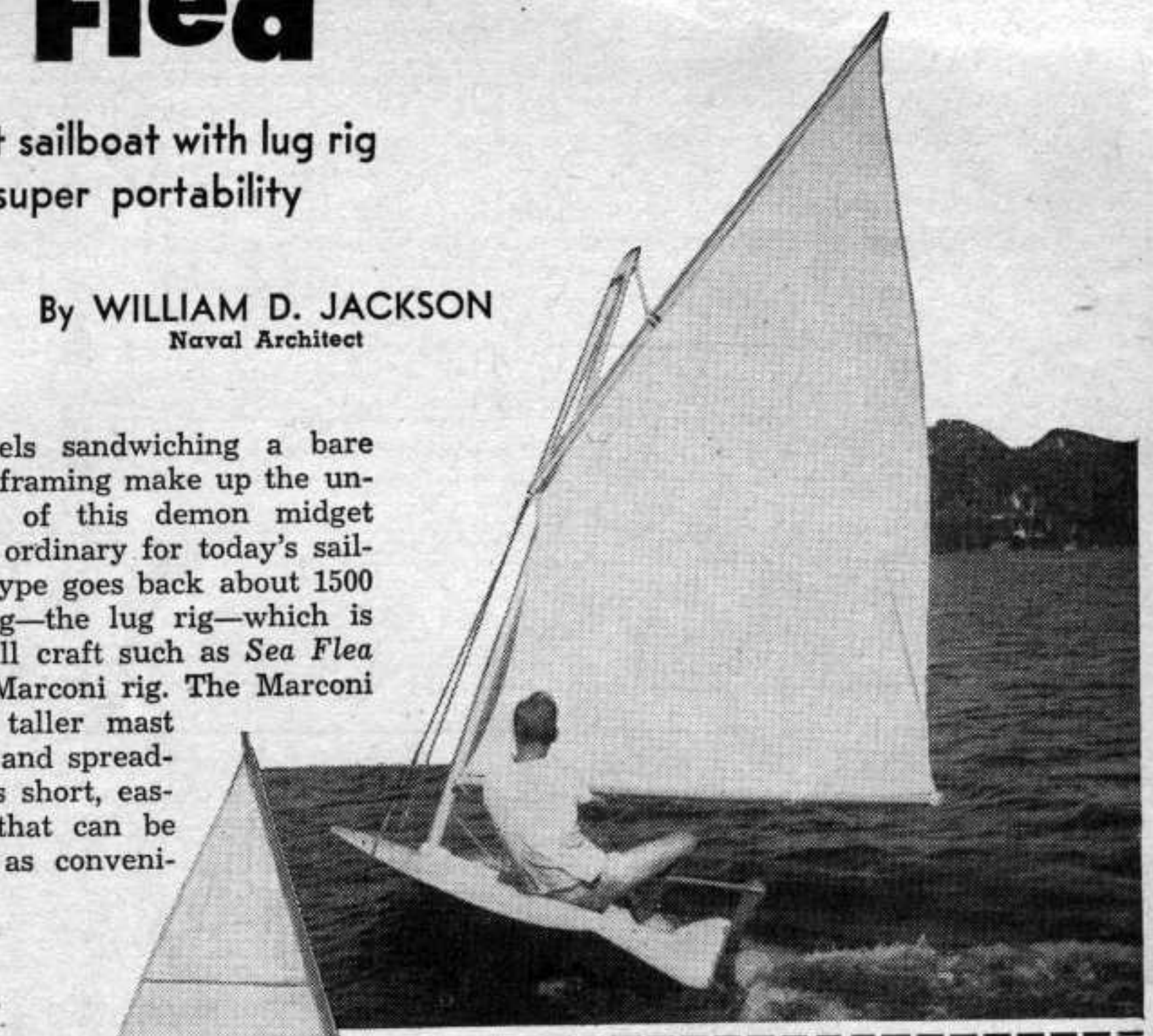
Sea Flea

This midget sailboat with lug rig offers super portability

By WILLIAM D. JACKSON
Naval Architect



TWO plywood panels sandwiching a bare minimum of inner framing make up the unusual construction of this demon midget sailer. Also out of the ordinary for today's sailing craft, though the type goes back about 1500 years, is its sailing rig—the lug rig—which is better suited to a small craft such as *Sea Flea* than the more usual Marconi rig. The Marconi rig would require a taller mast with many stay wires and spreaders; the lug rig utilizes short, easily dismantled spars that can be carried atop an auto as conveniently as the boat itself.

Plywood for *Sea Flea* should be purchased in 10-ft. lengths (see Materials List). If this length is unavailable, get 8-ft. lengths and close joints with a batten. Constructed to the dimensions given, *Sea Flea* will just plane; if you increase its length one or two feet, planing action will initiate more readily. Keep this in mind if you are going to make any modifications in the design to tailor it to your own individual requirements.

