

Safe, dependable and economical to operate are the outstanding features of this boat.

Sea Lark

Try this all-purpose, inboard-powered runabout

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Naval Architect

Craft Print Project No. 228

STATEMENT OF USES

USES: An exceptionally seaworthy boat for use with inboard motors up to 25 hp where speeds not in excess of 22 mph are desired. This craft may be taken out upon waters anywhere, for fishing and general pleasure or sports use.

LENGTH: 14-ft. 6-in. Overall.

BEAM: 5-ft. 6-in. Overall.

DEPTH: Amidships 28-in. Forward 38-in.

WEIGHT COMPLETE: 650 lbs.

SEATING CAPACITY: 5 persons.

CONSTRUCTION: 3/8" plywood over a frame with developable surfaces.

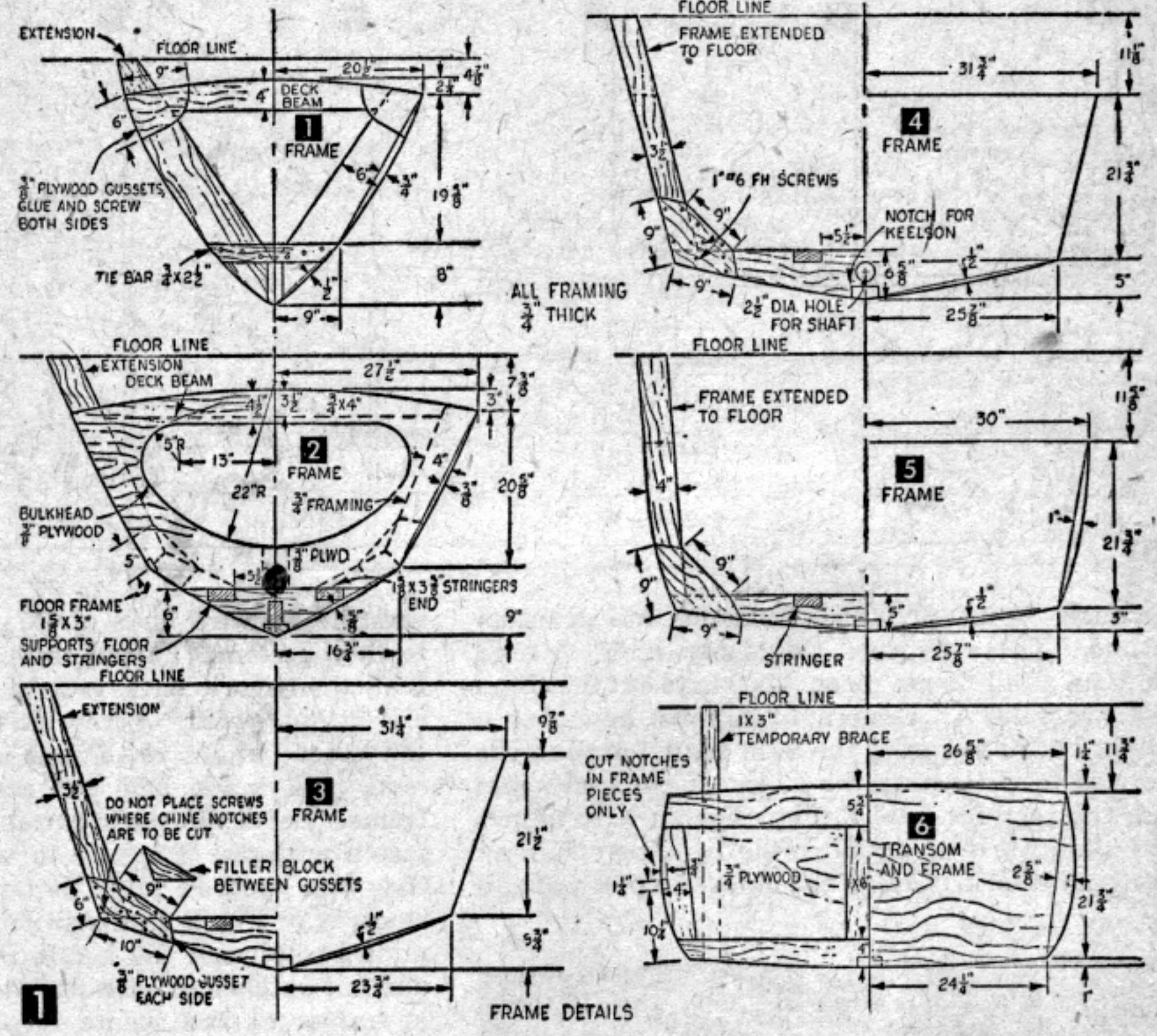
DESIGNED for fishing, general utility and pleasure use, this exceptionally seaworthy boat, because of its hull-lines, might be called a "small ship." Its developable-surface design makes possible a plywood-planked hull with lines superior to most round-bottom craft. Considerable flare to the forward top sides makes for great reserve stability. *Sea Lark* will give a fair turn of speed (10 to 20 *mph*) when powered with any one of the many inboard marine engines from 10 to 25 *hp*. She is not a fast boat, but in her speed range she is a sea-kindly boat that performs well in smooth or rough water.

Full-size frame patterns (Fig. 1) drawn on building paper (available at lumber yards) are the first items of construction. Be sure to include the frame extensions on both sides to reach the floor line because this boat is built in the upside-down position. Transfer the frame lines to 3/4 in. stock using carbon paper or a toothed wheel similar to a dressmaker's scriber and saw out the frame pieces. Then assemble the frame pieces again using the full size patterns as a guide. Fasten together at the chine joints with 3/8-in. gussets on both sides and a shaped filler block between. Coat all contacting surfaces with waterproof glue and 1 in. #6 *fh* screws. Instead of gussets on the aft side of #2 frame layout and saw the shaped 3/8-in. plywood bulkhead and fasten to frame pieces with glue and 1 1/4 in. #8 *fh* screws spaced 3 in. apart. This bulkhead not only strengthens the hull, but provides a storage space under the forward deck for odds and ends. If desirable, the bulkhead may be made with doors that can be locked. Note that #1 and #2

frames have deck beams which are assembled to the frames at this time and that #1 frame has a tiebar.

