

How to Build "SEA CRAFT" — a 25-ft.

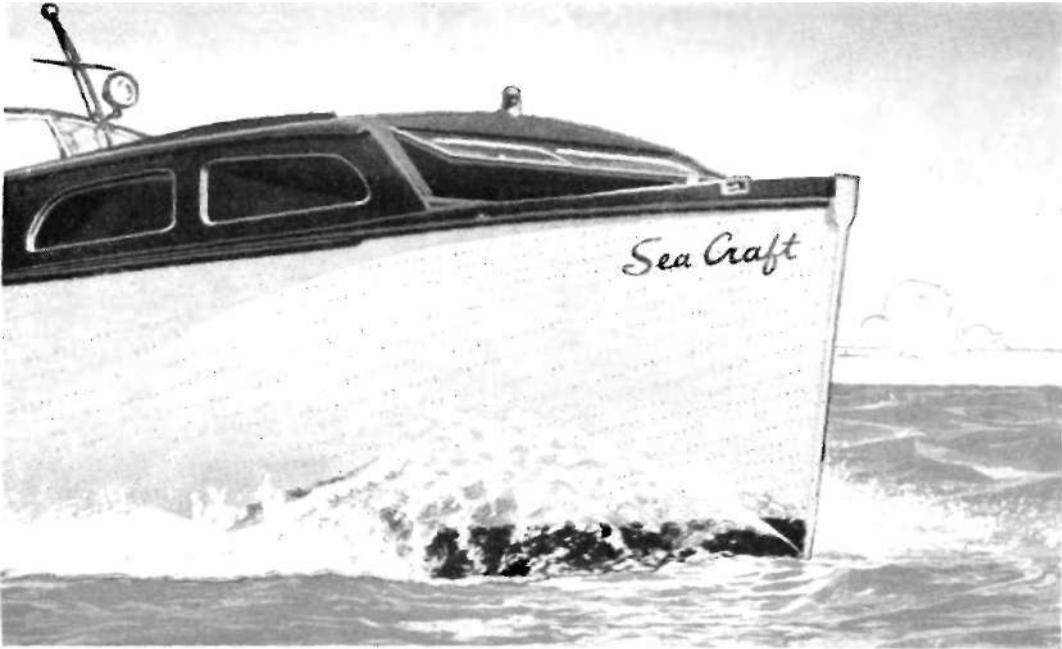
IDEAL for use on large lakes or rivers, *• and fully seaworthy for offshore ocean cruising, "Sea Craft" is a smart cabin cruiser designed with an eye toward simple, low-cost construction for the inexperienced boatbuilder. During World War II, the original boat was given severe tests for seaworthiness when it was used by the United States Coast Guard to take high-ranking officers from ship to shore. The boat has an over-all length of 24 ft. 7% in., and a breadth at sheer of 7 ft. 8% in. A converted Chrysler "75" auto engine easily pushed it along at a cruising speed of 15 knots. However, any marine or converted auto engine of similar horsepower may be used.

Although this section describes the building of a sedan cruiser, this particular hull, with a few changes in the cabin construction, is readily adaptable to a sport fisher, express cruiser or utility boat. The cabin design of Sea Craft was selected because it offers one of the most all-around accommodations. Its open cockpit is large enough for fishing, lounging or sun bathing and the roomy cabin provides comfortable living quarters on a long cruise. It is equipped with a fresh-water tank, sink, cooking stove, toilet and two bunks. Two additional upper bunks can be fitted to sleep a total of four. In addition, there is

plenty of cabinet and stowage space for gear. The photo, Fig. 1, shows the cabin interior looking forward.

Laying out, cutting and assembling the keel and rib structure is by far the most important operation of building the boat. As this framework is the backbone of the entire boat, the performance and beauty of the craft will depend upon the accuracy and skill with which the framework is constructed. As previously mentioned, the type of cabin, engine and even decking can be changed to suit the individual builder's fancy, but no changes should be made in the hull if the proven performance of this cruiser is to be maintained.

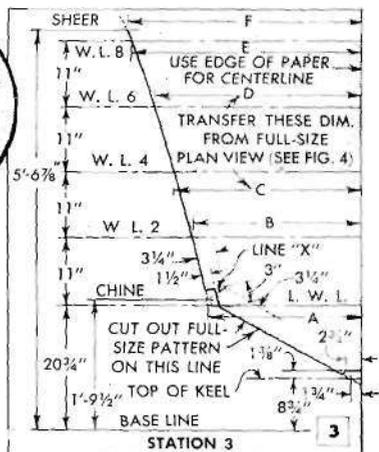
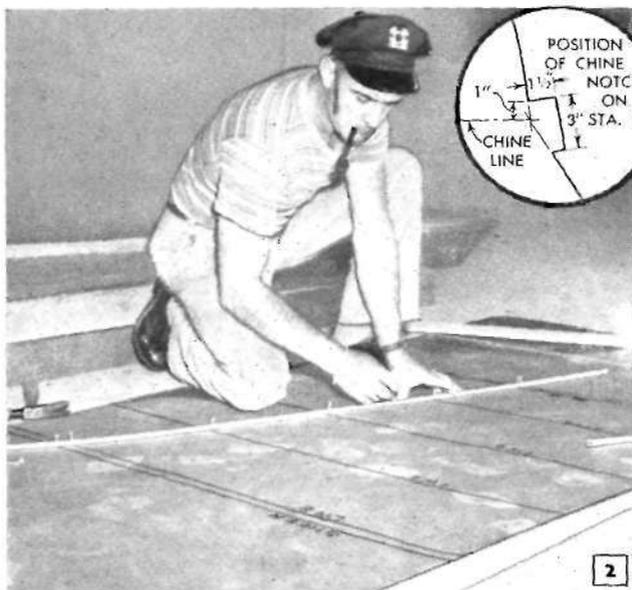
The first step in building a boat of this size is lofting, that is, drawing the profile, the plan view and the body-plan views full-size on paper, as shown in Fig. 4. These drawings are cut out to serve as patterns for marking and assembling the hull frame. Full-size, cutout patterns of the keel and ribs are available to those who care to purchase them. If you intend to make your own patterns, get a roll of heavy wrapping paper and edge-lap and glue enough strips together to make up the required width for the height from the base line to the top of the stem shown in the profile view, Fig. 4. The paper is tacked down on a wooden platform—a



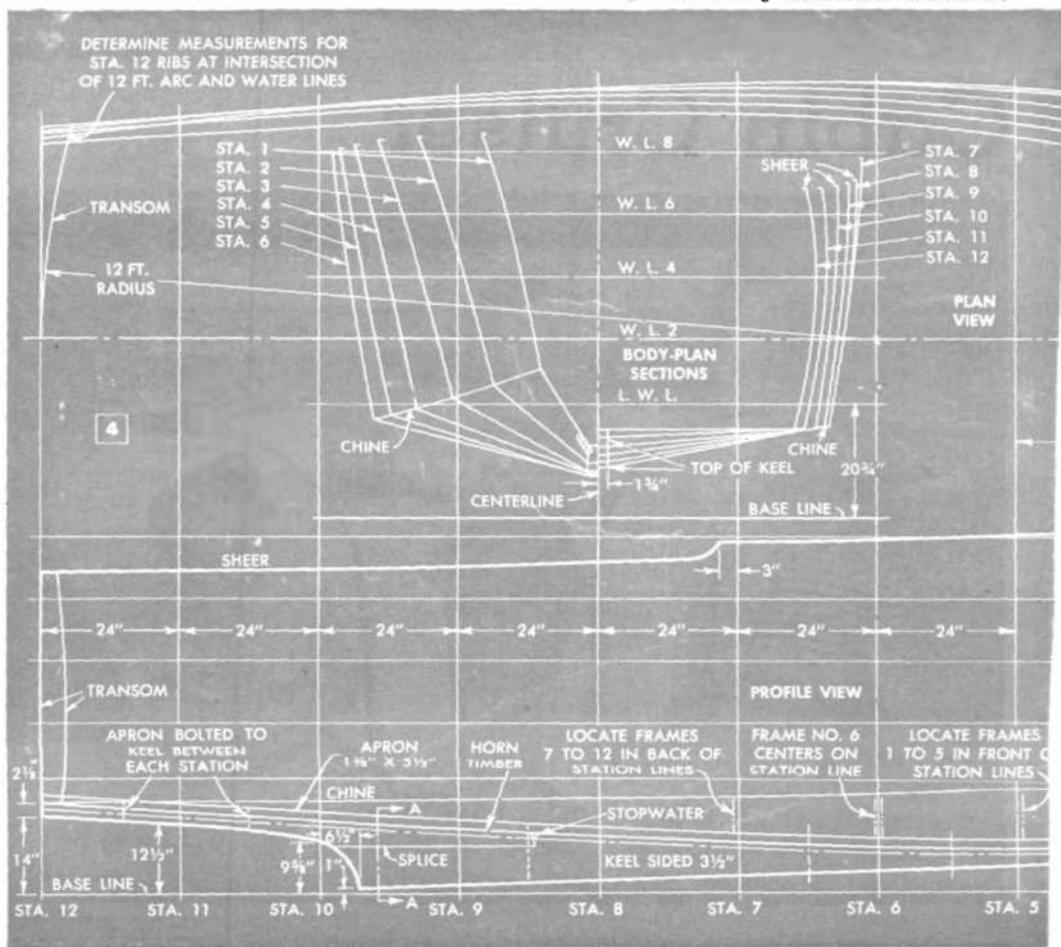
Cabin Cruiser

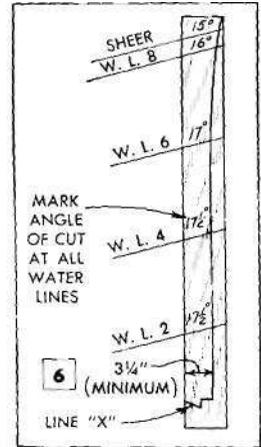


Large roomy cabin with sleeping accommodations and galley provides comfortable quarters on long cruises



Above, full-size half pattern of each station is drawn on heavy paper. Left, the natural curve of a wooden batten is used to mark curved line connecting half-breadth dimensions





Angles of saw cut marked on ribs, above, are called off by bandsawyer, left, as a helper tilts table

bow-stem block, follow the dimensions given in Fig. 9. Use a light, flexible batten to fair in the curves. Carefully mark the rabbet and bearding lines, as these must be transferred to the bow-stem pieces after they are assembled.

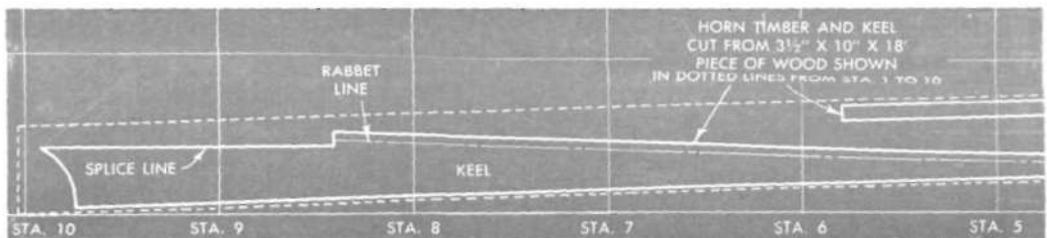
To transfer the lines to the wood, cut the paper along the bottom of the keel and forward edge of the bow stem. Do not cut the other lines as the pattern will be used later to lay in the propeller-shaft angle and motor mounts. The uncut lines can be transferred to the wood by rubbing the underside of the paper with a soft pencil and then tracing over the lines in a manner similar to that of using carbon paper. However, no cutting should be done until all other patterns have been made.

