build HAPPY CLAM

A 17-foot Seabright skiff.
Speed: 14 mph with 5 hp., 20 mph with 10 hp.
Beam: 5 feet 6 inches.
Displacement: 900 lbs.

By John Atkin
Naval Architect

HAPPY Clam is the latest of over 65 boats having this unusual hull form that have come from the boards of the Atkin family during the past 25 years. They have varied in size from the 17-footer shown here to a 305-foot shallow-draft tanker developed during the past war. Each has proven seaworthy and successful in attaining high speed with low power.

Among the inherent advantages of this hull form are its shallow draft, great stability, and low center of gravity. Full protection for the propeller is provided by the box keel. Flow of unbroken water to

If Happy Clam is built exactly as shown in the drawings and finished in a professional manner, she will be at home in any company.

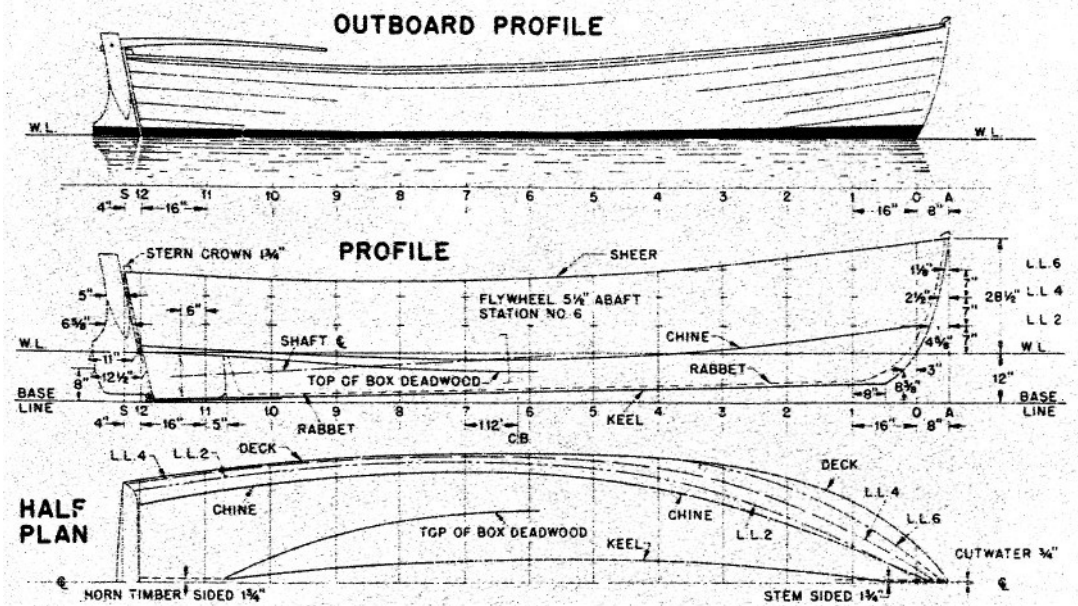
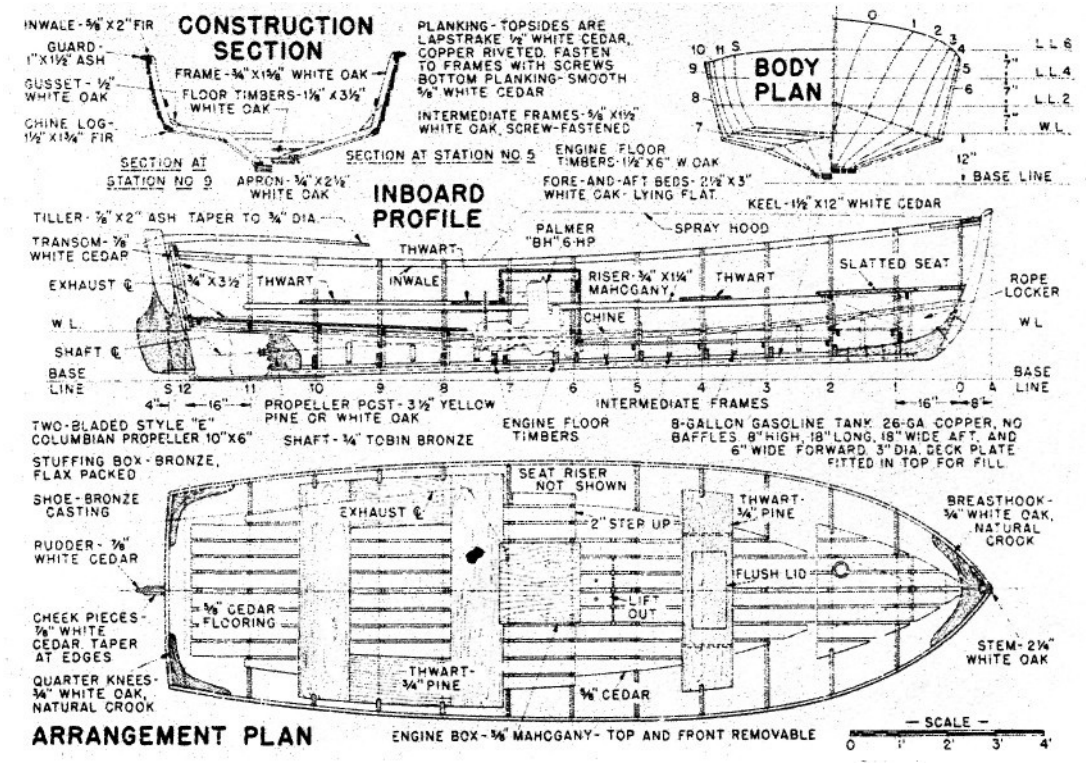

