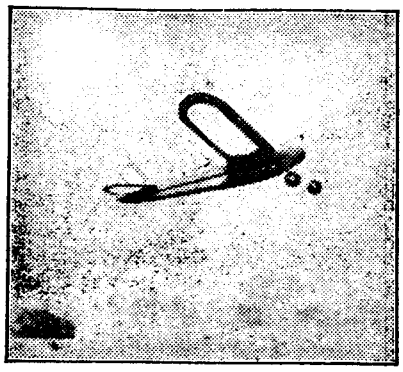
"She's off!" And appropriately enough, our "Cumulus" heads happily up toward the mounting banks of clouds for which she was named. And there's plenty that's cloud-like about her, too—for she flies "free as the wind" in spite of her rugged structure.



✪ ✪ ✪

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✪ ✪ ✪

Construct the "Cumulus"

By Ben Shereshaw

IN designing this "Cumulus" model for FLYING ACES gas model fans, I have tried to combine scale appearance with contest performance. In other words, the "Cumulus"—named after the massed cloud formation—is a ship that not only looks good, but also has "what it takes" when it comes to satisfactory performance.

Because of her high thrust line, she is an extremely stable flyer and you can depend upon her every time—if you carefully follow my instructions for building her. She has a good glide ratio—around fifteen-to-one with "power off."

In preparing these instructions, I have assumed that the out-and-out amateur would not yet be ready to build this gas model. So while the "Cumulus" is really an easy ship for the chap who *has* had a little model making experience (Herb Denaci, who built the original model from my plans—is sixteen years old)—I have glossed over the details that such a model hobbyist would normally know and have stuck entirely to the straight, practical end of the construction.

If, however, any reader *should* run into difficulties in connection with this model, he has only to drop me a note with a self-addressed, stamped return envelope and I'll do my best to straighten him out.

And here Herb Denaci, a friend of the author's, poses with the "Cumulus" gas job he built from the original plans. From this photo, you can get a swell idea of the ship's general make-up. And by the way, sixteen-year-old Denaci hastens to point out that the black circles showing where his eyes ought to be are merely dark glasses and not the result of any "argument" with his well-built plane.

FUSELAGE

THE first step in building the fuselage is to lay out the side elevation. This is done by "scaling" the side view up to full size, with an architect's or mechanical engineer's scale.

The longerons are made of ¼" by ¼" hard balsa, and are selected for their uniform texture and even bending characteristics—since longerons having variable bending qualities are apt to distort the fuselage.

The fuselage sides should be assembled on a piece of plywood or similar material, which must be absolutely level. Cut the compression members to size, and insert them at the proper stations as indicated on the plates. Then, cut your diagonal braces, and be sure to cut them so that part of the diagonal rests against both the longerons and the compression members. You will note that the diagonal bracing at the nose is of ¼" by ¼" balsa, and the diagonal bracing backward from the wing is of ⅛" by ¼" balsa.

See that each member makes a snug fit, and do not try to correct a poor fit by filling the crevice with cement. Use the very best cement available, and proceed by cementing all the compression and diagonal members securely in place.

The next step is the assembly of the fuselage. Our top longeron being straight and the lower one curved, it is easier to assemble the fuselage "inverted." Start by cutting the cross-members, then cementing the center portion of the fuselage together. Be sure to cement both the top and lower members to the fuselage sides at the same time. Following this procedure, work back until you have reached the stern post.

Chamfer (bevel) the vertical members at

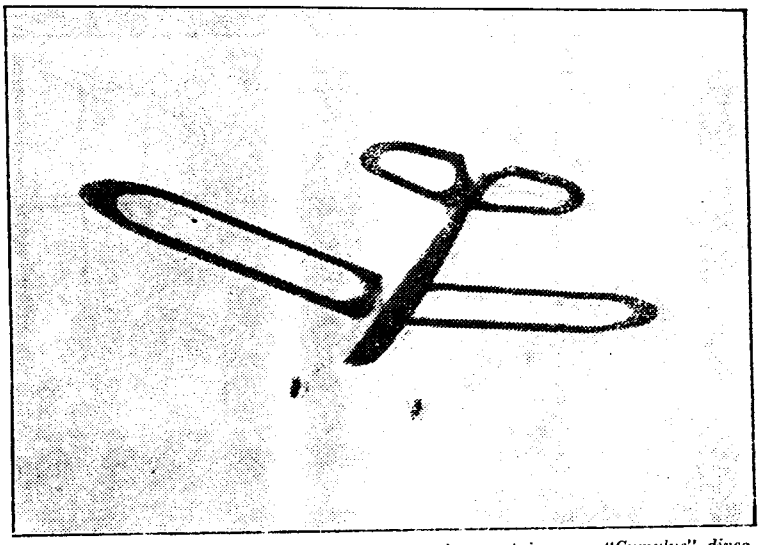
the stern to their correct angles. Flatten one side of the tail-skid and insert against the stern post, then bind both sides of the fuselage together with the skid between. Next, apply a generous coat of cement.