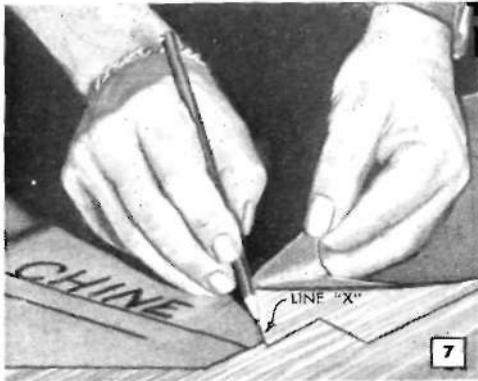
The keel is made of oak, apitong or straight-grained Douglas fir, and is assembled in two pieces cut from a single piece of timber as indicated by the dotted lines in Fig. 9. The aft section, known as the horn timber, is spliced to the keel proper as shown in the profile plan. Be sure to place the bolts off-center so they will not interfere when drilling the propeller-shaft hole through the keel, see section A-A, Fig. 4. The keel apron also

should be oak, apitong or Douglas fir, 1% in. x 5/8 in., and extends from the bow-stem block to the transom. Bolt the apron to the keel between the stations. The dot-dash lines through the bow-stem parts in Fig. 9 indicate where to bolt them together.

A plan view, as shown in Fig. 4, must be drawn full-size in the same manner as the profile view. First, lay down the centerline and then draw perpendicular lines across the paper at each station point. These station lines should be labeled clearly. Refer to the table of offsets in the chine column of the "half-breadths from centerline," and measure off the distance given from the centerline.

For example, read across the chine column under station 3, measure off the distance 2-1-2, which is 2 ft., 1/4 in., and mark the spot. This is shown as dimension A in Fig. 4. Then drive a small nail at the mark. Follow this same procedure at each station for the chine, and bend the long batten against the nails. When fairing the line, it may be found that the batten will clear some of the nails by Mo or V& in. This is not serious. The important thing is to have the curve follow the natural bend of the batten. When the batten fairs up nicely and





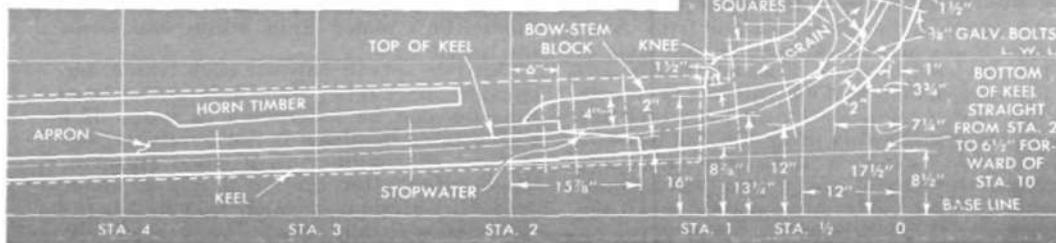
has a smooth, flowing curve, which you can see by sighting with your eye, draw in the line. Use the same method for all the water lines and the sheer line until you have a full-size drawing of the plan view as in Fig. 4. To avoid confusion later, draw each line a different color.

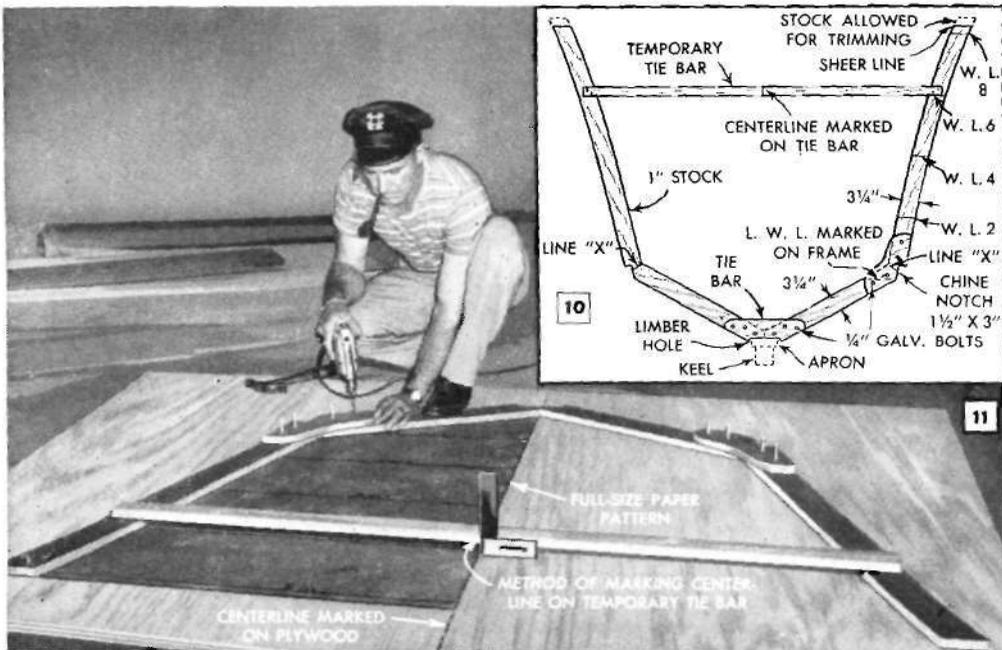
Full-size drawings of the body-plan sections, Fig. 4, become patterns for marking the ribs and assembling the frames. Cut a piece of paper for each station. The paper must be perfectly straight along one of the long sides which is used as a centerline. Draw a base line at right angles to the centerline, 2 in. from the bottom edge. Taking station 3 as an example, draw in the load water line and water lines 2, 4, 6 and 8 parallel with the base line from the dimensions given in Fig. 3. These lines are spaced the same for all stations. Identify each line.

The table of offsets is not used to draw in the lines for the rib patterns. All dimensions are taken from the faired lines of the full-size plan and profile drawings. On the profile drawing, measure up from the base line for the top-of-keel, chine and sheer lines at station 3 and transfer them to the station-3 rib pattern. From these points, draw lines parallel with the base line and identify each. On the plan view, measure the distance from the centerline to the chine (see dimension A, Fig. 4) and mark this distance on the chine line of the pattern by measuring in from the edge of the paper used as a centerline. Follow the same procedure in transferring dimensions B, C, D, E and F, Fig. 4, to their corresponding lines on the rib pattern. Drive a nail at each point marked, fair a batten against the nails, and scribe the line as in Fig. 2. Using a straightedge, scribe a line from the point marked on the chine line to a point $1\frac{3}{4}$ in. from the edge of the paper on the



A compass or marking gauge set at $3\frac{1}{4}$ in. is used to scribe a line conforming to the contour of the outside edge of rib. This becomes the inside edge of the rib





Ribs, gussets and tie bars are assembled directly over full-size patterns to assure exact alignment. Builder is shown drilling bolt holes through gussets and ribs. Note how centerline is marked on temporary tie bar

top-of-keel line. Dimensions for the notch over the keel apron and limber holes, indicated in Fig. 10, are given in Fig. 3 above the top-of-keel line. These dimensions apply to all stations except stations 1 and 2, which are slightly narrower because the apron tapers to $3\sqrt{2}$ in. where it joins the bow-stem block.

To draw in the notch for the chine batten, draw a line parallel with and $V\sqrt{2}$ in. from the faired line at the chine end. Measure 3 in. along this line from where it intersects the straight, line from the chine to top-of-keel. All chine notches are made the same way with the exception of station 1, shown in the inset of Fig. 2. Line X, Fig. 3, indicates where the two ribs join and is located by scribing a line from the point of intersection of the straight and faired lines to the point of intersection of two lines drawn parallel with and $3\sqrt{6}$ in. from the straight and faired lines. Cut out the pattern as indicated by the shaded area in Fig. 3, allowing it to extend about an inch beyond the sheer line for trim. Also, make a cut on line X to mark the ends of the ribs as shown in Fig. 7. All rib patterns are drawn and cut out as previously described, except station 12 for which the following method is used: On the full-size plan view strike a 12-ft. arc extending across the chine, sheer and water lines with a string centered at station 6. To determine the half-breadth dimensions for

station 12, or the transom, measure the distance from the centerline to where the arc crosses the water lines.

Use oak, apitong or vertical-grained Douglas fir, 1-in. thick, for rib stock. Each frame, with the exception of station 1, has four ribs held together with gussets and tie bars as shown in Fig. 10. Station 1, being narrower, requires only one rib on each side. Mark the rib stock by laying the full-size pattern directly over the wood and scribing a pencil line along the edge of the pattern, Fig. 7. Allow at least $3\sqrt{4}$ in. for the width of the rib. After marking the sheer, chine and all water lines on the rib stock, refer to the full-size plan view and measure the angles at the sheer and water lines with a bevel square as indicated at station 4, Fig. 4. Then, mark these angles at their respective water lines as shown in Fig. 6. When making the angle cut on a bandsaw, it is a good idea to have a helper, as in Fig. 5, because he can change the angle of the cut as marked at the various water lines while you guide the board.

Cut two sets of $\text{-it>a fox- ecvoh frame, but be sure to reverse the angle cut so that the ribs can be assembled as pairs. If a tilting-table bandsaw is not available, you can cut the angle with a wood chisel or block plane after the rib is sawed. However, this method is much slower and not quite as accurate. Mark the line for the$

second cut of the rib with a compass or marking gauge set at $\frac{3}{4}$ in., as in Fig. 8. Leave the penciled water-line marks on the ribs as they are, but cut a small notch at the load water line so that it can be located after the frame has been painted.

Assemble the frames either on a wooden floor or on two sheets of plywood fastened together. Draw a heavy line on the floor to serve as a centerline and line up the edge of the full-size pattern with it. Then place a bottom and side rib directly over the pattern to assure perfect alignment and temporarily nail a gusset to the ribs to hold them together. Pencil marks made on the floor along the outside edge of the ribs will help locate their position when the paper pattern is slid out and turned over to assemble the ribs for the other side of the frame. When both sides are assembled, carefully check the distances from centerline to sheer on each side and nail the temporary tie bar across at water line 6, as shown in Fig. 10. Then bolt the tie bar across the bottom with its lower edge flush with the notch for the keel apron. The tie bar is 4 in. wide and is made of the same material as the ribs. The gussets are also 1 in. thick and extend about 8 in. each way from the chine corner. Their curves may be drawn freehand.

The gussets are then bolted to the ribs. Before removing the frame from the floor, carefully mark the centerline on the temporary tie bar using a square edge as indicated in Fig. 11.

Blocking the Keel

When the keel, apron and bow-stem parts have been bolted together, a suitable erection site must be selected. As a boat of this size, in most cases, requires being built outdoors on uneven ground, blocking is necessary to support the bottom of the keel at the correct angle in relation to the base line. A leveled chalk line stretched between two stakes to correspond to the base line of the profile drawing, will serve as a starting point from which to measure heights of the blocks. The exact heights can be determined by taking measurements from the base line to the bottom of the keel on the full-size profile drawing. Two wedges driven between the keel and a block,

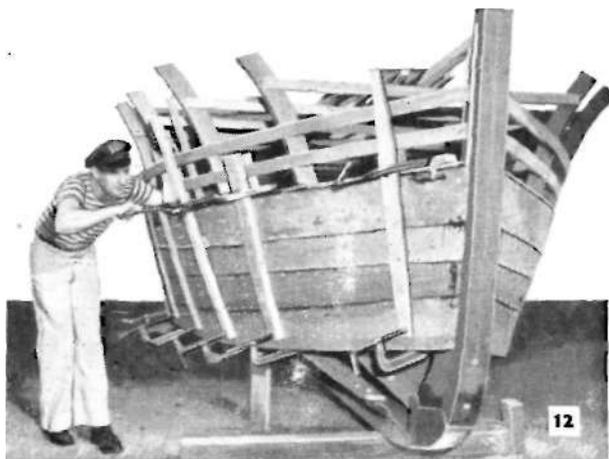
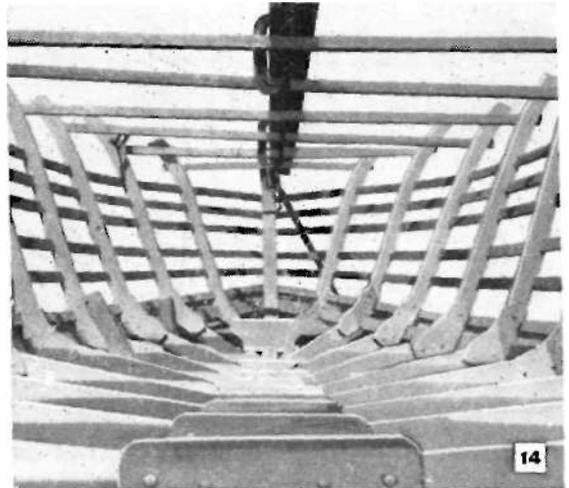


Fig. 19, make a close adjustment possible. The bow stem also must be lined up perpendicular athwartships. This can be done with a plumb line fastened to the top of the bow stem, as in Fig. 28.