A sailing dervish, Sea Flea points remarkably close into the wind and on some points of sailing will rise out of the water and plane.



Craft Print Project No. 270

STATEMENT OF USES

USES: Lightweight, low-cost sailboat providing the utmost in sailing sport. Easily carried atop an auto.

TYPE: Surfboard sailboat.

LENGTH: 10 ft.

BEAM: 48 in.

WEIGHT: Hull: 90 lbs; Spars: 15 lbs.

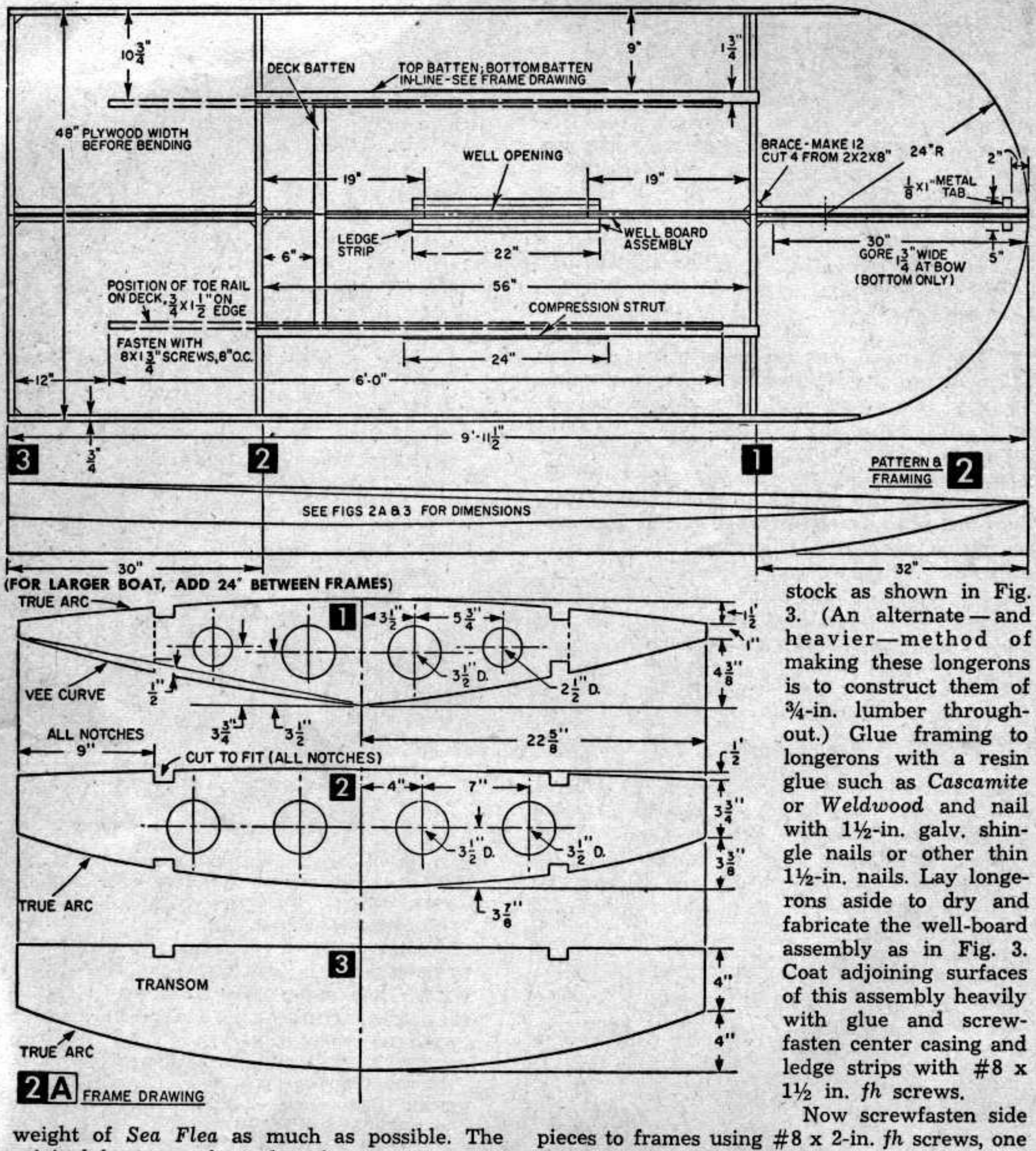
SEATING CAPACITY: A one-man boat but will carry two safely.

CONSTRUCTION: Exterior ¼-in. plywood over a developed lightweight frame.

REMARKS: Inherent air-chamber hull is non-sinkable, will support 800 lbs.

