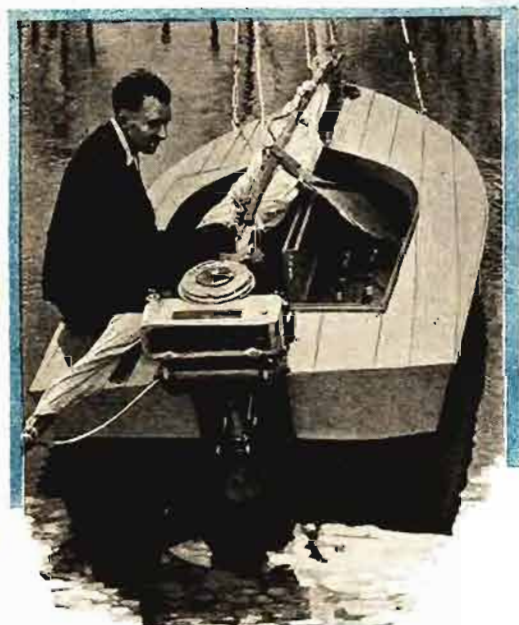


Speedy New Sailboat-Motorboat Gives All-Around Sport

By WILLIAM JACKSON



Under sail, *Dauntless* is not only safe but exceedingly speedy for a boat of her dimensions. She is easily controlled and does not tend to hang in the wind or "yaw."



Mr. Jackson tested the boat with several classes and makes of motors and found it both fast and seaworthy.

little water and is not heavy; and when propelled by an outboard motor, she does not squat and drag. *Dauntless* is 15 ft. long and has an extreme beam of 5 ft. 5 in. She is fast under power, and her beam makes her seaworthy. In our tests this craft proved faster than either round- or flat-bottomed rowboats powered with small outboard

motors. The following are the motors adapted to this boat and the speeds:

- Class "A," 2 to 8 H.P.—8 to 15 M.P.H.
- Class "B," 12 to 16 H.P.—12 to 18 M.P.H.
- Class "C," 18 to 25 H.P.—15 to 25 M.P.H.
- Class "D," 24 to 32 H.P.—20 to 28 M.P.H.

Should the boat be used solely as a motorboat, the sail can be either dismantled or dispensed with.

If you are a confirmed sailboat "bug" and look upon motorboats as a landlubbers' craft, well and good. *Dauntless*, besides being safe, sails extremely fast for a boat of her dimensions. It requires but the slightest effort to control her under sail. When going about, a push on the rudder spins her around, and you are off on another tack. She does not hang in the wind and "yaw" about like many of her kind.

At times the wind is fickle. If you are becalmed, unship the rudder, attach the trustworthy outboard that you have provided for this purpose, and you are home-

THIS new combination motorboat and sailboat affords more diversity of recreation and more genuine pleasure on the water than any one-purpose boat. She is so useful, versatile, stanch, and fast that she well deserves the name *Dauntless*.

Designed especially for POPULAR SCIENCE MONTHLY readers, this craft is no makeshift or haphazard combination, but represents a carefully studied effort to produce a boat that will give satisfactory service with either sail or power. Unlike many sailboats, she draws very

If you have ever skimmed over sunlit waters, sheet and tiller in hand, you know what fine sport there is in sailing. But motorboating has its thrills, too; and a motor always gets you there! By building this boat, you can enjoy both these sports.

ward bound in safety and solid comfort.

If you wish to go fishing or have taken this roomy little packet on an outing or camping trip and find it necessary to go for camp supplies merely attach the outboard motor to the permanent motor board and you can be on your way.

The end of the summer does not necessarily mean that the craft has to be stored. By unshipping the mast, sail, and rudder, and attaching the outboard, you have an excellent hunting or duck boat.

The original hull without sails, spars, and rudder weighs 300 lb.; completely equipped, *Dauntless* weighs 365 lb. The boat is light enough to be transported on a trailer if desired. The complete boat including sails cost the author \$65.

To realize all these advantages, we must set to work to build her. The construction is not difficult; and to make the work as easy to lay out as possible, three blueprints have been prepared with larger drawings than it is possible to publish within the restricted limits of a magazine page. In effort saved, you will be well repaid by sending for these prints, the price of which is seventy-five cents (see Nos. 131, 132, and 133 in the list on page 117).

Anyone familiar with carpenters' tools can turn out a creditable job. The woods suggested in the material list should be easy to obtain locally. If you are in doubt as to where to obtain the necessary hardware and fastenings or the sail cloth or

sails, send a self-addressed and stamped envelope to the Home Workshop Department for a list of dealers.

