

By HAROLD T. BODKIN

*Charter President of the Ship Model Club  
of Chicago*

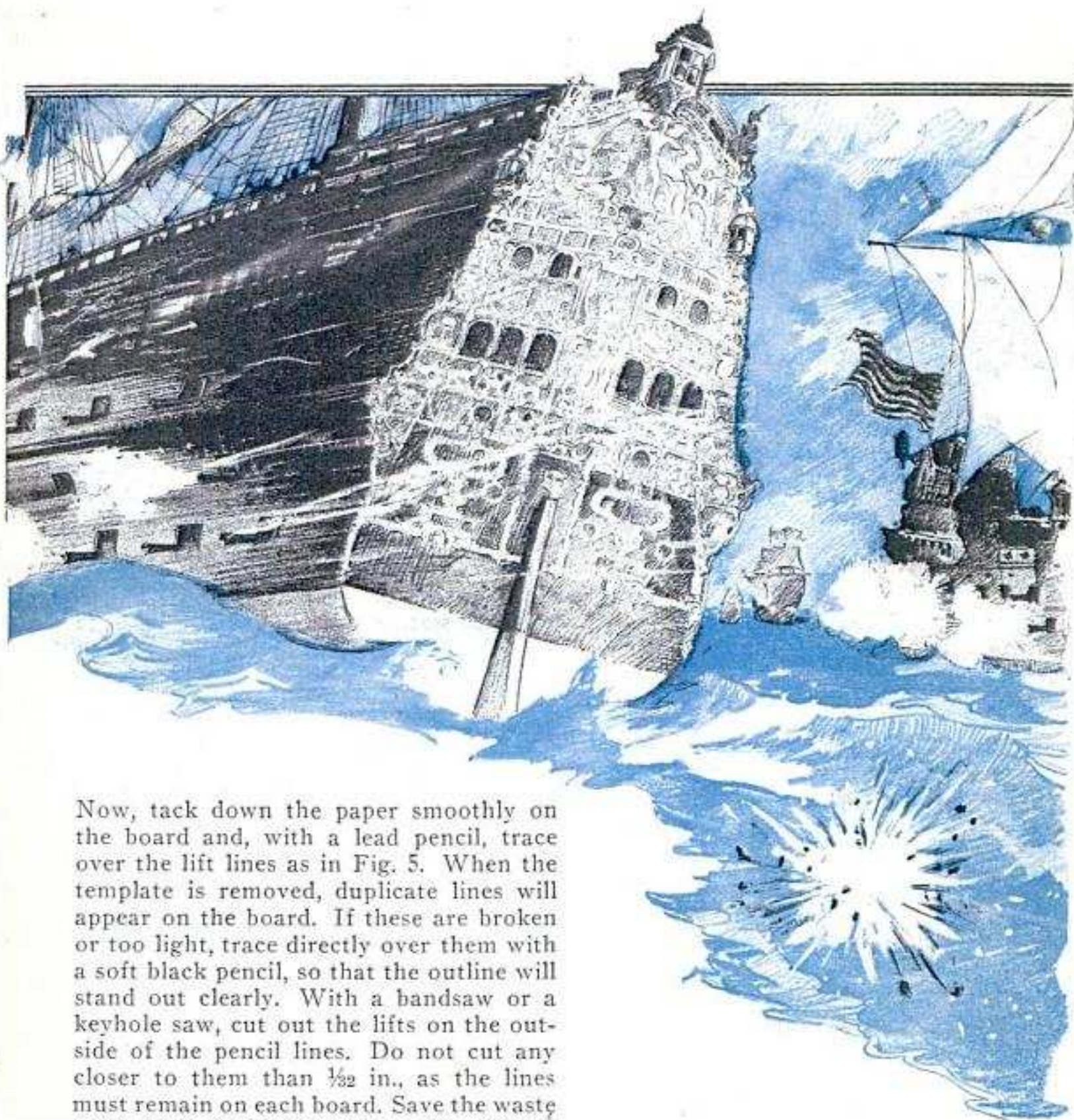
## PART I—SHAPING THE HULL

WITH just a few common tools, materials that cost little, and average patience, you can construct this accurate reproduction of the famous old "Sovereign of the Seas," the most beautiful warship that the world has ever known.

For the hull you will first need six boards, or lifts, of clear white pine, each 36 by 6 by  $\frac{3}{4}$  in. in size. Boards that are not exactly  $\frac{3}{4}$  in. thick are unsuitable. Make sure also, that the boards are thoroughly dry and free from gum and knots, which later might cause warping and splitting. Smooth each of the board sides with No. 00 sandpaper and then bevel off one end of each at a  $57^\circ$  angle to the horizontal surface, as in Figs. 1 and 2. The next step is to make patterns for cutting the lifts to shape. Figs. 6 and 7 give the lift lines. In making up the lift plan, rule off the paper in  $1\frac{1}{4}$ -in. squares and draw in the lift lines carefully; or, better still, get a set of blueprints that carry the lift lines in full size, enabling you to trace them as in Fig. 1. Cut six strips of tracing paper

or tough tissue paper, each 30 in. long and 6 in. wide. Fold the strips down their lengths so that, when thus doubled, each becomes 3 in. wide. One at a time, line up the fold of each sheet with the center line on the plan of lifts, but unfold the paper so that only one-half of it covers the lift lines. Beginning with lift line No. 1, trace each one on the paper, one line to a sheet. This done, fold each paper again as in Fig. 4, and trace a duplicate line on the second half, to get a complete symmetrical pattern. The result provides you with six full-width drawings of the lifts. On the underside of each sheet, cover the lines with soft-crayon shading to enable easy transfer of these lines to the lifts, which method is preferable to the use of carbon paper.

Then, one at a time, line up the aft end of each template squarely with the beveled ends of the respective lifts. The shaded side of the paper should make contact with the longest side of the board's surface, the bevel being on the underside.



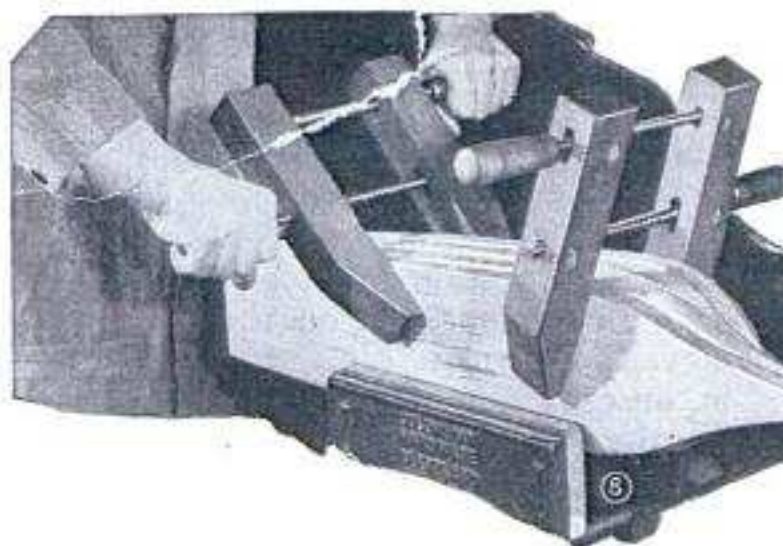
Now, tack down the paper smoothly on the board and, with a lead pencil, trace over the lift lines as in Fig. 5. When the template is removed, duplicate lines will appear on the board. If these are broken or too light, trace directly over them with a soft black pencil, so that the outline will stand out clearly. With a bandsaw or a keyhole saw, cut out the lifts on the outside of the pencil lines. Do not cut any closer to them than  $\frac{1}{32}$  in., as the lines must remain on each board. Save the waste stock from the boards; it can be used for the upper works. Next, draw a pencil center line down the long top side of each lift, and an adjoining center line on each beveled end. On each center line, locate the point at which station line No. 11 will cross.

Draw this station line across the tops of all the lifts, continuing it down the edges of each board. This is the midship point of the hull, the marks enabling you to properly line up the lifts when gluing. Now, take lifts Nos. 3, 4 and 5; on the center line of each, measure  $4\frac{1}{2}$  in. forward and 8 in. aft of station line No. 11. On the latter line, measure  $1\frac{1}{4}$  in. out

from the center line toward each side. Connect these points to form a penciled rectangle as shown in Fig. 10, and saw this part out in order to lighten the hull block.

Gluing the lifts together is next. You will need waterproof casein glue for this job, to assure strength and permanency. It is obtainable in package form as a dry powder, being sold at nearly all hardware stores. Full directions for mixing this glue are printed on each package. Follow these instructions carefully so that the mixture will have a smooth, creamy consistency, after which it is ready to apply.



