



## **how to build CABALLERO**

**Length: 19 ft.      Beam: 6½ ft.      Displacement: 1,750 lb.**  
**Speed: 27 mph with two 25-hp motors, 17 mph with one 25-hp motor.**

**By Charles M. Ungerbuehler**

*Naval Architect*

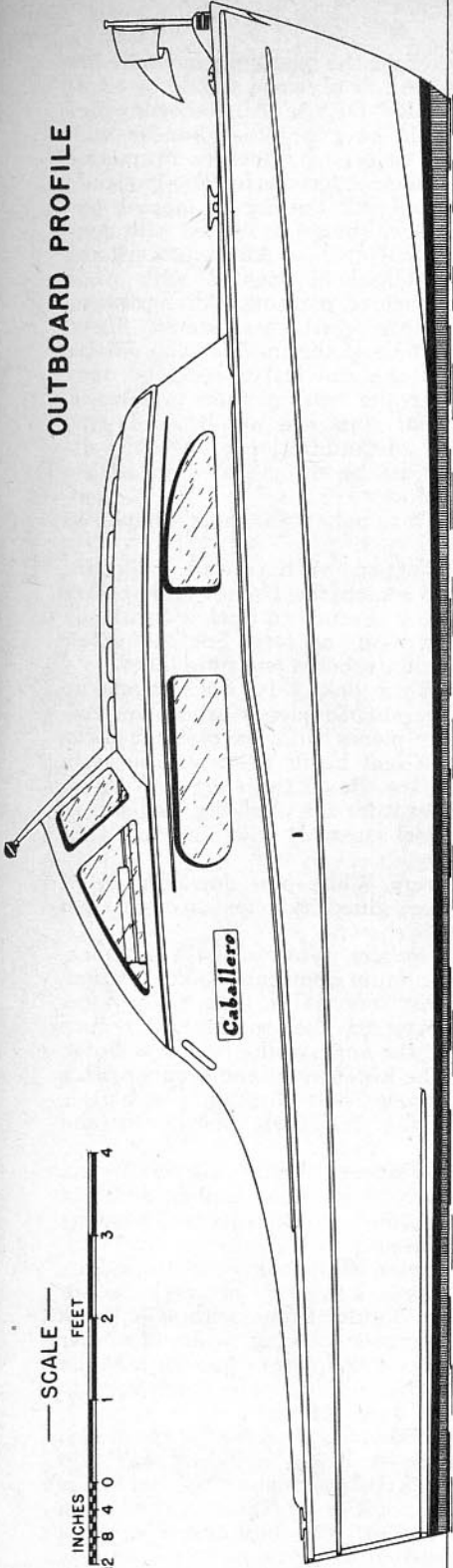
**C**ABALLERO was designed for the amateur builder who desires a roomy, fast, and comfortable cruiser without the attendant high building and upkeep costs usually associated with inboard craft. She is a direct development of an earlier design that has proved successful in the hands of a large number of builders.

The cabin provides comfortable quarters for two. Besides the berths, it contains a galley stove, food locker, icebox, watercloset, and adequate storage space. There is not, of course, standing headroom. There is, however, ample sitting headroom. That is all you can expect in a boat of this size; so don't be persuaded by some misguided amateur adviser to increase the headroom in hope of making a better boat of her. You have the word of the designer that you will not.