The transom is made as shown in Figs. 15 and 16. The aft edges of the top and bottom timbers have a convex curve of 12-ft. radius as in the plan view shown previously. The top timber is crowned 2 in. and the bottom timber is notched for the apron, and tapered $\frac{1}{8}$ in. from keel to chine on the lower surface. When assembled, the transom is bolted to the keel with a knee block, as indicated in the lower left-hand detail of Fig. 16. It must be perpendicular to the base line and exactly centered on the keel.

Before assembling the rib frames on the keel, refer to the profile view, Fig. 4. Note that the No. 6 frame straddles the station line and that frames 1 to 5 inclusive



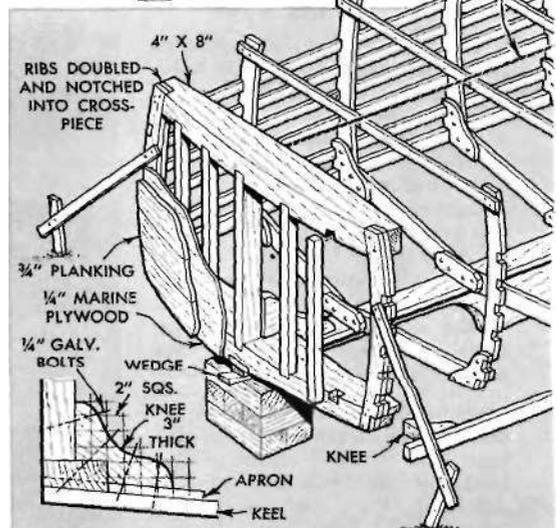
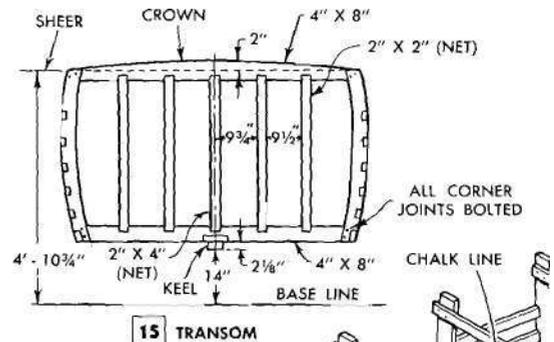


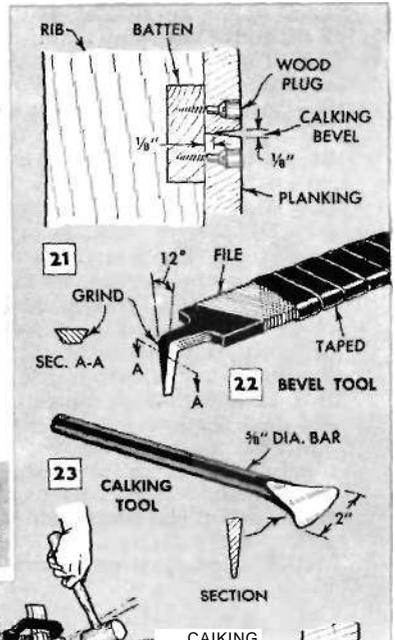
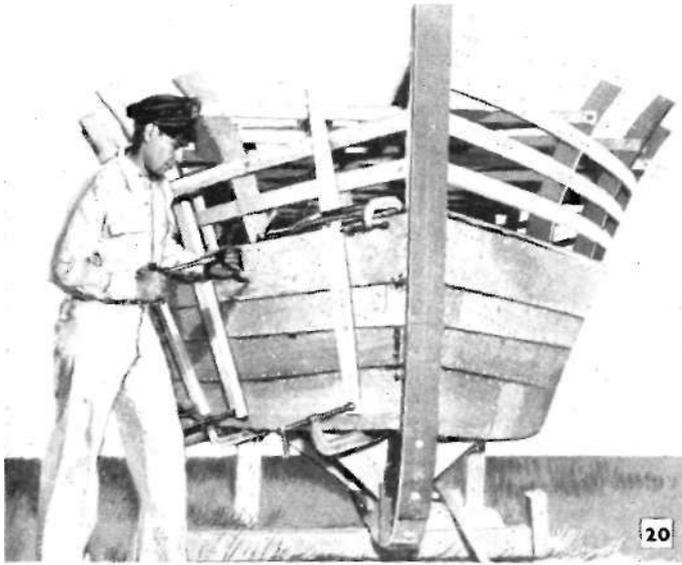
are forward of the station lines, whereas frames 7 to 12 inclusive are aft of the station lines. This refers only to the thickness of the rib and does not apply to the thickness of the tie bar. To start assembling, first mark each station line on the apron. Then draw a second line representing the thickness of the rib and set up the frames between the two lines. Use galvanized lag bolts to fasten the frames to the apron, Fig. 17. A chalk line from the center of the keel to the center of the transom, Fig. 16, is used to line up the frames with the centerlines marked on the temporary tie bars on each frame. The frames also must be at right angles to the keel athwartships and should be well braced.

The chine, which is vertical-grained oak, is fitted to the frames in one piece from bow to stern. To determine the position on the bow stem where the chine notch should be cut, clamp the chine in the rib notches and bend it over to the bow stem. The chine notch on the other side of the bow stem should be exactly opposite this point. Before fastening them permanently, be sure none of the station frames has been sprung out of position. A board clamped across the tie bars as in Figs. 13 and 14 will help keep the frames aligned.

Screw the chines to the bow stem and transom with P/2-in. No. 9 galvanized screws and bolt them to each rib gusset as in Fig. 17. Sea Craft is planked with $\frac{1}{2}$ -in. Philippine mahogany, but other woods such as white cedar or vertical-grained Douglas fir may be used. Be sure that all lumber is boat stock and keep in mind that it must be wider than the final width of the planks. In some cases, a 10-in. piece will make only a 6-in. plank. There is no set width for the finished planking. However, planking of uniform widths will give the

A plank, extending full length of boat and clamped to temporary tie bars, as shown in upper left photo, will help keep frames in proper alignment when installing the battens and planks. Photo above shows interior of the assembled frames looking forward

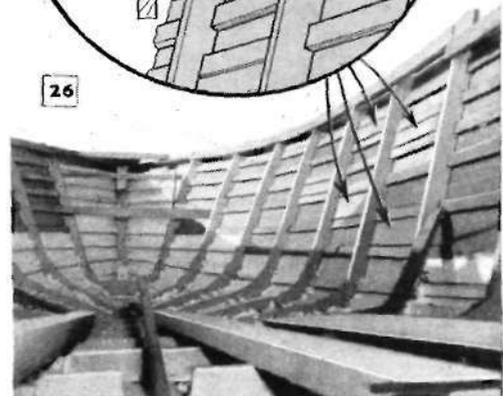
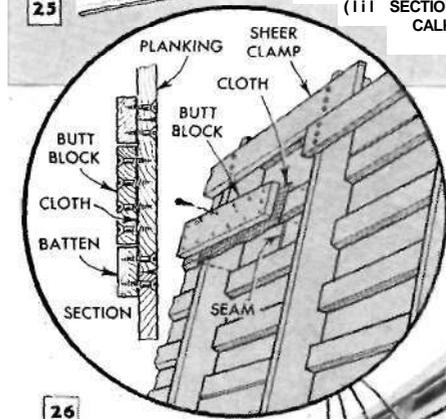




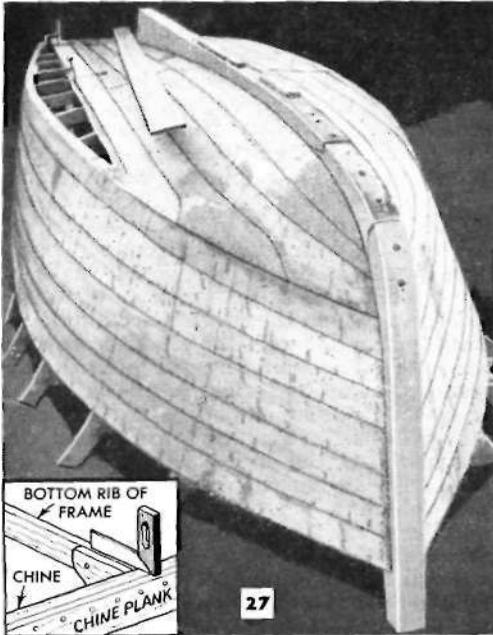
the chine. When in place, mark the inside surface of the plank along the top edge of the first batten. Then remove the plank and draw another line 1 in. in toward the chine edge. This is the cutting line which will bring the edge of the plank over the center of the batten. A slight bevel for calking, as in Fig. 21, should be planed along the edge. Before attaching the plank permanently, coat the chine and lower half of the first batten with marine glue. Apply muslin or cotton binding tape and more glue. Then clamp the plank firmly in place and fasten with P/i-in. No. 8 flat-headed galvanized screws at the battens and 1Vi-in. screws at the bow stem. Stagger all screws so they do not run in the same grain and place about 1 in. apart at the bow stem and 3 in. apart along the battens and ribs. Counterbore all screw holes for wooden plug's to be added later.

Planks can be spliced between the ribs amidships where the bend is not severe. A butt block, shown in the inset of Fig. 26, is used to join the ends of the planks. Use muslin and plenty of glue between the block and planks. Splices in adjacent planks should be staggered as in Fig. 26. Binding tape is not needed in seams above the L. W. L. Fig. 25 shows how the edges of the planks are drawn tightly together with wedge blocks.

Turn the boat over after all the side planks, except the sheer plank, are in place. This is left off to prevent it from being damaged. The bow-stem rabbet must be continued along the entire length of the keel, and the apron must be beveled flush with the bottom edge of the ribs. At this time, be sure the notches that serve as



Planks are butted together between ribs and joined with a butt block. Adjacent splices are staggered



limber holes have been cut in the ribs on each side of the apron, Fig. 17. Also be sure the stopwaters are in place. These are V2-in. softwood dowels dipped in paint and driven into holes drilled through the keel athwartships between the rabbet and bearding lines at four places as in Figs. 4 and 9.

The bottom edge of the chine and chine plank must be planed flush with the bottoms of the ribs. Test with a small square as detailed in Fig. 27. The bottom planks, especially forward, require considerable fitting and cutting to bring them to exact shape. A cardboard template for the forward end of each plank will simplify this fitting job. Fig. 27 shows the unusual contours the bottom planks assume at the forward end. It is best to install the bottom battens as the planking proceeds. Binding tape laid in marine glue is used on all bottom planks. Install the planks adjacent to the keel first, and then work toward the chine.

When this much of the planking is completed, wooden plugs dipped in marine glue are driven into the counterbored screw holes and cut off flush with the surface. The plugs can be purchased and should be of the same material as the planking. The bottom of the keel is planed flat to approximately the position of the second station. From this point forward the keel takes a slight bevel, which tapers to a sharp bevel at the bow stem, shown in Fig. 28.

Sand, calk and paint the bottom before



turning the hull upright. Although a power belt sander is preferred, a disk sander may be used if care is taken not to gouge the planking. To clean out the plank joints for calking, bend and grind the tang of a file as shown in Fig. 22. Cotton marine calking is driven into the seams with the calking tool shown in Fig. 23. Use plenty of calking along the keel seams. However, one strip between planks is usually enough because room must be left for the calking putty, which is applied with a knife over the calking cotton. The putty is slightly indented below the surface as in Fig. 24. To prevent the bottom from drying out, give it a coat of copper bottom paint. The hull is quite heavy now so probably you will need more help to turn it over. As the boat will remain in this position until it is finished, level the L.W.L. and securely block the hull in position.

Next, install the top or sheer planks. Carefully fit the bottom edge of the planks and clamp in position on the hull. Transfer the sheer-line marks on the ribs to the sheer planks and cut them slightly oversize at the sheer lines to allow for planing later. When the sheer planking is in place, plug the screw holes and calk the seams. Then sand the transom smooth, fill with a mahogany-colored wood filler and follow with two coats of marine varnish. The inside of the hull is painted with a mixture of white lead and linseed oil.