Study the plans and instructions carefully before beginning. Some of the pieces are not mentioned in the material list, but they can be cut from the waste lumber.

The first step is to make the form upon which the boat is to be built. This can be constructed from any rough 2 by 10 in. lumber. The form is made in two pieces as shown. With legs nailed on, it makes an excellent support for the hull.

The full size paper patterns for the frames are next prepared. Draw a center line on each sheet of paper and measure from it, laying out complete frames.

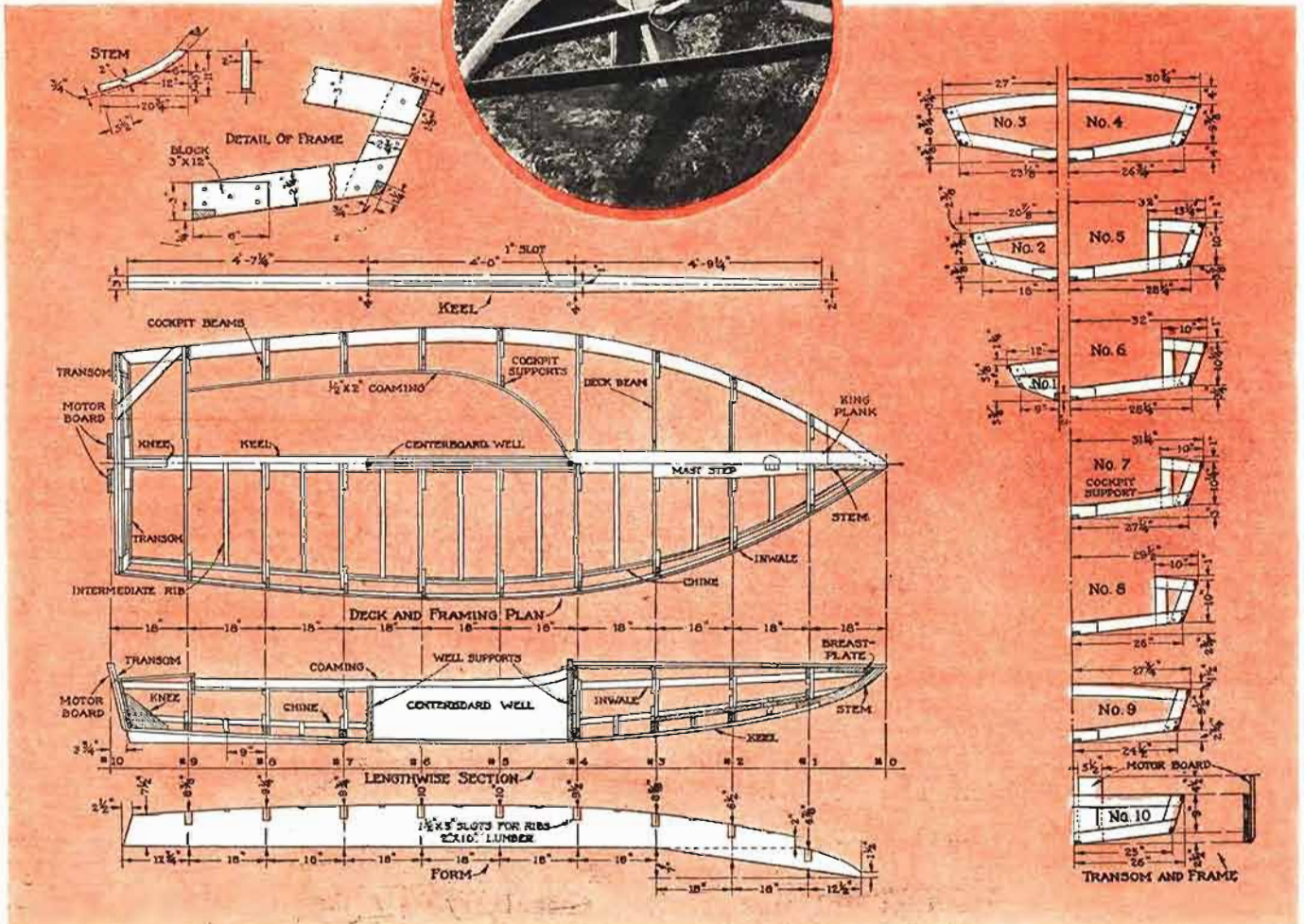
With the patterns finished, lay the 3/4 by 2 3/4 in. frame material on the patterns so as to conform to the outlines, and mark and saw out the parts. The two bottom members of each frame are joined in the center with a 3/4 by 3 by 12 in. block. Each of these blocks is coated with glue and fastened to the frames with ten 1 1/4-in. No. 8 flathead screws. Do not, however, glue the blocks of frames Nos. 5 and 6 as these blocks will be removed when the centerboard well is installed.