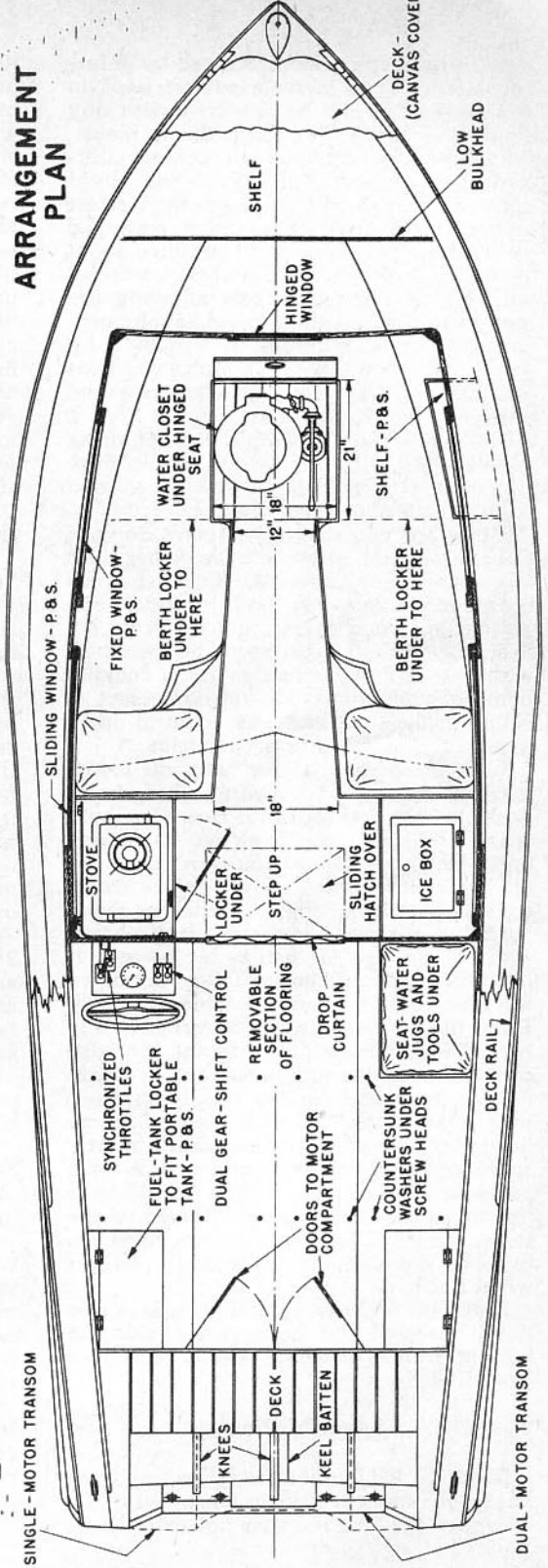
Caballero's rough-water ability will be excellent. The hull shows a pronounced flare forward and the maximum allowable deadrise consistent with her speed requirements. Her afterbody is of the constant-section type, which will insure comfortable banking on the turns and a smooth, disturbance-free, level ride.

While the boat has been specifically designed to carry two of the

# OUTBOARD PROFILE



# ARRANGEMENT PLAN



new 25-hp motors manufactured by Johnson Motors, it is in no wise restricted in this respect. It can be powered with any single 25-hp motor or single 33-hp motor, for the boat is large enough to have sufficient fore-and-aft stability so the slight differences in weight will have little effect on her trim. A single 25-hp motor, equipped with the proper wheel, will produce about 17 mph. Two of these motors, equipped with higher-pitched wheels allowing the motors to turn up their rated revolutions, will give about 27 mph. A single 33-hp motor will show about 21 mph. The boat will not perform properly when powered with less than 25 hp.

The plans show a simple compensating device that will effectively synchronize two motors to eliminate "wow-wow" and to hold the hull on a true course.

There are two things you can't do with Caballero. First, you can't plank her with large sheets of plywood. Since she has compound curves on both topsides and bottom, plywood sheets just won't go on. Second, you can't expect good performance with four or five passengers in her cockpit. Some of your guests should not object to riding in the light and airy cabin in order to hold the boat to her proper trim.

With prices varying as they do today, there is no way of knowing what she is going to cost you to build. However, here is one thing you can bank on. Build and finish her properly and you won't have her in the water many days before some envious boat lover offers you half as much again as she cost you—which probably won't be enough for you to let her go.

Before beginning construction, lay down the lines full size from the table of offsets. Build the hull upside down over a rigidly braced form that is cut to fit the top edge of the keel batten and is notched at intervals to hold the frames rigidly in their proper locations. Tie each pair of frame heads together at the sheer with a sturdy spreader and mark the center line on each spreader. If these center lines are made to line up as the frames are positioned on the form, and if the full-size drawing has been properly done, the boat is bound to be fair when finished.

Note that all frames stand at right angles to the base and that the lapping of side and bottom frames reverses between frames No. 3 and No. 4.

### Specifications

**Material.** All lumber should be free from knots, shakes, checks, or warp, with the exception that tight knots not over  $\frac{1}{2}$  in.

in diameter in the planking material are permitted. All fir plywood should be edge-branded "EXT-DFPA." All mahogany plywood should be guaranteed bonded with waterproof resorcinol adhesive. No mixing of ferrous and nonferrous fastenings should be permitted. All butting or lapping exterior surfaces should be coated with non-hardening marine glue. All framework and planking should be treated with wood preserver before painting. All hardware, fittings, paints, varnishes, stains, fillers, etc., should be of the marine type. Where more than one material is specified, they are listed in the order of their preference. All material sizes are net dressed. Any minor part of the interior not actually dimensioned can be either scaled or sized to suit the builder.

