

"DART"

A Fast 13-Foot Sailboat

Craft Print Project No. 76

USES: As a one design, class, or general purpose sailboat. Jib and mainsail easily handled. Points closely, foots quickly. Ideal for protected waterways such as lakes, rivers, bays. May be propelled with small outboard motors.

LENGTH: 13 ft. 4 in.

BEAM: 5 ft. Overall.

DEPTH: 18 in.

WEIGHT Complete: 275 lb.

SEATING CAPACITY: 3 persons.

CONSTRUCTION: Planking or Super-Harbor Marine Plywood on sides and bottom. Top Marine Plywood.

TYPE: Semi Vee bottom, pointed bow, fast design.

SAIL AREA: 100 sq. ft.

"SAILING" is a word to conjure with. Its adherents range from owners of little gnat-size craft to those of huge schooners. Nowhere on the water is a greater variety of action or repose to be had than in sailing. It ranges from merely moving lazily in light breezes to bowling along with the wind whistling through the rigging and lee rails awash, giving action and thrills akin to flying.

"Dart" is a small two or three person sailing craft, designed for use on protected waters such as bays,

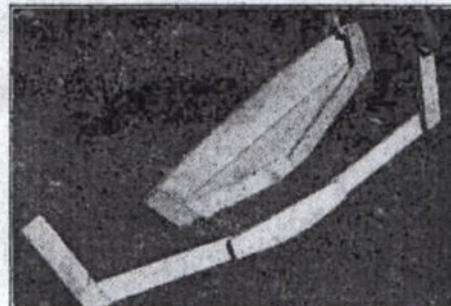


Footing along in a light breeze, the sailboat "Dart" is handled without difficulty by young or old boating enthusiasts.

lakes, rivers or wherever sheltered waters are found. Its construction will repay the builder handsomely and provide a fast sailing craft, light in weight, easily transportable and cheap to construct with all difficult joinery eliminated. It provides thrilling and economical sport.

To construct this small paragon of sailing craft, we begin with the form upon which the hull is to be built. This is sawed from any rough lumber to the shape shown and mounted atop legs similar to a sawhorse at a height convenient to work upon and notched as indicated for mould frames.

Full-size paper patterns are drawn of all frames, and the material for the mould frames laid upon the outline so as to

