Section III Sailboats and Special Purpose Boats



1

By C. T. ALLEN

CRESCENT is the ideal sailboat for day sailing on a small lake, river, or protected waters of a bay. Of course, day sailing doesn't mean you can't go for a moonlight cruise. It merely means that the little ship is not equipped with a cabin, galley and bunks for overnight cruising. Running lights should, of course, be installed for after-dark use.

Centerboard design (Fig. 2) reduces *Crescent's* draft, so shallow water is not a problem. Its broad beam of over 5½ ft. makes it an ideal family boat because there is room for a cockpit large enough to accommodate four adults or two

A slight breeze of only 4 *mph* fills Crescent's sails and she is on her way across the lake.

STATEMENT OF USES

USES: An ideal family day sailer for use on protected waters of a bay, small lake or river.

LENGTH: 15½ ft.

BEAM: 67 in.

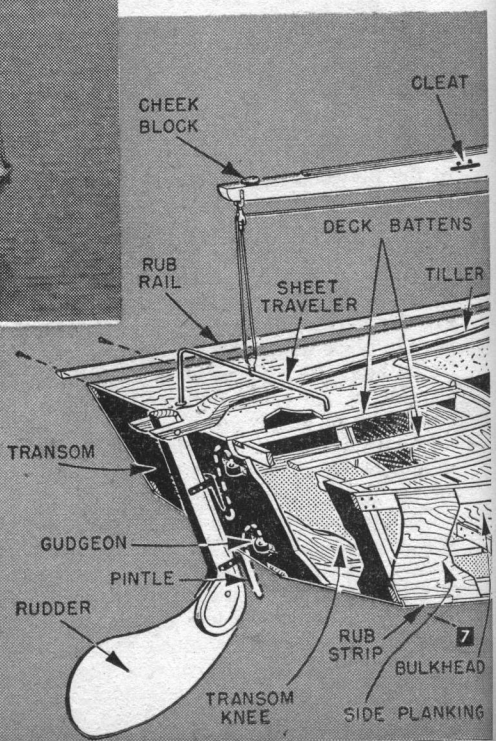
WEIGHT: 450 lbs.

SAIL AREA: 135 sq. ft.

CAPACITY: 4 adults.

TYPE: Vee-bottom, centerboard day sailer.

CONSTRUCTION: ⅜ in. exterior plywood over wooden framework.



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Crescent 15½ ft., centerboard Sailboat

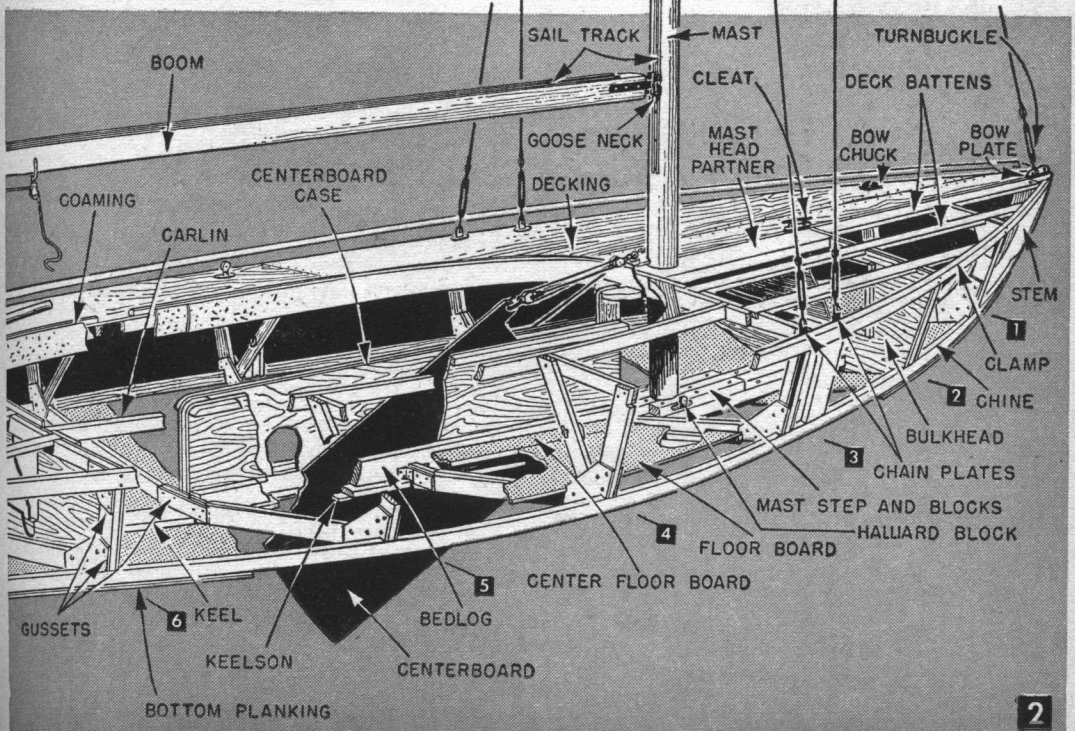
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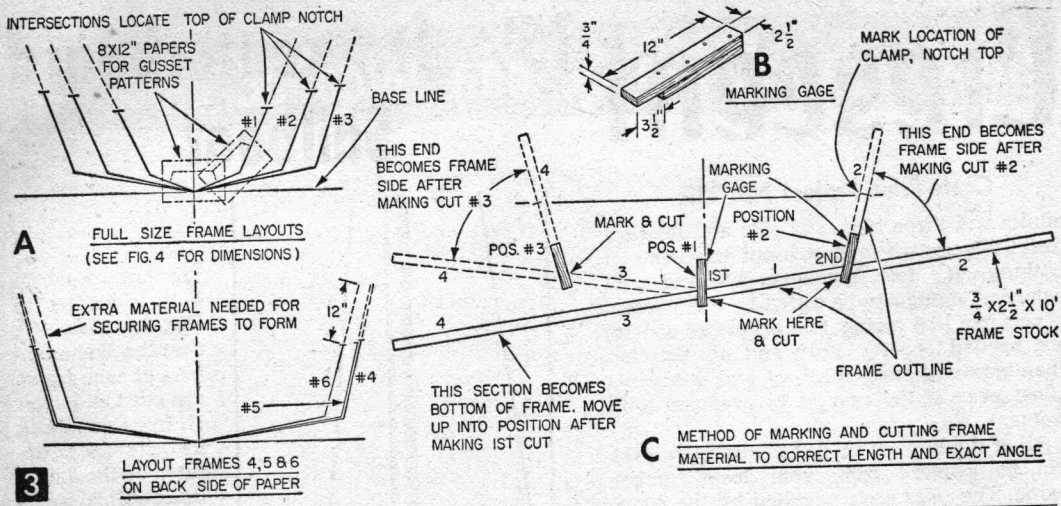
adults and three kids, and side and forward decks big enough to stretch out on when sun bathing. It's fast, maneuverable and well balanced enough to be sailed by one person. If you feel like racing, two people, of course, are needed aboard. Fore and aft flotation chambers will keep the boat and occupants afloat even if the cockpit is swamped with water.

All of the lumber needed to build *Crescent* can be ordered from your local lumber yards. The sails were supplied by the Alan-Clarke Company who have exact sail measurements for this boat. Duplicate sails of 4 oz. *Wamsutta* Egyptian sailcloth complete with two-tone insignias may be ordered by merely mentioning this article. (See materials list.)

Frames. Start construction by drawing, on heavy wrapping paper, full-size patterns or outside lines of each frame as in Fig. 3A from the dimensions given in Fig. 4. Three frames can be drawn on each piece of paper. Note that all dimensions (Fig. 4) are given from a base line and vertical centerline and that only half of frame is shown. When laying out, draw in both sides as in Fig. 3A. Note too, that the side members of each frame are cut 1 ft. longer than the deck height as indicated by the dotted lines. This additional material and cross ties, added later, secure the frame rigidly to the form during assembly. The outline for the transom can be laid out directly on the ¾ in. plywood from which it is to be cut.