Assuming that you are going to build *Sea Flea* as shown, take two ¼-in x 4 x 10-ft. panels of AC (or AB) grade, fir, exterior plywood and mark and cut fore ends to a 24-in. radius as shown in Fig. 2; slit and gore the piece to be used for the bottom as indicated. (This gore will later be brought together and fastened with a metal tab so that the bow will have a lift to it.)

Now set top and bottom panels aside and begin the framing. Lumber for framing should be selected with the objective of reducing the



weight of *Sea Flea* as much as possible. The original boat was framed with spruce and fir; you can reduce *Sea Flea's* weight from 90 lbs. specified in the Statement of Uses to as little as 75 lbs. by selecting your framing lumber from among those named first on this list: 1) spruce; 2) red cedar; 3) redwood; 4) white fir; 5) Douglas fir. Reducing its weight, of course, makes the craft easier to handle and quicker to plane.

Both side pieces are rough cut from a single 10-ft. 1 x 6, then cut to exact dimensions as shown in Fig. 3. After sawing out frames, cut holes (as shown in Fig. 2A) in #1 and 2 frames to lighten them. Use a circle cutter for this, preferably in a drill press rather than in a hand drill.

Now make the fore and aft longeron pieces from ¼-in. plywood and frame with ¾ x 1¼-in. stock as shown in Fig. 3. (An alternate — and heavier — method of making these longerons is to construct them of ¾-in. lumber throughout.) Glue framing to longerons with a resin glue such as *Cascamite* or *Weldwood* and nail with 1½-in. galv. shingle nails or other thin 1½-in. nails. Lay longerons aside to dry and fabricate the well-board assembly as in Fig. 3. Coat adjoining surfaces of this assembly heavily with glue and screwfasten center casing and ledge strips with #8 x 1½ in. *fh* screws.

Now screwfasten side pieces to frames using #8 x 2-in. *fh* screws, one at the #1 frame each side, two at the #2 and 3 frames, and position well-board assembly and fore and aft longerons. Carefully align all members, screwfasten well-board assembly to #1 and 2 frames with #8 x 2-in. *fh* screws, two at each frame, coat adjoining surfaces of longerons and frames with glue, and toe-nail longerons to frames with 1½-in. nails. Glue and nail tri-corner brace pieces as in Figs. 2 and 5. Notch top and bottom battens flush into frames and screwfasten with a #8 x 1¾-in. *fh* screw at each joint.

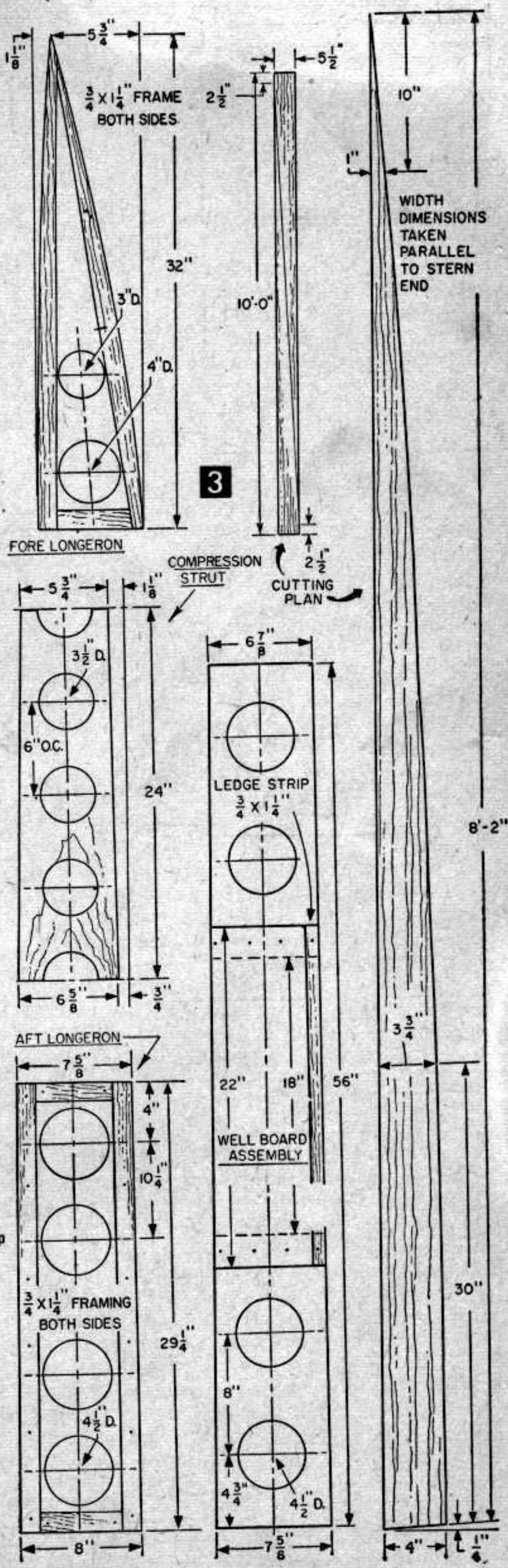
With framework upside down on a sawhorse, place the bottom plywood panel in position (A surface outside), clamp to side pieces with *Jorgenson* C-clamps, and close the bottom gore. A prop to the ceiling of your shop from the aft

