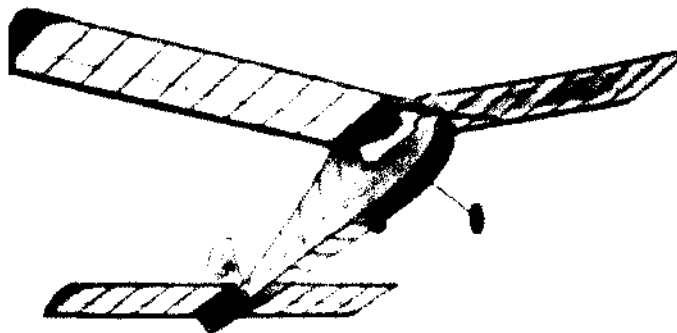


# PAA Load Flying Sandow

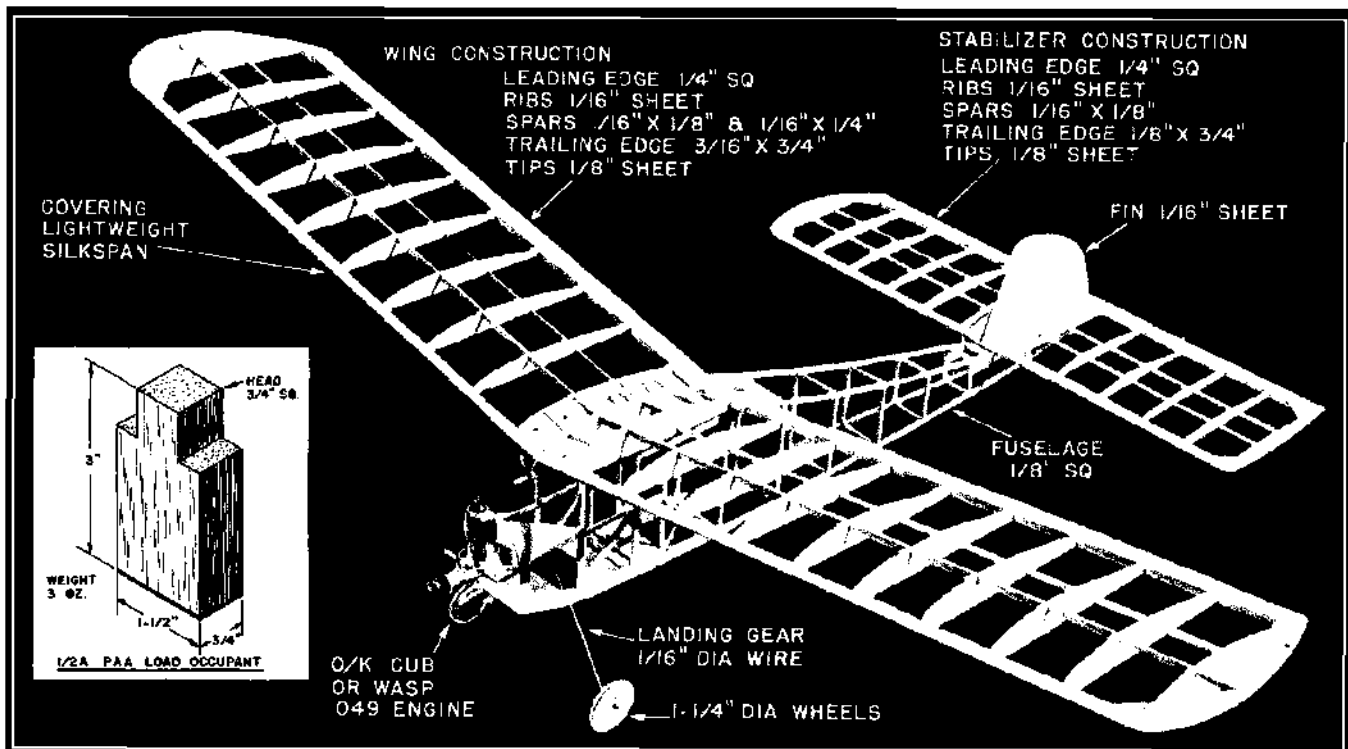
Namesake of the strong man, this free-flight weight lifter is designed for competition.