**Keel.** White oak, 2 in. thick, shaped as shown.

**Keel Batten.** White oak,  $1\frac{1}{4} \times 4$  in., beveled to match the frames and receive the planking. Secure to keel with  $2\frac{1}{2}$ -in. screws on 4-in. centers. Set the screw heads in counterbores and plug them.

**Stem.** White oak, 2 in. thick, made up from three shaped pieces as shown. Assemble the pieces with six carriage bolts, setting the bolt heads in counterbores in the stem face. Bevel the stem to a  $\frac{1}{2}$ -in. face, rabbet it for the planking, and secure it to the keel assembly with three carriage bolts.

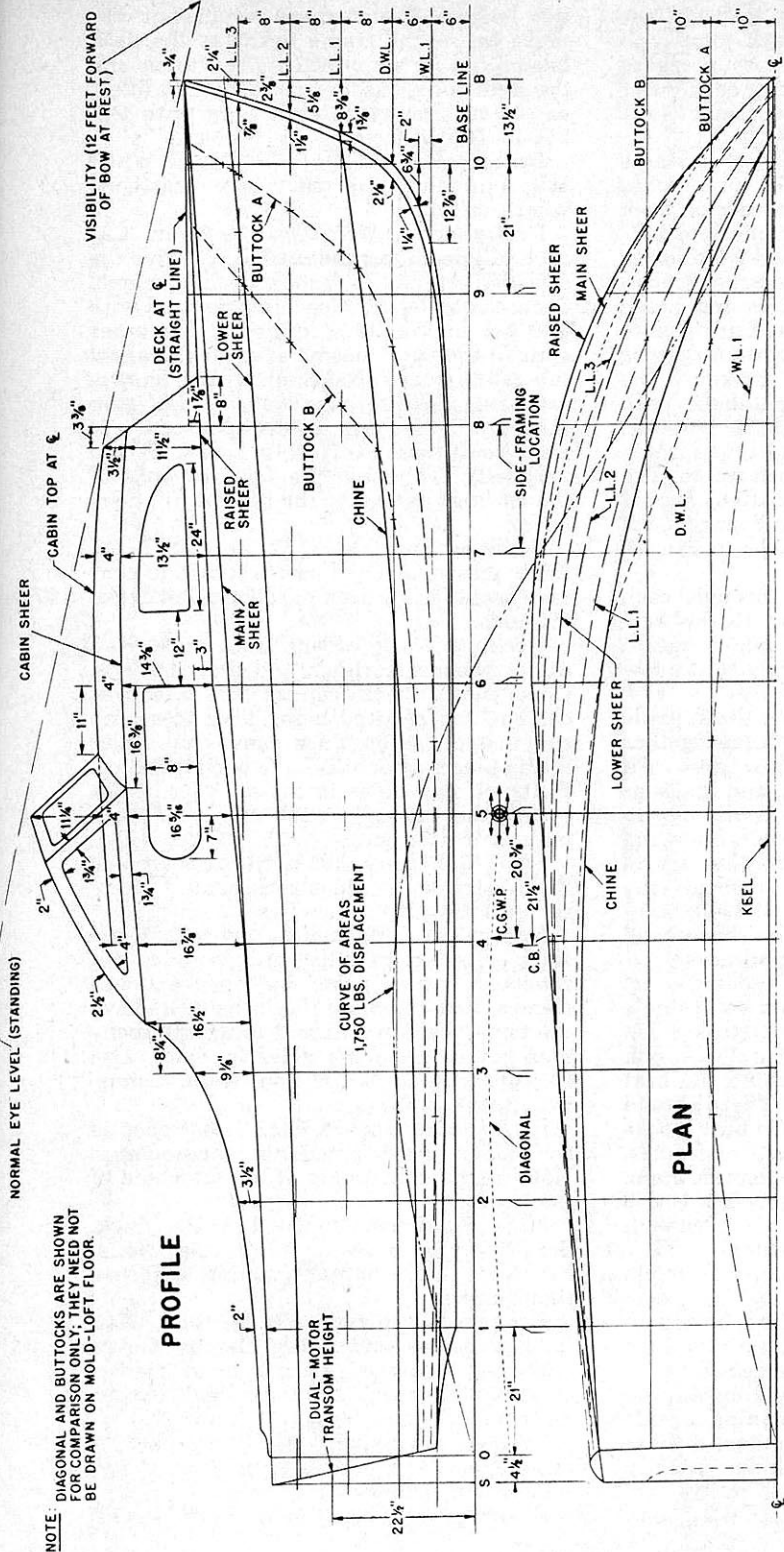
**Stopwaters.** White-pine doweling,  $\frac{1}{2}$  in. in diameter, glued in holes through stem in positions shown.