The best way to bevel the edge of the bow stem is with a wide wood chisel as shown in Fig. 28. Although there is enough

stock to bring the stem to a sharp edge, most boatbuilders prefer a flat edge about $\frac{1}{8}$ in. wide which is faced with a half-round metal strip.

Mounting the Engine

When the planking is completed and the seams below the L.W.L. have been calked, sand and give the planking a coat of flat white paint. The seams above the L.W.L. are filled later with a plastic seam sealer. When sanding, keep the machine constantly in motion to avoid sanding one area more than another, thus causing low spots.

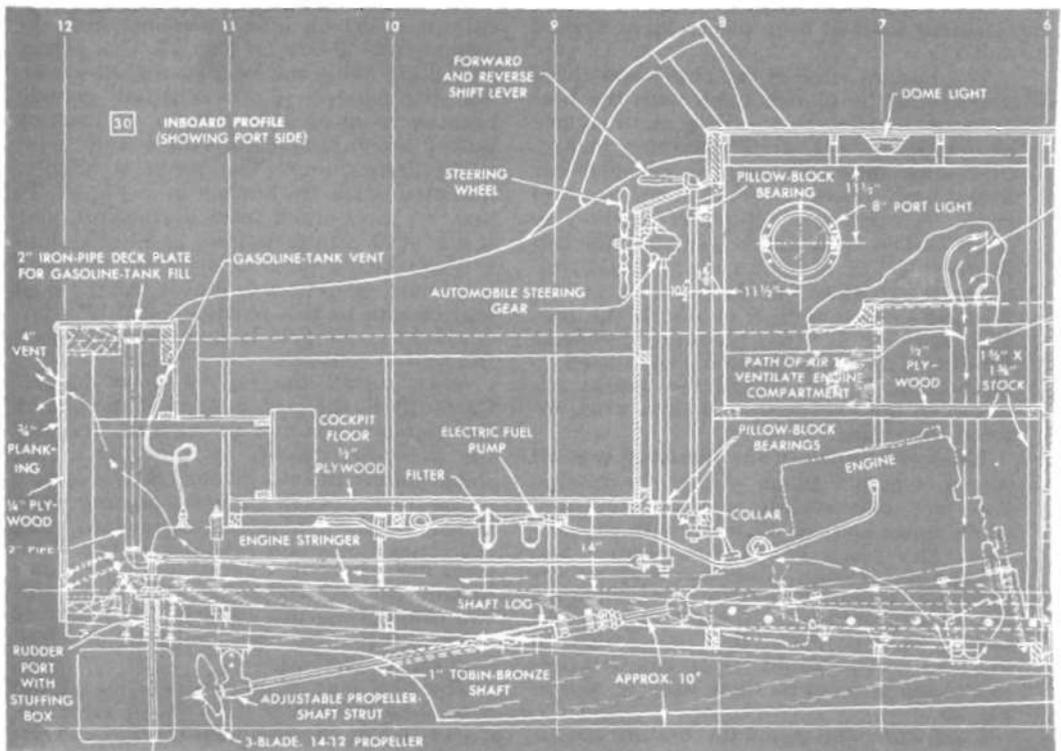
The 1 x 3V2-in. oak shear clamps, shown in Figs. 31 and 38, extend from the transom to station 2. Note in Fig. 30 that one clamp is placed above the other at station 7 where the sheer line drops. When screwing the clamps to each rib, allow the top edges of the clamps to project above the hull sheer line slightly. These are later planed down to come flush with a 2-in. crown in the decks. The sheer clamps from station 1 to the bow stem are lapped and bolted to the long sheer clamps at station 1 and are fastened to the bow stem with a block.

At this time, decide what kind of an engine will be used in the boat. A marine engine is best. However, many automobile engines work well when converted to marine use. Kits are available for converting the engine yourself, or a marine machinist

can convert your engine by removing all gears except the reverse and high gears and installing a thrust bearing. A water pump to circulate cooling water also is necessary. Sea Craft's Chrysler engine, Fig. 29, was converted in this way. Note the extra oil sump welded to the bottom of the oil pan to permit the engine to operate on an angle.

The engine-bed pieces, Fig. 33, are made of 2-in. oak and bolted to the engine stringers, Fig. 38, which extend from the transom to a 2 x 4-in. tie bar, which replaces the original tie bar on the frame of station 6. The engine stringers are placed approximately parallel with the keel apron, and are notched out and screwed to the lower transom beam and ribs. If placed 19 in. apart they will accommodate most engines. However, this dimension should be checked with the engine before installing them. The floor stringers, Figs. 33 and 38, are bolted to the outside of the engine stringers and are notched for the ribs to which they are screwed. The port stringer extends from station 3 to $\frac{1}{8}$ in. forward of station 8; starboard stringer from station 3 to 11 $\frac{1}{2}$ in. aft of station 8.

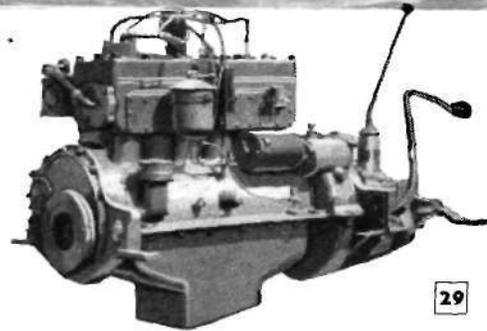
Before determining the shape of engine-bed pieces and the location of the propeller-shaft hole, the exact position of the engine in the hull must be determined. This can be done best by making a full-size, cutout pattern of the engine profile on heavy pa-



per. Carefully mark the location of the mounting brackets and center line of the crankshaft on the paper. Place the pattern on the full-size profile drawing between stations 6 and 8 and shift it around until the crankshaft center line is at an angle of 10 deg. or less with the L.W.L. Check the oil pan, flywheel and the transmission housing for clearance with the apron and ribs. When the engine pattern is in position, Fig. 30, fasten it down with tape and draw an extension of the crankshaft line across the keel and apron.

Other parts, such as the rudder, propeller, shaft log, rudder post and propeller-shaft strut, shown in Figs. 30 and 33, should be on hand so they may be sketched in on the profile drawing to check for clearance.

A method of holding the bit at the correct angle when drilling the propeller-shaft hole is shown in Fig. 32. The braces and starting block should be sketched on the profile drawing and their exact location transferred to the hull. Since the propeller shaft is 1-in.-dia. Tobin bronze, the hole must be 1 1/4 in. It is started with a regular wood bit because a "barefoot"



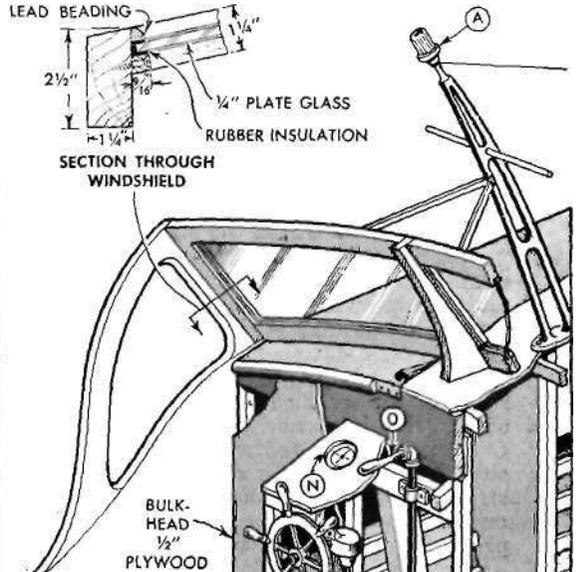
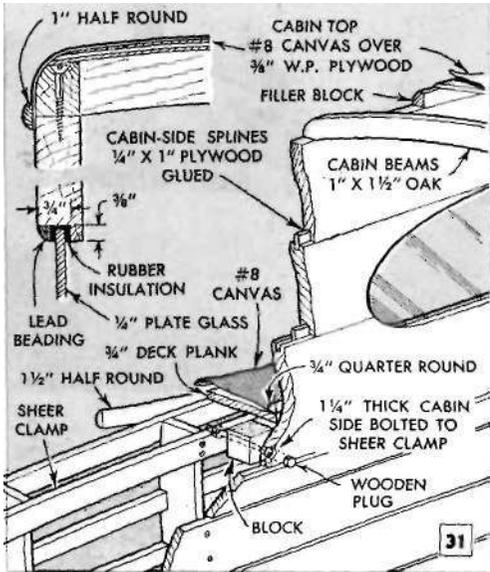
Auto engine converted to marine use gives dependable, low-cost power. Only high and reverse gears are used