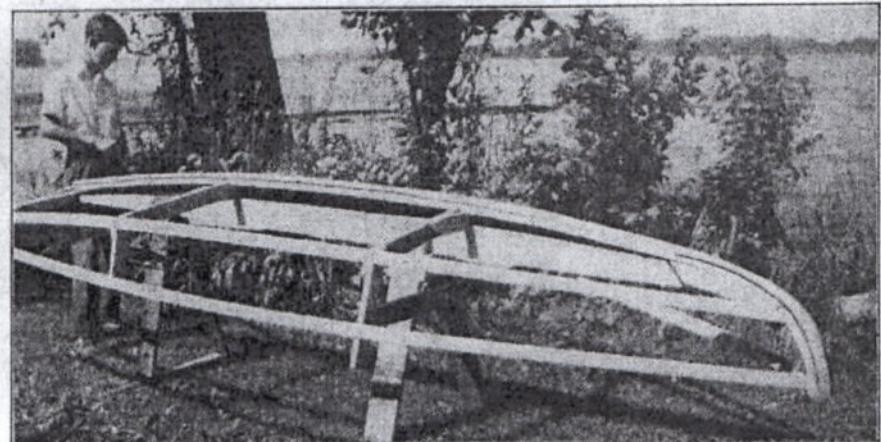


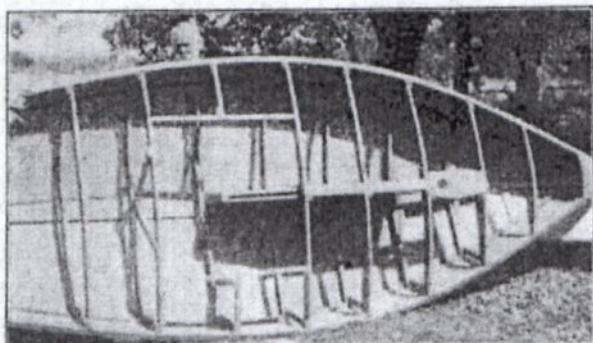
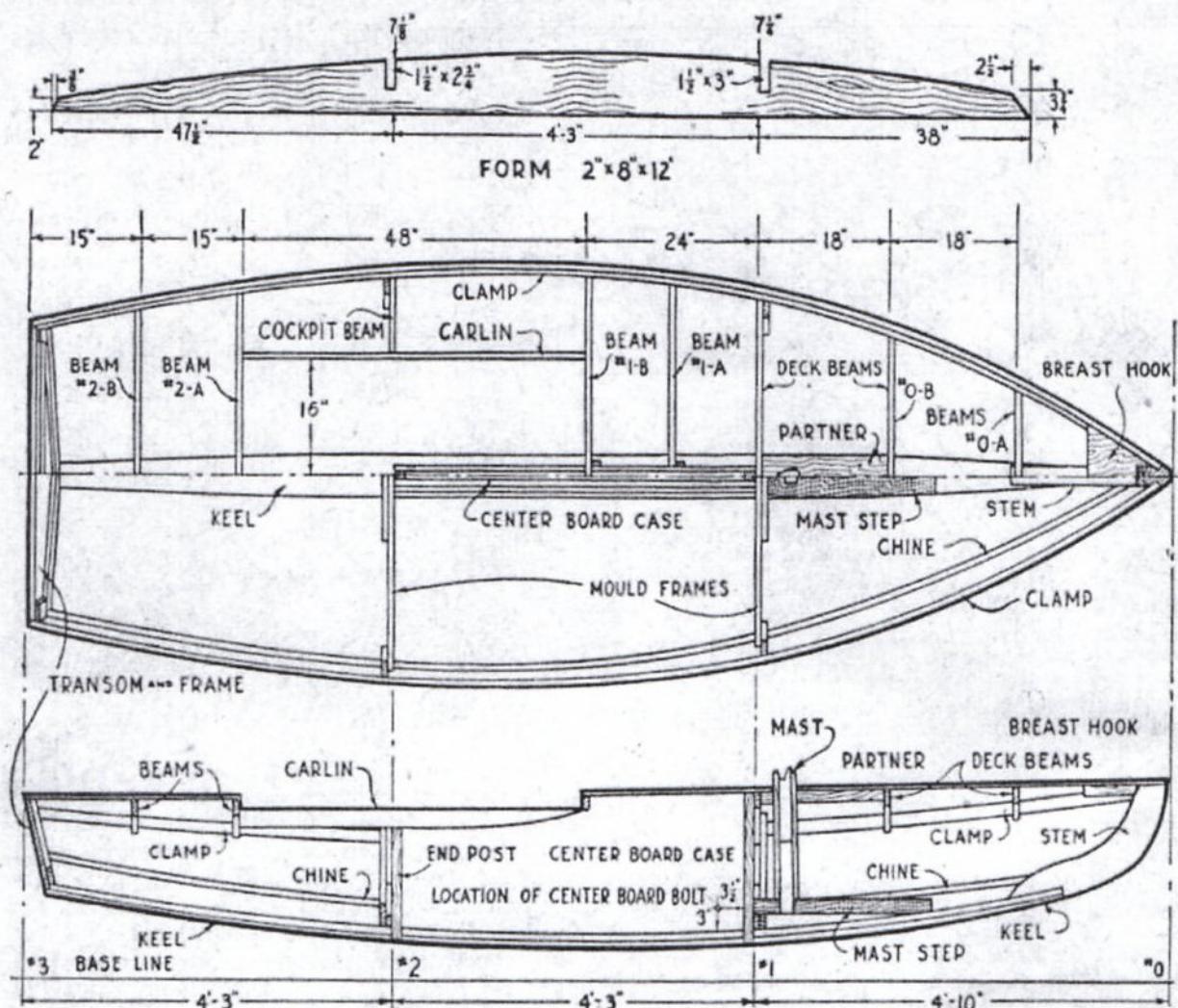
Transom and mould frame assembly.



Showing the rabbeted bow stem.

Here the frame, chines and keel are assembled on the form.

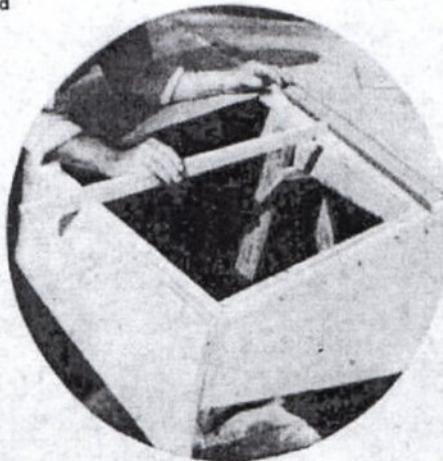




Above: Framing and center-board well assembly.

