

# MODEL Aircraft BUILDER

10¢

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THE CRUSADER  
*see page 4*



# Building a Flying Scale Model of the American Gyro's Twin Engined "Crusader"

by George Bendix

THE "Crusader" reaches a new "high" in private or commercial four to six place airplanes. The roomy interior — average width of four feet and five feet in the four and six place jobs respectively, combined with clean, streamlined exterior, make for comfortable, convenient and speedy transportation.

With two 150 h.p. Menasco engines, the smaller four place ship of 36 foot span has a maximum speed of about 250 m.p.h., cruises at 210 m.p.h. and lands at 55 m.p.h. The larger six place job of 46 foot span, equipped with two 250 h.p. Menasco engines, has a top speed of 190 m.p.h., cruises at 170 at 70 per cent b.h.p. at 4500 feet and lands at 63 m.p.h., power off.

Here again single engine performance is stressed, resulting in single engine speeds of approximately 150 and 130 m.p.h. with ceiling of between five and six thousand feet for the four and six place planes respectively.

Of all metal construction, the strong aluminum alloy 17 S-T (duralumin) is employed throughout in both structure and covering with the exception of the engine mounts and landing gear members. Wing outboard of engine is fabric covered. Tail surfaces and manually operated flap are also fabric covered providing ease of inspection and maintenance.

The above is but a brief description of this very interesting type of plane, of which more will be heard in the future, so let us continue with the general instructions for building a flying model of this plane. The accompanying drawings are for a model with a span of 24 inches and dimensions given are in corresponding scale. Increasing



all dimensions by one-half will produce a very good flying model of 36 inch span, which will out-perform the smaller ship in every way. Limited space does not permit printing plans of a model this size, full scale.

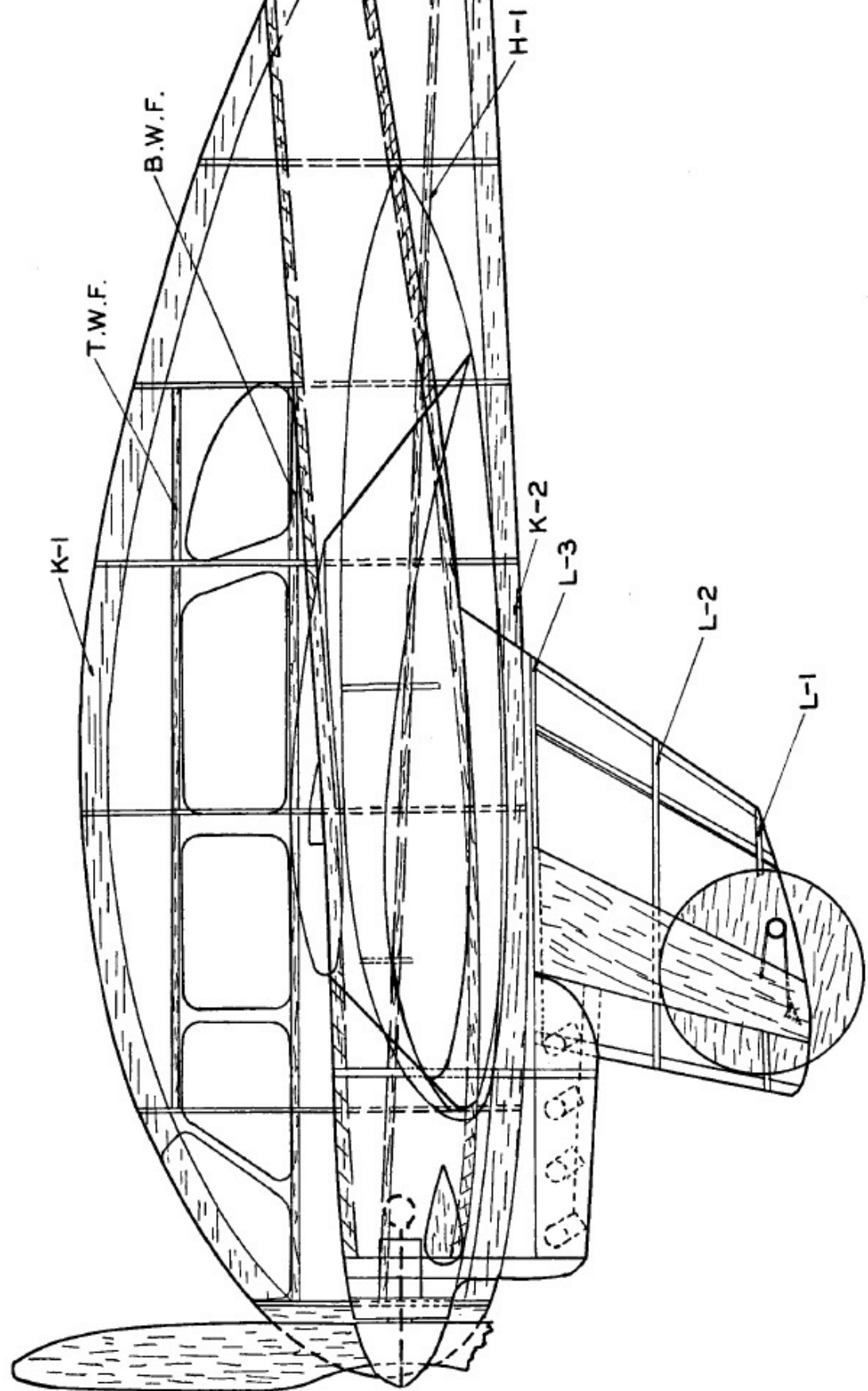
A careful study of present modern model construction has proved that constructing fuselages in halves (a left and a right half) is not only the most accurate method but also the easiest and strongest. Therefore, the "tear drop" fuselage of the "Crusader" should be constructed by cutting left and right formers F-1 to F-8 from 1/32-inch sheet balsa according to "patterns" K-1 and K-2 (grain-marked members in side view). Cutting these pieces from sheets prevents stresses which would be present if balsa was bent or forced to this shape. On top view you will note additional grain-marked members H-1 (one left and one right), these should also be cut from 1/32-inch balsa. Only left half of fuselage can be assembled on plan — other half should be assembled on