The nose of the model is then completed. Check carefully for alignment with a set of draftsman's angles.

This leaves us ready to insert our internal bulkheads at stations, A. B. C. D. E. The bulkheads are of balsa plywood, made up of two very hard 1/16" balsa sheets cemented together, with their respective grains running at right angles to each other. Then cut the notches which accommodate the motor bearers to size, and insert the bulkheads—using generous quantities of cement. Insert and cement the ½" by ⅞" pine motor bearers in place.

The landing gear comes next. The entire gear is made of .125 music wire. Scale all the views of landing gear to full-size so that the correct angles can be applied. In bending the music wire to shape, be sure that sharp corners are not formed, as such corners are apt to encourage crystallization in their vicinity. Bind all members as indicated on the plans, and wrap to fuselage crossmember with No. 8 silk thread.

It will be necessary to use a heavy needle to sew through the internal bulkheads. After a coat of cement has been applied to all thread wrappings, the struts are bound together with tinned wire and soldered with resin core solder.



After a pleasant confab with her fleecy namesakes upstairs, our "Cumulus" dives for home—and allows us an intriguing glimpse of her fascinating silhouette. And those landing wheels aren't just "taggin' along," modelers—they're securely attached to a well-designed landing gear of piano wire construction.

Bulkheads

ALL bulkhead material is cut from 3/32" sheet balsa, medium grade. Cut all bulkheads in exact accordance with your full-size drawings, with the grain running *across* the fuselage. Do not cut the stringer notches until all the bulkheads have been cemented to the fuselage. Then, starting at bulkhead No. 4—from which the stringers are all plotted—cut all notches, inserting a stringer as you cut each notch. Scale the cockpit pattern to full size and cut from hard 1/16" sheet balsa.

The headrest, which is carved from soft balsa and hollowed out for lightness, is cemented in place *after* the fuselage has been covered.

Carve the nose block of soft balsa, and cement it to internal bulkhead A and motor-bearers.

Rudder and Tail

A LIGHT grade of balsa is used throughout the entire construction of the tail group. The full-sized airfoil is used for both rudder and tail. The shaded portions on the drawings indicate that the leading edges are covered with 1/16" medium balsa, on both top and bottom. The sheet balsa leading edge is supported between the ribs by a very light balsa spar of ⅛" by ⅛" hard balsa. The tips of the tail surfaces should be of soft balsa. Box the entire spar structure of the empennage with 1/16" sheet balsa. Bamboo tissue or silk may be used for covering.

After covering, cement the horizontal tail to the fuselage longerons where the center ribs form a "V." Be sure that the horizontal tail possesses neither positive nor negative incidence. The rudder is next cemented to the top stringer and stern post, and should have neither incidence nor turn.

After the tail surfaces have been cemented and allowed to dry in place, dope them with three coats of nitrate dope.

Just as young Denaci thought his ship was about to land—and ran out to greet her—she took a sudden notion to zoom on a friendly thermal. Yep, up she went, permitting this fine, fast-lens camera "peek." Hang around, Herb, she'll be down in a minute.

Wing

WE start with the wing by cutting the main ribs. All ribs except the butt ribs are cut from 3/32" medium sheet balsa. The butt ribs are laminated, of two thicknesses of 3/32" hard balsa. It is best to first make a metal template, to assure accuracy in their cutting.

