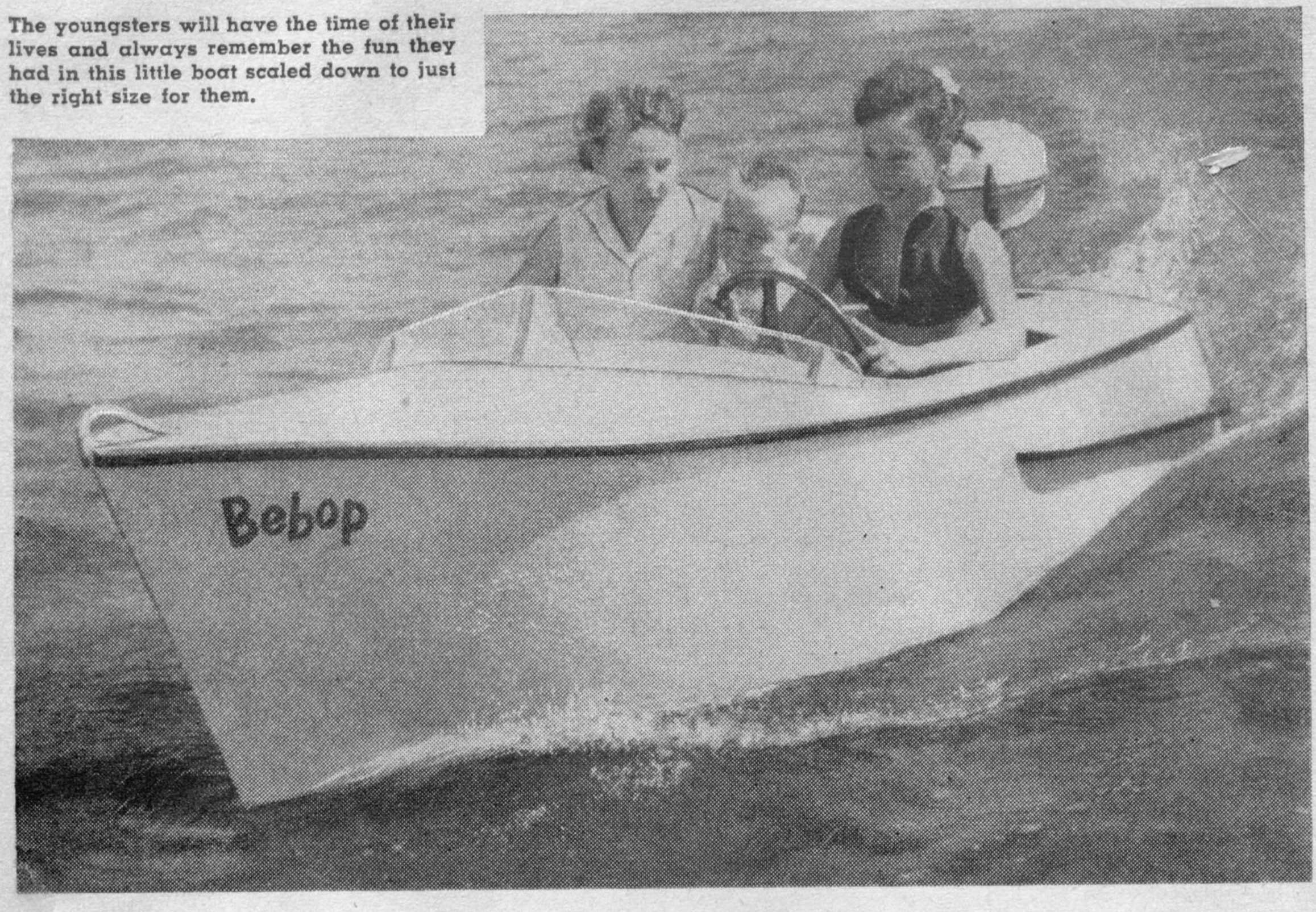
The youngsters will have the time of their lives and always remember the fun they had in this little boat scaled down to just the right size for them.



BEBOP 8ft. Outboard Runabout for Youngsters

By WILLIAM D. JACKSON
Naval Architect

Craft Print Project No. 276

STATEMENT OF USES

TYPE: Flat bottomed plywood runabout, 3½ *hp* outboard-motor powered, for exclusive use by youngsters on protected waters.

LENGTH: 8 ft.

BEAM: 48 in.

WEIGHT: 100 lb., includes steering wheel, steering gear, Plexiglas windshield, and seat, also bow and stern fittings, fiber glass bottom.

SEATING CAPACITY: Three children.

COST: Hull $17. Fittings $18. Total $35.

MATERIAL: ¼" fir exterior plywood over a sawn to shape wooden frame.

SPEED: 10 *mph* maximum.

FOR as little as $35 for materials, you can build this midget version of a classy runabout for your youngsters. The hull sides flare forward and curve aft with a wide safe beam. Single cockpit design with steering-wheel engine control and plastic windshield give it a racy appearance. Powered with a 1½-3½ *hp* outboard motor the little boat has a top speed of 10 *mph*. The speed, of course, could be limited by restricting the movement of the engine throttle beyond a certain point.