end of the slit and a prop to the floor from the fore end will enable you to accomplish this seemingly impossible task. Check for fit overall, mark framing for trimming where necessary, remove plywood and trim framing where needed. Re-position and clamp plywood as before and outline placement of all frames, sides and battens on inside (C surface) of bottom, remove bottom and drill spotting holes at 6-in. intervals down center of these outlines. Re-position and re-clamp plywood bottom to framework, mark for well opening (see Fig. 2), remove bottom, and with a keyhole or compass saw cut out well opening.

Now set bottom, C side up, on sawhorse, prop gore closed as before and bolt metal tab to plywood as indicated in Fig. 2, clipping bolts off flush with nuts on the inside. Notch fore longerons to receive metal tab and coat all adjoining surfaces of bottom and framing—except at well opening—fairly heavily with resin glue. At well opening, coat heavily with Kuhls *Avio* liquid marine glue and line with Canton flannel strips. Clamp framework in place on bottom and fasten at all contacting points—using spotting holes as a guide to framework location—with either #6 x 1-in. *fh* screws or 1 x 12 *Stronghold* nails spaced at 2-in. intervals. Drill lead holes where necessary and countersink slightly for either screws or nails.

When hull is completely secured, turn bottom side up and fill any gap on closed gore slit with a mixture of fine sawdust and resin glue. Let mixture dry and sand joint smooth.

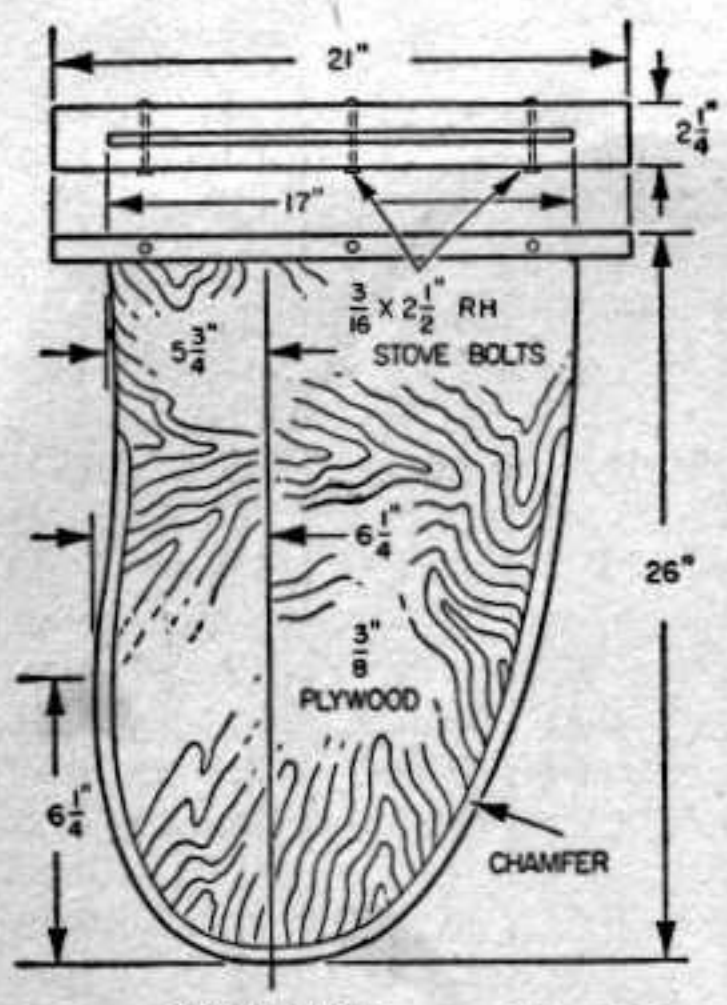
Next glue and nail compression struts in place (see Figs. 2 and 5), and give interior of hull and underside (C surface) of plywood deck panel two coats of Kuhls *3-Way Preservative*. Mark