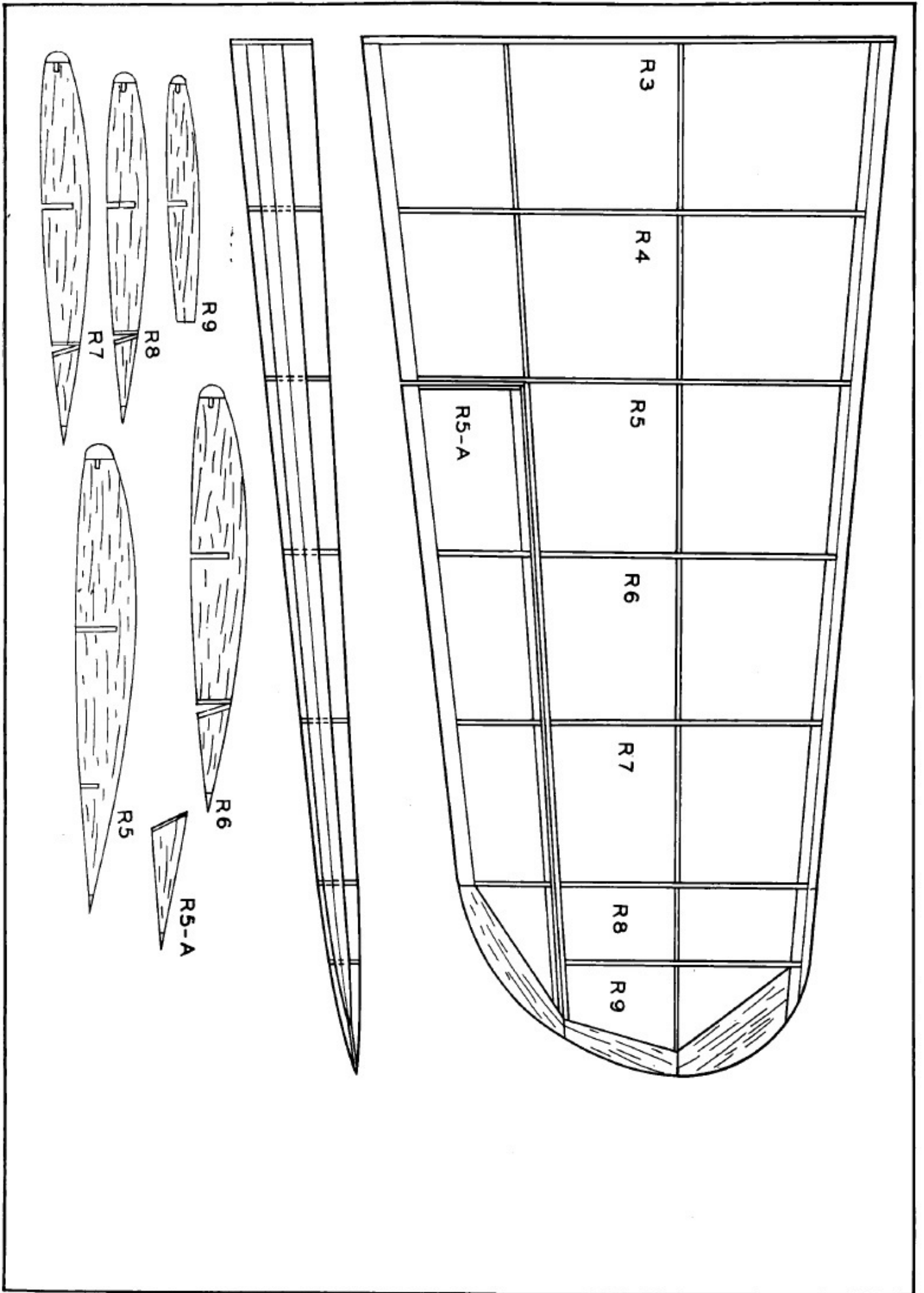
reversed outline traced from left half view shown.

