

BOAT BUILDER'S ANNUAL

1948 EDITION



Building FIRE FLY

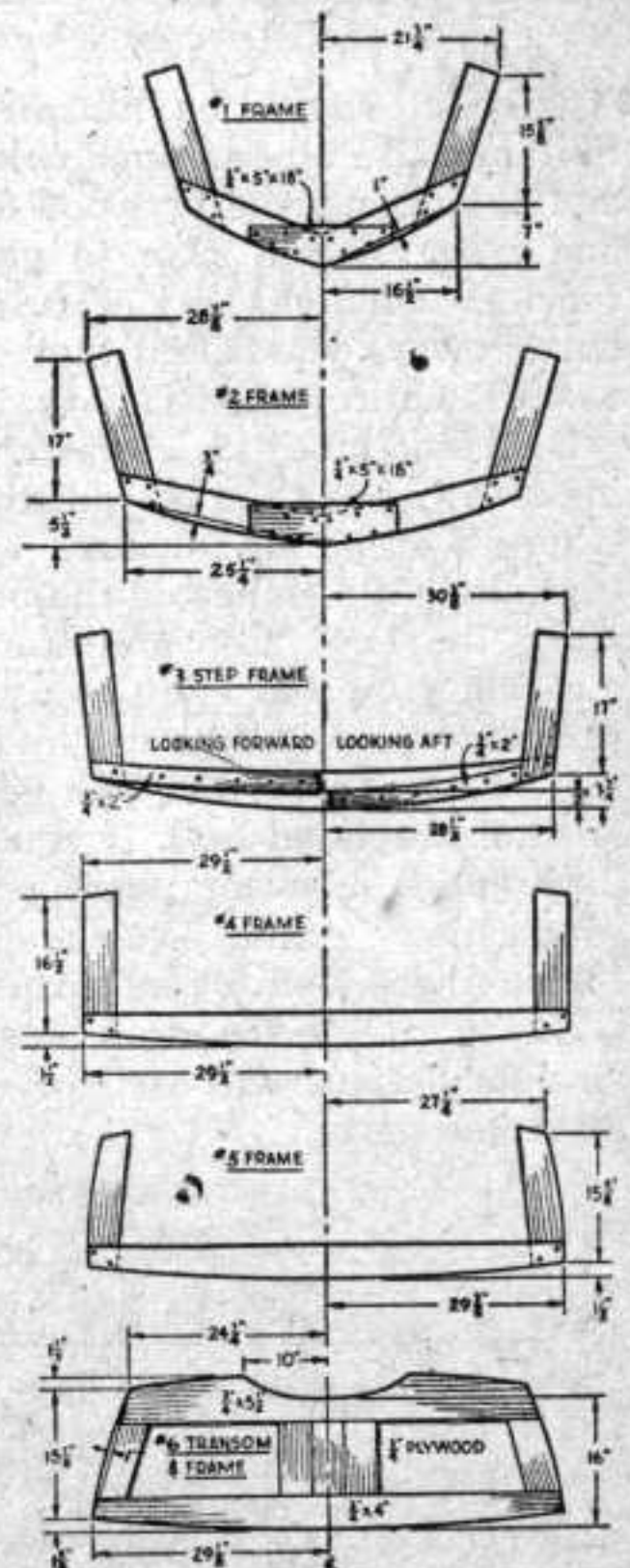
You can really go places in this speedy hydroplane, which is designed for the largest outboard motor available. Try your hand at building her. She's guaranteed fun

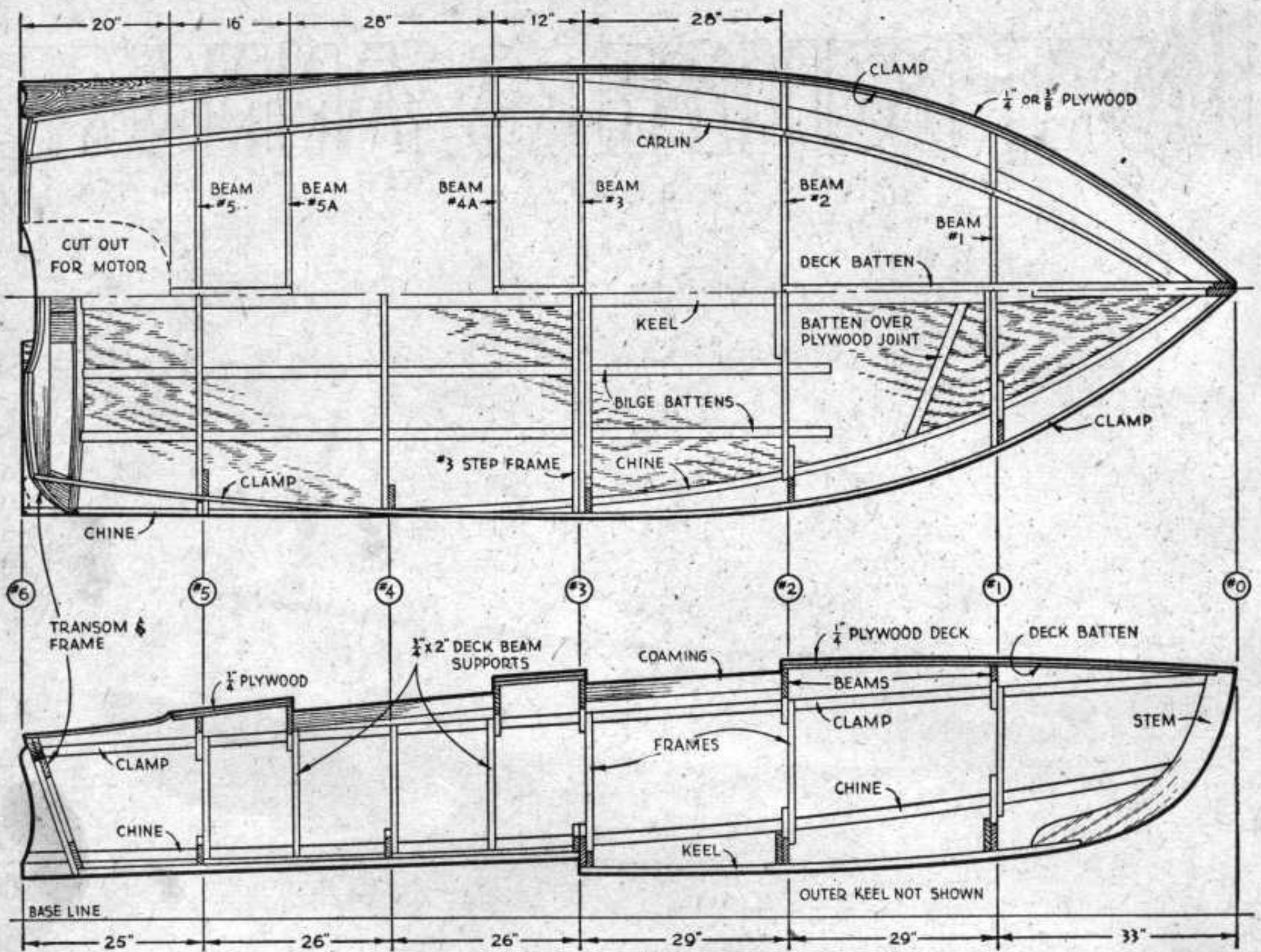
By WILLIAM D. JACKSON

Craft Print Project No. 55

FIRE FLY is a high speed, stepped, outboard hydroplane. A new but thoroughly proved method of venting the step for top speed, and a new bottom design, make this sporty craft fast, efficient and seaworthy on smooth or rough water. *Fire Fly* will exact every bit of speed possible from the power utilized. Outboard motors of 15 to 50 horsepower are best adapted to this super speed runabout. With this hull, the Evinrude Big Four (rated conservatively at 50 horsepower), can plane six persons with ease, haul aquaplanes, and attain speeds approaching 60 miles per hour. However, an outboard motor such as the Johnson Twin (developing around 25 horsepower), will give very satisfactory performance.

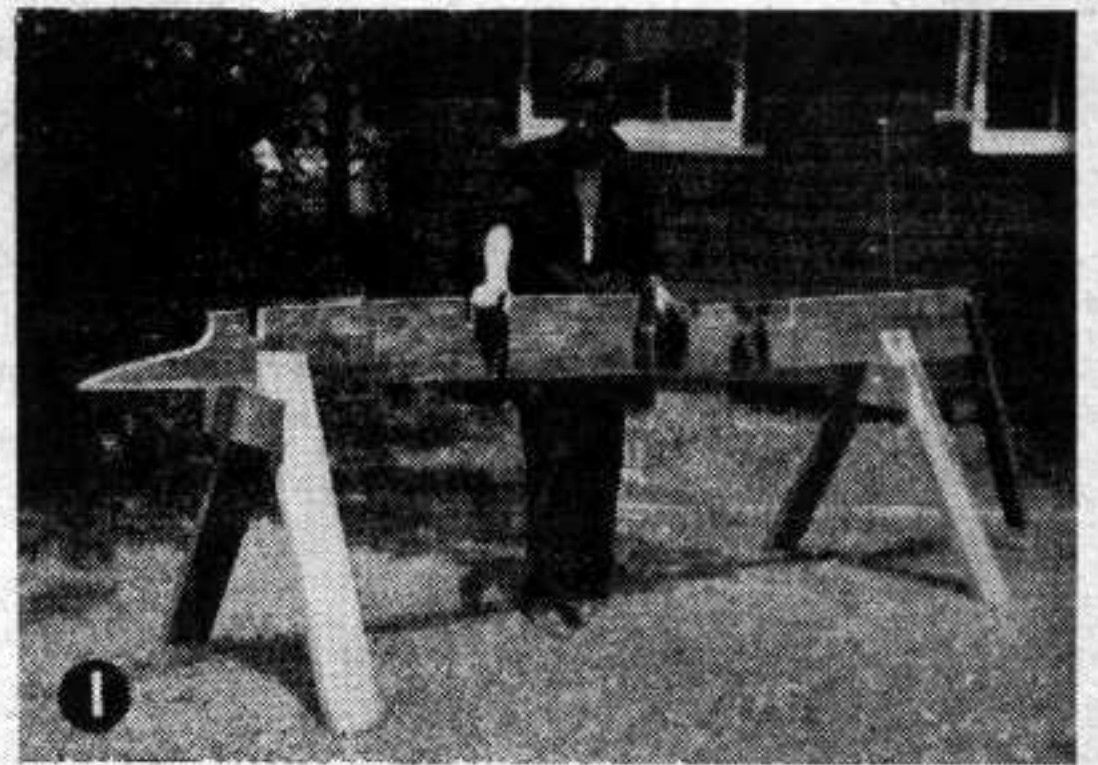
Fire Fly measures 14 feet long with a beam slightly over 5 feet. The completed weight of this hull is close to 275 pounds. Cost of construction will average about seventy-five dollars. The speed of *Fire Fly* will range between 15 and 60 miles per hour, depending on which power unit is being used.