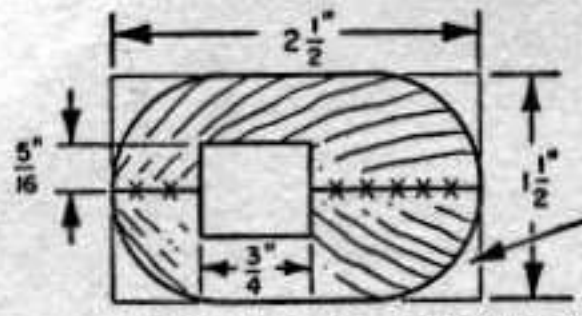
MATERIALS LIST—SEA FLEA

No.	Size and Description	Use
	Plywood (exterior grade AB or AC)	
2 pcs	1/4" x 4 x 10' fir, DPFA	decking and bottom
1 pc	1/4 x 24 x 30" fir	longerons, struts
1 pc	3/8 x 18 x 26" fir	well-board assembly
	Lumber	
1 pc	1 x 6" x 4'	#1 frame
1 pc	1 x 10" x 8'	#2 and 3 frames
1 pc	1 x 6" x 10'	sides
2 pcs	3/4 x 1 3/4" x 8'	deck battens
2 pcs	3/4 x 1 1/4" x 8'	bottom battens
2 pcs	3/4 x 1 1/2" x 6'	toe rails
1 pc	3/4 x 5 1/2 x 18"	rudder stock
1 pc	2 x 4" x 2'	tiller support, mast step
1 pc	3/4 x 1 5/8 x 12"	rudder post
2 pcs	1 x 4" x 12'	boom
2 pcs	1 x 4" x 12'	gaff
2 pcs	1 x 4" x 12'	mast
2 pcs	3/4 x 3/4" x 12'	mast
	Fastenings	
3 gross	#6-1" fh screws, or	
1 1/2 lbs	1 x 12 *Stronghold* nails, hot-dipped galvanized	
1 doz	#8-1 1/2" fh screws	
1 doz	#8-1 3/4" fh screws	
1 doz	#8-2" fh screws	
1/4 lb	1" wire nails	
1/2 lb	1 1/2" galvanized shingle nails	
15 yd	3" fiber-glass tape	available from Castolite Co., Woodstock, Illinois or Herter's, Inc., Waseca, Minnesota
1 qt.	resin hardener to suit	

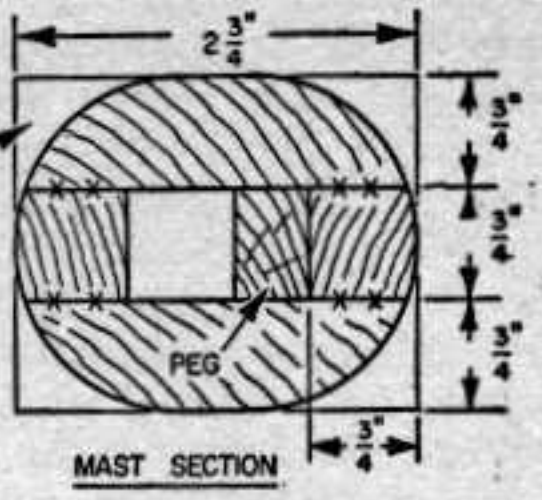
glue, hardware, tacks, sheet metal as required