COMBINATION
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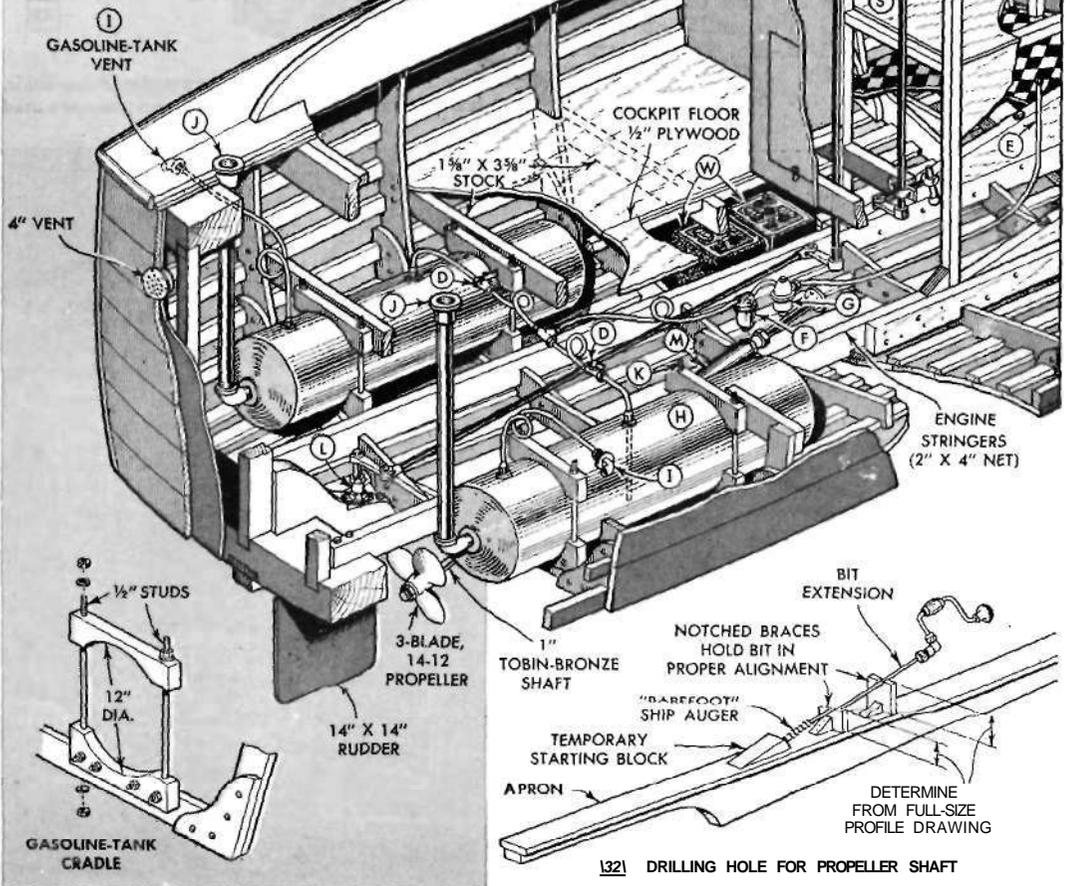
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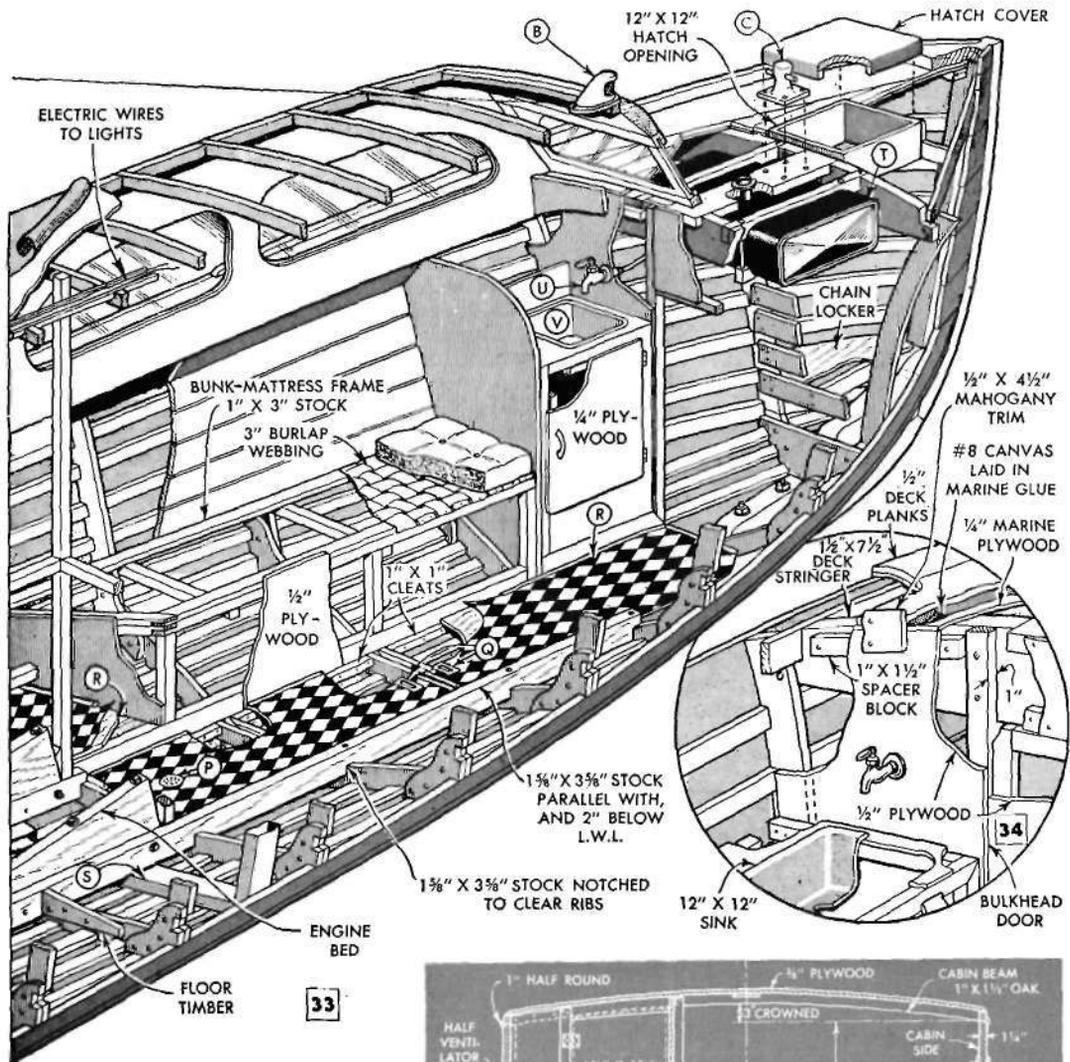
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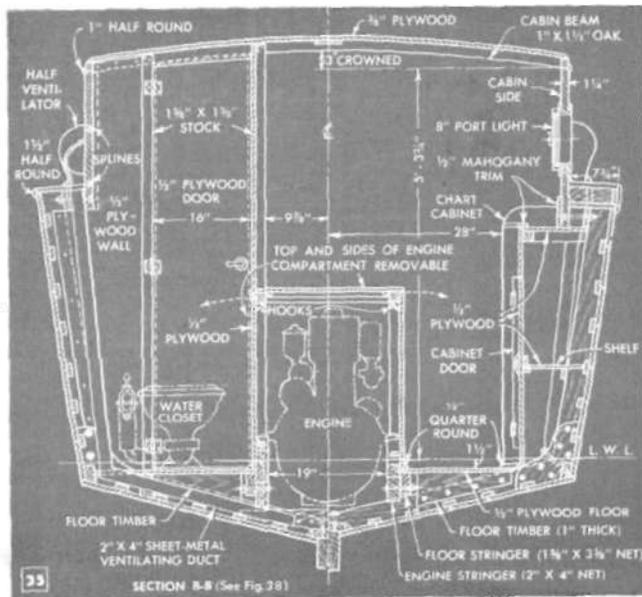
Drawings by Eldon Schiel



1321 DRILLING HOLE FOR PROPELLER SHAFT



- A—MAST LIGHT
- B—COMBINATION LIGHT
- C—MOORING BITT (6" X 3" BASE)
- D—GASOLINE-LINE SHUTOFF VALVE
- E—COPPER TUBING (GASOLINE LINE)
- F—GASOLINE-LINE FILTER
- G—ELECTRIC FUEL PUMP
- H—24-GAL. GASOLINE TANK
- I—THROUGH-HULL, GASOLINE-TANK VENT
- J—PIPE DECK PLATE (For Filling Gasoline Tank)
- K— $\frac{1}{2}$ " STUDS
- L—RUDDER PORT WITH STUFFING BOX
- M—PROPELLER-SHAFT LOG
- N—MARINE COMPASS
- O—FORWARD AND REVERSE SHIFT LEVER
- P—DRAIN PLATE
- Q—FLUSH-TYPE LIFTING HANDLE
- R—FLOOR $\frac{1}{2}$ " PLYWOOD COVERED WITH LINOLEUM
- S—2" X 4" SHEET-METAL VENTILATING DUCT
- T—15-GAL. FRESH-WATER TANK
- U—FRESH-WATER FAUCET
- V—12" X 12" GALLEY SINK
- W—TWO 6-VOLT STORAGE BATTERIES





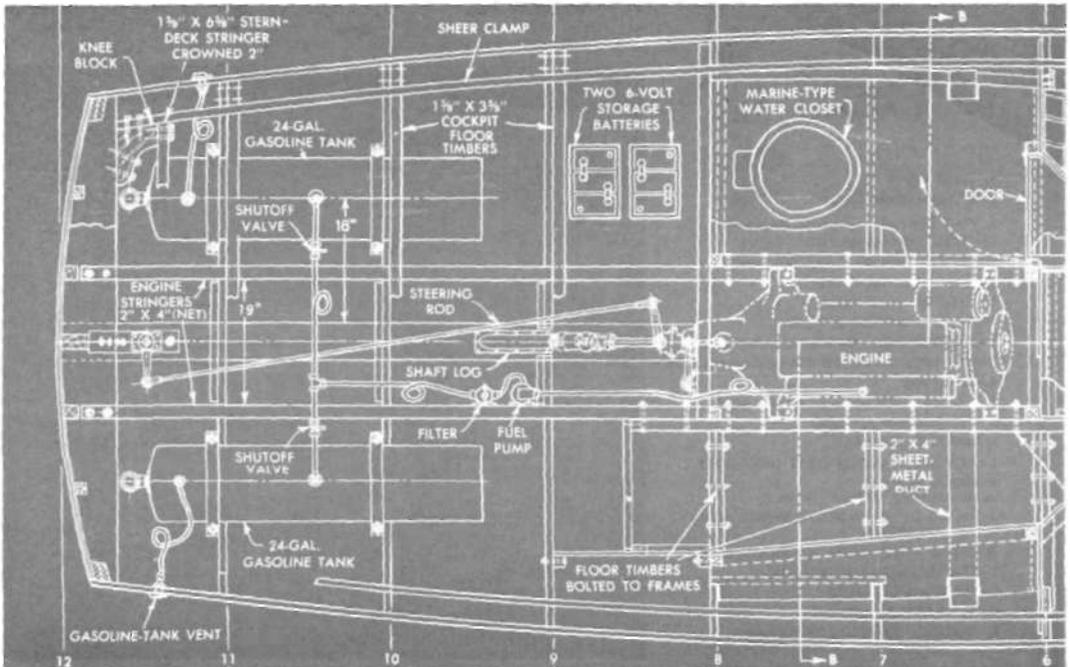
ship auger has no lead screw. In the event the hole runs out slightly, a bar of iron heated red-hot can be used to burn the hole in the proper direction.

Next, bolt the propeller-shaft strut to the keel, and drill a hole through the transom knee, apron and keel to take the rudder port. Locate the positions of the strut and port from the sketches made on the

profile drawing. Assemble the shaft log to the apron temporarily with two wood screws and insert the propeller shaft. A flanged coupling is used to connect the shaft to the engine. The engine stub shaft and the propeller shaft will require some machining to take the flanged coupling. After setting the engine on its bed, it can be lined up with the shaft by bringing the faces of the coupling flanges together and gauging the distance between them at four places 90 deg. apart around their periphery with a mechanic's feeler gauge. The shaft log may have to be shifted somewhat and the engine raised or lowered to get them in proper alignment. If the installation makes it impossible to line up the engine and shaft, a universal joint and thrust bearing can be installed between the coupling and shaft log. After the boat has been in the water a while, the propeller shaft may start to "pound" due to dampness from the bilge swelling the engine bed and throwing the motor out of alignment. However, once the motor has been realigned it rarely requires further adjustment.

Although many boats do not have a clutch-control pedal, it will be found useful. If an automobile engine is used, it is a simple task to saw off the clutch pedal, install the necessary linkage and connect to a foot pedal extending out of the control box, Fig. 37. The gearshift lever also is sawed off and connected to the forward and reverse lever as in Figs. 30 and 38.

Water to cool the engine is piped from an



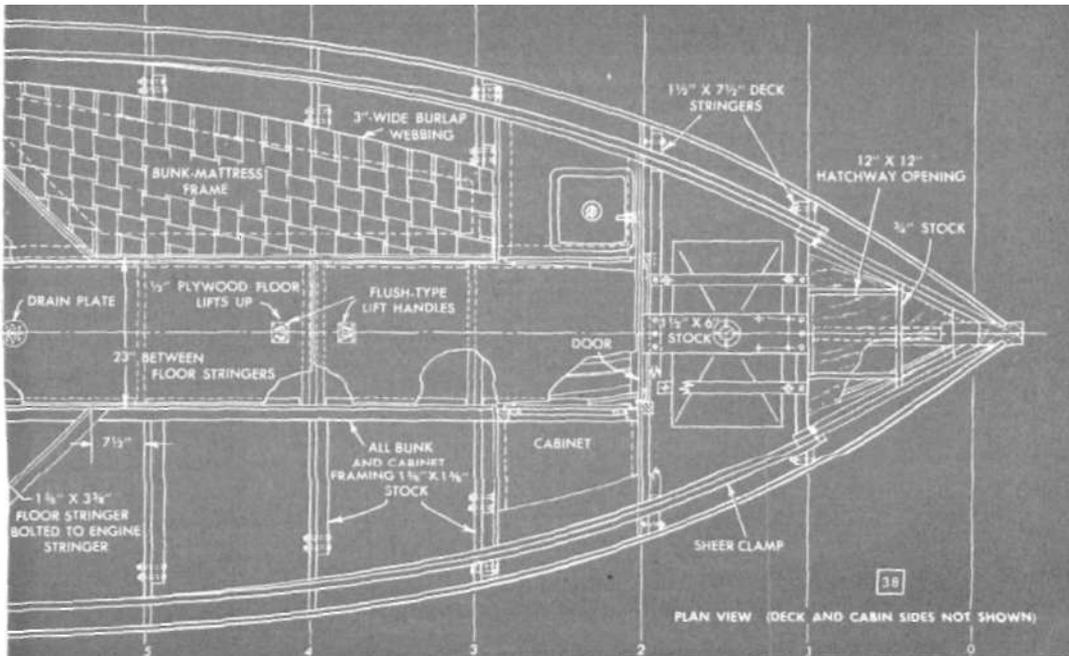
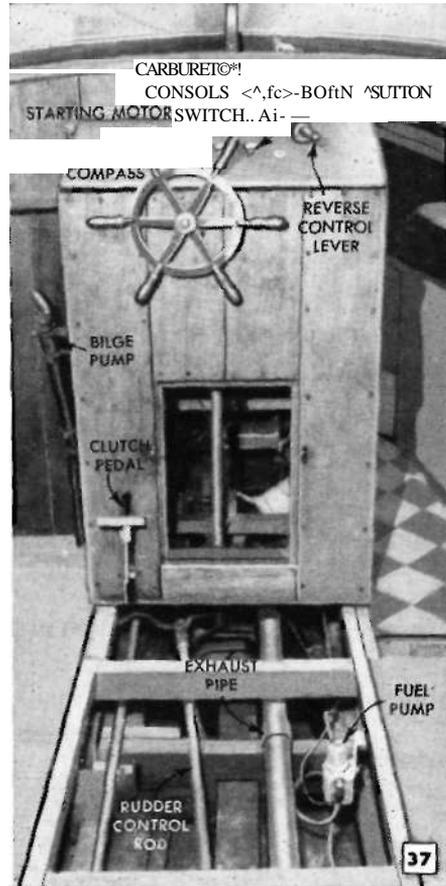
intake scoop to the pump. The scoop is fitted in a hole drilled in the bottom of the hull. Engine exhaust gases are carried through a 2¹/₂-in. galvanized pipe from the engine manifold to a hole in the transom 2 in. above the L.W.L. Cooling water from the engine also runs out the exhaust pipe. Asbestos must be wrapped around the exhaust pipe between the manifold and the cooling-water-pipe connection. The water keeps the rest of the exhaust pipe cool.