This hull should be built in a well lighted, dry building. Use air-seasoned oak for all framework, and 3/8-inch marine plywood for planking bottom and sides, if you plan to give the boat heavy service. For light service (using motors up to 25 horsepower) you'll find that 1/4-inch marine plywood is entirely satisfactory.

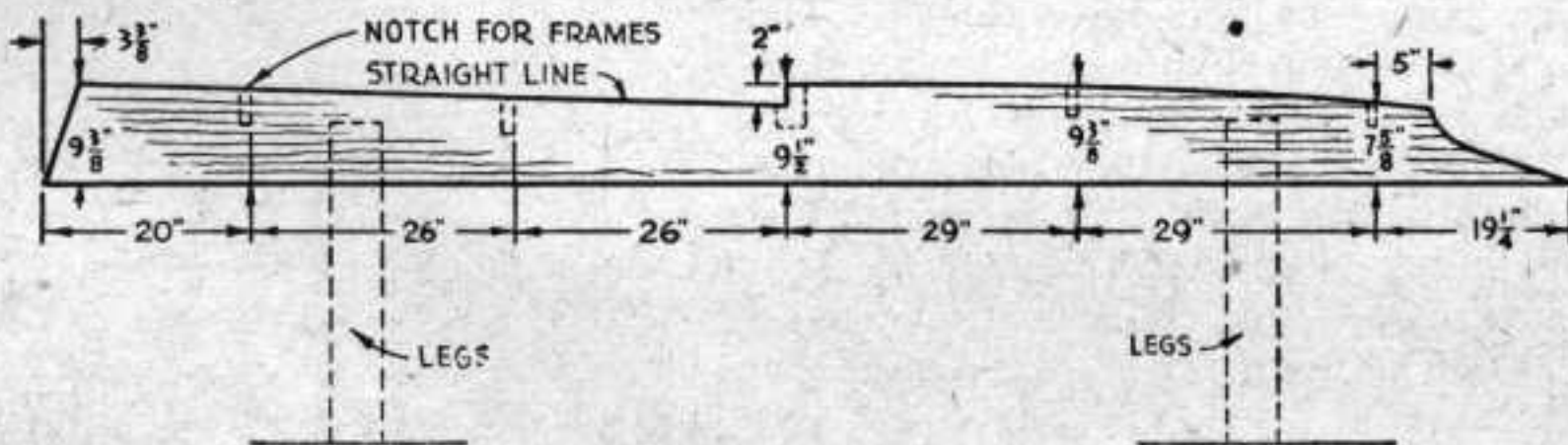
Drill lead holes for all fastenings. When inserting screws, soap the threads to prevent breakage. Glue all adjoining surfaces with resin glue, except along the chines on the bottom planking and along the keel, step and transom joints. Here aviation glue and cloth is used for flexible and permanently water-tight joints. Keep tools sharp for close even joints. Use good marine finishes on the completed hull. If you want an attractive deck job, use a combination of woods such as contrasting 1/4-inch birch and walnut plywoods. Finish these with spar varnish. A quantity of "C" Clamps will facilitate construction, and a few straight battens will assist materially in aligning all frame parts.



Notched form on saw horse legs ready for frames.

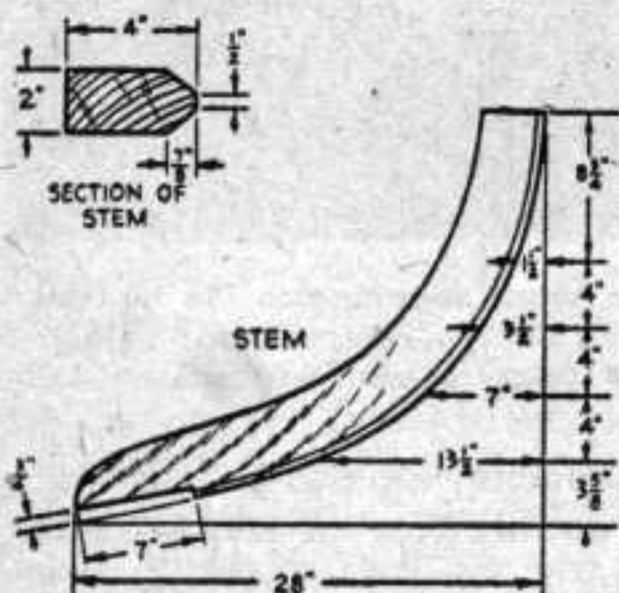
Before beginning the construction, scan the plans and familiarize yourself with the various details. It may help to lay the lines of this hull down full size upon the floor on large sheets of building paper. Begin by drawing full size patterns of all frames and stem upon large sheets of paper.

Laying the frame material upon these pattern outlines, mark the parts and cut them to shape. Return parts to pattern outlines for final assembly. Coat adjoining surfaces of frame with glue and fasten





Here are some of the first steps in the construction of the boat. They are (2) attaching the chines to the stem; (3) attachment of chines has been completed; (4) and (5) two views showing the completed framework; and (6) attaching the initial planking. Next steps will be to finish planking and decking.



with 1 1/2-inch No. 8 flathead screws.

Transom No. 6 is made of 3/4-inch plywood; as indicated edges are secured with a frame, then glued and screwed into place. Frames No. 4 and No. 5 are simply screw-fastened and glued at the joints. Step frame No. 3 consists of an after step frame fastened to forward step frame. A 3/4 x 2-inch frame is fastened to fore step frame to serve as a reinforcing doubling piece at this point.

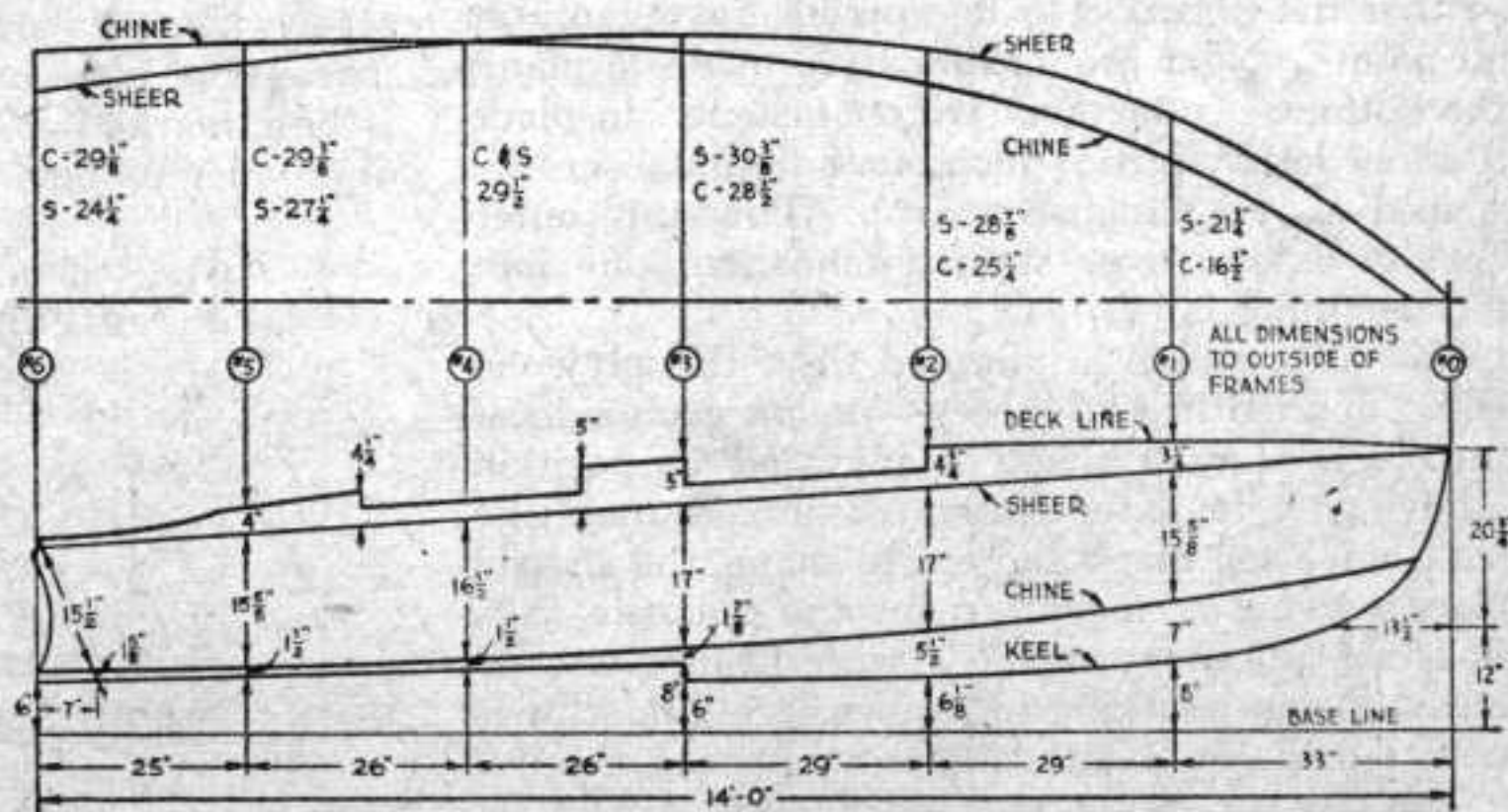
All parts of the step framing including the sides are glued and screw-fastened in place. Frames No. 1 and No. 2 are the same as the after frames except that the center or keel joint is secured with 3/4 x 6 x 18-inch floor frames; all parts are glued and screw fastened with 1 1/2-inch No. 8 flathead screws. Saw the stem to shape and notch it for the keel. Then bevel the edges as indicated.