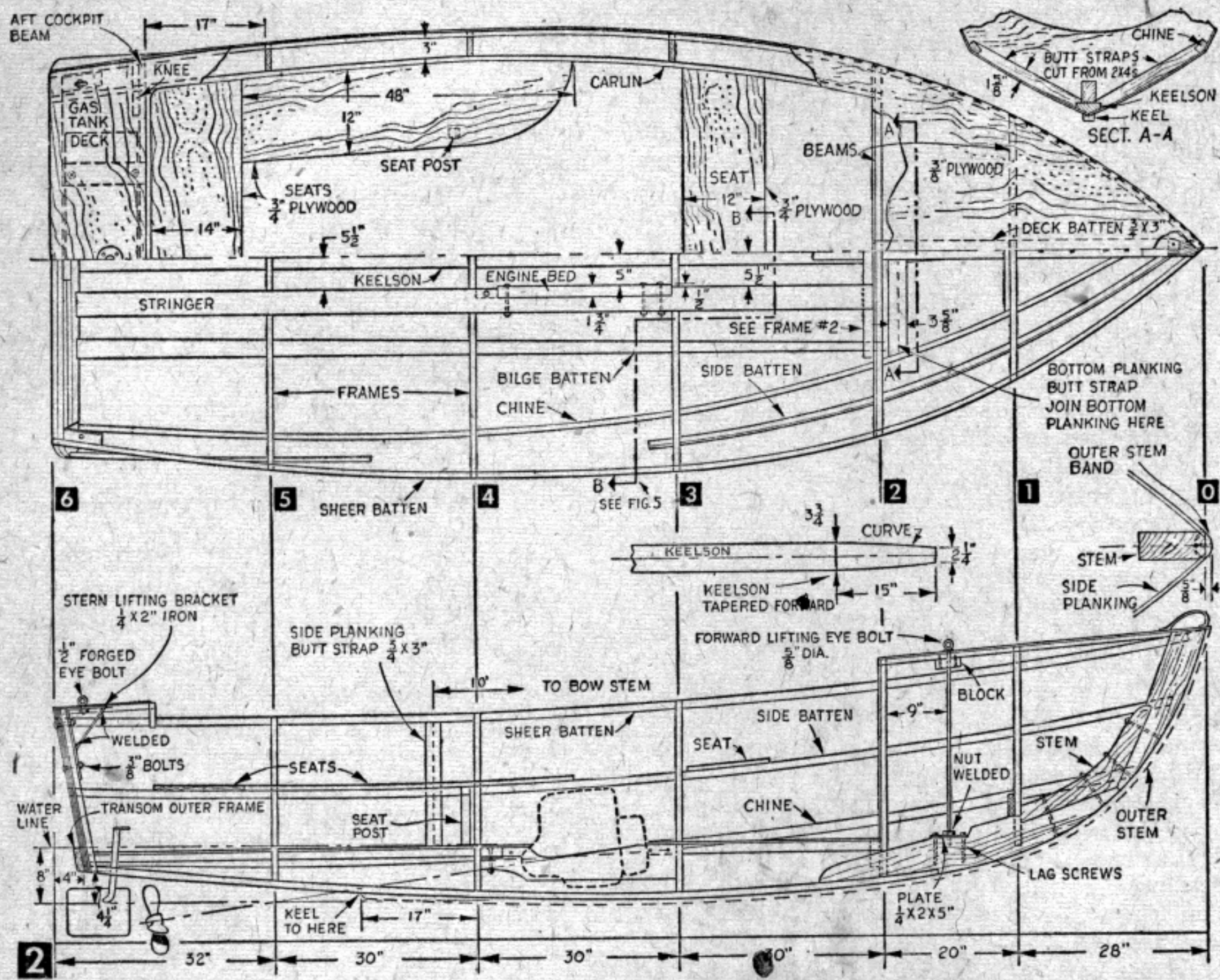
Fasten #6 frame pieces to a ¾-in. piece of plywood, cut to the shape of the transom, with glue and 1½-in. #8 *fh* screws spaced 3 in. apart. Provide 1 x 3 in. extensions temporarily screw-fastened to the transom to hold it off the floor at the proper height. Make up the stem pieces from a full-size pattern, only instead of gluing the parts together, coat the adjoining surfaces with Kuhl's *Bedlast* and bolt together with ⅜ in. carriage bolts. (Fig. 1)

When the frames and stem are made, your next step is to erect the framework. If you have a wooden floor on which to build Sea Lark, snap a chalk line 16 ft. long to represent the hull centerline. Layout the stem and frame spacing (Fig. 2) on this line and nail 2 x 2's (1⅝ x 1⅝ in.) 6 ft. long, centered and at right angles to the centerline, to the floor. These are used to align and keep the frames in position during construction (Fig. 3). If you are going to build Sea Lark on a concrete floor, make up the erection frame shown in Fig. 4. Be sure to place the 2 x 4's on edge as indicated to resist the force of bending the bottom plywood planking in place. The side planking on the hull will equalize this force when the boat is completed.



Line up the center of frames #1 and 2 with the centerline of the erecting frame with a plumb bob or 2-ft. square and temporarily clamp or screw-fasten the extensions on the frames to the 2 x 2's. Then fit the stem to the #1 and 2 frames and line it up with the mark on the centerline. If you are working on a wooden floor, securely fasten the stem to the floor with metal angle brackets. If you are using the erection frame on a concrete floor, secure the stem to the two center 2 x 4's with wooden blocks (Fig. 4). Line up and erect all the other frames and transom in the same way. Be sure to set the transom on the proper angle (Fig. 2). With all the frames in position, bend a light batten (¾ x 1 in. 16 ft. long) against the frames at the keel, chines, bilge battens and clamp locations to ascertain the relative positions and alignment of the frames and check for high or low spots. This checking is important as it determines the fairness of the completed boat. Make any minor adjustments by loosening and refastening the frames.

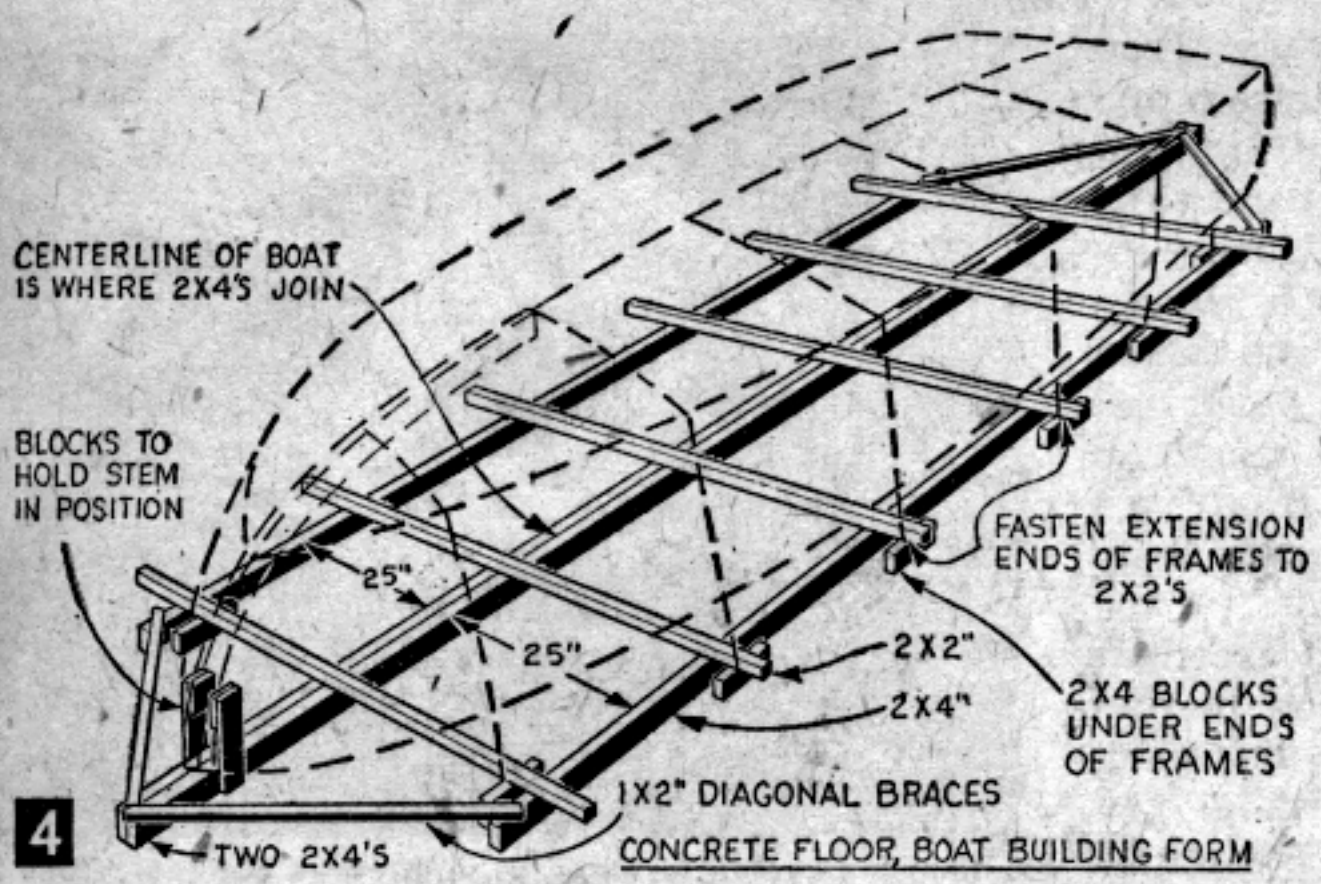
You are now ready to assemble the keelson, battens, chines and clamps. Begin by marking the keelson location on each frame. A small sample cut from the end of the keelson can be used to make accurate keelson notch markings on each frame. Saw out the notches and use a wood rasp to make a snug fit with the keelson. Note that the keelson is tapered slightly at frame #2. Spring the keelson in position and fasten with two 2¼-in. #10 *fh* screws to each joint. Keelson, chine and batten notches are cut



