

BUILD YOUR OWN GLASS BOTTOM BOAT

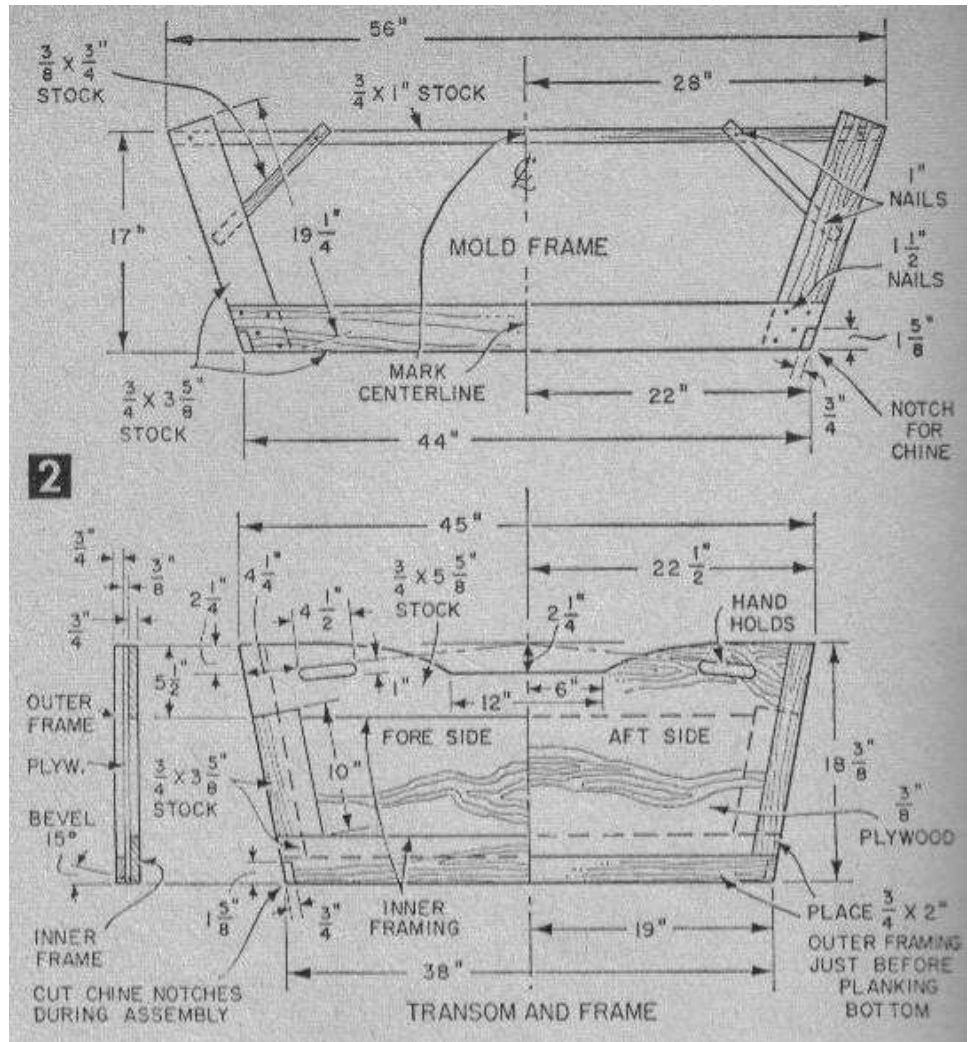
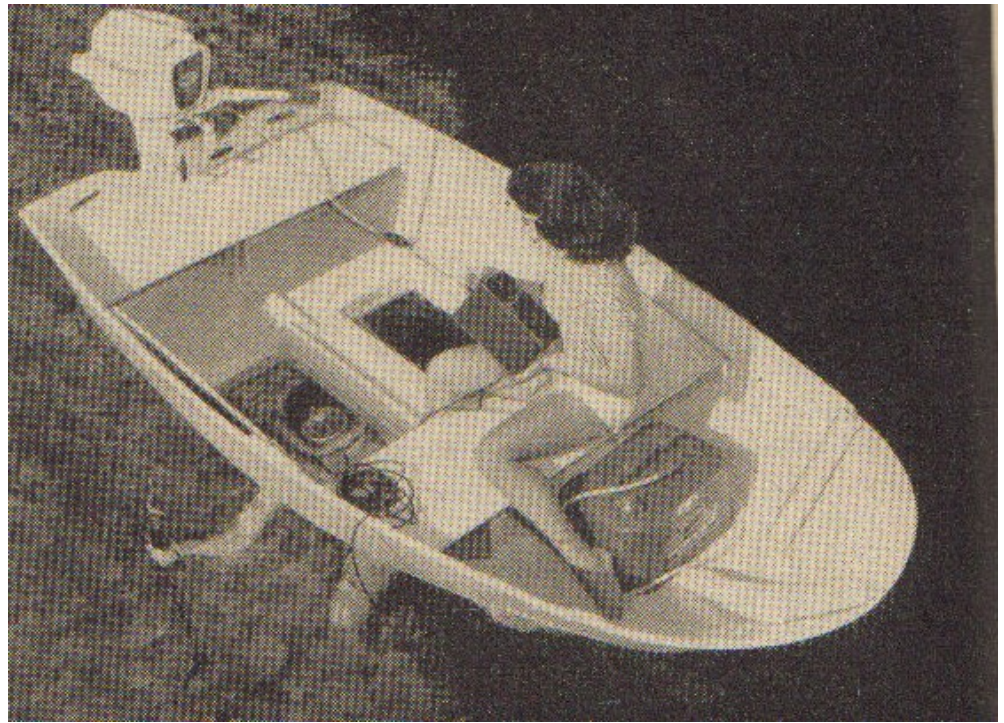
Glass panels in your boat open up the colorful underwater world to you. Glass bottom boats are ideal to SCUBA or skin divers, spearfishermen and naturalists. Follow the directions and you'll have an inexpensive all purpose boat.