PAN American World Airways' load events, since their inauguration in 1948, have gained tremendous popularity and interest with free-flight modelers. The challenge of putting a model to work in carrying weight has been well mastered by resourceful model builders. In this event, the model must have a cabin that encloses a dummy occupant, and/or fly with the handicap of additional weight.



The first PAA load contests were held solely for Class A and B models, although in 1950 the event was extended to include the 1/2 A class. The dummy occupant weight was 1-1/2 ounces and has since been increased to three ounces for 1951 events. Present rules for PAA load flying are very similar to regular rules for 1/2A, A and B free flight—models simply must take off from the ground carrying dummy occupants. One occupant is required for 1/2A models. Body of the dummy must be 1-1/2" wide, 3" high, 3/4" thick, have a head 3/4" square and weigh at least three ounces. Class A and B models must carry occupants with a body 3"x3"x1" and head 1" square, weighing at least eight ounces. Classes A and B are combined into one event: Class A must, carry one occupant: Class B, two.

A major consideration in load-flying is use of a proper dummy. Below is rough block for the 1/2A.





Weight is kept down by limiting  
dope-coats and excess construction

Wasp .049 engine is bolted directly  
to plywood firewall. Front end  
around occupant is beefed-up.

The secret of Sondow's exceptional  
lifting ability lies in the extra-  
large wing and elevator area.

Wooden occupants must be carried upright relative to normal flight, facing forward, in an enclosed compartment providing visibility through transparent areas both at the sides and in front. Visibility space for 1/2A models must be 3/4" in height and width and 1" in height and width for A and B models. Occupants must be readily removable for weight checking. Stringent rules, but they make for hot competition.

A new event for the 1951 National was the Clipper Cargo event. This is for 1/2A models only and is an anything goes affair. The idea is to see who can get their model into the air with the greatest amount of payload. The model must make an official flight of over 40 seconds and land safely. Rules for models are the same as regular 1/2A except that the weight load must be carried inside the cabin or fuselage and anchored securely to prevent shifting in flight. Payload material may be of any substance or shape, but should be something that can be built up or cut down readily.

Sandow has been designed strictly in accordance with the 1/2A load event rules, and the ship has turned in fine performances. Sandow will rise handily, and with the engine percolating the model climbs with the best of them. Glide is good because of the large wing and light weight. Payload models need more wing area than the average free flight because of the additional weight. Construction has been made as light as possible and yet rugged enough to withstand hard landings. The area around the occupant had been beefed up to prevent damage from the inertia of the occupant should the model come to a hard halt.

Medium to hard grade balsa should be used throughout the model structure. Hard stock should be used particularly around the nose and cabin area, since this area is subjected to the most strain.

Construction can be started with the fuselage. Side-view plans should be fastened down on the work board and covered with waxed paper. Cut out the lower longeron front pieces from hard 1/8" sheet. Pin down the longerons and proceed to cement the uprights and diagonals in place. The second fuselage side is built directly over the first to insure similarity. When the first side is dry the second side construction can be started. Don't worry if cement sticks the two sides together; they can be separated with a razor blade after they are taken up from the work-board. Some modelers like to put small squares of waxed paper over all joints on the first side so cement on the second side will not join the two together. When dry, the sides should be separated, and joining with crosspieces can be started.

Stand the two sides upright over the plan top view. Make sure the sides are perpendicular to the workboard, for here is where most box fuselages get out of alignment. Hold a square or triangle against the sides to check for perpendicular. It is a good idea to cut braces from scrap wood and pin sides and braces down to the work-board, forming a jig that will hold the sides upright while the crosspieces are added. The section of the fuselage under the wing has parallel sides. Crosspieces should be cemented in place here first.