through ¾-in. plywood transom and transom frame. These exposed joints are later covered with an outer frame piece. Mark and cut the chine notches next. All chine notches must be cut on a slight bevel, so spring the light batten around the frames to determine the angle of cut and again use the rasp for final fitting. Fasten both chines simultaneously to equalize the bending strain on the framework. Clamp the chines in position and saw the forward ends of the chines at an angle to fit the stem. Fasten the chines at this point first, then work back toward the transom. Use one 2¼-in. #10 *fh* screw at each joint. Clamp the sheer battens or clamps in position (Fig. 2) next, and mark and cut the notches in each frame. Bevel the sheer batten to fit the stem and fasten with one 2 in. #8 *fh* screw to each joint. Saw two tapered bilge battens from ¾ x 6 in. stock as in Fig. 5 and position on the framework midway between the keelson and chines. Mark and cut notches in each frame with the exception of frame #1 and secure bilge battens with two 2 in. #8 *fh* screws to each joint. Position and clamp the side battens into the notch previously cut in the transom frame and midway between the chines and sheer battens all the way to the stem. Mark, notch flush and fasten with one 2 in. #8 *fh* screw to each joint.

The stem and keelson must now be beveled (Figs. 1 and 6) and the entire framework trimmed and faired so that the plywood bottom and side planking will lie evenly and in contact with all frame members. This task can be lightened considerably by using a portable electric hand planer. Lacking one of these tools, however, a jack plane and wood rasp will suffice. Test the fairness of all contact surfaces with the light batten sprung around and over all frames and the stem. Cover the exposed ends of the

Hull is built upside down. Extensions on frames support and align framework during construction.



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MATERIALS LIST FOR SEA LARK

Plywood (exterior)

No.	Description	Use
6	3/8" x 4' x 10'	sides, bottom, deck, floor, gussets, bulkhead, engine box
1	3/4" x 4' x 8'	transom, seats

Lumber

3	3/4 x 4" x 12'	side frames
3	3/4 x 6 1/2" x 10'	bottom frames
1	3/4 x 3 3/4" x 15'	deck beams
2	2 x 4" x 10' (1 5/8 x 3 5/8)	engine stringers
1	1 5/8 x 6 x 60"	engine beds
1	3/4 x 5 5/8" x 10'	bilge battens
2	3/4 x 1 1/2" x 16'	side battens
1	1 1/4 x 3 3/4" x 12'	keelson
2	1 1/8 x 2 1/4" x 14'	chines
1	3/4 x 1 1/4" x 7'	outer keel
1	2 x 8" x 6'	stem
2	3/4 x 1 1/4" x 16'	sheer battens
2	3/4 x 1 1/2" x 16'	sheer moldings
2	3/4 x 1 1/2" x 10'	deck carlins
1	3/4 x 3" x 10'	deck battens

Fastenings

6 gross	1 1/4" #8 *fh* screws	deck, planking
1 gross	1" #6 *fh* screws	gussets
1 gross	1 1/2" #8 *fh* screws	transom
6 dozen	2" #8 *fh* screws	sheer batten
3 dozen	2 1/4" #10 *fh* screws	keelson, chines
4	3/8 x 1/2" galv. carriage bolts	stem
2	5/16 x 36" threaded rods	gas tank
4	5/16" standard nuts for above	
8	washers for above	

Fittings

May be purchased at Wilcox, Crittenden & Co., Inc., Middletown, Connecticut or, Perkins Marine Lamp & Hardware Corp., Brooklyn 7, N. Y.

1	8 x 10" rudder (bronze) 3/4" shaft
1	3/4" rudder part with stuffing box
1	3/4" shaft tiller
2	3/4" rudder post collars
1	10" dia. steering wheel with drum
20 ft.	1/4" tiller rope
1	single eye block for 1/4" rope
1	double eye block for 1/4" rope
2	double eye turnbuckles for 1/2" rope
1	adjustable strut to suit propeller shaft
1	self aligning shaft log to suit propeller shaft bolts for strut and rudder as needed
1	10 x 10" 3 blade Michigan propeller
1	propeller shaft to suit above propeller
1	5/8 x 6" shoulder eye bolt for welding to 5/8" shaft
1	5/8" standard nut
2	1/2 x 3 1/4" shoulder eye bolt threaded with nut
1	1/4 x 2 x 5" hot rolled steel for lifting brackets
1	gas tank vent
1	gas tank cap
1	3/8 O.D. x 12' copper tubing and fittings for gas line

Engine

1	inboard marine engine from 10 to 25 hp but not to exceed 25 hp

Miscellaneous

1 qt	Elmer's Waterproof, Penacolite 61124 or Weldwood glue
2 qt	Kuhls' Bedlast

keelson, bilge battens and chines with an outer frame piece cut to the shape of the transom bottom (Fig. 2). Coat adjoining surfaces with Bedlast and screw-fasten with 1½ in. #8 *fh* screws spaced 6 in. apart. Because the plywood panels used for bottom planking are only 10 ft. in length, two pieces must be joined just forward of frame #2. For a strong, watertight seam where the plywood joins, cut and install two butt straps extending from the keelson to each chine as in Fig. 2. Fair the butt straps to blend with the rest of the framing members.