To simplify marking the ¾ x



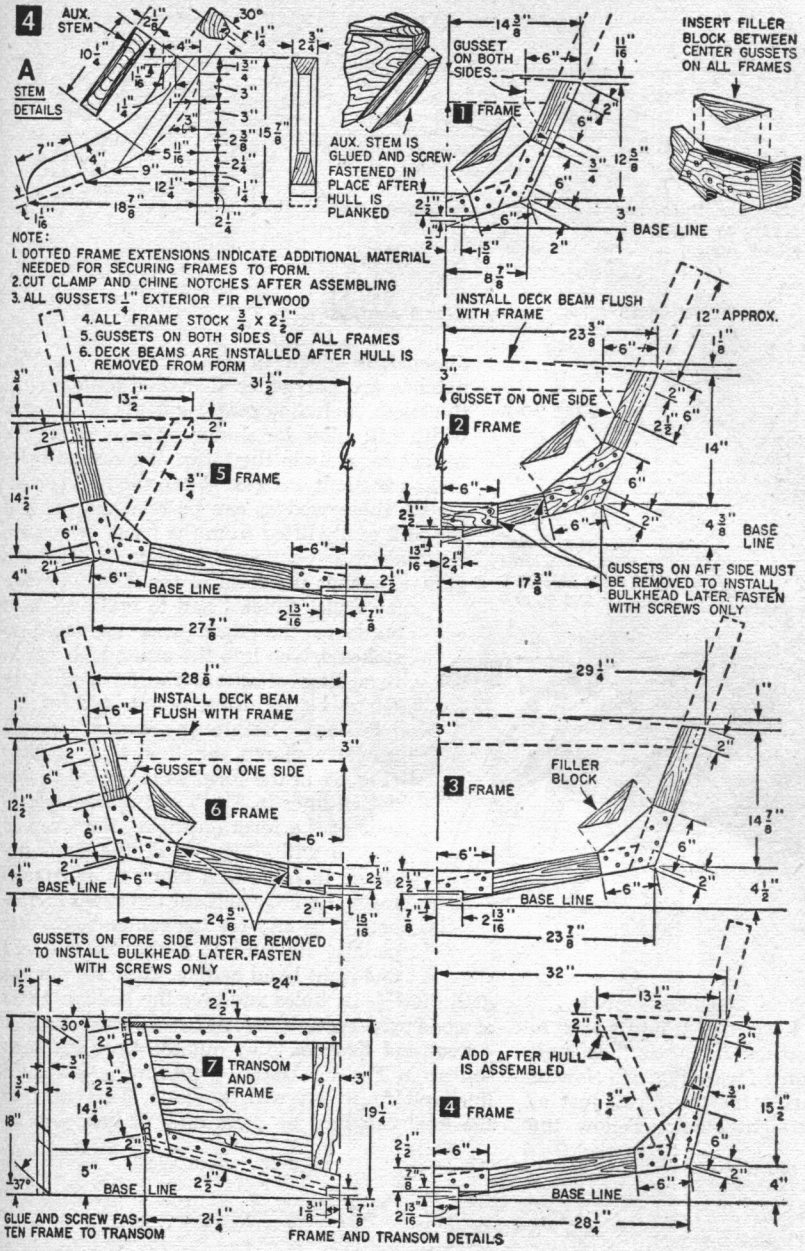


MATERIALS LIST—CRESCENT

No. Req.	Size and Description	Use
	EXTERIOR FIR PLYWOOD	
2	3/8 x 4" x 16'	sides, bottom and bulkheads
2	3/8 x 4" x 8'	Decking
2	1/2 x 12" x 5'	centerboard case
1	3/4 x 2" x 4'	transom
2	1/2 x 18" x 8'	floor
1	1/4" x 4 x 4'	gussets
	QUARTER SAWED FIR (Edge Grained)	
2	3/4 x 2" x 16'	chines
2	3/4 x 2" x 16'	clamps
6	3/4 x 2 1/2" x 10'	frames
2	3/4 x 3 5/8" x 10'	deck beams
2	3/4 x 2" x 6'	carlins
4	3/4 x 2" x 12'	deck batten
2	1 5/8 x 3 5/8" x 6' (2 x 4")	bedlogs
2	3/4 x 5 5/8" x 8'	floor board
4	3/4 x 1 3/4" x 16" (scrap)	deck supports
2	3/4 x 1 3/4" x 16" (scrap)	floor hold down
1	3/4 x 1 3/4" x 12'	transom framing
2	1 1/16 x 3" x 20' (fir stair tread)	mast
2	1 1/16 x 3" x 6' (fir stair tread)	mast
1	1 5/8 x 5 5/8" x 2' (2 x 6")	mast step
1	1 5/8 x 5 5/8" x 2' (2 x 6")	mast partner
1	1 5/8 x 1 5/8" x 4' (2 x 2")	mast blocks
1	3/4 x 4" x 4'	end posts centerboard case
1	1 1/16 x 4" x 4'	center deck batten
1	1 1/16 x 6" x 16' (stair tread material)	keel
1	1/2 x 4" x 14'	keelson
2	3/4 x 4" x 12'	boom
2	3/4 x 1/2" x 10' (oak shoe molding)	molding (coaming)
2	1/2" quarter-round 10' (white pine)	molding (bulkhead)
2	1/4 x 1 1/4" x 16' (pine or oak)	chine rubbing strip
1	1 1/16 x 3" x 16' (oak or yellow pine)	clamp rub rail
6	1/4 x 4" x 8' (oil tempered masonite)	coaming
1	2 x 12" x 16' (new or used)	form
4	2 x 4" x 3' (new or used)	legs (form)
1	3/4 x 4" x 14' (fir-pine)	stringer
6	3/4 x 1 1/2" x 5' (pine-fir)	cross stringer
12	shingles	wedges
1	1 5/8 x 3 5/8" x 5' (oak or fir)	tiller
1	1 1/16 x 8" x 4' (oak stair tread)	rudder post
1	2 3/4 x 8" x 26" (oak or fir)	stem
2 pc.	3/4 x 3 x 14" fir	mast

No. Req.	Size and Description	Wilcox-Crittenden Catalog Numbers
	RIGGING	
125 ft	1/8" dia. wire rope (galv. or stainless)	#3162
5	1/4 x 6 1/8" turnbuckles	#327
12	1/8" cable clamps	#3110
10	1/8" thimbles	#6483
1	boom goose neck	#849
1	mast head sheave (for 3/8" dia. rope)	#5800
1	cheek block #2	#4020
1	cleat 6" (deck)	

No. Req.	Size and Description	Wilcox-Crittenden Catalog Numbers
	RIGGING (Continued)	
4	cleats 4"	#4055
2	bow chocks	#4121
10 ft	5/8" sail track (boom)	#120
24 ft	5/8" sail track (mast)	#120
3	eye strap, size #0	#275
1	3/8 x 18" sheet traveler	#647
1	swivel eye tackle pulley 1 1/2" sheave	#0178
1	shoulder nut eye bolt 5/16 x 4 1/4"	#2221
2	screw pin anchor shackle 3/16"	#2902
2	bullet halliard block #1	#974
1	adjustable sail track stop	#8241
2	deck blocks	#9873
2	through deck fairleaders size 2	#993
4	finishing plates (chain plates)	#6301
2	#1 open shell block	#9520
2	#0 open shell blocks	#952
1	7/16 x 6" shouldered nut eye bolt (mooring ring)	#6145
2	1 3/4" boom travelers	#6390
2	forward chain plates (1/8 x 1 x 10") brass	
2	aft chain plates (1/8 x 1 x 1 x 10") brass angle	
1	bow plate, size 2	#9893
1 set	spreader fittings (mast)	#624
1 set	whisker pole fittings—optional	#654
2	1/4" brass pipes (spreader: 24" long)	
3	mast tangs, size #0	#9892
2	halliard shackles (mainsail and jib)	#2870
1	clew outhaul (5/8" sail track)	#980
1	jib halliard block	#954
2	1" pintle	#460
2	1" gudgeon	#462
	SCREWS AND BOLTS, ETC.	
12 gr	#8-3/4" fh screws (cadmium plated, zinc coated or brass)	
1 gr	#10-1 1/2" fh screws	
1 gr	#10-2" fh screws	
1 gr	#10-1 1/4 fh screws	
6	1/4 x 6" galv. carriage bolts	
7	1/4 x 4" galv. carriage bolts	
1 pc	3/16 x 24 x 52" hot rolled steel (centerboard)	
1 pc	1/8 x 12 x 30" 24ST aluminum or steel (rudder)	
3	1/4-20 brass wing nuts	
2	1/16 x 1 x 4" brass (floor cleats)	
2 doz	3/16 x 2" stove bolts	
1 doz	1/4-20 x 1 1/2 brass cap screw and nuts	
150 ft	3/8" sash cord	
	PAINT AND VARNISH (Marine Quality)	
1 gal	primer #389 Interlux	
1 gal	marine paint—gloss white #87 Interlux: International Paint Co.	
1/2 gal	spar varnish #90 Interlux	
2 lbs	Famowood Plastic Putty	
3 lbs	Kuhls Bedlast	
1 qt	Weldwood contact cement	
1/2 lb	Weldwood powdered glue	
1	suit of sails (available from Alan-Clark Co., 96 Chambers Street, New York 7, N. Y.)	