Cut all crosspieces and sheet fill-in to the same width to simplify the job. When these cross members are dry the fuselage sides can be pulled together at the tail and the other crosspieces added. Always cut top and bottom crosspieces to the same length and, also, work from the center of the fuselage toward the rear. The nose tapers in slightly and can be joined now, and the plywood firewall can be cemented onto the front face of the structure. Make sure that the front end is

flat and square so that the plywood will have uniform contact all around. If the Wasp .049 engine is used, it can be bolted directly to the firewall. Other engines can be mounted with wood screws. If wood screws are used it is a good idea to cement a strip of hardwood behind the firewall for additional holding surface for the wood screws.

The landing gear can be bent to shape and joined to its plywood mount. The gear wire should be sewn to the plywood with heavy fish line or soft wire. Coat the gear wire and stitching liberally with cement. The plywood gear mount can now be cemented in place in the fuselage.

Fuselage bottom, up front, is filled with 1/16" sheet back to the upright behind the occupant compartment. Additional bracing is added between the sides at the bottom of the window edge. This strengthens the fuselage ahead of the wooden dummy occupant.

The upper front part of the fuselage can be finished off now. Add 1/4" sheet behind the firewall and carve down to form the cowling. The 1/8" sheet in the top can be beveled to fit the windshield curve. Two strips of 1/8" square stock are cemented along the top outer edges of the fuselage, forming the wing platform. Dowel wing hold-down pegs are cemented in place at front of windshield and at the rear of the wing platform. Fill in the fuselage top around the rear peg with 1/16" sheet.

Hard 1/16" sheet is used for the stabilizer platform, grain crosswise, and cemented in place on the rear of the fuselage. Dowel hold-down pegs are cemented in place as indicated on the plans. Fill in the rear fuselage bottom triangle with 1/8" sheet. The wire skid is cemented to this sheet. Cover with a patch of silk and plenty of cement.

Celluloid windows and windshield can be cemented in place now or may be added after the engine is mounted and the fuselage covered. Sheet cowling under the engine is optional, depending upon what engine you install.

Wing construction follows standard practice. The wing is built in two halves and joined later. Build one half at a time over the plan top view. First cut out the required number of ribs from 1/16" sheet. Notch out the trailing edge for rib ends before pinning it down over the plan. The leading edge is blocked up all along its length with pieces of 1/16" sheet scrap. The rear spar can be laid down now or later. Drop the ribs into place between leading and trailing edges, cement in place, then add the front spar.

The two center ribs are omitted until the wing is joined. When the two halves are built, they can be

joined at the proper dihedral angle. Plywood dihedral joiners are cemented behind the leading edge and the front spar. Lay one panel flat and prop the other tip up while cementing the center section. Next add the two center ribs. The top of the wing at the center section should be strengthened by adding short lengths of 1/8" square between the ribs running span-wise. Space about one inch apart. These strips serve to prevent the hold-down rubber from tearing the tissue.

Reinforce the leading and trailing edge "V" with patches of gauze and plenty of cement. The bottom of the wing at the center section should be planked with 1/16" sheet to form a smooth surface where it rests on the fuselage top.

Wingtip plates are cut to outline from 1/8" sheet, notched for the front spar, and cemented in place on the outside face of the outermost rib. Note that the tips slant upward, running up from the bottom edge of the rib so the outer edge is level with the top of the spar.

The horizontal tail is built in the same manner as the wing except that it can be built in one piece, flat on the plan. Note that the two center ribs have a 1/16" space between them for the sheet fin. While building the tail, push scrap 1/16" sheet between these ribs while the spars and ribs are being cemented.

The fin is made by joining two pieces of 1/16" sheet edge to the edge to get the necessary width. Note that the grain runs vertically on the fin. Cut to the outline, notch out the bottom edge to fit over the stabilizer spars and cement into place between the center stabilizer ribs. A horizontal cut in the trailing edge of the fin separates the wood so that the section above the cut can be used as a rudder tab.