Start construction by making the mold frame as in figure 2. Since the frame is removed once the hull is finished any type of 1X4 lumber can be used. Saw notches in lower corners for the chines and put the frame aside for now.

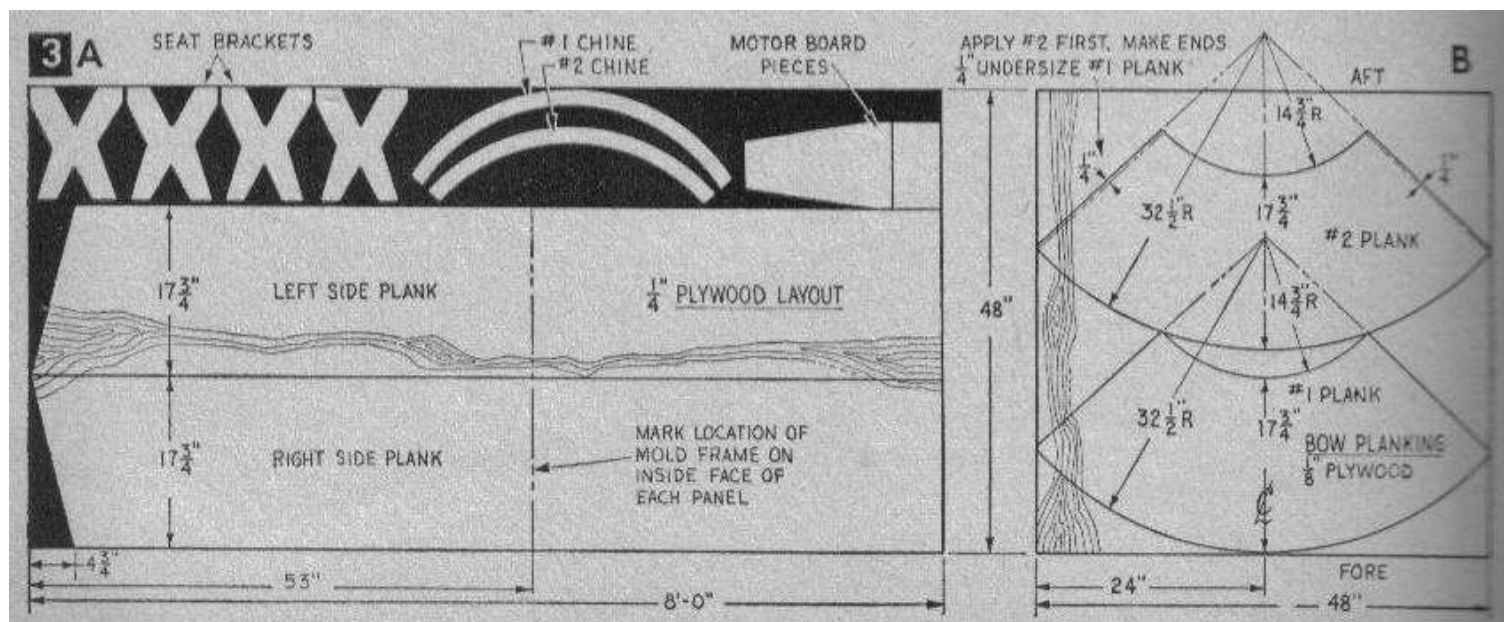
Next make a full size drawing of the transom (fig 2) on a 20X48" section of plywood. Be sure to mark the centerline on both sides of the plywood and then shape transom. Do not cut out hand holds or chine notches.

