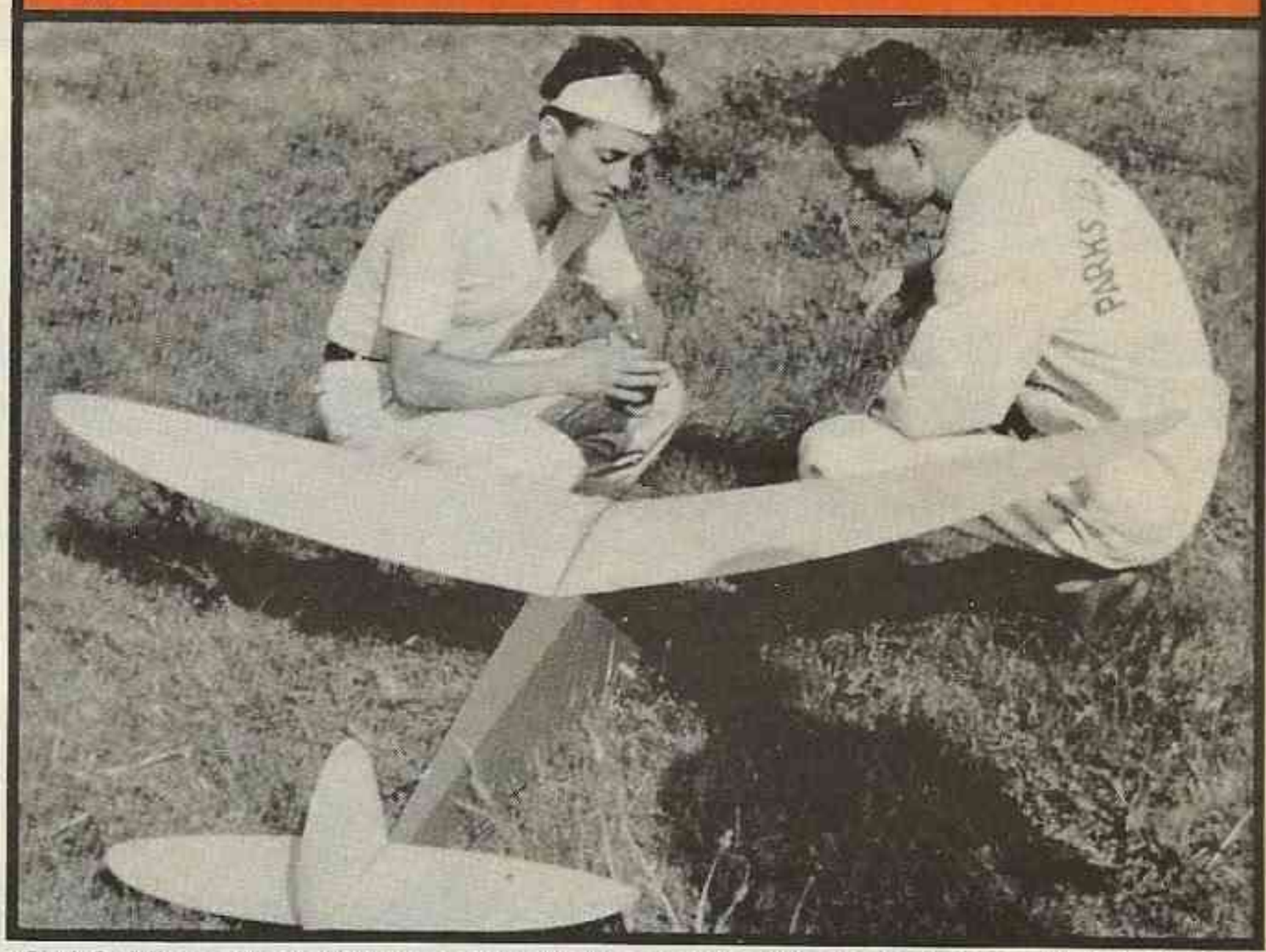
R/C conversion of Carl Goldberg's famous model.

By Randy Wrisley

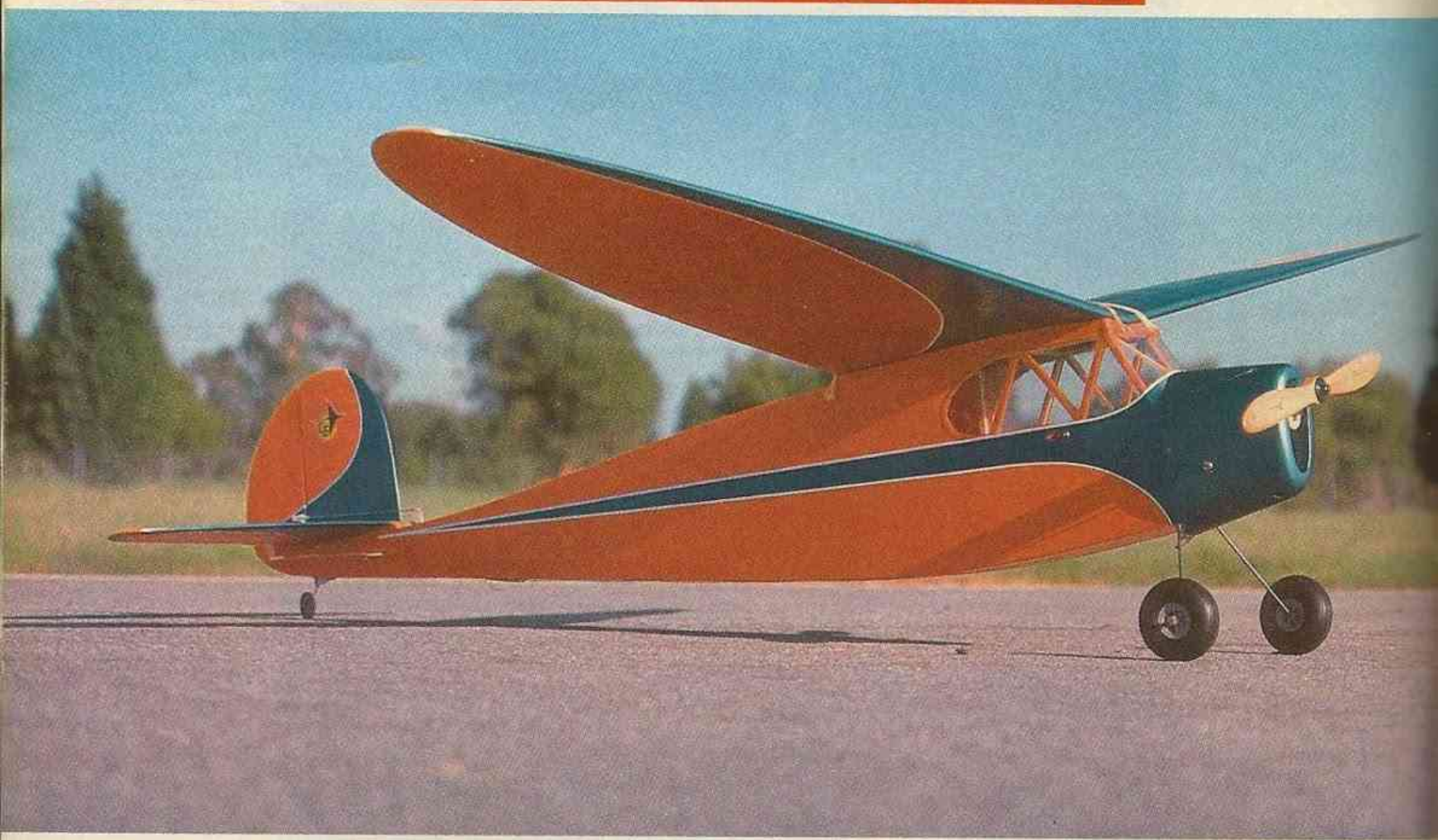
It's hard to find a prettier old timer than Carl Goldberg's Comet Clipper. With her double elliptical surfaces and long sweeping fuselage curves, the Clipper is a standout, even today. It's hard to believe Carl's handiwork first flew forty-seven years ago! What I've done is to follow the original plans as closely as possible, to keep this old timer authentic. While I don't fly my Clipper in competition, those who choose to should have no problems. The model is a natural for a 4-stroke power plant. A .30 or .40 flies it just fine. Larger engines are not required, or desired. If you feel the need for aerobatics, plan on spruce wing spars instead of the balsa spars shown on the plan.

To commemorate the anniversary of Carl Goldberg's death in January, 1985, RCM is proud to present an R/C version of his renowned classic Comet Clipper design.



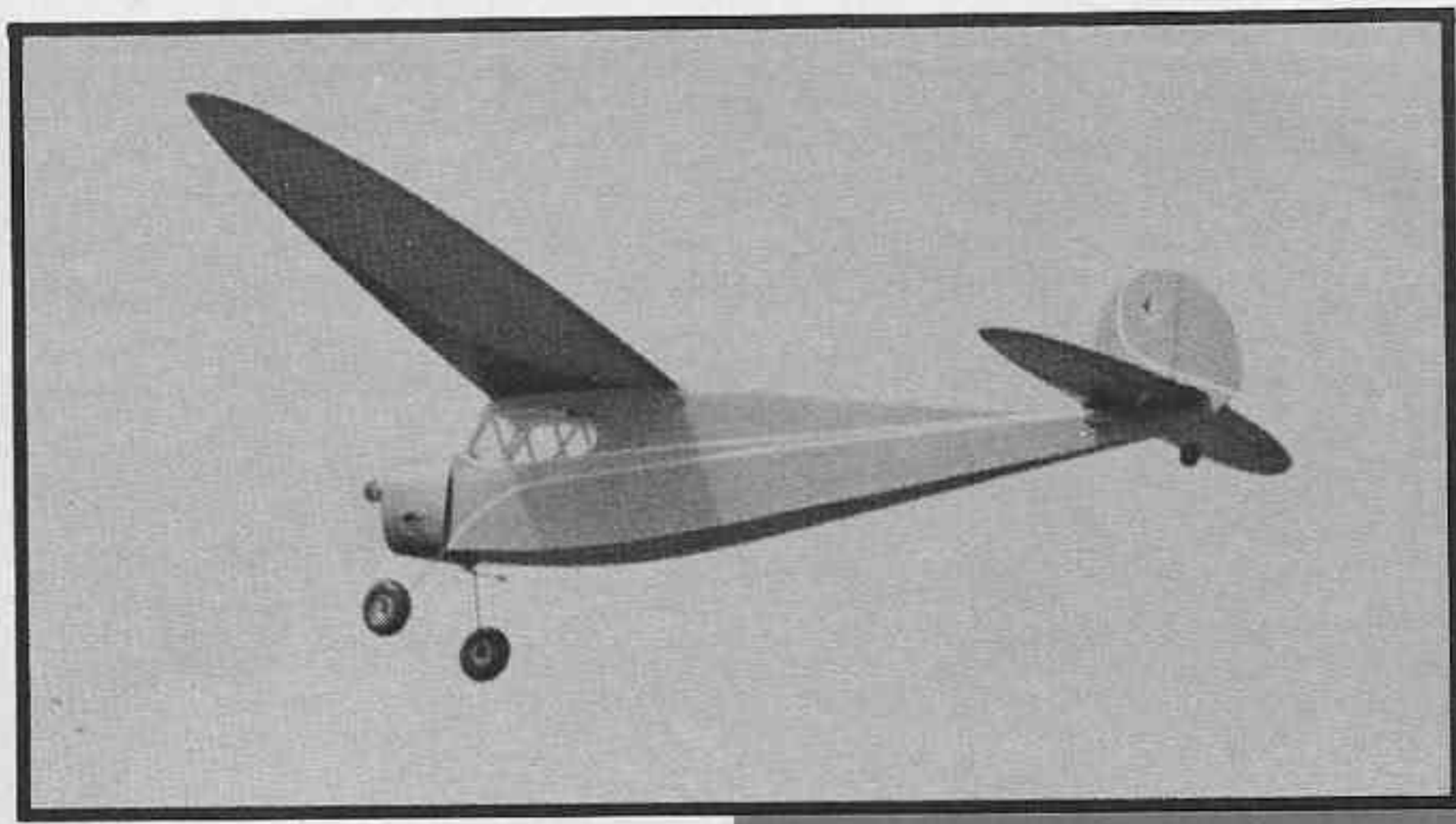
Carl Goldberg (Left) with his original Clipper at the Mississippi Valley Model Airplane Contest, Parks Air College Airport, East St. Louis, Illinois, 1938. Photo by Dick Tichenor.

1938 COMET CLIPPER



While on the subject of construction, you can lessen the load quite a bit by ordering the P & W partial kit from Hobby Horn. What you get is fine quality, machine cut ribs, and other sheet parts. You can also order the complete stripwood kit, saving many trips to the local hobby shop. I confess, I used both of them, and was very pleased with the results. Contact Hobby Horn at, P.O. Box 2212, Westminster, California 92684, (714) 893-8311.

Sadly, Carl left us before this article was printed. He was aware it was coming and had provided some of the materials and hardware used in its construction. It is my fondest hope that when he looks down and sees it, he smiles.