Go over the entire model with fine sandpaper before covering. Make sure all wood is smooth so no fuzz or sharp edges will show through the tissue. The model is covered with lightweight Silkspar or Sky Sail. Three or four coats of thinned fuel-proof clear dope should be sufficient to seal all tissue and make for light weight.

The dummy occupant can be cut from block or built up from three layers of 1/4" sheet. Three ounces of lead or similar heavy material should be enclosed in the dummy occupant. The weight can be inserted in a drilled hole after the dummy is made or can be built right in between the laminations. Keeping the weight high in the dummy, preferably mostly in the head, will improve spiral stability characteristics. Make sure the dummy slides in and out of its compartment easily. No hold-down is required since the wing is only about 1/4" above the dummy's head.

At this point the engine can be installed. A timer such

as the lightweight Spitfire timer valve is practical; and a glass medicine dropper or coiled fuel line tank setup may also be used. A pop-up tail dethermalizer is recommended if you intend to do contest flying.

Point of balance of the model should be at the dummy occupant's position. This will insure proper flying with or without the dummy. The ship can be flown in PAA load events with the occupant or in regular 1/2A free flight without the occupant.

Do all test flying without the dummy in place. This will prevent any serious damage should a cartwheel landing occur. Since ground take-offs will be made it

is important to check the model's ground roll. Make sure that the wheels turn freely on the axles. Push the model along the ground to see that it rolls straight. If not, twist the axles to counteract any strong turn tendencies.

Cabin models of this type tend to turn to the left under power. This will show up in the take off, so the model should be aimed directly into the wind or slightly to the right of the wind so that the left wing won't get down too far in the turn. Wind on the left side of the ship will help the model get off level before the turn starts to develop. •