Below: A stick serves to indicate the correctly beveled flat planking surfaces.

conform to shape. Joints are daubed with casein glue and each joint is fastened at the chines with three $1\frac{1}{4}$ " No. 8 f. h. screws. The floors at center of frames are fastened with five $1\frac{1}{4}$ " No. 8 screws each side of center line. The transom and frame is constructed from two pieces, the joint between boards being



secured with a $3\frac{1}{4}$ " x 3" frame, glued and screw fastened around outside. Space screws evenly.

Working Out the Stem

The stem for this craft may present the only difficulty, but its construction is simple if details are attended to carefully. A full-size paper pattern is drawn of the stem and laid upon the stem material. The outline is pricked through and stem sawed to shape. The planking does not fit on the outside of the stem, but is recessed or rabbeted into it. This stem must be rabbeted as shown, using a piece of planking as a depth guide and cutting the rabbet in line with the angle of the planking as it meets the stem.

Assemble transom, mould frames and stem upon the form. A light batten sprung around all frames and stem will indicate the correct bevel each must be cut so the planking to be later applied will lie evenly on all frames. Remove all frames, bevel edges, and cut notches for keel, chines and clamp.

MATERIAL LIST

Parts	Pieces	Finished Dimensions
Super-Harborg Marine Plywood or Planking		
Bottom	2	1/4" x 48" x 96"
Deck	2	1/4" x 48" x 96"
Sides	2	5/8" x 11 3/4" x 14"
Kinds of Wood: Marine plywood is used for the bottom and deck. The sides may be made from mahogany, cedar, cypress, white pine, redwood, spruce, fir or Super-Harborg Marine Plywood.		
Keel		
Inner	1	3/4" x 5 3/4" x 14'
Outer	1	3/4" x 2 3/4" x 14'
Chines	2	3/4" x 13 3/4" x 14'
Clamps	2	1/2" x 13 3/4" x 14'
Mouldings	2	3/4" x 1 1/8" x 14'
Transom	1	3/4" x 11 3/4" x 4'
Transom Frame, Mould Frames, and Intermediate Frames	8	3/4" x 3" x 8'
Centerboard Case	2	3/4" x 11 3/4" x 8'
Deck Beams	3	3/4" x 9 3/4" x 8'
Skeg	1	1 1/4" x 30"
Coaming and Splashboards	1	3/4" x 3 3/4" x 14'
Floor Boards	2	3/4" x 5 3/4" x 12'
Kinds of Wood: Spruce, fir, hemlock, or yellow pine.		
Stem	1	2 1/4" x 8" x 30"
Kinds of Wood: Oak, or mahogany.		
Mast	2	3/4" x 3 3/4" x 18'
	2	Filler pieces as noted.
Boom	1	3/4" x 2 1/4" x 10'
	1	3/4" x 1" x 10'
Form	1	1 3/4" x 8" x 12'

Kinds of Wood: Spruce, fir, or pine. The form can be made from any rough lumber.

FASTENINGS AND OTHER MATERIALS

5 Gro. 1" #8 f.h. screws	Brass, galvanized, or cadmium plated.
2 Gro. 1 1/4" #8 f.h. screws	Brass, galvanized, or cadmium plated.
4 Doz. 2" #10 f.h. screws	Brass, galvanized, or cadmium plated.
2 Lbs. casein glue.	
1 Pt. marine glue.	
1 Gal. canvas cement.	
9 Yds. 36" width canvas, 8-oz.—If bottom is canvas covered.	
1/2 Lb. 1/4" tacks.	
Carriage bolts as indicated.	

returning parts to form and fasten temporarily.

The 3/4" x 5 3/4" inner keel is tapered fore and aft as indicated and fastened to transom, moulds and stem with two 2" No. 10 f. h. screws to each joint. Bevel chine ends to fit the stem and fasten similarly to chine notches. Set screws snugly.