FRAME AND TRANSOM DETAILS

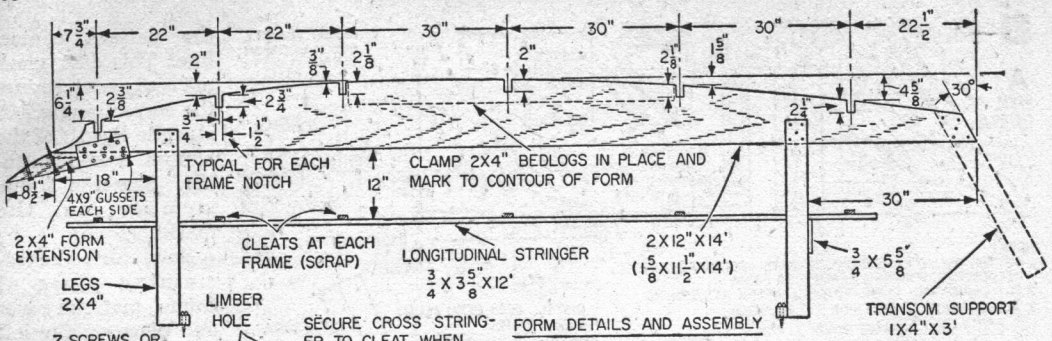
2½ in. frame material for cutting to the correct angle make up a marking gage shown in Fig. 3B. To use the marking gage, place a 10 ft. length of the frame material along the inside of the right hand bottom frame line on your full-size drawing as in Fig. 3C. Allow enough stock projecting to the right to make the right side frame member plus the 1 ft. extension. Place the marking gage on the left side of the centerline (position 1, Fig. 3C), and mark the frame material.

Next, place the gage along the inside of the right side frame line (position 2, Fig. 3C) and mark the frame material on the gage side facing the pattern centerline. This last mark not only determines the correct angle, but also the length of the bottom frame member. Saw the frame member on the marks.

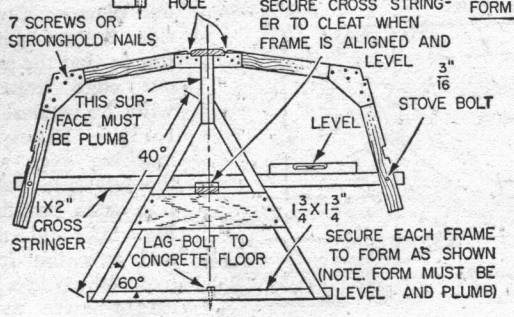
Now, turn the remaining piece of frame material over and place on the left side bottom pattern line so that the angle-cut edge lines up with the vertical centerline. Place the marking gage along the left side pattern line as in position 3, Fig. 3C, and mark and saw the frame material. With the angle cuts made, place the four frame pieces on the full-size drawing in their respective positions and mark the locations of the top of the clamp notches on each side member. Also mark and cut off the side members at a point 12 in. above the notch marks.

To make the gussets, tape a 8 x 12 in. piece of paper over the corner of the pattern and centerline as in Fig. 3A and lay out the gussets full size from dimensions given in Fig. 4. Remove the paper, cut gussets to size and transfer outlines to ¼ in. exterior plywood. Cut four corner gussets for each frame. No pattern is required for the #2 to #6 frame center gussets since they are 2½ x 12 in. and rectangular in shape. Assemble the frame members with the gussets using the full-size patterns as an alignment guide. Use glue (*Weldwood* or *Elmer's* Waterproof) and seven #8 x ¾ in. galv. *fh* screws or #0 x 1 in. Stronghold nails spaced as indicated in Fig. 4, so as not to interfere with cutting the chine and clamp notches. If you intend to use this boat in salt water, use Anchorfast nails of monel or bronze screws.

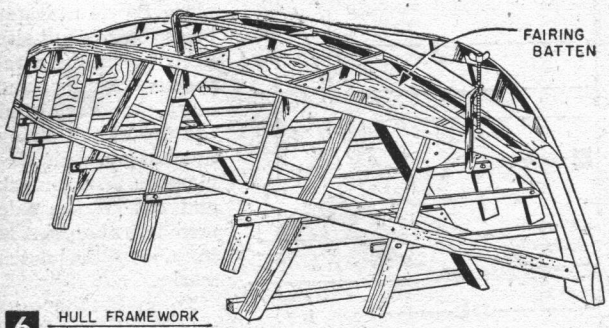
Follow the same procedure in making the other frames. After the glue dries, mark and cut out



FORM DETAILS AND ASSEMBLY



5



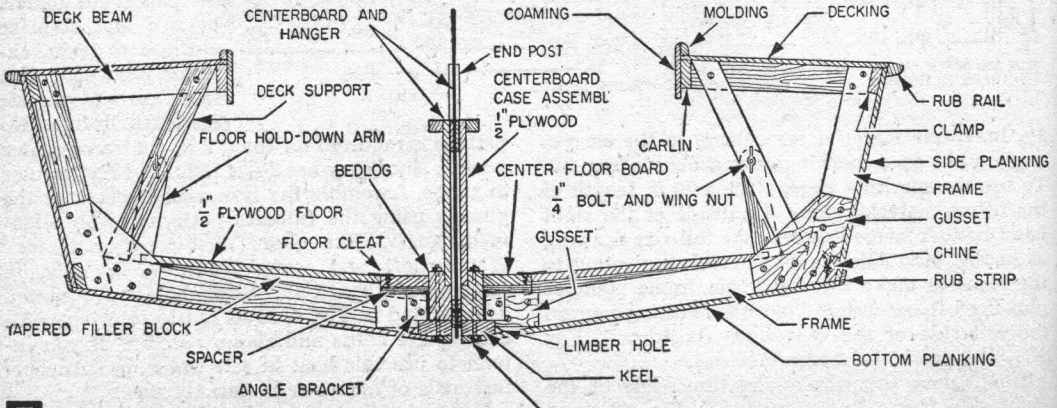
6 HULL FRAMEWORK AND BUILDING FORM

the clamp, chine and keel notches.

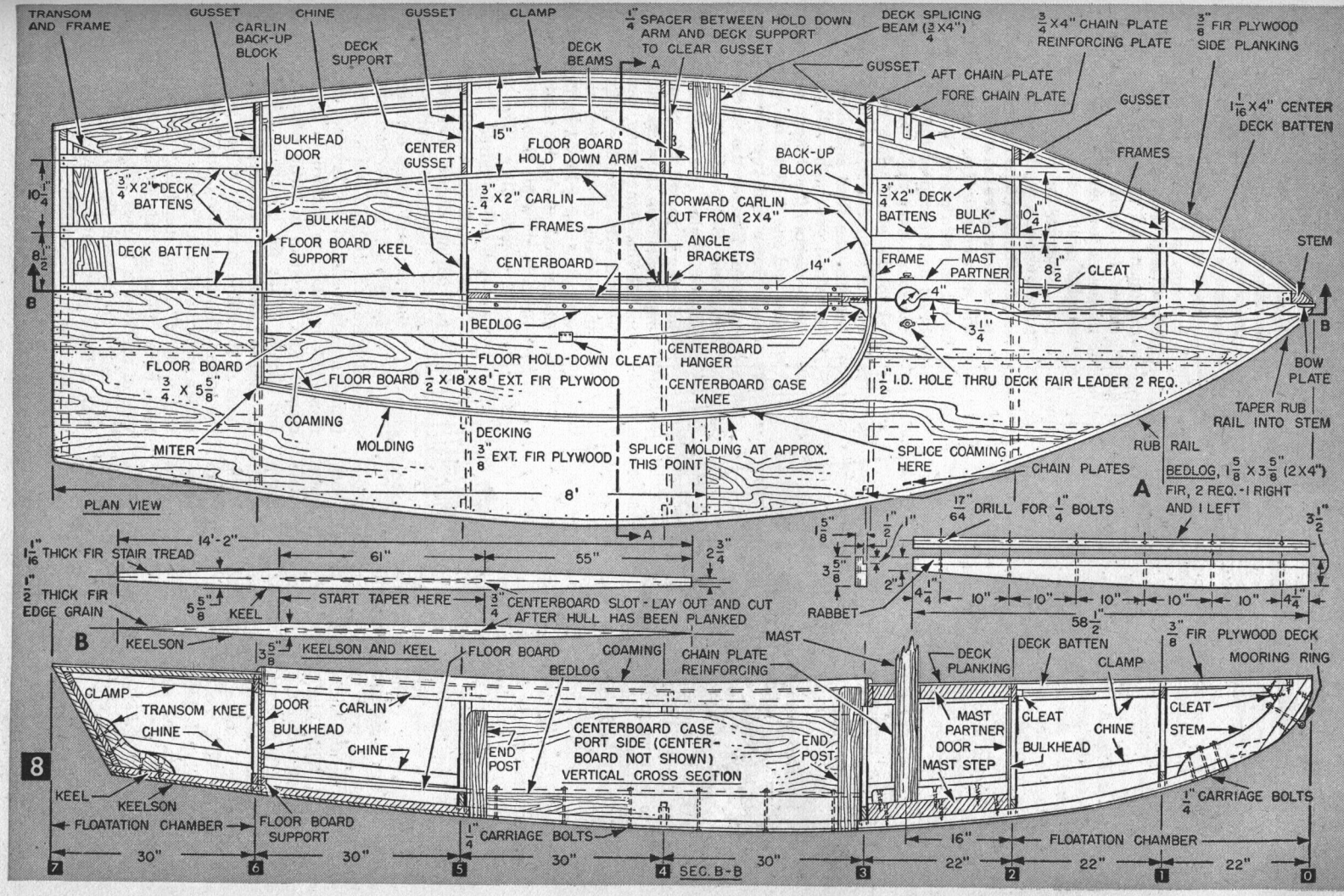
Building Form. To keep the frame parts in alignment during construction, the hull is built upside down on a building form (Fig. 6). New or used lumber can be used for the form, just as long as it is good straight stock. Follow the dimensions given in Fig. 5. Note that the notches are cut wider than the actual frame thickness, including center gussets. This extra width will allow for shimming or wedging the frames securely in the form. Wooden shingles make excellent wedges. When the hull is completed, these wedges can be knocked out and the hull easily lifted from the form. If you are building your boat on the concrete floor of a garage, anchor the form to the floor with two lag bolts. Since I had to build my boat outdoors the form was anchored to stakes driven into the ground. However, regardless of where the form must be set up be sure it is plumb and level.