Since odd-size, difficult to obtain boat lumber is not used, all materials can be purchased at your local lumber yard (see materials list). No steam bending of frame parts is required and difficult joinery work has been eliminated. Hull consists of sturdy framework covered with exterior plywood.

The first item needed to build *Bebop* is a 15 ft. length of building paper or ask your local lumber dealer for several pieces of the heavy paper that wall board is wrapped in. Upon this paper make full-size drawings of the three frames (Fig. 2). The curves can be drawn with the aid of a ¼ x ⅜ in. wooden strip or batten bent against nails driven through the paper at the corners of the drawings.

Transfer the outlines of the frame pieces to ¾ in. thick stock with a pointed wheel similar to a dressmaker's tracing wheel or make a series of marks with a scratch awl. Be sure to mark and cut the ¼ in. plywood gussets for the #1

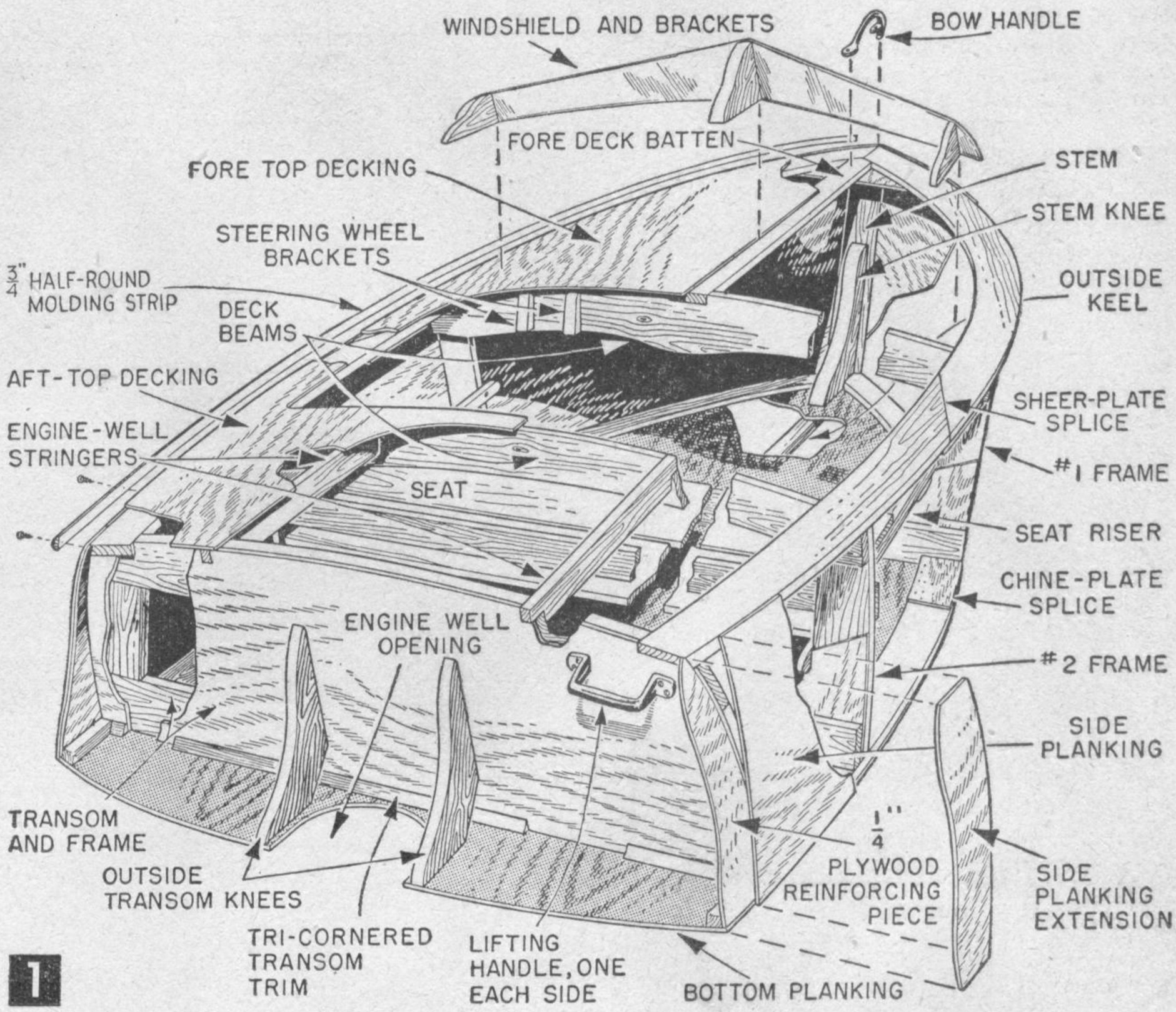
and #2 frames at the same time.