To make the inner transom frame, place a length of 1X4 stock along the bottom edge of the transom and a 1X6 piece along the top edge. Place these pieces on the poorest sides of the plywood so that the good side will be facing out. Mark each end of the 1X4 stock and ends of the 1X6 stock along the edges of the plywood transom and saw the piece to shape. Then replace and clamp them onto the transom. Saw 2 ten inch sections of 1X4 stock for the transom inner frame and place them on the top and bottom frame pieces. Align them with the ends of the plywood transom. Mark lower sides of pieces for cutting at an angle to fit against the bottom frame member and mark the top frame member for notching to receive the side pieces. After cutting and fitting the four frame members fasten them to the plywood transom with waterproof glue and #7X1 inch screws spaced 3 inches apart and driven from the plywood side.

After the glue dries lay out and cut the hand holes. First drill 1" holes at each end, then using a jigsaw cut out the pattern, filing each hole on both sides so that they taper out thereby giving user a comfortable grip. Cut a 15 degree angle on the bottom edge of the transom.



Next lay out and cut the two side planks from 1/4" plywood Fig 3a. Because of the rigidity of quarter inch plywood the bow planking is made up of two layers of 1/8" plywood glued together.



No mold is needed to assemble the boat, simply have someone hold the parts while you fasten the sides. To fasten the ends of the side planking to the ends of the bow planking, glue and clamp the planking battens. On the inside of the side planks fasten with #7 3/4" screws spacing them 2" apart.

With the help of your assistant bend the bow planks all the way around the fore end of the boat. Tie a rope around the fore ends of the side planks and pull them together so the outline of the side planks flows into the curvature of the bow. Once you have achieved the right shape fasten the bow planks to the side planking battens and screw them with three #7 X 3/4" screws. Be sure to countersink them.

Going back to the aft section or the transom mark the amount of bevel needed to fit the parts together tightly. Cut off the sides to the mark and cut off the notches. Use a marine type sealant to seal off joints and fasten with three #7X1" screws on each side plank.

Before the sealant cures or the glue dries out, draw a line from the center of the transom to the center of the bow.

The second layer of bow planking can now be installed. First bend the sheet around the first layer to make sure it fits properly. Then coat the inside surface of the second layer and the outside surface of the first layer with adhesive. Bond the sheets together and fasten with #7X1" screws at the spaced 1 1/2" along the edge where it meets the side planking. Use 3/4" nails clinched on the inside to fasten top and bottom edges.