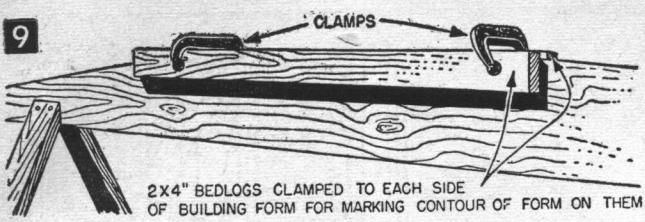
Bedlogs. Before the frames are set in place clamp the 2 x 4 in. bedlogs (Fig. 9) to the form as indicated by the dotted lines in Fig. 5 and mark the contour of the form on them. Remove and saw to within 1/16 in. of the line. Reclamp in place and plane to contour of form. Remove and cut the 1/2 x 1 in. rabbets (Fig. 8A) for the center-board case panels. Be sure to make one left and one right hand bedlog. Now lay out and drill the 17/64 in. holes and give the bedlogs a coat of wood preservative. Set them aside until needed.

Keel and Keelson. Lay out the keel and keelson as in Fig. 8B. Saw to within 1/16 in. of the line and finish off with a plane. The bevel on the keel can best be done after it has been as-



7 SECTION A-A #4 FRAME, AFT SIDE LOOKING FORWARD


TRANSOM AND FRAME
GUSSET
CARLIN BACK-UP BLOCK
CHINE
DECK SUPPORT
GUSSET
CLAMP
DECK BEAMS
1/4" SPACER BETWEEN HOLD DOWN ARM AND DECK SUPPORT TO CLEAR GUSSET
DECK SPLICING BEAM (3/4 X4")
3/4 X4" CHAIN PLATE REINFORCING PLATE
3/8" FIR PLYWOOD SIDE PLANKING
GUSSET
AFT CHAIN PLATE
FORE CHAIN PLATE
GUSSET
1 1/16 X4" CENTER DECK BATTEN
FRAMES
BULKHEAD DOOR
CENTER GUSSET
15"
FLOOR BOARD HOLD DOWN ARM
BACK-UP BLOCK
10 1/4"
3/4" X2" DECK BATTENS
3/4" X2" CARLIN
FORWARD CARLIN CUT FROM 2X4"
3/4" X2" DECK BATTENS
BULK-HEAD
10 1/4"
BULKHEAD
FRAMES
STEM
8 1/2"
DECK BATTEN
FLOOR BOARD SUPPORT
KEEL
CENTERBOARD
ANGLE BRACKETS
14"
FRAME
MAST PARTNER
8 1/2"
CLEAT
4"
3 1/4"
BEDLOG
FLOOR HOLD-DOWN CLEAT
CENTERBOARD HANGER
CENTERBOARD CASE KNEE
1/2" I.D. HOLE THRU DECK FAIR LEADER 2 REQ.
BOW PLATE
TAPER RUB RAIL INTO STEM
FLOOR BOARD 3/4 X 5 5/8"
FLOOR BOARD 1/2 X 18" X 8' EXT. FIR PLYWOOD
COAMING
MOLDING
MITER
DECKING 3/8" EXT. FIR PLYWOOD
SPLICE MOLDING AT APPROX. THIS POINT
SPLICE COAMING HERE
RUB RAIL
CHAIN PLATES
BEDLOG, 1 5/8 X 3 5/8" (2X4") FIR, 2 REQ. - 1 RIGHT AND 1 LEFT
8'
PLAN VIEW
17/64" DRILL FOR 1/4" BOLTS
1 5/8"
1"
1/2"
3 5/8"
2"
3 1/2"
4 1/4"
10" 10" 10" 10" 10" 4 1/4"
58 1/2"
RABBET
1 1/16" THICK FIR STAIR TREAD
14'-2"
61"
55"
2 3/4"
1/2" THICK FIR EDGE GRAIN
5 5/8"
KEEL
START TAPER HERE
3/4"
CENTERBOARD SLOT - LAY OUT AND CUT AFTER HULL HAS BEEN PLANKED
KEELSON
3 5/8"
KEELSON AND KEEL
FLOOR BOARD
COAMING
BEDLOG
CHAIN PLATE REINFORCING
MAST
DECK PLANKING
DECK BATTEN
CLAMP
3/8" FIR PLYWOOD DECK
MOORING RING
CLAMP
TRANSOM KNEE
CHINE
DOOR
CARLIN
BULKHEAD
CHINE
CENTERBOARD CASE PORT SIDE (CENTER-BOARD NOT SHOWN) VERTICAL CROSS SECTION
END POST
END POST
MAST PARTNER
DOOR
MAST STEP
CLEAT
BULKHEAD
CHINE
CLEAT
STEM
1/4" CARRIAGE BOLTS
KEEL
KEELSON
FLOATATION CHAMBER
FLOOR BOARD SUPPORT
1/4" CARRIAGE BOLTS
16"
FLOATATION CHAMBER
30" 30" 30" 30" 22" 22" 22"
SEC. B-B
7 6 5 4 3 2 1 0



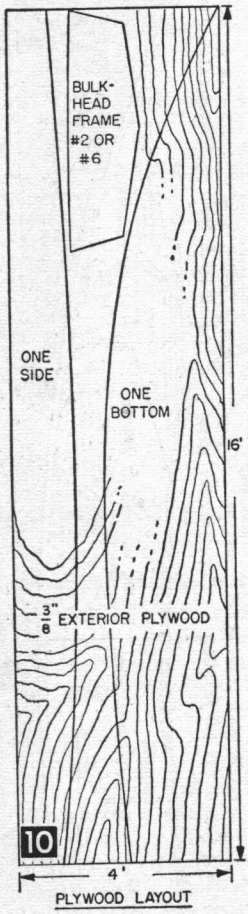
sembled to the frames.

Stem. Lay out the stem and cut to shape as in Fig. 4A. It is made up of two pieces, the smaller piece actually shaping the stem. This piece is fastened to the stem after the side planking is installed, thus eliminating the need for cutting a rabbet on the stem for the side planking.

Frame Assembly. Having made up the frames, transom, stem and keel, you are now ready to assemble the parts in place on the building form. To center the frames in the form, mark a center line at each center gusset. Now set each frame in place and secure it with shingle wedges (Fig. 9), inserted from each side so the frame will pull up square to the form. Place the keel over the frames and mark each keel notch for further fitting. Trim length of keel if needed. Also mark the frames so that the bottom of the keel notches can be beveled to conform to the contour of the form. Remove the frames and refit the keel notches. Bevel the notch in the transom in the same way.