Next saw the form to shape using the dimension

drawing for a guide. Notch the form for frames and mount it on legs similar to a saw horse and at a convenient working height. Next assemble all frames on the form in their respective notches and spring a batten around the frames. Mark along each edge the proper bevel each must be planed and trim accordingly.

Now remove the frames from the form and notch for keel, chines, and clamps, following the sweep of the beveled edges. Then return frames to their respective form notches, and prepare to attach the keel. The keel

is attached in two lengths or pieces, one from transom frame notch to step, and one from step to stem notch. Notch only the frame of the transom and the doubling piece of the step frame. Fasten fore and after keel in place with two 1 3/4-inch No. 10 flathead screws to each joint. Next attach the chines. These chines are notched all the way through the transom and extend 6 inches beyond the transom. Fasten the chines to each



LIST OF MATERIALS

Item	Wood Required
Clamps	2 pcs. $\frac{3}{4}$ " x $1\frac{1}{4}$ " x 15'
Chines	2 pcs. $\frac{3}{4}$ " x $1\frac{3}{4}$ " x 15'
Keel (Inner)	1 pc. $\frac{3}{4}$ " x $3\frac{1}{2}$ " x 12'
Keel (Outer)	1 pc. $\frac{1}{2}$ " x $1\frac{3}{4}$ " x 12'
Mouldings	2 pcs. $\frac{3}{4}$ " x $1\frac{1}{4}$ " x 15'
Frames	5 pcs. $\frac{3}{4}$ " x 4" x 10'
Deck beams	3 pcs. $\frac{3}{4}$ " x 8" x 10'
Stem	1 pc. $1\frac{3}{4}$ " x 10" x 4'
Transom knees	1 pc. $1\frac{3}{4}$ " x 8" x 2'
Form	1 pc. 2" x 10" x $12\frac{1}{2}$ '
Bilge battens	4 pcs. $\frac{3}{4}$ " x $1\frac{1}{4}$ " x 10'
Carlins	2 pcs. $\frac{3}{4}$ " x $1\frac{1}{8}$ " x 15'
Deck battens	1 pc. $\frac{3}{4}$ " x $1\frac{1}{4}$ " x 10'
Outside stem piece	1 pc. $\frac{1}{2}$ " x $1\frac{3}{4}$ " x 4'
Floor frames	1 pc. $\frac{3}{4}$ " x 6" x 3'
Coamings	2 pcs. $\frac{3}{8}$ " x 3" x 5'
Fore seats	1 pc. $\frac{3}{4}$ " x $5\frac{1}{2}$ " x 40"
	1 pc. $\frac{3}{4}$ " x 2" x 6'
	12 pcs. $\frac{3}{8}$ " x $2\frac{1}{4}$ " x 12"
	2 pcs. $\frac{3}{4}$ " x $3\frac{1}{4}$ " x 44"
	2 pcs. $\frac{3}{4}$ " x 4" x 12"
	5 pcs. $\frac{3}{8}$ " x $2\frac{1}{4}$ " x 48"
After seats	4 pcs. $\frac{3}{8}$ " x 8" x 6'
Sides and bottom (plywood)	1 pc. $\frac{3}{8}$ " x 4' x 16'
Decking (plywood)	3 pcs. $\frac{1}{4}$ " x 3' x 8'
Flooring (plywood)	1 pc. $\frac{1}{4}$ " x 4' x 4'

Fastenings Required

2 gross	1" No. 6 flat head screws
6 gross	1" No. 8 flat head screws
1 gross	$1\frac{1}{4}$ " No. 8 flat head screws
1 gross	$1\frac{3}{4}$ " No. 10 flat head screws
1 lb.	$1\frac{1}{4}$ " shingle nails
or 1 gross	$\frac{3}{4}$ " No. 6 flat head screws

Glues and Finishes Required

1 pound resin glue
1 pint aviation glue
Paint, Enamel, Varnish

side simultaneously, using one $1\frac{3}{4}$ -inch No. 10 flathead screw at each joint. Fasten chine ends in the same manner after beveling them to fit stem. Clamps are next attached to notches with one $1\frac{1}{4}$ -inch No. 8 flathead screw to each joint; ends are beveled to fit stem and fastened similarly.

Measure an equal distance between keel and chines on each side of the keel on both fore and after planes, and notch flush into frames the two bilge battens. Fasten in place using one $1\frac{1}{4}$ -inch No. 8 flathead screw to each joint. The entire framework is now trimmed and faired by planing so that the plywood to be applied lies evenly at all points. Next preparations are made to plank the bottom. Outer keel is first fastened in place to inner keel with $1\frac{1}{4}$ -inch No. 8 flathead screws, spaced about 8 inches apart. Allow this outer keel to extend over stem notch about one foot for trimming later.

The after plane is planked first, the plywood being applied in two pieces—one on each side of the keel. Lay a sheet of plywood in position allowing it to extend about 8 inches over the transom. Then mark and cut to shape, the shaped piece serving as a pattern for the opposite side. Coat all adjoining surfaces with resin glue and screw fasten planking to frames, keel and chines with 1-inch No. 8 flathead screws spaced about 2