## MATERIALS LIST

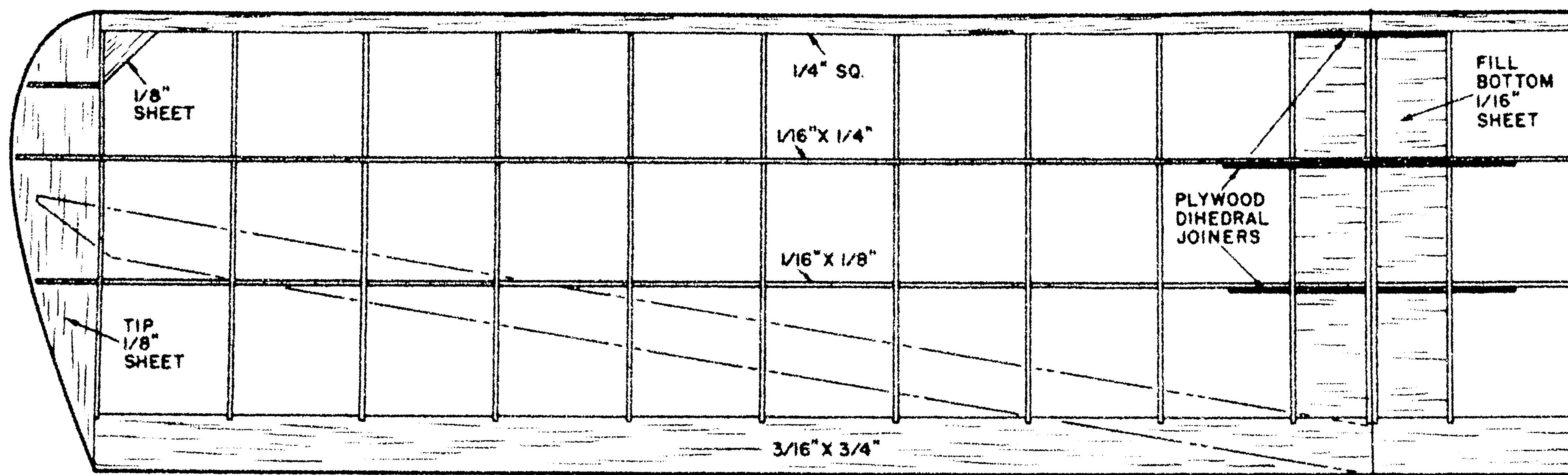
### Balsa unless otherwise specified

Quantity	Size	Use
1	1/8"x1/4"x36"	fuselage X-members
4	1/8"x1/8"x36"	fuselage longerons
		X-members
1	1/16"x1/4"x36"	wing spar
2	1/16"x1/8"x36"	wing stabilizer spars
2	1/4"x1/4"x36"	wing stabilizer, leading edge
1	3/16"x3/4"x36"	wing trailing edge
1	1/8"x3/4"x36"	stabilizer trailing edge
2	1/16"x3"x36"	ribs, fin, planking, fill-in
Scrap	1/8"x3"	wingtips, fuselage top, fuselage longeron
Scrap	3/4"x1-1/2"x3" block	load dummy
Scrap	1/8" plywood	firewall
Scrap	1/16" plywood	landing gear mount, dihedral joiners

8" of 1/16" dia. steel wire for landing gear, 1-1/4" dia. wheels of lightweight wood, celluloid for windshield lightweight Silkspan, 1/16" dowel, 3 ounces lead for load dummy, cement, clear dope, fuel cutoff if desired.