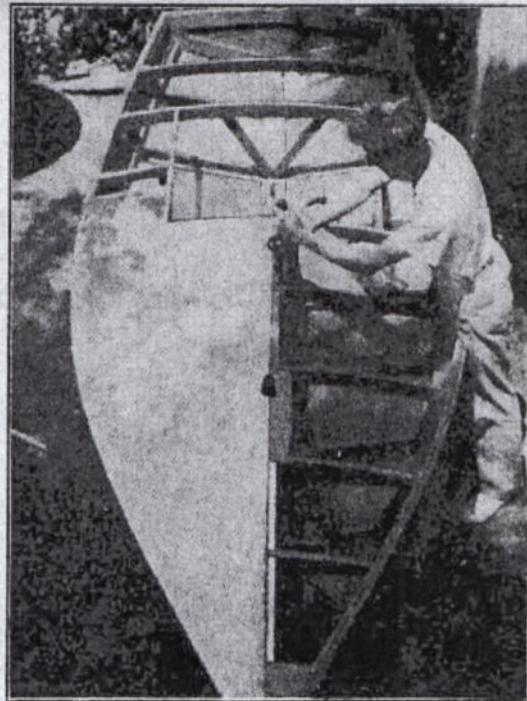
The 1/2" x 1 3/4" clamps are now screw fastened to clamp notches with one 1 1/4" No. 8 f. h. screw to each joint, beveled to fit just to rear of stem rabbet and fastened similarly.

Clamp the outer keel in place, centering it upon the inner keel, and mark along each edge. Remove outer keel and bevel inner keel, each

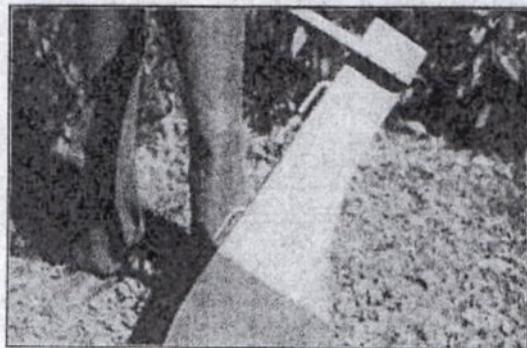
SAIL AND RIGGING PARTS

Many of these parts may be fabricated from brass strip or purchased as desirable. Only necessary parts are listed.

3 1/4" x 6" Turnbuckles	2 Mast tangs
3 6" Cleats	50 Ft. 3/16" Wire rope rigging
2 Chain plates	1 3/16" Sheet steel centerboard, or 1/2" thickness waterproof Plywood
1 Set pintles and gudgeons	8 Wire rope thimbles
125 Ft. 1/4" diameter Manila rope	2 1/4" Deck blocks
50 Ft. 1/8" Lacing line	2 1/4" x 2" Eye bolts
15 Yds. 30" width Sailcloth	1 3/8" x 3" Bolt for centerboard
9 1" diameter Rings or jib snaps	2 3/16" x 3" Roundhead stove bolts (mast tang.)
1 Goose-neck boom fitting	1 2" diameter Mast sheave
24 Ft. 5/8" Sail track—mast and boom	
22 5/8" Sail slides	



How marine plywood is cut to fit deck.

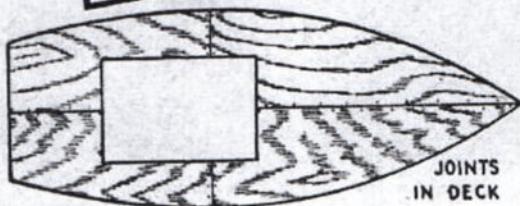
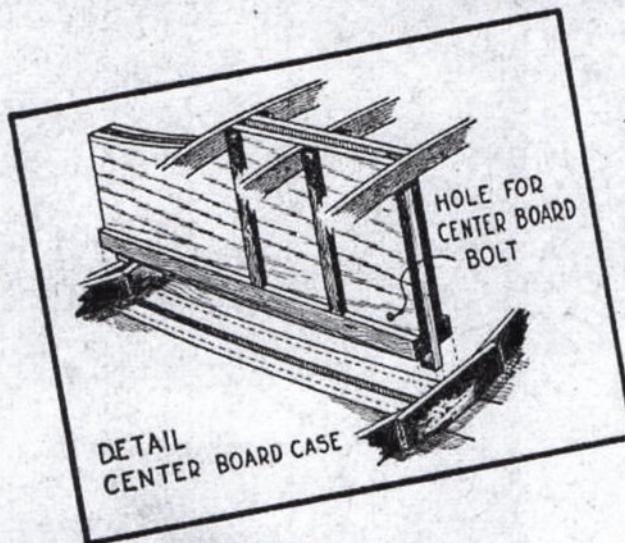


Tiller, rudder and fittings.