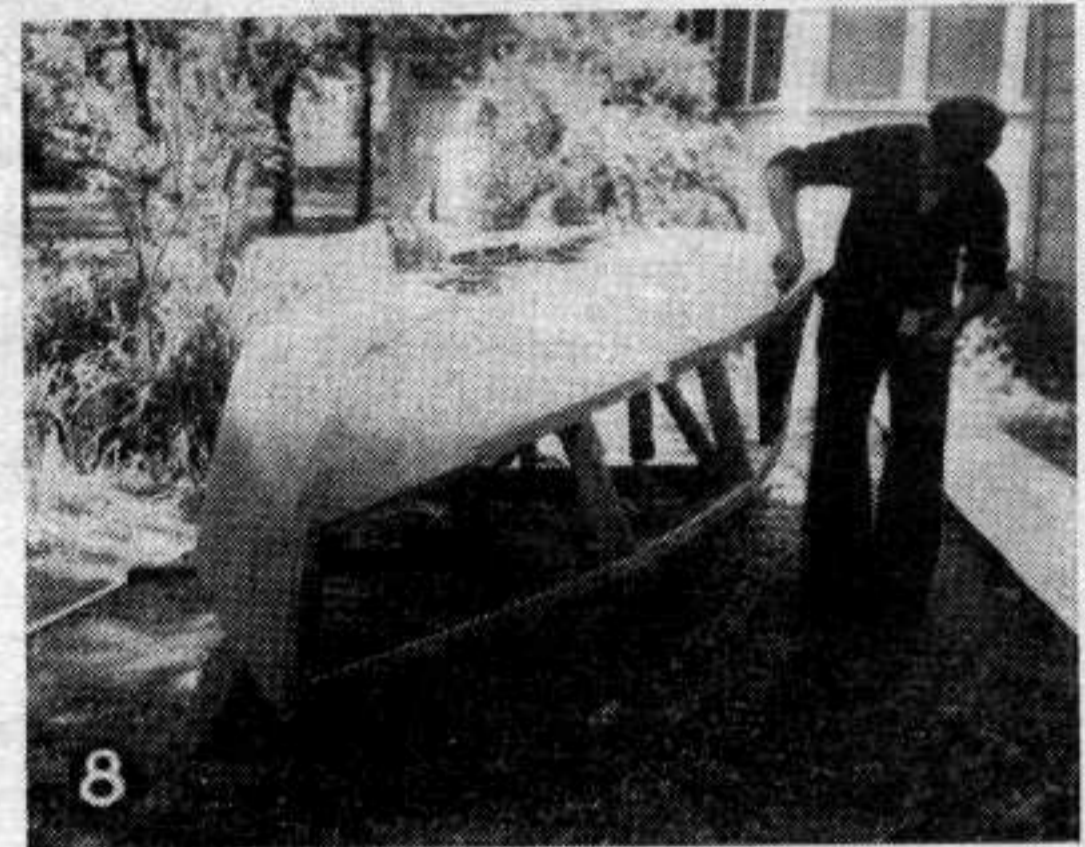
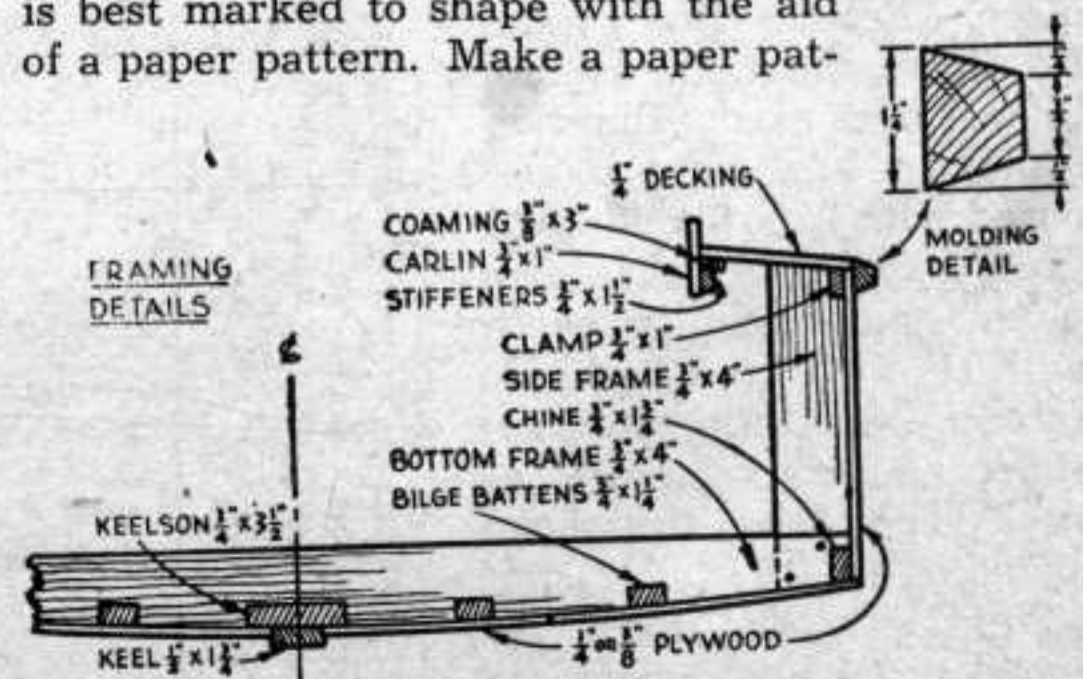
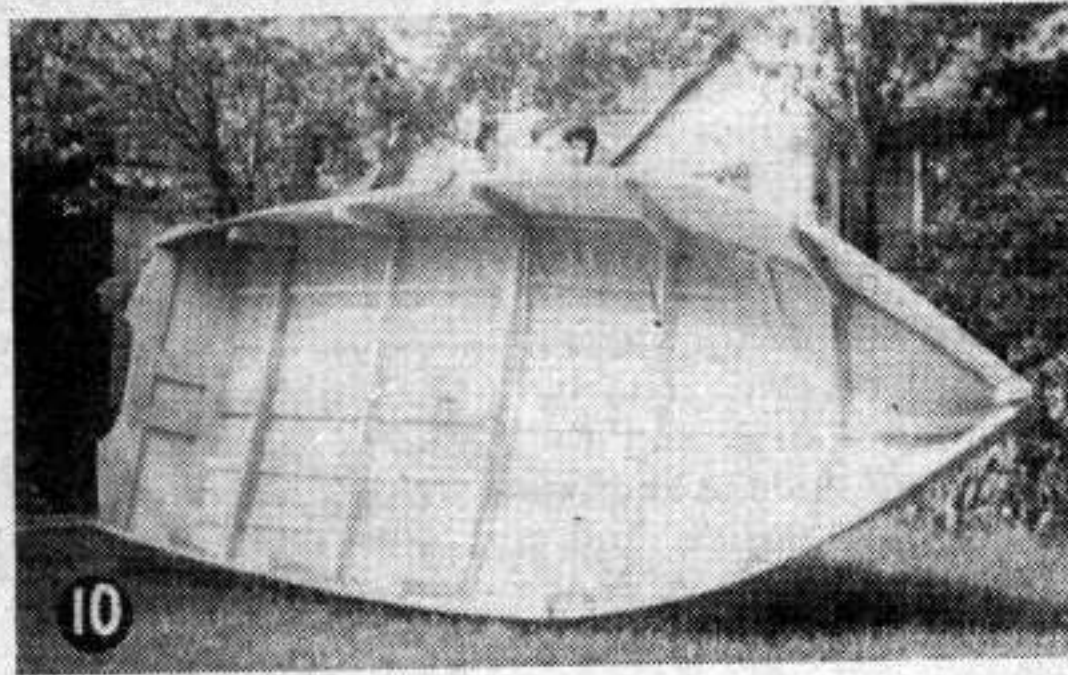
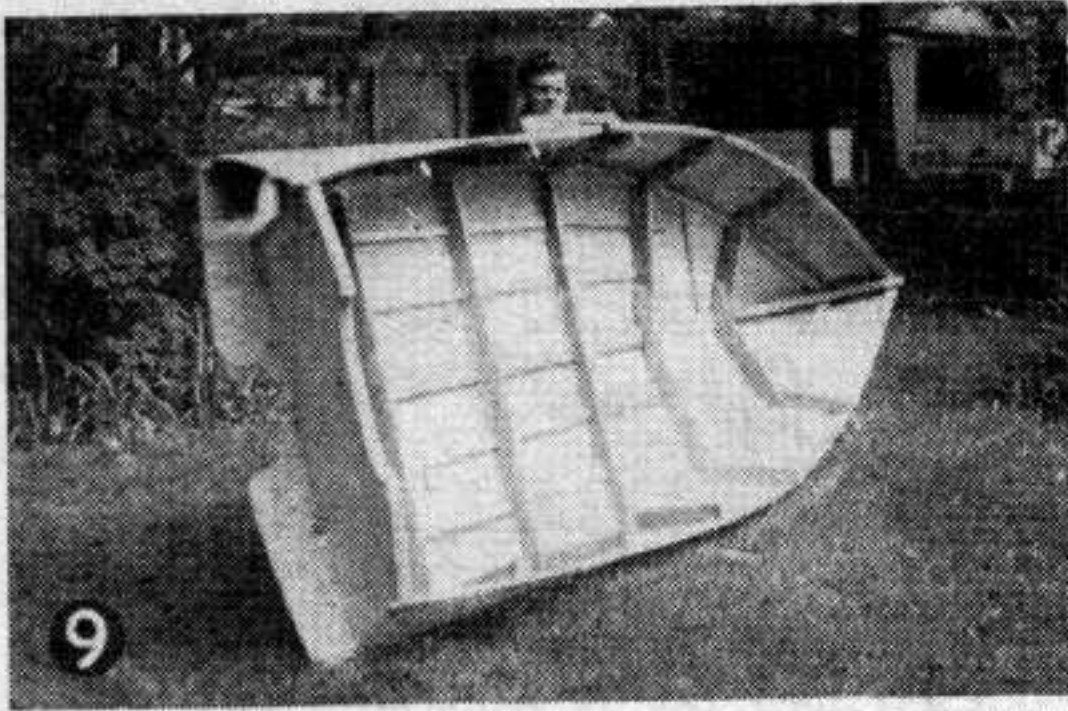


Fig. 7. Attaching fore plane planking to the bottom.
Fig. 8. Bottom planking has been completed; builder is coating chines prior to planking sides.

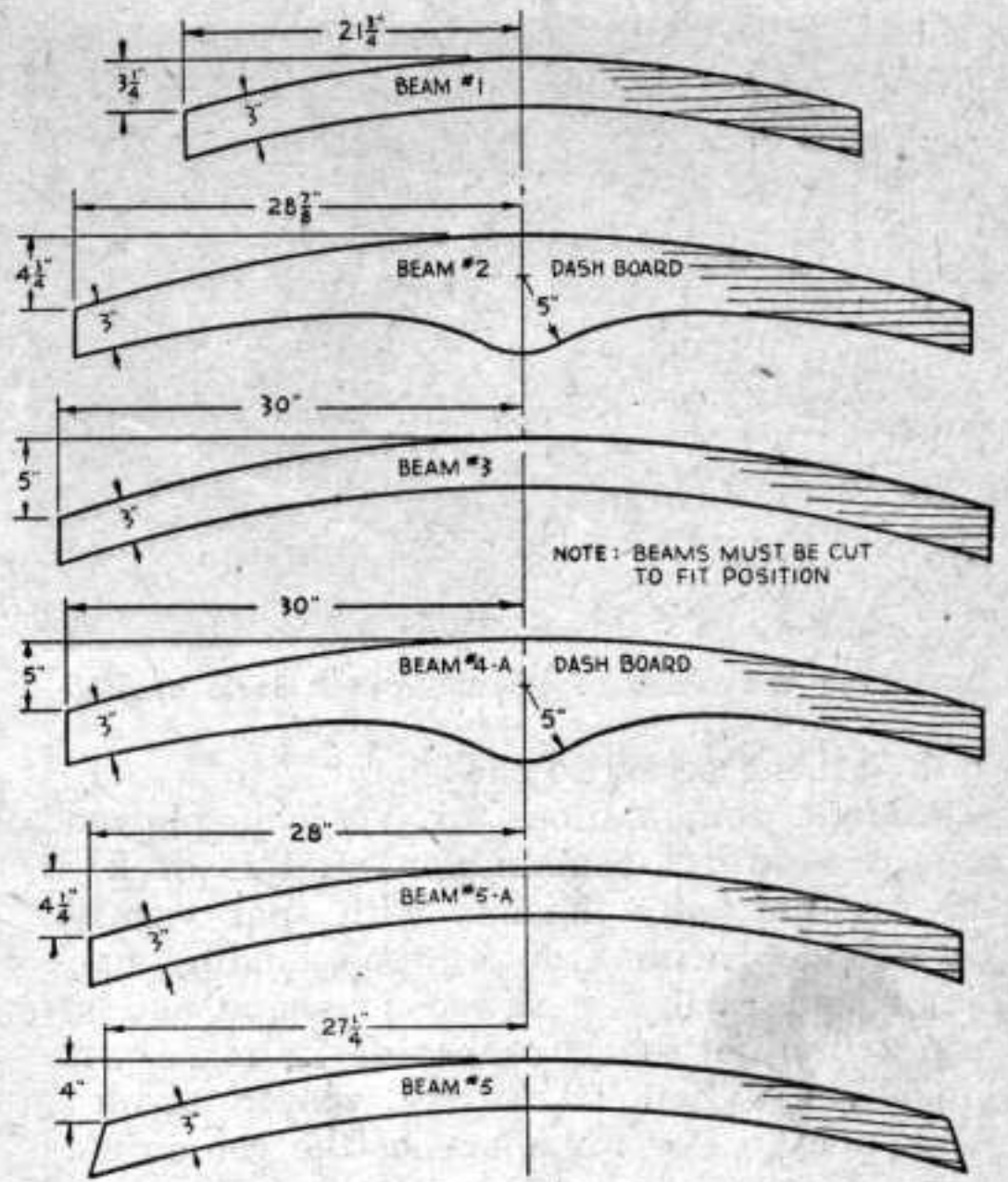
inches apart. After placing a cloth on the transom edges, insert a double row of screws along the transom.

