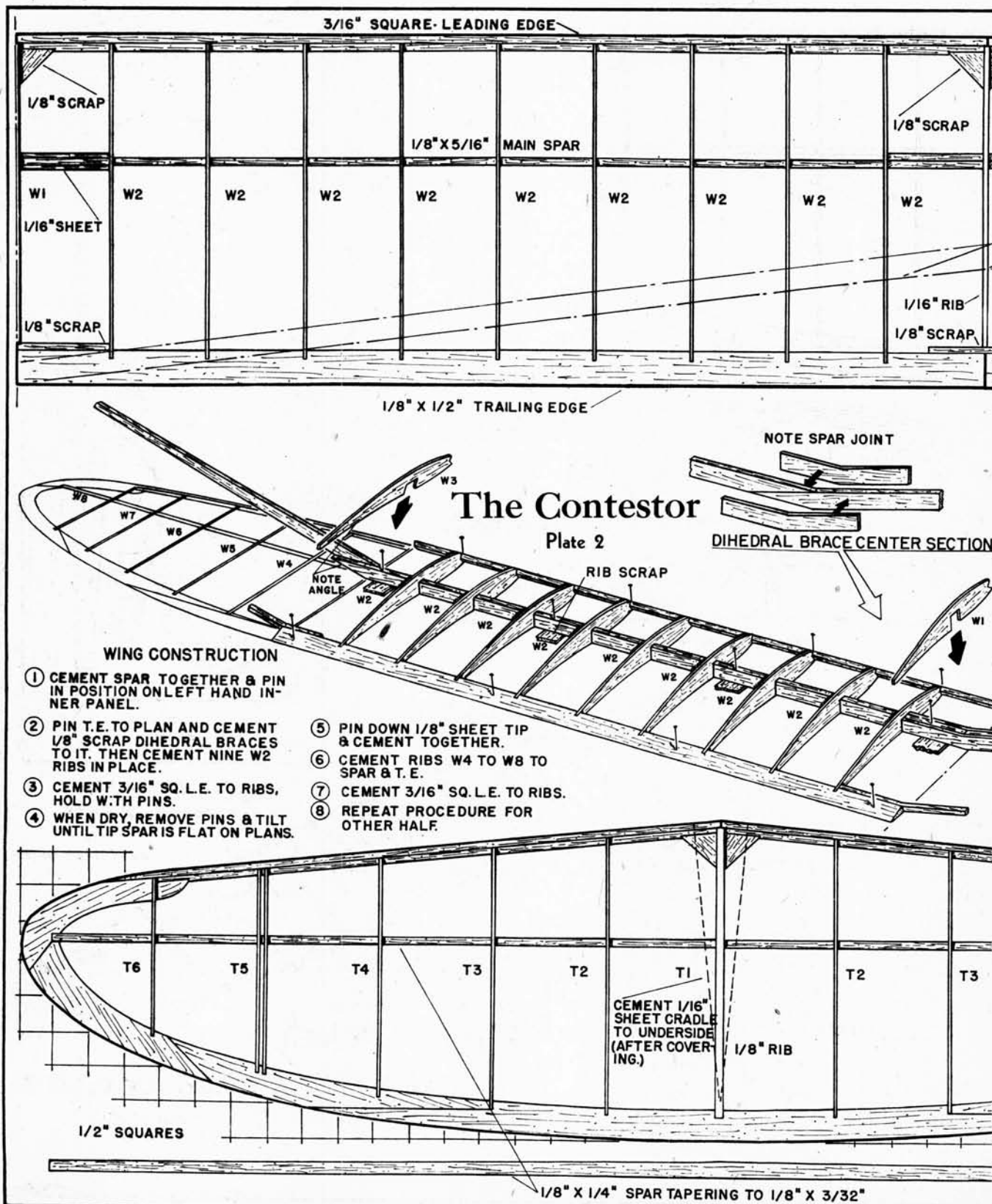
add the remaining ribs and bend the leading edge to shape. Cement in place.