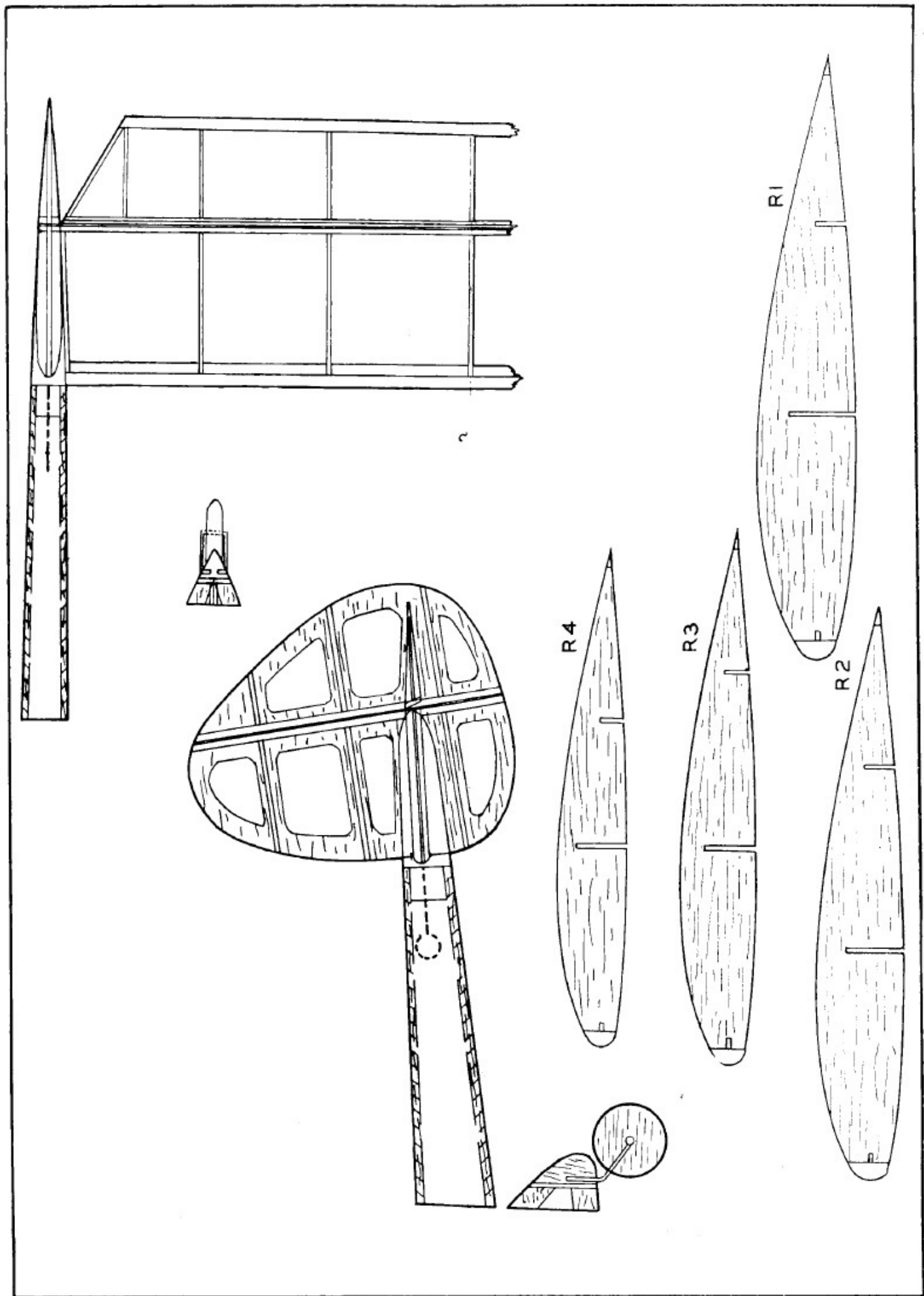
Now assemble formers for one-half of fuselage on keel pieces, on wax paper placed over plan, place H-1 in place, line up formers, use 1/2-inch "Lill" pins to hold in place and cement. Note that nose former—cut and sanded from solid balsa is not put on until two fuselage halves have been assembled. When dry, and while still pinned to plan, check for alinement and then place 1/32-inch square bamboo strips in notches marked on formers and cement in place. These are longitudinal stringers and will give fuselage proper stiffness and shape. Window outlines should be balsa — the lengthwise members cut to shape, shown on top view, and vertical cut according to side view. Tail block and tail wheel should be as on plan.