Number the frames to avoid confusion. Fasten the side member of each frame to the bottom member with two 3/4 by 1 3/4 in. carriage bolts. Before attaching frame No. 10 to the transom, saw out the chine, inwale, and keel notches. Secure it to the transom with glue and 1 1/4-in. No. 8 flathead screws spaced 4 in. apart.

The frames are now assembled in their



As shown in the view above, the framework is assembled bottom up on a heavy form mounted on legs like a sawhorse. The frames fit in slots in the form. At right: Planing bevel on chine.



Working drawings of the assembled framework, the form upon which the boat is built, and the individual frames and keel. Larger views and a number of supplementary sketches are contained in Blueprints Nos. 131, 132, and 133 (see page 117).

respective places on the form. Clamp the keel temporarily to the form. Lay a light batten along the frames and mark the bevels. Remove the frames and bevel the edges. Frames Nos. 1, 2, 3, and 4 will be beveled the most; the rest are beveled but slightly. This is done so the planking will lie evenly on the frames.

Reassemble the frames on the form and fasten the keel to each frame and to the transom with two 2-in. No. 9 flathead screws. Countersink these screws so the keel can be beveled off. The stem is attached to the keel with two 1/4 by 2 1/4 in. stove bolts. Nail strips from transom to

keel to hold the framework square, and run strips from the floor to the frames.

The chines are now clamped in place and fastened to each frame with one 2 1/4-in. No. 9 flathead screw. Fasten both chines at once; that is, drive a screw on one side, then on the other. At the stem the chine is sawed to fit flush, and it is fastened to the stem with one 1 1/4-in. No. 8 flathead screw. When both chines are fastened, proceed to attach the inwales to each frame and to the stem with one 1 1/4-in. No. 8 flathead screw. Although indicated in the drawings as 1 1/4 in. wide, a stronger frame will result if the inwales

are made 1 1/2 in. wide as suggested in the bill of materials. Bevel the keel and chines for the planking.

The 3/4 by 1 in. intermediate ribs are now sawed to size and fastened in the exact center between each frame. Drill a hole in the chine and nail each intermediate rib to the chine with one 2-in. nail. The keel end of each intermediate rib is notched and fitted to the keel.

The complete frame is now trimmed and faired.

Next month Mr. Jackson will tell how to apply the planking and finish the boat.

MATERIALS FOR DAUNTLESS

Centerboard, 1 pc. 3/4 by 14 in. by 4 ft., cypress, oak, or fir.
 Planking and decking, 14 pcs. 1/2 by 6 in. by 16 ft., red cedar, white cedar, cypress, or white pine. Side planks, 2 pcs. 1/2 by 12 in. by 16 ft.
 Frames, 6 pcs. 3/4 by 2 3/4 in. by 10 ft., spruce or fir.
 Transom, 1 pc. 3/4 by 12 in. by 4 ft., spruce, fir, cypress, or white pine.
 Deck beams, 1 pc. 3/4 by 12 in. by 10 ft., oak, fir, or yellow pine. King plank, 1 pc. 3/4 by 6 in. by 8 ft.
 Centerboard case, 2 pcs. 3/4 by 12 in. by 4 ft., fir, cypress, or white pine.
 Intermediate frames, 7 pcs. 3/4 by 1 in. by 8 ft., oak or fir.
 Outside coaming, 2 pcs. 3/8 by 4 in. by 8 ft., oak, fir, white pine, red cedar, or mahogany.
 Chines, 2 pcs. 3/4 by 1 1/4 in. by 16 ft., oak or fir.
 Keel, 3/4 by 4 in. by 14 ft., oak or fir.

Inwales, 2 pcs. 3/8 by 1 1/2 in. by 16 ft., oak, yellow pine, or fir.
 Floor boards, 6 pcs. 1/2 by 6 in. by 8 ft., yellow pine.
 Stem, 1 pc. 2 by 6 in. by 2 ft., oak, elm, or ash.
 Mast step, 1 pc. 2 by 6 in. by 2 ft., fir, yellow pine, or oak.
 Spars—Mast, 1 pc. 4 by 4 in. by 14 ft.; boom, 1 pc. 4 by 4 in. by 14 ft.; gaff, 1 pc. 4 by 4 in. by 8 ft., spruce, fir, or yellow pine.