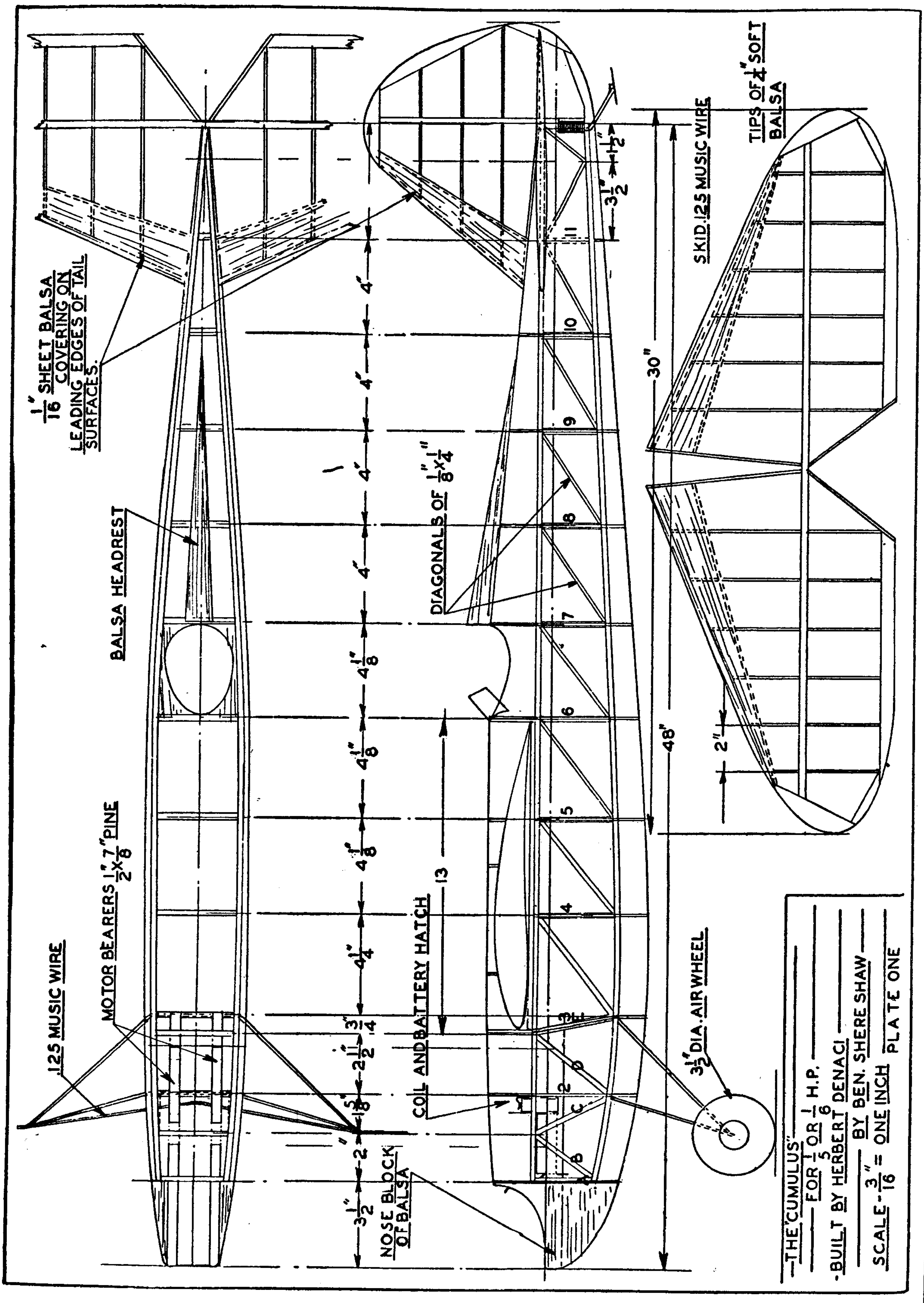
The tip ribs are scaled down as follows: We assume that one of our tip ribs is 70 per cent of the chord to that of the main rib; it would obviously then be 70 per cent of the depth along all stations to that of the main rib.