Your next step is to replace each frame and accurately secure them thwartwise to the building form. First clamp a 1 x 2 in. cross stringer (Fig. 5), to the longitudinal stringer and clamp the side members of the frames to the cross stringers. The vertical distances from the chine notches to the cross stringer should be the same on both sides. If not, loosen the clamps and tap the high side down to make both sides equal. While the clamps are still in place drill 7/32 in. holes through the stringers and frame side members, and secure with 10-32 x 2 in. stove bolts. Nail the cross stringers to the longitudinal stringer using cleats as in Fig. 5 before removing the clamps. Shift the transom on the transom support to bring it into alignment and temporarily secure to the support with screws or a C-clamp.

Glue and bolt the stem to the keel next. When the glue has dried, coat the keel notches in the frames with glue and spring the keel in place on the form securing it with bar clamps at stem and stern. Drill and countersink for two #10 x 2 in. *fh* screws at each frame and transom, and fasten the keel in place. Bar clamps must remain in place until the chine and clamp strips are installed. These strips can be fitted one at a time because the form is rigid enough to prevent any springing out of alignment.



Proceed by clamping a chine strip to frame #4, then spring it fore and aft. Clamp one end to the stem and the other end to the transom. Then check the amount each frame and transom notch must be beveled to fit snugly against the chine. You can draw lines on the frames parallel to the chines as a guide for sawing. Or, as some boat builders prefer, you can make successive saw cuts between the chine and the frame notches until the two pieces fit. Next, cut a bevel on the end of the chine to fit the stem. Keep the saw blade parallel to the stem, while making this cut. If your cut is not perfect, saw between the stem and chine several times and your joint will fit up perfectly. Secure the chine in place with glue and one #10 x 2 in. *fh* screw at each frame and two screws in the transom. Stagger the screws in the transom. Secure the chine to the stem with glue and to #10 x 1½ in. *fh* screws. Install the chine on the opposite side in the same manner. To install the clamp strip, proceed as you did with the chine strip. Center the keelson on the keel and fasten with glue and #10 x 1 in. *fh* screws. Countersink the screw heads at least 1/16 in. to allow for filling with *Famowood* plastic filler. The frame is now ready to be faired.

Use a block plane and coarse rasp for fairing frame members. First spring a batten the entire length of the boat and clamp both ends down as in Fig. 11. This batten will show you which frames are high and the amount each frame member should be beveled. Bevel the frame side members to conform to the chine and clamp. Fair the stem to blend with the chines and clamps. Plane the bottom of the chine and the keel to conform to each frame. Note that the bevel of the chine increases as you work toward the stem. Continue fairing and testing with a batten until the plywood planking will make contact with all frame members. Cut the limber holes next. These are triangular notches at each side of the keel in frames #3, 4 and 5 (Fig. 5). The entire framework should now be painted with a wood preservative. Flow it on liberally and allow to dry thoroughly.

Planking Sides and Bottom. The sides are planked first then the bottom. Each 4 x 16 ft.

sheet of ⅜ in. plywood will make one side and one bottom (Fig. 10). Proceed by clamping a sheet of the plywood to the side of the framework and mark a line along the chine, clamp, stem and transom. Remove and saw to within ⅛ in. of the line. Try it on the opposite side. If it is a perfect fit use it for a pattern to lay out another side on the other 4' x 16 in. sheet of plywood.

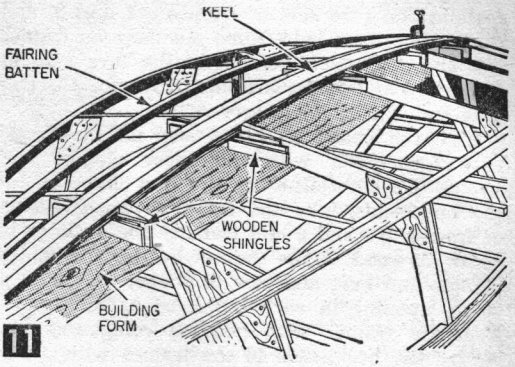
Next clamp the sides in place and screw fasten in several places for locating purposes only. Then remove one side at a time and apply a 1/32 in. coating of Kuhls *Bedlast,* along the chine, clamp, stem and transom. Replace the side in its original location and screw fasten in place. Using a pair of dividers, space additional #8 x ¾ in. *fh* screws 2 in. apart along the chine. Use #10 x 1¼ in. *fh* screws in the stem and transom spaced 1 in. apart and staggered in a double row. Use #8 x ¾ in. *fh* screws in the clamp and side frame members 3 in. apart. A combination drill and countersink should be used for starting each screw. Countersink the screw heads at least 1/32 in. below the surface to allow for filling with *Famowood* plastic putty. Follow the same procedure on the other side. The excess bedding compound can be removed with a putty knife and re-used if kept clean.

After fastening both side planks, plane the edges flush with the chine taking special care to maintain the same bevel. Now take the piece of plywood from which one side has been cut and, with the straight edges butting up to the keelson, spring the plywood down to conform to the contour of the frame. Clamp or tack in position. If the joint at the keelson does not fit properly scribe to the contour of the keelson, remove the piece and saw or plane to the line. When you have a good fit at the keelson, mark the plywood along the chine, remove and saw to within ¼ in. of the line. Try the piece on the opposite side. If it fits you can use it for a pattern as you did for the sides.

Next make a pencil mark on the keel and the sides at the center of each frame. These marks will aid you later in locating where to place the screws in the bottom frames. Replace the bottom and temporarily secure with several screws. Step off the spacing for additional screws at 2 in. intervals along the keel and chine. A double row of screws should be used in the transom. The spacing of the screws at the stem should be 1½ in. apart for about 6 to 8 holes. Drill and countersink for #8 x ¾ in. *fh* screws but do not drive the screws at this time.

Remove the bottom planking and apply a coating of Kuhls *Bedlast* to the keel, chine, transom and frames #2 and 6. Replace the bottom and fasten with #8 x ¾ in. *fh* screws. Use #10 x 1 in. *fh* screws in the first 6 to 8 holes back from the stem. Rub soap on these screws if the stem is made of hardwood. Remove the excess bedding compound and carefully plane the bottom planking flush with the sides and transom.

To fasten the bottom planking to each frame,



11

first locate where the screws should be placed by drawing a light line between the two marks you previously made on the keel and the sides at each frame. This line will indicate the exact center of the frame bottom members. Drill and countersink for #8 x ¾ in. *fh* screws, spaced about 4 in. apart. Bevel the keelson to conform to the contour of the bottom. Then fasten the stem front piece (Fig. 4A), in place with glue and two #10 x 1½ in. *fh* screws. When the glue has dried, finish shaping the contour of the front piece flush with the sides and to the keel curve.

Prior to sanding the bottom, sides, transom and stem, fill the screw-head holes, dents, etc., with *Famowood* plastic putty. The entire hull can now be sanded. Use a #2 production paper first and finish with a #0 paper. Remove sanding dust with a vacuum cleaner and give the hull a coat of wood preservative.

Now temporarily tack the ¼ x 1¼ in. chine rubbing strip in place with 1 in. brads. Start at the stem and work back toward the transom. Space the brads as necessary to hold the molding strip to the contour of the chine. Then drill and countersink for #8 x ¾ in. *fh* screws spaced 6 in. apart but do not drive screws. Remove the strips and brads, taper the stem end down to ⅛ in. from about 8 in. back. Apply a coat of Kuhls *Bedlast* and fasten the strips back in place with #8 x ¾ in. *fh* screws. Remove the excess compound and bevel the strip to fit the contour of the bottom. Cut the strip flush with the transom and round the corner. The strip serves to protect the edges of the bottom planking and the compound seals the edge grain of the plywood. Fill the screw head holes with *Famowood* and sandpaper when the putty has dried. The hull can now be given two coats of primer. Sandpaper lightly between coats and dust the surface before you apply the second coat.

To remove the hull from the building form, first knock out the shingle shims that hold the frames in place, remove the bolts from the cross stringers and the temporary screws in the transom. Then, with the aid of a few friends, lift the hull from the form and place it right side up on two saw horses.

Deck beams and bulkheads. Lay out and saw the beams on frames #1, 2, 3 and 6 to shape as shown in Fig. 4. Note that the beams are

installed on fore side of frames #1 and 3, and flush or between side frame members on frames #2 and 6. Fasten gussets to the fore side of frame #2 and to the aft side of frame #6. Use glue and 8 x ¾ in. *fh* screws.