OUTBOARD PROFILE
W.L.
W.L.
S 12 11 10 9 8 7 6 5 4 3 2 1 0 A
4" 16" 16" 8"
PROFILE
STERN CROWN 1¾"
SHEER
5"
6"
6⅝"
FLYWHEEL 5½" ABAFT STATION NO. 6
SHAFT ℄
CHINE
RABBET
11"
12½"
8"
TOP OF BOX DEADWOOD
3"
8⅜"
12"
BASE LINE
BASE LINE
W.L.
1⅛"
2½"
4⅝"
7"
7"
28½"
L.L.6
L.L.4
L.L.2
W.L.
S 12 11 10 9 8 7 6 5 4 3 2 1 0 A
4" 16" 5" 10 9 8 7 1.12" 6 5 4 3 2 1 16" 8"
RABBET
C.B.
KEEL
HALF PLAN
L.L.4
L.L.2
DECK
CHINE
TOP OF BOX DEADWOOD
KEEL
CHINE
L.L.2
DECK
L.L.4
L.L.6
CUTWATER ¾"
℄
HORN TIMBER SIDED 1¾"
STEM SIDED 1¾"
℄

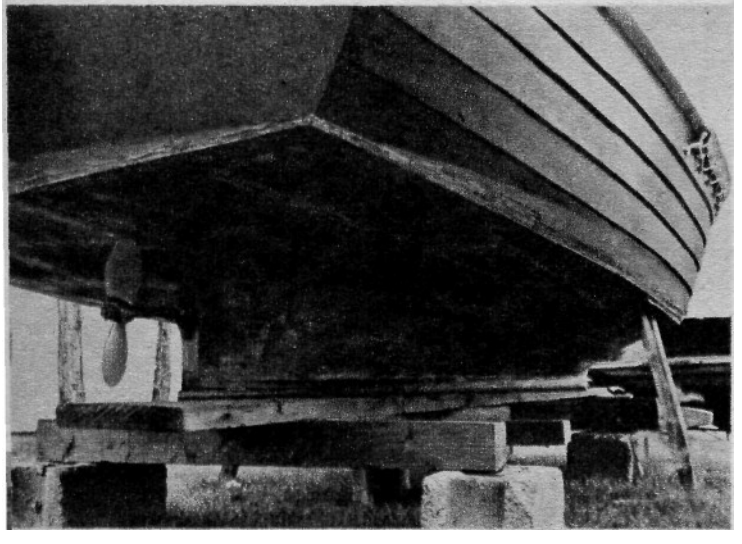
TABLE OF OFFSETS

DIMENSIONS GIVEN IN FEET, INCHES, AND EIGHTHS OF INCHES TO OUTSIDE OF PLANKING

STATION	A	C	1	2	3	4	5	6	7	8	9	10	11	12	S
HEIGHTS ABOVE THE BASE LINE															
SHEER	3-4-4	3-3-4	3-1-3	2-11-4	2-9-6	2-8-3	2-7-2	2-6-4*	2-5-6*	2-5-5	2-5-6	2-6-1	2-6-5	2-7-4	2-7-6
CHINE		1-7-2	1-4-7	1-2-7	1-1-1	0-11-7	0-11-0	0-10-5*	0-10-5*	0-10-7	0-11-2	1-0-0	1-0-6	1-1-5-	
TOP OF BOX DEADWOOD								0-7-5	0-7-7	0-8-5	0-9-2	0-10-3	0-11-5	1-0-C	
RABBET			0-5-2	STRAIGHT								0-1-7			
KEEL			0-4-4	STRAIGHT								0-1-1			
SHAFT CENTER LINE								0-11-4	STRAIGHT				0-6-6		
HALF BREADTHS															
DECK	0-0-3	0-9-3	1-8-2	2-2-0	2-5-1	2-6-6*	2-7-0	2-8-0	2-7-7	2-7-4	2-6-6*	2-5-3	2-3-4	2-1-0	2-0-2
L L 6		0-6-2	1-4-5	2-0-0	2-4-5*										
L L 4		0-3-5	1-0-5	1-8-0	2-1-2	2-4-4	2-6-2	2-7-0	2-7-2	2-7-0	2-6-1	2-4-4	2-3-0	2-0-4	
L L 2		0-1-4	0-9-4	1-4-4	1-10-2	2-2-1*	2-4-4	2-5-4	2-5-7	2-5-4	2-5-0-	2-3-3	2-1-2	1-10-4	
CHINE		0-2-0	0-8-4	1-3-5	1-8-6	1-11-4	2-1-7	2-3-2	2-3-4	2-3-2	2-2-1	2-0-2	1-10-C	1-6-6	
TOP OF BOX DEADWOOD								1-6-4	1-5-0	1-3-2	0-11-6	0-6-4			
KEEL			0-1-4	0-3-3	0-4-5		0-5-5	0-5-6	0-5-4	0-4-7	0-3-6	0-2-1			