After sawing the pieces to shape, assemble them using the paper patterns as an alignment guide. Fasten the gussets with glue (*Weldwood* or *Elmer's Waterproof*) and #8 x 1 in. *fh* screws or #0 x 1 in. *Stronghold* nails and the deck beams with glue and two #8 x 1½ *fh* screws at each joint.

The bottom is the next item on the agenda. Begin by marking an 8 ft. long centerline down the exact center of a 4 x 8 ft. sheet of ⅜ in. plywood. Measure and mark the station lines (Fig. 3) at right angles to the centerline. Now, measure and mark the distances from the centerline outward on each station line and drive a 1½ in. finishing nail partially into the plywood at each mark. Bend a ½ x ¾ in. batten 8½ ft. long against these nails, and secure with additional nails at each end of the batten. Then, holding a pencil against the batten, draw the curved line on the plywood. Repeat the procedure to draw the curved line on the other side of the centerline. Remove the batten and nails, mark the engine well opening with a compass and saw the plywood bottom to shape.

To lay out the curved chine plates, which must be made in two sections, place a 4 ft. length of ¾ x 9⅝ in. board under the forward curved edge of the bottom plywood and draw the first curve as in Fig. 3. Then move the board out a little, measure the 3 and 2¼ in. distance for the chine width and draw the second curved line again using the plywood bottom piece. Lay out the #2 chine piece in the same way. Be sure to mark the end of the splice of the #1 chine piece on the plywood so that you can continue from that mark when laying out the #2 chine.

Since two chines are required, repeat the process using the other side of the plywood bottom and saw the chines to shape. Coat the contacting surfaces of the chines and bottom with glue and clamp the chines to the plywood bottom. Then turn the bottom over on the floor and nail the plywood to the chines with #0 x 1 in. Stronghold nails placed in a double row and staggered 2½ in. apart. Block up the back of the chine when nailing. Now, before the glue dries, turn the bottom over and trim the aft ends of the chines at an angle as in Fig. 3. Also glue and nail the ¼ in. plywood gusset over the diagonal



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MATERIALS LIST—BEBOP

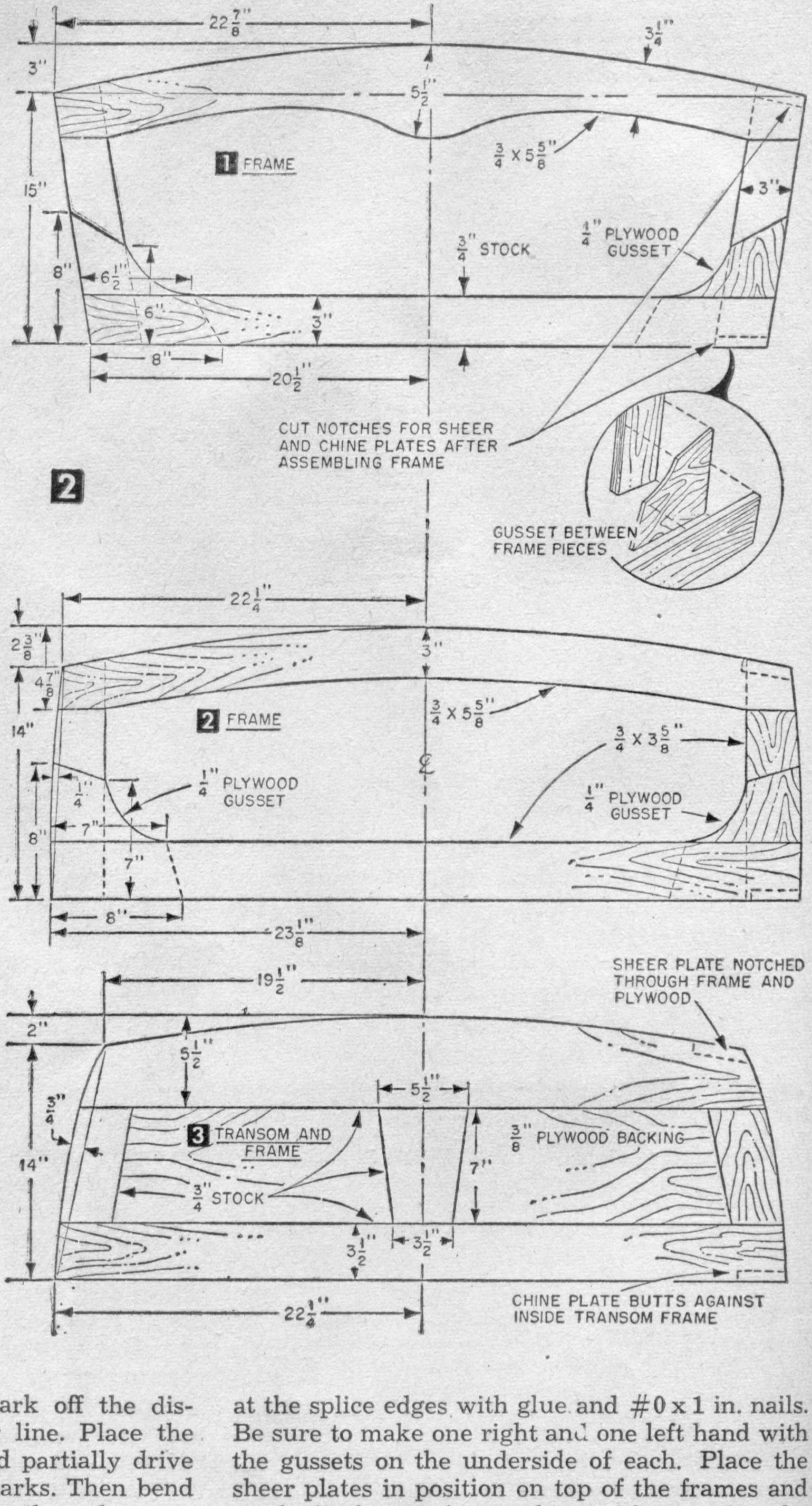
No. Req.	Size and description	Use
	PLYWOOD REQUIRED	
1 pc	⅜" x 4 x 8' AC grade fir exterior	bottom
2 pcs	¼" x 4 x 8' fir ex, AC	decking and sides
1 pc	⅜ x 16 x 48" fir ex AC	transom
	Note: waste from bottom and sides will make all gussets	
	LUMBER REQUIRED (hemlock, spruce or fir)	
1 pc	1 x 10 x 10'	sheer plates
1 pc	1 x 10 x 8'	chine plates
1 pc	1 x 6 x 12'	framing pieces
1 pc	1 x 4 x 14'	framing pieces
1 pc	1 x 8 x12'	framing pieces
1 pc	2 x 4 x 20"	stem
1 pc	2 x 10 x 24"	transom and stem knee
1 pc	1 x 8 x 8'	seat boards
1 pc	¾ x 1½" x 8'	outside keel
2 pcs	¾ x 1¾ x 21"	well stringers
2 pcs	¾" half round 10 ft. long	sheer molding
	OTHER PARTS	
3 yd	50" wide fiber glass cloth with resin	
2 lbs	#0 x 1 in. Stronghold nails (The above two items available at Herter's Inc., Waseca, Minnesota)	
3 gross	#8 x 1" fh screws	
2 doz.	#8 x 1½" fh screws	
2 doz.	#8 x 1¾" fh screws	
6	#10 x 2" fh screws	
6	#12 x 2½" fh screws	
1	3/16" single swivel eye block	steering gear
2	3/16" double swivel eye block	steering gear
1	10 or 12" steering wheel	steering gear
20 ft	3/16" plastic covered steering cable	steering gear
1	8 x 24" Plexiglas or Lucite	windshield
1	bow handle, aluminum	
2	lifting handles, aluminum	