With the beams in place, saw off the frame extensions flush with the sheer clamps and beams. To determine the size and shape to cut the bulkheads, take the full-size paper layouts of frames #2 and 6 and transfer the outlines to ⅜ in. plywood. Make the notches for the chines clamps and keel and saw to shape. Cut a 10 x 20 in. opening in each bulkhead as in Fig. 14. Coat the frames with bedding compound and secure the bulkheads to the frames with #8 x ¾ in. *fh* screws.

Make ⅜ x 12 x 22 in. plywood covers for bulkhead openings and temporarily fasten in place with #8 x ¾-in. *fh* screws spaced about 2 in. apart. Then glue and nail ½ x ¾-in. molding around the cover on the #2 frame and up to where the coaming will be on the #6 frame as in Fig. 14. Later, after removing the covers to paint the interior of the hull, coat the edges of the covers that come in contact with the bulkheads with bedding compound. The covers will then make an airtight seal creating a fore and aft flotation chamber. The covers should be removed each season during storage to allow flotation chambers to dry out.

You can convert the aft flotation chamber to a storage compartment by hinging the cover to serve as a door. On the original *Crescent* we used this compartment for storing the hull tarpaulin, boom crutch, clothing, etc.



Coming up to the dock after its first successful trial run, Crescent proved to be in perfect balance.

Deck Framing. The short deck beams on each side of the #4 and 5 frames must be installed simultaneously with the carlins as shown in Fig. 8. First cut the four ¾ x 2 x 4 in. back-up blocks, to which the ends of the carlins are secured and fasten to the #3 and 6 deck beams with C-clamps. Then spring the carlin material from the #3 to 6 frames bowing it outward 15 in. from the sheer clamp and mark and cut to length. Also mark and bevel ends of back-up blocks to fit snugly against carlins and fasten blocks to deck beams

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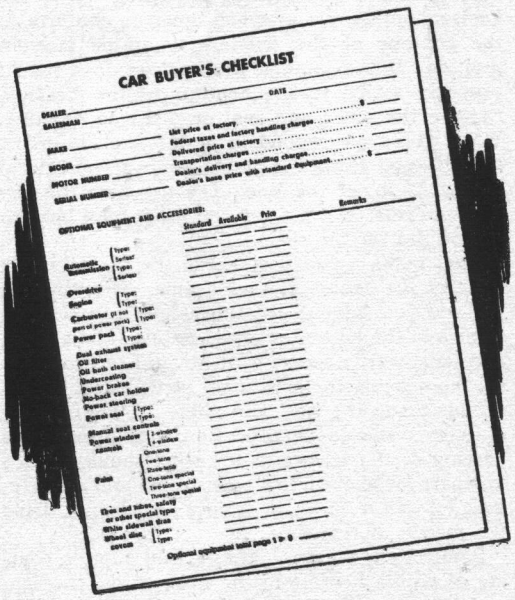
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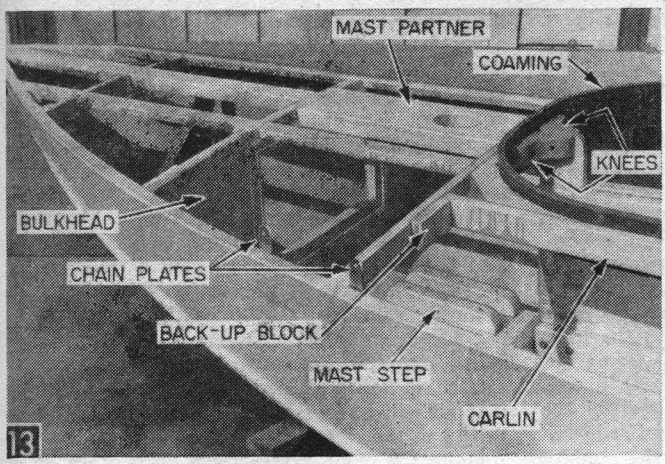
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Forward view of hull showing location of parts under the decking.

with glue and three #10 x 1½ in. *fh* screws.

Temporarily clamp the #3 and 4 deck beams in place, again springing the carlins in place and mark the angle at which to cut the ends of the deck beams. When the carlins and deck beams fit properly, fasten with glue and #10 x 1½ in. *fh* screws. Follow by fastening the angular deck supports and deck splice battens (Fig. 7, page 88) in place.

While the inside bottom of the hull is readily accessible, install the mast step and transom knee. Make up the mast step as in Fig. 16 and place between the #2 and 3 frames on top of the keel (Fig. 13). Scribe to the contour of the keel, remove and plane bottom surface to fit. Fasten in place with six #10 x 2 in. *fh* screws. Then make up the mast partner (Fig. 16), and fit in place between #2 and 3 frame deck beams (Fig. 13). Fasten with three #10 x 2 in. *fh* screws.

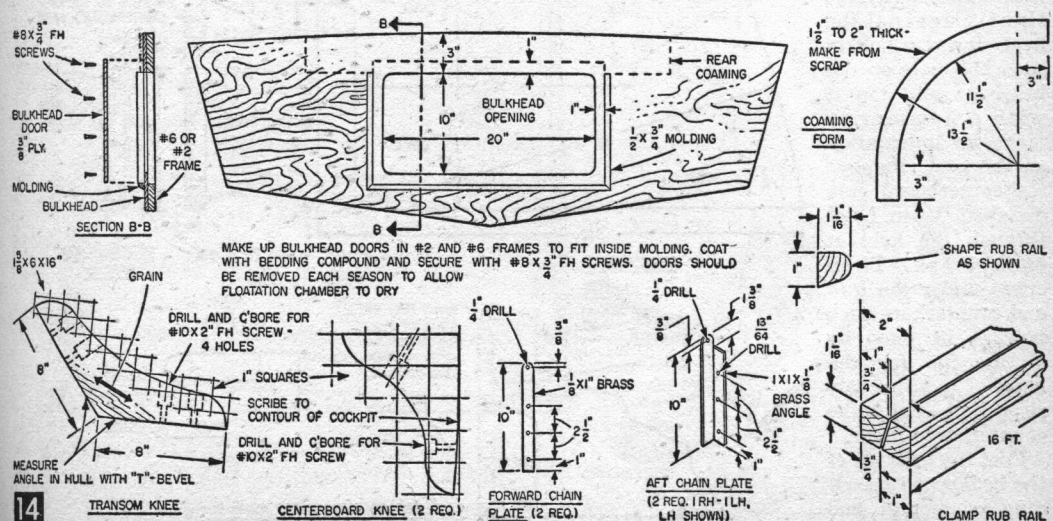
Lay out the transom knee as in Fig. 14 and drill and counterbore for #10 x 2 in. screws so that the screws will protrude 1 in. Fasten with glue and four screws.

Deck battens are next. Cut a notch in the #1 frame for the center deck batten (Fig. 8, page 89). Use a ¾ x 1-in. cleat under the batten at #2 frame and a 3 in. knee at the stem. Fasten with two #10 x 2-in. *fh* screws at each joint. Install the ¾ x 2 in. deck battens on the fore and aft decks locating them as in Fig. 8, Part 1. Notch the battens into the deck beams and transom frame and fasten with glue and #10 x 1½ in. *fh* screws.

To provide a curved form on which to fasten the coaming, lay out the curved, forward carlin blocks (Fig. 8, page 89) on 2 x 4 in. stock and cut to shape. Bevel the pieces, so that the coaming can be mounted vertically, with a spokeshave after the pieces are secured in place, judging the amount of bevel by eye. Finally fair off all deck framing pieces flush with one another with a block plane and rasp.

Centerboard case. Building and installing the centerboard case is your next step. First make the two plywood side panels and end posts as in Fig. 15. Then clamp the panels in the rabbets cut in the bedlogs. Drill and countersink for #10 x 1¼ in. *fh* screws at 4 in. spacing. Remove the panels, coat the rabbets with bedding compound and fasten the panels in place with screws driven 1/16 in. below the surface. Fill screw heads with *Famowood* and sandpaper flush when dry.

Because it would be impossible to paint the inside of the centerboard case after it is assembled, temporarily screw fasten the end posts to one panel of the centerboard case with #10 x 1¼ in. *fh* screws driven through from the outside. Then clamp the opposite side in place with



C-clamps and adjust until it is square and aligned end to end with the opposite side. Secure with #10 x 1¼ *fh* screws. Also drill two 9/32 in. holes through the bedlogs at each end (Fig. 15) for ¼ x 4½ in. carriage bolts.

Now disassemble the centerboard sides and end posts and paint the inside surfaces with two coats of primer and three coats of marine paint. When dry, coat the end posts with bedding compound and reassemble.