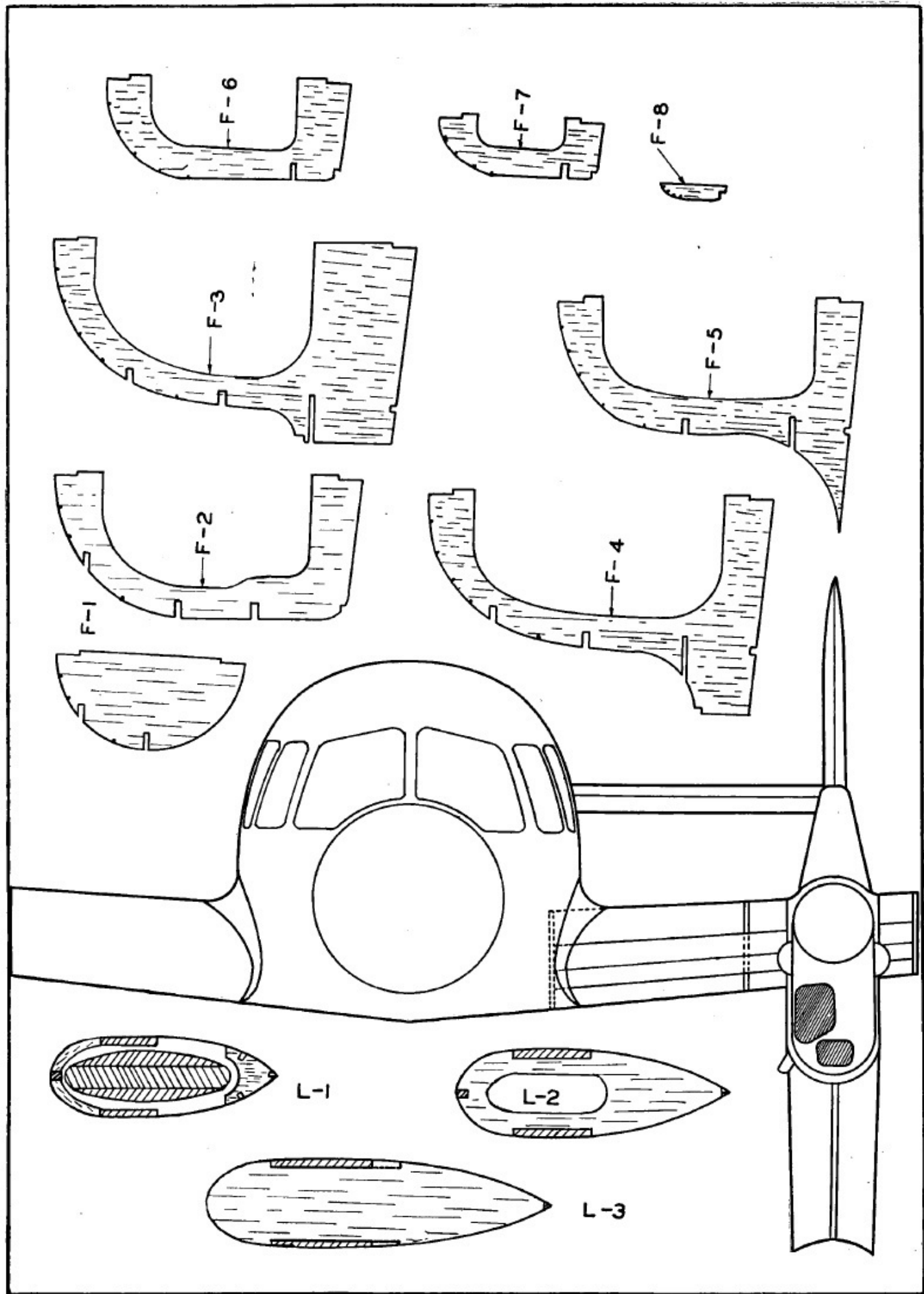
The wing should be constructed in three sections—two outer sections and a center section (the latter to extend to outboard of the outriggers; that is, to rig 3). Make two of each rib pat-