The forward plane is next planked with the plywood overlapping upon the step as indicated in the drawings. This forward plane is planked in similar fashion to the after plane except that the forward plane or fore end of plywood on each side is tapered as shown and fore edges of plywood are partially rabbetted into the keel and chine. Glue and screw fasten as was done with the after plane. Fasten the planking at all points including bilge battens with 1-inch No. 8 flathead screws spaced about 2 inches apart. The extreme fore end of planking covering the stem is best marked to shape with the aid of a paper pattern. Make a paper pat-





Two views of boat interior showing the hull completely planked and ready for work on deck beams.



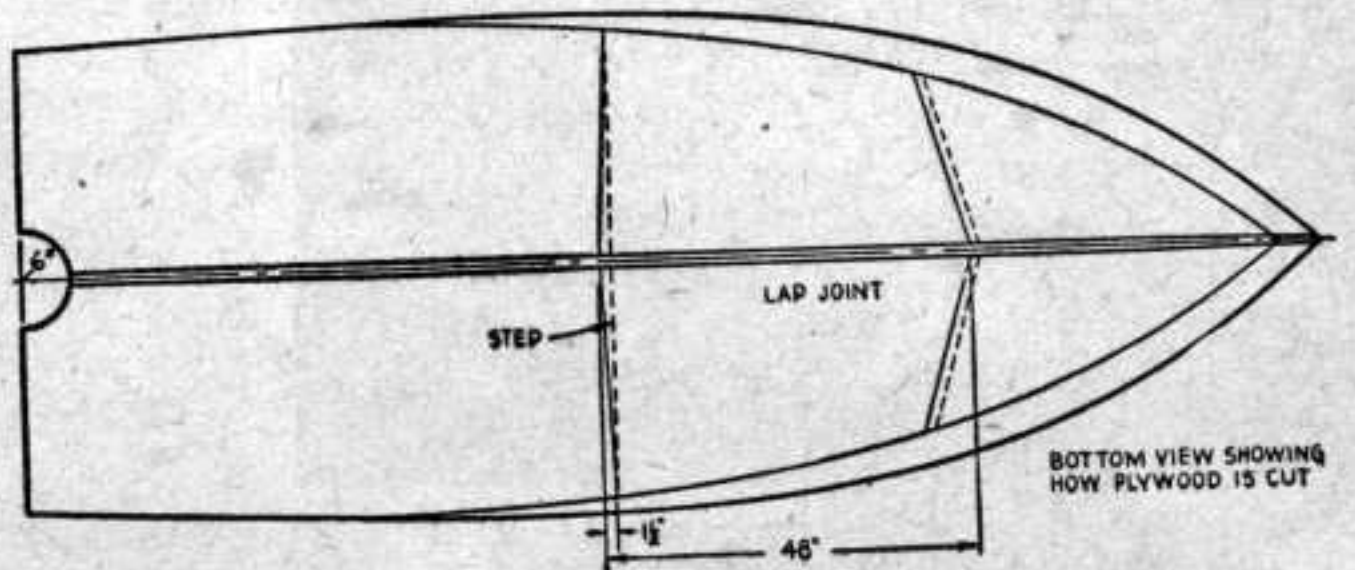
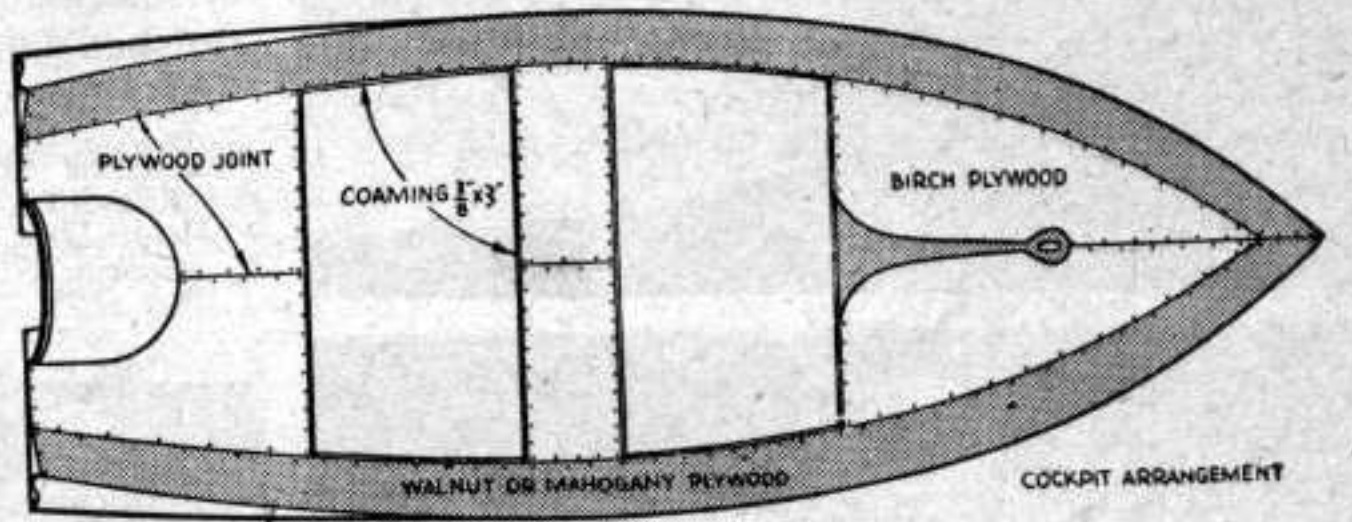
tern of the area to be covered and then transfer the paper template to the plywood, marking and cutting to shape. This fore piece of plywood will bend into place if it is soaked in hot water.

With the bottom finished, trim the plywood evenly along the edges. Then prepare to cover the sides by simply lifting a sheet of plywood in position. Leave about 6 inches extending over transom mark and cut to shape, using the shaped piece as a pattern for the opposite side. Coat chine edges with aviation glue. Next lay cloth strips upon the glued area and recoat. With clamps coated with resin glue, clamp plywood in place and screw fasten along chines and transom with 1 inch No. 8 flathead screws spaced about 2 inches apart. The plywood along the clamps is fastened either with 1 1/4 inch galvanized shingle nails or 3/4 inch No. 6 flathead screws.

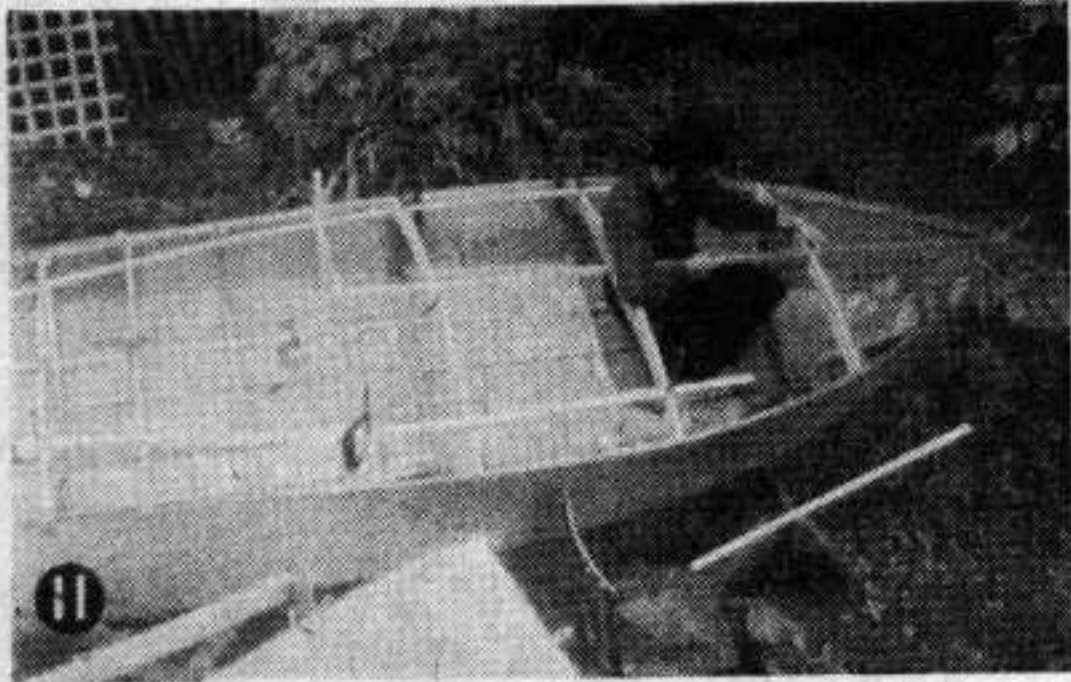
Next trim edges off evenly. Then prepare to lift hull from form; this is done by turning right side up. Trim planking evenly along the clamps, and trim projecting plywood at transom according to drawings—both sides and bottom. Provide doubling strips of 3/8 inch plywood on bottom of transom extensions. Then coat adjoining surfaces heavily with aviation glue and fasten doubling pieces of plywood to transom extensions with 3/4 inch No. 6 flathead screws. Before beginning inside of

hull turn the hull over and bend an outside bow stem 1/2 x 2 x 3 inches around the exposed edges of stem. Fair lower end of outer stem into outer keel and screw fasten at all points.

