Planing Sailer "tabu"

By combining new materials with improved techniques of water dynamics, this sports sailer brings about a new concept of high-in-the-water speed sailing

Craft Print No. 356

Designed by William Jackson

SPEEDS of up to four times faster than conventional sailers of comparable size are possible with the Tabu. To achieve this speed, it rides over the surface instead of forcing its way through it. It performs much like the outriggers made by the Polynesian Islanders whose handmade craft often exceeded 20 mph.

A 16-foot planing sailer like Tabu if purchased ready-made will cost you from $1700 to $2000. The primary reason for this high price is because there are only a few firms who make them, and they, in turn, can charge premium dollar for their product which is the end result of their "exclusive" knowledge about what makes a *planing* sailer.

Several years of research have gone into designing this sailer for *Boat Builder*. By following the designs given in this article you can build a craft just like the one that we came up with and proved to be a successful planing sailer.

An exceptionally strong structure is produced by utilizing two frames and the transom so they add the necessary support with the logitudinal stiffening members. Covering the craft with Dynel makes it sufficiently flexible so it rolls and yields with impact, but still maintains a strength ratio just a little below that of steel.

Sailing light weight boats in winds over 15 mph requires masts that are not heavy. Ordinary spars made of wood are too heavy, with too many foot pounds of weight aloft to carry sail in a real blow. When planing sailers really take off they begin to throw spray like an outboard runabout, riding out upon the water's surface at speeds just under wind velocity.

Aluminum masts are light weight, rigid and unyielding, but will cost from $150 to $200. The one used on the Tabu costs about a tenth less to make, and weighs only 23 pounds when covered with Dynel. In winds over 20 mph it will yield and flex considerably without fracturing. We discourage covering the masts with fiber glass, as this product has a tendency to fracture, and does not have the flexibility of Dynel.

Planing performance of sailers like the Tabu necessitates reduction of excess weight. This means you must carefully consider the kind of plywood and lumber to use for the craft.

Six sheets of 4x8 plywood are used to construct the Tabu. A sheet of ¼-in. fir weighs approximately 22 pounds, and the amount required comes to about 132 pounds. Mahogany, on the other hand, weighs 17 pounds a panel. Total weight for the latter, considering you need six panels, comes to 102 pounds.

The mahogany will cost about $3.84, depending on local prices, more than fir of similar quality for all you need, and effect a weight savings of 42 pounds. If you use mahogany plywood, be sure to check for face veneer and consistent overall thickness. Tissue paper thickness face veneers on some mahogany is too weak for use on the Tabu, as it will only fracture when the winds mount over 15 mph.

Thinner gauges of mahogany can be used in constructing the hull if you cover it with Dynel. By using this covering you are able to save over 15 pounds of weight, and still provide the necessary structural strength.

We used western spruce for other members, but any other light weight strong wood will also function well. Philippine mahogany is excellent for framing. It costs less than oak, and may be obtained in long, clear lengths.

There are several advantages to using Dynel instead of fiber glass. Besides the weight factor we just mentioned it can be stretched in place and eliminates the use of