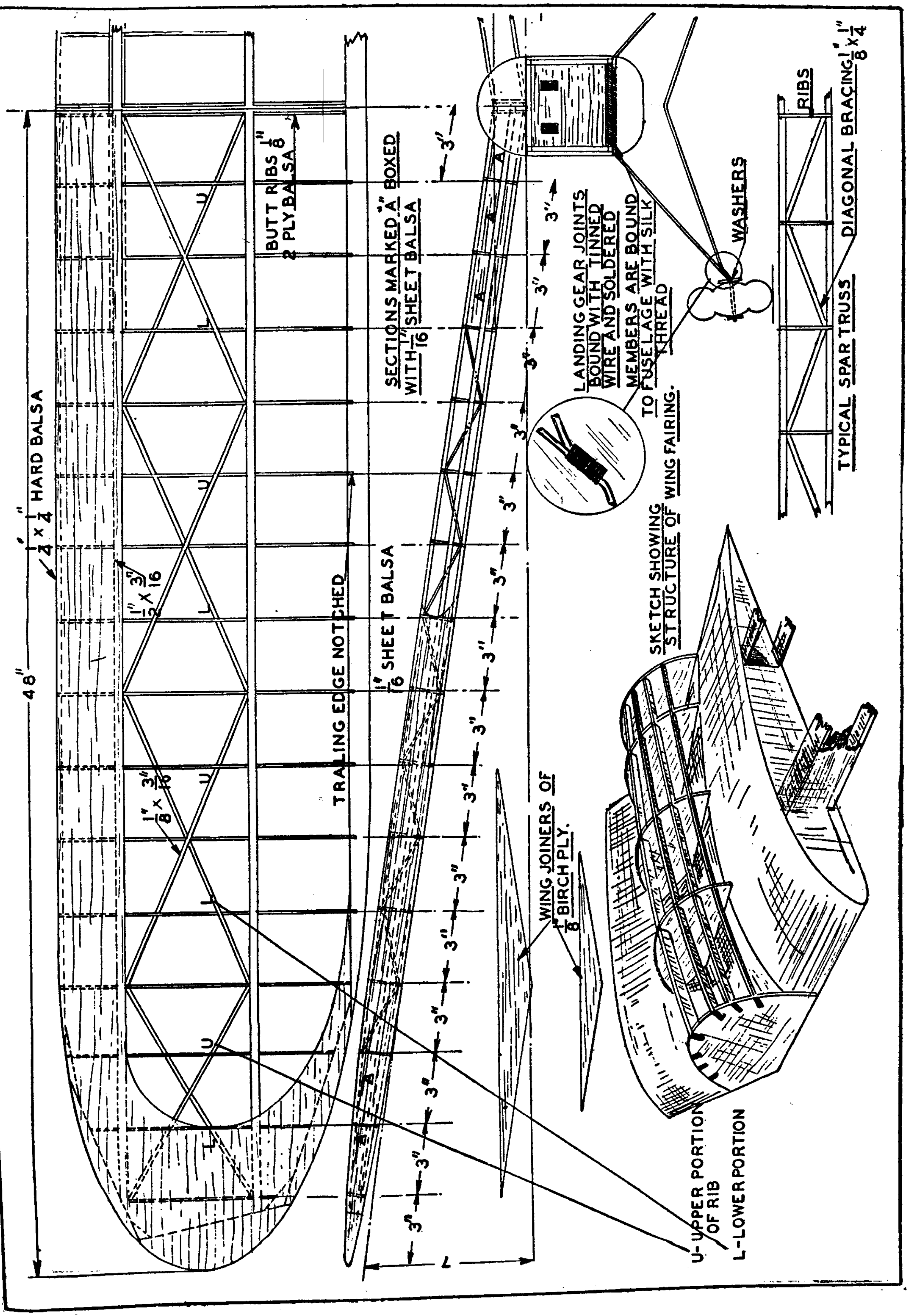
Draw a layout exactly as you see it for the full-size rib, and for each tip rib chord. Divide them into the same number of vertical stations, except that you alter the distance between each station as the chord varies.