CONSTRUCTION SECTION
INWALE - 5/8" X 2" FIR
GUARD - 1" X 1½" ASH
GUSSET - ½" WHITE OAK
CHINE LOG - 1½" X 1¾" FIR
FRAME - ¾" X 1⅜" WHITE OAK
FLOOR TIMBERS - 1⅛" X 3½" WHITE OAK
PLANKING - TOPSIDES ARE LAPSTRAKE ⅛" WHITE CEDAR, COPPER RIVETED, FASTEN TO FRAMES WITH SCREWS
BOTTOM PLANKING - SMOOTH ⅝" WHITE CEDAR
INTERMEDIATE FRAMES - ⅝" X 1½" WHITE OAK, SCREW-FASTENED
SECTION AT STATION NO 9
SECTION AT STATION NO 5
APRON - ¾" X 2½" WHITE OAK
ENGINE FLOOR TIMBERS - 1½" X 6" W OAK
FORE-AND-AFT BEDS - 2½" X 3" WHITE OAK - LYING FLAT
BODY PLAN
10 11 S
9
8
7
0 1 2 3 4 5 6
LL 6
LL 4
LL 2
W.L.
12"
BASE LINE
INBOARD PROFILE
TILLER - ⅞" X 2" ASH TAPER TO ¾" DIA
TRANSOM - ⅞" WHITE CEDAR
EXHAUST ℄
¾" X 3½"
THWART
INWALE
PALMER "BH" 6 HP
SPRAY HOOD
KEEL - 1½" X 12" WHITE CEDAR
RISER - ¾" X 1¼" MAHOGANY
THWART
SLATTED SEAT
ROPE LOCKER
CHINE
W L
SHAFT ℄
BASE LINE
S 12 11 10 9 8 7 6 5 4 3 2 1 0 4
4" 16" 16" 8"
INTERMEDIATE FRAMES
PROPELLER POST - 3½" YELLOW PINE OR WHITE OAK
TWO-BLADED STYLE "E" COLUMBIAN PROPELLER 10" X 6"
SHAFT - ¾" TOBIN BRONZE
ENGINE FLOOR TIMBERS
8-GALLON GASOLINE TANK 26-GA COPPER, NO BAFFLES 8" HIGH, 18" LONG, 18" WIDE AFT, AND 6" WIDE FORWARD, 3" DIA. DECK PLATE FITTED IN TOP FOR FILL
STUFFING BOX - BRONZE, FLAX PACKED
SHOE - BRONZE CASTING
RUDDER - ⅞" WHITE CEDAR
CHEEK PIECES - ⅞" WHITE CEDAR, TAPER AT EDGES
QUARTER KNEES - ¾" WHITE OAK, NATURAL CROOK
SEAT RISER NOT SHOWN
EXHAUST ℄
2" STEP UP
THWART - ¾" PINE
BREASTHOOK - ¾" WHITE OAK, NATURAL CROOK
FLUSH LID
LIFT OUT
⅜" CEDAR FLOORING
THWART - ¾" PINE
⅜" CEDAR
STEM - 2¼" WHITE OAK
ARRANGEMENT PLAN
ENGINE BOX - ⅜" MAHOGANY - TOP AND FRONT REMOVABLE
SCALE
0 1' 2' 3' 4'