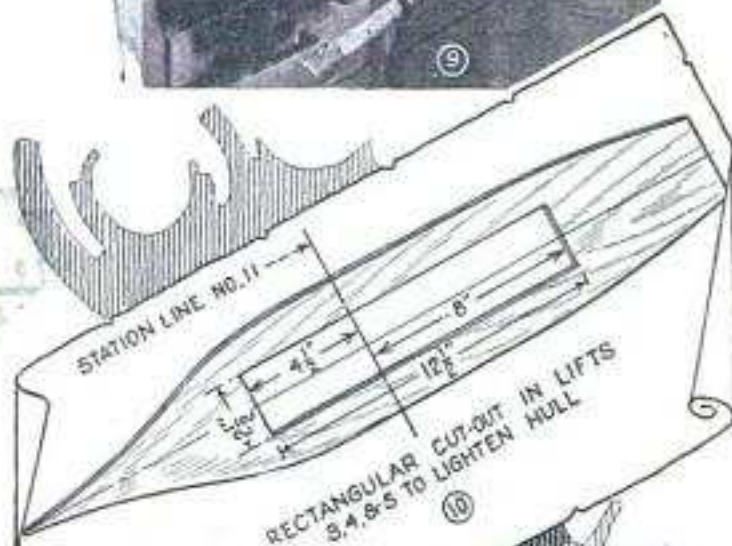


LEFT, WOOD CLAMPS AND VISE HOLD LIFTS TOGETHER WHILE GLUE SETS  
RIGHT, ROUGH SHAPING OF CENTER SECTION OF HULL

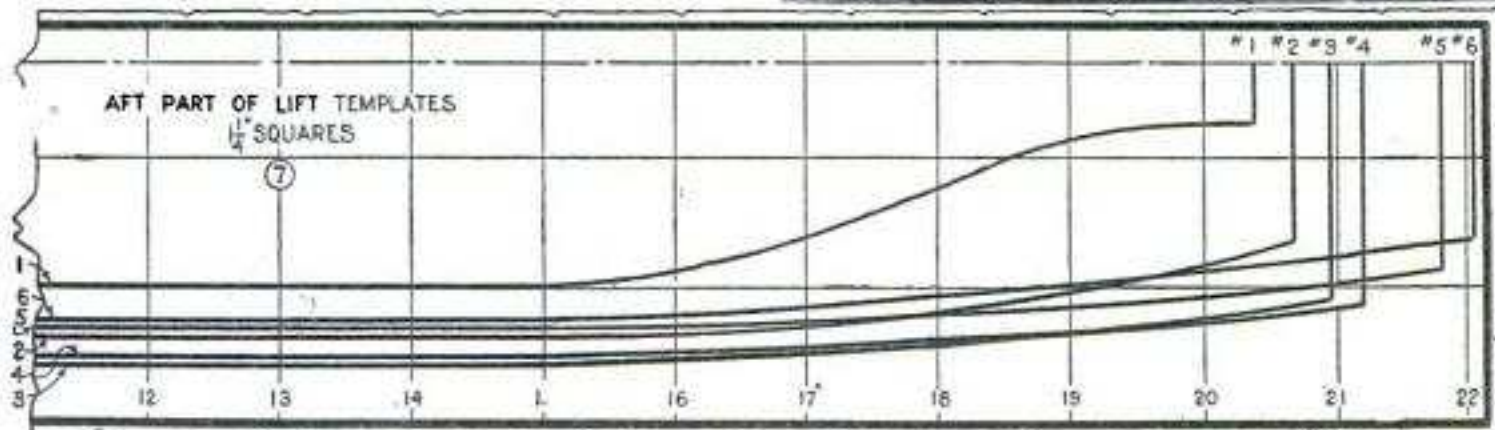


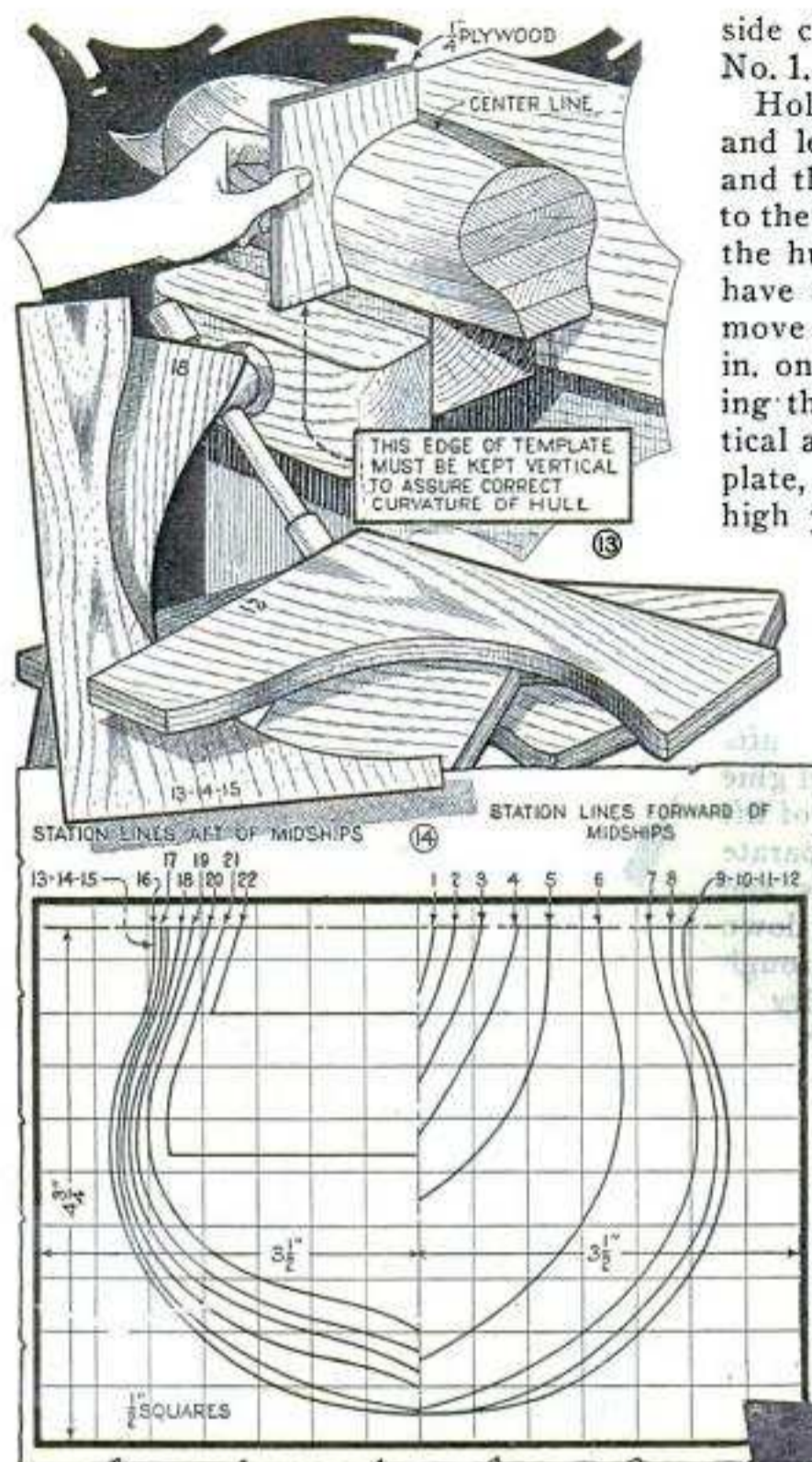
least moisture from the air. While the others are drying, locate the junctures of station lines Nos. 1 to 22 along the center line on the top side of lift No. 6. Through each point, draw lines across the lift and down each side. After the two sets of lifts have dried, mix fresh casein glue and glue the top of lift No. 2 to the bottom of lift No. 3. Aline these as you did the separate lifts, clamp until the glue partly sets, and then glue the bottom of lift No. 6 down upon lift No. 5. This completes the rough hull block, which you should let dry 24 hours or longer. The beveled aft end of lift No. 5 should be sawed and filed in a smooth curve that joins the bevels of lifts Nos. 4 and 6.

Now we will make the body templates as in Figs. 13 and 14. Cut 17 squares of  $\frac{1}{4}$ -in. plywood,  $4\frac{3}{4}$  in. long and  $3\frac{1}{2}$  in. wide. The lines, numbered 1 to 22, represent the finished cross sections of the hull at each of the station lines of corresponding numbers. One by one, line up a long edge of each wooden square with the center line and, with a carbon paper between the drawing and wood, trace a single curved station line on each piece. Saw reasonably close to the line on the left-hand side of templates 1 to 12, and to the



WATERPROOF GLUE USED ON LIFTS





right-hand side of the lines on templates 13 to 22. Carefully finish down to the lines with coarse and fine sandpaper. You will now note that only one template is required for station lines 9, 10, 11 and 12, and one for station lines 13, 14 and 15. After these templates have been cut, you may begin carving. You will need a sharp spokeshave, a small block plane and possibly a 1-in. carpenter's chisel; also, a soft red or black wax crayon. A block is screwed to the top of lift No. 6 to hold the hull in a vise, enabling you to do the carving with ease. Draw a pencil center line over the bottom side of the hull and then rub a thick coating of the crayon on the in-

side curved edge of station-line template No. 1.

Holding the top edge of the latter flush and level with the top of the lift No. 6, and the long edge exactly at right angles to the same surface, press the piece against the hull at station line No. 1, which you have already marked on the lift. Now, move the template each way for about  $\frac{1}{2}$  in. on each side of the station line, keeping the square edge of the template vertical at all times. When you lift the template, a crayon smear will show at each high point on the hull block. With the