FASTENINGS

6 gross 1 1/4-in. No. 8, 2 doz. 2-in. No. 9, and 3 doz. 2 1/4-in. No. 9 F. H. galvanized screws. (For salt water, use brass or bronze fittings.)
 48—1/4 by 1 3/4 in. and 1—1/2 by 4 in. carriage bolts.
 1 1/2 lb. 1 1/4-in. galvanized nails.
 1 lb. 2-in. finishing nails or 4 gross 1 1/4-in. No. 8 F. H. gal. screws.

HARDWARE AND FITTINGS

3—1/4 by 6 in. gal. turnbuckles.
 1 No. 1105 screw eye.
 5—1/4-in. gal. blocks (pulleys), fast eye.
 2—1/4-in. gal. deck blocks.
 2—No. 2 gal. rudder braces or hangers.
 2—1/4 by 2 1/4 in. and 2—1/4 by 3 1/4 in. gal. eyebolts and 3—5-in. gal. cleats.
 1—1/4 in. by 3 ft. gal. iron rod.
 6—4-in. gal. iron mast hoops.
 1/2 gross brass grommets.
 8—1/4-in. gal. thimbles.
 45 ft. 1/4-in. gal. wire rope.
 100 ft. 1/4-in. Manila rope.
 1 pc. 1/4-in. gal. iron pipe, 24 in. long.
 2—1/4 by 2 in. lag screws.
 1—7/16 by 6 in. lag screw.
 2 pcs. 1/8 by 1 by 12 in. strap iron.
 2 1/2 lb. seam composition, 2 balls cotton calking (wicking), 20 yd. 6-oz. cotton sail twill, and 3 pt. waterproof glue (casein) or 2 lb. white lead. Paint and varnish.

Giant Checkerboard for Outdoor Use

THE old, familiar game of checkers, which everyone enjoys playing, can be transformed into a novel outdoor sport by constructing a giant concrete checkerboard like that illustrated.

Nail together four 2-in. planks about 1 ft. wide to make a bottomless box or form that measures 5 ft. square inside. Set this on the ground where the checkerboard is to be located, allowing it to slant slightly for drainage. After staking the box in place, fill it within an inch or two of the top with alternate layers of dirt and gravel, well tamped. Sprinkle it, tamp again, and, if possible, let it settle for a month or more so that when the cement is poured, the surface will not crack.

The remainder of the box is filled with concrete composed of three parts sand, one part Portland cement, and enough water to give a workable consistency. With a mason's trowel, smooth the entire surface, leaving it rather moist so that it will take the

coloring well. The squares cannot be colored, however, until the concrete has partially hardened.

While waiting for the concrete to set, drive nails along the four sides of the form, beginning 2 in. from each inside corner and spacing them 7 in. apart. Stretch strings across the concrete from nail to nail to divide the surface into sixty-four 7-in. squares with a 2-in. border all around the large concrete checkerboard.



You can give the ancient game of checkers new popularity among your friends by building a concrete checkerboard in the garden where they can play in the open.

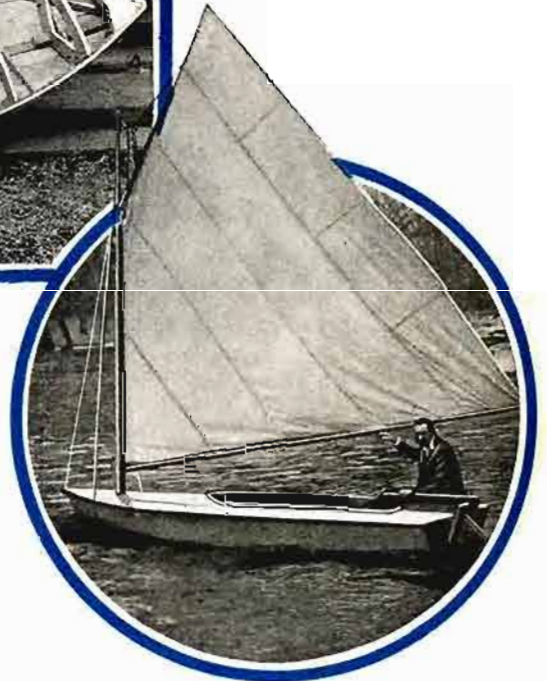
From an old magazine cut thirty-two 7-in. squares and dip them in a pail of water. Place these paper squares on every other square of the checkerboard, being careful that the edges adhere to the wet cement. When this is done, the checkerboard is ready for coloring.