Because of the relatively broad, flat keel, the boat will maintain a level position when beached or tied to a fiat-bed boat trailer.



Box deadwood provides protection for propeller. When this photo was snapped, the galvanized-irom shoe had not yet been installed.

the propeller is made possible by tapering the keel to the propeller post. The relatively wide, flat keel maintains the boat in a level position when beached or trailer-borne. The nearly level shaft angle, which is of value in performance, is not possible to achieve in any other hull form.

Edgar Davis of Whitemarsh, Pa., commissioned us to design and build the original Happy Clam. An accounting of material costs and time involved was kept and accurate speed and performance trials were made with the completed boat All of this, I am sure, will be of interest and value to prospective builders and owners of Happy Clam.

The principal dimensions of this little hooker are 17 feet over all, 16 feet on her designed water line, 5 feet 6 inches wide, and 11½ inches draft. Her ample freeboard of 28½ inches forward and 19 5/8 inches at her stern assist in making her a dry boat.

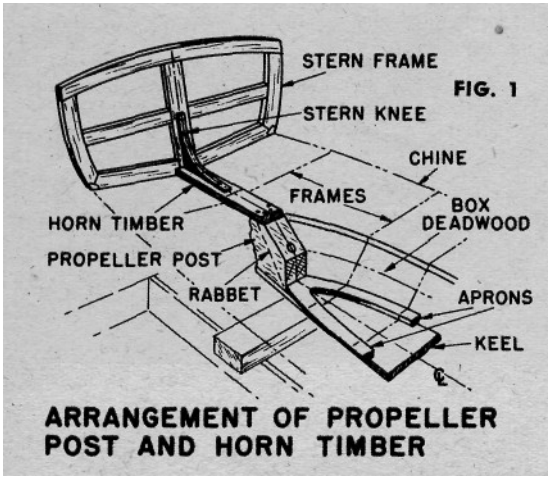
Her speed came up to full expectations. She was accurately clocked over the official measured mile off Lloyd's Neck in Long Island Sound, making 14.8 mph with a Palmer 5-hp. Baby Husky marine engine turning 2,250 rpm. The Columbian Type E two-bladed propeller is 10 in. in diameter and has a 6-in. pitch.

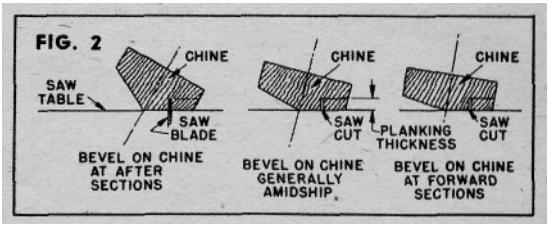
Happy Clam was built right-side up and I suggest future models should be built in the same position. Her 1½-in. keel, cut to the widths shown at the stations on the full-sized lines, should be laid on suitable building stocks with the amount of drag that's indicated on the lines drawing. Build her at least 18 in. above the floor as there is considerable fitting to do in her bottom planking and the room will come in handy.

Apron pieces of ¾ x 2½-in. stock are screw-fastened to the top of the flat keel. The bevels of the rabbet formed by apron and keel must be taken from the full-size

body plan. The aprons are in single lengths.

Mark the 16-in. frame spacing accurately on the flat keel. Affix the frame gussets and floor timbers to the forward sides of the frames forward of Station 6 and to the after sides of the frames aft of Station 6.