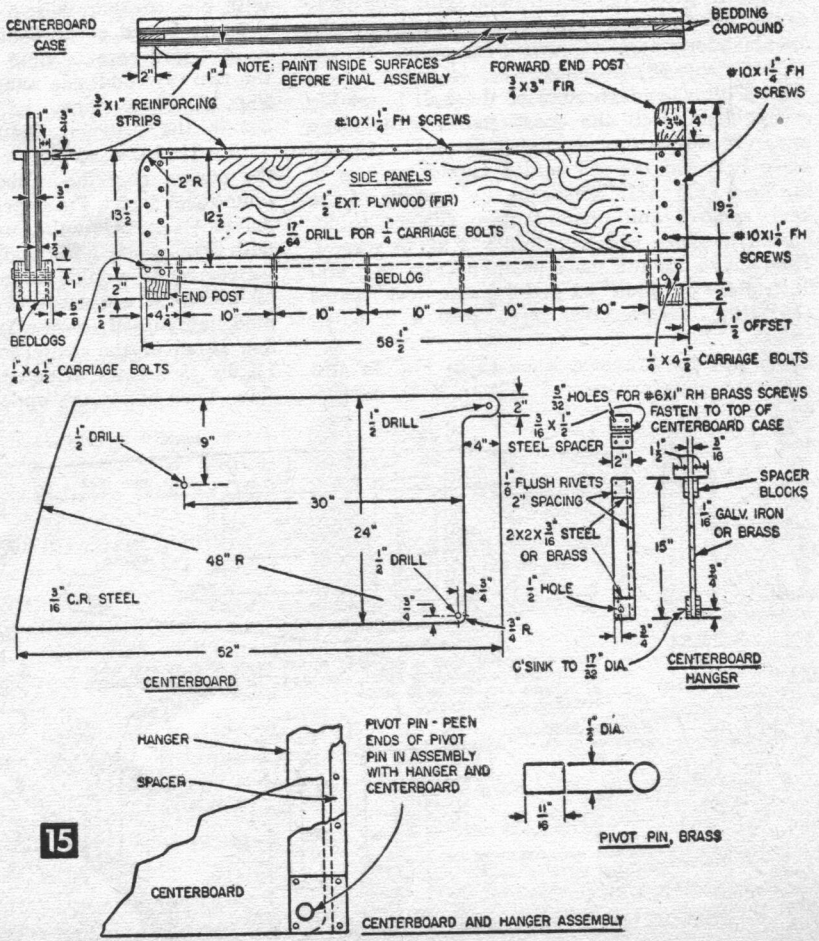
To install the centerboard case, measure the overall width across the bedlogs. Lay out half this width on each side of the center on frame #4 and cut out the section down to the keel. Next mark the center of the keel at frame #3 and 5 and connect the two points with a line. To lay out the slot to be cut in the keel for the centerboard, mark a point, on the centerline of the keel aft of frame #3, equal to the amount of forward end post offset, plus ⅜ in.—the radius of a ¾ in. auger bit. Mark a point on the center line of the keel forward of frame #5 in the same way for the rear end post. Check the distance between these points to see if it corresponds to the overall length between the outsides of the centerboard end posts minus ¾ inch. Bore ¾ in. dia. holes vertically through the keel at the two marked points. Use frames #3 and 5 as a guide and bore the holes parallel to them. Then, with a straightedge, mark tangent lines between the two holes. Saw out the slot starting with a key-hole saw until a rip saw can be used.

Now set the centerboard case in place tapping it down to make sure it fits tightly against the keel. Insert a bolt in each bolt hole on the bedlogs and tap it with a hammer to make an indentation on the keel. Remove the centerboard case and drill 17/64 in. holes through the keel at each mark. Then crawl under the hull and counterbore each hole ⅜ in. deep by ¾ in. dia. for the head of a ¼-in. carriage bolt. Paint the counterbored holes.

Coat the bottoms of the bedlogs with bedding compound and the end posts with glue. Set the centerboard in place, drive the carriage bolts up through from the bottom and put on washers and nuts. Draw up each bolt a little at a time so the unit will pull down evenly. Fill the bolt-head holes with *Famowood* and sandpaper flush when dry. Use #8-¾" *fh* screws to fasten the angle brackets in place at frame #4.

The centerboard is supported by a hanger to which the centerboard is hinged to permit raising and lowering. Make the centerboard from 3/16 in. steel and have it saw-cut or flame cut with a torch as in Fig. 15. Make the hanger as in Fig. 15. Give the parts two coats of rust-inhibitor paint. The centerboard need not be installed at this time, however, make a test installation so that all will be in readiness when the boat is to be put in the water.

Make the chain plates from brass stock as in Fig. 14. Secure the aft plates to frame #3 with ¼ x 1¼ in. cap screws and the forward chain plates to a ¾ in. thick reinforcing pad directly opposite the mast. Fit the reinforcing pad between the chine and the clamp and fasten with glue and #8-1 in. *fh* screws. Then bolt the forward chain plate to the pad and side planking with ¼ x



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1½ in. *fh* machine screws.

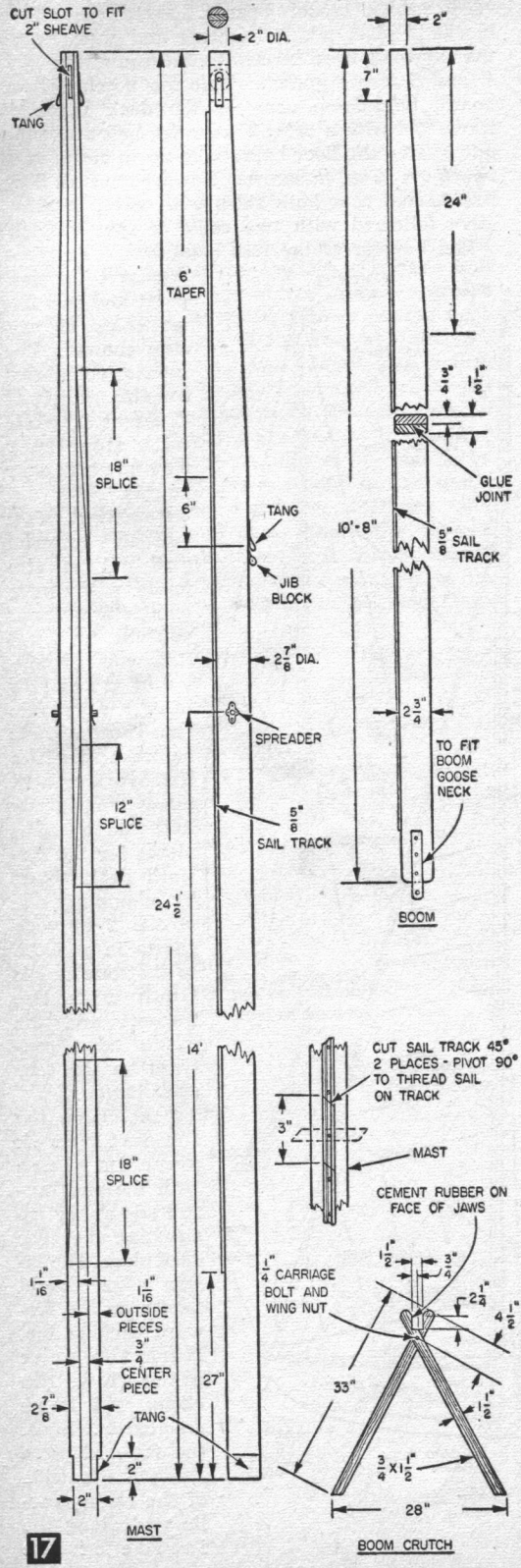
Floor Boards. Cut the two ¾ x 5⅝" x 8' center floor boards to fit on each side of the bedlogs (Fig. 8, page 89). Install cleats to support the ends of the floor boards at #3 and 6 frames and a ½ in. thick spacer at #4 frame as in Fig. 7, page 88. Fasten the two center floor boards with one #10 x 1½ in. *fh* screw at #4 and 5 frames.

For the ½ in. plywood floor boards, make up tapered filler blocks for the top of each frame so that the floor boards will come flush with the ¾ in. thick center boards. Fasten the filler blocks in place with 1 in. brads and glue. Notch the plywood floor boards to fit around the #3, 4, and 5 frame gussets. Bolt the notched floor board, hold-down arms to the deck brace at frame #4 with a ¼" x 2" carriage bolt and wing nut. Fasten the floor board hold-down cleats with two #6 x ¾ in. *fh* screws. Now, remove all floor boards and coat both sides with wood preservative followed with two coats of spar varnish.