**Floor Timbers.** White oak,  $\frac{7}{8}$  in. thick,  $2\frac{1}{2}$  in. minimum depth above keel batten, and not less than 18 in. long in the after frames (forward, the lengths will reduce because of the angle of the bottom). Notch each for the keel batten and secure with a  $\frac{1}{4}$ -in. carriage bolt through the batten, counterboring for each bolt head and plugging.

**Bottom Frames.** White oak,  $\frac{3}{4} \times 2\frac{1}{2}$  in. Secure each to its floor timber with six  $\frac{1}{4}$ -in. machine bolts, placing washers under heads and nuts.

**Side Frames.** White oak,  $\frac{3}{4}$  in. thick, 2 in. wide at heads, 3 in. wide at heels. Secure each to its bottom frame with two  $\frac{1}{4}$ -in. machine screws, placing washers under heads and nuts. After positioning the frames on the building form, notch them to receive the inner chines.

**Chines.** Each composed of two pieces. Inner piece is  $1 \times 2\frac{1}{2}$ -in. white oak and outer one is  $1 \times 2$ -in. mahogany. Set inner pieces in notches in frames (including transom frame) and box them into the stem. Secure at each joint with two  $2\frac{1}{4}$ -in.

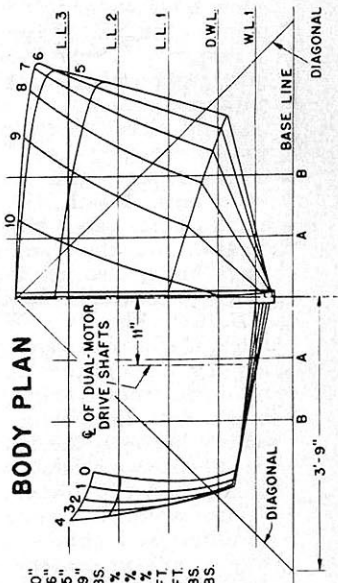


**TABLE OF OFFSETS** DIMENSIONS GIVEN IN FEET, INCHES, AND SIXTEENTHS OF INCHES TO OUTSIDE OF PLANKING

STATION	0	1	2	3	4	5	6	7	8	9	10	B
KEEL	STRAIGHT											
FAIRBODY	0-6-0	0-5-6	0-4-14	0-4-6	0-3-14	0-3-10	0-3-8	0-3-6	0-3-6	0-4-9	0-3-0	0-1-0
CHINE	0-9-0	0-9-1	0-9-3	0-9-7	0-9-14	0-10-0	1-0-11-9	1-0-14	1-0-12	1-0-14	1-0-14	1-2-0
LOWER SHEER	2-3-10	2-3-14	2-4-7	2-5-1	2-5-12	2-6-8	2-7-7	2-8-2	2-9-10	2-11-2	2-11-2	3-1-0
MAIN SHEER	2-8-0	2-8-11	2-9-10	2-10-0	2-11-1	2-11-1	2-11-1	2-11-1	2-11-1	2-11-1	2-11-1	2-11-1
RAISED SHEER	2-8-0	2-8-11	2-9-10	2-10-0	2-11-1	2-11-1	2-11-1	2-11-1	2-11-1	2-11-1	2-11-1	2-11-1
WIDTHS FROM CENTER LINE	STRAIGHT											
FAIRBODY	0-1-0	STRAIGHT										
CHINE	2-4-4	2-5-8	2-6-7	2-6-14	2-6-12	2-5-13	2-3-11	2-0-2	1-6-13	0-11-11	0-2-12	0-1-0
D.W.L	2-5-3	2-6-8	2-7-8	2-7-12	2-7-8	2-6-5	2-3-14	2-2-12	2-2-12	1-9-1	1-1-0	0-2-14
L.L.1	2-5-14	2-7-10	2-8-14	2-9-11	2-9-11	2-8-10	2-6-8	2-2-12	2-0-3	2-0-3	1-4-12	0-5-10
L.L.2	2-5-1	2-7-6	2-9-5	2-10-0	2-11-6	2-11-7	2-10-9	2-8-6	2-4-0	1-8-12	0-9-9	0-5-0
LOWER SHEER	2-5-2	2-7-6	2-9-5	2-10-0	2-11-6	2-11-7	2-10-9	2-8-6	2-4-0	1-8-12	0-9-9	0-5-0
L.L.3	3-0-1	3-0-7	3-0-7	3-0-13	3-0-13	3-0-7	2-10-6	2-5-8	1-9-4	0-8-14	0-8-14	0-8-14
MAIN SHEER	2-4-4	2-5-10	2-6-10	2-6-10	3-0-2	3-1-1	3-1-7	3-0-6	2-8-15	2-11-1	1-0-11	1-0-11
RAISED SHEER	2-4-4	2-6-10	2-8-13	2-10-10	3-0-2	3-1-4	3-2-9	3-1-4	3-2-9	3-1-11	1-2-10	2-2-9