In the process of making up the ¾ x l 5/8-in. frames, take all dimensions from the full-size body plan. Assemble them with glue and screws. Notch out the 1 1/8 x 3½-in. floor timbers to fit over the apron pieces. Drive screws up through the keel into these floors. A stretcher of ¾ x 3-in. scrap wood must be screw-fastened to the heads of each frame at the sheer line. Pick up the water line, the sheer line, and the center line from the body plan and transfer these accurately to each finished frame.

The stem is made in two pieces and shaped as shown in the lines and construction drawings. Bolt the pieces together. A template must be taken from the lines to locate the proper positioning of the rabbet, back rabbet, and bearding lines. When these are transferred to the actual stem, the work of cutting the rabbet may proceed. Further details on this phase of construction can be found in any book on the subject. Secure the completed stem to the keel with four bolts.

See that the stem is plumb and brace it in a secure fashion to overhead members in the building shed. A great amount of strain is put upon the stem, frames, and transom when bending the planking and other members into place, so care in bracing the framework must be taken.

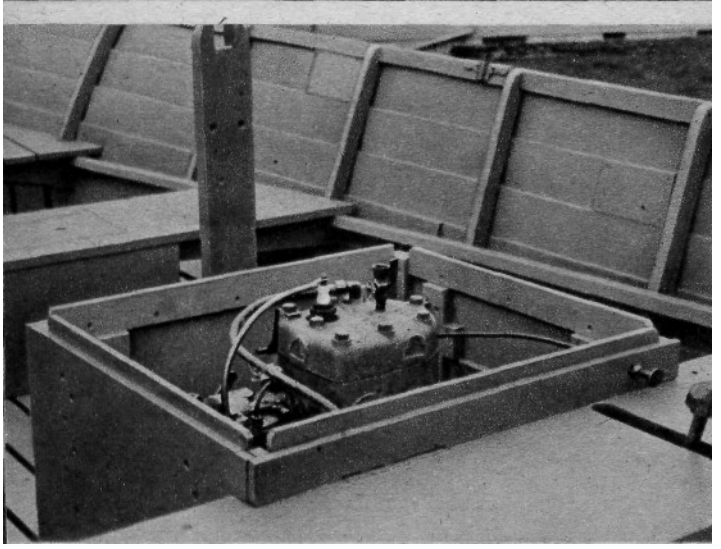
The propeller post and horn timber come next. Bore a hole 1 in. in diameter through the propeller post to take the ¾-in. shaft. .The after face of the post is square with the shaft center line, so the work can be placed on a drill press and accomplished with little difficulty. Use a bare-foot ship auger rather than a ear-penter's bit—the latter has a strong tendency to follow the grain in the wood rather than to bore a straight, square hole.

Secure the horn timber to the propeller post with drift bolts and screws. Cut a rabbet in the horn timber to take the bottom planking and a rabbet in the propeller post to take the planking of the box deadwood. Particular care must be given this part of the work. Fasten the propeller post and horn timber to the keel as shown in Fig. 1.

The 7/8-in. transom is built over a ¾ x 3½-in. frame. Secure the transom to the frame with 1½-in. No. 10 screws. Make the stern knee, which is shown in Fig. 1, from a ¾-in. natural crook if available. There may be some difficulty in securing natural crooks for this member and the breasthook and quarter knees. I visited local apple orchards for the ones in Happy Clam and the time spent proved well worth while. Practical substitutes for natural crooks are laminated oak knees of the same size and shape. Several laminations of 3/8 x ¾-in. wood can be bent to shape and tied together with waterproof glue. Secure the stern knee to the transom framing and horn timber with bolts and screws.

At this point, the completed frame should be faired up, checking with long battens tacked temporarily to the stem, frames, and

Compartment under flush lid in the thwart holds tools and small gear. A gasoline lank and a rope locker lie beneath the slatted bow seat.



For quick and easy access to the engine, the top of the motor box lifts off. If desired, the back and side panels can also be removed.

transom. Any irregular hollows or hard spots must be built up or planed down to assure the planking being smooth. When this work has been completed, brace each frame to overhead members.