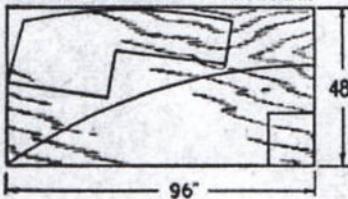
side of mark so planking lies evenly when applied. At this point go over the entire framework, carefully beveling and fairing all joints, using a batten to show when all edges are faired correctly. All planking joints hereafter described should be

coated with quality marine glue for firm waterproof joints.

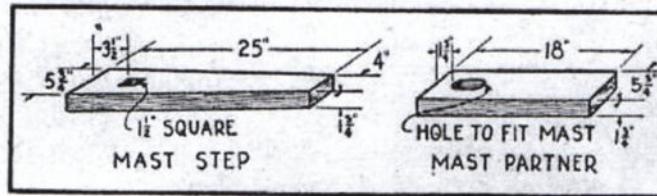
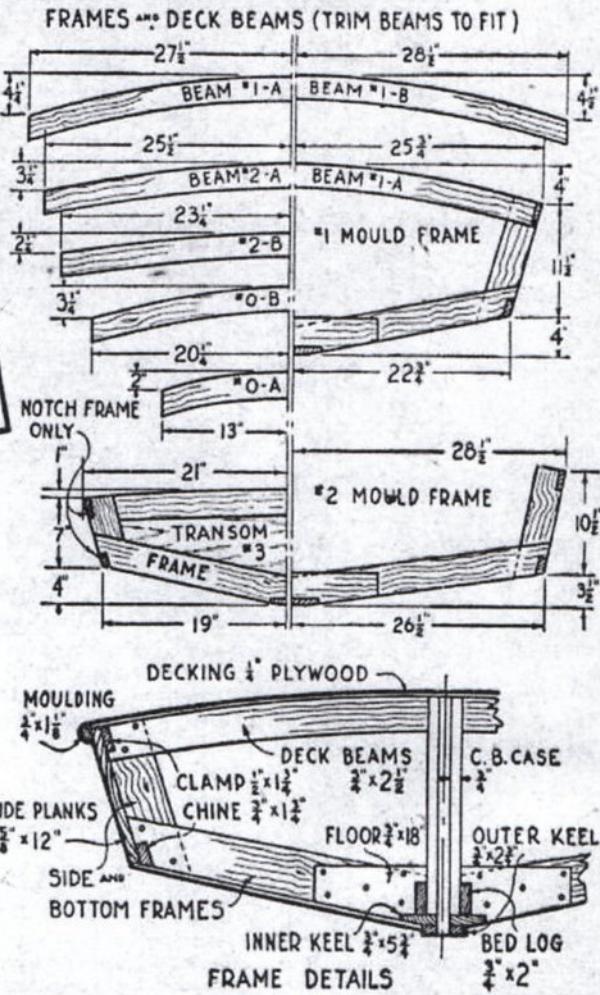
The two side planks are attached simultaneously to prevent pulling the framework out of shape. Clamp planks in place, mark and saw to shape. Return planks and carefully fit to the stem rabbet. Before attaching planks, coat chines, clamp, transom edges and stem rabbet



DECK LAYOUT ON PLYWOOD
SHEET - MAKE BOTTOM SIMILAR



KEEL SECTION
AMIDSHIP



with glue. Clamp planks in place and fasten with 1 $\frac{1}{4}$ " No. 8 f. h. screws spaced about 3 in. apart. With both side planks attached, trim edges evenly and proceed to apply bottom.