Set your table saw to a 19 degree cut and rip two 8 foot chines (fig 4a). Place them in the chine notches cut in the mold frame and transom, mark a pencil line on the inside of the side planks along the edge of the chines and coat the contacting surfaces with sealant, making sure not to apply it over the line you just drew.

When you are ready to install the chines permanently have your assistant help you install both sides simultaneously to prevent warping the hull. With a hammer tap the chines' aft end forward until they fit against the planking battens, and clamp the chines to the side planking, fasten with #7X1" screws spaced about 2 1/2" use #8X1 3/4" where at the chine notch.

The exposed edges of the side planks and chines at the transom can now be covered with the three outer transom pieces (fig 2). Fasten them with sealant and #8X1 1/4" screws. If you intend to use this with an outboard you must build a transom mount see figure 7.

Two pieces of 1/4" plywood glued together are used to continue the chine over the bow planking. Since both pieces are cut separately you may end up with less than perfect match. Fill in any voids with synthetic wood filler, or make your own filler by mixing sawdust and glue.

When assembling the bow chine clamp the piece to the center of the bow and work outwards. Fastening with nails spaced 1 3/4". Clinch the nails on the inside.

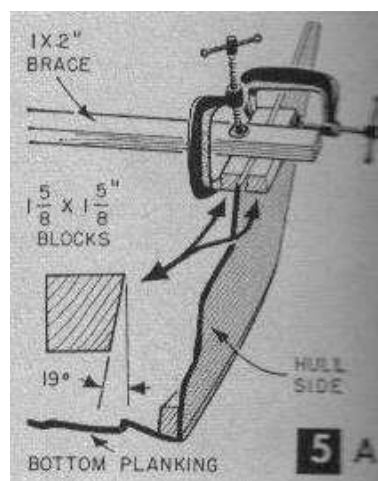
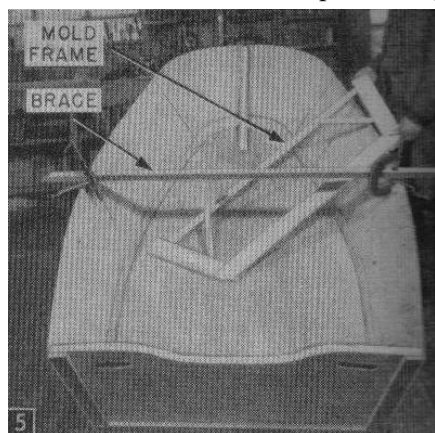
Then place a batten across the hull as in figure 1e. Temporarily clamp or nail it to the transom and bend it down over the mold frame until it touches the bottom of the bow planking. This will give you an idea of how much or what angle you have to fair or bevel the bow plan edges and chine to provide a flat surface to which the bottom planking can adhere to. A 5 foot batten placed

atwartships will indicate the angle of bevel required for fairing the side chines.

To make the stern, first draw it full size on cardboard and cut it. This will be used as a template. Hold the template against the inside center of the bow planking and see if it seats properly against the underside of the batten. Make any alterations in case the template doesn't fit. Transfer the outline of the template to a section of 1 5/8" stock, cut out the traced shape with a jig saw, and fasten to the inside center of the bow planking, using glue and screws Figure 4.

Use a full sheet of 5/8" plywood for the bottom. Position the aft edge of plywood sheet against the outer transom framing, then fasten it temporarily with two screws (Fig 1f). Trace the outline of the underside of bow and side planking, then remove and cut out the traced pattern with a jig saw. Next apply sealer on the outer edge and fasten the bottom to the hull. Start with the two holes already drilled during the tracing process.

Allow sealer to cure before proceeding to next step.