Each l½ x l¾-in. chine log is in a single length. Cut the proper bevels on each, then place it on a table saw, as shown in Fig. 2, and cut the rabbet depth by slowly turning the chine as it passes over the saw so the cut is kept square with the beveled surface. The balance of each rabbet is cut with a chisel and a rabbet plane. Since the forward ends of the chines take a considerable twist, they'll require steaming.

Inwales, or sheer clamps, of 5/8 x 2-in. material, are fitted at the frame heads. As shown in the construction section, the frames must be notched out to take these. Because of the amount of sheer and the coming together of the sides at the stem, it is necessary to saw these inwales to shape prior to fitting them. A template is taken from the boat and the required shape determined from this. It is *not* possible to bend in these sheer clamps from straight stock. After installing the inwales, add the breasthook and quarter knees,

Happy Clam's topsides are planked with ½-in. white cedar in lapstrake fashion. This manner of planking, reminiscent of the New Jersey Seabright skiffs, is stronger than conventional smooth planking and is easier for amateurs to apply. The lapped surfaces may vary as much as an eighth of an inch with no one being the wiser, while a smooth-planked boat must have carefully made, evenly spaced, properly outgaged seams.

The 5/8-in. bottom planking is smooth. Intermediate 5/8 x l½ in. frames extend from the apron to the chines. The run of planking on the bottom of Happy Clam is a little out of the ordinary. In addition to the regular garboards, stealer planks must be installed. The garboards and the planks just

outboard of them are cut and screwed to the frames in the conventional manner. These run from the rabbet in the stem to the rabbet in the propeller post. The stealer planks, fitted against the horn timber and alongside the top of the box deadwood, go in next. Each is about 2 in. wide at its forward end and fitted with a butt block.

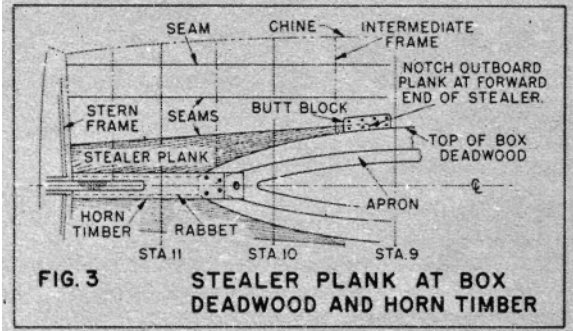
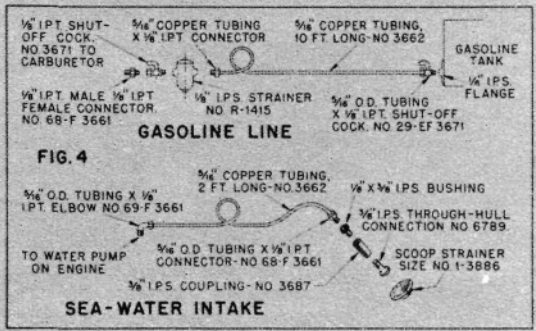


FIG. 3 STEALER PLANK AT BOX DEADWOOD AND HORN TIMBER



While this part of the work is rather difficult to describe, Fig. 3 illustrates the stealer planks and you will find the work quite clear on the actual hull. Once the stealers are properly fitted, the rest of the bottom planking will go on as easy as in any V-bottom form.

Calk the seams in the bottom planking by rolling in a strand or two of cotton wicking, using a regular calking wheel. Pay the seams with thinned-out white lead and then putty them with Kuhl's flexible seam compound.

Nicely shaped l x l½-in. guards will prevent the boat from becoming damaged as she lies in a slip. These must be steam-bent around the forward part of the boat. Screw them to the frame heads and drive 2-in. No. 10 screws through the sheer clamps and planking into the guards. Slightly round off the heads pf the frames.

Her rudder is hung on the transom. A galvanized shoe projects from the underside of the box deadwood to take the heel fitting of the rudder. Standard rudder hangers are installed on the transom and on the rudder. A 3/8-in. bronze rod runs between these. A long tiller provides a simple, inexpensive, and completely practical manner of steering the little boat.

The engine floor timbers are heavier than the ones secured to the frames, being 1½ x 6-in. material. The fore-and-aft beds are 2½ x 3-in. stock lying on the flat.