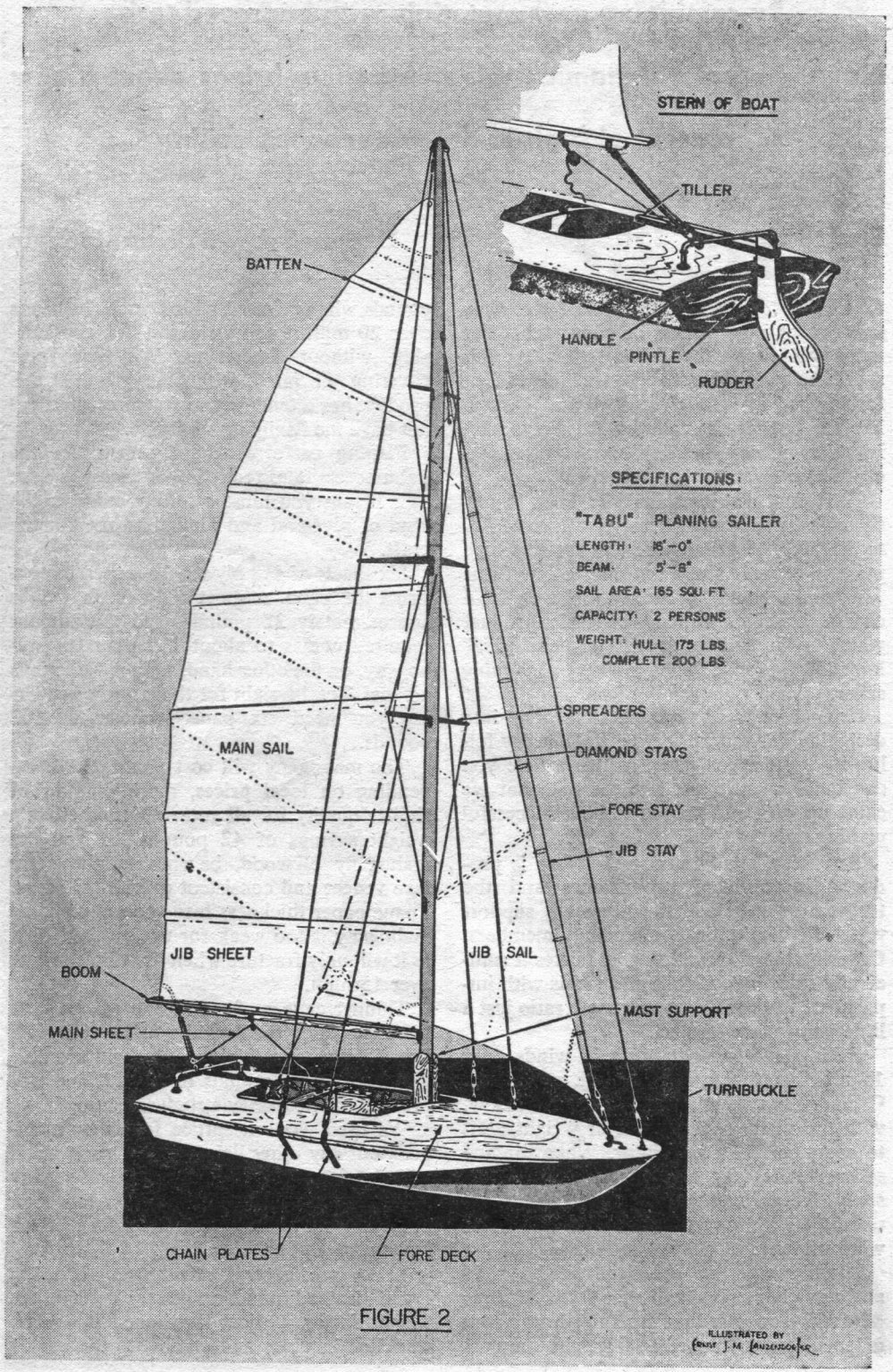
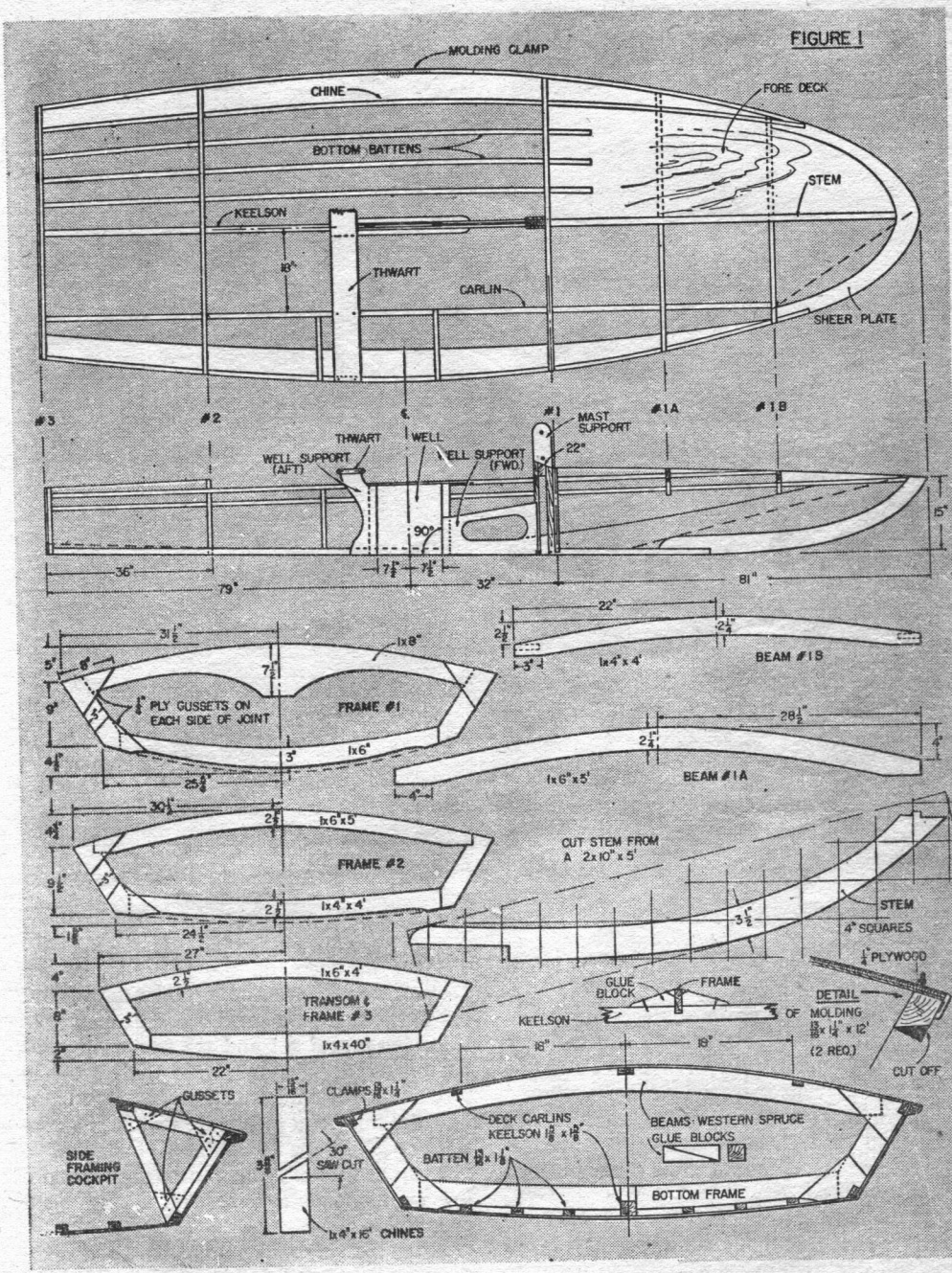


FIGURE 2

ILLUSTRATED BY ERNEST J. M. LANZENDORFER



glass tape at chines, sheer, and conforms intimately to the curved surfaces. Although Dynel requires slightly more resin, it "wets" out much more thoroughly than glass cloth and affords a superior bond.

It also enabled us to make the mast out of ⅛-in. material, which made it lighter in weight than aluminum. Once wrapped around the sail support it made it about five times more flexible than glass, which allows stay wires to be set up sagless and not be rigid like most mast assemblies, which induces considerable strains upon the lightweight sailer. The toughness index for Dynel