CONSTRUCTION

Begin by building the rudder and vertical fin. Jet glue R-1, R-2, R-3, and R-4 together over the plan. Spread R-1 and R-2 apart just enough to attach the two R-5s. Cut one front and two rear spars to size, taking care to get the taper even. Slide the front, and one rear spar into place between the two R-5s. Use the plan as a guide to get the spars into exact position. Check the front view carefully before you glue anything into place. The three ribs are simply 1/16" x 1/4" soft balsa capstrips, bent over the spars. Do both sides of each rib at the same time to prevent warping the structure. Bevel the second rear spar until it slips into place. Glue the rear spar only to the ribs and outline. Complete the basic structure by gluing 1/32" balsa cross grain to the top of all the ribs, and R-5. This will prevent the ribs from collapsing when the rudder is cut free. Once the rudder is loose, bevel the leading edge until you have enough clearance to move the rudder about 1¼" left and right. Now you can add the spar capstrips, rudder horn gusset, and sand the structure to final shape. Don't glue the hinges in until after covering. The stabilizer and elevators are constructed in the same manner. Laminate the leading and trailing edges, then glue the tips in place.

Install the front and rear spars, then flex the center section sheeting into place. The ribs are added, followed by the second rear spar. Glue the 1/32" balsa to the ribs, and cut the elevators free. You must hinge the elevators as close to the top of the surface as possible. Bevel only the bottom of the elevator spars, and install the top capstrips, placing the hinges just below them. You want about an inch of travel in each direction. Finish up by adding the remaining spar capstrips, elevator horn gussets, and sanding the structure to shape. Fit the vertical fin and rudder to the stabilizer, carefully removing material off the bottom of the rudder until everything fits.

Fuselage:

Soak the spruce longerons in water until flexible. Pin them into place over the fuselage plan, one on top of the other. Don't pin through the longeron, just to either side. Use a small triangle and check to be sure the longerons are square with one another. Proper alignment starts early in construction!

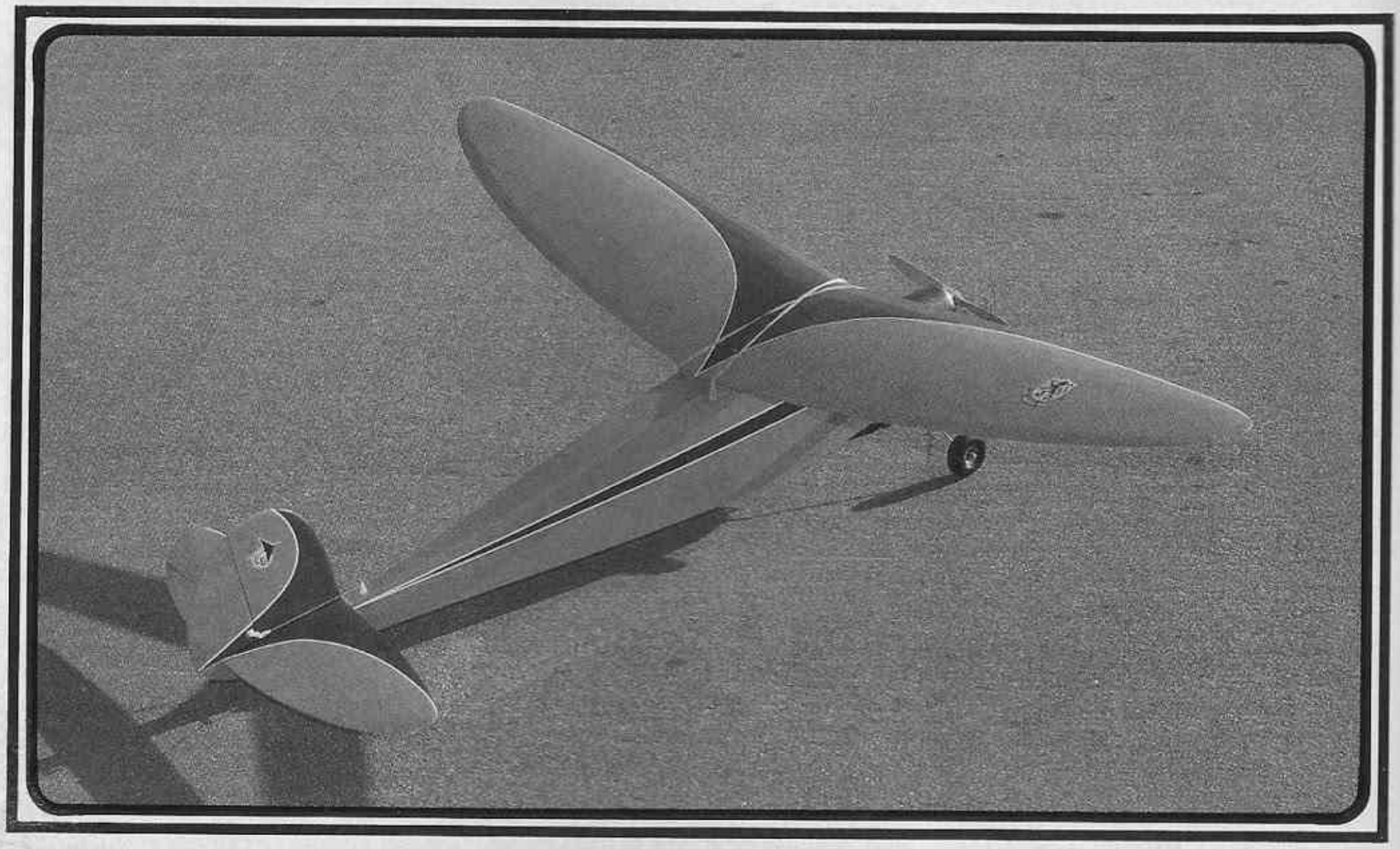
Once the longerons have dried out, start at the cabin, cutting and fitting uprights and diagonals. Take care to use spruce where indicated in the cabin area. I smear a thin coat of Titebond on each piece to be joined, and allow it to dry. I then smooth the grain up with a piece of fine

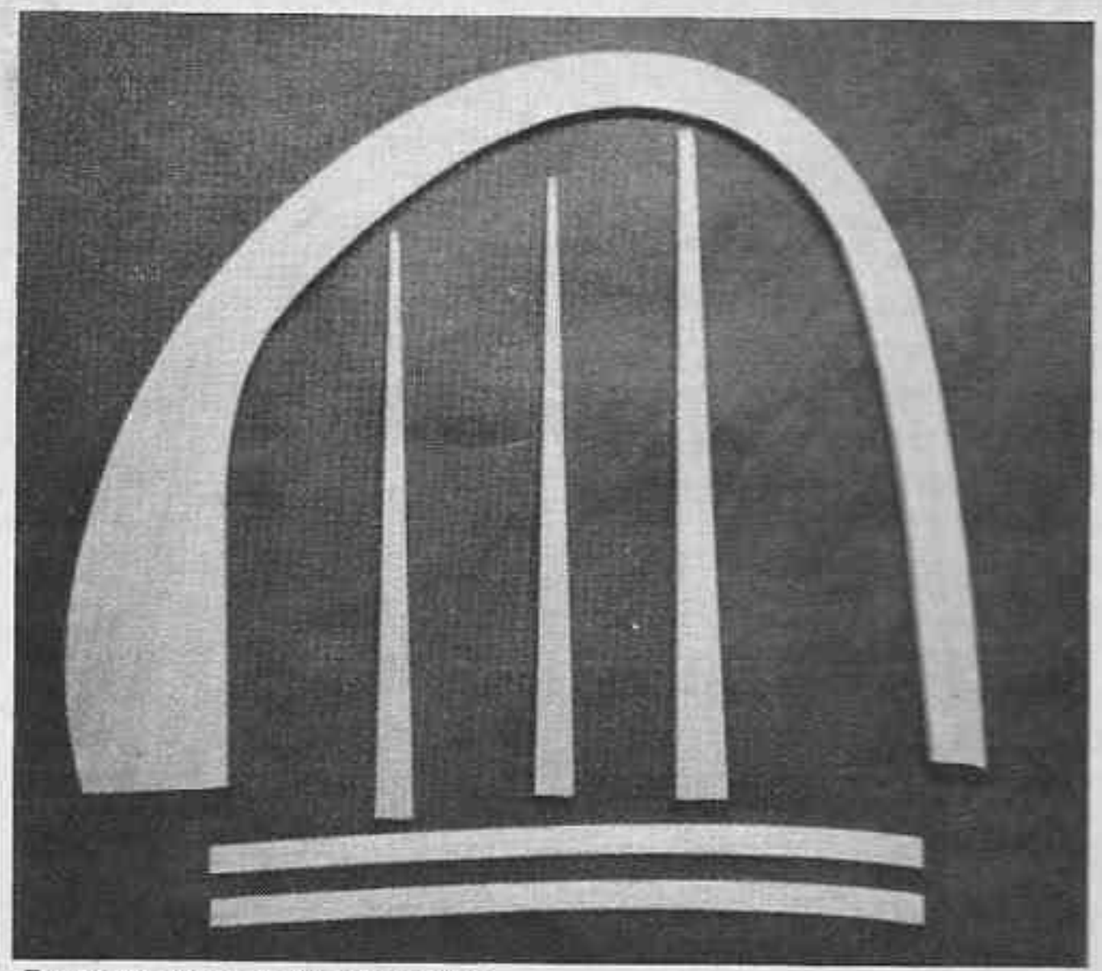
1938 COMET CLIPPER

Designed By: Carl Goldberg
R/C Conversion By: Randy Wrisley
TYPE AIRCRAFT Old Timer
WINGSPAN 72 Inches
WING CHORD 9.32" (Avg.)
TOTAL WING AREA 671.04 Sq. In.
WING LOCATION Top Of Fuselage
AIRFOIL Undercambered to Semi-symmetrical
WING PLANFORM Double-Elliptical
DIHEDRAL EACH TIP 5.5 Inches
O.A. FUSELAGE LENGTH 53.5 Inches
RADIO COMPARTMENT SIZE (L) 9" x (W) 2.5" x (H) 4.25"
STABILIZER SPAN 27.5 Inches
STABILIZER CHORD (incl. elev.) 6.6 Inches
STABILIZER AREA 181.4 Sq. In.
STAB. AIRFOIL SECTION Symmetrical
STABILIZER LOCATION Top of Fuselage
VERTICAL FIN HEIGHT 7 Inches
VERTICAL FIN WIDTH (incl. rud.) 8 Inches (Avg.)
REC. ENGINE SIZE .30-.40 4-stroke
FUEL TANK SIZE 4-6 Oz.
LANDING GEAR Conventional
REC. NO. OF CHANNELS 3
CONTROL FUNCTIONS Rud., Elev., Throt.

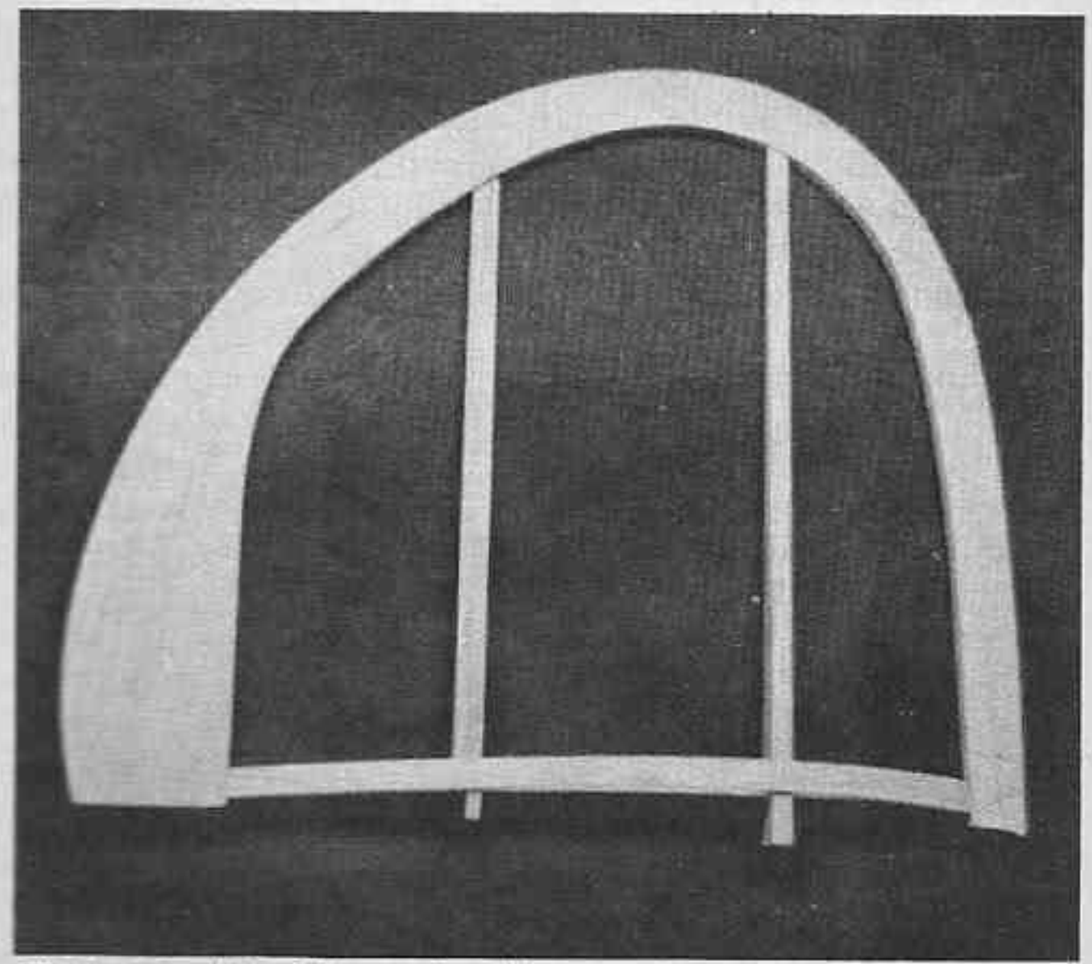
BASIC MATERIALS USED IN CONSTRUCTION

Fuselage	Balsa, Spruce, Ply
Wing	Balsa, Spruce, Ply
Empennage	Balsa
Wt. Ready To Fly	**62.5 Oz.**
Wing Loading	**13.4 Oz./Sq. Ft.**