When the hull has been turned right side up, the various deck beams are cut to shape and each is trimmed to fit its position. Where a deck beam does not land upon a frame, provide a 3/4 x 1 1/4 inch support to extend from chine to clamp. The beams are then attached to support and all beams are fastened with 1 3/4 inch No. 10 flathead screws, two to each joint. The deck battens and carlins are now notched flush into the beams and screw fastened with 1 1/2 inch



BOTTOM VIEW SHOWING HOW PLYWOOD IS CUT



Beginning the work of attaching the deck beams.

No. 8 flathead screw to each joint.

Different combinations of $\frac{1}{4}$ inch plywood make a beautiful combination on this deck, if they are naturally finished with spar varnish. The outside portions of plywood landing upon clamps and carlins is sawed to shape and attached, first fastening each side in place with 1 inch No. 6 flathead screws, spaced about 3 inches apart. For the shape of the center portions of plywood, use paper patterns, fitting paper in place and transferring shape to plywood, and then fastening similarly to deck. Finish cockpit edges by covering beam sides with scrap pieces of plywood and sides of cockpit with a $\frac{3}{8}$ x 3 inch coaming. All coverings are screw fastened in place with 1 inch No. 6 flathead screws.

Moldings are screw fastened in place as shown

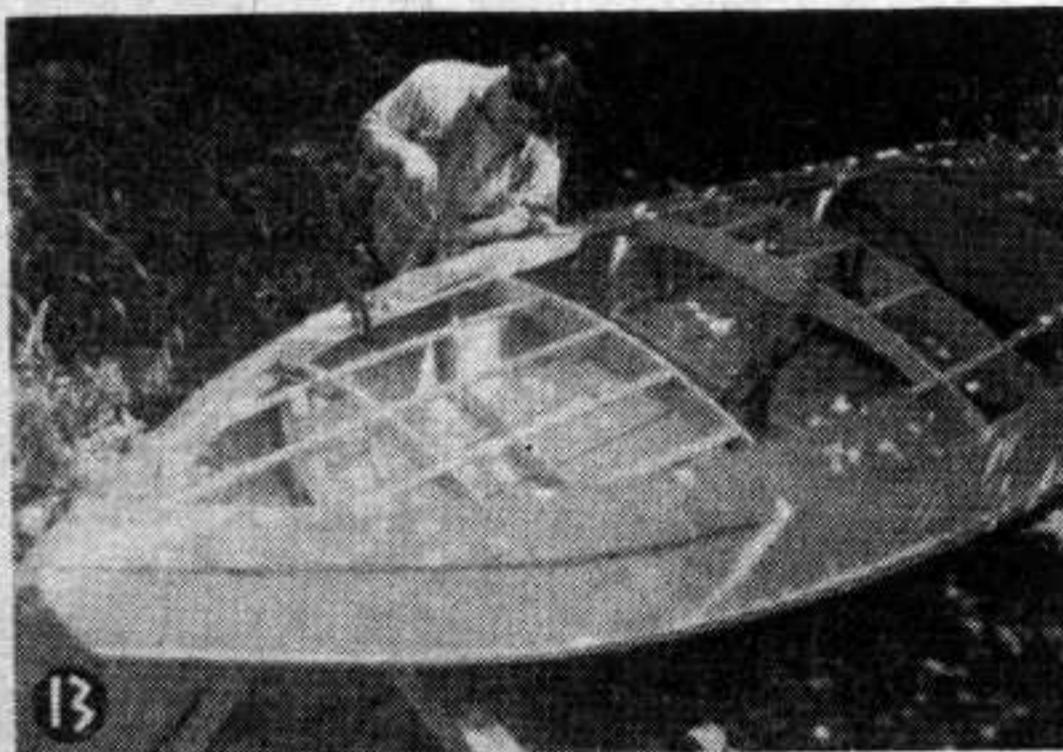
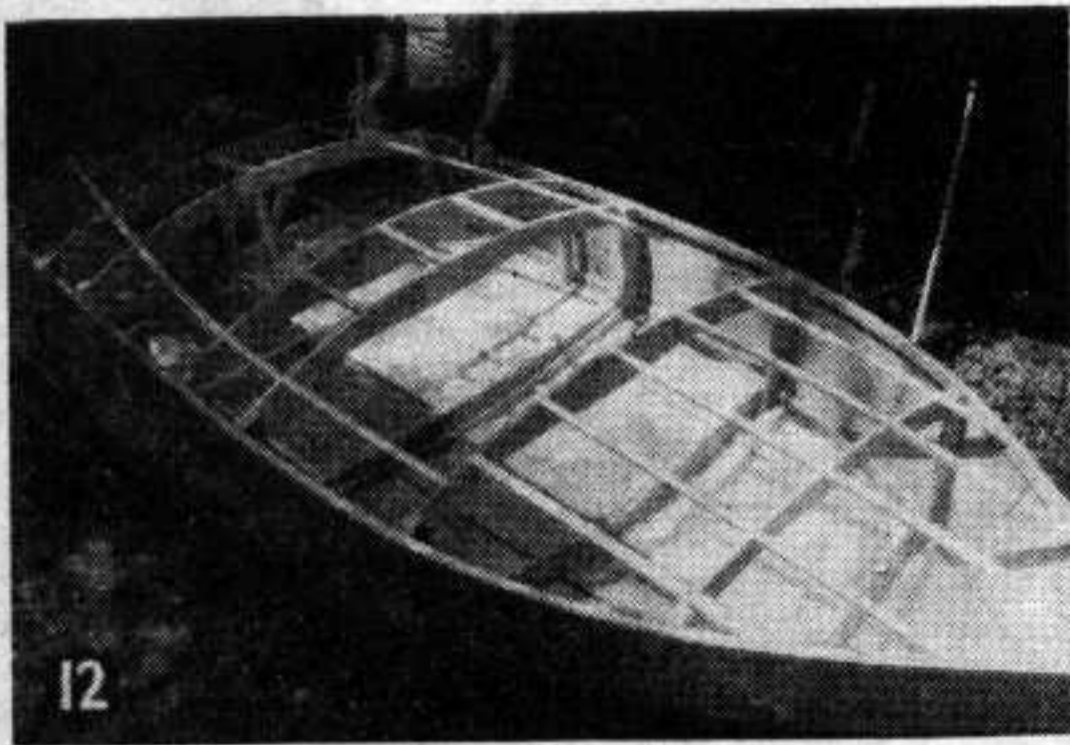
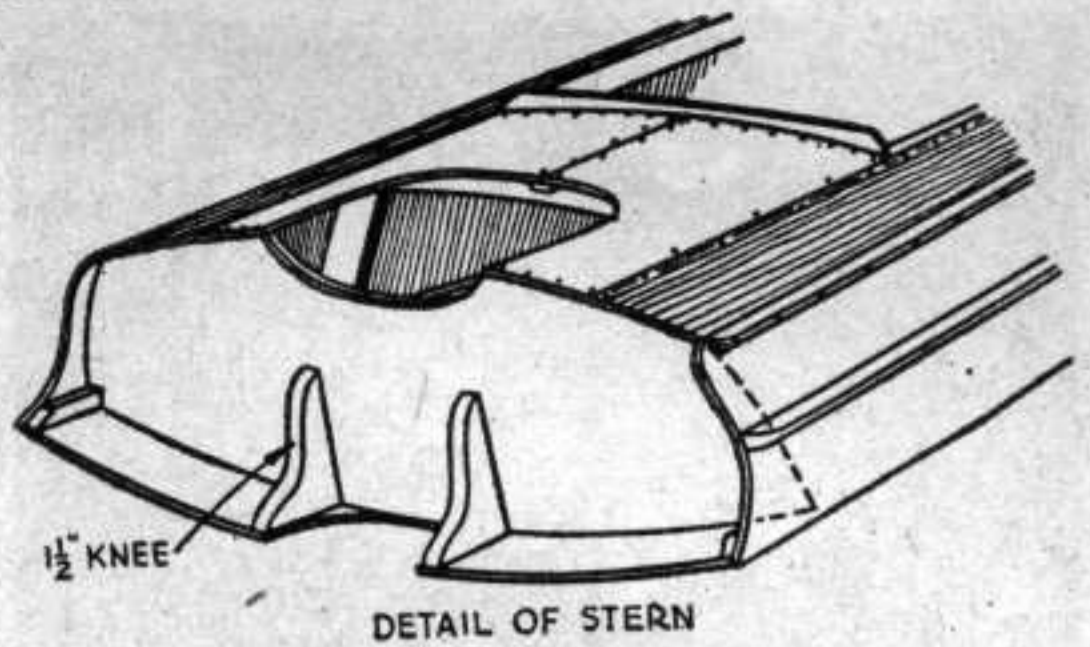


Fig. 12 shows boat with deck beams installed. Fig. 13 shows the builder attaching the decking.