The best material to use is regular red cement coloring in powdered form. Sprinkle it over the concrete and smooth it out with the trowel. It mixes with the moist cement in such a way that it will not peel off. The strings and squares of paper are now removed, leaving every other square white. The wooden form may be left in place and painted red or any other color that will harmonize with the garden furniture.

The checkers should be about 5 1/2 in. in diameter; they may be turned on a lathe or ordered at a woodworking mill. If you play chess as well as checkers, you may also wish to make a set of chessmen, which is not difficult if you have access to a lathe.



Left: An exceptional top view of the partially completed hull showing the deck frames, well for centerboard, and transom knee. Below: The author sailing his 15-ft. two-purpose boat.



We complete the hull and rigging for our *Combination* Sailboat-Motorboat

By WILLIAM JACKSON

NO MATTER what preferences you may have regarding a small boat, *Dauntless* will meet your requirements far more completely than any ordinary design. Pleasure jaunts, quick trips to town, fishing, hunting, sailing, motorboating—all these come within the scope of this 15-ft. combination boat built to operate efficiently with either sail or outboard motor.

The construction is not at all complicated, and to make the work even easier for those who have had little boat building experience, three blueprints have been prepared which contain larger drawings than it is possible to include in the magazine. These prints will save you time and effort. (See Nos. 131, 132, and 133 in the list on page 91.)

Last month we completed the frame of our boat (P.S.M., July '31, p. 79). In applying the planking, the side planks are put on first. As in the case of the inwales and chines, both side planks are applied simultaneously. This is done to prevent the frame from being twisted out of shape, which would be the case if one side was planked before the other. Clamp the planks in place, mark them to shape, remove, and cut them to the lines, being careful to keep the saw outside of the line. Next, coat the chines, transom, and stem with glue, clamp the planks in place, and fasten with $1\frac{1}{4}$ in. No. 8 F.H. screws spaced $2\frac{1}{2}$ in. apart. Countersink these screws slightly.

When both sides are in place, trim the edges flush with the transom, chines, and stem, and bevel the planking from frame No. 1 to No. 4 to receive the bottom planks.

In planking the bottom,

work from the keel outward. Place the first two planks so that their inside edges follow a center line drawn on the keel. Where the keel planks overlap at frames Nos. 1, 2, and 3, remove the excess wood with a saw. The slot for the centerboard well also should be sawed at this time.

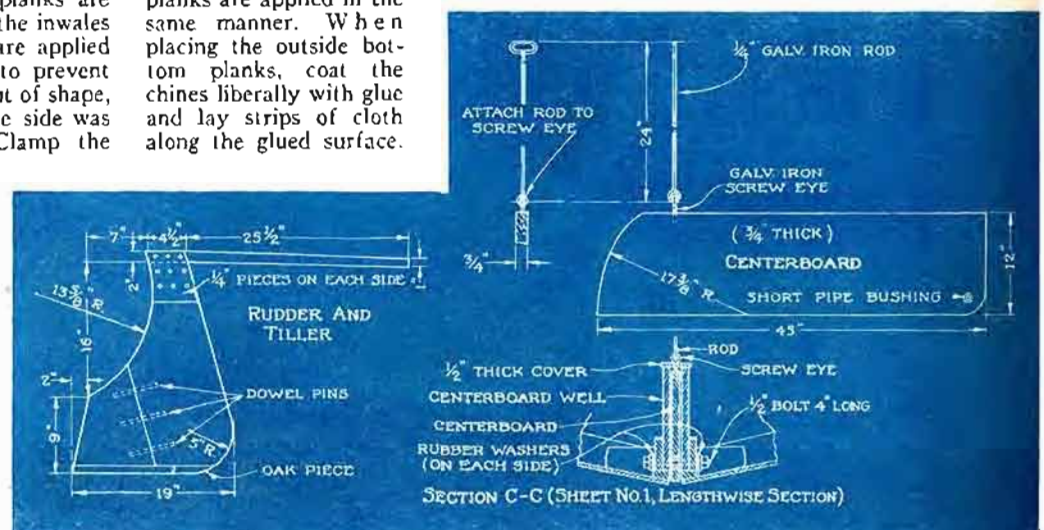
Before fastening the first two planks in place, lay strips of cloth along the transom and around the centerboard slot and coat the joint edges with glue or white lead. Fasten the planks to the frames, keel, stem, and transom with $1\frac{1}{4}$ -in. No. 8 F.H. screws, slightly countersunk and spaced about $2\frac{1}{2}$ in. apart, and to the intermediate frames with $1\frac{1}{4}$ -in. galvanized nails spaced 2 in. apart. If these center planks are wrapped in burlap soaked with hot water, it will assist greatly in bending them to fit the curve of the bottom frames.