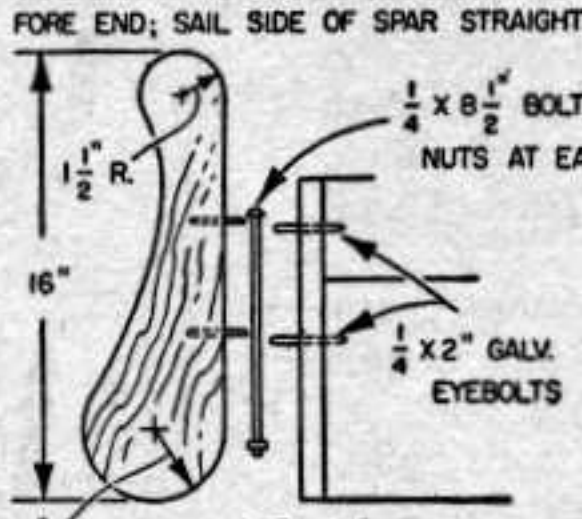
CENTER BOARD



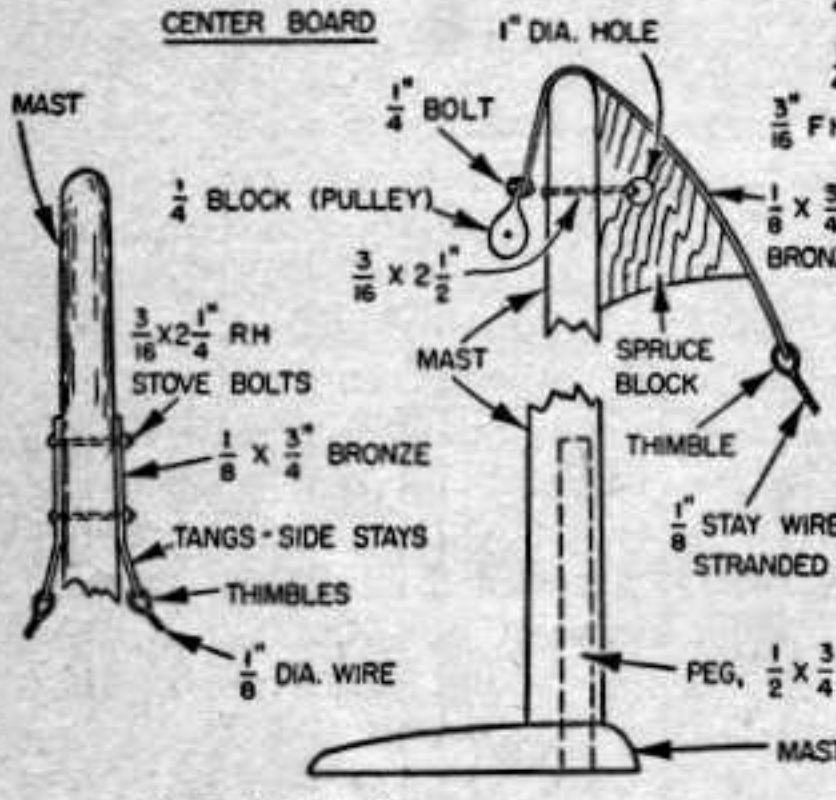
SECTION OF GAFF AND BOOM - TAPER TO ENDS. MAKE ENTIRE SPAR 2 1/2" WIDTH - GLUE DRIES - TAPER SPAR TOWARDS EACH END. ALL TAPERING AT FORE END; SAIL SIDE OF SPAR STRAIGHT.