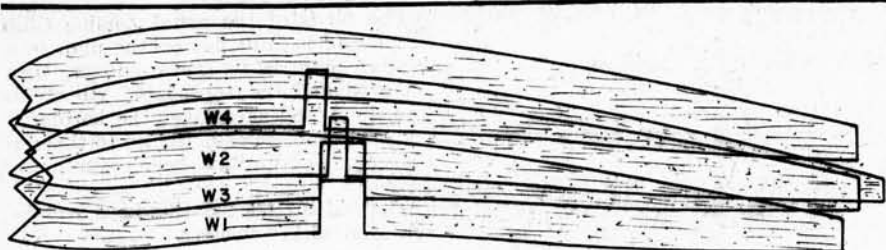
Tilt over and repeat the entire process for the other wing half-shaping the tip trailing edge and the leading edge after removing from the plan.

**BUILDING THE TAIL SURFACES:** Cut the spar from a very hard piece of  $\frac{1}{8}'' \times \frac{1}{4}''$ . Commence by pinning the spar and sheet trailing edge flat on the plan. Add the sheet trailing edge and tips followed by the ribs and leading edge. The tips, leading edge and trailing edge are shaped after removing from the plan and the tip fins added after covering.

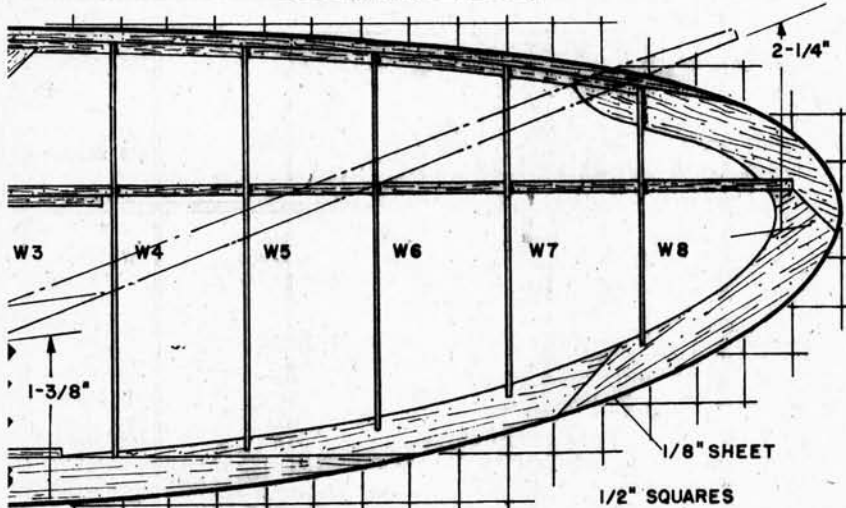
The fin is of the usual Zombie Club shape and is built flat on the plan in a similar manner to the stabilizer, then removed and the  $\frac{1}{16}'' \times \frac{1}{8}''$  rib strips and the  $\frac{1}{16}''$  sheet over the bottom is added. Do not cement the fin to the stabilizer until both have been covered and doped.

The tail surface locating keys are also attached after covering.





FULL SIZE WING RIBS

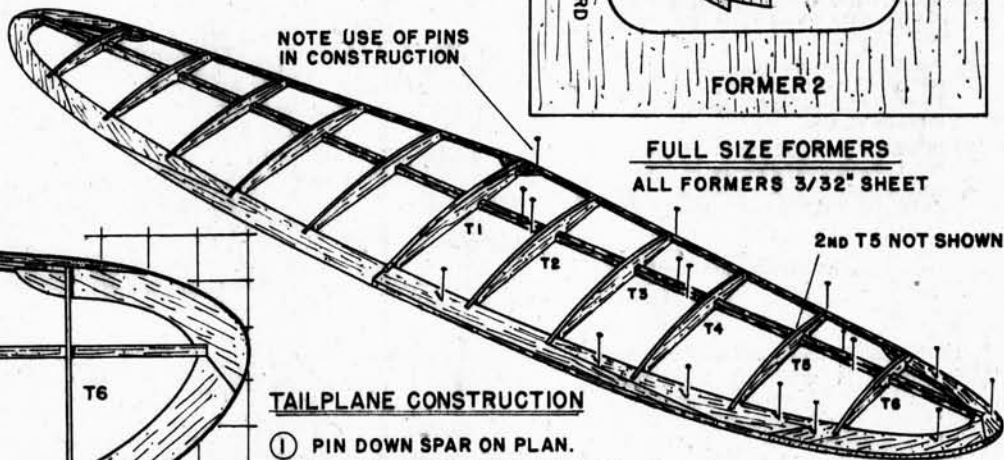
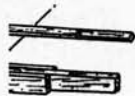