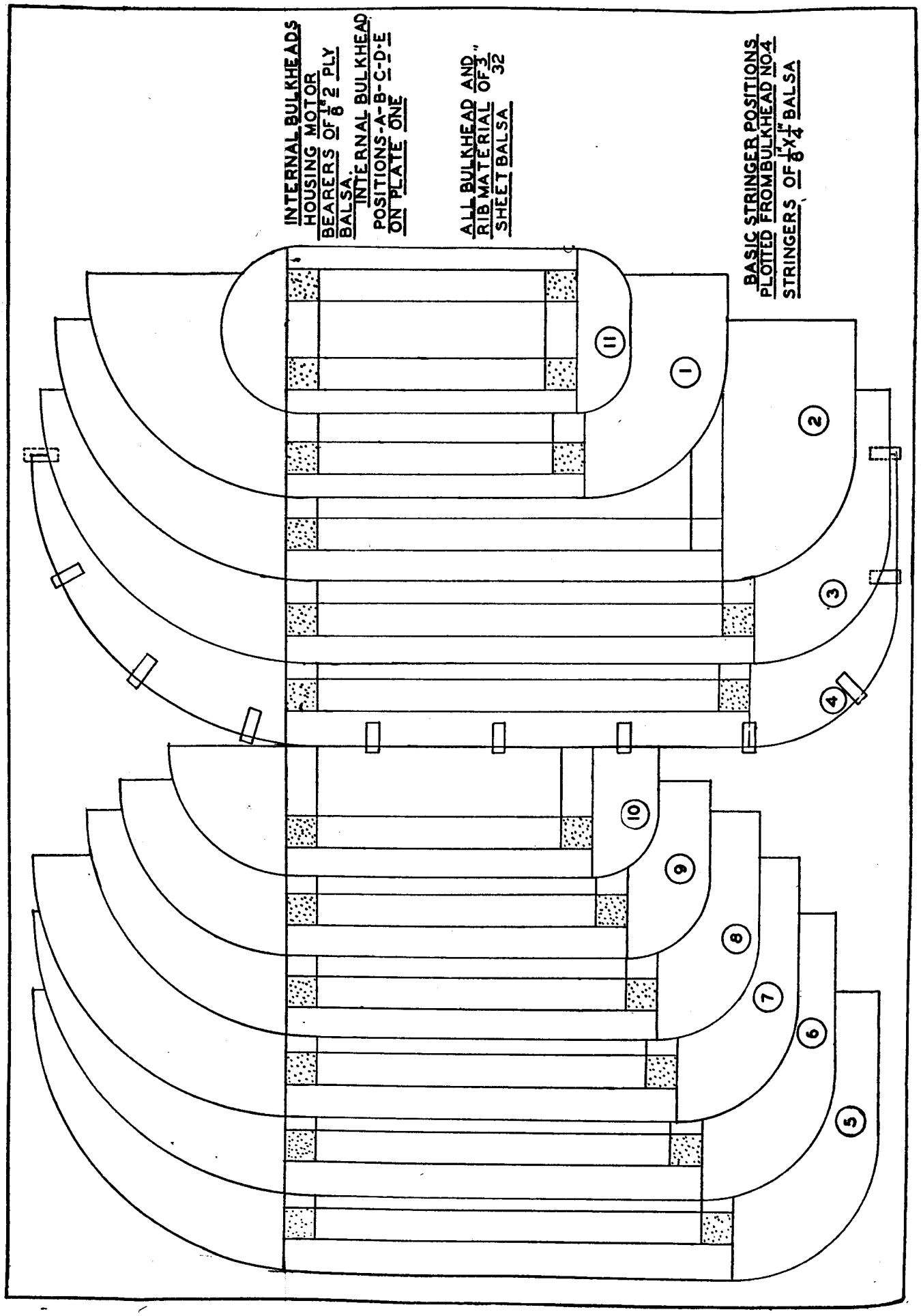
Then, proceed to plot each

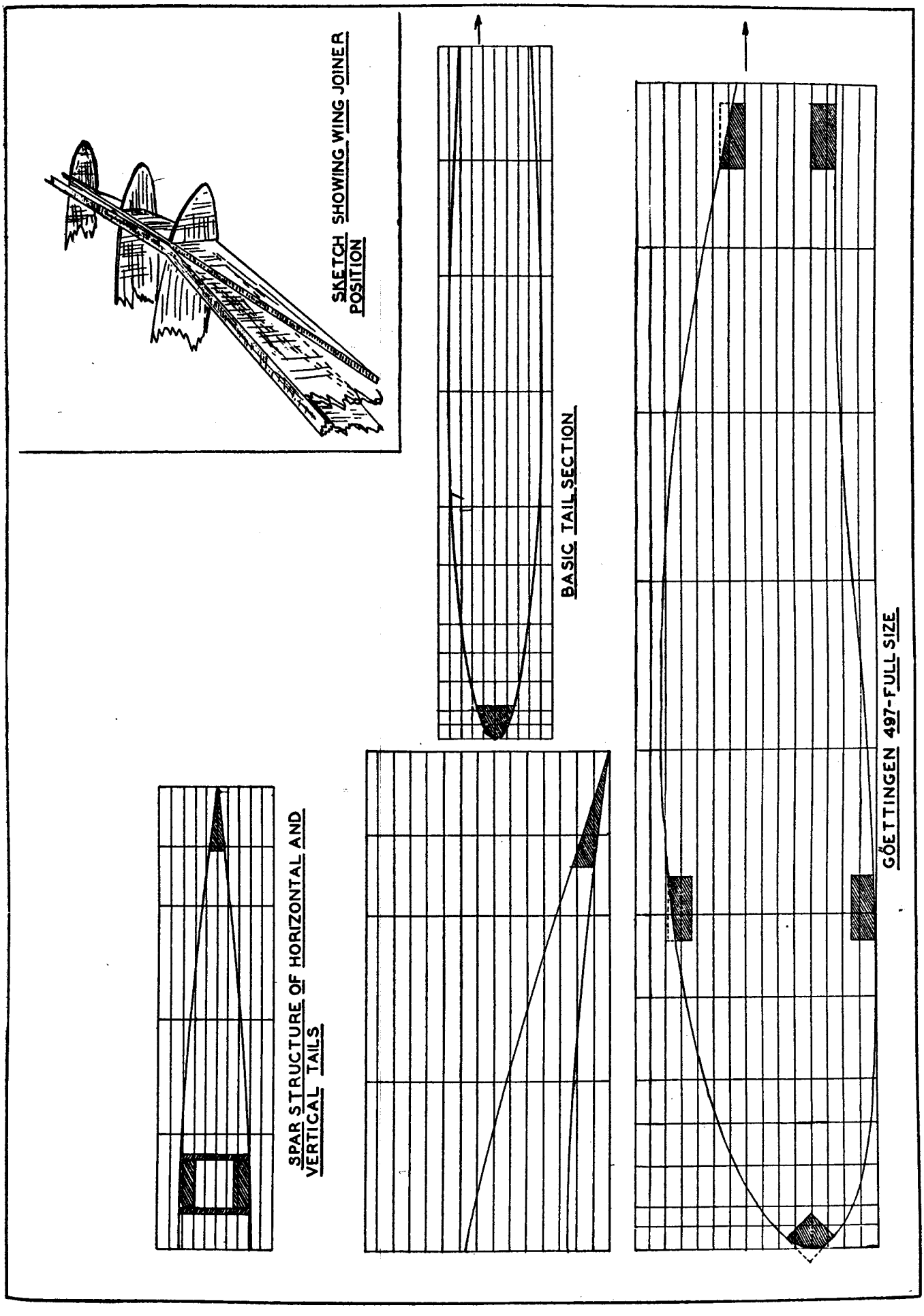
(Continued on page 93)

Construction Plans
for this top-notch gas job will be found on the four following pages.


1/16" SHEET BALSA COVERING ON LEADING EDGES OF TAIL SURFACES.
BALSA HEADREST
MOTOR BEARERS 1/2"x7/8" PINE
.125 MUSIC WIRE
NOSE BLOCK OF BALSA
COIL AND BATTERY HATCH
DIAGONALS OF 1/8"x1/4"
3 1/2" DIA. AIR WHEEL
SKID .125 MUSIC WIRE
TIPS OF 1/4" SOFT BALSA
30"
48"
-THE "CUMULUS"-
FOR 1/5 OR 1/6 H.P.
-BUILT BY HERBERT DENACI
BY BEN. SHERESHAW
SCALE - 3/16" = ONE INCH
PLATE ONE


48"
1/4" x 1/4" HARD BALSA
1/2" x 3/16"
1/8" x 3/16"
BUTT RIBS 1/8" 2 PLY BALSA
SECTIONS MARKED "A" BOXED WITH 1/16" SHEET BALSA
TRAILING EDGE NOTCHED