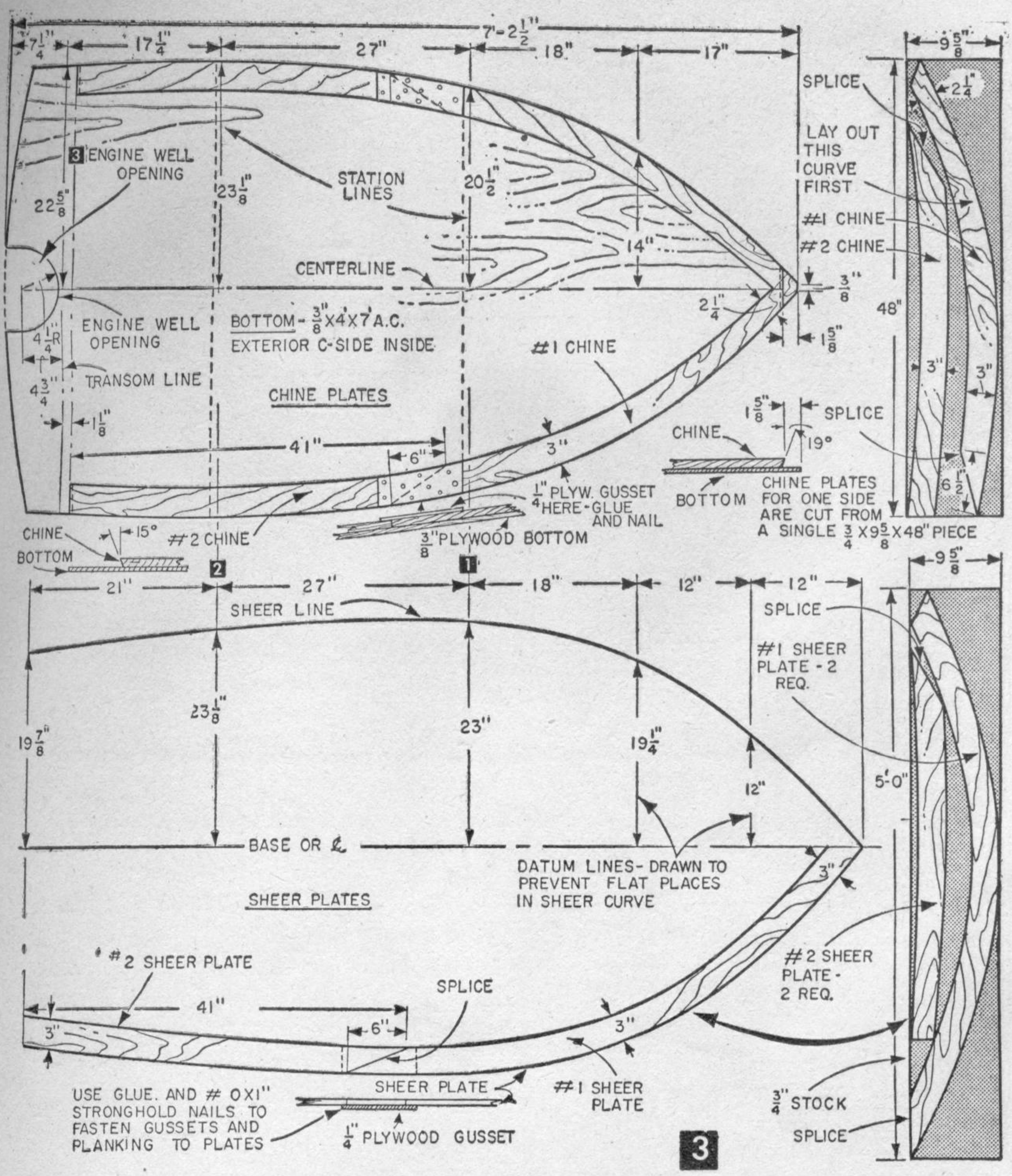
splice of the chines.