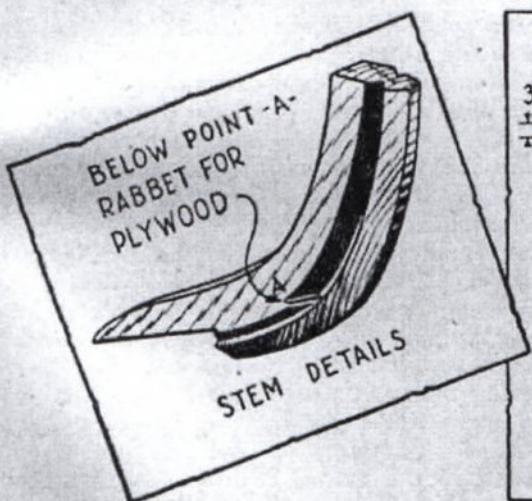
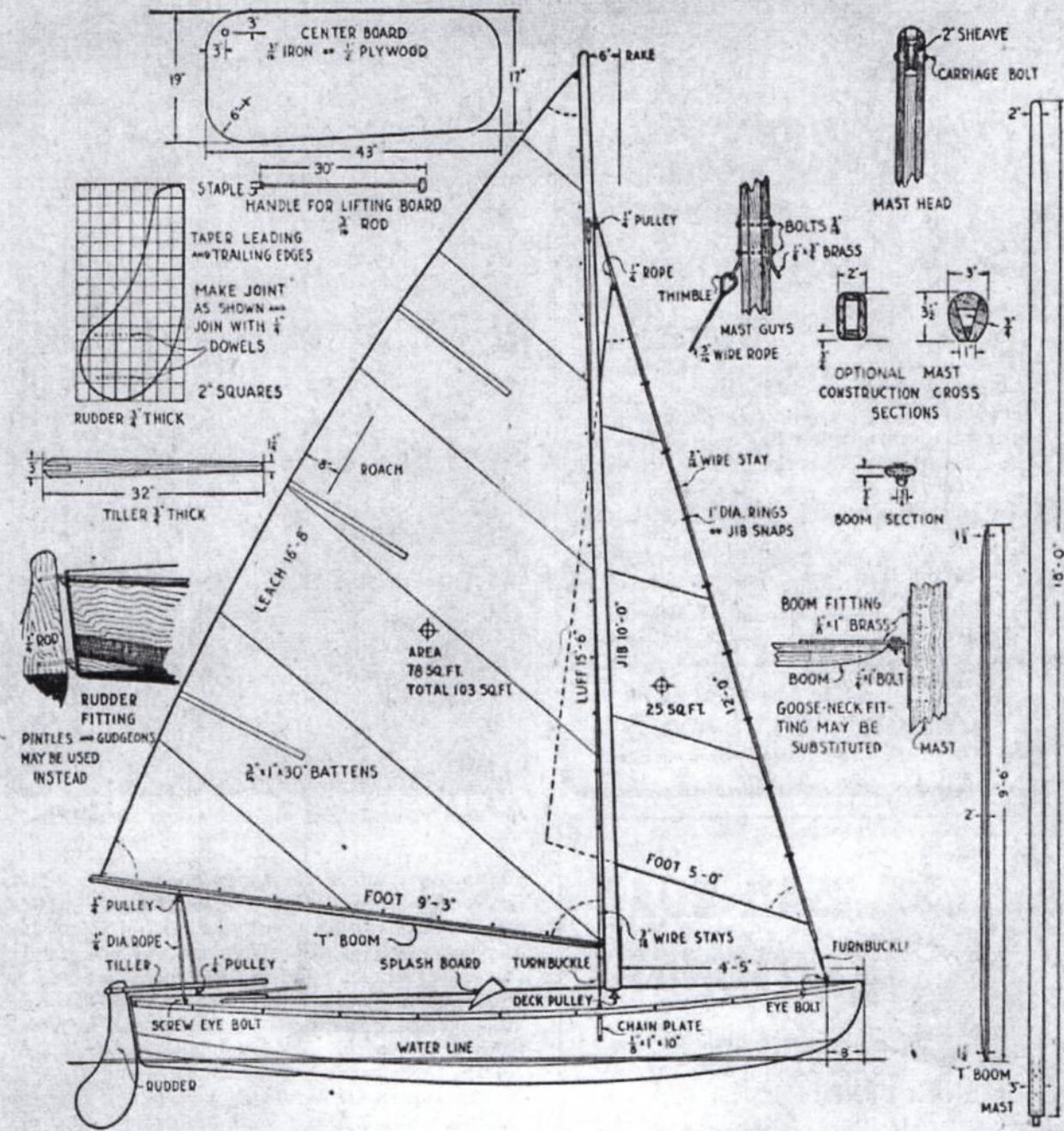
The bottom may be planked with $\frac{3}{4}$ " x 6" boards laid at a 45 degree angle, seams caulked and puttied. However, $\frac{1}{4}$ -in. thickness waterproof plywood is quite satisfactory. If the waterproof variety is used the surface need only be painted but if the wallboard variety is used the surface must be canvas covered. The bottom plywood may be either attached in one piece each side of the keel or two pieces or even three, the joints being secured and backed by a $\frac{3}{4}$ " x 1 $\frac{1}{4}$ " piece to which edges of plywood are glued and screw fastened. Coat all adjoining surfaces first with glue, fit and clamp plywood in place fastening with 1" No. 8 f. h. screws spaced 3 in. apart. With bottom planked trim edges evenly and remove from form. Before turning boat over cut the $\frac{3}{4}$ " wide slot for well through keels. Turn the hull right side up and begin the inner construction. (Caution: When plywood is specified in these boat plans, remember that it means marine plywood.)