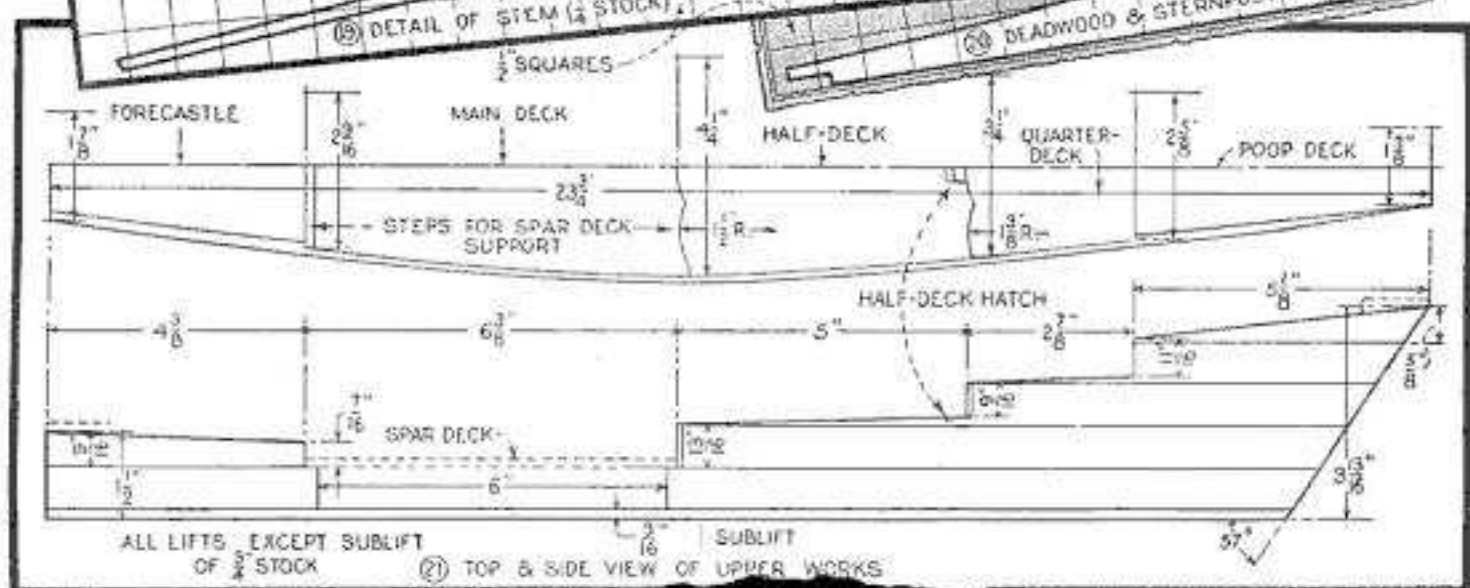
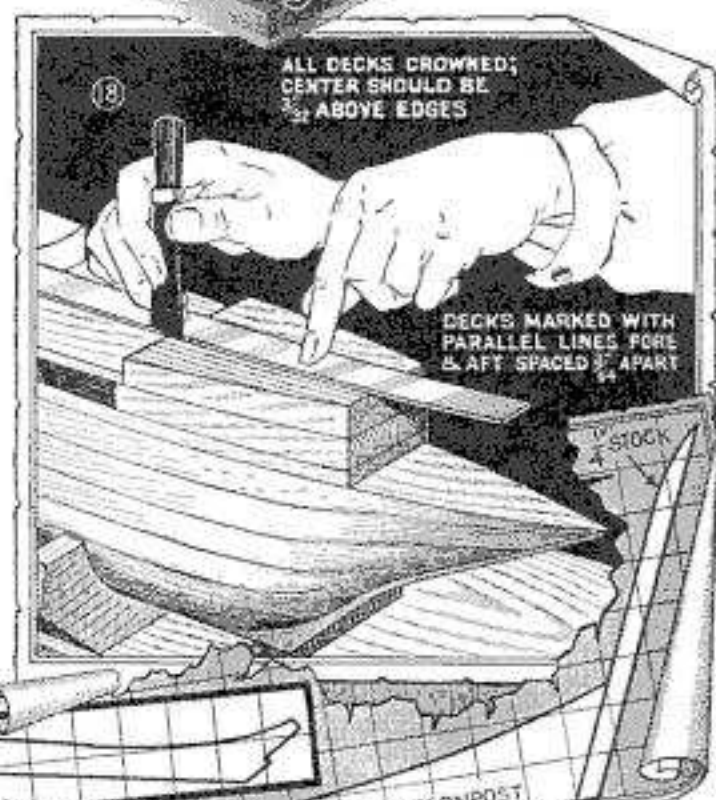
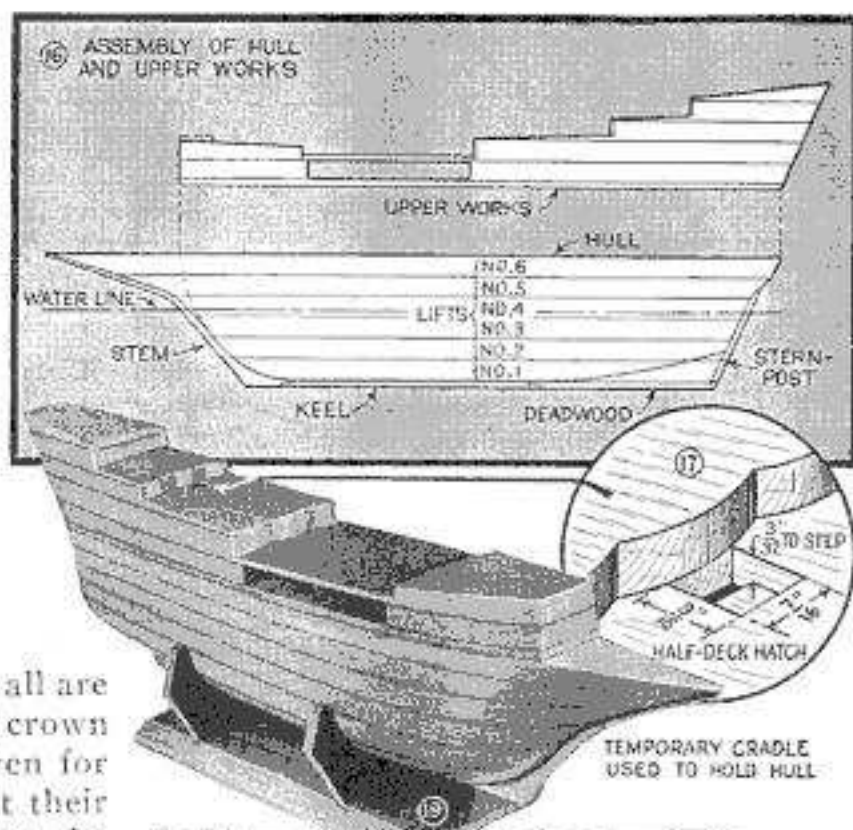
spokeshave, remove the crayon smears only. Then again press the templates against the hull, moving it fore and aft as before to produce more crayon smears and shave these off. Repeat these alternative steps until this section of the hull is near its finished shape. The inside point of the template curve should almost touch the bottom center line of the hull. The same method is followed in carving all the hull sections, which should be done in consecutive order, bow to stern. When working on the broad midship sections, you can use the block plane, as in Fig. 9, or a chisel to help cut away the stock. Be sure to take it easy. Don't make unsightly gouges that you will have to fill in later. After roughing down one side with the tools,



turn the hull and rough down the opposite side in the same way. Finish all sections to the exact template curves with Nos. 1, 0 and 00 sandpaper.

The upper works are next. Using the paper pattern of lift No. 6, cut a sublift from  $\frac{3}{16}$ -in. thick board or plywood. Cut off the point square across, about 5 in. aft of the bow end. Two  $\frac{3}{4}$ -in. lifts are needed for the forecabin and five more of the same thickness for the after decks. Waste stock from the hull lifts may be used. Follow the dimensions for the upper works as given in Fig. 21, cutting each lift to shape before all are glued together. For better effect, crown each deck, from the dimensions given for the edges, to about  $\frac{3}{32}$  in. higher at their centers. The crown is not given on the drawing. Across the decks, from the center to the sides, step off points about  $\frac{3}{4}$  in. apart. Then, mark pencil lines through the points, straight fore and aft. Lay a flexible straightedge along each deck line and, with an old hacksaw blade or putty knife, score V-shaped cuts along the full length of each deck line, as in Fig. 18. Cut the half-deck hatch steps as shown in Fig. 17. The spar deck is made of  $\frac{3}{16}$ -in. wood, fitted and lined. It should also be crowned. Do not glue this deck in place now; only make it to fit in place as in Fig. 19. Then, glue the completed upper works down on top of the hull. When dry, go over the