While waiting for the glue to dry, set up the #1 and #2 frames in their respective positions on the bottom and mark the frames for cutting the chine notches. After cutting notches, coat bottom contacting edges of frames with glue and clamp them to the bottom. Then turn the entire assembly over and fasten the chines and the bottom frame member with two #8 x 1¾ in. *fh* screws through each chine and the bottom with #0 x 1 in. Stronghold nails spaced 3 in. apart. Before securing the transom in position cut a 15° bevel on the bottom edge of the transom so it will tilt outward, and make up the transom knee (Fig. 5). Fasten the knee to the inside center of the transom with glue and three #12 x 2½ in. *fh* screws countersunk into plywood of transom. Then fit and fasten this transom assembly to the plywood bottom with glue and #0 x 1 in. Stronghold nails or #8 x 1 in. *fh* screws. Now make the outside transom knees (Fig. 5) and fasten to the bottom and transom on each side of the motor well (Fig. 1) with glue and six #8 x 1¼ in. *fh* screws in each knee. Rip a 3-corner strip (Fig. 5) and fasten to the lower outside bottom edge of the transom and plywood bottom of the boat.

Your next step is to make a full-size layout on building paper of the sheer plate (Fig. 3). First draw a centerline 7½ ft. long lengthwise of the paper about ½ in. from the left edge. At right angles to this line measure and draw in the frame and datum lines, and mark off the distances from centerline to sheer line. Place the paper on a sheet of plywood and partially drive in finishing nails at sheer line marks. Then bend a ½ x ¾ in. batten against the nails and secure at each end with additional nails. Hold a pencil against the batten and draw the curved sheer line on the paper. For the inside sheer-plate line, measure and mark 3 in. toward the centerline and draw in the curved line as you did the sheer line. Then mark the diagonal splice and cut out the sheer plate pattern with a scissors.

Now, place the patterns on the 13/16 x 9⅝ in. board as in Fig. 3, draw around them and saw to shape. Make two sets and fasten them together at the splice edges with glue and #0 x 1 in. nails. Be sure to make one right and one left hand with the gussets on the underside of each. Place the sheer plates in position on top of the frames and mark the frames for notching. After cutting the notches, replace the sheer plates and temporarily clamp in place. Make the sheer-plate gusset from ⅜ in. plywood with the grain of the top and bottom plies running with the 7¼ in. dimension as in Fig. 5 so it will bend readily. Temporarily clamp the gusset in place and make up the stem, Fig. 5, from 2 x 4-in. stock, beveling the long edges as indicated. Determine the angle at which to cut the top and bottom ends of the stem directly from the hull. Also make up the stem knee





and temporarily fit it in place against the bottom and stern.