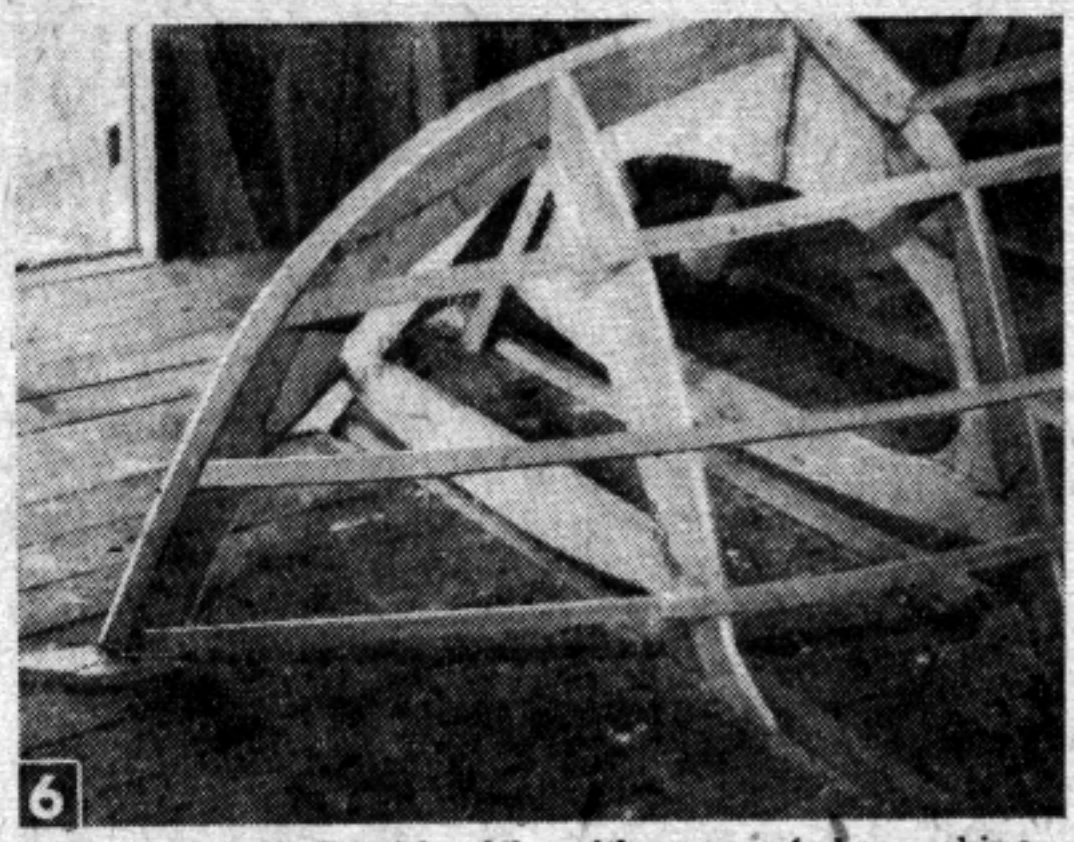
Plank the bottom first. Clamp a 4 x 10 ft. piece of plywood ⅜ in. thick to the framework flush with the outer transom frame so that one edge is just overlapping the keelson centerline. Place the light batten on top of the plywood and in line with the keelson centerline and mark the plywood. Also mark the plywood along the chine and check to see that the plywood covers about one-half of the butt strap. Then remove and saw to shape. Using this shaped piece of bottom plywood as a pattern, mark and saw the other bottom plywood piece. Before fastening the plywood bottom pieces in place, coat the contacting surfaces of the bilge battens, frames and butt straps with waterproof glue and the keelson, chines and transom with Bedlast. Then clamp the bottom pieces in position and fasten at all points with 1¼-in. #8 *fh* screws spaced about 3 in. apart. Use a double row of screws along the transom. To fit the triangular shaped fore end pieces of planking, first place a piece of building paper over one side of the forward end of the framework, mark and cut out a paper pattern. Transfer the outline to ⅜-in. plywood and saw two pieces to shape. Soak in hot water until pliable enough to bend, then clamp and fasten to the framework as you did the other bottom planking using glue on all contacting surfaces. After the glue dries, trim the plywood flush with the chines and transom outer frame.

The plywood side planking may be cut from one 16 ft. length or two 10 ft. lengths joined with a ¾ x 3-in. batten just aft of frame #4 (Figs. 2 and 7). Temporarily clamp the forward piece of plywood to the sides, mark, remove and saw to shape. Use this piece as a pattern for cutting the other forward side piece. Coat the contacting surfaces of the chine with Bedlast and the frames, side batten and clamp with glue. Then clamp and fasten the forward side planking with 1¼-in. #8 *fh* screws spaced about 3 in. apart. Mark and cut the aft sections of side planking and fasten in place

the same as you did the forward sections. Trim the plywood flush along the chines, transom and stem, and cover the end grain of the planking at the stem with a ⅝ x 1½-in. outer stem band (Fig. 2). To prevent splitting the stem band during installation, soak it in hot water until it is pliable, coat contacting surfaces with Bedlast and fasten with ½-in. #8 *fh* screws. When dry, bevel and sand corners round. Cut the keel to length so that it will extend to 17 in. aft of frame #4 (Fig. 2), seat in Bedlast and fasten with 2 in. #8 *fh* screws.

Before the hull is turned over is an excellent time to paint the outside. Use a good marine paint such as *BoatLIFE* following the manufacturer's instructions for the particular paint you use. When the paint has dried hard enough to take handling without scratching, saw off the frame extensions flush with the sheer battens, and turn Sea Lark right side up.

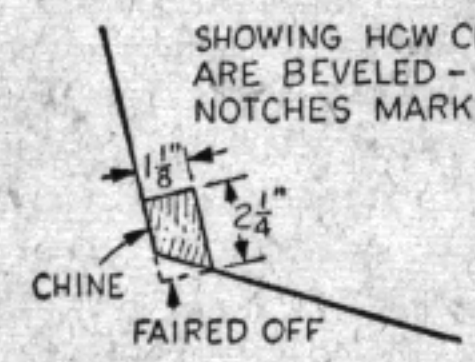
The inside framing details are installed next. Make up the aft cockpit beam and knees (Fig. 5) and install 17 in. aft of frame #5 (Fig. 2). Cut half notches (Fig. 5) in the transom frame, cockpit beam and deck beam of frame #2 and corner notches in #3, 4 and 5 frames for the carlins (Fig. 5). Fasten carlins with 1½-in. #8 *fh* screws. Notch the forward deck batten (Fig. 2) flush into deck beams on #1 and 2 frames and end of stem. Fasten with two 1½-in. #8 screws at each joint.

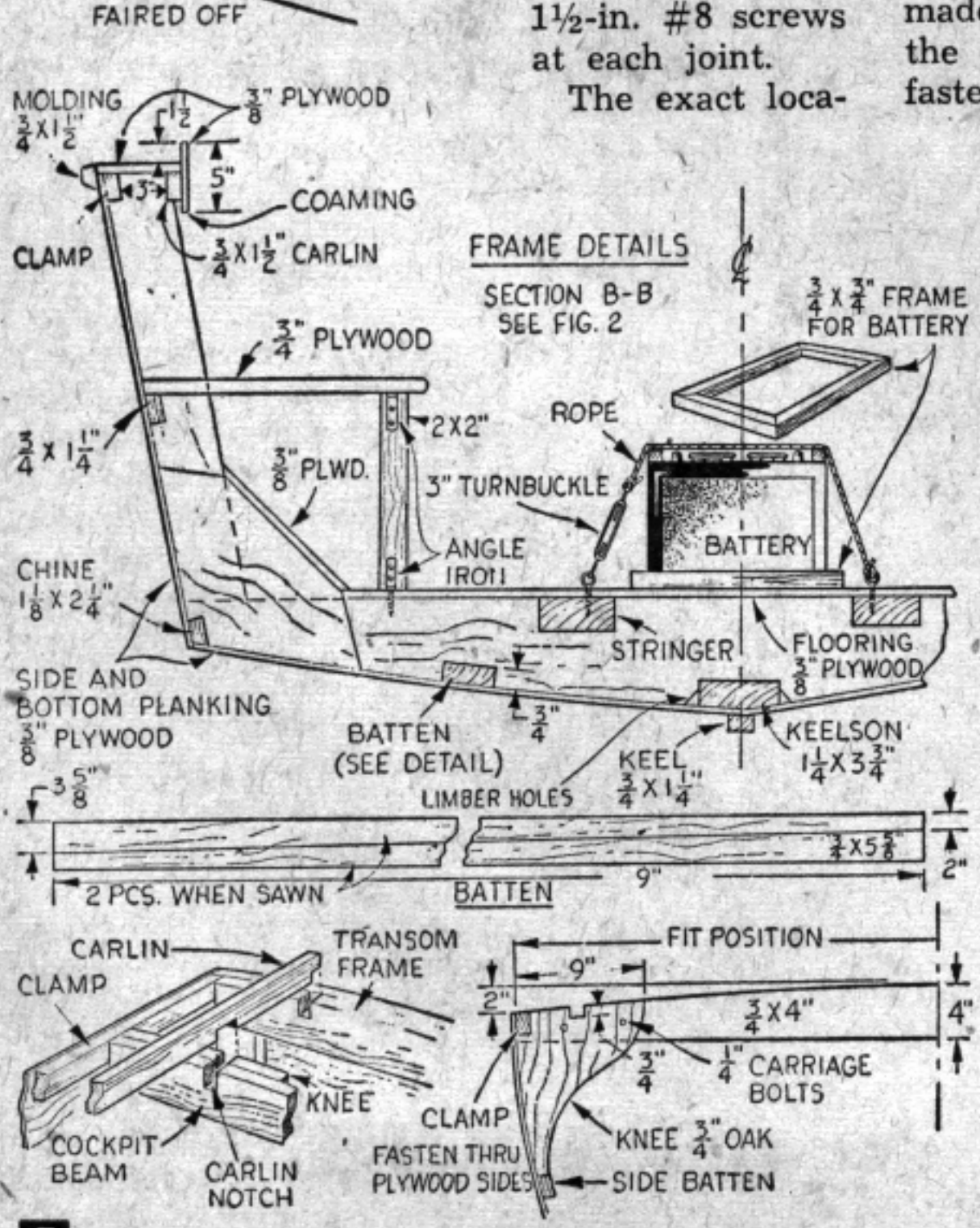


Stem is beveled to blend in with curve of sheer, chine and #1 and 2 frames.