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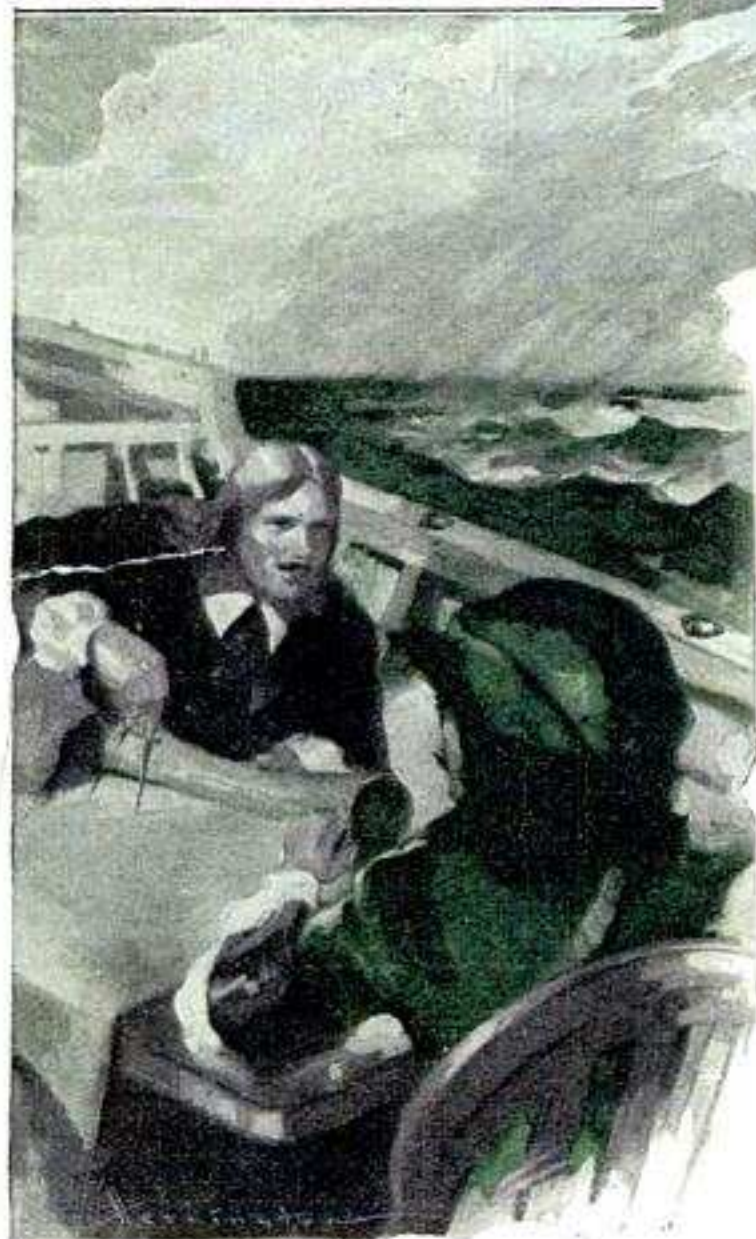
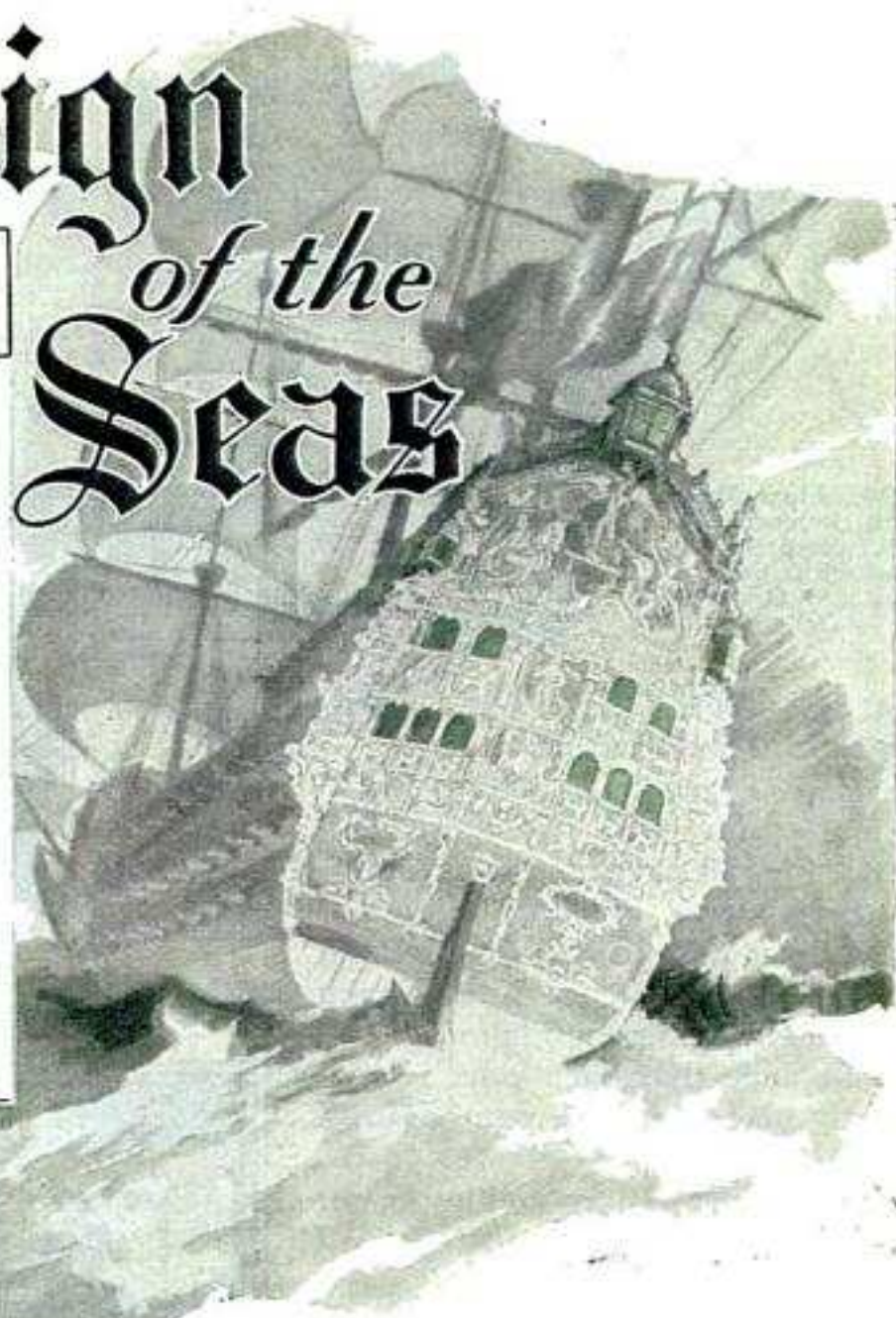
# Sovereign of the Seas

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## PART II—The Rudder, Quarter Galleries and Gunports

AFTER carving the hull to shape as covered in the November issue of *Popular Mechanics*, you will need two main-deck bulwarks to build up the ship's sides just below the spar deck. The bulwarks are simply two strips of white pine, each 6 by  $\frac{7}{16}$  by  $\frac{1}{8}$  in. in size, as shown in Figs. 29 and 30. Into each of these pieces cut five gunports,  $\frac{5}{16}$  in. square, beginning with the center



gunport and locating two more ports on either side. All of the ports should be located so that they come exactly  $1\frac{3}{8}$  in. center to center. This done, mix a little casein glue, and with it attach to each bulwark two  $\frac{1}{8}$ -in. square reinforcing pieces of wood, flush with each end, top and bottom as in Fig. 30. When dry, glue the bulwarks in place as shown on the general assembly, Fig. 28. The reinforcing pieces should be inboard, of course, and the outside of the bulwarks should be flush with the ship's side at the main deck level. Sandpaper the juncture of the bulwarks and the hull side so that the hull curve will flow smoothly into the bulwark face.

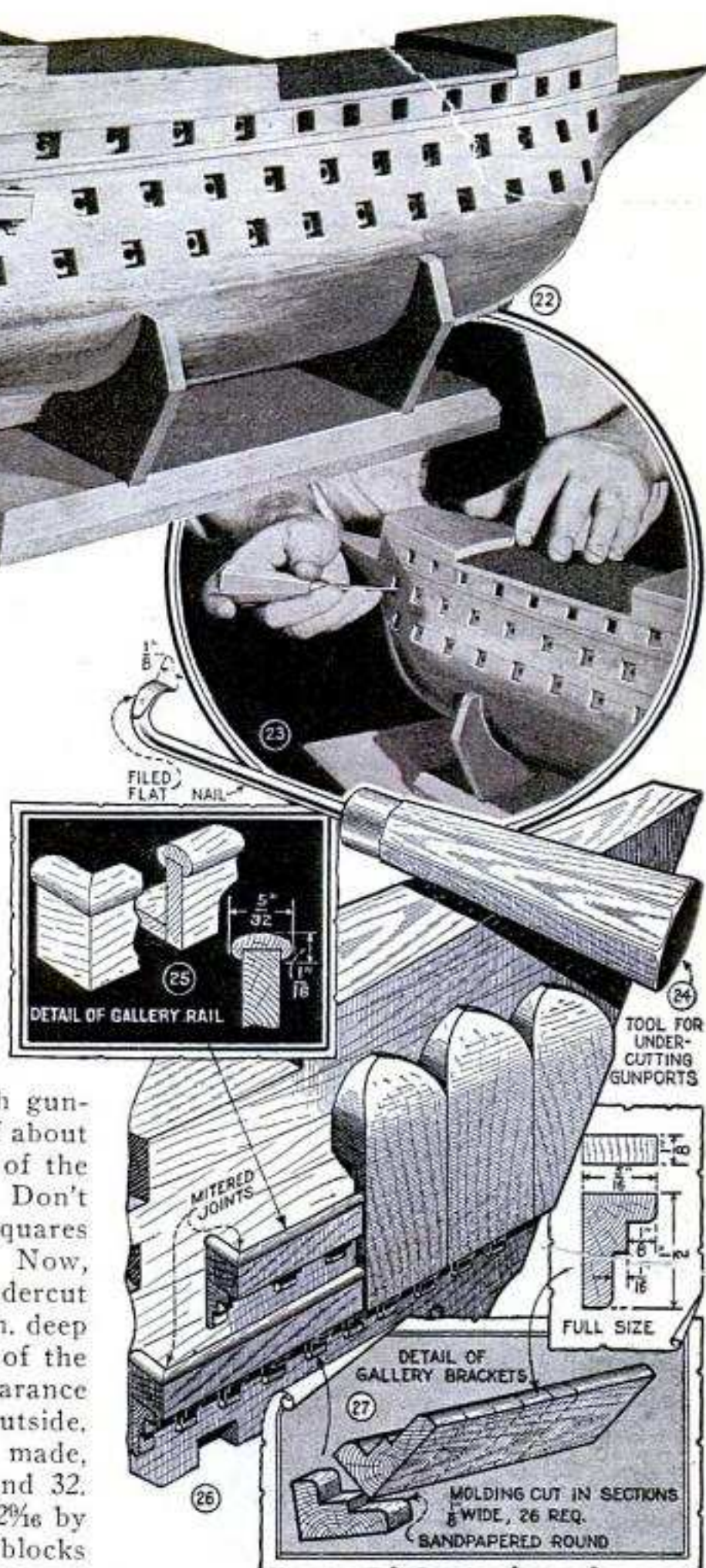
Now, we again take to carving. Beginning with the top row of gunports, draw pencil squares,  $\frac{5}{16}$  in. on a side, to define the gunports to be cut next. The top line of ports is on the horizontal center line of the bulwark gunports. In the next row below, the gunports are centered along

This View Shows the Gunports Cut and the Stern Fitted with the Rudder and Quarter Galleries