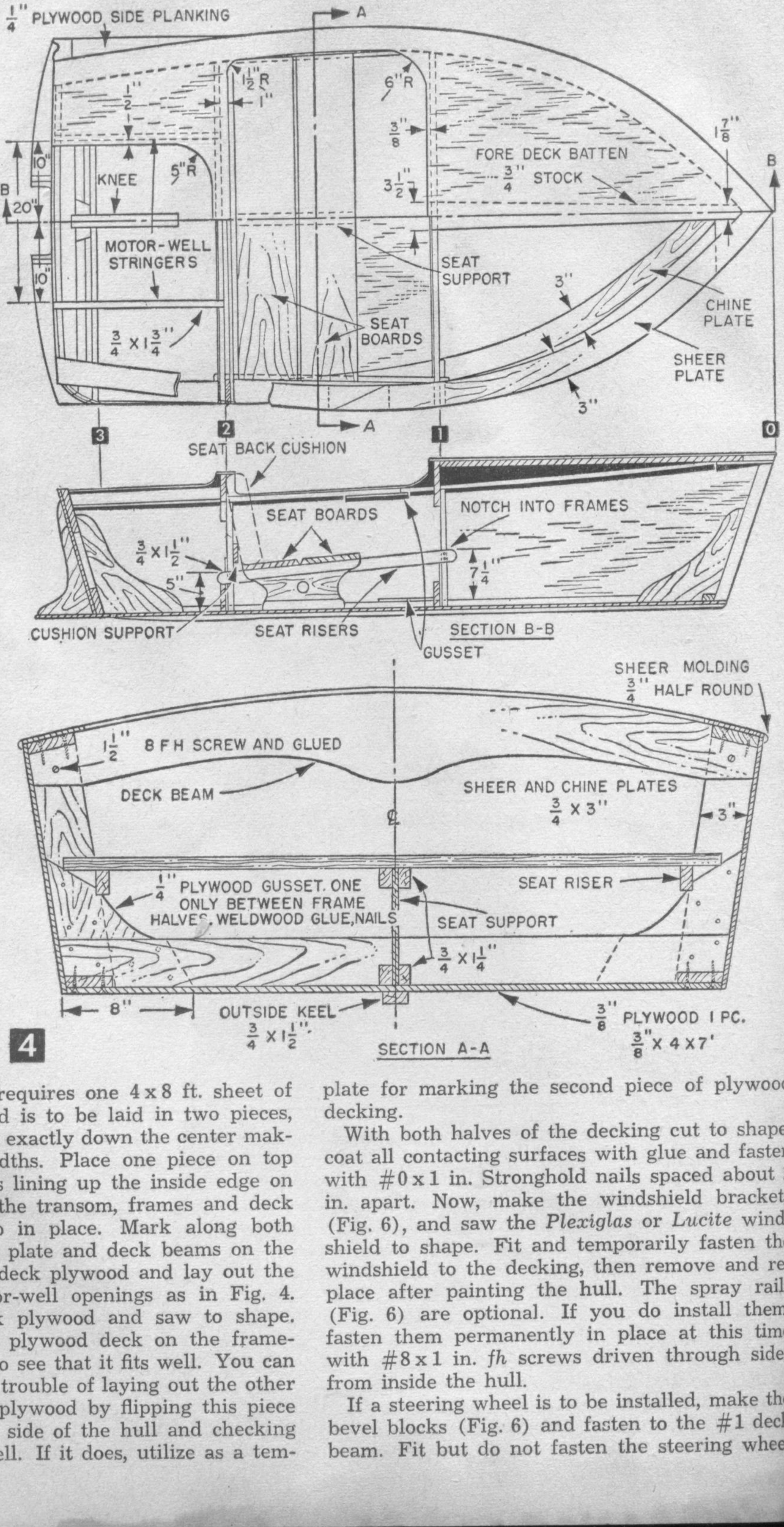
When you are satisfied that all the parts fit properly, mark their location with a pencil and disassemble them including the sheer plates. Then, starting with the sheer plates, reassemble them to the frames fastening with glue and two #8 x 1¾ in. *fh* screws to each joint. Fasten the sheer-plate gusset with glue and #0 x 1 in. nails to the underside of the plates. Before installing the stem, fasten the stem knee to the stem with glue and two #12 x 2½ in. *fh* screws as in Fig. 5. Then install the stem assembly and fasten at the top with one #10 x 2 in. *fh* screw driven through the plate gusset, and at the bottom with four #8 x 1½ in. *fh* screws driven through the plywood bottom into the stem knee. Follow by notching the fore deck batten flush with the top of the #1 deck beam and trim the fore end of the batten to fit between the sheer plates at the bow. Fasten the batten to the deck beam with glue and two #8 x 1½ in. *fh* screws and glue and #0 x 1 in. nails to the sheer-plate gusset.

Next, cut two ¾ x 1¾ in. strips 21 in. long for the motor-well stringers (Fig. 4). Cut partial notches in the transom for these stringers and butt the fore ends against the #2 deck beam. Fasten with glue and one #8 x 1½ in. *fh* screw at transom and two #8 x 1½ in. *fh* screws to #2 deck beam. Make up the seat risers and notch them into the #1 and #2 frame sides as in Fig. 4. Fasten with one #8 x 1¾ in. *fh* screw at each joint. The exact height of the seat support (Fig. 5) can best be determined by placing a board across the seat risers and measuring the distance from bottom of boat to underside of board. Lay out the ⅜ in. plywood piece of the seat support, cut to shape and then glue and nail the ¾ x 1¼ in. pieces on each side. Fasten the support to the bottom of the boat at the centerline with glue and six #8 x 1 in. *fh* screws driven up through bottom. Cut the seat boards to size and fit in place. Drill lead holes for screws but do not fasten in place now as it will be too difficult to paint the inside of the hull.