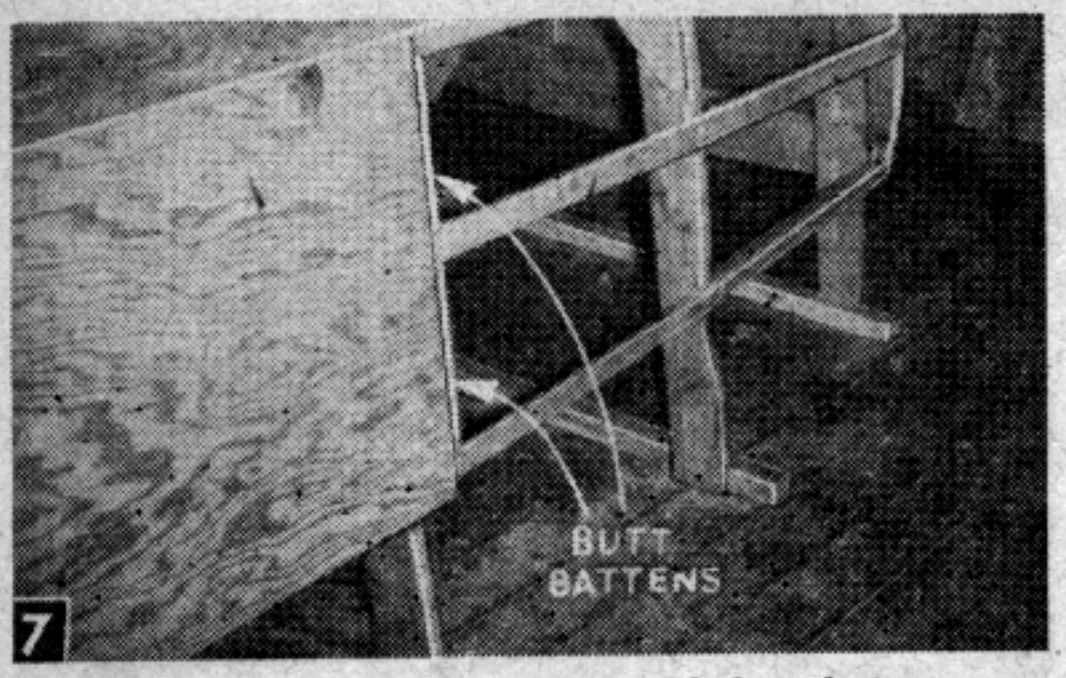
The exact location of the 2 x 4-in. (1⅝ x 3⅝-in.) engine stringers will depend upon the type and size of inboard engine used. The location of the stringers (Fig. 2) are for use with a Kermath *Sea Twin* marine motor. Use light-weight marine engines only, and not to exceed 25 *hp*. Check the information received with the engine and locate the stringers accordingly. Mark and notch the bottom piece of each frame for the stringers with the exception of frame #2. Make a 1⅝ x 3 in. floor frame, notch for the engine stringers and fasten the frame #2 as in Fig. 5. Now, before fastening the stringers in place permanently, make up two engine beds (Fig. 8) to suit the engine you are using, and fit into cutouts made in the stringers as in Fig. 2. After bolting the engine beds to the stringers, assemble and fasten the stringers to frames with two 2¼-in. #10 *fh* screws to each joint. Place engine temporarily on the engine beds, mark the point at which the propeller shaft must go through the keelson and remove the engine. Then make a drill-guide block from 4 x 4-in. stock (Fig. 8) and drill about 3½ in. deep at the angle at which the engine will set (approx. 11° to 12°). For a ¾-in. dia. shaft use ⅞-in. bit, etc. Line up the marks on the drill-guide block with the mark on the keelson and temporarily fasten the block to keelson. If a ship auger is not available, use a bit extender or have a steel rod welded to the end of a regular bit. Place the bit in the hole in the block and drill through the rest of the block, keelson and bottom blanking.

To align the engine and propeller shaft, block up the hull about 18 to 20 in. above the floor and place the engine on the beds, but do not fasten down. Assemble the propeller to the shaft, place the strut on the shaft, slide the shaft through the drilled hole in the hull and shaft log and couple to the engine as in Fig. 8. Now, while you hold the strut by hand under the hull, have a friend in the boat hull slowly turning the engine over by hand. Adjust the strut





5 AFT COCKPIT BEAM AND KNEE

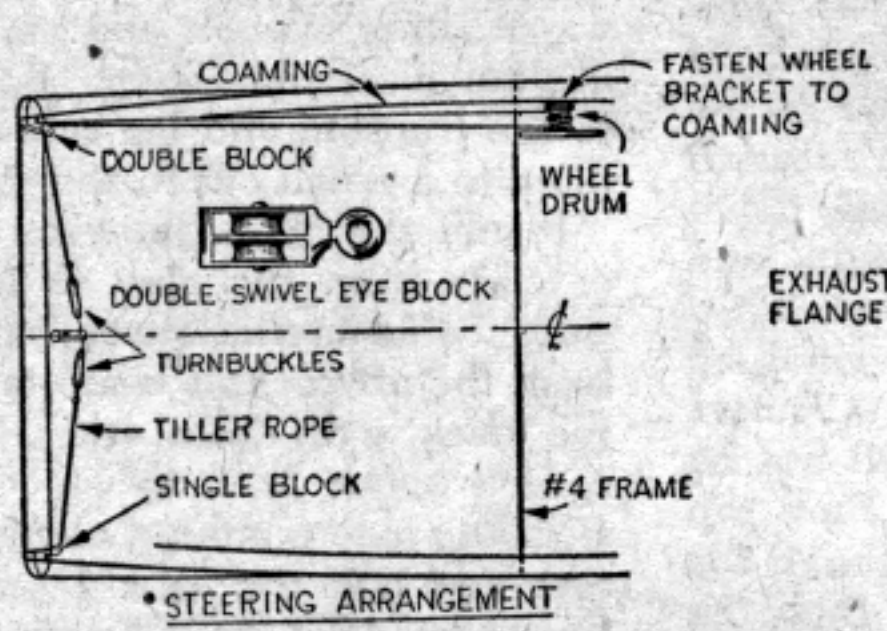


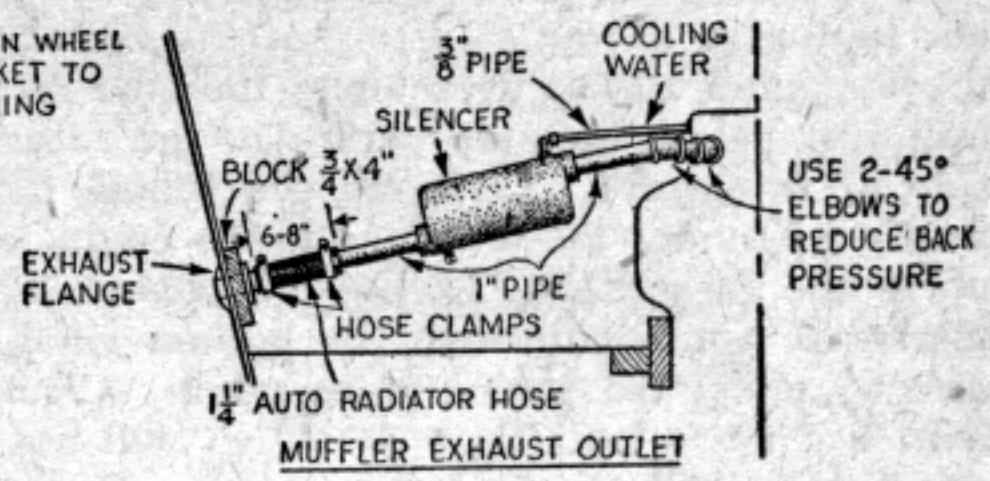
Join plywood side planking with butt battens.