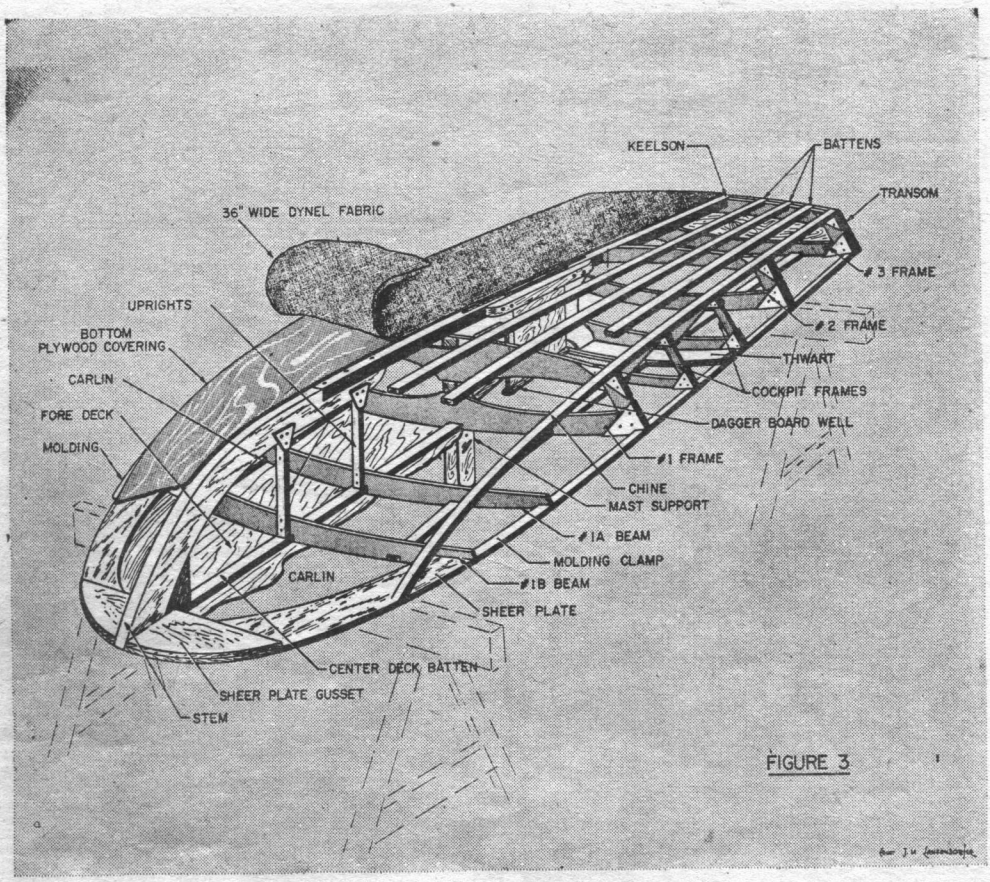


FIGURE 3

is 8030 foot pounds per cubic inch, while it is only 1900 for glass.

Building forms are not necessary when constructing the Tabu. Simply use two saw horses and clamp four or five 1x2's to the frame to prevent it from twisting.

Begin work by making the transom and #1 and #2 frames. The deck beams (#1A and B) stem and sheer plate are then cut to size and shape.

Many hardware stores carry a wheeled pattern transfer tool that enables you to transfer the full-size patterns you make on paper to the wood without damaging the pattern. With this tool you can insure yourself of precision-built parts.

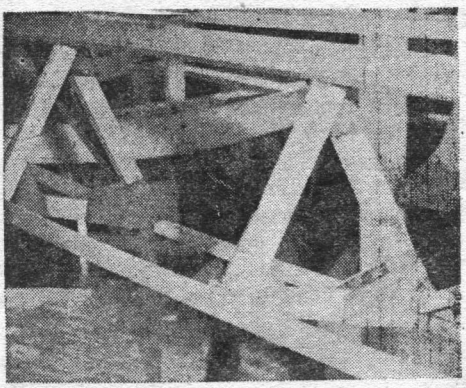
Make the parts for keelson assembly by first ripping a 10 foot long 2x4 in half the long way, then cut off two 6 foot lengths. Shape the cutoff parts so they can be fitted in place to make up the well portion of the keelson.

Place the stem on the fore part of the keelson, and the transom on the after part of the keelson, as shown in the drawings. Position the precut #1 and #2 frames in place on top of the keelson. Hold the frames in place with 1⅝-in. beveled blocks.

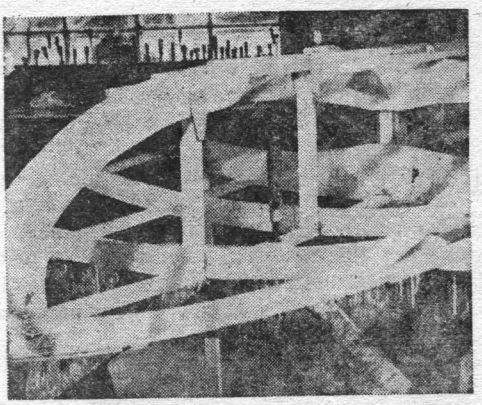
From this point on always maintain a constant check on the straightness of the keel so you can be sure of always cutting the remaining components to size and fitting them properly in place.

After the side and bottom plywood is attached the hull will hold its shape. We used one inch #15 Silicon Bronze nails to fasten the hull components. Space them 2 inches apart when attaching the plywood to the framing members. This fastening arrangement will require about 1½ pounds of these nails.

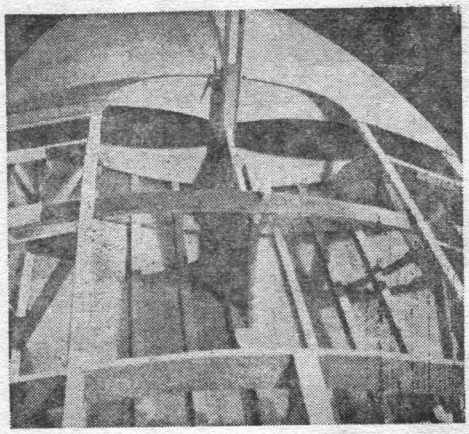
Elmer's Waterproof Glue or Weldwood's Phenolic Resin adhesive is recommended as a coating between every wood-to-wood con-



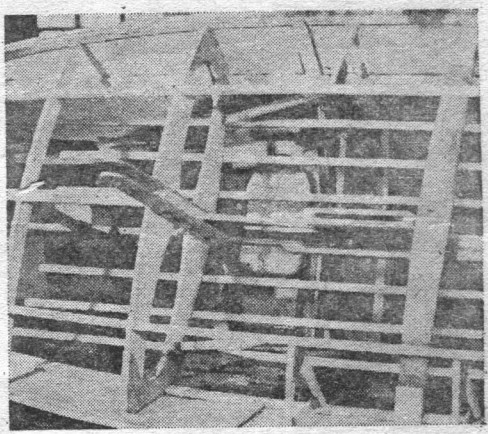
ALL MATING MEMBERS are glued together.