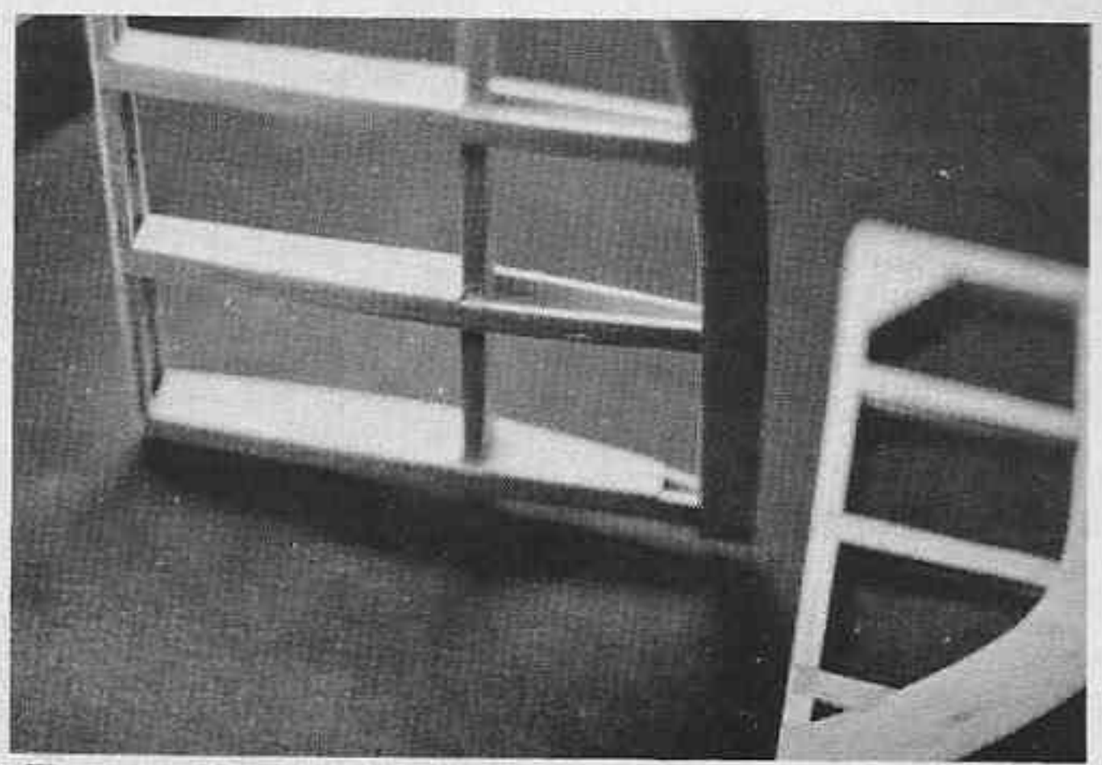




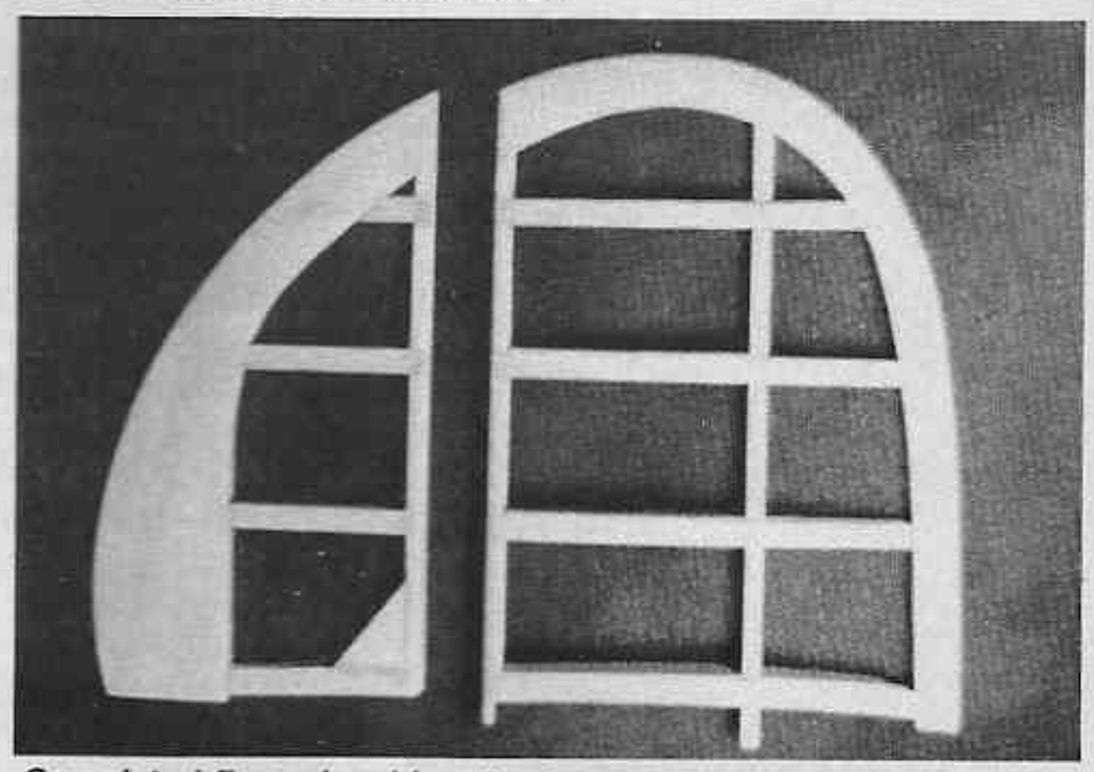
Parts to start fin and rudder.



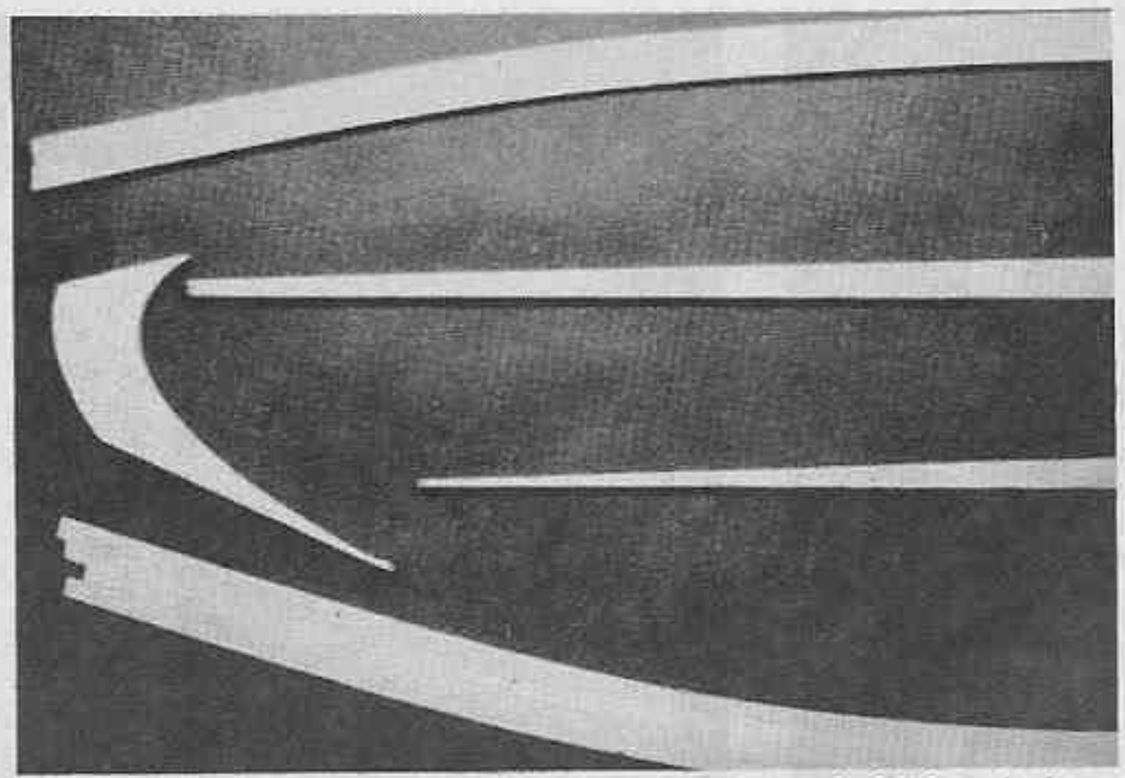
First assembly of fin and rudder.



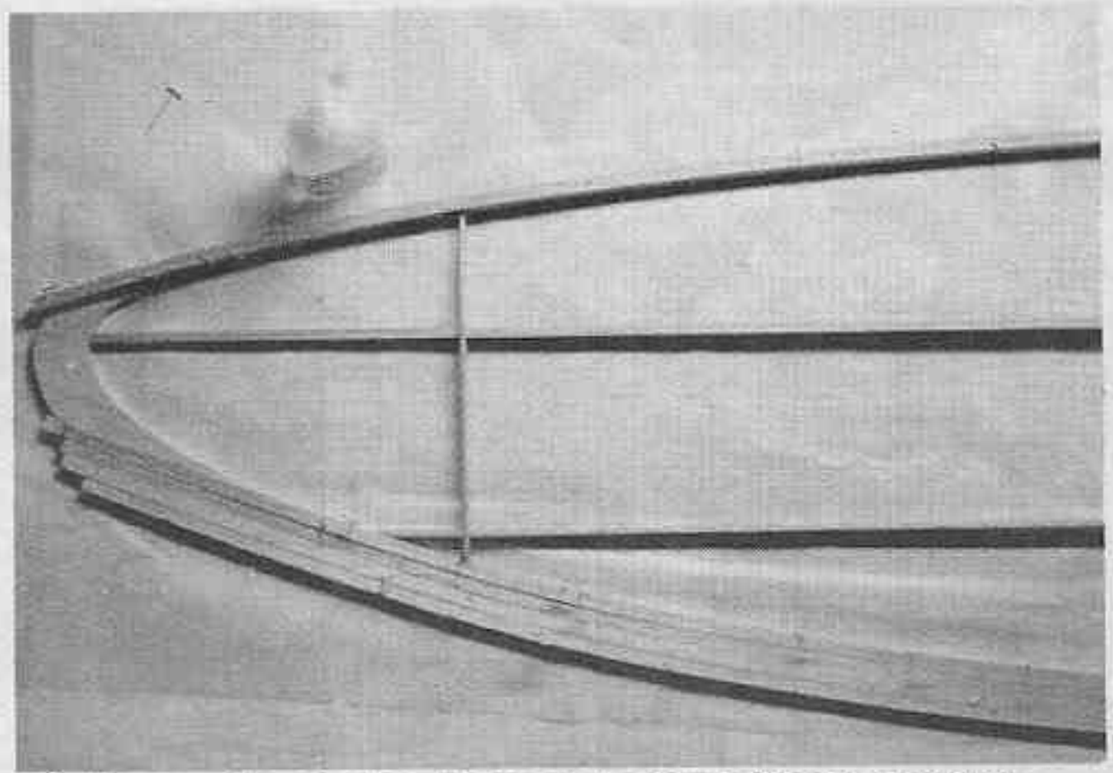
Fin and rudder separated. Note webs on fin ribs.