With the framework completed your next step is to prepare it for side and deck planking. First fair the outside edges of the sheer and chine

plates with a block plane, beveling the edges flush with the frame sides.

For the side planking, rip a 4 x 8 ft. sheet of ¼ in. plywood lengthwise and, with the ½ x ¾ batten, lay out the sides as in Fig. 3. When sawing to shape, cut about 1 in. oversize along the bottom edge to allow for trimming. Coat contacting edges of framework with glue and clamp one side in place starting at the bow. Fasten with #0 x 1 in. Stronghold nails spaced about 1½ in. apart and slightly staggered to prevent splitting of frame members. You will find that the 8 ft. length of plywood is lacking about 2 in. at the stern. To extend the length, add two pieces of ¼ in. plywood glued and nailed together as in Fig. 1. Install the other side planking in the same way and plane the edges flush at the top and bottom.



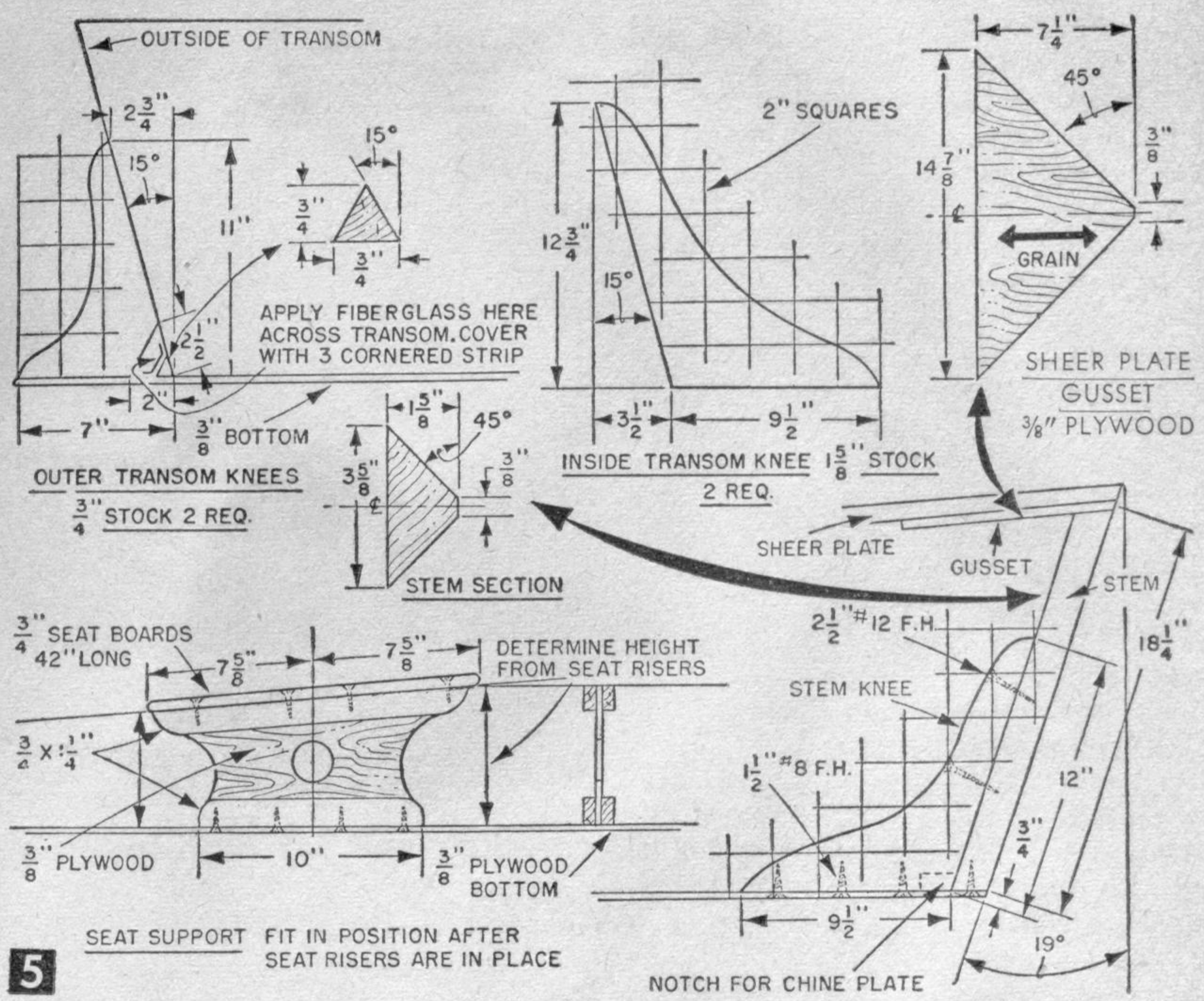
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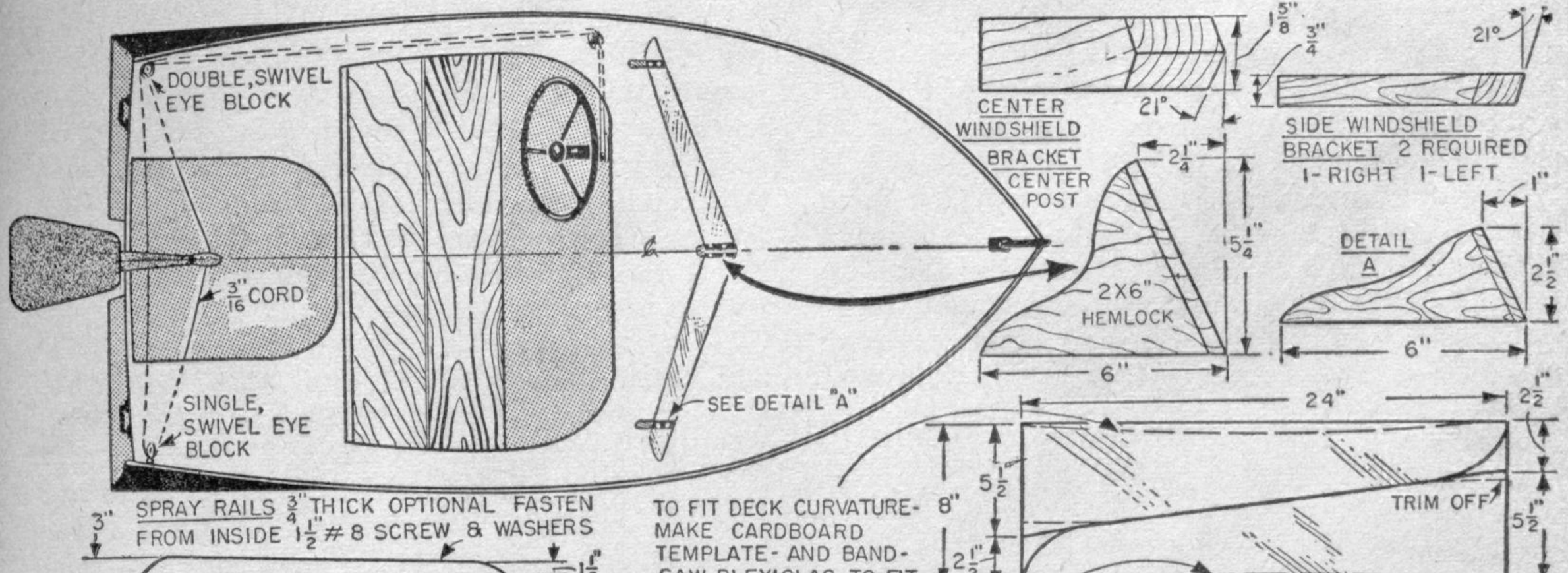
Since the deck requires one 4 x 8 ft. sheet of ¼ in. plywood and is to be laid in two pieces, saw the 4 ft. width exactly down the center making two 24 in. widths. Place one piece on top of the deck beams lining up the inside edge on the centerline of the transom, frames and deck batten and clamp in place. Mark along both sides of the sheer plate and deck beams on the underside of the deck plywood and lay out the cockpit and motor-well openings as in Fig. 4. Remove the deck plywood and saw to shape. Then replace the plywood deck on the framework and check to see that it fits well. You can save yourself the trouble of laying out the other piece of decking plywood by flipping this piece over to the other side of the hull and checking to see if it fits well. If it does, utilize as a template for marking the second piece of plywood decking.