**CHARACTERISTICS**

- OVER ALL LENGTH - - - 19'-0"
- WATER-LINE LENGTH - - - 17'-6"
- BEAM (EXTREME) - - - 6'-5"
- HULL DRAFT - - - 9"
- DISPLACEMENT (FRESH WATER) - 1750 LBS.
- BLOCK COEFFICIENT - - - 0.428
- PRISMATIC COEFFICIENT - - - 0.723
- FINESS COEFFICIENT - - - 0.769
- AREA OF WETTED SURFACE - 786 SQ. FT.
- AREA OF WATER PLANE - 70.9 SQ. FT.
- MOMENT TO CHANGE TRIM 1" - 146 FT. LBS.
- LBS. PER INCH IMMERSION - 367 LBS.





screws. Extend outer pieces to back face of transom and secure at each joint with a No. 8 screw that's set in a counterbore and plugged. The outer edge of each outer chine must be left sharp from frame No. 7 aft, or speed will be reduced.

**Battens.** White oak,  $\frac{1}{2} \times 1\frac{1}{2}$  in., in single lengths if possible. Set them in notches in the side frames located to divide each frame from lower sheer to chine into four equal spaces. Divide the space from lower sheer to raised sheer into two equal spaces. Box the battens into the stem and notch them into the transom frame, but not into the transom itself. Lay the bottom battens out to allow the garboard strakes to be slightly wider than their neighbors, with their outer edges as straight as possible. The remaining planks should be approximately the same width at each frame. The forward ends of the bottom battens should box into the inner chines. Secure each batten at each joint with a  $\frac{1}{4}$ -in. No. 10 screw.

**Limber Holes.** Cut two through each frame and floor timber next to the keel batten. They should be of ample size to allow bilge water to flow freely to the low point of the boat.

**Transom.** Mahogany,  $1\frac{1}{8}$  in. thick, made up of two pieces. Secure the pieces together with a spline and Cascophen glue. Fit framing, cleats, motor board, and knees as shown, securing them to the transom with nonhardening glue and the following fastenings:  $1\frac{1}{2}$ -in. No. 10 screws, set in counterbores and plugged, through the transom into the framing; and  $\frac{1}{4}$ -in. carriage bolts, also set in counterbores and plugged, through transom and knees.

**Bottom Planking.** White cedar,  $\frac{1}{2}$  in. thick. Garboard strakes should be in single lengths. Each of the remaining strakes can be made from two pieces if a  $\frac{1}{2}$ -in. oak block, 8 in. long, is fitted behind the butt tightly between the battens. There should be at least two strakes between butt blocks falling between the same pair of frames. Secure planks to frames, keel batten, stem, transom, and chines with  $1\frac{1}{4}$ -in. No. 8 screws on 3-in. centers, and to battens with  $\frac{7}{8}$ -in. No. 8 screws on 3-in. centers.

**Side Planking.** White cedar,  $\frac{1}{2}$  in. thick. The shutter strakes must be in single lengths. The remainder can be butted in the same manner as the bottom planking. Plank the hull to the lower sheer and then turn the boat right-side up, install the clamps, and add the four remaining topside planks. All fastenings are similar to those used in the bottom planking. Lightly countersink them and fill with putty.

**Clamps.** Spruce,  $\frac{3}{4} \times 2$  in. Each may be in

two lengths. Fasten them a sufficient distance below the frame heads so the deck beams can be set on them. Box them into the stem and transom framing and fit fillers as shown. Secure at each joint with two  $2\frac{1}{4}$ -in. No. 12 screws.