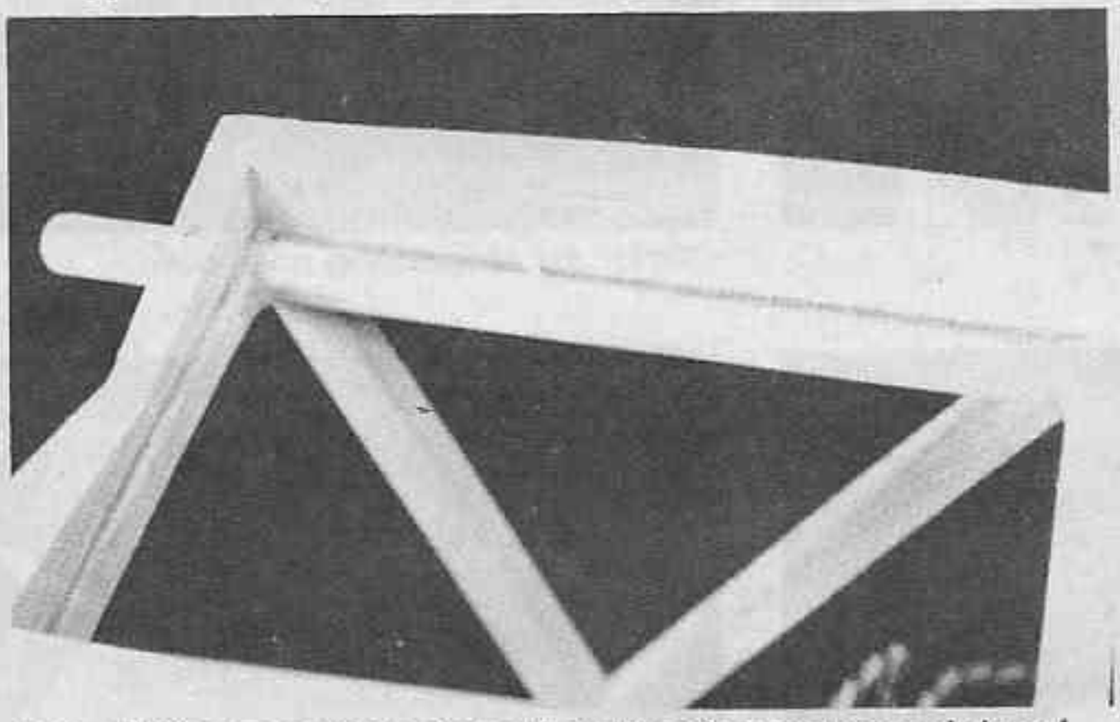
Completed fin and rudder structure.



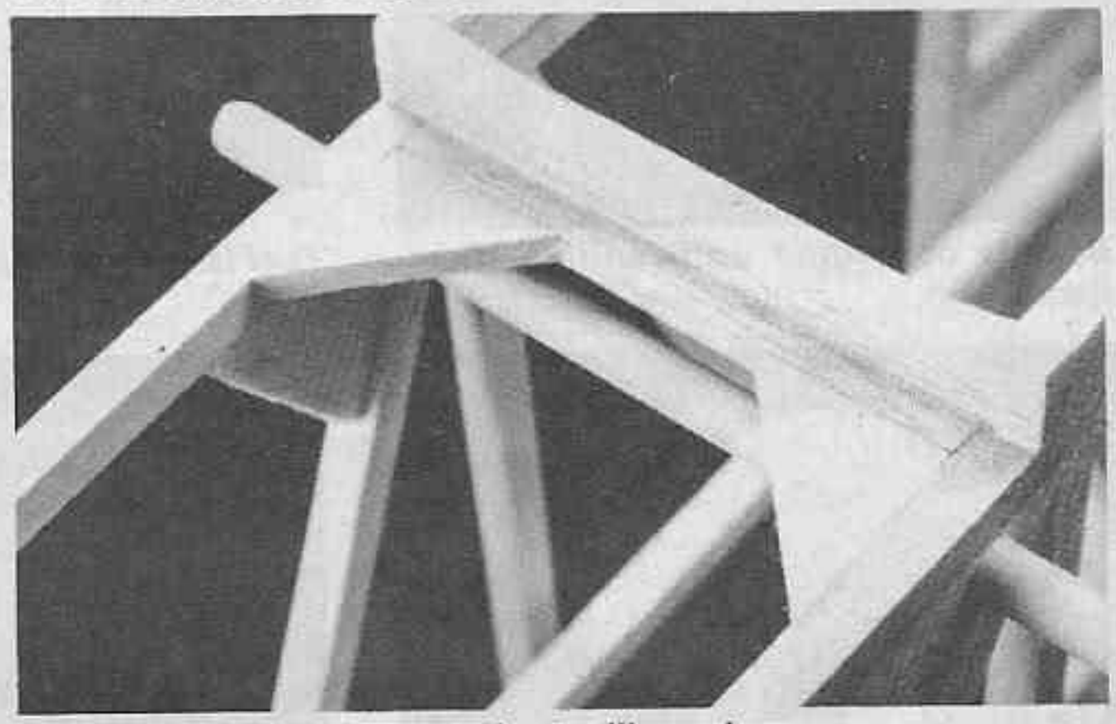
Wing parts at left tip. Note trailing edge laminated of 1/4 sq. balsa.



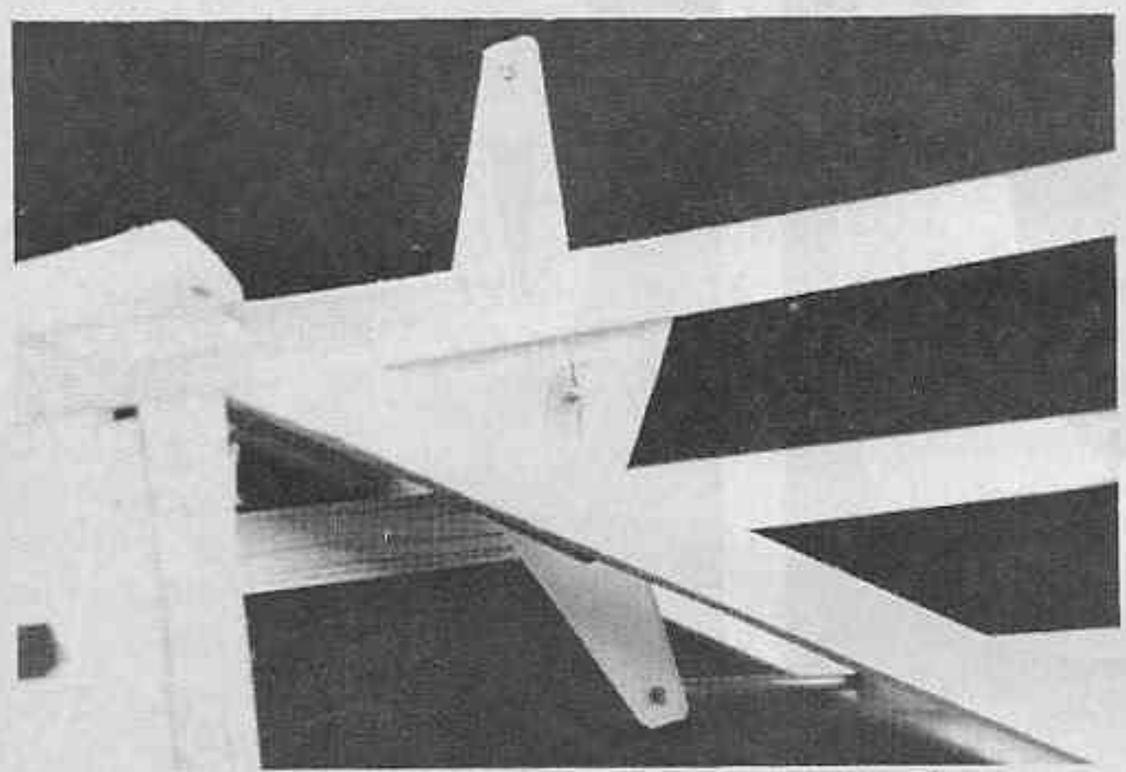
First assembly of wing. Balance is conventional structure.



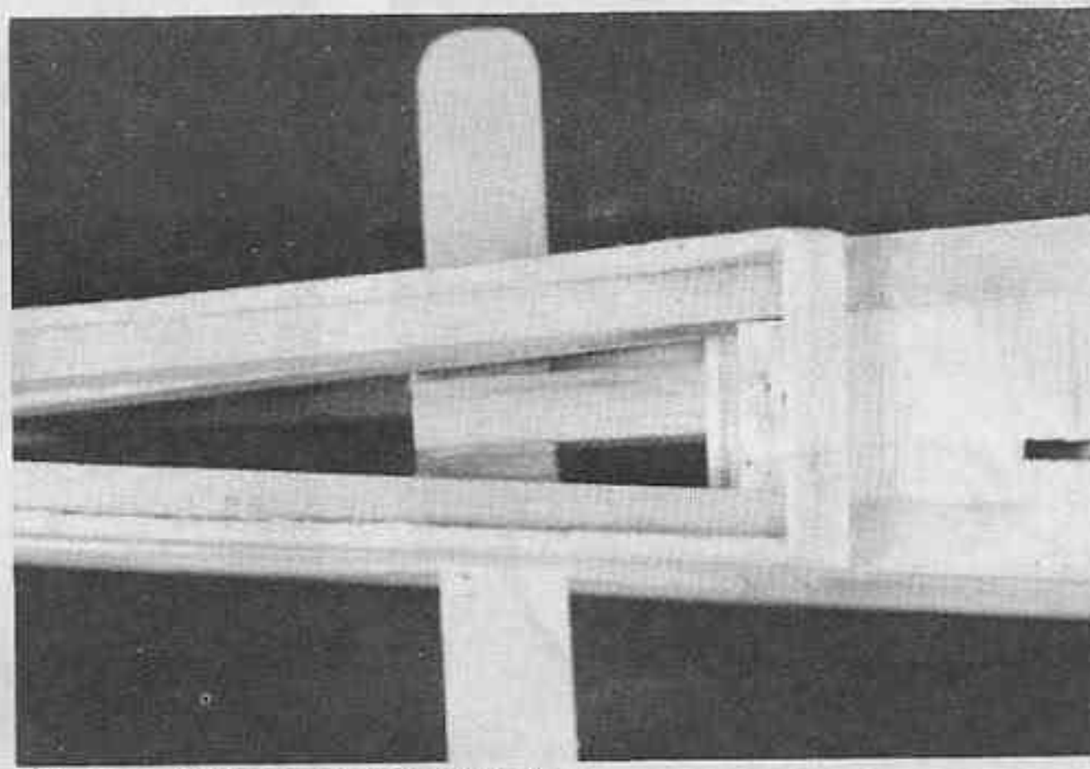
Top right corner of fuselage showing wing mount and dowel.



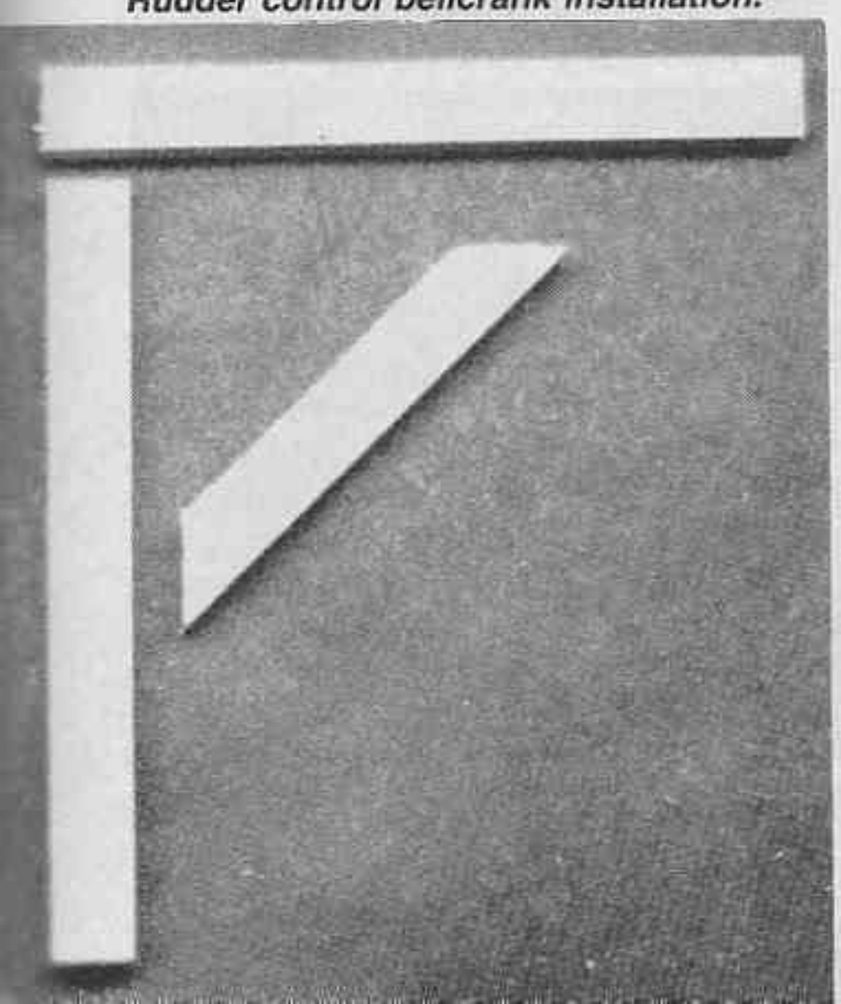
Details of fuselage top at wing trailing edge.