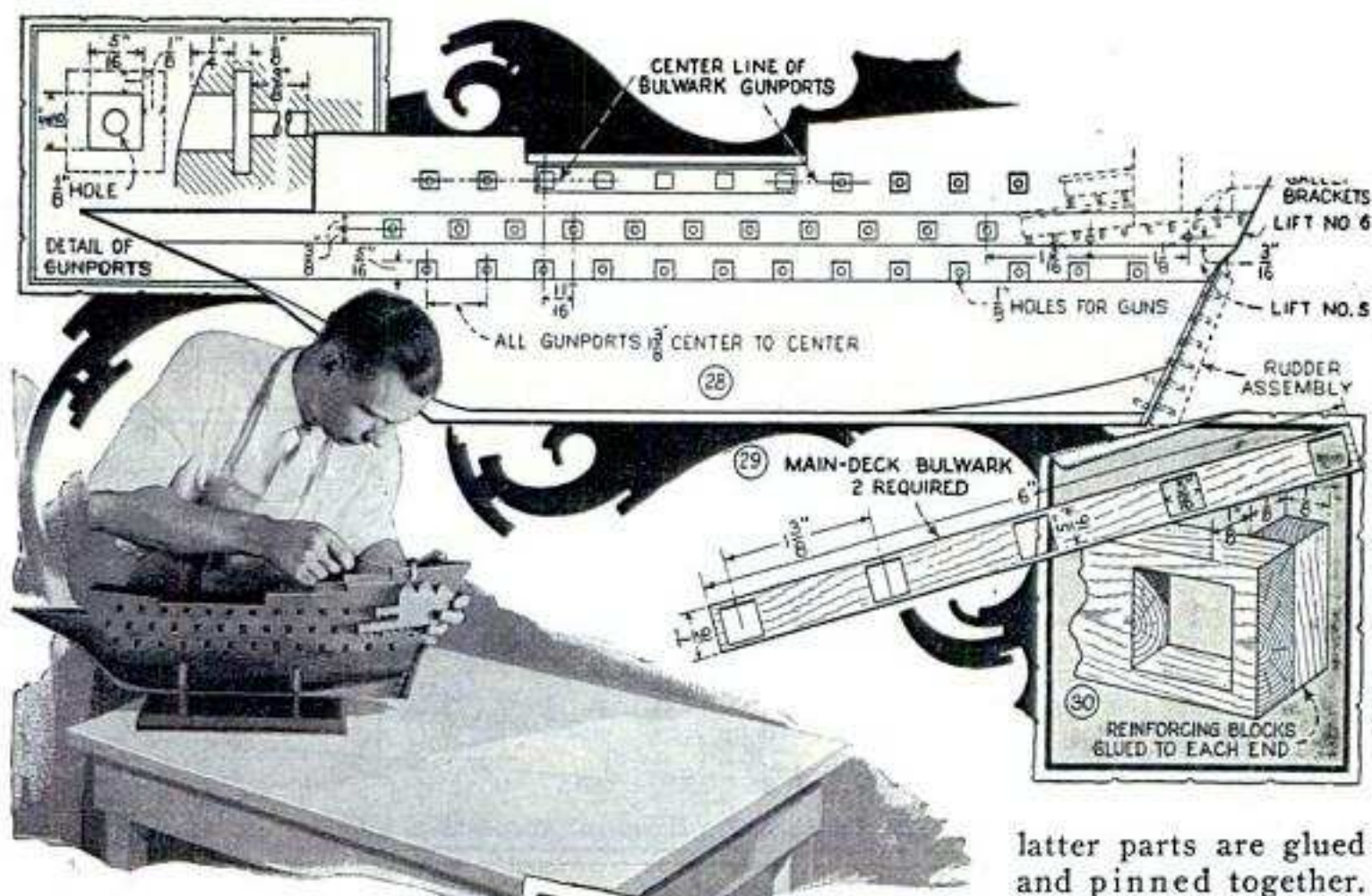
lift No. 6 of the hull. The lowest ports have their bottom edges flush with the bottom edge of No. 5 hull lift. Fig. 28 shows how the gunports of each line are staggered and gives dimensions for locating the gunports in each line. Check your complete pencil layout again to be sure that each port is correctly placed, before you begin to cut.

With a very sharp jackknife, cut deeply along each side of each gunport as marked. Then, use a  $\frac{1}{4}$ -in. carpenter's chisel to sink the holes. These must be cut into the hull squarely to a depth of  $\frac{3}{8}$  in. In the exact center of each gunport, drill a  $\frac{1}{8}$ -in. hole to a depth of about  $\frac{3}{8}$  in. to receive the inboard ends of the guns, which will be described later. Don't overlook the two holes without squares just under the quarter galleries. Now, make a tool, shown in Fig. 24, to undercut all sides of each gunport about  $\frac{1}{8}$  in. deep as in Figs. 23 and 24. The object of the undercut is to produce a hollow appearance of the interior as viewed from the outside.

Two quarter galleries are next made, one for each side; see Figs. 26 and 32. From white pine, cut four blocks,  $2\frac{9}{16}$  by  $1\frac{1}{16}$  by  $\frac{1}{2}$  in. in size. Cut two more blocks of the same thickness, but  $2\frac{3}{4}$  in. long and  $1\frac{1}{16}$  in. wide. One end of each block is cut dome-shaped as shown. Note that greater curves are cut in the two larger blocks. Now, on the flat back side of two small blocks, measure down  $\frac{1}{2}$  in. from the point where the dome curve meets the

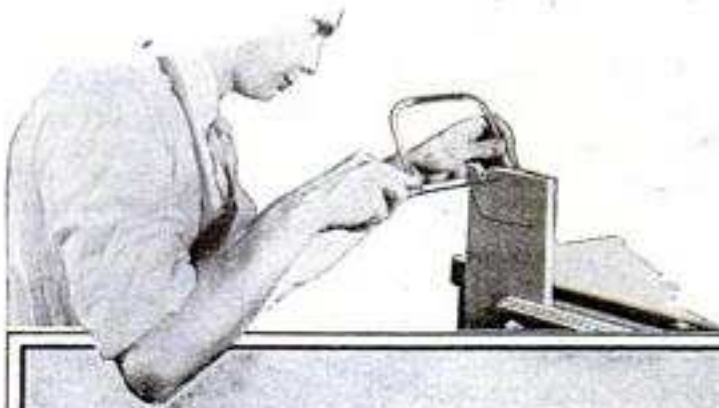


vertical side. Draw a line straight across each piece and, from this point down, cut away the wood so that only a  $\frac{3}{32}$ -in. thickness remains as the outboard side, as shown in Fig. 32. Glue the blocks together, as shown, in sets of three, one large



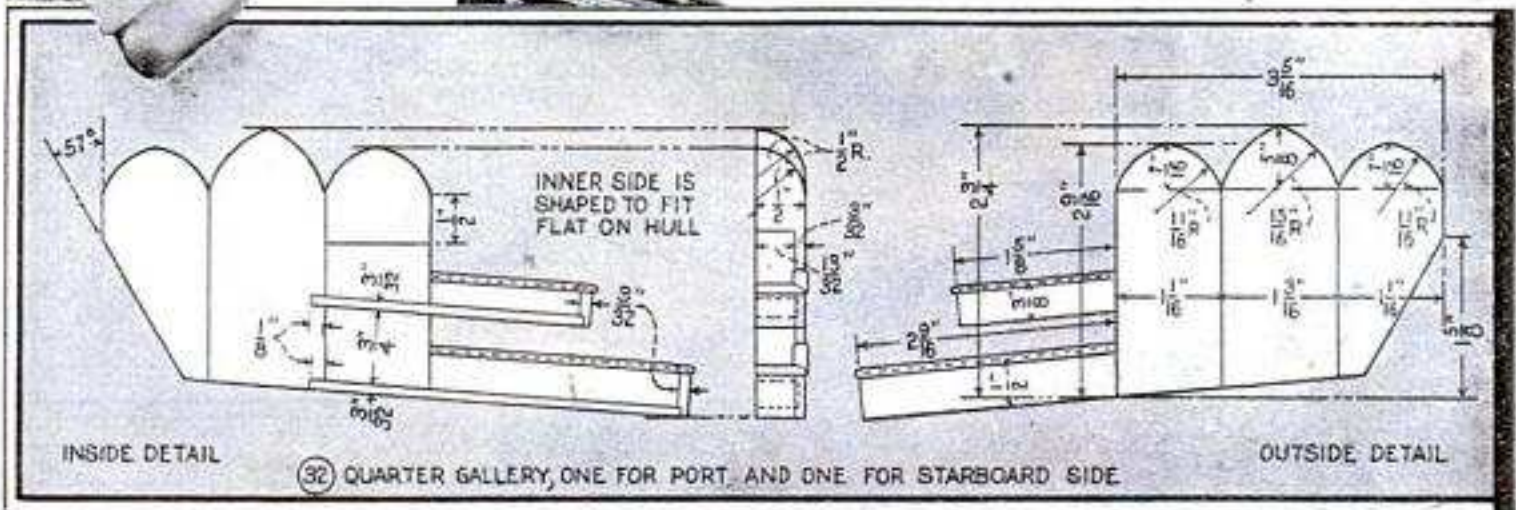
block between two smaller ones. On one set, glue the cut-away block to the right of the center block; on the other set, glue the corresponding block to the left of the center. The gallery rails, rail tops and decks are made as shown in the quarter-gallery details. Cut the stern angle and the bottom angle in each set of blocks. Then, mortise shallow channels in the inner side of each cut-away and middle block, to receive the parts of the gallery decks that continue aft on their inner sides. You can buy fine pins, called "lills," at your stationery or department store, which provide excellent fastenings for all small parts on the ship, including the decks and rails of the quarter galleries. These

latter parts are glued and pinned together.



31, is full size, and, to get the proper offset for the rounded section at the top, trace the outline first on tissue paper and then onto the wood, following the same method you did when laying out the hull lifts.

The aft side of the rudder is cut down to  $\frac{1}{8}$  in. thick; the top, just under the rounded section, is  $\frac{5}{16}$  in. wide from the forward edge, and the bottom measures  $\frac{5}{8}$  in. wide from the same edge. Two shal-



with  $\frac{1}{16}$ -in. wood dowels, driven through holes that go through the two solid gallery blocks and into the hull on each side. After this, you can use lills to secure the decks and rails where they meet the hull.

You can make the gallery brackets while the glue on the two assemblies dries. It will save time if you form these as molding strips from  $\frac{5}{16}$  by  $\frac{1}{2}$ -in. square white pine. Make lengthwise cuts and sandpaper the curved edges of the sticks as shown in the detailed drawing of the gallery brackets, Fig. 27. Then cut  $\frac{1}{8}$ -in. sections from the molding to make the individual brackets. After cutting, carefully sandpaper off any fuzzy edges left by the saw on the brackets, as this will detract from their appearance when on the ship. Twenty-six brackets will be required, three to be equally spaced on the underside of each gallery deck, and ten spaced out under the lower gallery deck. It will be necessary to change the right angle of the backs of the brackets so that they will fit snugly against both deck and hull. However, this angle depends upon the exact shape to which you have carved your hull, and so cannot be determined here. Attach the brackets with lills and glue.