1/16" SHEET BALSA
WING JOINERS OF 1/8" BIRCH PLY.
LANDING GEAR JOINTS BOUND WITH TINNED WIRE AND SOLDERED
MEMBERS ARE BOUND TO FUSELAGE WITH SILK THREAD
WASHERS
SKETCH SHOWING STRUCTURE OF WING FAIRING.
RIBS
DIAGONAL BRACING 1/8" x 1/4"
TYPICAL SPAR TRUSS
U-UPPER PORTION OF RIB
L-LOWER PORTION


INTERNAL BULKHEADS
HOUSING MOTOR
BEARERS OF 1/8" 2 PLY
BALSA.
INTERNAL BULKHEAD
POSITIONS-A-B-C-D-E
ON PLATE ONE
ALL BULKHEAD AND
RIB MATERIAL OF 3/32"
SHEET BALSA
BASIC STRINGER POSITIONS
PLOTTED FROM BULKHEAD NO 4
STRINGERS OF 1/8"X1/4" BALSA
1
2
3
4
5
6
7
8
9
10
11


SKETCH SHOWING WING JOINER POSITION
BASIC TAIL SECTION
GÖETTINGEN 497-FULL SIZE
SPAR STRUCTURE OF HORIZONTAL AND VERTICAL TAILS

cement the pants together permanently.