Rudder control bellcrank installation.



Elevator "T" pushrod installation.

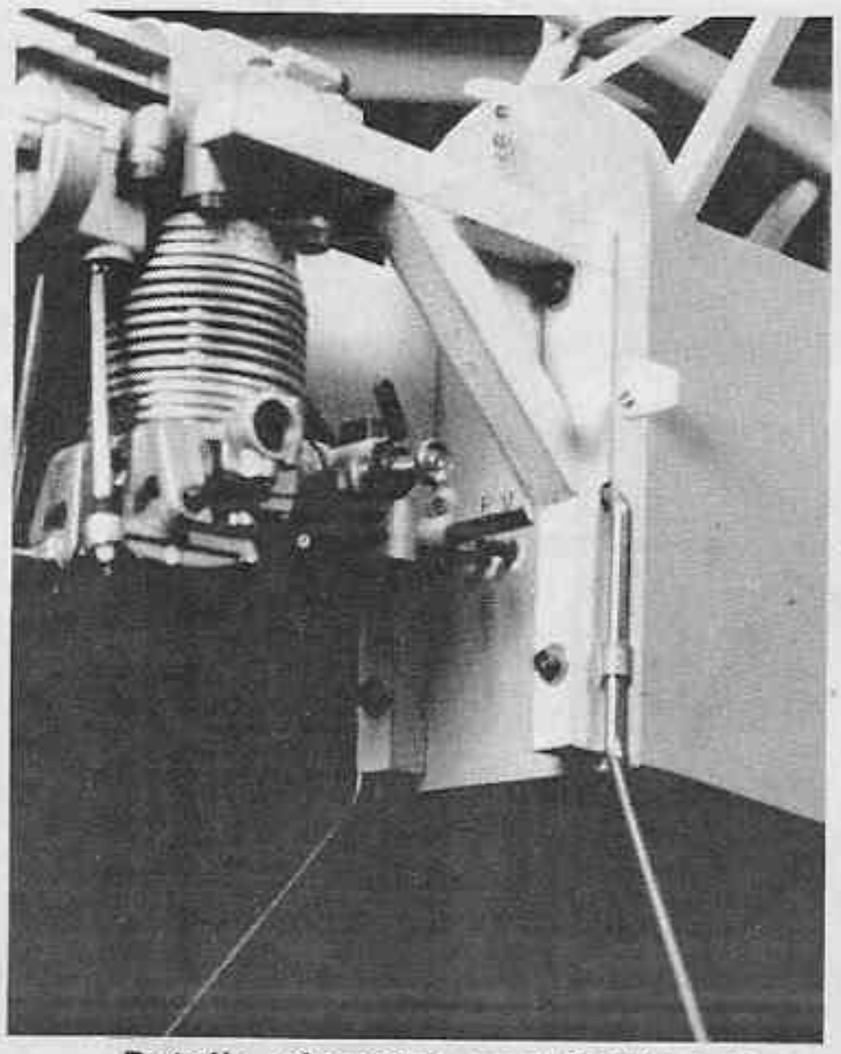


Parts for engine mount.

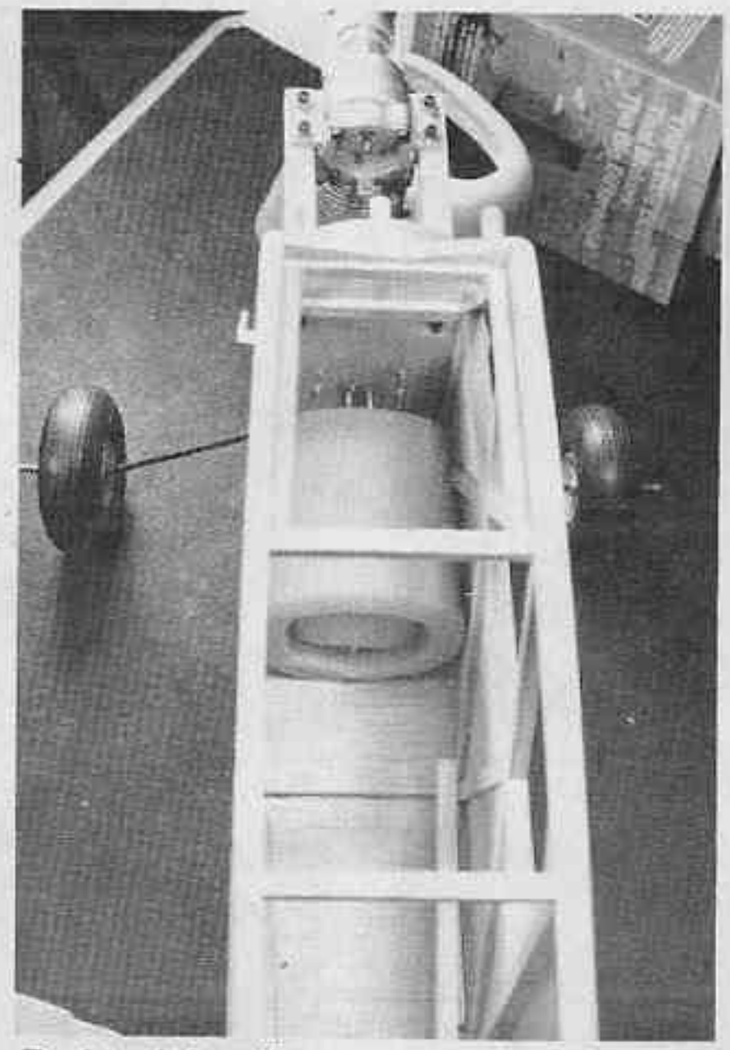
sandpaper, apply a little more Titebond, and position the piece. I've found by cementing all the pieces in on the bottom fuselage side first, and then the top side, stronger joints result, plus the sides are not as hard to separate. Use that triangle as you assemble, to keep all the parts square with one another. Cement the 1/4" balsa gussets in place aft of the cabin, as well as the two piece tail former.

Allow the sides to dry at least overnight before you pull them off the board. Carefully separate the sides, using a butter knife, or the like, as a wedge. Repair any pieces that popped loose before continuing! Glue the 1/8" sheet balsa cabin fill in place and recheck each side with the plan to be sure nothing gets misaligned. Bevel the tail former insides, checking the top view frequently. Cut the top and bottom cross pieces to size, double gluing as mentioned earlier. Since the bottom aft fuselage is straight, pin that area down over the top view during assembly.

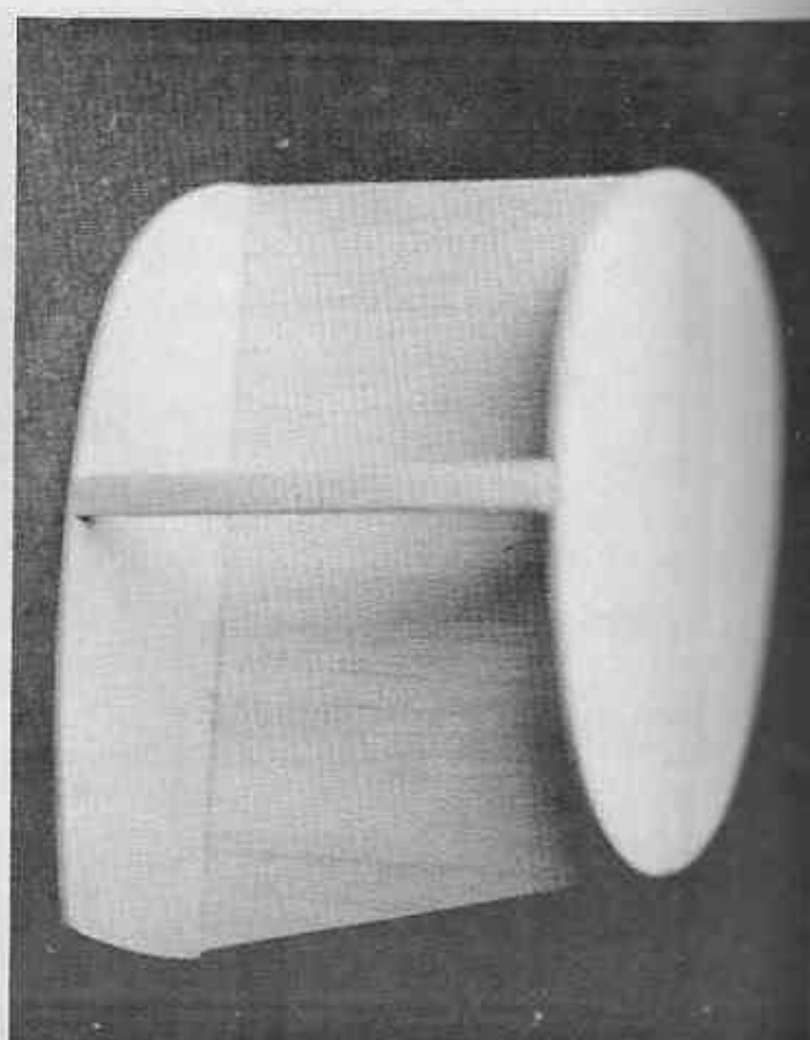
When you get to the cabin area, use rubber bands to pull the nose together. Cut the firewall from plywood. Drill all necessary holes, and install blind mounting nuts before epoxying it in



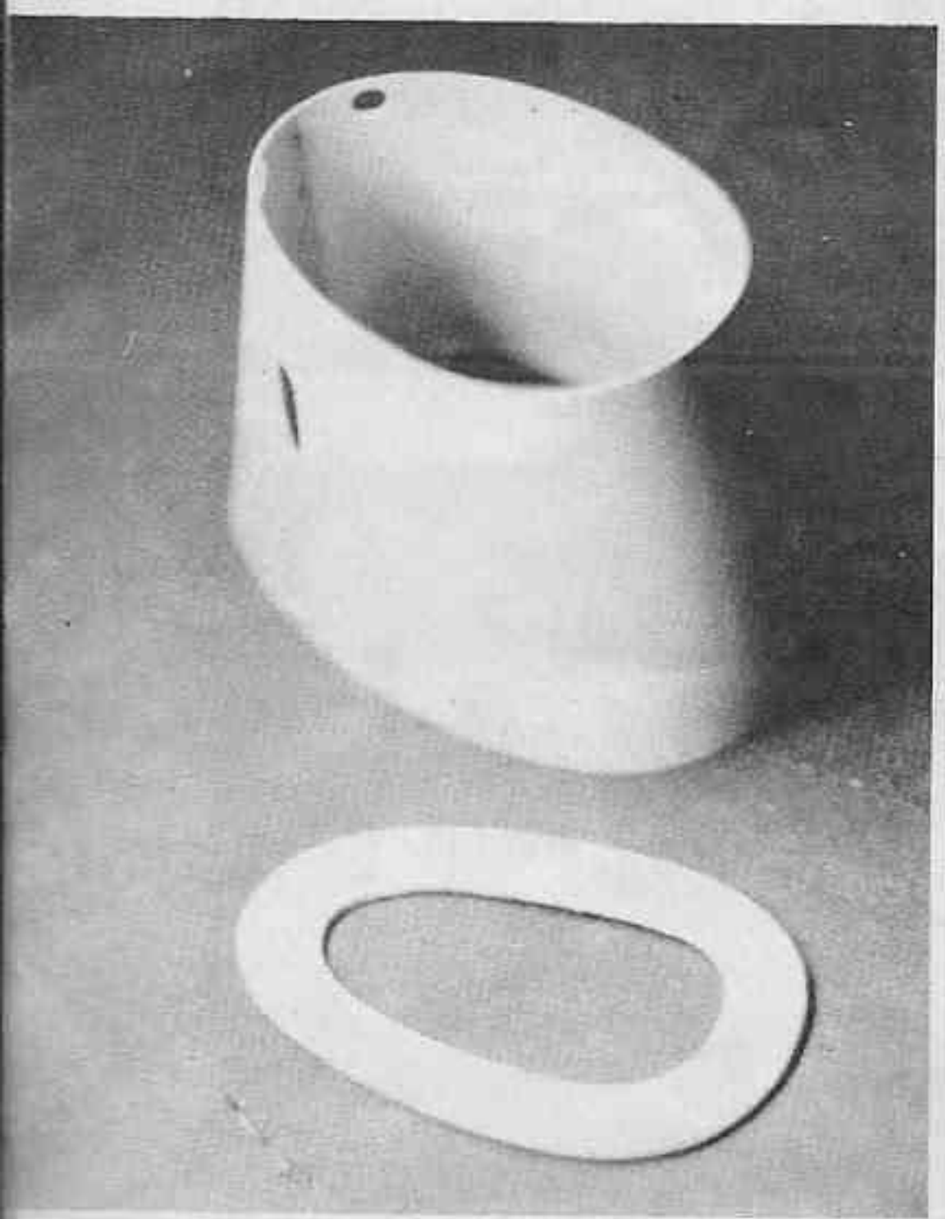
Details of engine and landing gear installation.