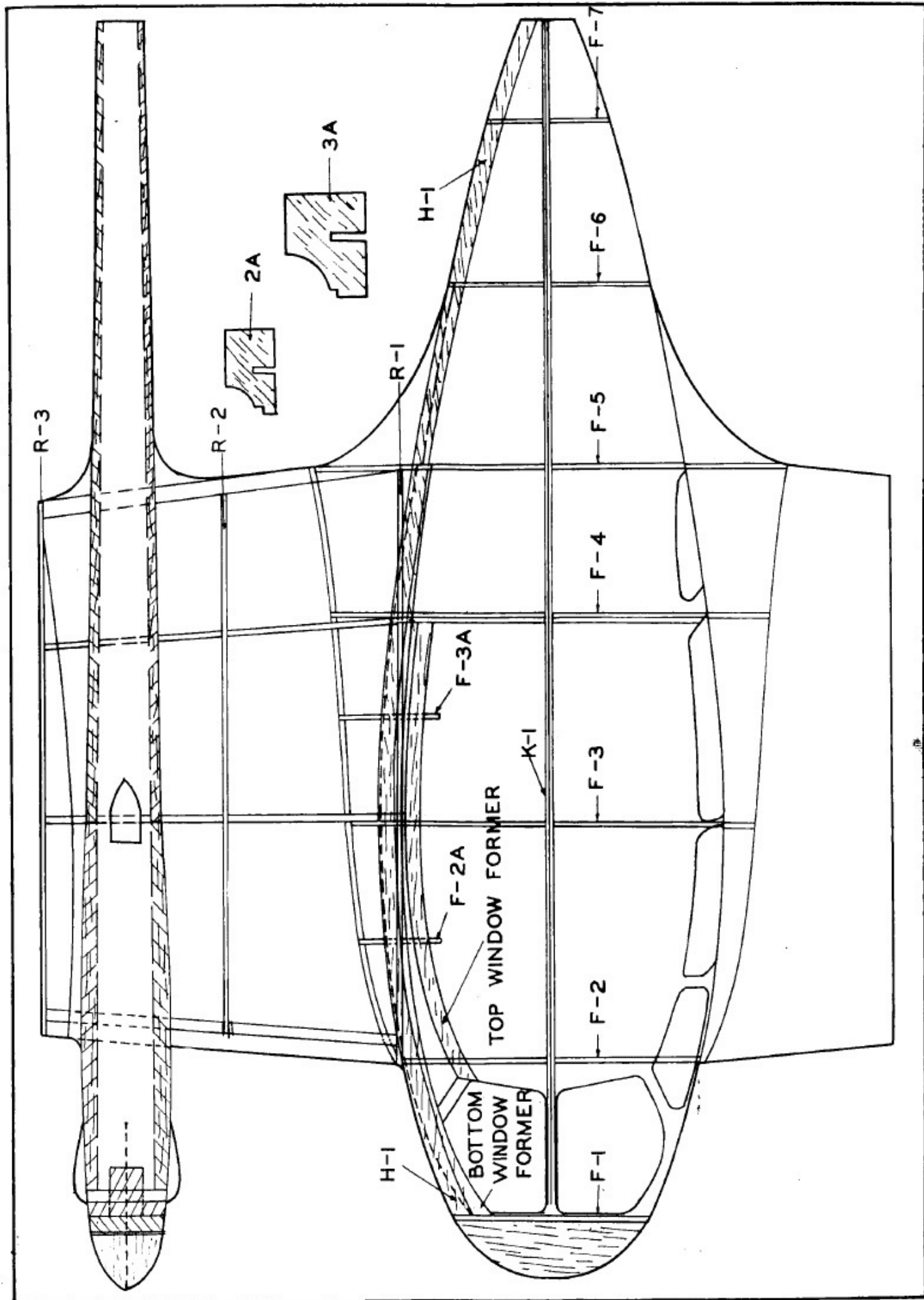
(Continued on Page 36)