Make the rudder, as a single piece, from a good, clear strip of white pine, 5 by 1 by  $\frac{3}{16}$  in. in size. The rudder drawing, Fig.

low V-cuts are made parallel to the forward edge from the bottom of the piece to represent planking. Seven notches,  $\frac{1}{16}$  in. wide and  $\frac{1}{32}$  in. deep, are cut into the forward edge, as shown in the same detail, to receive the pintle and gudgeon or hinge fittings, which attach the rudder to the ship. Similar notches are cut into the sternpost, but are staggered below those of the rudder when it is in position. Check the position carefully with the drawing before cutting the notches. When the rudder is attached, the bottom edge must be cut as a continuation of the straight line of the keel. Don't trim this until you have actually hung the rudder, for you may have to make some adjustments—up and down—to get the rudder in the position that looks best to you.

Pintle and gudgeon fittings are next. A flat cigaret tin will provide metal of suitable thickness from which they can be cut. From this, cut 14 strips, each  $\frac{1}{16}$  in. wide and 2 in. long. Bend these in the middle and, using a common pin, form the eye at the upper end of each by putting the pin in the angle and pressing the metal together with a pair of pliers, just under the pin. Further development of these fittings is shown in the details of Fig. 31. Insert a pin in each eye of seven fittings only and

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# Sovereign of the Seas

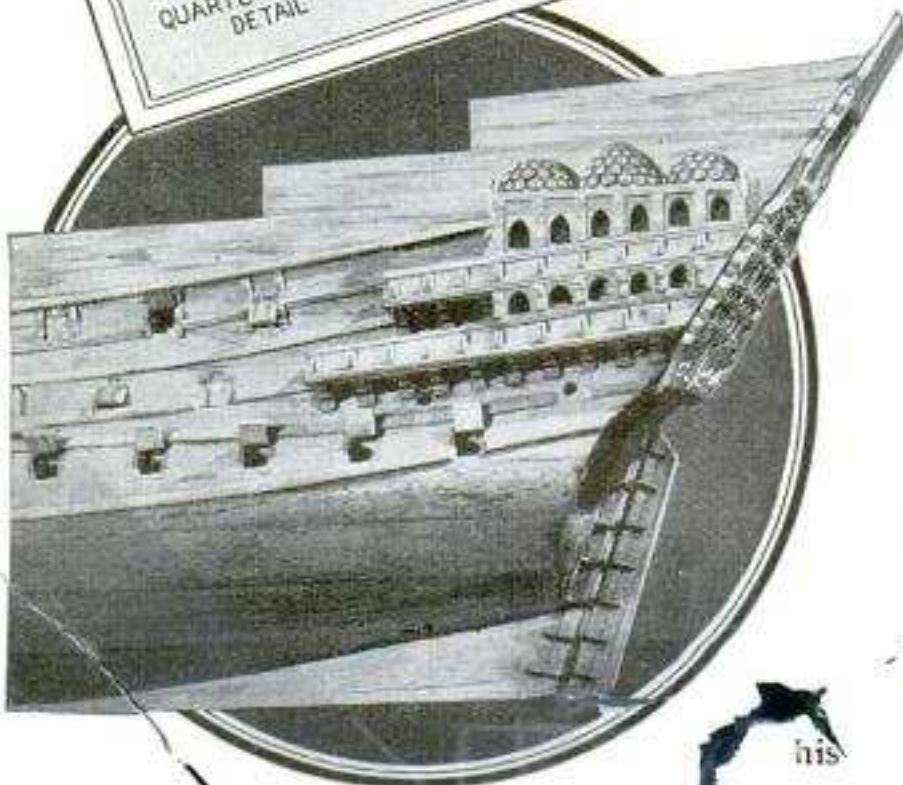
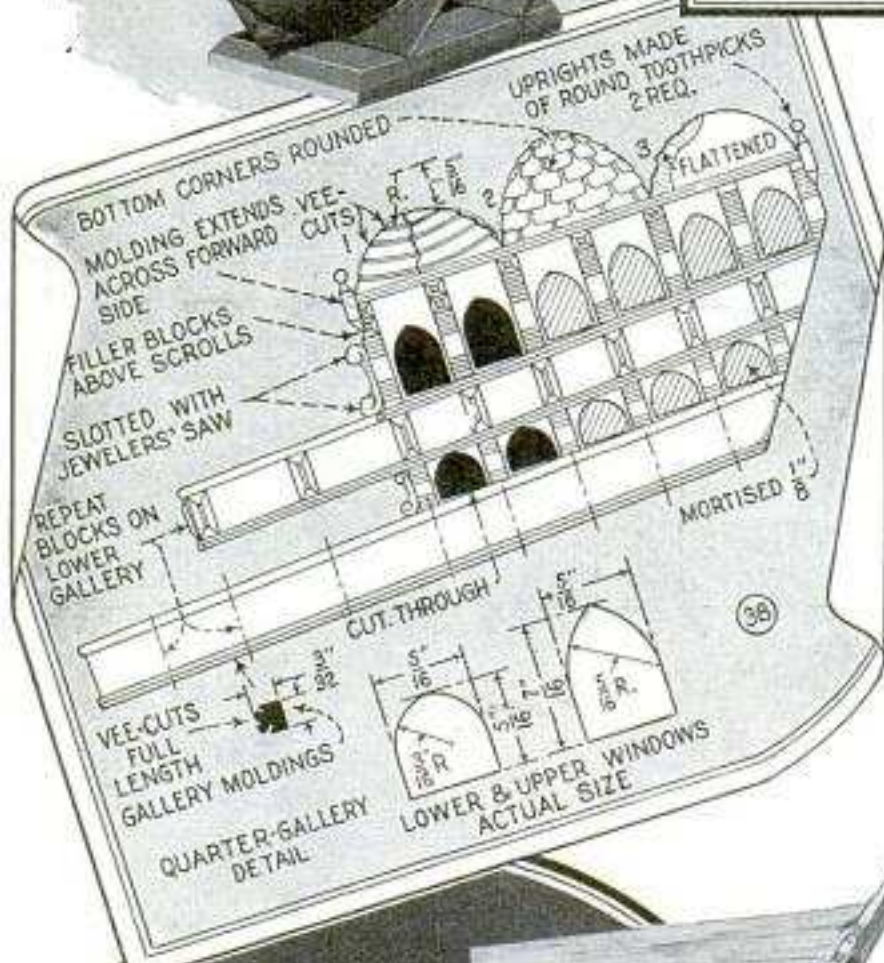
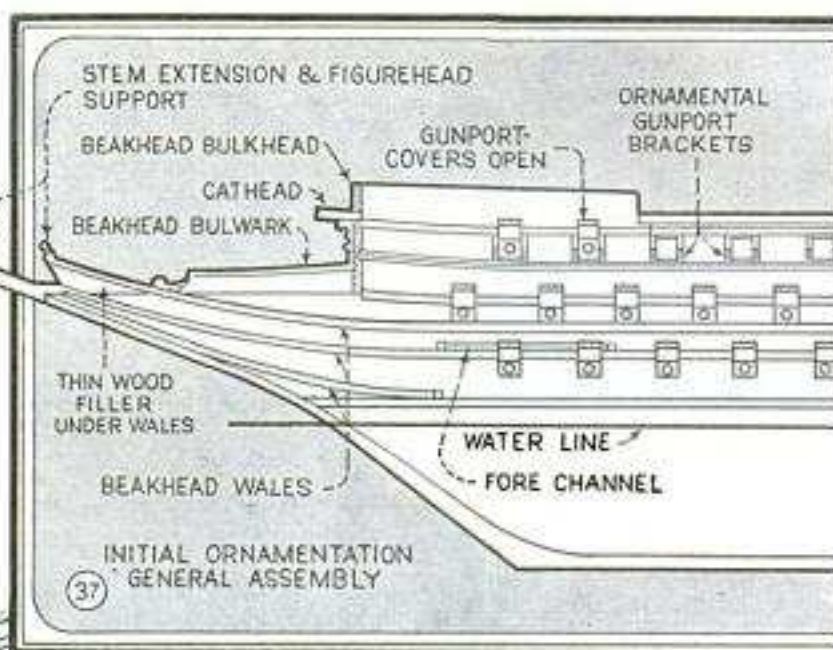


## PART III—Wales, Gunport Covers and Initial Ornamentation

CROSS sections of the wales, which are made of maple, are shown in Fig. 41 and their position in Fig. 37. The thickness of the beakhead wales is the same throughout their length, but the depth tapers to about  $\frac{1}{8}$  in. at the forward end. Before rounding main wale No. 2, it is slotted down the middle, either with a small circular metal-cutting saw or by hand, using the sharpened tang end of a small file. Temporarily, main wales Nos. 1 to 5, inclusive, are allowed to extend about 1 in. beyond the vertical line of the beakhead bulkhead. Use waterproof casein glue and lill pins, with heads clipped and riveted over with a light ball-peen hammer, to attach the wales to the hull.

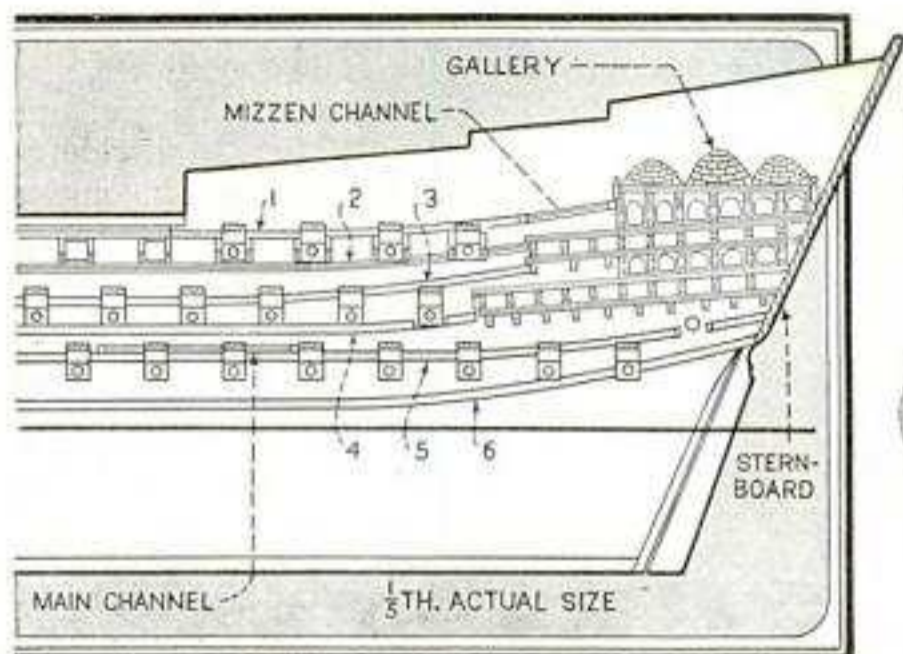
Before attaching the beakhead wales, the stem extension and figurehead support, Fig. 40, are installed. When you have completed this small assembly, cut off the sharp beakhead point about  $\frac{1}{8}$  in. back and mortise the beakhead deck,  $\frac{1}{16}$  in. deep, on the center line to receive the new fitting. You can now apply the three beakhead wales. In a vertical line with the beakhead bulkhead, above, join the upper ones by half-lap joints with



CLAMPING GUNPORT BRACKETS  
ON MAIN-DECK BULWARKS

wales Nos. 4 and 5. Just before pinning and gluing the top beakhead wale to the inboard upright of the new fitting, insert a thin triangular wood filler between the two. This can be made from a match box. Exact dimensions cannot be given for the curves of the beakhead wales, but reference to Fig. 37 will enable you to locate these wales properly.