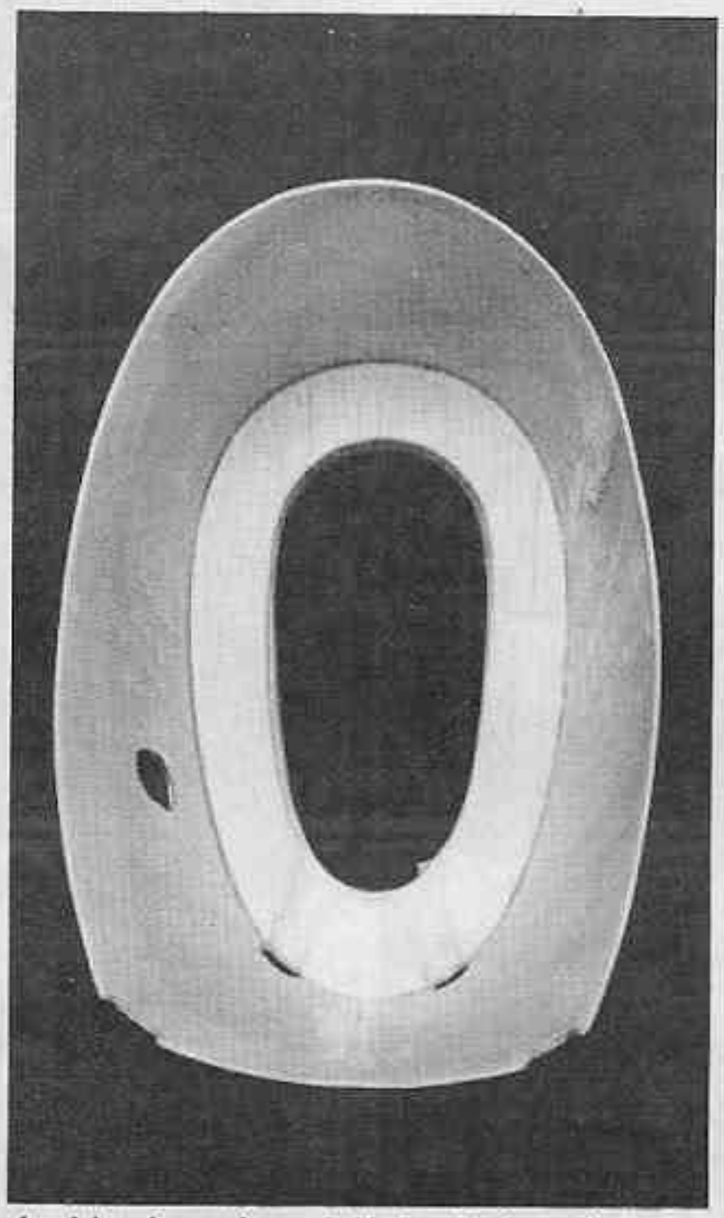
Fuel tank location.



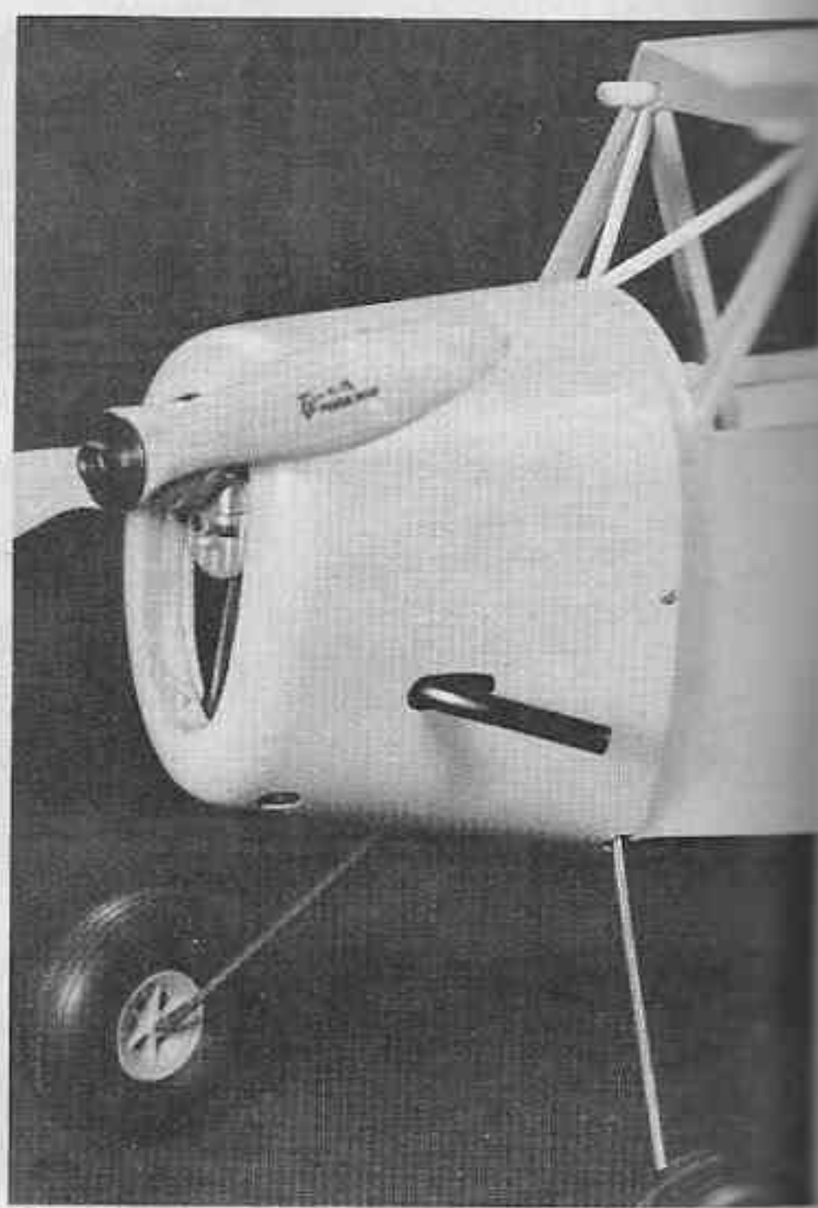
"Mold" for assembling nose cowl.



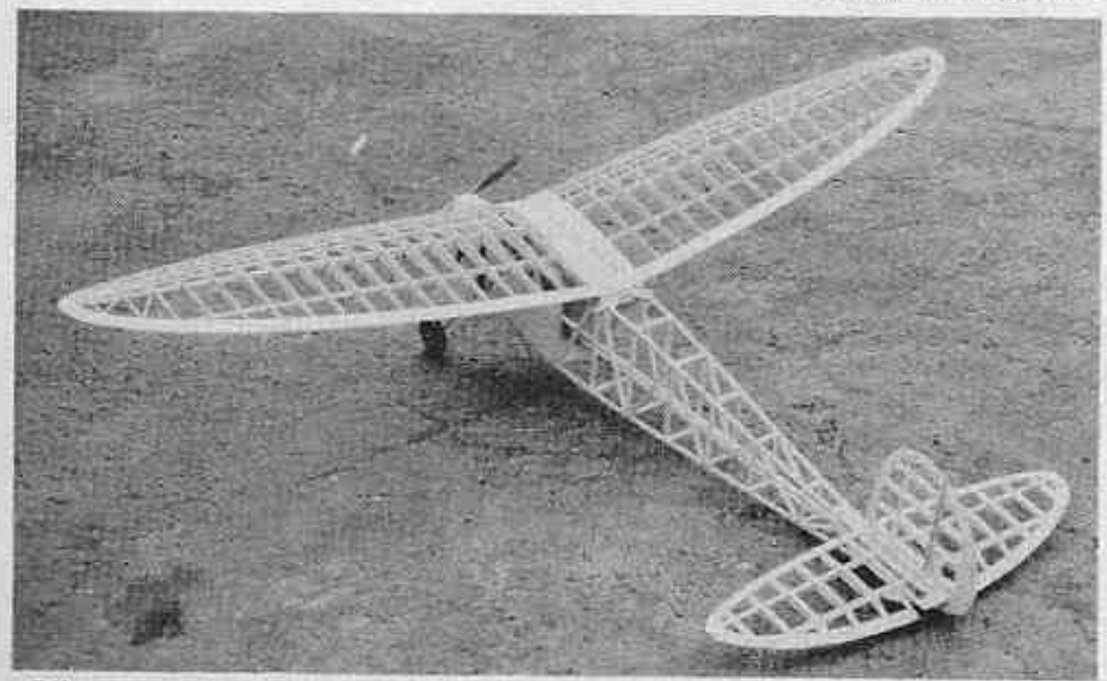
Cowl skin and front former.



Inside view of cowl. Holes in front bottom facilitate tappet adjustment.

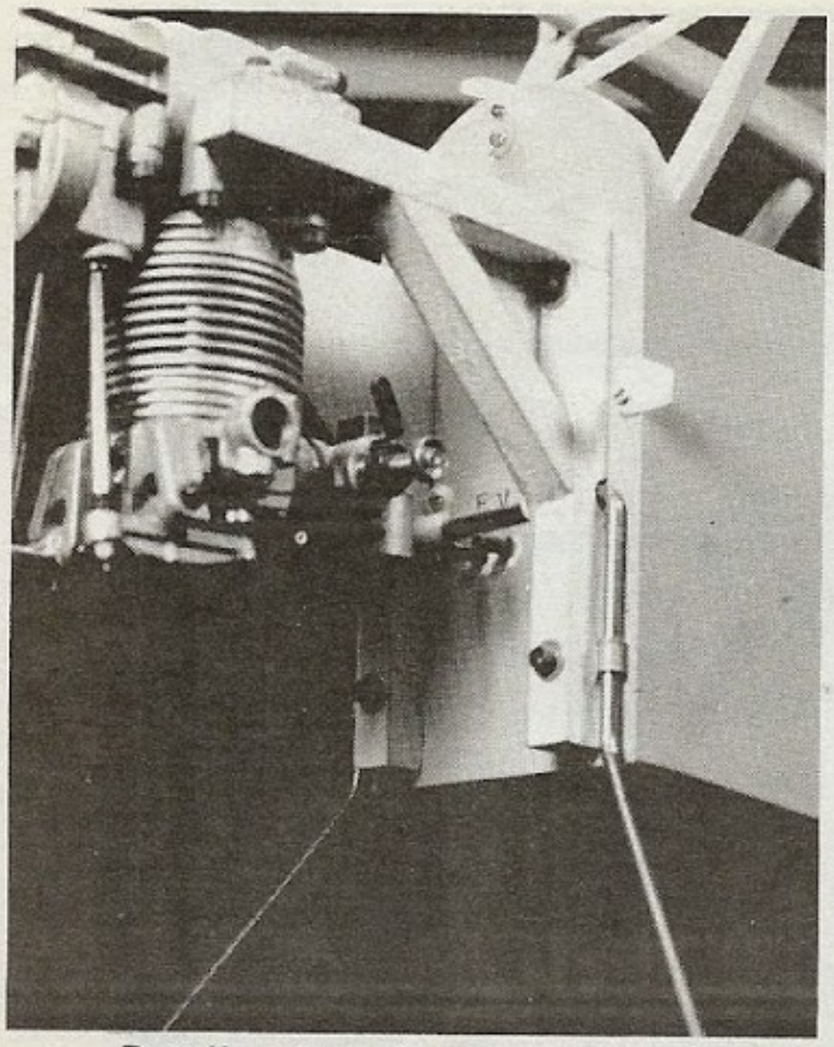


Cowl finished and installed.



Clipper structure completed and ready for covering.

Randy is not happy. He has to stop flying, go home and do his chores.