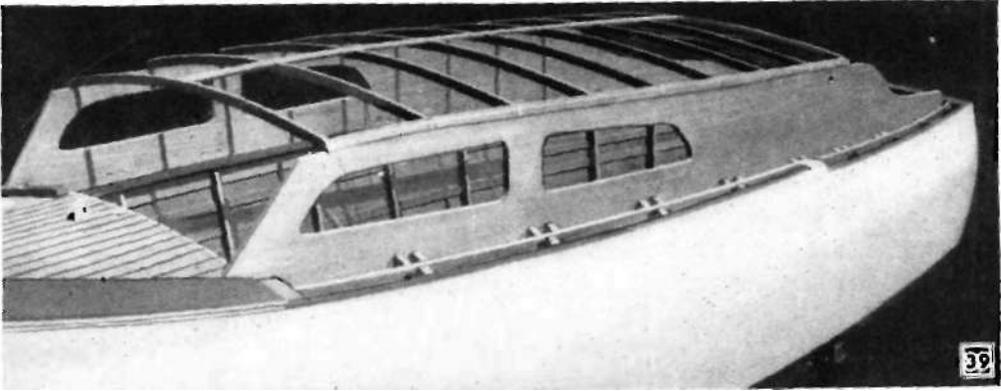
Sea Craft has two 24-gal. round tanks supported by cradles. However, any type of marine gasoline tanks can be used provided they have the fill pipe connected to deck plates located on an open deck so there is no danger of gasoline being spilled into the bilge. The tanks also must be vented through the hull as indicated. Copper tubing, coiled to absorb vibration, carries the gasoline to the engine by means of an electric pump. The tank outlet is the type fitted to the top of the tank to minimize the possibility of leakage.

Air for engine and bilge ventilation is supplied by sheet-metal ducts between stations 6 and 7, Figs. 30 and 35. Circulation is maintained by two plate vents in the transom.

Cabin Construction

The size of the cabin and the arrangement of the bunks, cabinets and bulkheads is a matter of personal choice and may be changed without affecting the performance of the boat. If more headroom is required, the cabin sides can be made higher or, if less headroom is desired, the cabin floor may be raised slightly.





Also, the length of the cabin can be shortened to provide a larger open cockpit. However, regardless of the changes made, the methods of construction shown in the drawings should be followed. All structural members must be fastened to the frames, never directly to the hull planking. Stock-size fir or spruce can be used for most of the framing and the plywood must be of the type made especially for marine use.

Sea Craft's forward deck extends from the bow to station 2. Two deck stringers, shown in the upper drawing of Fig. 42, are bolted to the aft and forward sides of the frames at stations 1 and 2 as shown in Fig. 38. The top edges of the stringers are notched for the cradle of the fresh-water tank and a 1/2 x 6-in. center beam, which is bolted to the stringers as shown in Figs. 30 and 38. The shape of the cradle, which is made of 1 1/2 x 3-in. oak, must be determined by the tank dimensions. Refer to the perspective drawing, Fig. 33, for clarification. The frame for the hatchway opening, indicated in Fig. 38, projects 2 in. above the stringer. This opening gives access to the chain locker, which is floored and partitioned as shown in Figs. 30 and 42. Cleats of 1 x 1-in. stock, screwed to the sides of the hatchway frame flush with the top edge of the stringer, support the 3/4-in. plywood, which is screwed down to cover the entire deck area. After the plywood has been covered with marine glue and canvas, it is planked with 1/2 x 3-in. mahogany. The white lines between the planks are made by beveling the planks slightly, as for calking, and then filling the resulting grooves with sealing compound. Although the 3-in. planning can be laid to the sheer line, a margin plank on each side, as in Fig. 40, will improve the appearance. Details of the bulkhead at station 2 are given in Figs. 41, 42 and 43.

The cockpit floor is supported by timbers which extend athwartships and bolt to the forward sides of frames 9, 10 and 11 and the aft side of frame 8. A portion of the

cockpit floor timber at station 8 is sawed out later for the stair well to the cabin. Note in Fig. 40 that the center section of the floor is removable and that it rests on two strips of 1 x 1-in. stock which are notched into the athwartship floor timbers. The outboard edges of the strips are located directly above the engine stringers. These pieces extend from station 8 to the vertical transom braces. Fig. 37 shows this section of floor removed.

The stern-deck stringer, which is crowned 2 in., the same as the top transom timber, is placed 16 in. forward of the transom and lag-bolted to a 3-in. knee block fastened to the sheer clamp and transom timber as indicated in Figs. 40 and 41.

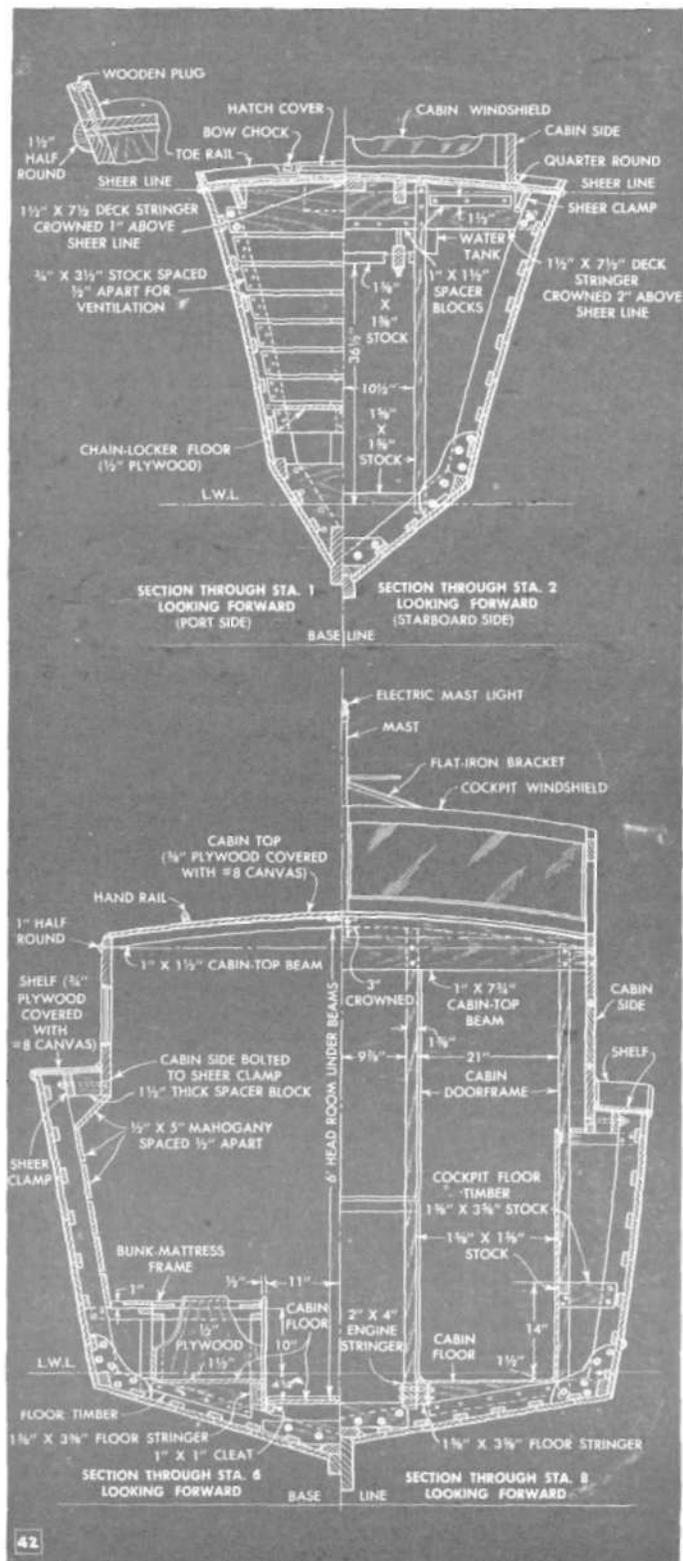
The cabin sides are installed next. First make the 1/2-in.-thick spacer blocks shown in Fig. 40. Considerable fitting will be required when installing the blocks. The in-board edges of the blocks must be perpendicular to the base line and their top edges must be on a slight downward angle to the sheer line to coincide with the 2-in. crown of the decks. When fitted, toenail them to the sheer clamp. Note that the dimensions for the blocks at stations 3, 4 and 5 have been omitted. These are installed after the cabin sides are clamped in position.

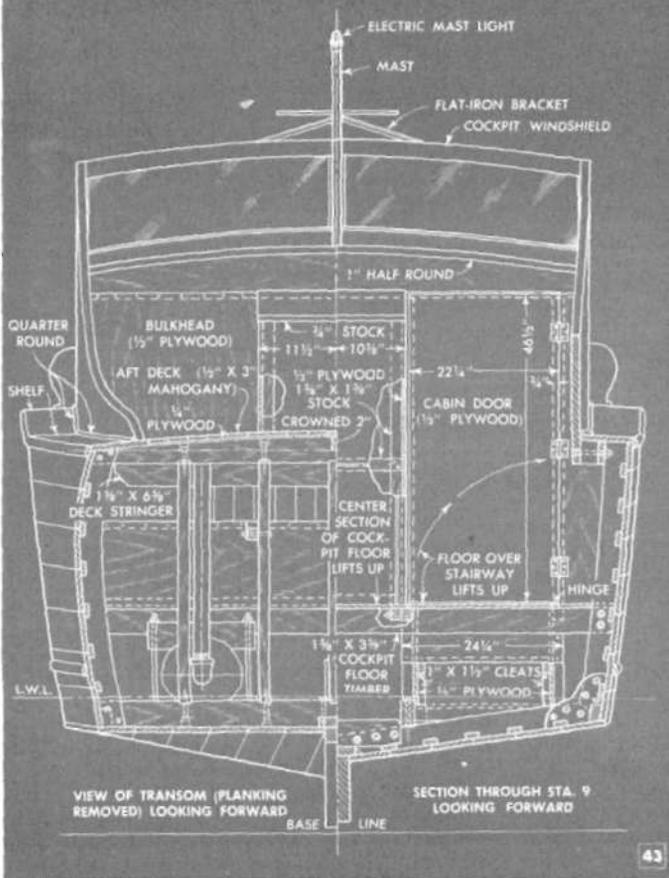
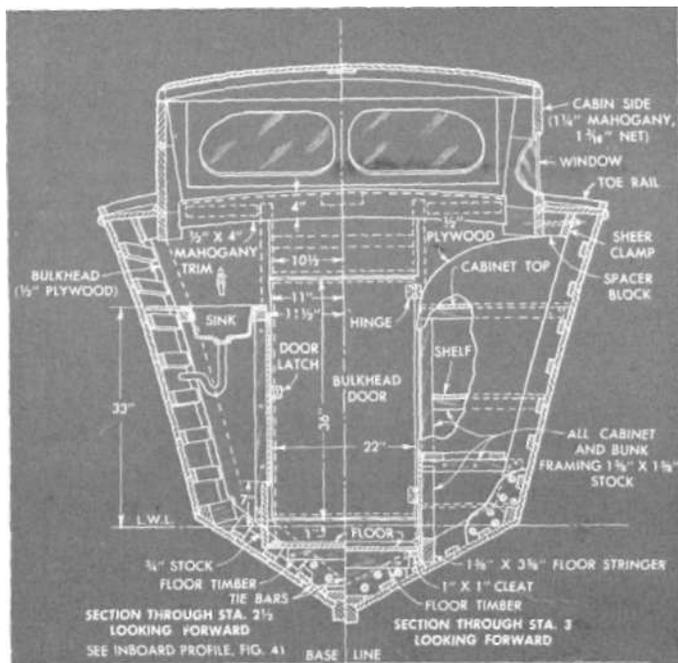
Each cabin side is made up of three pieces of 1 1/2-in. (1/4 in. net) mahogany, splined and glued as indicated in Fig. 31. The total width of the glued-up boards should be not less than 28 in. If three 9/2-in. boards are used, each side will require two pieces 20 ft. long and one piece 16 ft. long. However, if the headroom is to be increased, the width of the cabin sideboards must also be increased. To lay out the shape of the sides, joint the edges of the boards and lay them together on a flat surface. As the lower corners of the cabin sides are notched to fit 3/4 in. below the sheer line between the bulkhead at station 2 and the stern-deck stringer, the developed length must be obtained. This can be done best by fairing a batten against the

head and the stringer.