FULL SIZE TAILPLANE RIBS

ALL RIBS 1/32" SHEET EXCEPT WHERE NOTED



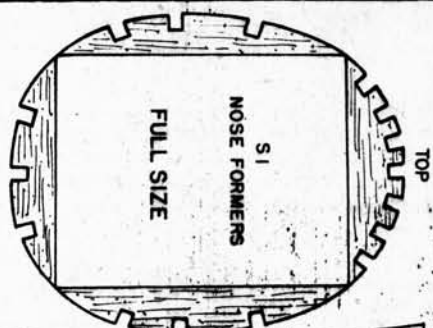
FULL SIZE WING RIBS



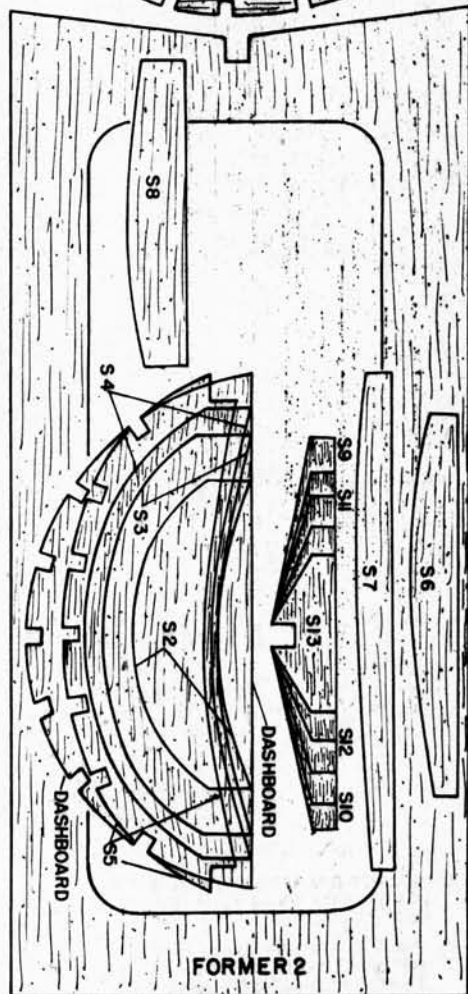
NOTE USE OF PINS IN CONSTRUCTION

**TAILPLANE CONSTRUCTION**

- ① PIN DOWN SPAR ON PLAN.
- ② PIN 1/8" SHEET TRAILING EDGE AND TIP TO PLANS—CEMENT TOGETHER.
- ③ CEMENT ALL RIBS TO SPAR & TRAILING EDGE.
- ④ CEMENT 1/8" SQ. L.E. TO RIBS.



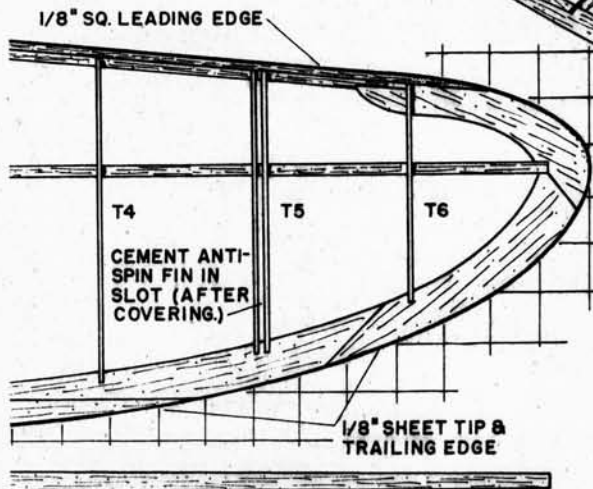
FULL SIZE NOSE FORMERS S1



FORMER 2

**FULL SIZE FORMERS**

ALL FORMERS 3/32" SHEET



1/8" SQ. LEADING EDGE

T4 T5 T6

CEMENT ANTI-SPIN FIN IN SLOT (AFTER COVERING.)

1/8" SHEET TIP & TRAILING EDGE

**The Contestor**

Plate 2 (ctd.)