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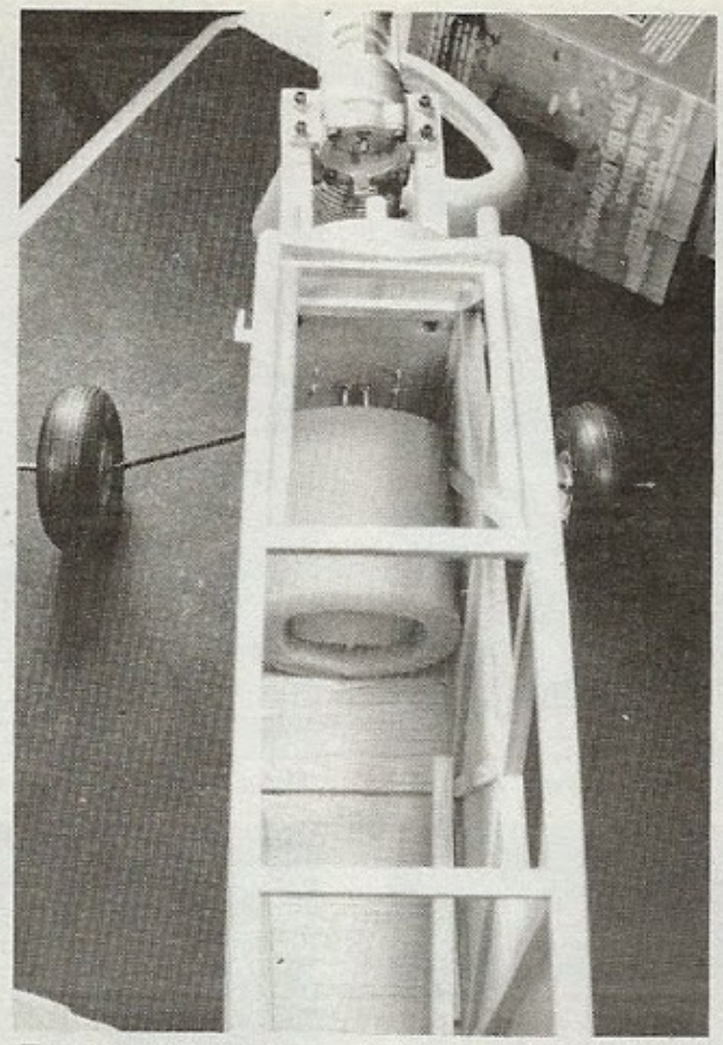
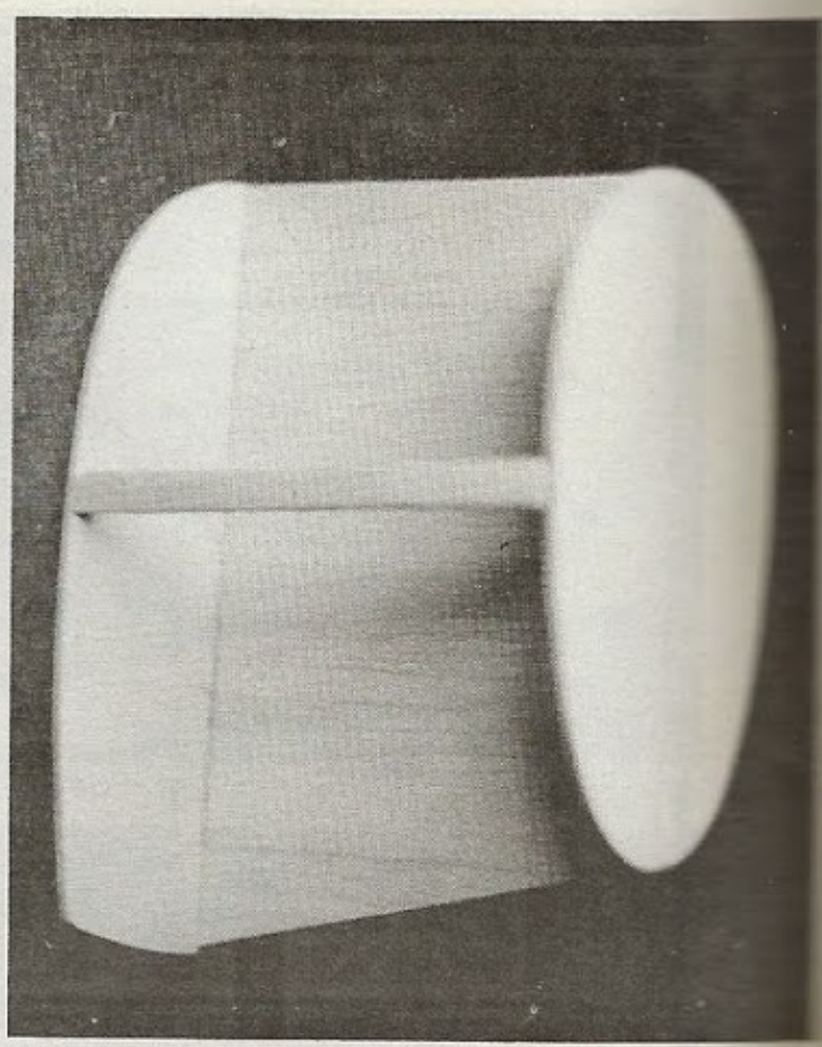
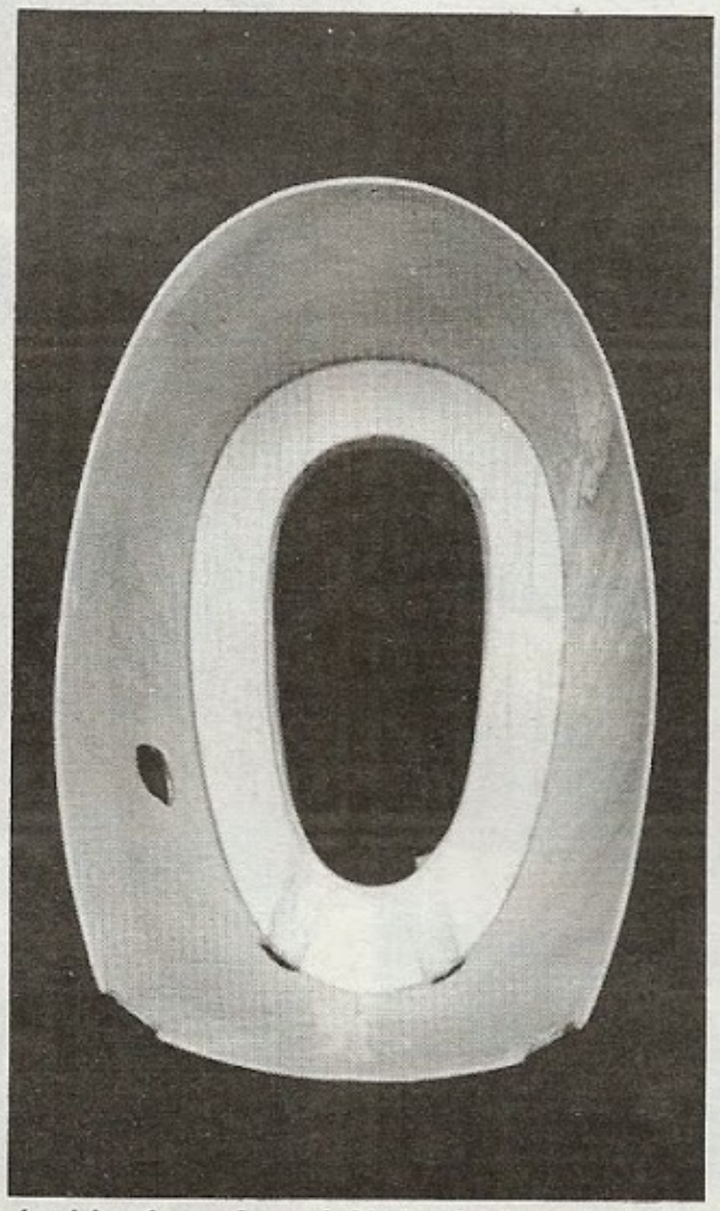


Fuel tank location.



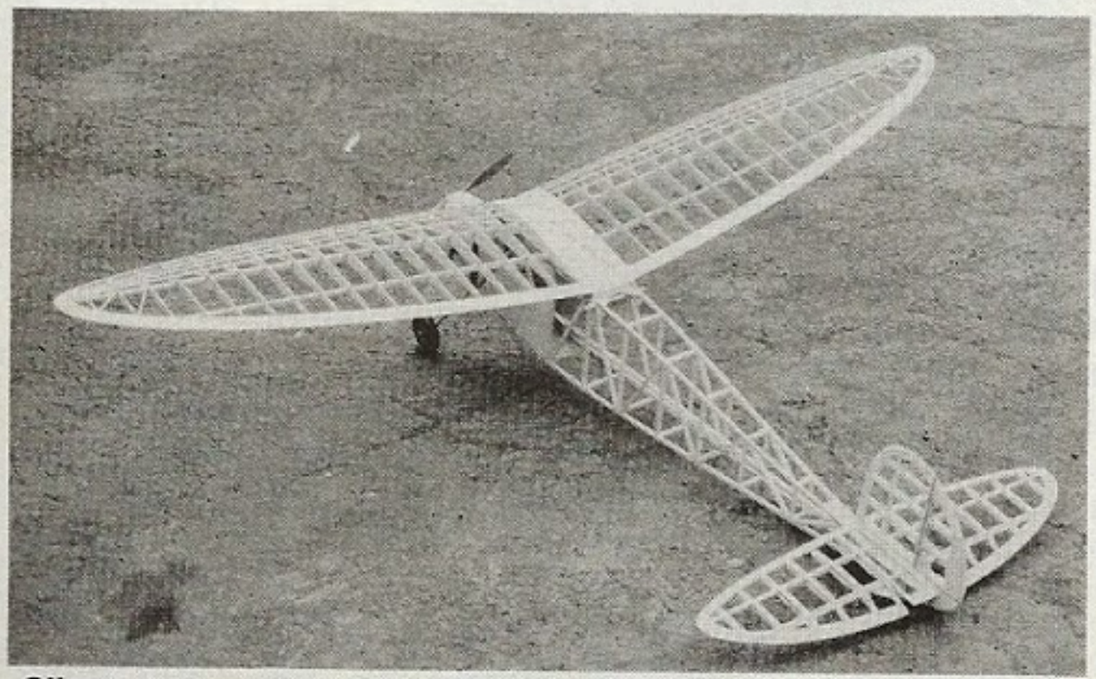
"Mold" for assembling nose cowl.

Cowl skin and front former.



Inside view of cowl. Holes in front bottom facilitate tappet adjustment.

Cowl finished and installed.