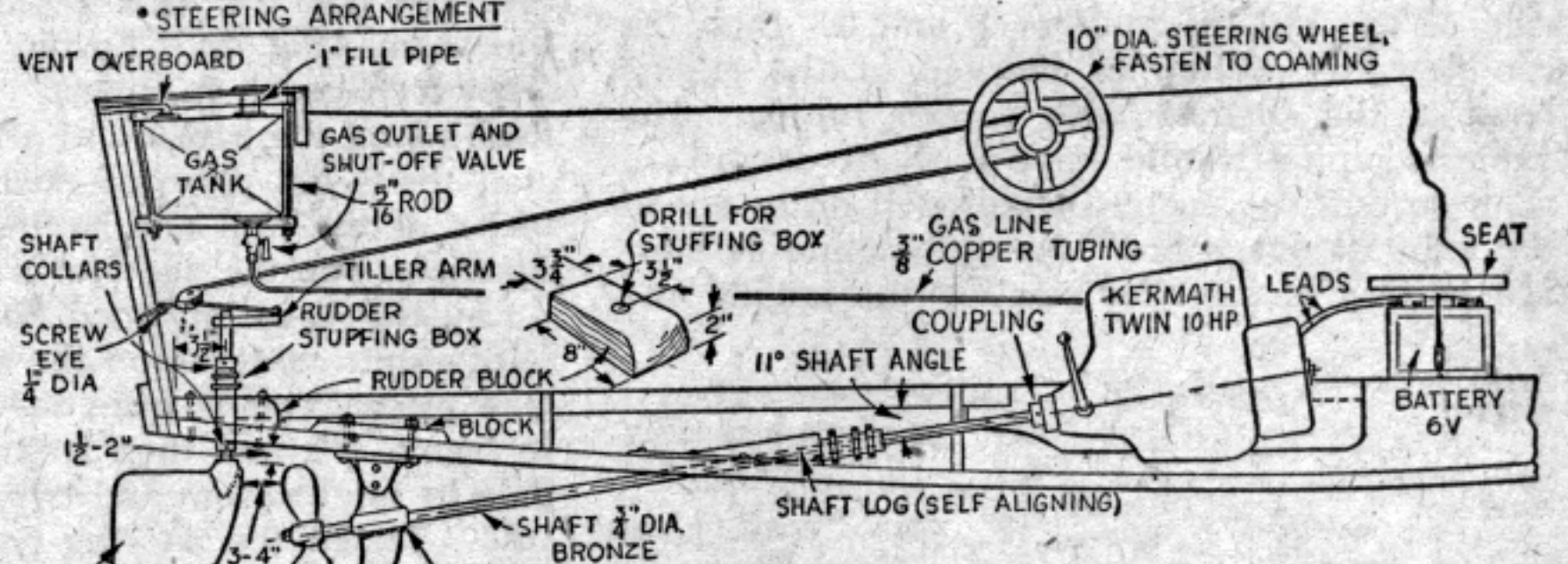
until no binding is apparent in the shaft or coupling and check to make sure the shaft is centered or nearly so in the bored hole in the hull. If needed, raise the engine with metal shims or washers, or lower it by cutting away some of the engine bed. Also check the shaft log to see that it will seat against the keelson without binding with the shaft in place.

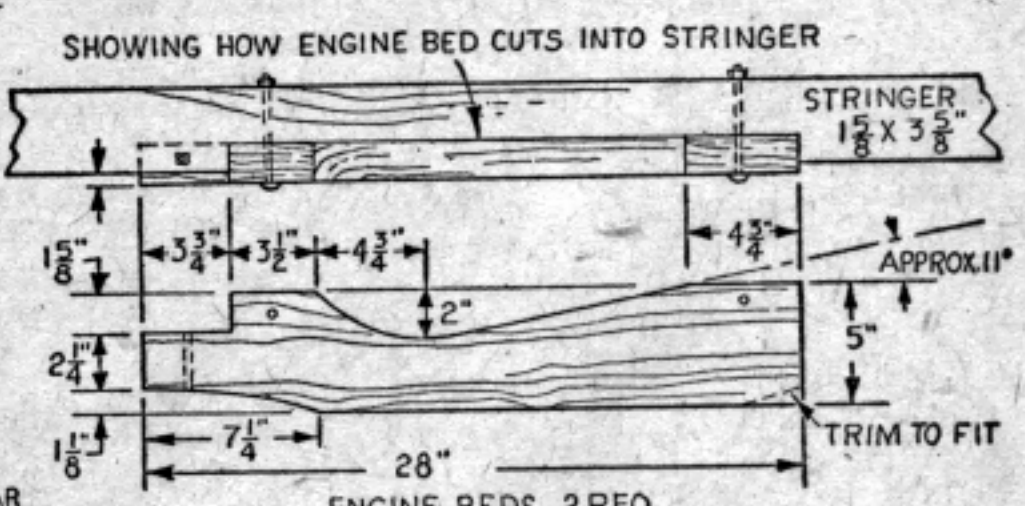
When all parts are in alignment, fasten the engine to the bed rails with 3/8-in. lag screws and bolt the strut to the hull through the keelson and a block of wood on top of the keelson inside to strengthen the joint. Before screwfastening the shaft log to the keelson, make a rubber gasket (from an old inner tube) and place between the log and keelson. Bedlast can also be used between log and keelson, but do not get Bedlast on shaft as it may cause binding. Although not shown in the photo Fig. 11, it is advisable to make and braze a skeg (Fig. 8) on the lower side of the strut to prevent a bent or broken propeller due to striking some submerged object. Make and bolt the rudder block to the keelson as in Fig. 8 and install the rudder stuffing box, rudder, collars and tiller arm. These are all purchased parts; see list of materials for sizes. The hook up for controlling the rudder with a steering wheel fastened to coaming is shown in Fig. 8.