With both halves of the decking cut to shape, coat all contacting surfaces with glue and fasten with #0 x 1 in. Stronghold nails spaced about 2 in. apart. Now, make the windshield brackets (Fig. 6), and saw the *Plexiglas* or *Lucite* windshield to shape. Fit and temporarily fasten the windshield to the decking, then remove and replace after painting the hull. The spray rails (Fig. 6) are optional. If you do install them, fasten them permanently in place at this time with #8 x 1 in. *fh* screws driven through sides from inside the hull.

If a steering wheel is to be installed, make the bevel blocks (Fig. 6) and fasten to the #1 deck beam. Fit but do not fasten the steering wheel

in place until after fiber glassing and painting hull. Since only the bottom of the hull is covered with fiber glass, turn the hull over and set it up on boxes or saw horses. Sand the bottom and round off the corners along the chine. Use 50 in. wide fiber-glass cloth so you can cover the entire bottom with one piece. Wrap it around the chines allowing the cloth to extend about 2 in. up the sides and around the bottom edge at the stern. Use strips of the cloth cut from waste trimmed at the bow to wrap around chine at widest part of the hull.





After the 3 coats of fiber-glass resin have hardened, install the keel and paint the boat inside and out with marine undercoater and enamel (Fig. 6). If desired, pigmented colors may be added to the fiber-glass liquid for a permanently sealed-in color on the fiber-glassed bottom.

When dry, replace the windshield, steering wheel and seat boards. The half-round sheer moldings, which should be stained mahogany and varnished before installation, can now be fastened in place with #8 x 1½ in. *fh* screws spaced 8 in. apart. Rig the steering wheel control as in Fig. 6 and install the bow and stern lifting handles to complete the little runabout.

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