The remaining bottom planks are applied in the same manner. When placing the outside bottom planks, coat the chines liberally with glue and lay strips of cloth along the glued surface.

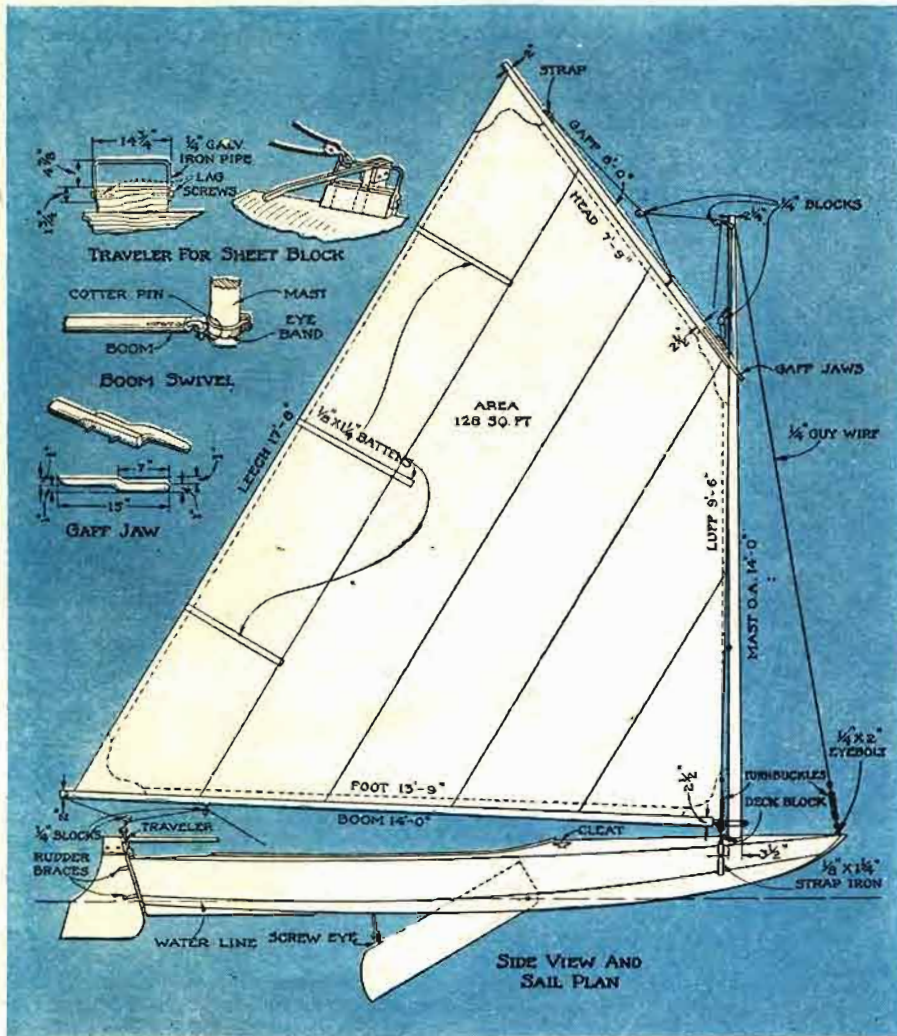
The edges of all the bottom planks should be planed so that they fit tightly together on the inside and are open about $1/16$ in. on the outside to allow for calking.

When the sides and bottom are planked, the hull can be removed from the form, and the edges of the planking along the inwales planed flush. Clamp the deck beams to their respective frames and fasten each in place with one $\frac{1}{4}$ by $1\frac{1}{4}$ in. carriage bolt. The cockpit beams are fastened to the frames with two $1\frac{1}{4}$ -in. No. 8 F.H. screws. Fasten each support to the cockpit beams and frames with two $1\frac{1}{4}$ -in. No. 8 F.H. screws. The mast step is fastened in place with three $2\frac{3}{4}$ -in. No. 9 F.H. screws at each frame.