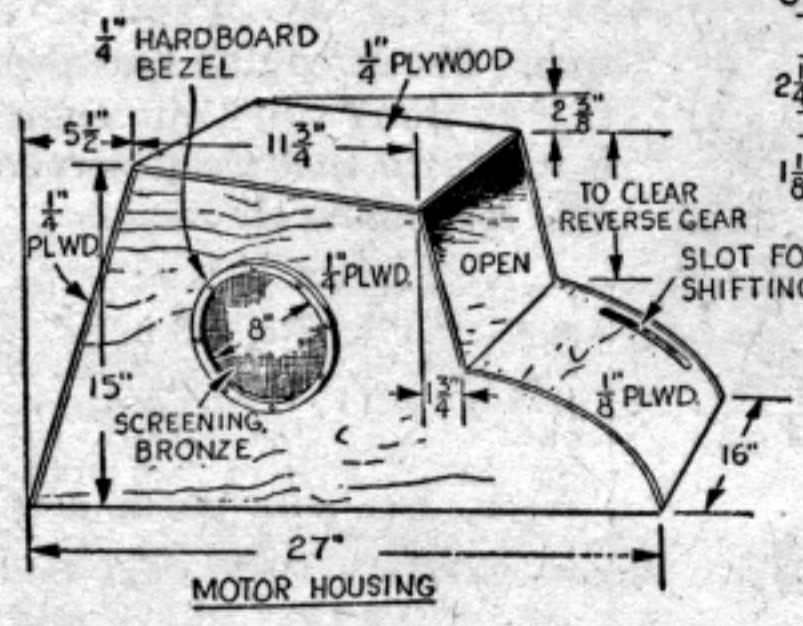
Have the gas tank (Fig. 10) made at your local sheet metal shop. Fittings for the vent, fill pipe cap and gas line to the engine should be soldered in place before tank is installed. Notch the aft-deck battens into the transom frame and aft deck beam (Fig. 10) and fasten with two 1½-in. #8 *fh* screws. Drill and counter-bore for the rods, which are 5/16-in. threaded rods with a washer welded to one end to serve as a bolt head, and make the gas-tank support bars (Fig. 10). Before installing the gas tank, make the two filler blocks and place them on top of the tank so that the blocks will be between the aft deck battens and top of the tank. The filler blocks will provide enough clearance between the un-