If the bottom is planked with plywood, the entire hull may be considerably strengthened by attaching intermediate ribs between mould frames. These intermediate frames consist of $\frac{3}{4}$ " x 1 $\frac{3}{4}$ " pieces, two intermediate ribs are attached each side of mould frames and two between mould frames, all equally spaced, and fastened to bottom with 1" No. 8 f. h. screws and to clamp and chine joint with 2" No. 10 f. h. screws.

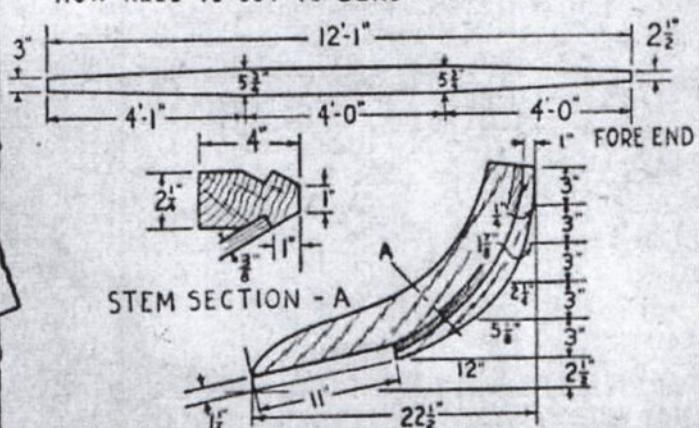
No. 1-A and No. 1-B deck beams are sawed to shape and attached to sides of mould frames and intermediate frames with 1 $\frac{1}{4}$ " No. 8 f. h. screws. $\frac{3}{4}$ " x 1 $\frac{1}{2}$ " well end posts are coated with glue and inserted in each end of the centerboard or well slot. The after end post is left long enough to trim but the forward well end post fits flush with the top of deck beam at No. 2 mould frame. The well consists of $\frac{3}{4}$ " x 9- $\frac{3}{4}$ " boards cut to fit keel.

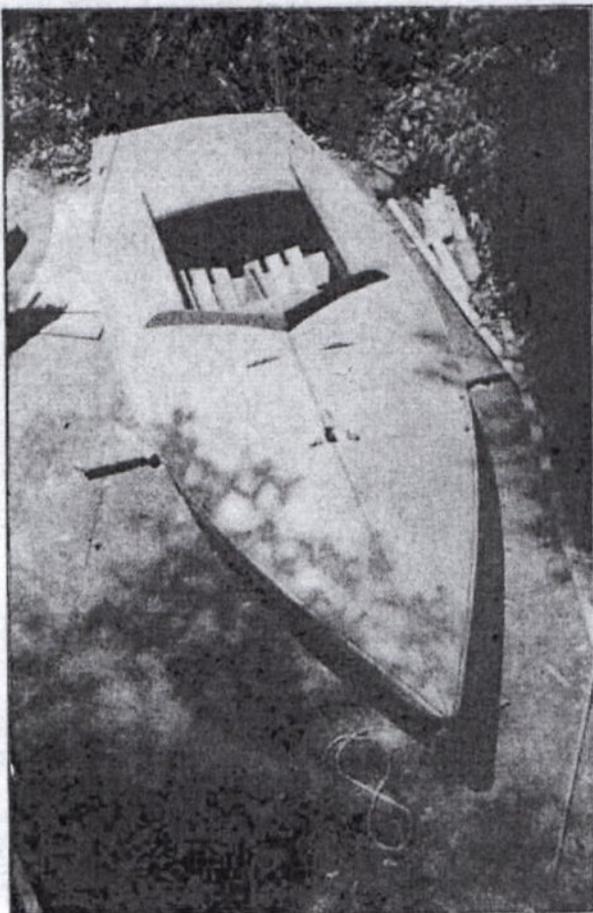
Work on the Well Boards

Before attaching well boards, coat the edges of both boards and area around well slot liberally with marine glue. Lay strips of outing flannel