FRAME STRUCTURE forward of the bulkhead.



CAREFULLY BEND plywood over hull and deck.



MAST STEP is attached directly to frame No. 1.

tacting surface. This provides for increased bonding, and insures an equal amount of stress between the mating surfaces and not on the fasteners.

Chines, sheer clamps and battens are attached with one 1¾ No. 8 fh screw for each joint. Once the hull is framed, trim and fair all framing surfaces with a Stanley *Surform* wood file to insure intimate contact of the plywood covering that is to be fastened in place later on.

Cut the plywood panels to size by following the measurements given in the drawings. Remember to cut the paneling face up on a bench saw and face down when using a saber saw to reduce splintering. Use a fine-tooth blade in the saber saw.

Fasten the shaped pieces to the hull with one inch serrated nails that are spaced 2 inches apart. Once the bottom and sides of the hull are glued and nailed in place, round off the edges along the chines, attach sheer mouldings, and apply the Dynel covering.

Make sure the Dynel overlaps the center line of the keel and sheer moulding by at least one inch. Pull it tightly over the hull and secure it along the sheer moulding with ⅛-in. mason's twine that's held in place with steel tacks that pass through the cord.

Steel fasteners can be used because three coats of resin will be applied which will completely cover the tacks and twine. This resin overlay will make a corrosion-proof plating over the entire hull.

After the Dynel is applied over the entire hull, turn the planked structure right side up and trim the plywood and moulding evenly along the sheer, then prepare to attach the plywood decking.

Use the same construction procedures to attach the decking. First glue all contacting surfaces, then nail the components in place.

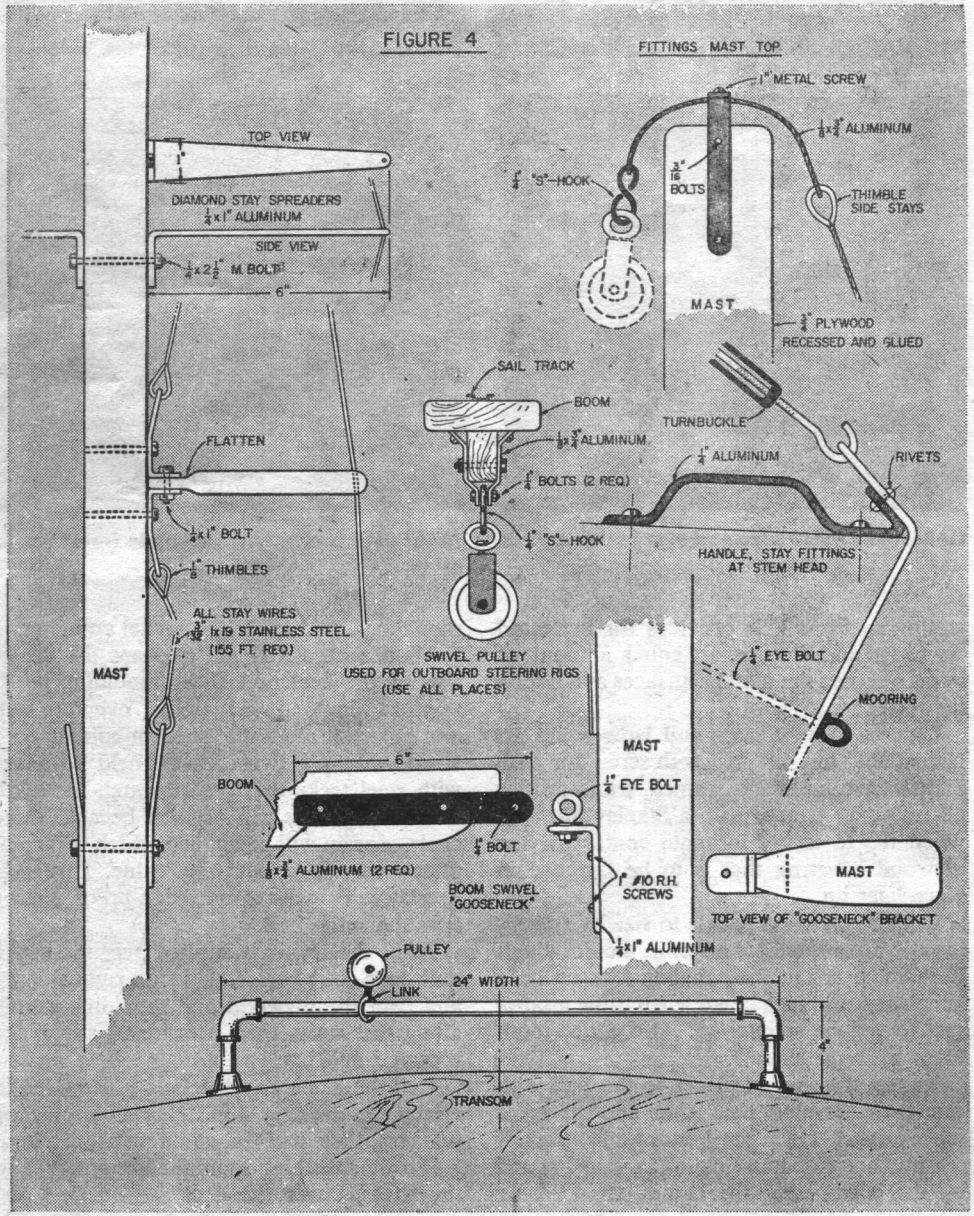
Before attaching aluminum mouldings to the sheer, cover the deck with Dynel and

apply three coats of resin. If additional paint coats are not to be brushed on, simply use resin with pigment included. After the resin dries attach the three 12-foot aluminum mouldings.