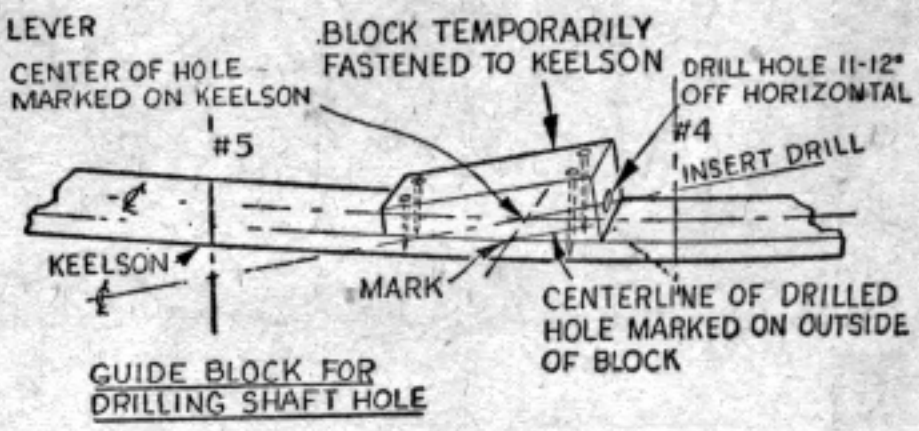




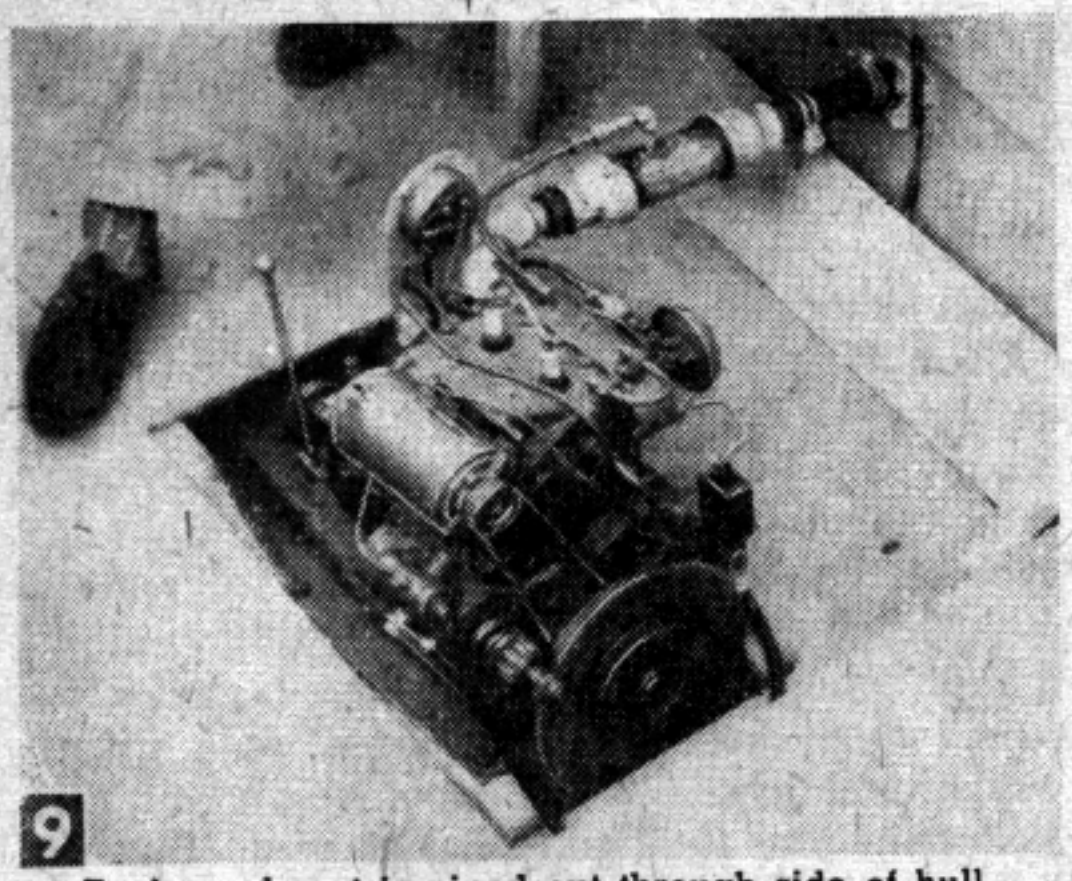








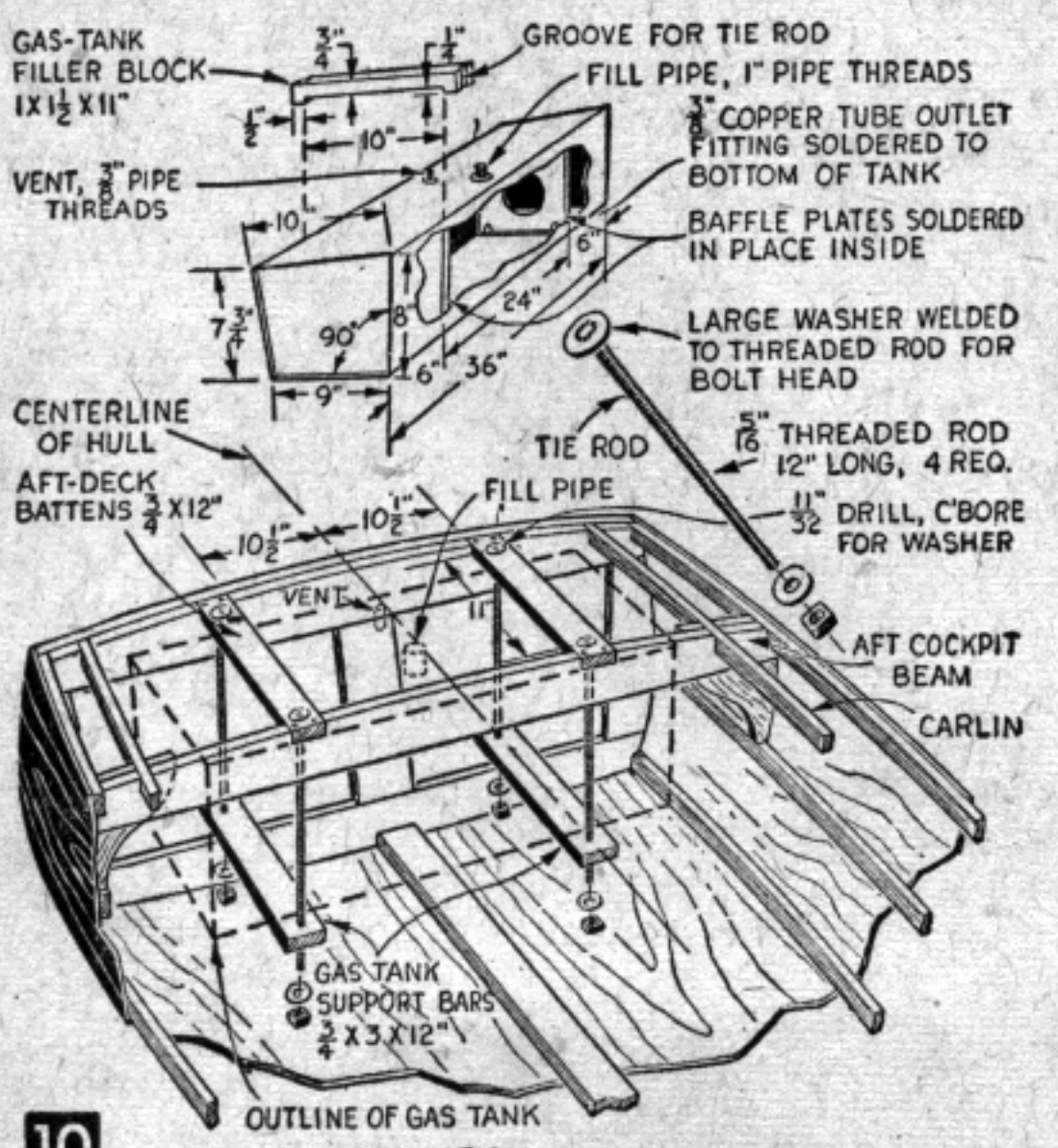
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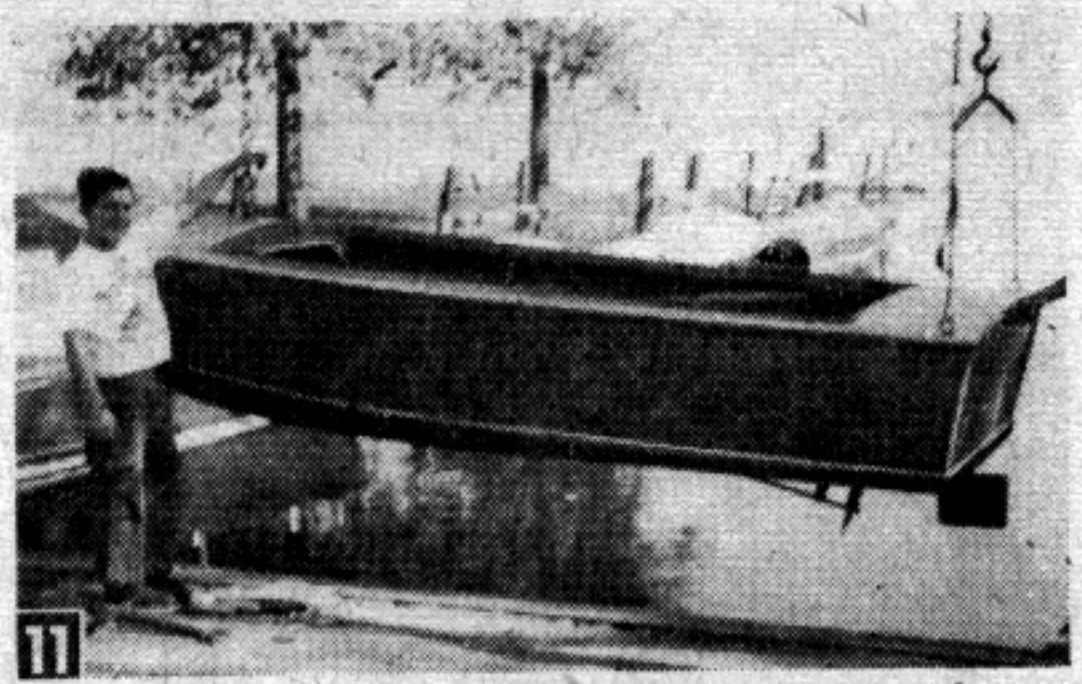
9 Engine exhaust is piped out through side of hull.

derside of the aft deck and the top of the tank to install the fill pipe and tank vent which must extend through transom to outside of the hull.

When the gas tank is drawn up tightly in position with the four tie rods, connect a ⅜-in. copper tubing to an outlet fitting at the bottom of the tank and run it over along the side of the hull just below the side batten to the forward side of frame #4. Continue the tubing down frame #4, under the floor line to the engine and up to the carburetor. Locate the engine water intake for cooling through the bottom planking directly under the engine water pump. Connect with a length of plastic hose which will not be affected by vibration of the engine. Pipe the exhaust gases from the manifold out through the side of the hull as in Figs. 8 and 9. Pipe the cooling-water outlet on the top of the engine head to the silencer with copper tubing. The exhaust piping should have a slight downward slant so that the cooling water will drain out of the exhaust overboard. An automobile 6v storage battery is used for starting the engine and



10 GAS TANK INSTALLATION



11 Three eye bolts fastened to hull permit easy placement or removal of boat to and from water.

deck lights. Locate it in the center of the hull under the forward seat or more nautically speaking, the thwarts. Make the battery frame and hold down as in Fig. 5.

To facilitate placement and removal of Sea Lark from the water with a boat hoist as in Fig. 11, have two stern lifting brackets and one forward lifting eyebolt and plate (Fig. 2) made up at your local weld shop. Bolt the stern brackets to the transom and lag screw the lifting eye-bolt plate to a notch cut in the stem.

Install the ⅜-in. plywood decking next. This extends from the bow to frame #2, along the sides between the sheer batten and carlin, and from the aft cockpit beam to the transom. Fasten the deck with glue and 1¼-in. #8 *fh* screws spaced about 3 in. apart. Trim the deck flush with the side planking along the sheer and transom and add the ¾ x 1½-in. molding to cover the seam (Fig. 5). Fasten with 1½-in. #8 *fh* screws spaced 8 in. apart. Also trim the deck flush along the carlin and aft deck beam and install the ⅜-in. plywood coaming. Paint the interior of the hull and varnish or use BoatLIFE *Plasticlear* on the deck for a natural wood finish.

Lay the ⅜-in. plywood flooring in four pieces with seams centered on the engine-bed stringers. One piece extends from the front of the engine to frame #2, and then from the rear of the engine to the transom and two long pieces on each side. Fasten the flooring down with 1¼-in. #8 *fh* screws, use no glue. A diagonally-placed piece of ⅜-in. plywood can be fastened to the gussets between frames #3 and 5 to prevent small objects from rolling down into the bilge. Make the seats from ¾-in. plywood and fasten to the side batten (Fig. 2). Paint or varnish the floor and seats. Check engine housing dimensions (Fig. 8). If they don't suit your engine, change as needed. Be sure to include a screened opening on each side for engine air intake.

● Craft Print No. 228 in enlarged size for building the Sea Lark is available at $1. SPECIAL QUANTITY DISCOUNT! If you order two or more craft prints (this or any other prints), you may deduct 10¢ from the regular price of each print. Hence, for two prints deduct 20¢; three prints, deduct 30¢, etc. Order by print number, enclosing remittance (no C.O.D.'s or stamps) from Craft Print Dept. B-156, SCIENCE AND MECHANICS, 450 East Ohio Street, Chicago 11, Illinois. See coupon on page 192.