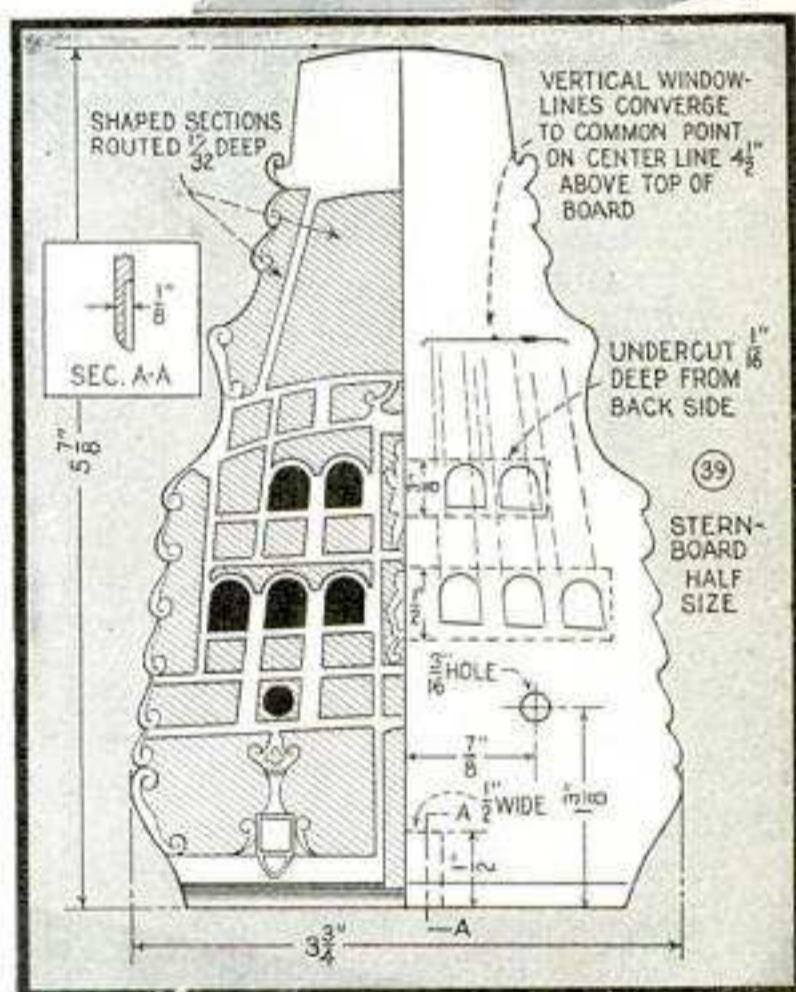
The beakhead bulkhead is made of maple. (See Fig. 40.) Its base is the exact width of the beakhead deck. The sides are flush with the sides of the forecastle, while the top edge comes flush with the forecastle deck. Next, locate centers for two  $\frac{1}{16}$ -in. holes to receive the heavy bracing cables that will extend downward from the holes to the beakhead deck. Four  $\frac{1}{8}$ -in. holes for gunports are also drilled. The door measures  $\frac{3}{4}$  by  $\frac{3}{8}$  in. and is located on the center line of the bulkhead,  $\frac{1}{2}$  in. above the deck. Fit it with a maple sill,  $\frac{1}{32}$  in. thick, and frame the top and sides with other pieces of the same thickness. Attach the door trim with casein glue. A pair of catheads are made from  $\frac{5}{32}$ -in. square maple, the edge and back of the bulkhead being mortised to receive them. Before attaching, drill and file a vertical sheave slot through each cathead,  $\frac{1}{32}$  in. wide and  $\frac{1}{8}$  in. long, about  $\frac{1}{16}$  in. in from the outboard end.



MORTISING  
STERNBOARD  
WITH CARVING  
CHISEL



After the glue on the catheads has dried, drill small holes through them and into the bulkhead to take dowels made from round toothpicks, gluing these in place. Cut off the inboard ends of the catheads flush with the back side of the bulkhead. Figures D are conventional representations of human figures. However, the effect would be better if these were actually shaped to human likenesses. To prevent splitting, make the cathead brackets C of three-ply maple. You can glue this up yourself in the small-size pieces required. Brackets F are made first as a section of molding, and then each is cut  $\frac{1}{8}$  in. wide. Trim the top of the two outer brackets on both sides to accommodate the curved molding above. Now, glue the completed bulkhead assembly to the forward side of the forecastle. Glue and pin main wales Nos. 1 and 2 to the sides of the bulkhead and bevel their forward ends flush with the exposed forward side of the bulkhead. The beakhead bulwarks, detailed in Fig. 40, are of two pieces, the top rail being pinned and glued on the top edge of the lower piece, and rounded after the glue has dried. Bevel the bottom edge of each bulwark so that it is flush with the flare of the beakhead below. The bulwark abuts the bulkhead, the top rail being beveled to join the edge of the latter. Make another strip of molding for the upper gunport brackets. When formed, cut each bracket off the strip,  $\frac{1}{16}$  in. thick, and glue one bracket at each side of each upper gunport only. The forward brackets fit ni-

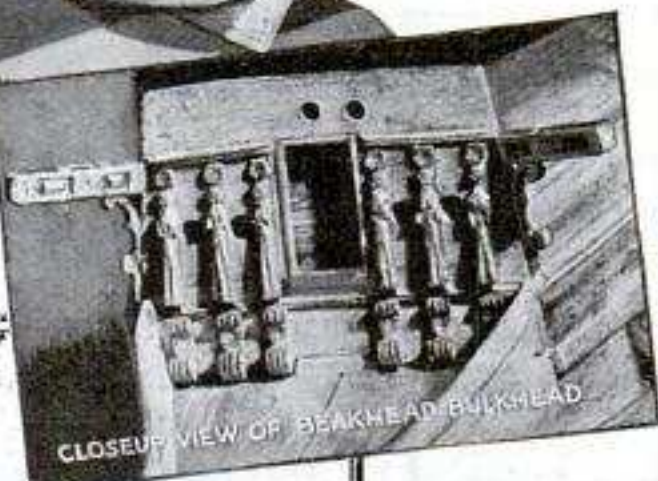
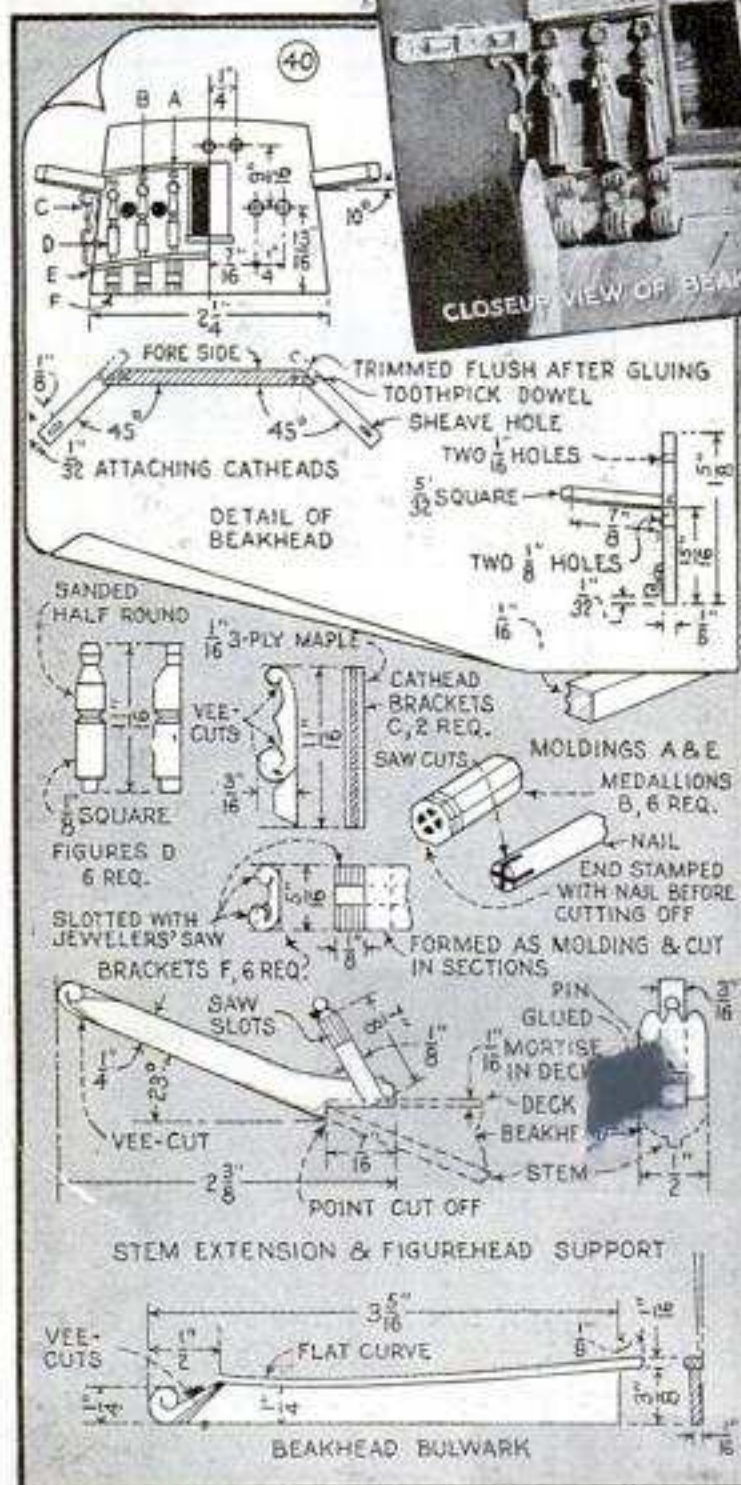


bet main wales Nos. 1 and 2, but these holes must be cut out to take the brackets of the last two gunports aft.