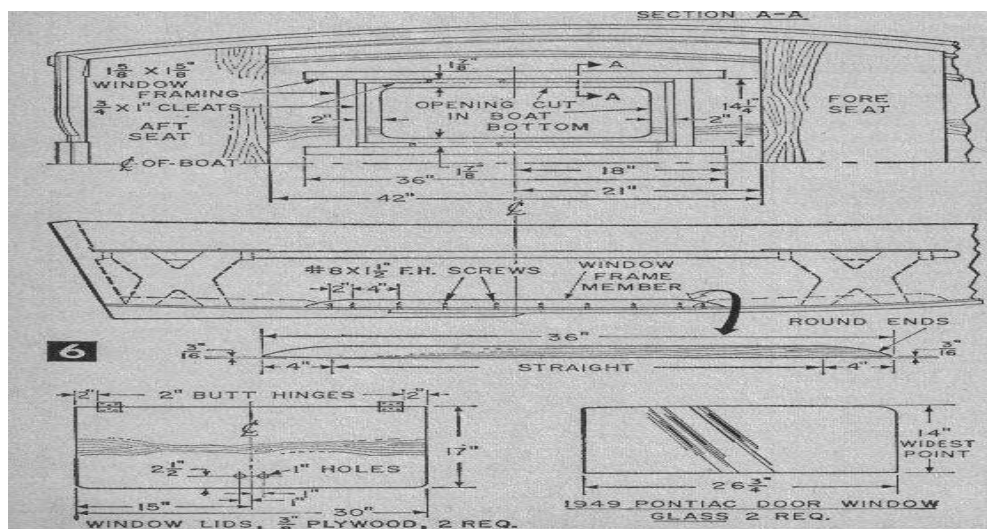
Now turn the boat right side up and install a brace as in figures 5 and 5a. This will prevent the sides from warping inwards when you remove mold frame and diagonal braces. Fill the screw holes with filler.

Now turn the boat hull right-side-up. The Keel and skeg on the bottom are best installed later. Before removing the mold frame and diagonal braces, clamp a brace across the sides as in Figs, 5 and 5A, to prevent the sides from springing inward. After removing the frame, fill the four screw holes with Plastic Wood.

Saw a 15° bevel on a 43-in. length of 2x2-in. stock for the transom seat riser and notch each end to clear the side members of the inner transom frame, fasten the riser on the inside with a #8 x 1 1/2-in. jh screw at each end to the inner frame and from the outside through the plywood transom with six #8 x 1 1/2-in. fk screws. Rip the two 74-in. long seat risers and fasten to the side planking with #7 x 1-in. f/i screws spaced about 4 in. apart and driven from the outside of the planking.

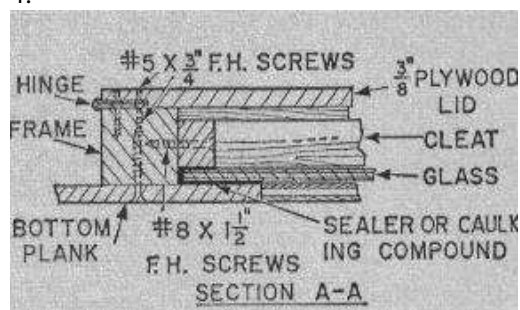
Next, rip the 1 1/2-in. wide fore and aft keelsons from 2 x 4-in. stock and drill the 1/2-in. holes for carriage bolts as in Fig. 4, When making the 1/2-in. plywood seats, take the length dimensions directly from

Saw a 15 degree bevel on 43 inch section of 2"X2". This is the transom seat riser.
your boat so that the seats fit snugly between the hull sides. After fitting them in place, mark a pencil line on the undersides along the seat risers and remove them to glue and screw the 146-in. reinforcement : pieces shown in Fig. 4F to the underside. Then replace the seats and fasten them to the seat risers with four #7x1-in. jh screws at each end. The