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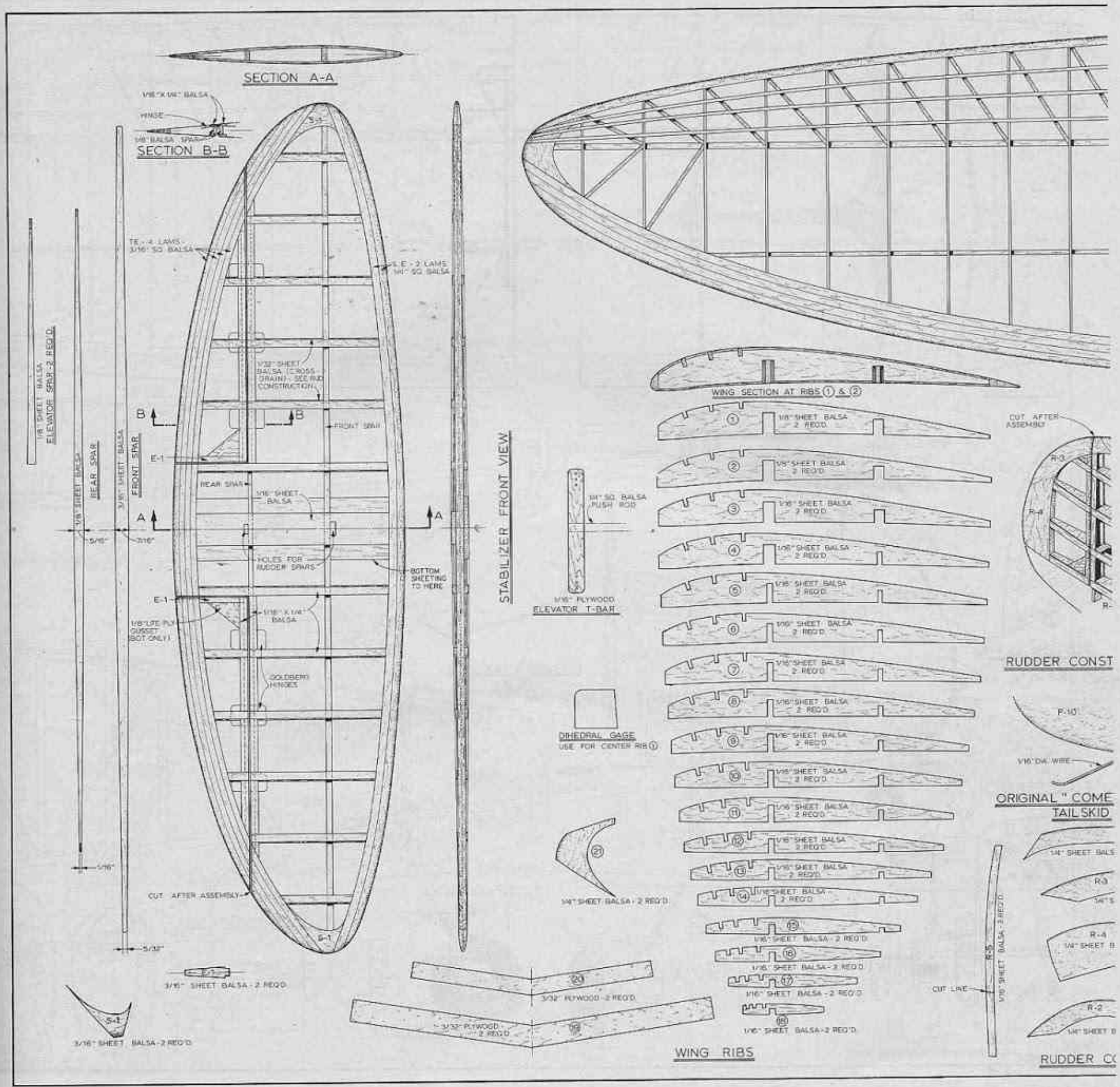
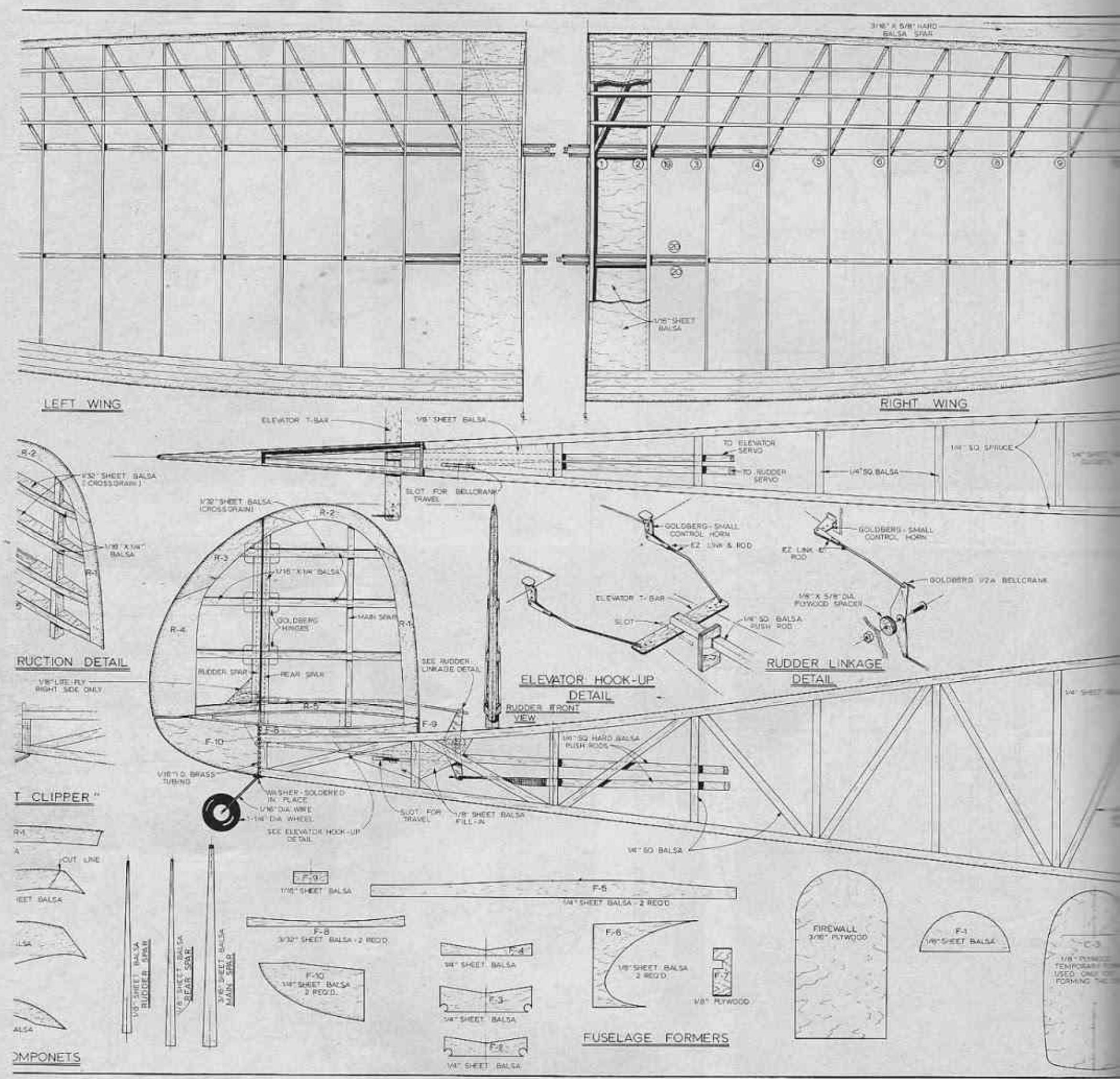


place. I built up my motor mount from 3/8" maple, with 1/32" plywood sides. You could adapt a commercial nylon or metal motor mount if you choose. I mounted my Saito .40 inverted.

With the engine location fixed, install the fuel tank with respect to the carburetor. A four ounce square tank was used in the prototype. Glue F-1 to the back of the firewall, and follow with the 1/8" x 1/4" spruce windshield braces. Cut the 1/4" front wing hold-down dowels to size, and install them. Follow with the rear wing gussets and dowel. Carefully glue the wing and stabilizer mounts to the top of the fuselage. Bend the landing gear from 1/8" music wire. Use Goldberg 1/8" landing gear clamps to secure the top of the gear to the fuselage. I used a pair of brass clips to hold the bottom gear legs to the firewall, trimming away the back of the motor mount for a snug fit.

Since we can't put it off any longer, we will now build the cowl. Believe me, it isn't as hard as it looks! Cut the side view, front and rear formers from scrap 1/8" hard balsa or plywood. Add a 1/4" x 1/2" balsa stiffener to each side to prevent the cowl from collapsing during assembly. The next step is to bend a piece of stiff paper, such as a file folder around your "mold" and draw around it with a pencil, creating a pattern. Once cut out and verified, the pattern can be transferred to 1/32" plywood. Make sure your plywood sheet is large enough to allow the grain to run fore and aft. Soak the plywood in hot water until it becomes flexible. Form it around the mold, holding it in place with rubber bands until dry. Join the seam with a scarf joint, or a butt joint, with a doubler placed inside. Slip the cowl back on the mold, and glue in the 1/8" plywood front former. Follow with the nose block. No additional reinforcement is necessary at the aft end. With the engine in place, fit the cowl to the fuselage. Mine is held in place with three Goldberg 90 degree cowl mounts. Make any cut-outs now, before covering and painting.

As you have seen by the photos, I used a different style of pushrod for



moving both the rudder and elevators. For the rudder, a Goldberg 1/2A bellcrank is attached to a small piece of plywood, and glued to the right inside of the fuselage. The 1/4" square balsa pushrod connects to the bottom, and the top projects out of the fuselage, allowing a straight run to the rudder horn. Once you have installed it, use 1/16" balsa to fill the top of the fuselage around it.

The elevator was an even greater challenge! The Clipper gets real skinny back towards the tail, and not a lot of room is left over for a pushrod. I made a small bulkhead, with a 1/4" square hole in the center, and glued it in place. Next, I glued a 1/16" plywood "T" to the top of the pushrod. Fill the area around the "T" with 1/16" balsa where the "T" projects out the sides. Again, we now have an almost straight run to the two elevator horns. If you can come up with something simpler, be my guest! With the fuselage now complete, it's time to build the wing.

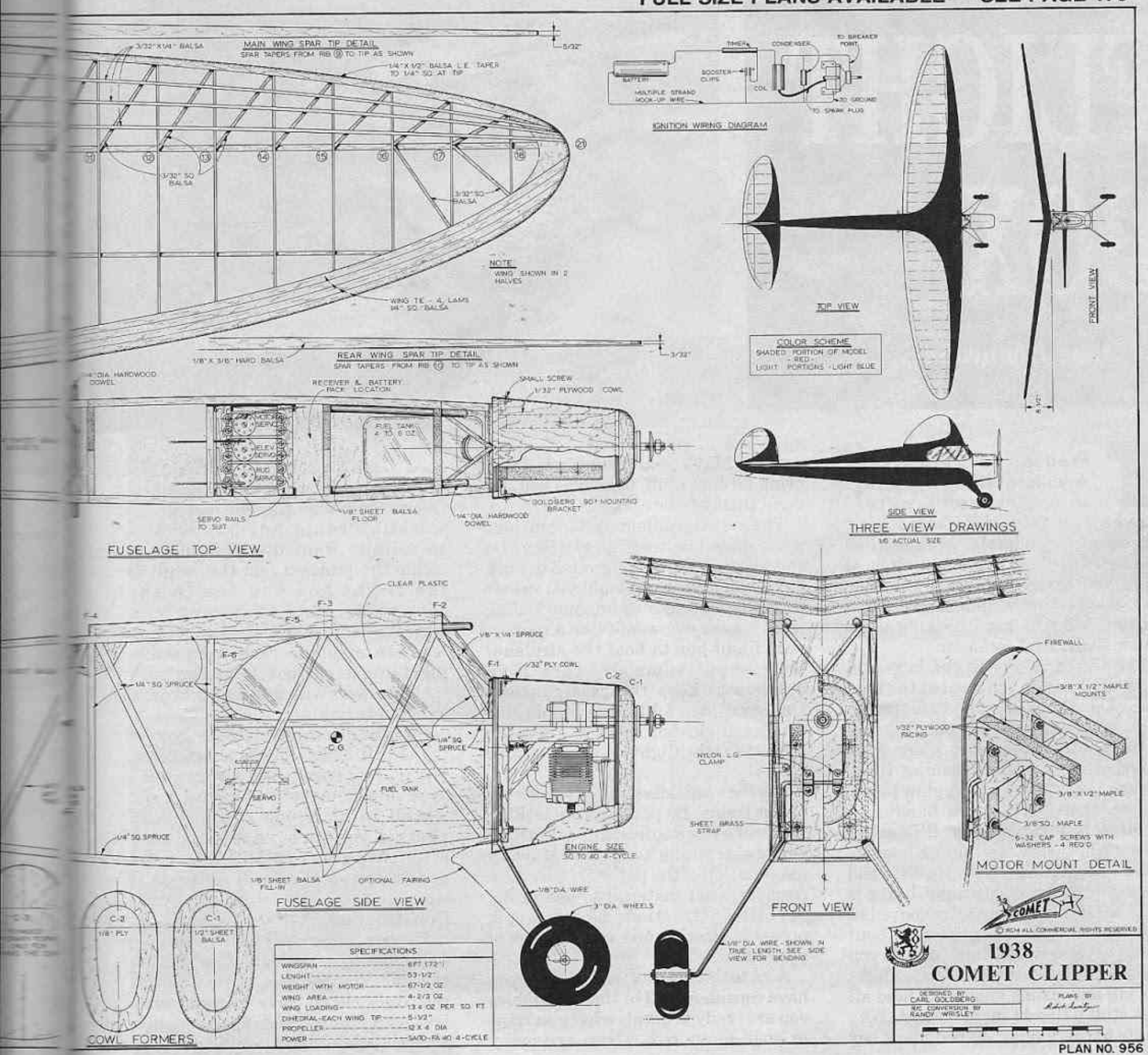
Wing:

Begin by cutting two each of all the required wing ribs. Pin the leading edge down on the plan, and laminate the trailing edge as well. Pre-taper the front and rear spars before pinning them in place. Remember, use spruce spar stock if you intend to do any aerobatics! With the wing tip glued in place, install the ribs. Angle the center section ribs as shown. The 3/32" square diagonals come next. Take care to glue them in place high enough to clear the undercamber. Pick the wing up off the board and carefully carve the leading and trailing edges to shape. The airfoil section changes from undercamber to almost symmetrical at the tip, so carve accordingly. With that little chore complete, pin one panel back down, and raise the other tip up 11". Epoxy the 3/32" ply dihedral braces in on the front and rear spars. Glue the 3/32" x 1/4" spruce turbulator spars to the top of each wing panel. Complete the wing by installing the 1/16" balsa center section sheeting, top and bottom.

Covering:

I used Goldberg "Colortex" on my Clipper. With such a pretty structure, it's a shame to hide it. Most any plastic

FULL SIZE PLANS AVAILABLE — SEE PAGE 176



film would work very well and, if transparent, really show off your beautiful craftsmanship. All parts should be covered, and the rudder/elevators hinged before assembly. It goes without saying, try to keep the tail light!

Assembly:

Epoxy the vertical fin and rudder to the stabilizer. Epoxy the stabilizer to the fuselage. Place the radio in the cabin, rubber band the wing on, and check the Center of Gravity. It should fall somewhere ahead of the front spar, as shown on the plan. I had all my radio equipment right on the firewall, and still had to add a two ounce spinner weight to trim my Clipper. I guess I should have heeded my own advice about keeping the tail light! Mount the three servos abreast in the cabin, taking care to get them low enough so they won't show through the windows.

Hooking up the throttle proved to be almost as much of a challenge as the elevators! What worked best for me was a 1/32" flex-cable, looped around backwards. The throttle works without binding, and I don't have to contend with a short, stiff wire rod up front.

With the radio in place, it's time to add the windshield and side windows. I have used R/C 56 glue by Wilhold for years. It is about the only glue that sticks to all plastics, dries clear, and really holds.

Flying:

My Clipper weighed in at 62.5 ounces, including that 1.5 ounce spinner weight. The first flight was uneventful, in spite of a 10 to 15 mph gusty breeze. I find mine to be overpowered with a forty, allowing for some really quick take-offs. The Clipper is a very responsive model, without being touchy. As the Center of Gravity moves forward, the Clipper gets less responsive to rudder, though I doubt anyone will have a nose heavy Clipper, ever! This is one old timer that flies as good as it looks! □