Center Board and Rudder. Recent advances in highly efficient under-water shapes have clearly determined that air foil shapes are not efficient when submerged. In fact, they are actually detrimental to speed.

For the Tabu a hollow, ⅛-in. plywood dagger board and rudder were worked out to eliminate any drag. The center board and rudder are made with ⅛-in. mahogany because we found that ⅛-in. fir plywood was much too brittle.

Spline pieces are positioned to achieve the proper water dynamic shape. Edges of the board and rudder are clinch nailed with one-inch thin gauge common wire fasteners. Once the glue dries, cover with Dynel and apply three coats of resin. Sand all but the

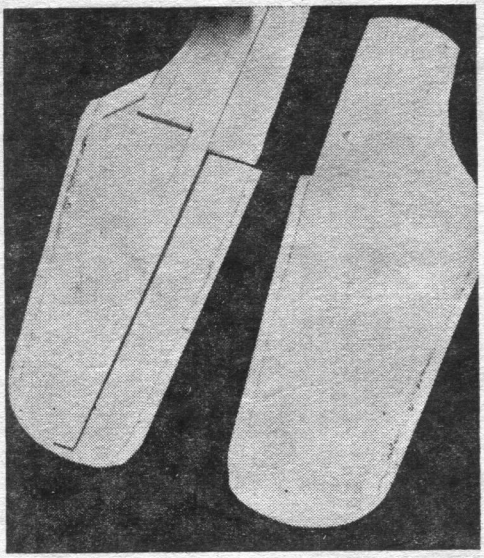


last coat, which should be finished with a very fine abrasive to make a steel hard surface with the absolute smoothness required in a fast planing-type sailer.

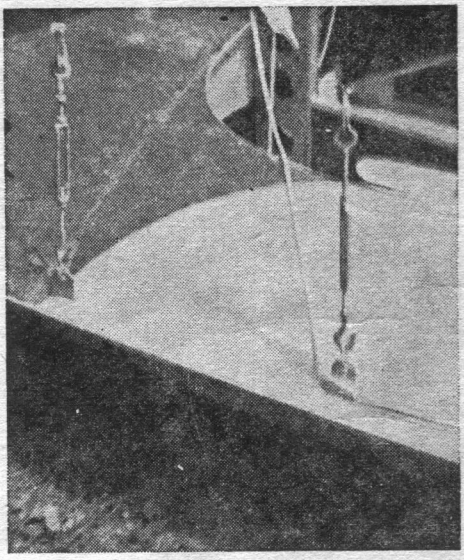
A hinged-type center board is not used in the Tabu because it proved inefficient. As the hinged board is lowered the centers of lateral resistance varies through a wide arc, causing erratic sailing.

To use the streamlined dagger board, simply shove it into the case for "tacking," and in this way utilize most of the board surface. For planing, pull the board out to expose as little surface as necessary to maintain good control.

At high speeds the dagger board acts like a fin that is found under all outboard hydroplanes, and needs scant surface to control the boat. In fact, the less board surface exposed, the higher will be the sailing speed.

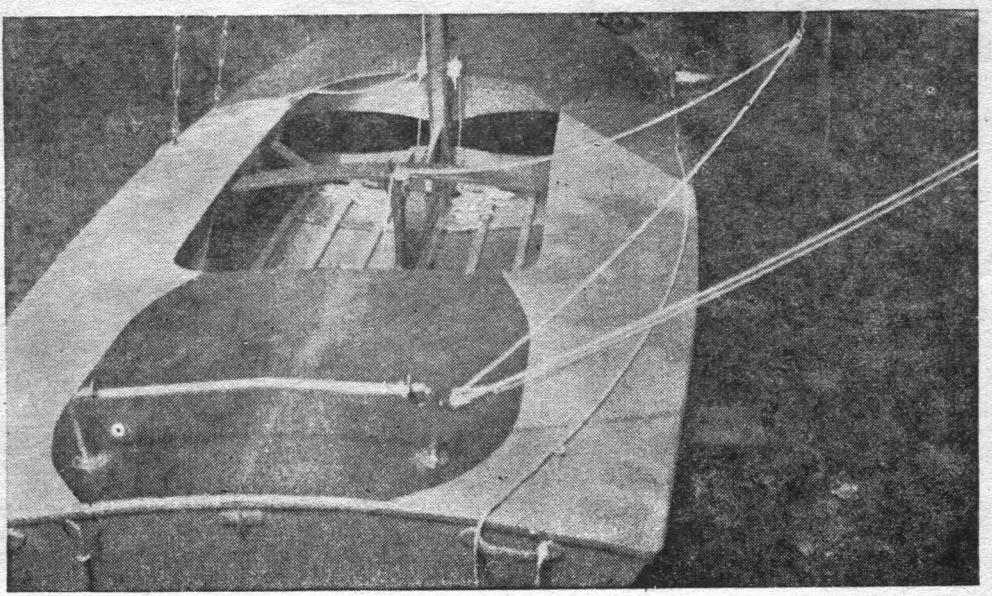


DAGGER BOARD was made from 1/8-in. mahogany. It's hollow to eliminate any drag.



MANY of the rigging components were hand made to keep overall cost of sailer down.

ENTIRE shell was covered with Dynel fabric to increase overall strength of the craft.