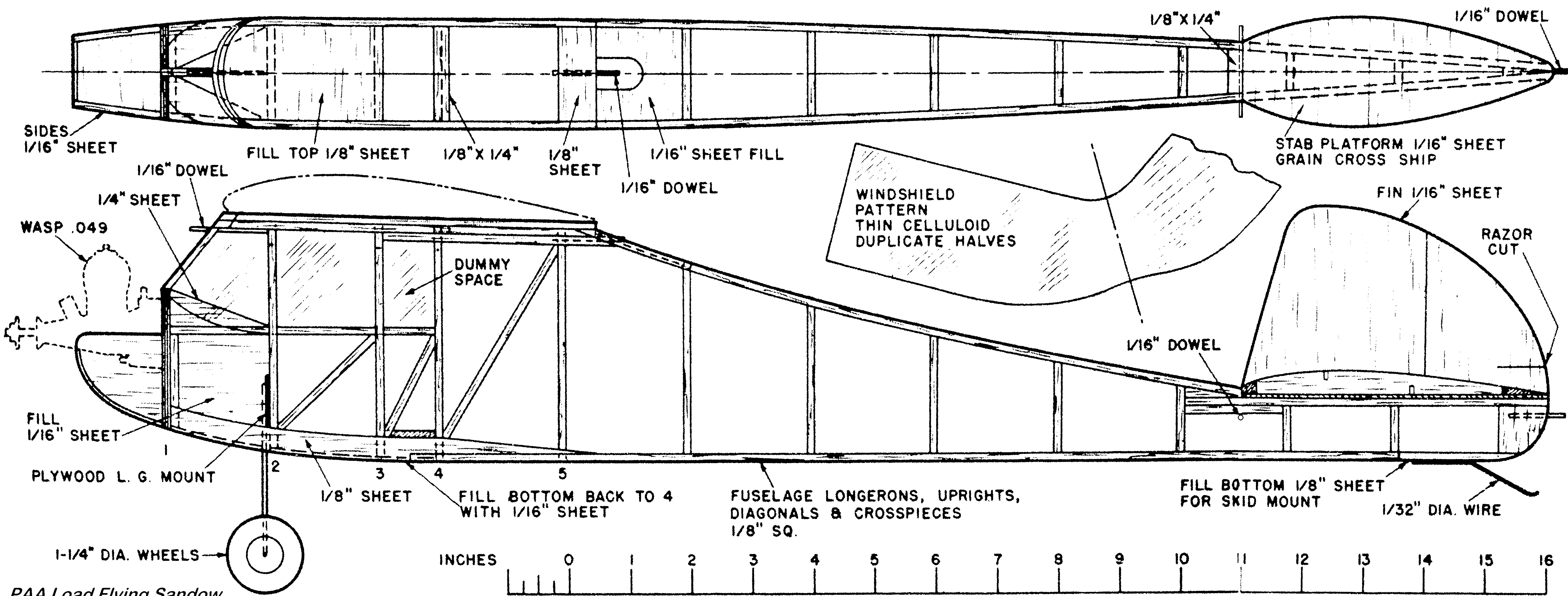
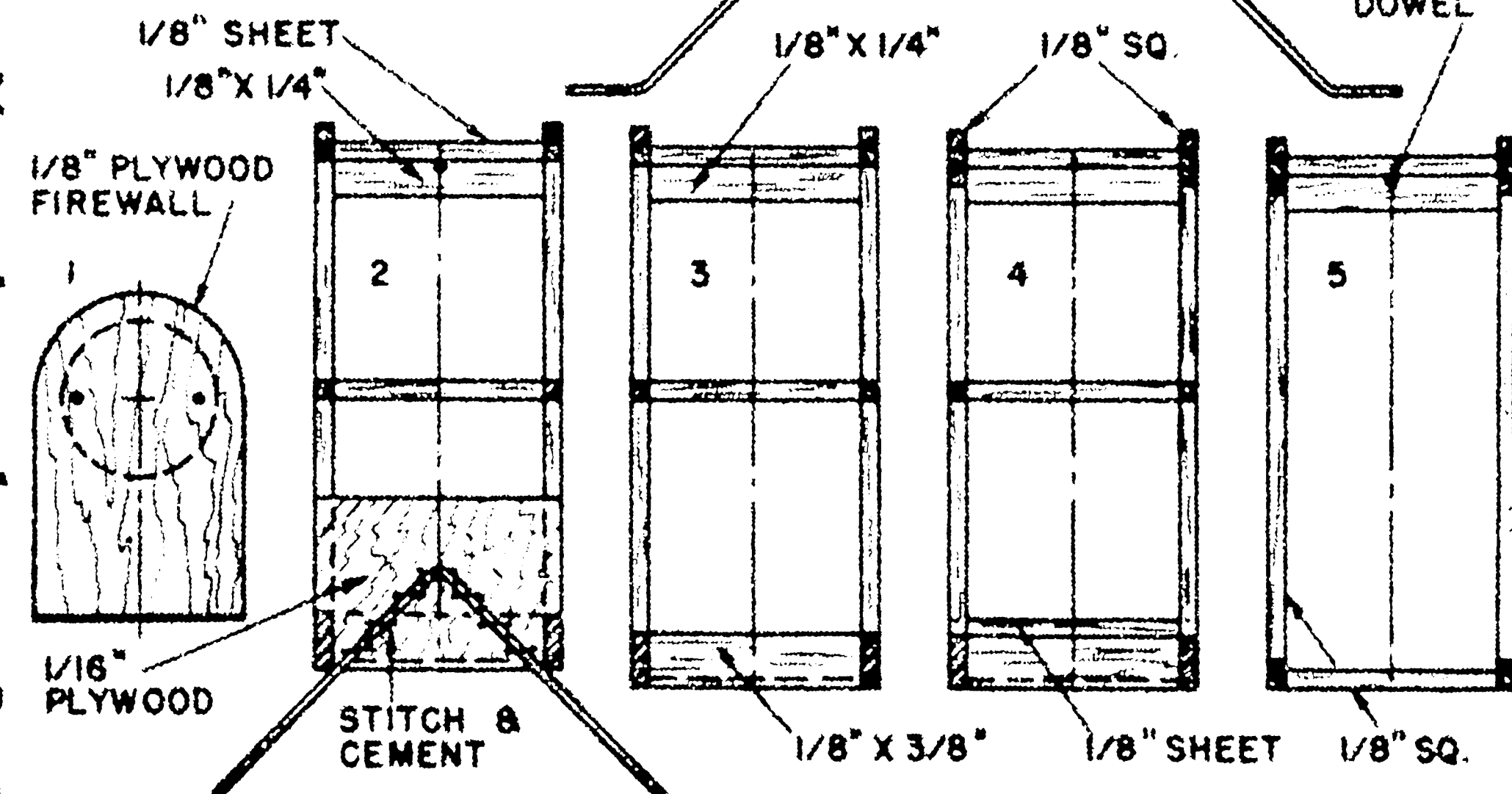
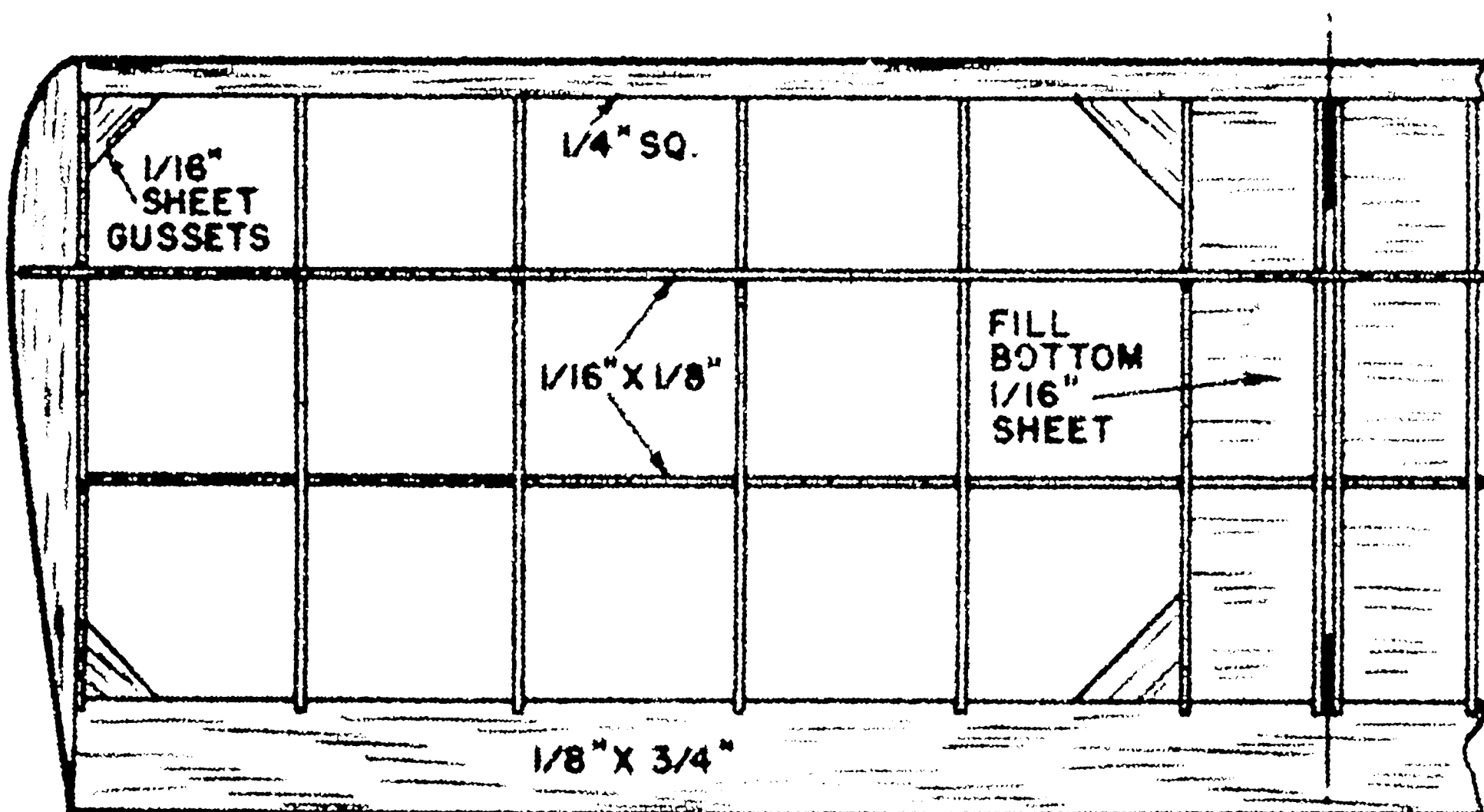
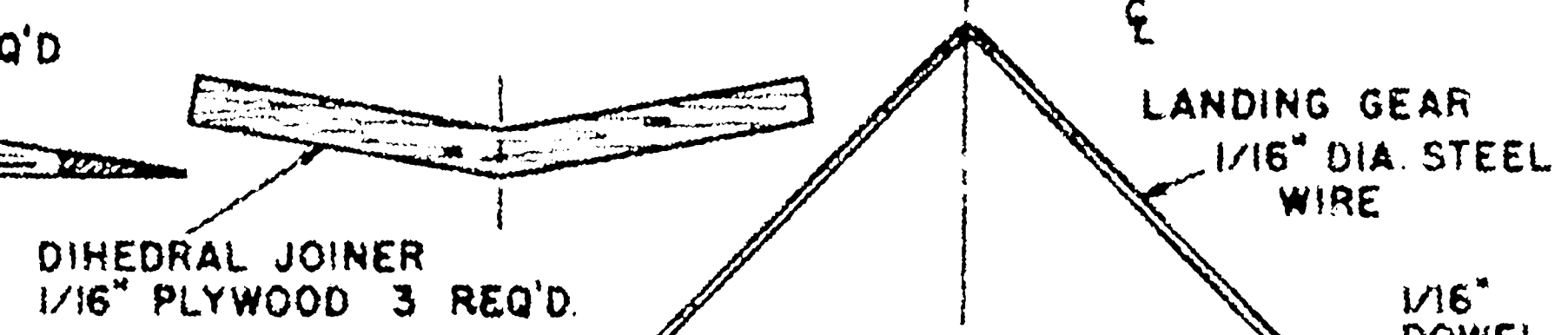