With the batten in place, mark the position of each station on it, then remove, place on the cabin sideboards and transfer the station locations to the sideboards. Draw lines across the boards perpendicular to the seams at the station marks and ends of the batten. Note in Fig. 40, section G-G, that the cabin side projects over the forward deck 5V2 in. A chalk line parallel with and 64V4 in. above the L.W.L. is stretched between two temporary upright braces at station 2 and the transom to represent the top of the cabin sides. The distance between the chalk line and the bottom of the sheer clamp or blocks at each station is measured and transferred to the cabin sideboards. A line connecting these points gives the bottom cutting line of the cabin side. The line between stations 6 and 7 drops abruptly because of the sheer drop. The curved lines of the cockpit sides and cutouts for the windows are drawn freehand with the aid of a pattern of squared lines drawn lightly on the boards as in Figs. 30 and 41. The aft ends of the cabin sides project about 1% in. over the stern deck. When cutting the spline grooves, stop them so they will not run out in the end grain of the windows and the curve of the cockpit sides. The forward edge can run out as it is covered by the windshield frame. When assembling the boards, use marine

glue and clamp securely until dry. Then lay out the port-light hole and the forward end which slopes about 36 deg. off the vertical. After sawing, rabbet the edges of the



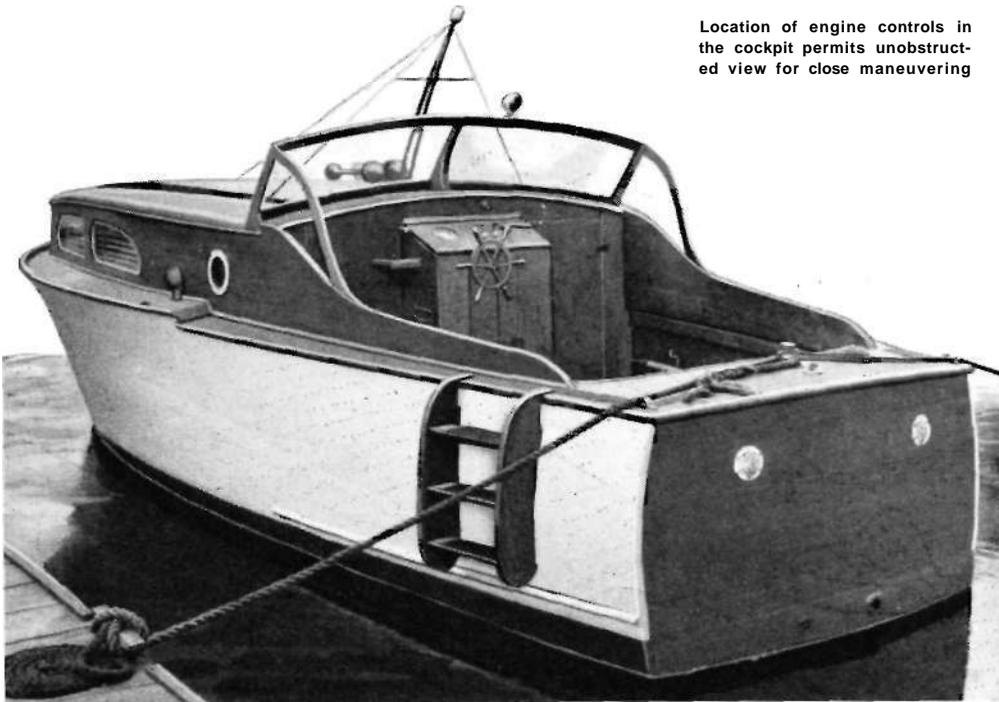


shown in Fig. 31, to take the plate-glass windows, which are installed later. As both cabin sides are the same, the completed one can be used as a pattern to lay out the second side. Care should be taken to make the rabbeted edge around the window openings on the outside of each piece.

When installing the cabin sides, nail temporary tie bars across frames 5, 6 and 7 just below the sheer clamps, and use timbers and wedges or automobile jacks at stations 6 and 7 to force the cabin sides against the spacer blocks for stations 3, 4 and 5, wedge and clamp the cabin sides until they are fairly straight between stations 2 and 5 so the window glass will seat tight against the rabbeted edges. When the sides are clamped firmly in position, bolt them to the sheer clamps at each spacer block with large-headed, 3/8-in. galvanized carriage bolts. Counter-sink all bolts and plug the holes for neat appearance.

Before removing the clamps, install the cabin-top beams shown in Figs. 35 and 40. The forward beam is placed 1/4 in. aft of the forward top corners of the cabin sides. The other frames are spaced uniformly with one directly above the frame at station 6. They are screwed to the top edge of the cabin sides and have filler blocks between them as in Figs. 31 and 39. The aft beam is cut off flush with the inboard sides of the cabin sides as-vid screwed to the 1 X 7 7/8-in. beam shown in Figs. 41 and 42. The top sides of the beams are notched in the center to take a V2 x 4-in. piece of mahogany as shown in Fig. 40.

Location of engine controls in the cockpit permits unobstructed view for close maneuvering



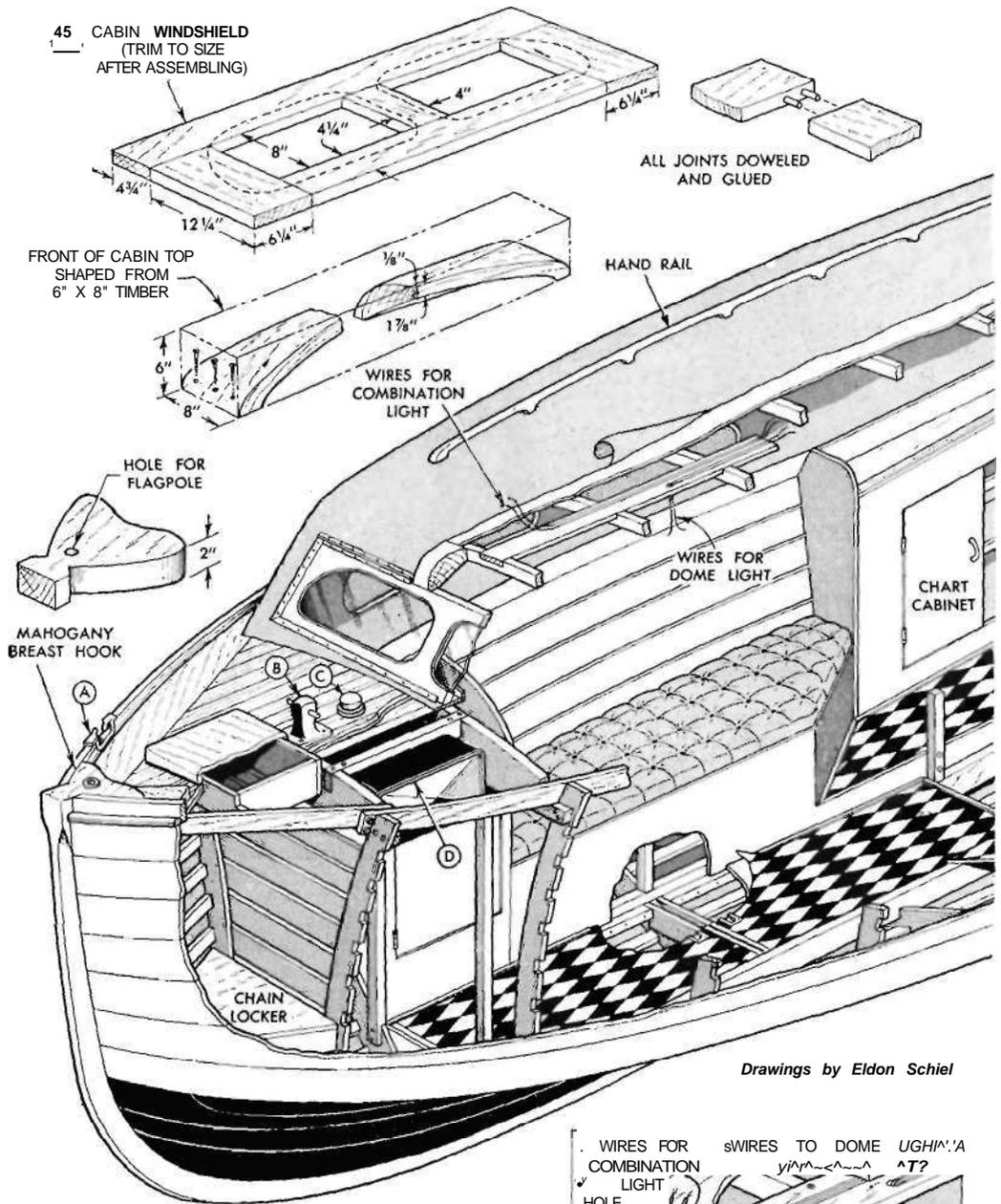
Stock-size lumber is used for the cockpit-bulkhead framing dimensioned in section 8 of Fig. 42. The framing for the engine compartment, toilet room and chart cabinet, shown in Figs. 30 and 35, is an integral part of the bulkhead framing and should be installed at this time.

Finishing the Cabin

Continuing with the cabin interior, install the framing and plywood covering of the port and starboard bunks and forward cabinets. The top of the port-side cabinet is cut out to take a 12 x 12-in. galley sink, which drains through the hull, as in Fig. 43. Fresh water is piped to a faucet fitted through the bulkhead, Fig. 30. The bunk mattresses are supported on a removable frame woven of burlap webbing, as in Fig. 33. They are kept in place by a 1/2-in. projection of the plywood bunk sides, which extend down over the inboard sides of the floor stringers. The hull ribs above the bunk frames are covered with Vg-in. mahogany, Figs. 41 and 42. The center of the cabin floor is made in two removable sections, each supported by cleats fastened to the plywood bunk sides and floor timbers which are bolted to the frames on top of the tie bars (see station 3, Fig. 43). Note that the floor slopes to obtain maximum headroom at station 6. The cabin floor on both sides of the engine compartment is fastened permanently to the top edges of the floor stringers and floor timbers, Figs. 35 and 38.