HOW KEEL IS CUT TO BEND - TRIM TO FIT



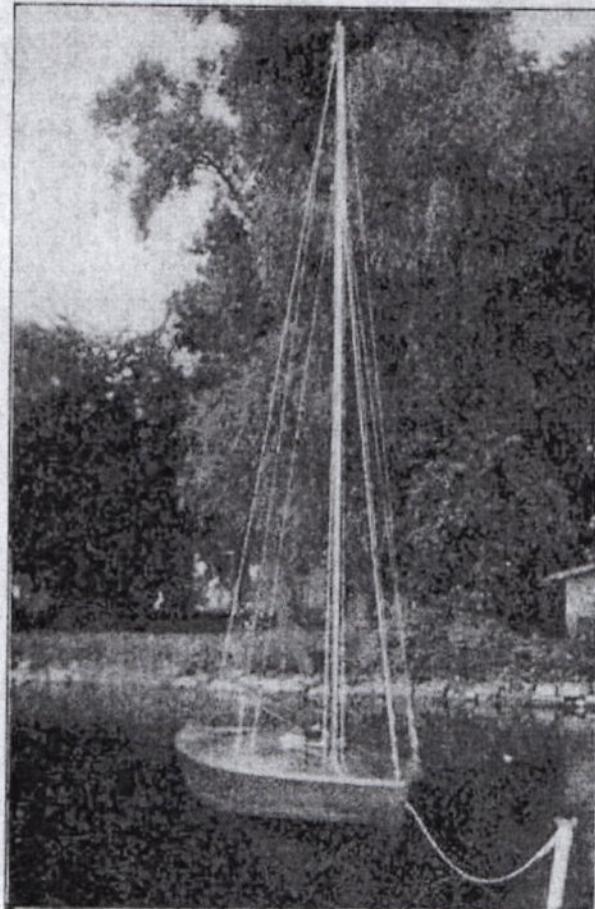


Deck view showing cockpit. Splash boards keep out the water.

upon glued area and apply another coating of glue. Fit and clamp well boards in position and screw fasten to end posts with $1\frac{1}{4}$ " No. 8 f. h. screws. The $\frac{3}{4}$ " x 2" bed logs are now screw fastened at keel. The well is filled solid up to deck beams with the other $\frac{3}{4}$ " x $9\frac{3}{4}$ " boards, these being glued and similarly screw fastened. The after end of the well boards extending aft of the deck beam is trimmed as shown.

The remainder of the deck beams is now installed while a breast hook is fitted to stem and ends of clamps forward and fastened with 2" No. 8 f. h. screws. A mast step as shown is secured to the keel with two $\frac{1}{4}$ " x 6" carriage bolts while a mast partner is fastened between deck beams to reinforce mast at deck. The cockpit railing is $\frac{3}{4}$ " x $1\frac{3}{4}$ " pieces screw fastened in place with 2" No. 10 f. h. screws while the cockpit beam is merely a straight piece of $\frac{3}{4}$ " x $1\frac{3}{4}$ ". The inside should now be painted three coats of paint.

The decking for "Dart" is sawed from two pieces of $\frac{1}{4}$ " x 48" x 96" plywood. This is cut as shown, the joints secured at center where necessary with $\frac{3}{4}$ " x $1\frac{3}{4}$ " pieces, and fastened to beams, sides with 1" No. 8 f. h. screws spaced about 3 in. apart. Cut a hole for the mast and proceed to trim edges and sides evenly. For a shipshape appearance and wearing qualities the plywood deck is canvas covered. Apply a coat-



Rigging details of the "Dart."

ing of canvas cement to the deck; stretch the canvas in place, and lap over the sides about $1\frac{1}{2}$ " and tack, at the same time rub surface of the canvas to insure complete adhesion between plywood, cement and canvas. A filler coat for the canvas is secured by thinning the cement with alcohol to the consistency of paint and applying to surface of canvas. Allow to dry, sand smooth and finish with paint coats. The splash boards, coaming and sheer moulding are now attached and sanded smooth, then varnished.

The mast for "Dart" may be either of two shapes, square or streamlined as shown. Both types are made of wood strips, glued and clamped together until dry. The glued mast when dry is planed to shape, sanded smooth, and varnished four coats. The boom is similarly built except that the two pieces are both glued and screw fastened, followed by varnish coats. Paint or varnish the boat any particular color desired and make such accessories as centerboard which may be cut from $3/16$ " sheet steel or $1/2$ " thickness plywood. The sail is made from closely woven muslin. This is an important item that is best procured from a professional sail maker, if purchased or made its details are indicated.

• Craft Print No. 76 in enlarged size for building the "Dart" is available at 25¢ each. Address Craft Print Dept. B-48, SCIENCE AND MECHANICS, 49 East Superior St., Chicago 11, Ill.