**Breasthooks and Quarter Knees.** White oak, 1 in. thick, securely screw-fastened where shown.

**Deck Beams.** White oak,  $\frac{3}{4} \times 2$  in. Cut each full beam to a radius that will give the specified rise and each short beam to match. Secure each beam to each frame head with two  $1\frac{1}{4}$ -in. No. 10 screws. Cut the inner ends of the short beams at angles to allow the cabin sides to rake inboard as shown.

**Carlings.** White oak,  $\frac{3}{4} \times 2$  in. Half-gain them into the short beams and secure at each joint with a No. 10 screw driven vertically. Note that the forward ends of the carlings extend to the second full deck beam.

**Partners and Fillers.** White oak,  $\frac{3}{4}$  in. thick, screw-fastened where shown to provide backings for deck hardware and decking ends.

**Decking.** White cedar,  $\frac{1}{2}$  in. thick. Nail to deck beams, carlings, and sheer battens. Cover with 10-oz. canvas set in canvas cement and secured along all edges with short copper nails. Turn canvas up under facing pieces after sills have been installed. Putty all nail holes in the decking before laying the canvas. Finish the after deck natural if desired.

**Sills.** Mahogany,  $1 \times 1\frac{1}{4}$  in., rabbeted to receive the house sides and secured to the carlings with No. 10 screws.

**House Sides.** Mahogany plywood,  $\frac{1}{2}$  in. thick. Secure to sills with screws. Fit rabbeted corner posts and spruce house clamps, half-notching the latter to receive the house beams. Cut and finish all openings before fastening sides in place. Use Cascophen glue in addition to the fastenings in all joints.

**Roof Beams.** Spruce,  $\frac{3}{4} \times 1\frac{1}{2}$  in. Space as shown and screw-fasten into house clamps. Note the hatch framing at the after end of the house.

**Main Bulkhead.** Plywood,  $\frac{1}{2}$  in. thick. Screw to after sides of side frames No. 4. Fit cleats to the bottom framing to secure this member.

**Roofing.** White cedar,  $\frac{3}{8}$  in. thick. Nail to roof beams and house clamps. Cover with 8-oz. canvas, setting it in canvas cement and securing it with small copper nails under the moldings.

**Facings.** Mahogany,  $\frac{1}{2}$  in. thick. Fit against carlings and sills as shown and secure with screws.

**Flooring.** Plywood,  $\frac{1}{2}$  in. thick. Install





the cockpit flooring on ledges that are fitted on the bottom frames to raise the floor level to the specified height. Use countersunk washers under all fastenings and provide a removable section to allow access to the bilge. Fit cabin flooring in-board of berths and lockers only.

**After Bulkhead.** Plywood, 1/2 in. thick. Fit on the forward side of frame No. 1 and install doors as shown to allow access to the stern compartment.

**Berths and Lockers.** Plywood, 1/2 in. thick for the tops and 1/4 in. thick for the sides. Sheath the insides of the berth lockers with 1/4-in. plywood and make a low bulkhead and shelf of this same material at frame No. 9. Fit two strakes of 1/4-in. ceiling above each berth to prevent loose articles from rolling into the bilge.

**Icebox.** Plywood, 1/2 in. thick for the top and 1/4 in. thick for the sides. Install a galvanized-iron liner, leaving at least 1 1/2 in. of space between liner and box. Fill the

space with suitable insulating material. Equip the liner with a 3/8-in. copper drain tube, leading it overboard through the hull side above the water line.

**Windshield.** Mahogany, 3/4 in. thick. Neatly rabbet the cut-outs to take 3/16-in. Lucite and install the windshield on a sill. Make the mast of similar material, bore it for the wiring, and secure it to the windshield center post.

**Grab Rail.** Mahogany, 3/4x1 3/4 in. Shape as shown, cutting hand holes between beams, and fasten to each beam with one long screw. [Continued on page 140]

## LARGE-SCALE PLANS

will greatly simplify construction. Send \$3.50 to MECHANIX ILLUSTRATED Plans Service, Fawcett Building, Greenwich, Conn. Please specify Plan No. B-208.

## BILL OF MATERIALS

(Approximate Quantities Required)

Specify that all materials are to be used for boatbuilding. All plywood is to be exterior grade. All wood is 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.