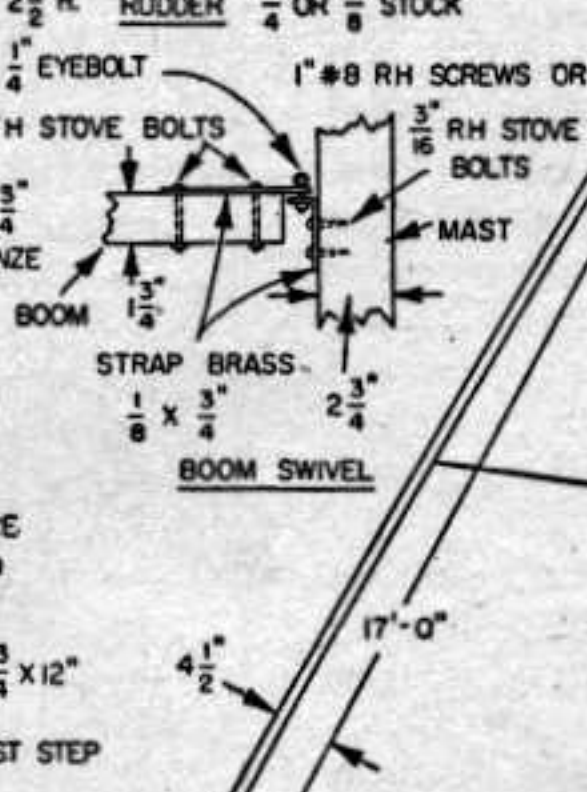
MAST SECTION



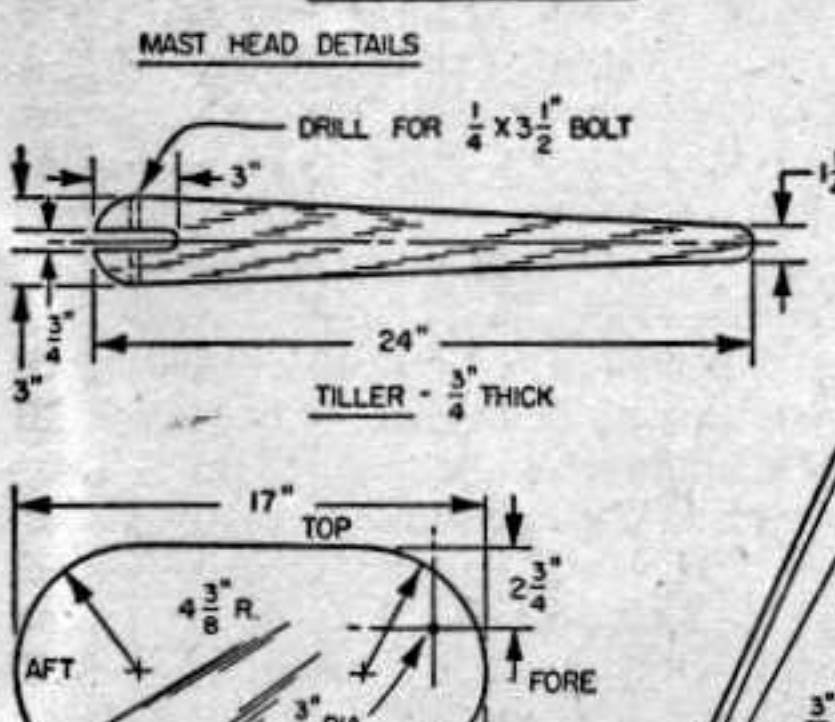
RUDDER 3/4" OR 7/8" STOCK



MAST HEAD DETAILS



BOOM SWIVEL

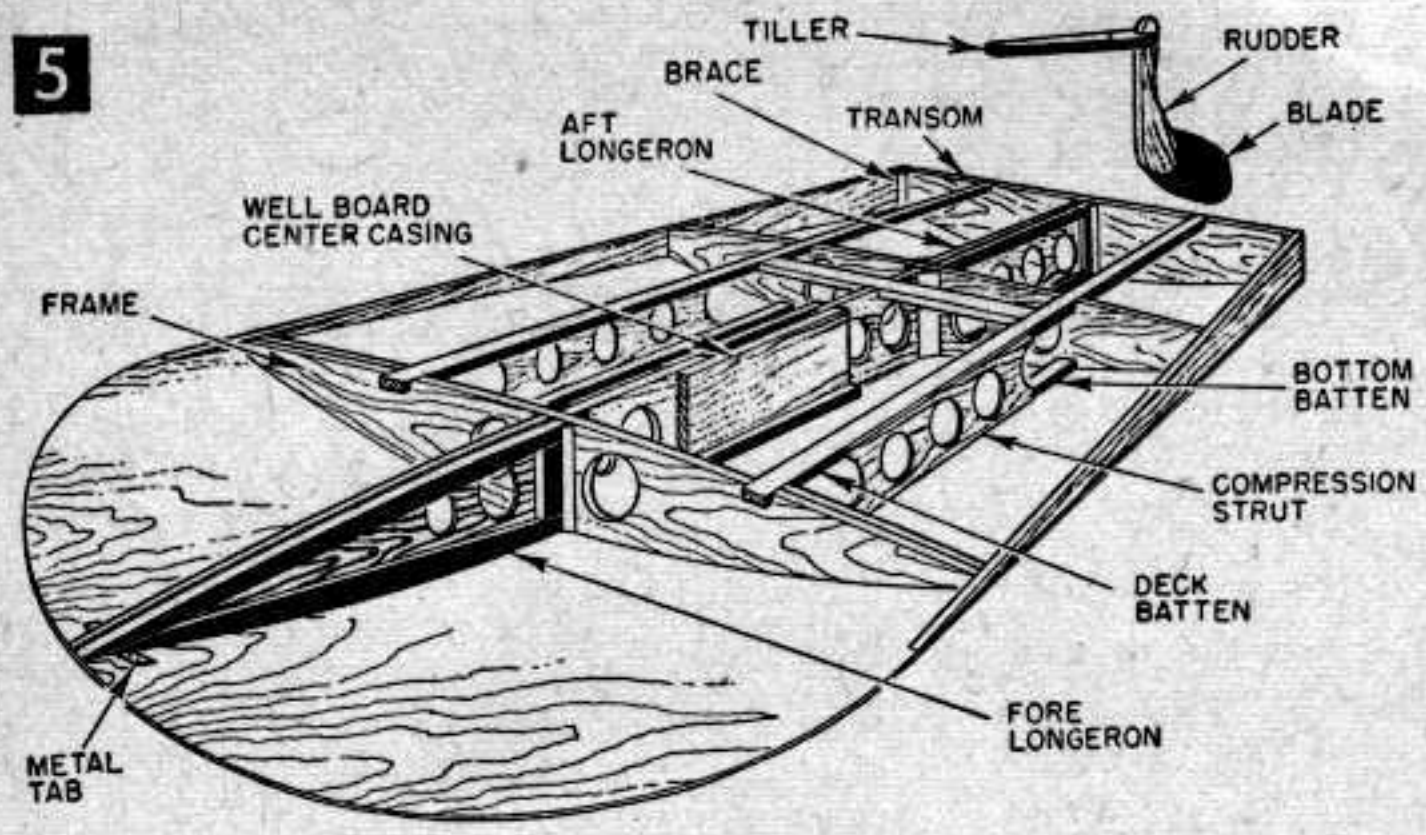


TILLER - 3/4" THICK

RUDDER BLADE - 1/16" SHEET METAL (OR HEAVIER ALUMINUM)

MAST STEP - 2 X 4 X 12"

TILLER SUPPORT - 1 5/8" THICK



frame locations and centers on both sides of deck panel, coat all contacting surfaces with resin glue and screwfasten or nail in place to framework as with bottom, except at the fore ends of plywood deck and bottom panels. Clip the radii of these panels together with 1-in. wire nails clinched over on underside. When the glue has dried thoroughly, power-disc sand off the nails; the glue bond will in no way be weakened. Finally, install toe rails on deck as shown in Fig. 2.