DETAIL OF STERN

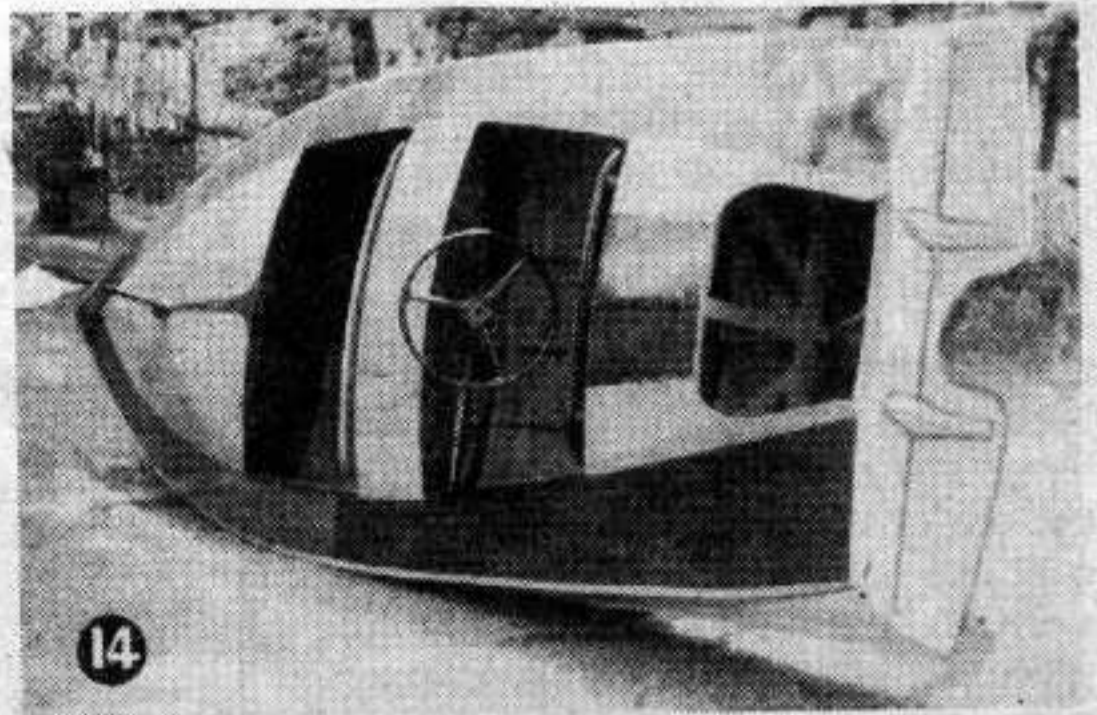
with $1\frac{3}{4}$ inch No. 10 flathead screws, spaced about 8 inches apart. Seats are made as shown in illustrations screw fastened in place with angle irons and supports. The flooring is of $\frac{1}{4}$ inch plywood, cut to fit position and screw fastened in place to keel and bilge battens with 1 inch No. 6 flathead screws. A paint strip is attached to each side of hull as indicated with 1 inch No. 6 flathead screws. The bottom paint color comes up to this strip and the top sides paint comes down and ends at the paint strip. Prime coat the entire hull inside and out and then apply at least three coats of marine enamel. The moldings and deck should be given three coats of varnish, allow ample drying time between coats.

Fittings such as a windshield, bow light, stern flag staff and steering wheel will dress up the hull most effectively, enhancing its value.

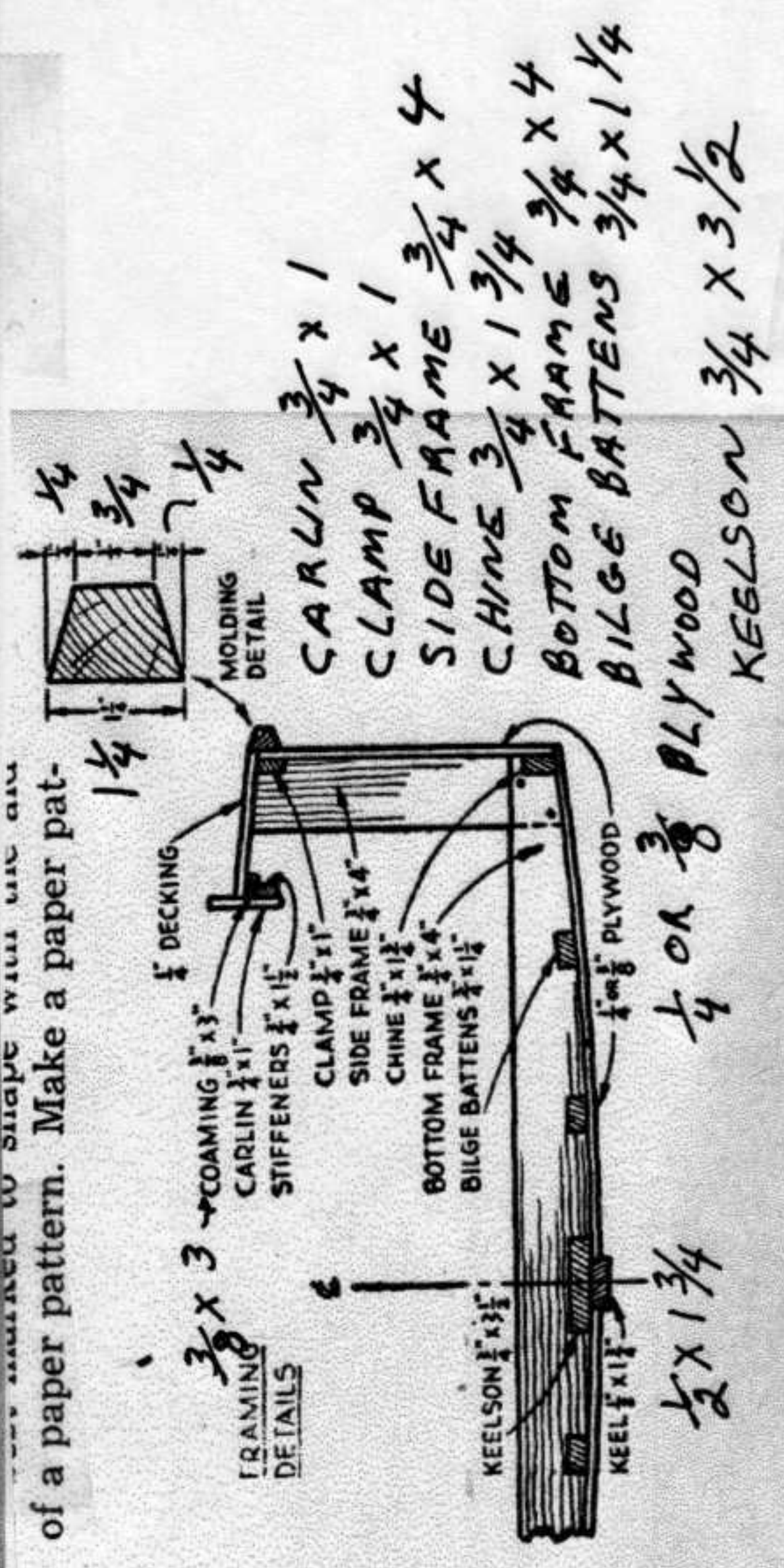
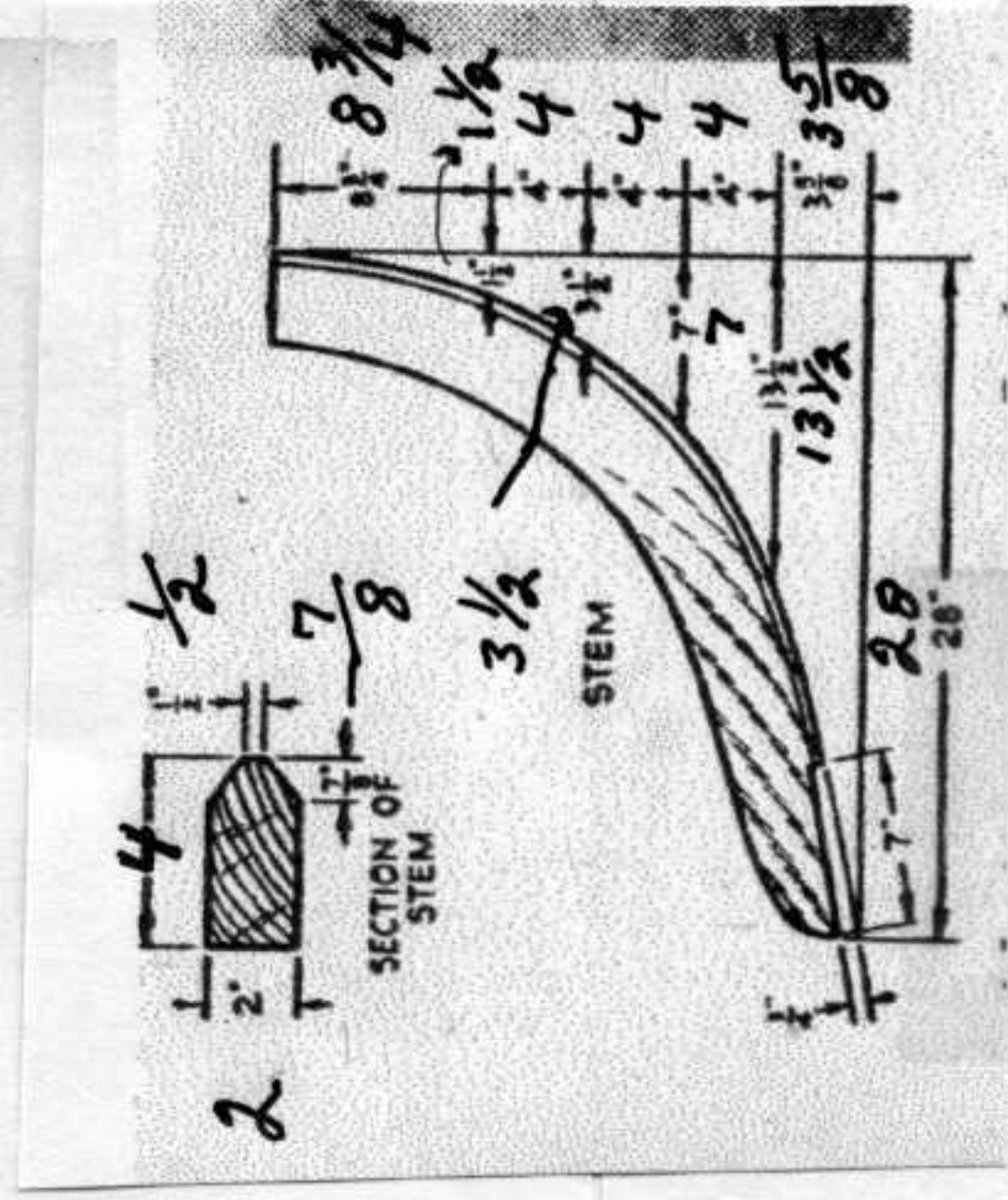
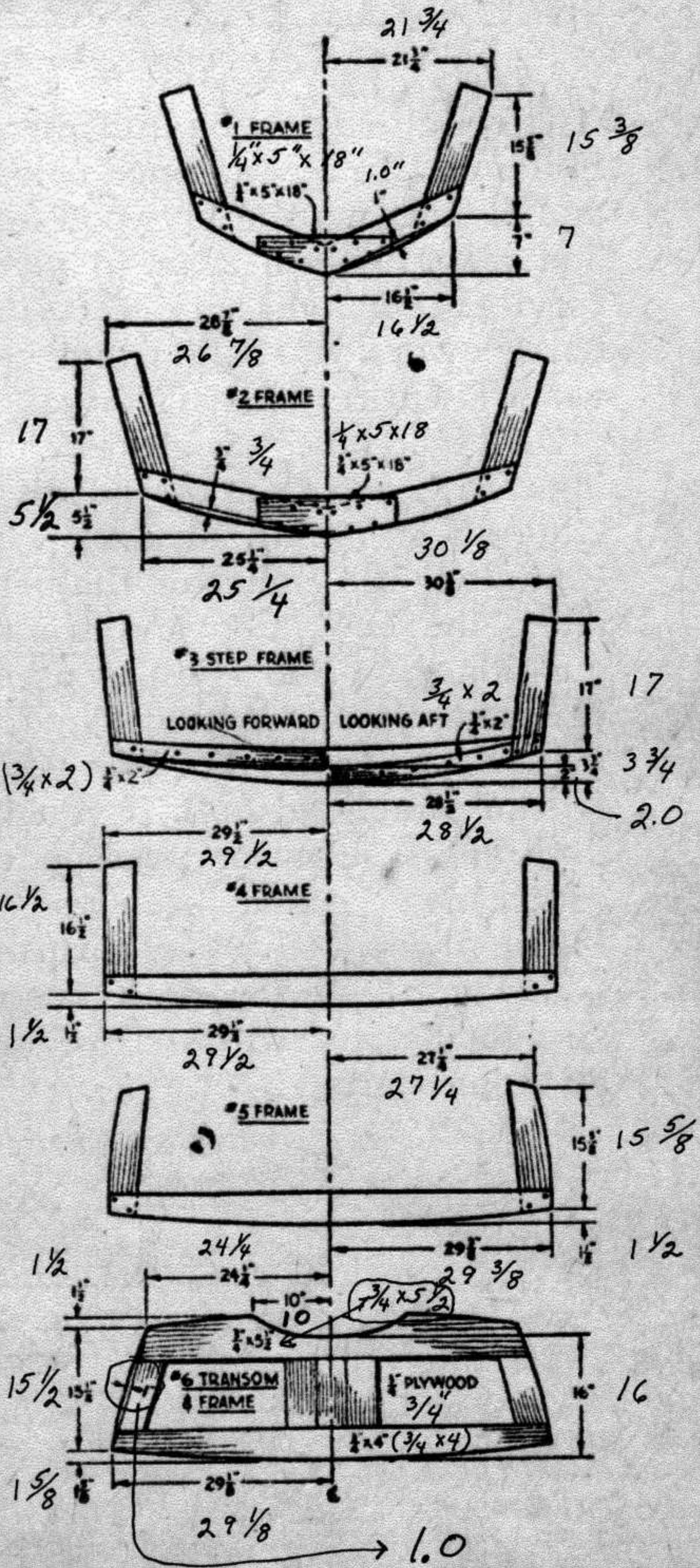
When fitting a motor to this hull try it in various positions to gain the most efficient planing angles. Try shifting the motor in or out to obtain best running trim. Also try raising the motor to obtain the most efficient stern height. The Big Four Evinrude utilizes a separate motor board supplied by the manufacturer and this should be set at the height indicated by the manufacturer's directions for best results.