A copper gasoline tank is installed under

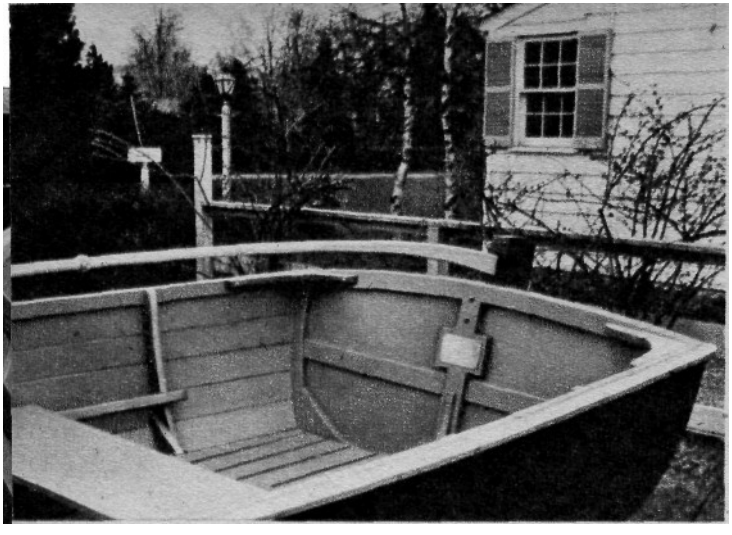
ACTUAL BUILDING TIME

Lofting	17 hours
Templates	15
Keel and building stocks	8
Stem	12
Frames	37
Stern post and horn timber	9
Stern frame and transom	13
Fairing frames and notching for chines	8
Chine logs and inwales	28
Bottom planking	50
Intermediate frames	10
Topsides planking	46
Riveting	12
Finishing exterior	19
Engine beds	5
Tank installation	2
Floor beams and flooring	24
Thwarts and engine box	20
Rudder and tiller	16
Patterns for various castings	6
Exhaust, sea-water, and gasoline lines	10
Hardware, bow chocks, blocks, etc.	5
Finishing interior	16
Miscellaneous	40
TOTAL	428 hours

ACTUAL BUILDING COSTS

(Original was built in 1950. Costs in 1951 are about 10 per cent higher)

Engine (Palmer Baby Husky with reverse gear and rope starter)	$ 314.00
Propeller and machined shaft	32.00
Fastenings (bronze screws and bolts, copper rivets)	22.78
Lumber (Philippine mahogany planking over white oak and Douglas fir framing)	90.70
Hardware	35.50
Gasoline, sea-water, and exhaust lines; choke controls; fuel strainer	15.91
Paint, varnish, glue, seam compound, and sandpaper	13.50
Castings	10.30
Boat's name and registry number	8.50
Gasoline tank	33.41
Miscellaneous	20.00
TOTAL	$ 594.40
RESALE VALUE OF FINISHED BOAT	$1,600.00



To allow one to face aft while trolling, after thwart is set some distance ahead of transom. A long tiller is used lor steering.

the bow seat. It may be necessary, because of the forthcoming difficulty of securing copper, to substitute galvanized iron. Details of the tubing and various fittings for the gasoline and the sea-water lines are shown in Fig. 4.

A ¾ x 1¼-in. seat riser is screwed to the insides of the frames on each side from Station 2 to Station 11. The three ¾ x10-in. thwarts are fastened to the risers.

Secure the floor boards to floor beams set 6 in. above the keel. The beams are ¾ x l½ in. and the floor boards are 5/8-in. stock about 4 in. wide. A small hatch immediately forward of the engine allows convenient use of a rope starter. •

BILL OF MATERIALS

(Approximate Quantities Required)

Specify that all materials are to be used for boatbuilding **and are to be air-dried to a maximum of 15 per cent moisture content. All hardwood is to consist of first, second, and select grades only. All softwood is to consist of A and B grades only. No loose knots, shakes, or sapwood should be accepted. When purchasing white cedar, select widest possible pieces.**

White Cedar, Cypress, or Philippine Mahogany

Topsides Planking: 100 sq. ft., S2S ½" (purchase 50 sq. ft. of 5/4 stock and have it resawn and finished to ½")
Bottom Planking: 130 sq. ft., S2S 5/8" (purchase 65 sq. ft. of 6/4 stock and have it resawn and finished to 5/8")
Floor Boards: 50 sq. ft., S2S 5/8" (purchase 25 sq. ft. of 6/4 stock and have it resawn and finished to 5/8")
Transom: 22 sq. ft., S2S 7/8"
Keel: 1 piece, S2S 1½", 12" wide, 16'-0" long