For a permanently watertight hull, the edges of *Sea Flea* are covered with 3-in. fiber-glass tape and resin. To prepare hull for application of tape, trim all edges smoothly with disc sander or plane and sandpaper and with a spokeshave round off hull forward where panels join, sanding smooth after. With hull right side up, start taping at transom and tack every 18 in., pulling tape snugly but not tightly towards bow. Pull tape tight around curve of bow and continue back to transom. Now coat tape with a heavy impregnation of resin and let harden. Turn hull over and tape bottom, ending tape at point where panels join. Coat tape with resin and let harden. Then seal corners of hull at transom with coated tape and when this has hardened apply two coats of resin to entire taped area, allowing first coat to harden before applying second.

Sand entire hull and apply three coats of enamel or three coats of cream or white *Boatlife*. The *Boatlife* finish is preferable as a finish since it prevents undue water soakage and adds very little weight to the hull.

Sails for *Sea Flea* can be made at home on an ordinary sewing machine, or purchased from Alan-Clarke Co., 96 Chambers St., New York 7, N. Y. Specify 3-oz. balloon cloth if you buy your sails; if you make them, use closely woven 4-oz. muslin. Since there is considerable shrinkage in unbleached muslin, soak the cloth in water and let it dry before cutting. Make according to dimensions shown in Fig. 4. Quarter-inch brass grommets, spaced 12 in. apart are used to lash gaff of sail to spar; the remainder of the sail is loose footed—simply provide a grommet at fore and aft end of foot (or boom) of sail. Sew a length of ¼-in. manila line around gaff portion of sail (upper edge), sewing rope to sail with an overcast stitch. Use heavy thread for this lashing.

Make spars from spruce as indicated in Fig. 4. All spars are hollow, the mast of four pieces, boom and gaff of two. The centers of the boom and gaff are hollowed by routing two halves or using a table saw with groover and dado blades. Glue-coat all adjoining surfaces (*Elmer's Waterproof* is best for this but *Cascamite* or *Weldwood* may be used) and either clamp together or wind with wire and wedge. When glue has dried, round spars with jack plane and sand, first with coarse paper, then with fine. Finish with three coats of enamel or clear *Boatlife*. Many of the fittings for these spars can be made with 3/16-in. bronze welding rod or #12 galvanized wire. Mast step and tiller support are made from 2 x 4, sanded and finished as with spars. Fastenings are indicated in Fig. 4.

Sea Flea's rudder is collapsible so that it may be used in either deep or shallow waters. The stock is cut from ¾-in. (or ⅞-in.) hardwood (see Fig. 4) and slotted at the bottom edge for the blade. The blade may be either sheet steel or aluminum (if aluminum, use heavier than 1/16-in.), secured to stock with a 5/16-in. bolt and wing nut. Tiller is cut as shown in Fig. 4 and slotted to receive stock which is hung with a ¼ x 3½-in. bolt and wing nut. The center board is of the dagger type cut from ⅜-in. plywood. Chamfer edges sharp, coat with resin glue and when dry sand smooth and apply three coats of enamel or *Boatlife*.

Take your *Sea Flea* out in a moderate breeze for its first trial run, a breeze of not over 10 *mph*. Wear bathing trunks and a small life preserver and take a position toward the stern. If you sit too far forward, speed will be reduced and the hull may nose under. Feel the craft out at first, letting some wind spill from the sail if necessary. If wind is gusty and the hull fails to come about properly lift board out part way and hull will come about with no effort. If the gaff sags to windward, lash ¼-in. line loosely around gaff and mast to peak gaff higher; keep stays taut but not too tight. Once you get to know your boat you're in for many fine days of smooth sailing with *Sea Flea*.

● Craft Print No. 270, in enlarged size for building Sea Flea is available at $1.50. SPECIAL QUANTITY DISCOUNT! If you order two or more craft prints (this or any other print), you may deduct 25¢ from the regular price of each print. Hence, for two prints, deduct 50¢; three prints, deduct 75¢; etc. Order by print number, enclosing remittance (no C.O.D.'s or stamps) from Craft Print Dept. 2039, SCIENCE AND MECHANICS, 450 East Ohio Street, Chicago 11, Illinois. See coupon on page 168. Now available, our new illustrated catalog of "196 Do It Yourself Plans," 10¢. Allow four weeks for delivery.