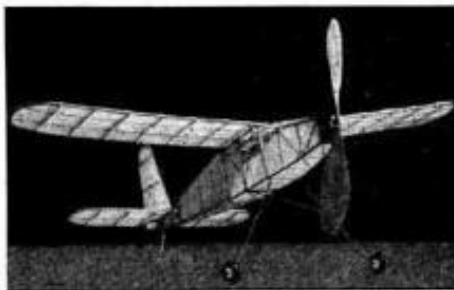








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### The "Crusader"

(Continued from Page 4)

terns R-1 to R-9 from 1/32-inch sheet balsa. Cut out aileron spars, rear spar and main spar according to patterns. Assemble right-outer panel on wax paper on plan. Left outer section should be assembled on reversed tracing of wing half shown.

Center section is integral with fuselage. Make sparts according to patterns shown. Cement main spars with proper dihedral angle on back of former F-3. Fit R-1 to fuselage and spar, and then assemble rest of center section wing structure on main spars and R-1's and cement. Cover between ribs R-1 and R-3 with 1/64-inch sheet balsa.

Carefully study cross sections of outriggers booms and note construction. Dotted lines in side and top views give proper outline of side and top members of booms. Cement 1/16-inch square balsa to edges of side members. Allow to dry, then cement top members to 1/16-inch square balsa pieces on side members, sand both booms to proper cross sections (see X-Y and Y-Y-). Nacelles forward of main spar should be constructed as separate units. See cross sections of this unit. Assemble these nacelles and prepare special propeller bearing to

assure a neutral angle of incidence. Assemble to center section both the nacelles and booms. Construct landing gear according to plans — insert streamline wheel on wire shock absorber and cement wire in place—cover leading edge of pants with manila paper and trailing edge with regular tissue.

Stabilizer and elevator should be constructed according to drawings of same. Make rudders by cementing ribs to 1/64-inch sheet balsa, cut out as shown in rudder side view. Cement rudders to edges of stabilizer and add streamlining and rear hook blocks. Note sketch. Check alinement of booms and fit rear hook blocks until tail will stap in proper position. Cover all surfaces with model tissue and dope with aluminum dope. It is best to cover fuselage in small sections at a time in order to preserve proper shape.

Props should be carved one left and one right to counteract torque. Insert shaft in thrust bearing and prop, bend and cement in prop. Use long wire hook for rubber motor — use four strands 1/8-flat for each motor.

Make several trial glides of model and adjust by adding weight or adjusting surfaces.

Model will take off under own power. Flights of over 250 feet have been achieved with a 24-inch span model and the 36-inch model has consistently flown 600 to 800 feet.

# Model Aircraft Builder

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