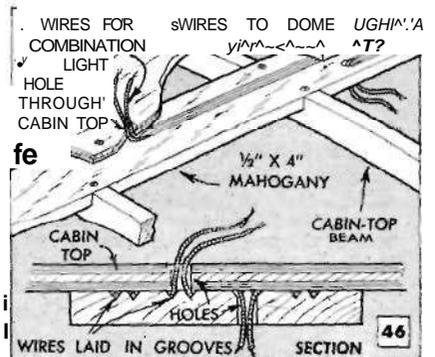
Before covering the cockpit-bulkhead framing, install the water closet, which must be purchased from a marine supply house. Plywood is used for the walls and doors of the toilet room, engine compartment and chart cabinet. Note in Fig. 35 that the sides and top of the engine compartment are removable. They also must be lined with asbestos. The sides are held in place at the top by hooks and at the bottom with quarter round nailed to the floor. One side and the top are shown removed in Fig. 36. An alcohol cooking stove is bolted in a sheet-metal cabinet mounted on the bulkhead frame. The cabinet must be removable for access to the rear of the control box as detailed in Figs. 43 and 49. This box houses the compass, electrical switches, engine controls and steering gear. An inspection door in the front of the box, Fig. 37, is held in place with brass door buttons and plates.

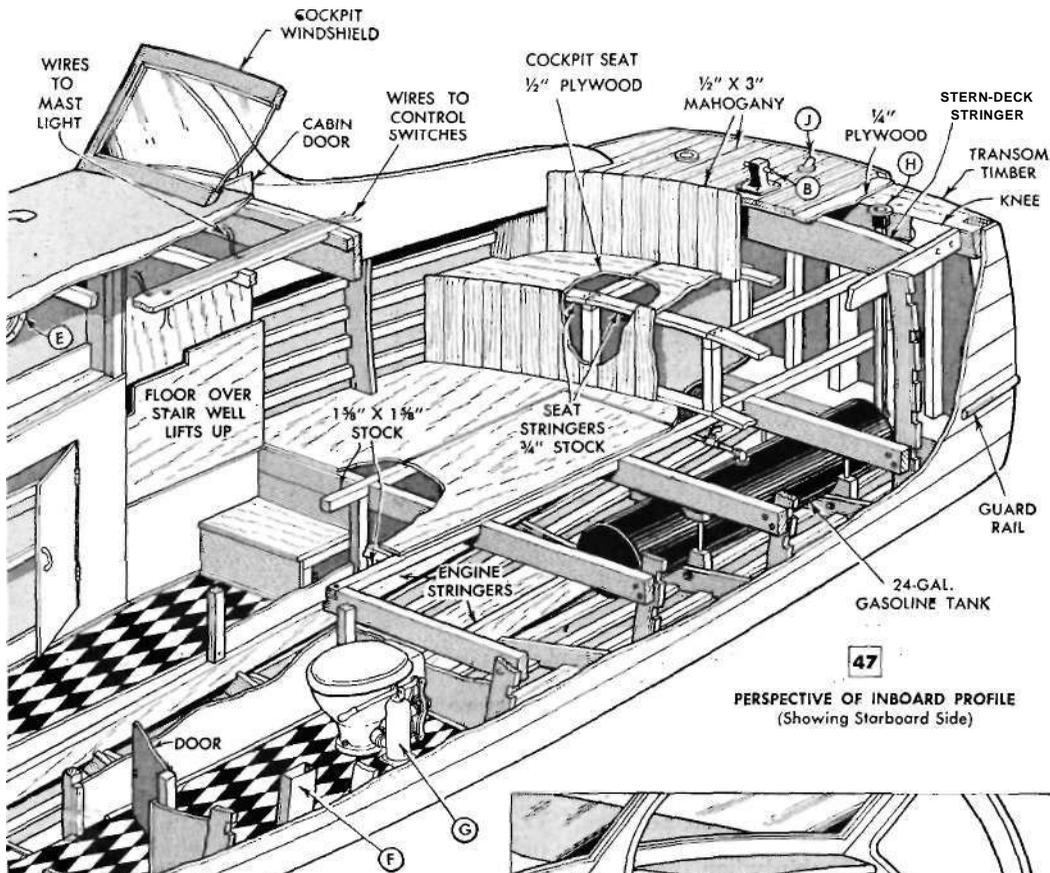
The steering system, Figs. 30 and 38, consists of an automobile steering knuckle of the worm-gear type bolted in the control box so that a steering wheel can be fastened to the worm shaft. The stub shaft of the worm gear is welded to a vertical shaft extending below the cockpit floor. Lever arms attached to the lower end of the shaft and rudder post are connected with a steering rod of 1/2-in. pipe, which has a clevis welded to each end. A hand-operated bilge pump is fastened to the port side of the control box with the outlet joined to a 1/2-in.



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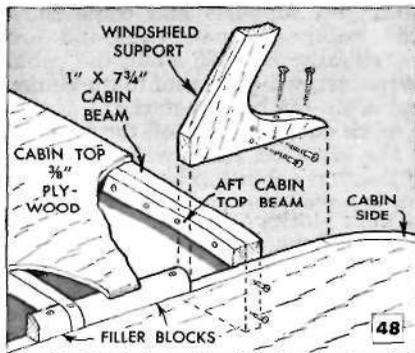




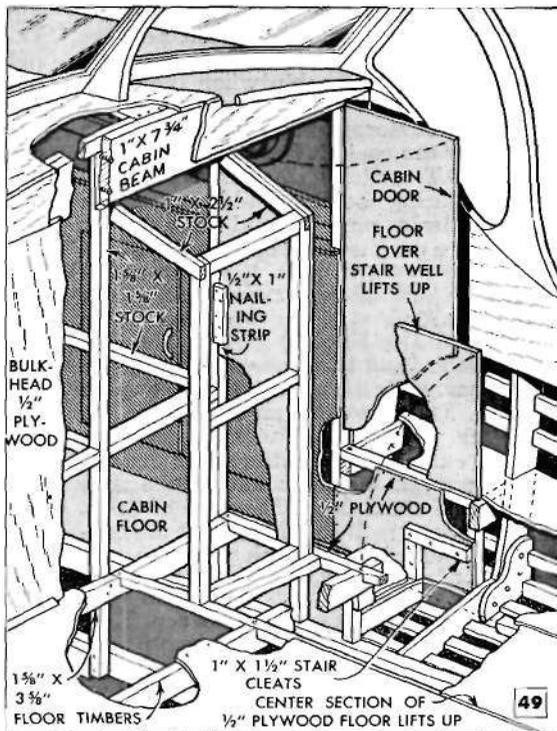
47

PERSPECTIVE OF INBOARD PROFILE
(Showing Starboard Side)

- A—SKENE BULWARK BOW CHOCK
- B—MOORING BIT
- C—PIPE DECK PLATE
(For Filling Fresh-Water Tank)
- D—15-GAL. FRESH-WATER TANK
- E—PORT LIGHT
- F—SHEET-METAL VENTILATING DUCT
- G—MARINE-TYPE PUMP CLOSET
- H—PIPE DECK PLATE
(For Filling Gasoline Tank)
- J—FLAGPOLE SOCKET



48



49



"Sea Craft's" tines show to best advantage when viewed off the bow. Cabin roof can be used for sun bathing

galvanized pipe running under the cockpit floor to a hole in the transom. The pump intake is connected to a hose extending down to the bilge.

The cabin stairway, Figs. 41 and 43, is covered with a trap door which projects under the cabin door when closed, preventing entrance to the cabin when the cabin door is locked.

Two 6-volt storage batteries, placed in a box under the cockpit floor are connected to a S.P.D.T. switch located in the control box. The wiring hookup should be arranged so the batteries may be used individually.

The stern deck is made of the same material as the forward deck. It is crowned 2 in, and the forward edge curved to conform with the radius of the cockpit seat, as in Fig. 47 and also Figs. 40 and 41. The seat top is made from three pieces of plywood and is removable for access to storage space beneath. This provides an ideal place to store life preservers. The side decks or shelves, extending from the sheer drop to the transom, should be installed at the same time as the stern deck. They are of $\frac{1}{2}$ -in. mahogany cut to fit snugly against the cabin sides and trimmed flush with the hull planking. The shelves, forward of the sheer drop, are of $\frac{1}{2}$ -in. plywood covered with canvas to provide a nonslip surface. They must be notched to clear the ventilating ducts. A block of wood is inserted between the fore and aft shelves where the sheer line drops, and $\frac{1}{4}$ -in. quarter round is used along the joint of the shelf and cabin side.

Before the cabin top is put on, cut grooves in the center strip for the insulated electrical wires, as in Figs. 46 and 47. These wires, which are connected to switches on the control-box panel, are brought through holes in the cabin top to the combination light, mast light and a horn which is required for a boat of this size. The wires leading to the cabin dome lights and toilet-room wall light, which have individual switches, are connected directly to an ammeter on the panel.

The two outer supports for the cockpit windshield are shown in pattern squares in Fig. 41. Each side is made from two pieces doweled and glued together at the top and screwed to the top edge of the cabin sides, Fig. 48. For the cabin roof, two pieces of $\frac{1}{2}$ -in. plywood 4 x 12 ft. are needed. These are joined at the center, notched to clear the windshield supports and come flush with the bulkhead covering, and are trimmed slightly oversize along the cabin sides. When screwing the roof to the center strip and cabin-top beams, start at the center and work outward. Saw off the forward end of the plywood flush with the front edge of the first cabin-top beam and plane the sides to a well-rounded corner to blend into the filler blocks. The top of the cabin top is shaped from a timber, as in Fig. 45. The entire top is coated with canvas cement and one piece of canvas stretched tightly and tacked along the sides just below the seam between the filler blocks and cabin sides. The forward edge of the canvas is

Top of the engine compartment serves as a table when preparing food in the cruiser's cabin

tacked under the front edge of the shaped timber and the aft edge is tacked to the bulkhead. The canvas then is given several coats of thinned paint. Half-round mahogany molding covers the tacked edges of the canvas along the cabin sides and bulkhead. The cockpit windshield is completed, as in sections F-F and E-E of Fig. 41. The mast, also detailed in Fig. 41, supports a white light. Section D-D of Fig. 41 gives the dimensions of handrails fitted to the cabin top.

The cabin windshield, Fig. 45, fits into a rabbet cut in three pieces of 1½-in. stock, two of which are screwed to the forward edges of the cabin sides, section C-C of Fig. 41, and one placed horizontally across the forward deck. Widths will vary somewhat with each boat. Note in Fig. 47 that the rabbet on the athwartship piece is cut at an angle to fit a 36-deg. bevel on the lower edge of the windshield. Toe rails ex-

Jading from the breast hook at the bow to station 4 on both sides along the sheer, Figs. 40 and 41, are screwed to the deck planking as in the upper detail of Fig. 42. The seam between the hull and deck planking at the sheer is covered with 1½-in. half-round molding. This also is used for the guard rail at the aft end of the hull, Fig. 41. The hatch cover for the chain locker should be a snug fit. It is planked with V2 x 3-in. mahogany over ½-in. plywood, which is rabbeted into the top edges of the cover frame.

Before painting the exterior, mark the L.W.L. on the hull and fill the planking seams above this line with a fresh or salt-water seam sealer. Give the hull three or four coats of flat-white marine paint above the L.W.L., sanding the hull by hand after each coat. Then apply a mixture of flat and glossy white paint and follow with a coat of glossy white. The decks, cabin sides and windshield frames are sanded, and a mahogany-colored wood filler or a stain is applied, after which three coats of marine varnish are applied, sanding the first two coats. Deck-plank seams are filled with a white seam sealer before varnishing.

All exterior hardware is installed next. The fore and aft mooring bitts must be bolted securely in position to withstand considerable strain. Plate glass for the windshields and cabin windows is held in



place with lead beading, as in Figs. 31 and 41. Mahogany on the interior of Sea Craft's cabin was stained and varnished and the plywood painted white, as in Fig. 44. The boat must be provided with a fire extinguisher which should be mounted on the cabin side wall above the chart cabinet. Give the bottom of the hull another coat of copper bottom paint and launch while the paint is wet.

A boat of this size must carry registration numbers. Application for a certificate of award of number can be made by the boat owner to the District Coast Guard Officer having jurisdiction over the area in which the owner resides. See page 175.

In addition to a set of seven working-size blueprints, full-size paper patterns for the hull frames and keel are also available from the Blueprint Department of Popular Mechanics Press.