SCHROEDER

# THE CONTESTOR

(Continued from Page 45)

**COVERING THE MODEL:** Cover all parts with the paper grain running along the greatest length, using dope as adhesive. The fuselage is covered in four main pieces, with three more pieces for the curved nose top.

Cover the undersurfaces of the wing first—in four pieces—making sure that the tissue is stuck to the undercambered ribs. Four pieces are also needed for the upper surfaces—the inner panels being covered first. Polyhedral wings are harder to cover than conventional wings, so take your time.

The stabilizer and fin each require two pieces of tissue for covering. No special instructions are needed. Spray all the parts with water to tighten. Give the fuselage three coats of dope—the wing and tail surfaces two. Pin down all parts until the dope is quite dry.

Colored dope is too heavy for a contest model, but decoration (striping or club name, etc.) can be added in the form of tissue applied with clear dope. The original Contestor had white flying surfaces, orange fuselage and blue trim.

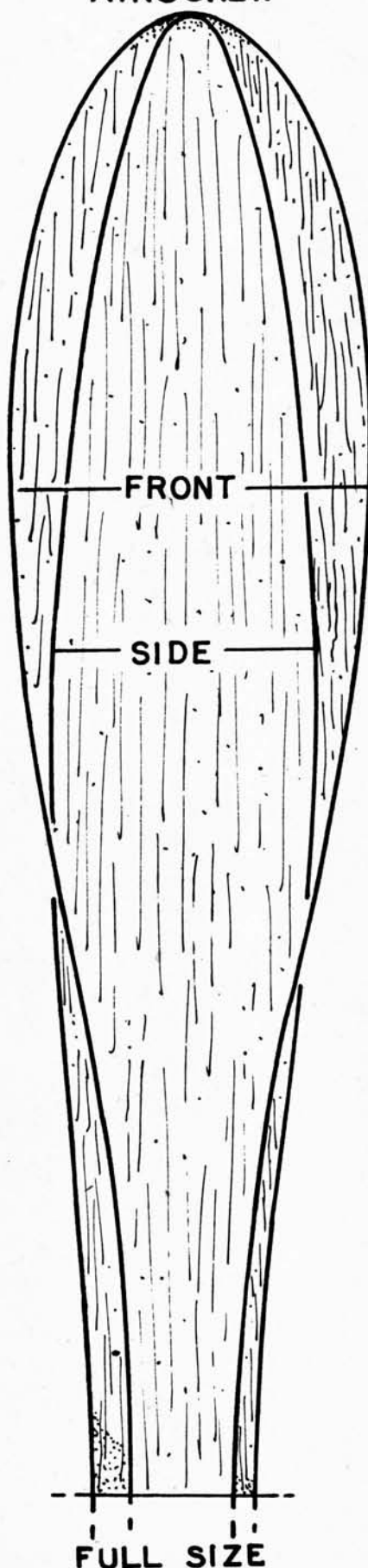
**PRETENSIONING THE MOTOR:** In order to prevent the unwound motor from spoiling the fore and aft trim, the rubber is pretensioned.

First of all, tie the ends together (17 yards of  $\frac{1}{4}$ " flat rubber) and lubricate well. Carefully double the loop to get four strands—then double again to get eight. Connect one end to a convenient hook and attach the airscrew assembly to the other end and wind on 100 to 150 turns. Now pass the rubber through the airscrew hook and loop this over the static end also. The resultant sixteen strands will intertwine with each other and consequently shorten the overall length. If the motor is still longer than 26", the process must be repeated, giving more turns to the airscrew. When this is correct, bind the loops together at both ends with rubber bands.

**ASSEMBLY:** All the trimming angles have been "built in" to the model and providing you have made your model accurately, trimming will be quite straightforward. Before leaving the workbench, see that all flying surfaces are warp-free and line up correctly in all views. Attach the wings by four rubber bands—two to each wing dowel. The keys will locate the tail unit centrally,

**FULL-SIZE PLANS** are available at 25c each for the KINGPIN (A Wakefield rubber job, 46 $\frac{1}{2}$ " span fixed wing, shark nose); LILLIPUT (Class A Free-Flight, .099 Arden powered, 35 $\frac{1}{2}$ " span, 158 sq. in. wing area, contest design); RING LEADER (Light-weight, streamlined, built-up construction, Class D engine, speedliner); and CONTENDER (Class C rubber, contest cabin ship, simple diamond box fuselage, 38" span). Send order and remittance to: FLYING MODELS PLAN SERVICE, Dept. 1048, 215 4th Ave., N. Y. 3, N. Y.