### Fir Plywood

2 panels, 1/4" x 4'-0" x 8'-0"  
3 panels, 1/2" x 4'-0" x 8'-0"

### Mahogany Plywood

House Sides: 1 panel, 1/2" x 4'-0" x 10'-0"

### White Cedar

Roofing: 40 sq. ft., S2S 3/8", random widths and lengths  
Planking and Decking: 400 sq. ft., S2S 1/2" (Four planks to be 20 ft. long and at least 10 in. wide; remainder can average 15 ft. in length and 6 to 8 in. in width)

### Mahogany

Deck Cleats: 12 lineal ft., S4S 3/8" x 3/4"  
Window Trim: 5 sq. ft., S2S 3/8"  
Facing: 30 lineal ft., S2S 1/2", 6" wide  
Windshield: 15 sq. ft., S2S 3/4"  
Sills: 34 lineal ft., S4S 1" x 1 1/4"  
Outer Chines: 2 pieces, S4S 1 1/2" x 2", 19'-0" long  
Monkey Rails, Etc.: 6 lineal ft., S2S 1" x 6" wide  
Transom: 1 piece, S2S 1 1/2", 14" wide, 10'-0" long  
Molding: 60 lineal ft., 3/4" half-round  
40 lineal ft., 1" half-round

### White Oak

Battens: 400 lineal ft., S4S 1/2" x 1 1/2"  
Carlings: 2 pieces, S4S 3/4" x 2", 14'-0" long  
Framing: 40 sq. ft., S2S 3/8", random widths and lengths  
(no piece to measure less than 6" wide and 6'-0" long)  
Deck Beams: 20 sq. ft., S2S 3/4", random widths and lengths  
(no piece to measure less than 8" wide and 6'-0" long)  
Floor Timbers: 10 sq. ft., S2S 7/8"  
Breasthooks, Knees, Etc.: 5 sq. ft., S2S 1"  
Chines: 2 pieces, S4S 1 1/2" x 2 1/2", 19'-0" long  
Guard Rails: 6 lineal ft., S2S 1" x 6" wide  
Keel Batten: 1 piece, S4S 1 1/4" x 4", 16'-0" long  
Keel: 1 piece, S4S 2" x 3", 16'-0" long  
Stem: 1 piece, S4S 2" x 6", 7'-0" long

### Spruce

Clamps: 40 lineal ft., S4S 3/4" x 2"  
Roof Beams: 50 lineal ft., S2S 3/4", 6" wide

### White Pine

Stopwater: 1 piece, 1/2" doweling, 12" long

### Hull Fastenings

(Bronze, brass, or hot-dipped galvanized iron)

100 machine bolts, 1/4" x 2", each with a nut and two washers  
12 carriage bolts, 1/4" x 5", with nuts and washers  
12 carriage bolts, 1/4" x 6", with nuts and washers  
22 gross, 7/16" No. 8 flathead wood screws  
7 gross, 1 1/2" No. 8 flathead wood screws  
4 gross, 1 1/2" No. 10 flathead wood screws  
1 gross, 1 1/2" No. 10 flathead wood screws  
6 dozen, 2 1/4" No. 12 flathead wood screws

### Miscellaneous

3 lb., 4-penny common nails  
40 ft., 14-gauge primary wire  
Lucite: 1 piece, 1/8" x 12" x 18"  
1 piece, 1/2" x 18" x 25"  
1 piece, 1/2" x 18" x 26"  
1 piece, 1/2" x 24" x 27"  
1 piece, 3/16" x 18" x 30"  
10 ft., 5/8" stainless-steel felt-lined track  
5 ft., rubber sealing, 1/4" x 3/8"  
1 "Seaclo" Junior Watercloset with one 3/4" sea cock  
and one 1 1/2" sea cock  
5 sq. yards, 8-oz. canvas  
6 sq. yards, 10-oz. canvas  
1 lb., mahogany plugs, 3/8" dia.  
3 dozen, mahogany plugs, 5/8" dia.  
1 pint, elastic seam filler, underwater type  
1 pint, putty, Duratite or equal  
2 quarts, preservative, Cuprinol or equal  
1 quart, nonhardening marine glue  
1 pint, Cascophen glue, with catalyst  
1 gallon, canvas cement  
1 quart, spar varnish  
2 quarts, marine paint for topsides, color to suit  
2 quarts, marine paint for decks, color to suit  
2 quarts, marine paint for interior, color to suit  
2 quarts, marine paint for bottom, color to suit  
1/4 pint, boottopping paint, color to suit  
1 quart, stain and filler, shade to suit





section at the head to take the tiller and screw 6-in. cheek pieces on the sides to form braces for the tiller hole.