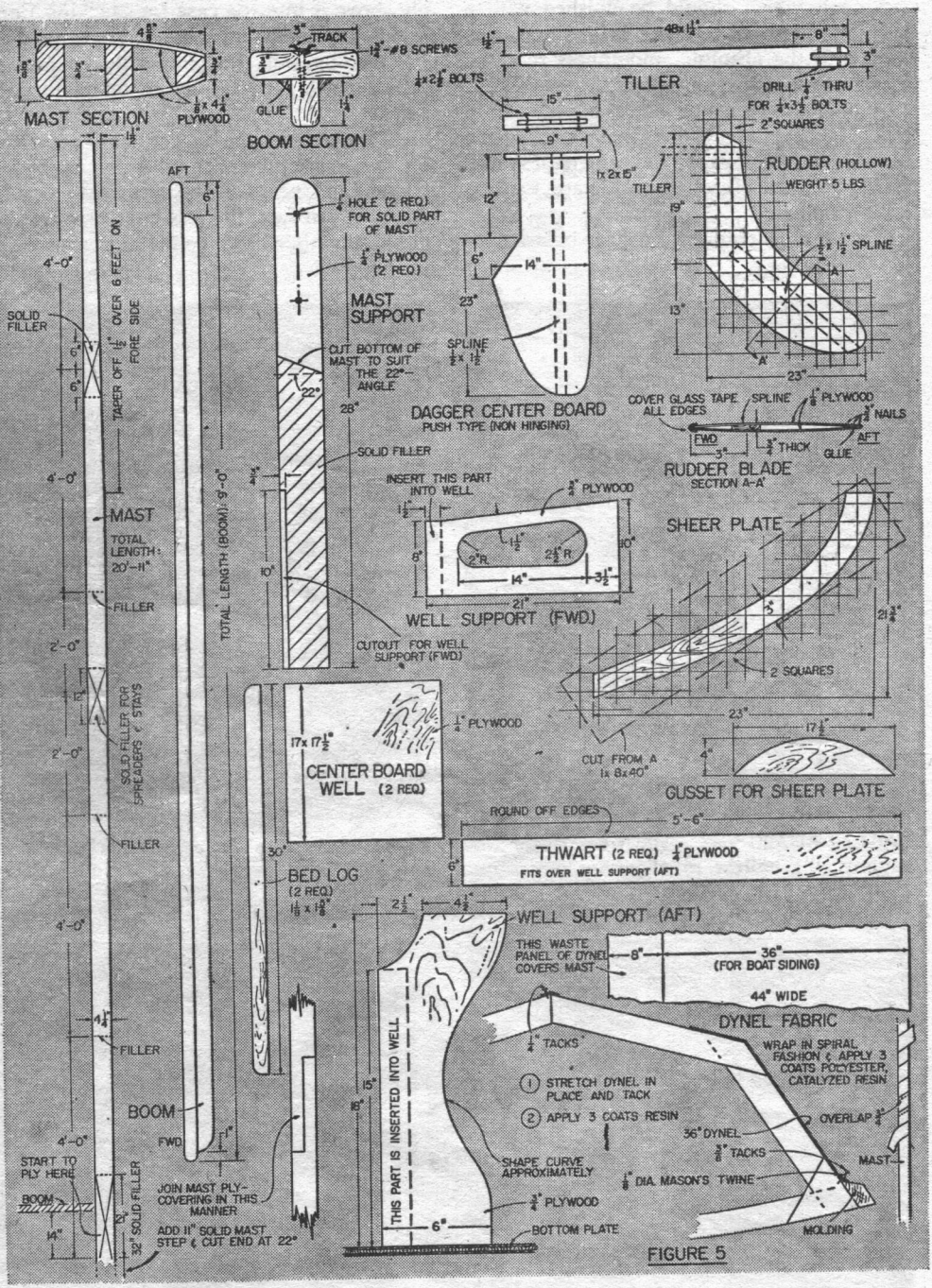
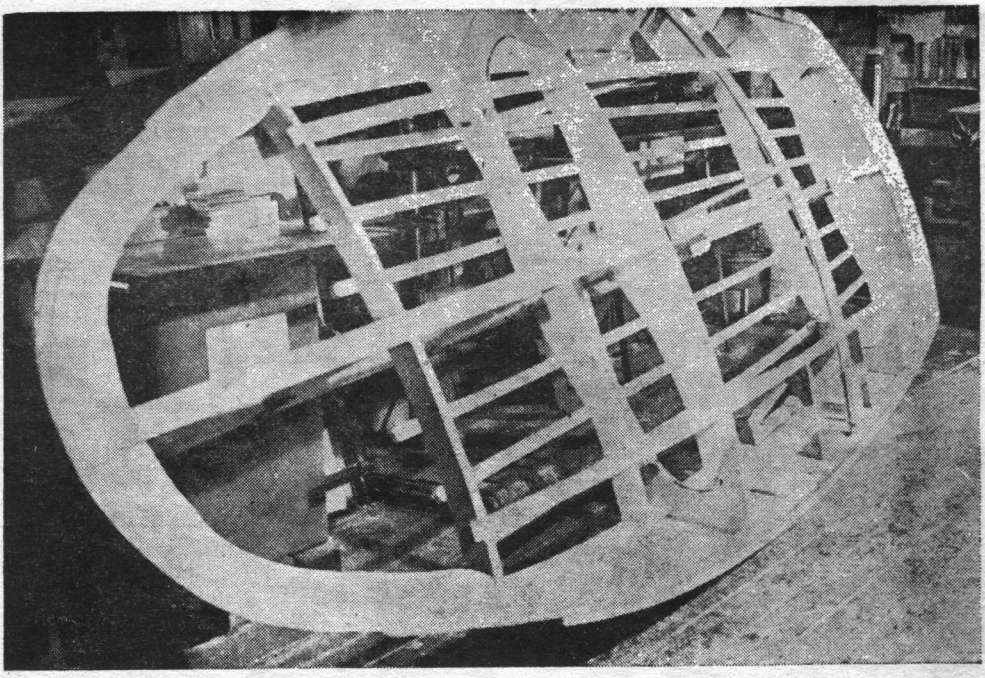