The boat is now finished. If you try your hand at making it, a line to us with a photo of your finished boat will be more than appreciated.

● Craft Print No. 55 in enlarged size for building the "Fire Fly" is available at 25¢ each. Address Craft Print Dept. B-48, SCIENCE AND MECHANICS, 49 East Superior St., Chicago 11, Ill.



Drawing and photo showing stern knees and completed boat, with knees attached.

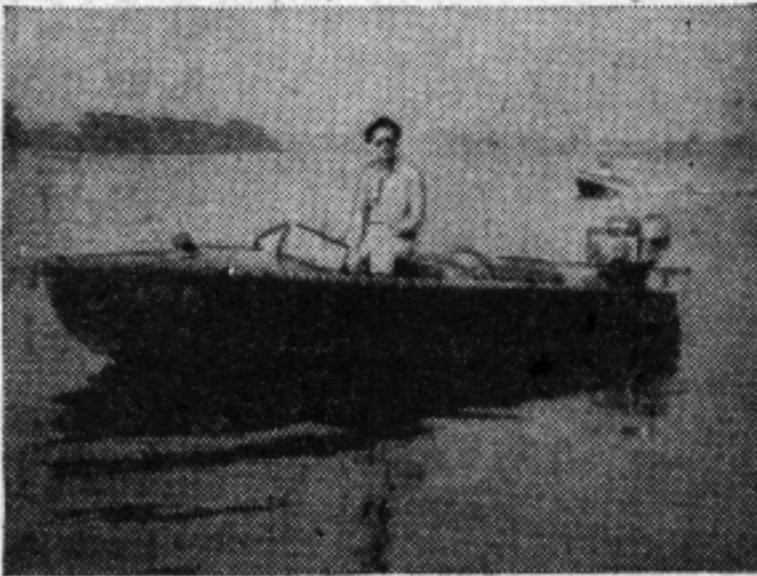
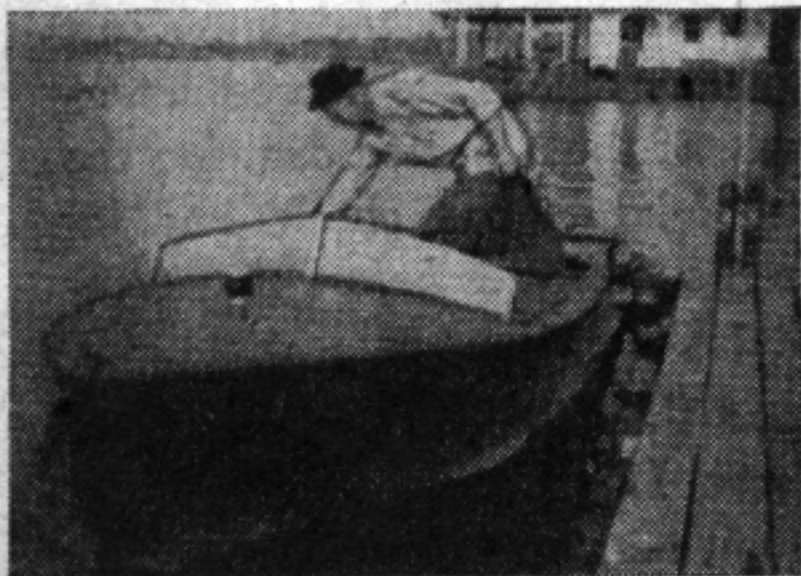




FIRE FLY →

Readers ROUND TABLE

This department is conducted by the readers of **SCIENCE AND MECHANICS**. Everyone is invited to write for publication. Give us your views, ideas, questions and suggestions. **SCIENCE AND MECHANICS** aims to be first and foremost a readers' publication. Therefore, don't hesitate to write us frankly how you like it.



builder of large Cabin Cruisers (who docked overnight at the Boat Club dock) expressed the opinion that it was a very nicely built and balanced boat.

I noticed the pictures of *Fire Fly* in your Oct.-Nov. '47 issue and I believe I have a nicer looking boat. This is the third boat I have con-

Fire Fly Performance

I am sending 3 photos of *Fire Fly* which I built using your craft prints and instructions. Our *Fire Fly* is being powered with the Big Four Evinrude 50 h.p. motor; does not reach the speed of 60 mph but, boy, it really gets over the water at about 40 to 45 miles per hr. I have some very stiff competition here with other boats powered by the same motor which have lighter hulls. One or two of these lighter craft has the edge on *Fire Fly* but only for speed. Gas consumption is 1 1/4 hours at full speed using a full tank (28 pts.); cruising at half throttle it will run for about 3 hours.

In building *Fire Fly* your plans were followed exactly with the exception of fore end planking of bottom. I put this part on using one piece on each side instead of 2 pieces with very good results.

The bottom was painted with copper bronze paint; sides and decks were mahogany stained and varnished. Fir plywood (3/8-inch) was used throughout as it was the only marine plywood we could obtain. Keels, frames, and stern were made from oak. This construction resulted in a heavier boat than that described in your article. It is equipped with Plexiglas windshield, a combination light on the front and a stern light. I also made coverings that go on over each individual cockpit, which resulted in having less than 1/2 gallon of water leakage all through the past summer. *Fire Fly* was launched in June and taken from the water the last of October. Pictures were taken in October.

I have had some very nice compliments on the balance and running of *Fire Fly*. A designer and

constructed from your plans and I have been exceedingly well pleased with all three. I am particularly proud of this boat. Thanks a million.

R.R. No. 10

East Riverside Ave.
Evansville, Ind.

HERMAN W. BERNING

We're happy to have you join the fast growing number of readers who are confirmed fans of Mr. Jackson's super speedster, Fire Fly.

Novel Clock Calendar

Here's a photo of one of my electric clock calendars. This clock automatically changes dates at midnight, and also months of 28-30 or 31 days. It is noiseless and keeps perfect time. It also has a small green light burning, and when power fails (which happens often here) the green light goes out.

When power comes back on again a red light shows, until I reset the clock for the right time, when the red light goes out and green light goes on again. It also has a small light which serves as a night light and is operated by turning on a switch (a pushbutton above my bed), so that I can see at night what time it is. I also have