The interior of the hull should now be given a coat of primer paint and two finish coats of marine enamel. The interior color used on the original Crescent is white with clear spar varnish floor boards.

Decking. You will save material and all of the joints will center on a deck batten if you cut the 4 x 8 ft. sheets of plywood decking lengthwise into two-foot widths before applying. Remove the chain plates temporarily to fit and mark the pieces for the forward deck. Start by clamping one of the 2 ft. wide sheets in position so that one end is flush with the transom and the inside edge centered on the rear deck batten.

Next clamp the forward deck piece in place with the end butted squarely up against the rear deck piece. The inside edge should center on the forward deck batten. Mark the rear piece along the clamp, #6 frame and carlin. Mark the forward piece along the outside of the clamp, carlin and along the inside of the



clamp to locate the position of #3 frame. Remove pieces and cut to shape oversize at least ¼ in. on the outside and ⅛ in. on the inside.

Replace the chain plates. Measure the distance the chain plates are from frame #3 and lay out these measurements along inside clamp line on decking. Make chain-plate openings slightly under size and force chain plates through decking by tapping with a hammer and wood block. Coat underside of decking with wood preservative and paint before securing in place.

Proceed with the decking on opposite side in the same manner. Fill in the center section with the cutoffs from the side pieces. Mark and cut out the hole for the mast before fastening the center section in place.

Apply a coat of bedding compound along the clamp, transom, #3 and 6 frames and fore and aft deck battens. Fasten the decking in place with #8-¾ in *fh* screws spaced 3 in. apart and counter-sunk at least 1/32 of an inch. Plane deck edges flush with sides, transom and carlin. Fill screw head holes with *Famowood* plastic putty.

Coaming. The coaming is made of ¼ x 4" wide tempered hardboard, steamed (with a tea kettle) and bent to shape on a form.

Cut four pieces, two inside pieces 28 in. long with the smooth side on the inside of the bend and two outside pieces 30 in. long with the smooth side on the outside of the bend. The 2 in. difference in length is to form a half-lap joint. Make the bending form (Fig. 14) from scrap material. Note that the outside radius of the form is ½ in. less than the radii of the cockpit. Steam the masonite on both sides, moving it back and forth over the steam until it starts to bend from its own weight. Clamp each piece singly to the form and allow to dry about a half hour. When all four pieces are bent and dried, coat the dull side of one outside and one inside piece with glue, clamp back in form and allow to dry. Repeat with remaining two pieces.

Glue two ¼ x 4 in. wide strips of masonite together, long enough to complete the coaming back to the rear of the cockpit. Make up a set for each side allowing one end extended to make a half-lap joint with the curved coaming pieces. Also glue up two ¼ x 4 in. wide strips for the rear coaming. Install the coaming so that it extends ⅞ in. above the deck and fasten with #10 1¼ in. *fh* screws. Install the curved sections first and work toward the back.

Finish the outside of the coaming with oak, base-shoe molding. This will require steaming a 6 ft. length to be bent around the front of the cockpit. A simple steaming setup can be made by using a hot plate, tea kettle, 6 ft. of 1¼ in. pipe and a prop. It takes about three hours of steaming before the molding can be bent in place. Be sure to use plenty of clamps to secure the molding in place around the coaming while making the bend. Fit forward piece first and allow to dry, making a scarf joint where the pieces meet just forward of frame #4.

If the pieces should twist slightly, plane the

inside corner to make a tight fit to the coaming. Fasten the molding with 1¼ in. *fh* screws. Fill the screw-head holes with *Famowood,* and sand flush when dry. Plane the coaming flush with the molding and round off the inside edge. Secure the forward centerboard-case post to the coaming with two knees (Figs. 13 and 14). Cut the rub rail molding to shape as in Fig. 14 and fasten with #10 x 2 in. *fh* screws spaced 12 in. apart.

Rudder and tiller. Make the rudder blade from ⅛ in. thick aluminum or steel cut to the shape shown in Fig. 18. Use 1 1/16 in. thick oak stair-tread stock for the rudder post pieces. First lay out a full-size paper pattern of the post and then transfer the outline to the wood for two pieces. Nest the two together to save material. After sawing to shape, fasten the pieces together with glue and #10 x 1½ in. *fh* screws. If you cannot purchase a piece of oak for the tiller, use a clear, straight-grained piece of fir 2 x 4 in. stock. Cut to shape as in Fig. 16 and shape the handle with a spokeshave. Then sand smoothly and give the post and tiller three coats of spar varnish. Install rudder with pintles and gudgeons so the tiller will go between deck and sheet traveler (Fig. 16).

Before painting the hull, temporarily fasten all metal fittings in place. Then remove, and give the deck two coats of primer. Follow with two coats of marine paint. Sand lightly between coats and fill scratches with *Famowood.*

Mast. While the hull is drying between coats of paint, work on the mast and boom. The mast and boom for your boat can be *cemented* together (not glued) and with the aid of just one C-clamp if you use *Weldwood* contact cement.

Since the mast is 24½ ft. long, each of the three strips that make up the laminated mast must be spliced. Stagger the locations of the splices as in Fig. 17. Use ¾ in. thick stock for the mast center strip and 1 1/16 in. fir stair-tread stock for the outside pieces. Cement the splices together first. When clamping, place a block of scrap on each side of the splice and clamp together with the C-clamp. Then loosen, move the blocks and C-clamp a few inches, and reclamp. Repeat this clamping operation along the entire length of the splice.

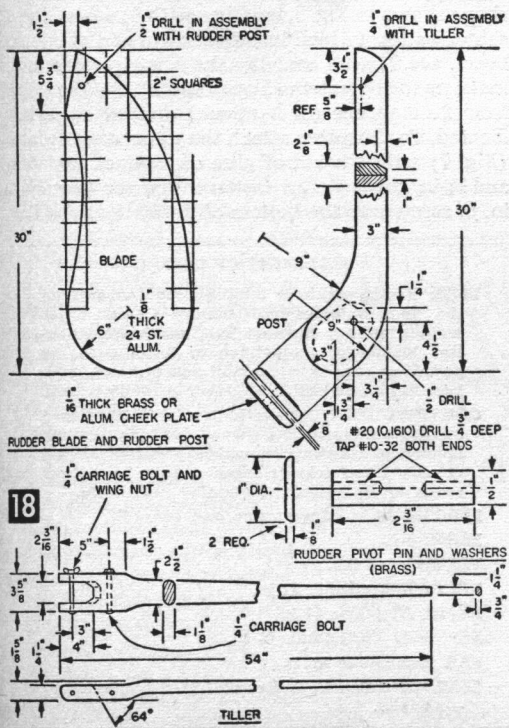
When assembling the three spliced pieces that make up the laminated mast, do not attempt to cement the three at one time. Instead, cement the center and one outside piece and press together by walking back and forth over the entire length. Hold together with blocks and C-clamp as you did on the splices. Repeat the procedure when cementing the other outside piece.

Although the mast can be left square with corners rounded, we shaped it round to reduce its weight. First lay out and saw the 6 ft. long tapers on three sides at the top as in Fig. 17. Do not taper the side where the sail track is to be fastened. Then bevel the four corners 45° with a portable electric saw making the mast 8-sided or octagon in shape. Continue the shaping with a plane until the entire length of the mast is round. For final smoothing, cement a half sheet of #3 production sandpaper to a piece of heavy cloth and use it as you would a shoe-polishing cloth. Then sand the mast lengthwise to remove the circular scratches.

Lay out and cut the slot for the mast sheave and the tang to fit the mast step. Follow the same procedure when cementing the boom pieces (Fig. 17) together. Taper the bottom side of the boom and leave it square but round the corners slightly. Attach all fittings on the mast and boom, and then remove them for varnishing. Apply three coats of spar varnish, sanding lightly between coats. When dry, reinstall the fittings. To support the boom when the sail is removed, make the boom crutch (Fig. 17). In use, the crutch is placed on the cockpit floor and the boom cradled in notches cut in the crutch top.

Rather than attempt to level the hull with the waterline on land to set up the mast with a 6 in. rack aft, launch the boat in shallow water. Then set up the mast with a plumb line down the aft side and rig the ⅛ in. wire-rope stays (Fig. 16) loosely. Adjust the turnbuckles until plumb line hangs 6 in. aft of mast at the base.

Next, install the centerboard and its lifting rig as in Fig. 16. Drop the rudder in place, install and rig the boom, haul up the sails, and your Crescent is all set for her maiden voyage.



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