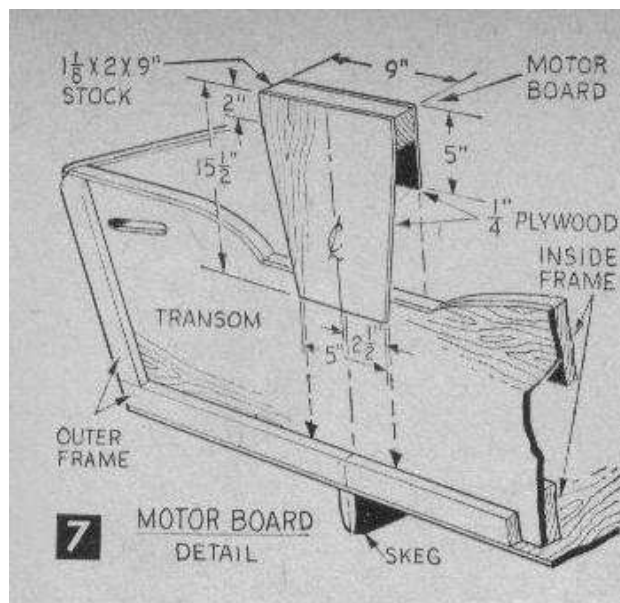
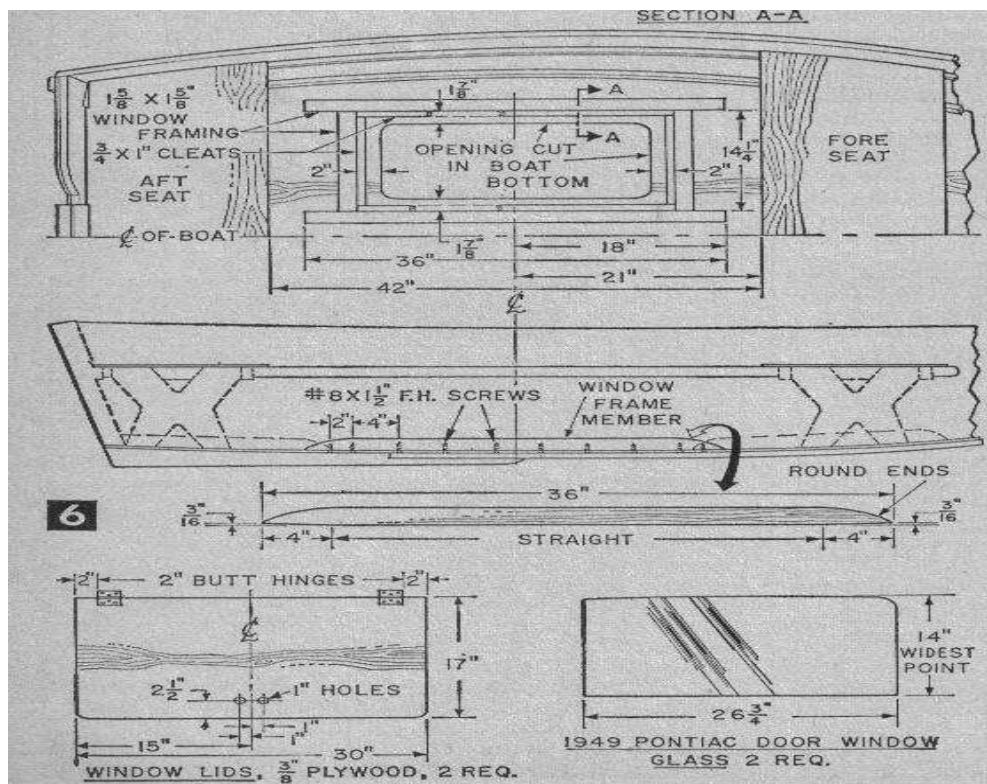
brace clamped across the sides can now be removed.

Now turn the hull upside down and place it on a couple of sawhorses or boxes. Make the skeg and keel as in Fig. 4. Then, while you hold the skeg tightly in place straddling the centerline on the bottom planking, have your helper crawl under the boat and mark the location of the V4-in. holes, drilled through the bottom, on the skeg. When boring these holes in the skeg, be sure to drill them square to the edge of the skeg that contacts the bottom planking. Otherwise the holes will not line up properly with the holes in the aft keelson. Apply neoprene sealer to the contacting surfaces of the skeg and aft keelson and bolt them in place loosely at first so that the keel can be placed in the notch cut in the skeg. Follow the same procedure when bolting the keel and fore keelson in place as in Fig. 4.