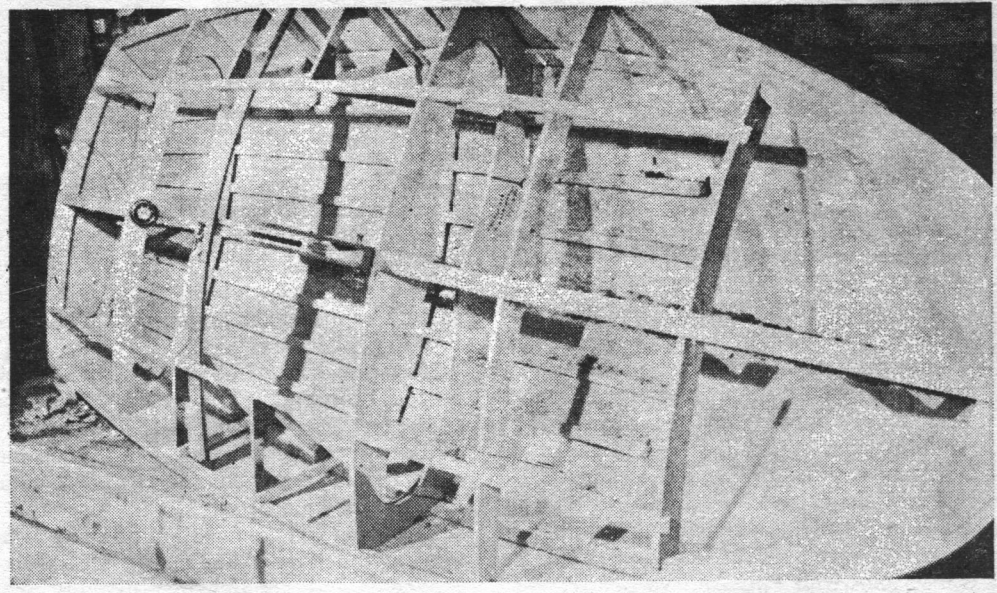
FIGURE 5

Construct the mast from ⅛-in. mahogany plywood and you will have one that is lighter than aluminum. By wrapping it with Dynel you can increase its strength so it can stand gusts up to 25 mph without fracturing.

The ability of this material to hold up under strain was recently proved to us. The Tabu is moored in shallow water, twice in wind storms where the gusts were as high as 60 mph, this sailer turned over and during the storm the mast was pounding on the bottom of the lake with the hull acting as a



ALWAYS maintain a constant check on the straightness of the keels so all members fit right.



FASTEN plywood to hull with one-inch serrated nails that are spaced every two inches.

handle. When the Tabu was righted the mast did not show the slightest sign of fracture.

Finishing Your Sailer. Lead and oil base paints do not adhere to a glassed surface. Therefore for the outside of the hull we used Stay-Tite's *Fleet* finish (Urethane) that is available in a variety of popular marine colors. An epoxy paint can also be used. The inside of the hull was covered with a clear Stay-Tite Urethane.

We made many of the rigging fixtures from aluminum stock that is available from

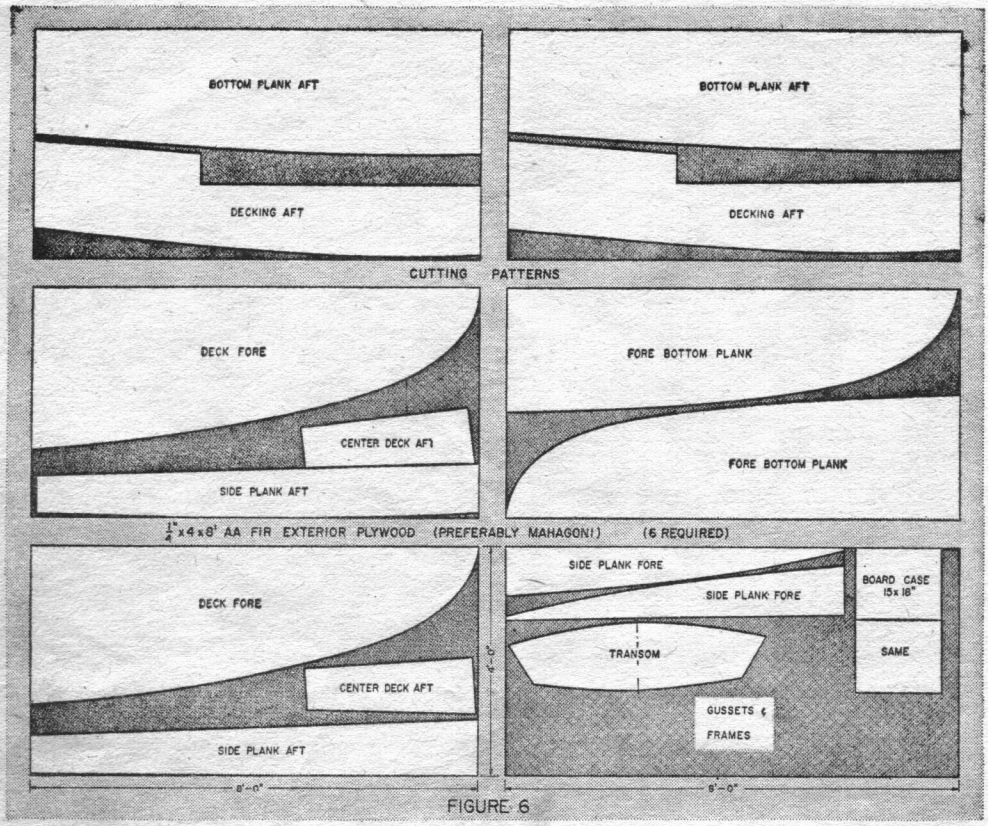


FIGURE 6

most mail order companies and at lumber yards. Thin, stainless steel fittings can be ordered from the Race-Lite Marine Hardware Co. or bronze rigging supplies from Alan Clarke Co.

Splicing of such thin wire, and especially stainless steel, usually requires the services of an expert. But the intricate splicing may be eliminated by slipping the wire through and around thimbles, and securing it with a ⅛-inch wire clamp, allowing 3 inches of the wire end to extend beyond the clamp.