**Tiller.** Owing to the relatively thin rudder blade, the tiller will have to be made of very hard and strong material. It may best be made of an ax or maul handle cut to about the length shown.

**Seats.** Brace with framing of oak or long-leaf pine and arrange locker spaces below to suit individual preference.

**Flooring.** Lay on top of the floor timbers and cut hatches to give access to the bilge, stuffing box, and other inspection points.

**Deck Fittings.** One 6-in. cleat forward and two 5-in. cleats aft, bolted in place with oak fillers under the deck; one forward flagpole socket and one outboard-type socket aft; one combination bow light powered by a dry battery of the type used on outboard boats; and one stern light of the same style operating from dry cells.

**Spray Hood.** Made up of 8-oz. duck with fasteners around the outside of the coaming. The after portion can be supported by a brass or galvanized iron hoop set into small sockets on the inside of the coaming.

**Painting.** The entire inside of the hull should have at least two coats of marine paint before the joiner work is put in place. The working parts of the cockpit should receive at least three coats of paint or varnish, while topsides and decks will also require three coats. Apply at least two coats of approved antifouling paint below the boot-top line. •

## **How To Build Caballero**

[Continued from page 76]

**Bow Block.** Mahogany, 1 in. thick, shaped as shown and mortised to receive the ends of the monkey rails.

**Monkey Rails.** Mahogany, 1x1½ in. Neatly taper and round them and secure to deck edges with screws sufficiently long to reach into sheer battens.

**Deck Cleats.** Mahogany, ¾x¾ in., fastened to deck edges as shown in way of the cabin.

**Moldings.** Mahogany, 1-in. half-round at the sheer and ¾-in. half-round at the cabin top and lower sheer. Paint them on their undersides before screwing in place.

**Guard Rails.** White oak, 1x1½ in. Bevel and round them and screw-fasten them into the lowest pair of topside battens.

**Control Box.** Plywood, ½ in. thick for the top and ¼ in. thick for the sides. Provide a suitable door in the bottom to allow access

to a 6-volt hot-shot battery. Mount the steering wheel and controls as shown.

**Windows.** Make from Lucite as shown in the detail drawings. Fit the sliding windows with ⅝-in. stainless-steel felt-lined track and support them with cleats as detailed. Install strips of felt on the after ends of these windows to prevent the entry of water when the windows are closed.

**Watercloset.** Install in accordance with the manufacturer's specifications and fit a hinged top over it.

**Wiring.** Hook the various fixtures together with parallel 14-ga. primary wire. Mount suitable switches on the control box.

**Berth Cushions.** Make these from material to suit. There should be a separate removable cushion on the hinged top over the water-closet.

**Deck Hardware.** One 6-in. cleat, two 4-in. cleats, one pair of 5-in. bow chocks, one Class 1 combination bow light, and one stern light with fresnel globe.

**Miscellaneous Hardware.** One 15-in. steering wheel with four 2-in. sheaves, two 2-in. housed-fairlead sheaves, and 18 ft. of ⅜-in. bronze-center steering cable; one set of throttle controls for either single or dual motors; one set of gear-shift controls for ditto; one 18-in. length of brass piano hinge; ten 2-in. brass hinges; three wardrobe hooks; one piece of ¼x1¼-in. brass flatbar, with suitable bolts, to make drag link for connecting dual motors; and one brass cabin lamp.

**Miscellaneous Equipment.** One 17-lb. Danforth anchor, 75 ft. of ½-in. manila for anchor line, 50 ft. of ¼-in. manila for warps, one fire extinguisher, one buoyant cushion for each passenger, one whistle, and one galley stove.

**Paint.** Apply two coats of paint to the interior, three coats of paint to the topsides after priming, three coats of hard antifouling bottom paint, and three coats of spar varnish to all bright work after filling and staining. Strike in a boottopping of contrasting color with its lower edge 1¼ in. above the water line at the stern and 2½ in. above the water line at the bow.

**Dual-Motor Installation.** Locate the motors on the transom with their thrust lines parallel to the center line of the boat. Connect them with a drag link fastened to the back edges of the motor rests on their center lines. Fasten arms to the motors to take the ends of the steering cable. Since the motors must turn as a unit, a little experimentation with the installation may be necessary. The steering cables must hold a constant tension throughout the turning radius. Once the installation has been correctly made, the transom should be fitted with four recessed clamp sockets so each motor can thereafter be returned to its proper position. •