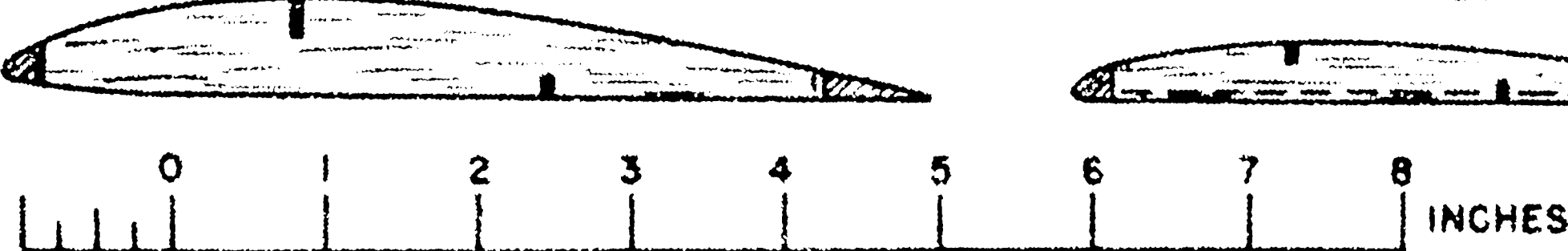
### FULL-SIZE PLANS

of this model are available. Send 50c to  
 MODEL BUILDERS' Plans Service, Fawcett  
 Building, Greenwich, Connecticut. Specify  
 Plan No. 1001.



WING RIBS 1/16" SHEET 22 REQ'D.

STAB RIBS 1/16" SHEET 12 REQ'D



# Sadow

## By Cal Smith

Cal Smith on Model Building  
Fawcett Book 139, 1952