The center deck plank, which is called the "king plank," is fastened to each deck beam with three 2-in. No. 9 screws. Cut a



Drawings of the rudder and centerboard, and section detailing the centerboard assembly. Larger drawings of this 15-ft. boat can be obtained by sending seventy-five cents for Blueprints Nos. 131, 132, and 133.



Sail and rigging plan and details showing the sheet-block traveler assembly, boom swivel, and gaff jaw. Yacht twill is used for the sail and 4 by 4's serve as stock for the spars.

hole 3 1/2 in. in diameter in the "king plank" directly over the hole in the mast step.

The forward centerboard post, which is coated with glue or white lead and pushed up through the centerboard slot until its bottom edge is flush with the bottom of the keel and its top edge projects 1 1/2 in. above the deck beam, is fastened to the deck beam with two 2-in. No. 9 F.H. screws. Fasten the bottom ends of the centerboard posts to the keel with one 2 1/4-in. galvanized nail. Coat the posts with glue or white lead and drill a hole for the nail before fastening it in place.

In order to place the two well boards, remove the keel blocks from frames Nos. 5 and 6 and saw the frames to allow the well boards to fit flush against the keel on each side of the centerboard slot. Coat all joints liberally with glue or white lead and lay strips of cloth along all edges. Clamp the side boards to the well posts and fasten with 1 1/4-in. No. 8 F.H. screws spaced 2 in. apart. Drive 2 1/4-in. No. 9 screws up through the keel into the bottom edges of the well boards and nail 3/4 by 3 in. blocks along the sides between each frame. Over these blocks nail a 3/4 by 1 in. strip the full length of the well boards.

Fasten the 1/2 by 2 in. inside coaming to each cockpit beam with two 1 1/4-in. No. 8

F.H. screws. The oak transom knee and breastplate are fastened in place with 2-in. No. 9 F.H. screws.

The hull is then planed and sanded smooth, and a priming coat of paint is

applied inside and out. Work the paint well into the seams. While it is still wet, push cotton calking into the cracks between the planks with a putty knife. When the paint is dry, work over the seams with a composition putty or seam filler. The use of a composition putty or filler is advised as it will last longer than ordinary putty. After the putty dries apply two more coats of paint, inside and out.

The remainder of the decking is fastened to the deck and cockpit beams with 1 1/4-in. No. 8 F.H. screws spaced about 2 1/2 in. apart. If a natural finish on the deck is desired, leave a 1/16-in. seam between adjacent planks for putty. For general use, the deck should be covered with canvas.

With the deck in place, fit the 3/8 by 4 in. outer cockpit coaming against the centerboard post at frame No. 4 and fasten it with 1-in. No. 6 F.H. screws spaced 4 in. apart. The outer coaming should project about 1 in. above the deck. Fasten a 3/8 by 1 1/8 in. molding to the sheer of the hull with screws spaced 6 in. apart. Bolt the motor boards to the transom with eight 1/4 by 1 3/4 in. carriage bolts.

The rudder, which is made in two pieces, is fastened together with dowels and glue. The oak piece at the bottom of the rudder is fastened with four 2 1/4-in. No. 9 F.H. screws. Two 1/4 in. thick pieces are used to hold the tiller in place. These are fastened with eight 1-in. No. 6 screws in each.

The centerboard is hinged at its forward end on a 1/2 by 4 in. carriage bolt. Use rubber and metal washers on each side of the well boards to keep out the water.

The after keel is fastened in place with six 2 1/4-in. No. 9 F.H. screws driven through from the inside.

Boom, gaff, and mast can be made from 4 by 4's. Finish spars by sanding, and apply three coats of spar varnish. The bottom end of the mast should be cut square for 2 in. to fit in the mast step.

Yacht sail twill (6-oz.) is used in making the sails. If this is not obtainable, a good grade of muslin will serve the purpose. The lengths of cloth can be sewed together on an ordinary sewing machine. All outside seams are 1 1/2 in. wide and inside seams are 1 in. wide. Brass grommets for a 1/4-in. rope are spaced 1 ft. apart on the foot and head of the sail. Those for the mast hoops are spaced 17 in. apart. Reinforcing pieces of cloth should be sewed on both sides of the sail at all corners. When the sail is completely assembled, sew a 1/4-in. manila rope around the outside edge of the sail.