The landing gear fairings are cut out to shape, and carved and sanded to a streamlined section. When completed, cement them to the pants with the piano wire reinforcing included.

ASSEMBLY

THE model should be covered with the wing, landing gear, and stabilizer first cemented securely in position. Begin by cementing—with extreme care and generosity of cement—the wing in the opening provided in fuselage. Next put the landing gear on the wing, again employing the short lengths of piano wire as reinforcement. The landing struts should be placed in position next.

Now slide the stabilizer spar into half the stabilizer and cement it, being careful in sliding it through the ribs that the latter are not disturbed. When the ship is covered, push the bare half of the spar through the fuselage, cementing it and the end rib, next to fuselage, in place. The remaining half of the stabilizer is now slid over the spar and likewise cemented. Now only half the stabilizer has to be papered on the plane.

FINISHING AND FLYING

COVERING the model is a job which should not be rushed, inasmuch as it is necessary to use fairly small sections of paper in doing so. The better grades of tissue are recommended for covering material. Cover the pants, fairings, and nose-block completely, to insure a final, smooth paint job.

When covering is completed, watershrink the paper first. Now brush on two coats of clear dope. The writer's model was finished with colored dopes applied with a spray gun, although brushing is satisfactory to a certain extent if you don't have the gun.

The color scheme used on the original is as follows:

Fuselage, fin, rudder, landing gear, landing and wing struts, and spinner—all green.

Wings, stabilizer, and propeller—silver or aluminum.

This color combination is of course optional, but on the original "pylon polisher" it has given good contrast.

It is advisable to fly this type model on a grass-covered area. First, glide it in usual way to check the balance. It may need a slight weight in the nose, or a bit of stabilizer adjustment. It so happened that the original flew nicely right at the start, with no adjustment—but such may not always be the case.

After adjusting the glide properly, install 14 strands of ⅛" flat rubber, preferably brown. More power may be added later if necessary or desirable. Now give the prop the usual number of preliminary turns and get set to watch her streak.

Construct the "Cumulus"

(Continued from page 45)

tip-rib and tail-rib in proportion to their respective basic airfoils. Incorporate in the template the spar notches, so that these may be cut at the same time.

Select the wing spars for rigidity and grain structure. Scale the wing panels up to their full size, and lay the lower spars in their respective places. Then cement the ribs onto the spars—and *don't* spare the cement!

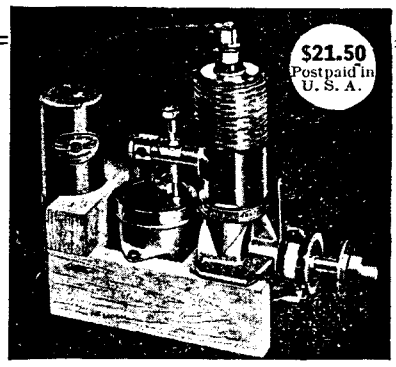
Next, cement the upper spars in place, and be sure that the ribs are perpendicular to the spars. Box the spars with 1/16" sheet balsa at the designated sections marked "A" between the ribs.

The spar truss is then built by inserting diagonal pieces of ⅛" by ¼" balsa between each rib. And the drag truss is made by first notching the ribs on top and bottom for ⅛" by ¼" strips, then inserting the drag truss strips and butting them against the wing spars.

The tips are cut from soft balsa, and should be cemented together before attaching to wing frame. Cover all shaded portions (leading edge and tips) with 1/16" medium balsa.

The two panels are now ready for joining. Be sure that the butt-ribs are cemented in place, so that the panels will have their proper amount of dihedral. Cut four joiners—two for each spar, as illustrated. Next, cement both panels together at the butt ribs. Notch the ribs to their proper depth and insert the joiners. Wrap the latter se-

THE 1937 MODEL
BROWN JR. MOTOR



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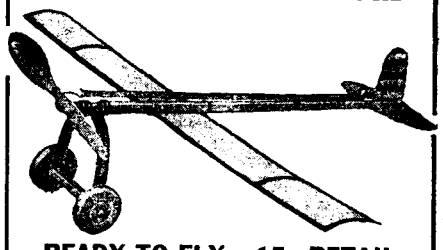

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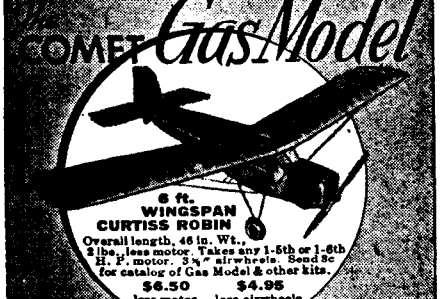

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curely in place with No. 8 silk thread, and apply a generous coat of cement. The wings may be either covered with bamboo tissue or china silk.