## AIRSCREW



but check that the wing is on straight, making small pencil marks to indicate the position.

Complete with rubber, the Contestor should balance (when held under the wing roots) at a point between  $1\frac{1}{4}$ " and  $2\frac{3}{4}$ " from the leading edge. The distance from the leading edge to the C.G. must never exceed 3"—if it does, add a piece of cement tube to the back of the noseblock, to bring the weight forward.

**TEST GLIDING:** On the test glides, you may be lucky and find the model has a "natural turn" to the right. If not, offset the rudder about  $1/16$ " at the trailing edge to get a gentle right turn. Once a steady stall-free curving glide has been achieved, confine all future adjustments for power flights to side and downthrust only. Minor incidence alterations ( $1/32$ " to  $1/16$ "") can be made with small pieces of sheet balsa.

**POWER FLIGHTS:** For the first power flight, give about 100 turns and hand-launch into the wind. If a steady climbing turn to the right results, increase the turns to 250. If this flight is O.K., try stretch winding, using a standard hand drill with a 16 gauge hook in the chuck. Connect up the winding hook and stretch out the rubber several times its own length from the nose, and put on 300 turns. From this point gradually walk in towards the model whilst still winding, so that the nose block is back in place after another 150 turns have been put on.

Gradually work up to the safe maximum of 700 to 800 turns. (It is a good idea to try this number *outside* the fuselage first). On full turns, the torque reaction will tend to turn the model to the left—perhaps dangerously. This can be counteracted by offsetting the nose block to the right.

With the turn (right rudder) and anti-torque adjustment (right side thrust) mentioned above, the flight pattern will consist of fairly tight climbing turns to the right, widening out to larger circles as the power diminishes.

**DATA:** Span 45 $\frac{1}{2}$ "—length 36"—wing area 208 square inches—section GrantX8. Tailplane area 68.25 square inches—Fin area 26.5 square inches (plus tip fins). Complies with new F.A.I. rules.

### BILL OF MATERIALS

(Balsa unless otherwise specified)

- 10— $\frac{1}{8}$ " x  $\frac{1}{8}$ " x 36"..... Longerons, crossbraces, uprights, rudder, leading edges of spar and ribs, stabilizer leading edge.
- 2— $\frac{1}{8}$ " x 3" x 36"..... Shaped longerons, shaped upright, rudder and sub-rudder, cabin frame, wing tips, stabilizer tip, rib trailing edge
- 1— $\frac{3}{32}$ " x 3" x 36"..... Formers
- 4— $\frac{1}{16}$ " x  $\frac{1}{16}$ " x 36"..... Stringers
- 1— $\frac{3}{16}$ " dowel (hardwood)..... Rear rubber peg
- 1— $\frac{1}{8}$ " dowel (hardwood)..... Wing hold-downs, rudder hold-down
- 1— $\frac{1}{16}$ " x 2" x 36"..... Wing rib, stabilizer cradle, dihedral bracing
- 2— $\frac{3}{16}$ " x  $\frac{3}{16}$ " x 36"..... Wing leading edge
- 4— $\frac{1}{32}$ " x 2" x 36"..... Wing, stabilizer ribs
- 2— $\frac{1}{8}$ " x  $\frac{5}{16}$ " x 36"..... Wing spar
- 1— $\frac{1}{8}$ " x  $\frac{1}{4}$ " x 36"..... Stabilizer spar
- 1— $\frac{1}{8}$ " x  $\frac{1}{2}$ " x 36"..... Wing tie
- 1— $\frac{1}{2}$ " x 1" x 2"..... Nose block
- 1— $\frac{1}{2}$ " x 2" x 18"..... Propellor block (or 17" saw-cut prop blank)

.078 piano wire for landing gear, propeller shaft, free-wheeling clutch; small copper burrs (thrust washers); cup washers or grommets for clutch bearings;  $\frac{1}{8}$ " O.D. x  $\frac{3}{32}$ " I.D. brass or aluminum tubing for propeller and nose block bushings; rubber model silkspan for covering; 2" balsa or  $1/32$ " plywood wheels; straight pins; cement.