By lowering the sail and attaching the outboard motor, the combination boat is transformed into a motorboat. Insert: The side planks are applied simultaneously so as not to twist the frame.

BLUEPRINTS FOR YOUR HOME WORKSHOP

TO ASSIST you in your home workshop, POPULAR SCIENCE MONTHLY offers large blueprints containing working drawings of a number of well-tested projects. Each subject can be obtained for 25 cents with the exception of certain designs that require two or three sheets of blueprints and are accordingly 50 or 75 cents as noted below. The blueprints are each 15 by 22 in.

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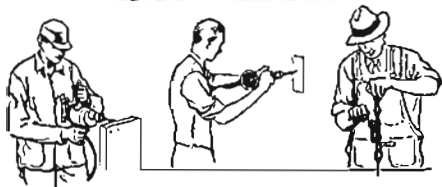
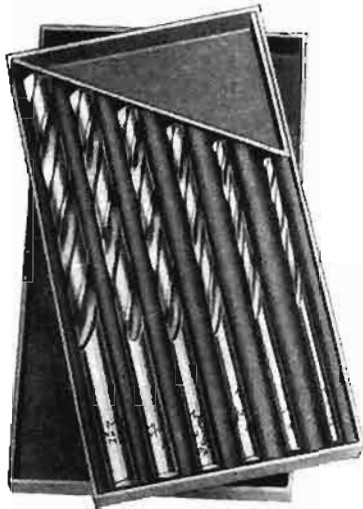
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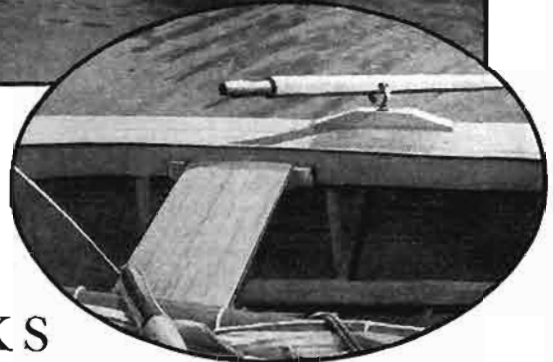
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The POPULAR SCIENCE MONTHLY combination boat being rowed, and, at right, the seat and one oarlock



Fitting OARLOCKS to our Sailboat-Motorboat

By WILLIAM JACKSON

POPULAR SCIENCE MONTHLY'S combination sailboat-motorboat *Dauntless*, which was built with great success by a number of readers last summer and is being constructed by many more this winter, can be equipped very easily with oarlocks and a removable seat so that it may be rowed in an emergency. If wind and power fail, oars are worth their weight in gold.

The materials required are: 1 pair oarlocks, North River style; 1 pair 8-ft. oars, ash or spruce; 2 pcs. 1 3/4 by 2 1/4 by 14 in. oak for oarlock blocks; 1 pc. 3/4 by 10 by 42 in. oak, yellow pine, or spruce for seat; 2 pcs. 3/4 by 2 by 14 in. oak for seat supports; 4 carriage bolts 1/4 by 1 3/4 in.; 8 flathead wood screws 1 3/4 in. No. 8; and 4 flathead wood screws 1 1/4 in. No. 8.

Make the two seat supports as shown in the drawings and fasten each of them to the coaming between frames Nos. 6 and

• IF YOU intend to build a boat this winter and want one that will give you all-around sport, you will make no mistake in choosing our 15-ft. combination sailboat-motorboat *Dauntless*. She is fast and seaworthy when driven by an outboard motor and is better under sail than many boats designed only for sailing. She can be rowed, too, if fitted with oarlocks as described by her designer in this article. You can obtain complete drawings by sending seventy-five cents for POPULAR SCIENCE MONTHLY Blueprints Nos. 131, 132, and 133. Use the coupon on page 110.

7 with two 1/4 by 1 3/4 in. carriage bolts. The seat, which fits in the long shallow notch in each support, will have to be shaped to fit against the coaming. Much of the strain may be taken off the coaming by fastening a small block under the center of the seat so as to rest upon the centerboard well.

Shape the oarlock blocks and mortise them to receive the oarlock sockets. Fasten the sockets flush in the blocks with the 1 1/4-in. screws. Attach the blocks to the deck about 18 in. abaft the edge of the seat, using four of the 1 3/4-in. screws in each. Fasten the pins to the oars about 22 or 24 in. from the handles.