MOTOR AND TEST FLIGHT

WITH a little adjustment of the motor mount, almost any standard, low-powered gas motor can be installed and will give good results.

Test flight should be made most carefully. Glide your "Cumulus" first, without power, until her plainest faults (if any) have been discovered and corrected. Then allow only enough gas for a three-or-five second power flight. Don't take any chances until you "know" your ship.

Build a Cut-Out Waco

(Continued from page 52)

out, and fold it over so that the trailing edges meet. Glue them together, but be sure to leave the tips open so you can insert the spar later on. When the glue has dried, cut a strip of cardboard 9" long and ¾" wide. Fold it over into three ¼" strips and push it into the wing about ½" from the leading edge. This is your spar, and now you may glue the tips together. When the cement has dried, sandpaper the edges lightly.

The lower wing, 8, is made the same way, except that it is made in two separate halves—one right, and one left. Again, only one plan is given, but trace over it twice. The spars are the same thickness—¾" folded into three strips—but they are only 3½" long. Make two, one for each side.

Cut out the rudder and elevator. Sandpaper the edges smooth. Then, using a sharp razor-blade, cut a slit in the rear of the fuselage directly on the seam, looking from the rear, and on the dark line on the right side. Insert the elevator in the slit and glue. Now place the rudder in position and hold it upright with a pin until the glue is dry.

MOTOR AND ASSEMBLY

PARTS lettered A, B, and C, are the motor crank-case. Disk A is glued directly to Numbers 3 and 6. C is glued around the edges of circle B, and allowed to dry. Then it is glued to A, with the disk B facing forward. A button of the correct size is placed on B to form the motor cowl.

The nine cylinders are glued around the crank-case. They may be either of wood or small corks. If you can copy from a photo of the real Wright J-6 engine, so much the better.

The prop, J, is cut out, and the center strip rolled and glued.

On Plate 3 the full size drawings indicate the position of the wings. Attach the lower halves first. A balsa spar, shaped to the size given on the plan, acts as a brace to hold the wings firmly. Cut a hole in each side of the fuselage as shown, then shape out the wood spar and glue into the hole. About ½" of wood should stick out on either side.

Now slip the wing halves over the spar (it should fit ½" from the leading edge), and glue securely. After the wings have been placed, prop them up so that they keep the proper dihedral until they are dry. Use silver-foil or plain paper as a fillet, for the spaces left between the wings and the fuselage.

Now set the floats in place. Put plenty of glue on the tips of the struts and pin the latter against the side of the fuselage. The three-view and full size drawing will give the position. Prop up the fuselage and allow the glue to dry. If you use bamboo, make the struts a bit longer, and force the tips into small holes placed at the proper position in the body. Make sure that the pontoons are at the correct distance and angle from the fuselage. Take your time here, for this is the worse part of the whole job.

When the floats have been attached, make the wing center section N-struts from the full size plans on Plate 3. Cement them in position, and let them dry. Now place the upper wing upon a flat surface, and turn the plane upside down so that the N-struts rest upon the center section of the upper wing. Be sure they are in the correct position, then cement them well.

When they have dried, turn the plane upright again and put the outer wing struts in place. Make them either of cardboard or balsa, and a little longer than shown on the plan so they can be trimmed to fit tightly (do not try to force them in place).

Rig the plane with black thread, and add the details. *Take your time.* I have built two ships from these plans, and both turned out perfectly—so you should have no trouble! But if you do, write to me in care of FLYING ACES.

"Dove of War"—The Taube

(Continued from page 54)

THE Rumpler Taube was also the only Taube with a decided dihedral angle. And it had a sturdy tripod landing gear, and clean fuselage design—making it especially suitable for a flying scale model.

The construction of our model Taube has been greatly simplified, by giving full-size layouts of the curved parts so that they can be easily cut from sheet balsa. The three-view assembly plan—drawn one-half the size of the finished model and to a scale of ¼" to 1'—shows the ship in completed form.

The small area of the fuselage makes the building up of two sides of longerons and struts impractical. A stronger, and a quicker way, is to cut the sides from soft 1/16" sheet balsa to the pattern given. Cut the formers likewise, of 1/16" sheet. Join the sides, by cementing Formers 1, 2 and 3 to the top and the