White Oak, Yellow Oak, Longleaf Yellow Pine, Douglas Fir, or American Elm

Intermediate Frames: 2 pieces, S4S 5/8" x 1½", 10'- 0" long
Sheer Clamps (Inwales): 4 pieces, S2S 5/8", 8" wide, 12'- 0'

Risers: 2 pieces, S4S ¾" x 1¼", 16'- 0" long
Floor Beams: 2 pieces, S2S ¾" x 1½", 12' - 0" long
Frames: 5 pieces. S4S ¾" x 1 5/8", 12'- 0" long
4 pieces, S2S ¾", 8" wide, 16'- 0" long
Apron: 2 pieces, S2S ¾", 8" wide, 16'- 0" long
Rudder: 1 piece, S2S ¾". 8" wide, 8'- 0" long
Breasthook, Quarter Knees, and Stern Knee: ¾" stock, template from work
Floor Timbers: 2 pieces, S4S 1 1/8" x 3½", 10'- 0" long
Horn Timber: 1 piece, S4S 1¼" x 6", 3'- 0" long
Engine Floor Timbers: 1 piece, S2S 1½", 6" wide, 6'- 0" long
Chine Logs: 2 pieces, S4S 1½" x 1¾", 20'- 0" long
Engine Beds: 1 piece, S2S 2½", 3" wide, 8'-0" long
Stem: 2 pieces, S2S 2½", 9" wide, 4'- 0" long
Propeller Post: 1 piece, S4S 3½" x 9", 12" long

White Ash or White Oak

Tiller: 1 piece, S2S 7/8", 2" wide, 4'- 0" long
Guards: *A* pieces, S4S 1" x 1½", 12'- 0" long

White Pine or White Cedar

Bow Seat: 4 pieces, S4S ½" x 6", 6'- 0" long
Engine Box: 2 pieces, S2S ½", 8" wide, 10'- 0" long
Thwarts: 3 pieces, S4S ¾" x 10", 6'- 0" long

Fastenings

Bronze, brass, or galvanized. If galvanized fastenings are used in one place, it is advisable to use them throughout except in the topsides planking laps, where copper nails should be employed.

Bottom Planking to Intermediate Frames: 2 gross 1" No. 8 flathead wood screws
Guards to Planking: 5 dozen 1" No. 8 flathead wood screws
Floor Boards, Engine Box, Miscellaneous: 3 gross 1" No. 8 flathead wood screws
Chines to Frames: 4 dozen 1¼" No. 8 flathead wood screws
Sheer Clamps (Inwales): 4 dozen 1¼" No. 8 flathead wood screws
Topsides Planking to Chine and Sheer Clamps: 2 gross 1¼" No. 8 flathead wood screws
Bottom Planking to Frames: 2 gross 1¼" No. 8 flathead wood screws
Floor Beams to Frames: 4 dozen 1½" No. 8 flathead wood screws
Risers to Frames: 2 dozen 1½" No. 10 flathead wood screws
Apron to Keel: 1 gross 1½" No. 10 flathead wood screws
Frames to Floor Timbers and Gussets: 1 gross 1½" No. 10 flathead wood screws
Topsides Planking to Frames: 1 gross 2" No. 10 flathead wood screws (or 2" copper or galvanized nail can be used)
Guards to Frame Heads: 2½ dozen 2½" No. 10 flathead wood screws
Keel to Floor Timbers: 5 dozen 3" No. 16 flathead wood screws
Stern Knee and Horn Timber: 1 dozen 3" No. 16 flathead wood screws
Engine Beds: 2 dozen 3" No. 16 flathead wood screws
Stem Assembly and Stem to Keel: ½ dozen 5/16" x 8" bolts
Horn Timber: Four 5/16" x 5" drift bolts
Topsides Planking Laps: 3 grass 1½" cut copper nails with burrs

Miscellaneous

2 dozen mahogany or cedar 3/8" dia. boat plugs
6 dozen mahogany or cedar ½" dia. boat plugs
½ pint Weldwood waterproof glue
½ pint Kuhl's flexible seam compound
4 quarts marine paint for interior and exterior—color to suit
½ pint spar varnish
1 quart antifouling bottom paint