Make the four U-in. plywood seat brackets as in Fig. 4E and trim to fit when installing them under the seats. Fasten with glue and 1-in. nails. Make the sheer molding as in Fig. 4D and fasten to the outer top edge and aides of the side planking with glue and 1-in. nails. The sheer molding around the bow planking is made up of two layers of 1/2-in. plywood as in Fig. 4H. Follow the same procedure you used to make the bow chine.

Before painting your boat, apply 4-in. wide fiber glass tape along the outside where the bottom planking joins the sides and transom. When dry, give the entire boat two coats of primer followed by one coat of marine enamel of the color you desire.



Installation of Glass Bottom. Although we used two pieces of automobile safety window glass taken from the doors of a '49 Pontiac, window glass from other makes of cars could be used as well. Since the size of the window openings in the bottom of your boat must be determined by the size of the glass you purchase, obtain the glass first. In our case we made the openings in the bottom of the boat 10 1/2 x 23 in. which allowed about a 2-in. overlap all-around the glass bottom surface of your boat between the fore and aft seats as in Fig. 5.

First use a 2¹/₂-in. dia. hole saw and electric drill to cut four holes at the Corners of the window opening. Then use a keyhole saw or portable jig-saw to cut the openings. Place glass over openings so that glass overlap is equi-distant on all sides and draw a line on the bottom around the glass.

Make the window frames (Fig. 6) of 2x2 in. Stock (actually 1¹/₂ x 1¹/₂ in.) so that their Inside dimensions will clear the glass by 1/4 in. on all sides. Then fasten the frames to the bottom with neoprene sealer or caulking compound and #8x1¹/₂-in. -ph screws spaced 4 in. apart and driven from the outside of the bottom-To make a watertight seal between the glass and the bottom planking, coat the inside of the bottom planking around the opening with a uniform layer of neoprene sealer or caulking compound about 1/4-in. thick. Place the pieces of glass in position on the sealer but do not press the glass down to embed it in the sealer. Instead, allow the glass to stand for about one hour and it will embed itself in the sealer. Secure the glass within the frame with 1/2 x 1-in. cleats fastened to the frames with #8 x 1¹/₂-in. ph screws as in sec. A-A in Fig. 6. Put a layer of sealer under the cleats where they contact the glass before installing them.

To protect the glass and enable you to walk over the glassed area when not using the windows for viewing, make the lids as in Fig. C and fasten to the window frames with hinges. Underwater viewing will be greatly improved by making and using the sun shade shown in Fig. 8. This is simply a lightweight box that excludes the sunlight at the top of the glass windows. An umbrella or black photographer's cloth draped over your head would improve underwater viewing.

Although a 6 hp outboard motor is used to power the boat, oars will come in handy for maneuvering in shallow water. Bolt the oar locks to the side planking and sheer molding as in Fig. 4 to complete the boat

Lay out the window openings on the inside

Next rip the 1 1/8" wide fore and aft keelsons from 2"x4" stock.

When making the 3/8" plywood seats take direct dimensions from your finished product.

Fiberglass all seams. Then prime and paint.

Metrics

Type: Flat bottom dingy

Length: 9'5"

Beam 56"

Weight 95 lbs

Capacity 3 to 4 adults

Speed 8-12 mph using a 6 hp outboard

Materials List

2 3/8" sheets of plywood

1 3/8" 20"x45" section of exterior grade plywood

1 1/2" 6 1/2"x18" section of exterior grade plywood

1 1/4" sheet of plywood

1 1/4" 12"x30" section of plywood

1 1/8" 4x4 foot section of plywood

1 3/4"x5 5/8"x12"

1 3/4"x3 5/8"x8'

1 3/4"x5 5/8"x12'

1 3/4"x3 5/8"x8'

1 1 5/8"x5 5/8"x36"

1 1 5/8"x3 5/8"x10'

2 1 5/8"x1 5/8"x12"

2 Acrylic sections

Adhesive, sealant, fiberglass tape & resin, screws, nails.