Finish the extended portion of the wire by winding loosely, separated turns with thin "seizing" wire, and rigidly cold weld the entire joint with *Poly-Epoxyn Solder.*

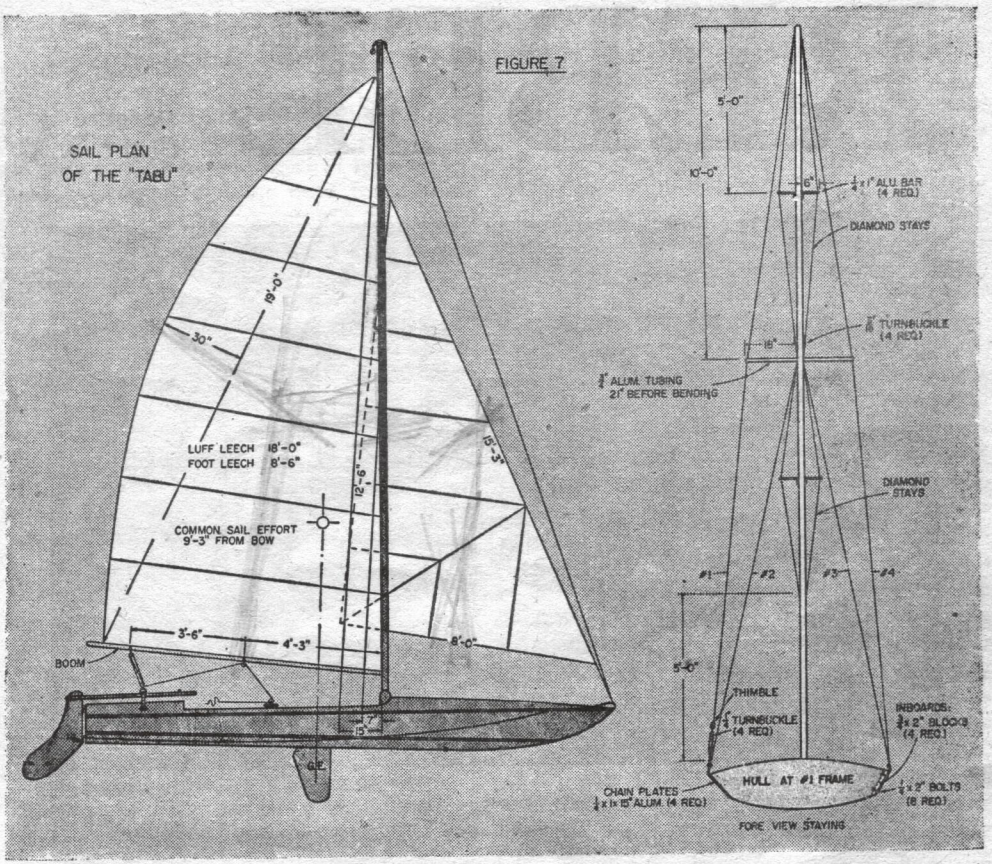
This epoxy solder is a two part plastic that is available in paste form. All you have to do is mix the two parts together and the solder is ready to use. Your next step is to apply it to the wire joint with a putty knife. To make a neat, symmetrical job, just hold a heat lamp a few inches from the pasted joint and the adhesive will permeate the wires.

Stainless steel is exceptionally difficult to join with conventional products. Silver solder was used but it lacked prolonged holding power. Epoxyn, however, will give you an inseparable joint that you need for a lasting connection. The adhesive can later be filed smooth or the excess removed to give you a professional looking job.

You can use just about any kind of sail on the Tabu and approach fairly close the speed formula that applies to the ordinary displacement type of sailer. But if you want a planing sailer, then you don't want to settle for just any kind of sail.

The Tabu is a combination of many techniques gleaned from the English, Australians, Japanese, and aerodynamic designs. Self-made sails will afford only a mediocre sailing craft, and not one worth the time, money and labor that is required to create the Tabu. It would be like putting a Model T engine in a modern sports car—it can be done but does nothing to improve performance.

We used Alan Clarke dacron sails that are impervious to sun, moisture, and are several times stronger than those made of cloth. ■



MATERIALS LIST—PLANING SAILER

Amt. Req.	Size and Description	Use
	LUMBER	
1	⅛"x2x8' mahogany exterior plywood	mast
6	¼"x4x8' mahogany, or AA fir exterior plywood	hull and deck
1	(1x4)x2' spruce or fir	#1 frame
3	(1x4)x4' spruce or fir	transom, fore beams
1	(1x4)x8' spruce or fir	#2 frame
2	(1x4)x10' spruce or fir	bottom battens
1	(1x4)x12' spruce or fir	mouldings
3	(1x4)x16' spruce or fir	chines, clamps, deck carlins
2	(1x6)x4' spruce or fir	#1 frame, transom
2	(1x6)x5' spruce or fir	#2 frame, fore beams 1A and B
1	(1x6)x10' spruce or fir	boom
1	(1x6)x16' spruce or fir	mast
1	(1x8)x5' spruce or fir	#1 frame
1	(1x8)x8' spruce or fir	sheer plate
1	1¼x3x48" spruce or fir	tiller handle
1	(2x4)x10' spruce or fir	keelson
1	(2x10)x5' spruce or fir	stem
	HARDWARE and FITTINGS	
6	5/16" rope-use pulleys	outboard steering lines
1	¼x6" eye bolt	bow
4	3/16" "Petite" turnbuckles	diamond stays
6	¼" turnbuckles	
150 ft.	5/16" nylon rope	
155 ft.	3/32" 1x19 stainless steel wire	
12	⅛" wire rope thimbles	
32	⅛" cable clamps	
4	6" aluminum cleats	
2	complete sets ¾" Pintles & Gudgeons	
1	gooseneck (snipe style)	
28 ft.	5/8" sail track	
1	sheet traveler	
1	suit of sails	
36 ft.	#182 aluminum moulding	
	FASTENINGS, ADHESIVES, PAINT	
20 yds.	48" width Dynel or Dura-Nel 815 Fabric*	
3 gal.	resin	
1 box	steel tacks	
2 qts.	Stay-Tite "Fleet" paint	
1½ lbs.	#15 Stronghold serrated nails—galvanized or monel metal	
4 doz.	1¾" #8 fh screws	
1 gal.	Elmer's glue	
1 pt.	epoxy solder	

*Available from the
Alan-Clarke Co.
235-239 Main St.
Northport, N.Y. 11768

● Craft Print No. 356 in enlarged size for building Tabu is available at $3. To avoid possible loss of coin or currency in mails, remit by check or money order (no CODs or stamps) to Craft Print Dept. BB, SCIENCE and MECHANICS, 229 Park Ave. South, New York, N. Y. 10003.