Carving on the three quarter-gallery domes is shown in Fig. 38. Cut four windows through the forward section of the gallery and route the others  $\frac{1}{8}$  in. deep. The lengthwise gallery moldings are made from strips of maple, as shown in the detail of Fig. 38. Brackets,  $\frac{1}{8}$  in. wide, are



View Showing Finished Beakhead Bulkhead with Catheads; Stern Extension and Figurehead Supports; Beakhead Wales and Bulwarks



CLOSE-UP VIEW OF BEAKHEAD BULKHEAD

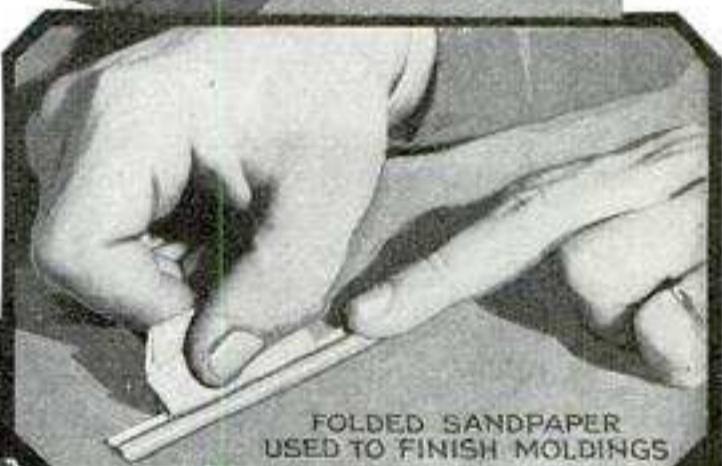
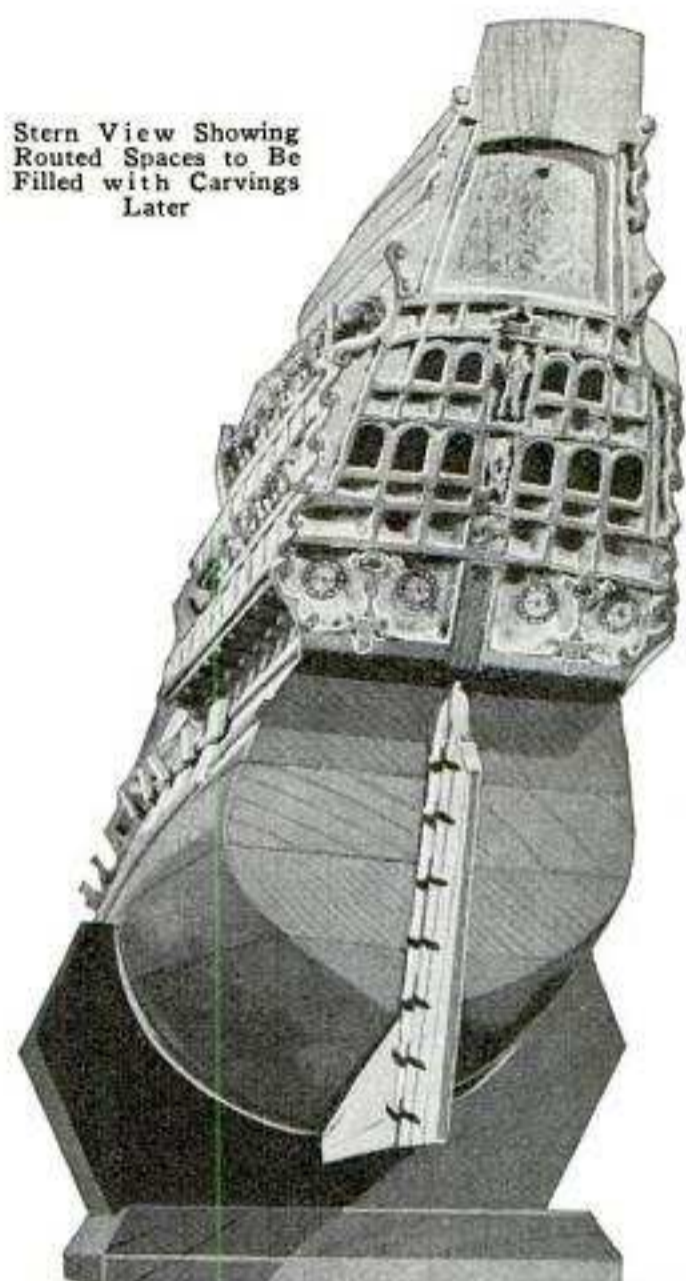
glued in the spaces between the windows, one at each corner, and one on the forward side of each gallery. The lower brackets are shorter than those above. Just below the rails, small rectangular blocks are attached in line with the brackets above and below, and extending at regular intervals forward along each open gallery section. These are  $\frac{1}{8}$  by  $\frac{5}{16}$  by  $\frac{1}{16}$  in. in size and beveled on all four edges. One of each is also glued to the forward end of each open gallery. From toothpicks, make decorative uprights and attach one at each end of the topmost molding, which should be notched to receive them.

The sternboard is cut from maple stock,  $3\frac{3}{4}$  by  $5\frac{7}{8}$  by  $\frac{1}{8}$  in. in size. Follow Fig. 39 for details. The sternboard curves can be cut either by hand or on a power jigsaw. Make a full-size tracing on drawing paper, and transfer the surface decorations to the sternboard, following the same method you first used to lay out the hull lifts. Ten windows are cut through the board, as shown, while the shaded sections are routed out  $\frac{1}{32}$  in. below the surface. Round the bottom edge of the board to a curve that will match nicely with the curve of the stern, which it joins. At the bottom, on the reverse side of the board and centered, cut out a  $\frac{1}{2}$ -in. square  $\frac{1}{8}$  in. deep, to provide clearance for the rudderpost. Do not attach the sternboard permanently; tack it in position with two or three light nails, pending further decoration that will be described later.

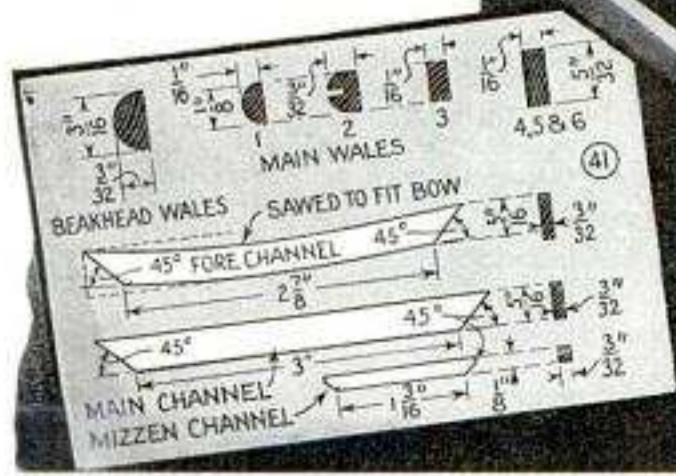
The fore channel is made of  $3\frac{1}{2}$  by  $\frac{1}{2}$  by  $\frac{3}{32}$ -in. maple. It conforms to the curve of the bow and should be sawed to insure a constant width of  $\frac{5}{16}$  in. its entire length. Before cutting the wood, make a cardboard template of the curve and fit it to the exact curve of the bow, transferring the curve later to the wood. Between bev-

els, this channel will be  $2\frac{7}{8}$  in. long. Attach with the channel resting on top of main wale No. 5, the forward, outboard corner of the piece about  $\frac{1}{8}$  in. forward of the first gunport in the middle row. The main channel is 3 in. long between bevels and the same in width and thickness as the first channel. It also rests on top of main wale No. 5, its corresponding forward corner exactly in line with the forward side of the seventh gunport aft in the middle row. The mizzen channel is  $1\frac{3}{16}$  in. long between bevels,  $\frac{1}{8}$  in. wide and  $\frac{3}{32}$  in. thick. Flatten main wale No. 1 sufficiently from the quarter-gallery dome forward, to give this channel a good seat. Then glue and pin the mizzen channel in place, directly over the vertical side of the wale. The fore and mizzen channels are likewise glued and pinned to the hull with headless lill pins, driven through their beveled ends. You may make either working or dummy gunports, as in Fig. 33. Fig. 35 shows a jig to hold the gunport covers while you drill small holes through brass and wood for pins, using a vise. Use the clothespin jig as in Fig. 36 to hold the cover and hinge assembly securely, while applying a drop of solder to each end of the hinge pivot. To attach the working gunport covers, insert a thin blade between the wale and hull centrally above the gunport. Then slip the wide section of the hinge under the wale and remove the blade. Try the cover in the gunport to make sure that it fits flush on all four sides. Now, with the cover closed, use the pin vise to drill through the wale and brass to the hull, after which a pin is driven through both, the pinhead clipped off and the end riveted over with light taps of a ball-peen hammer.

Stern View Showing  
Routed Spaces to Be  
Filled with Carvings  
Later



FOLDED SANDPAPER  
USED TO FINISH MOLDINGS



# Sovereign of the Seas

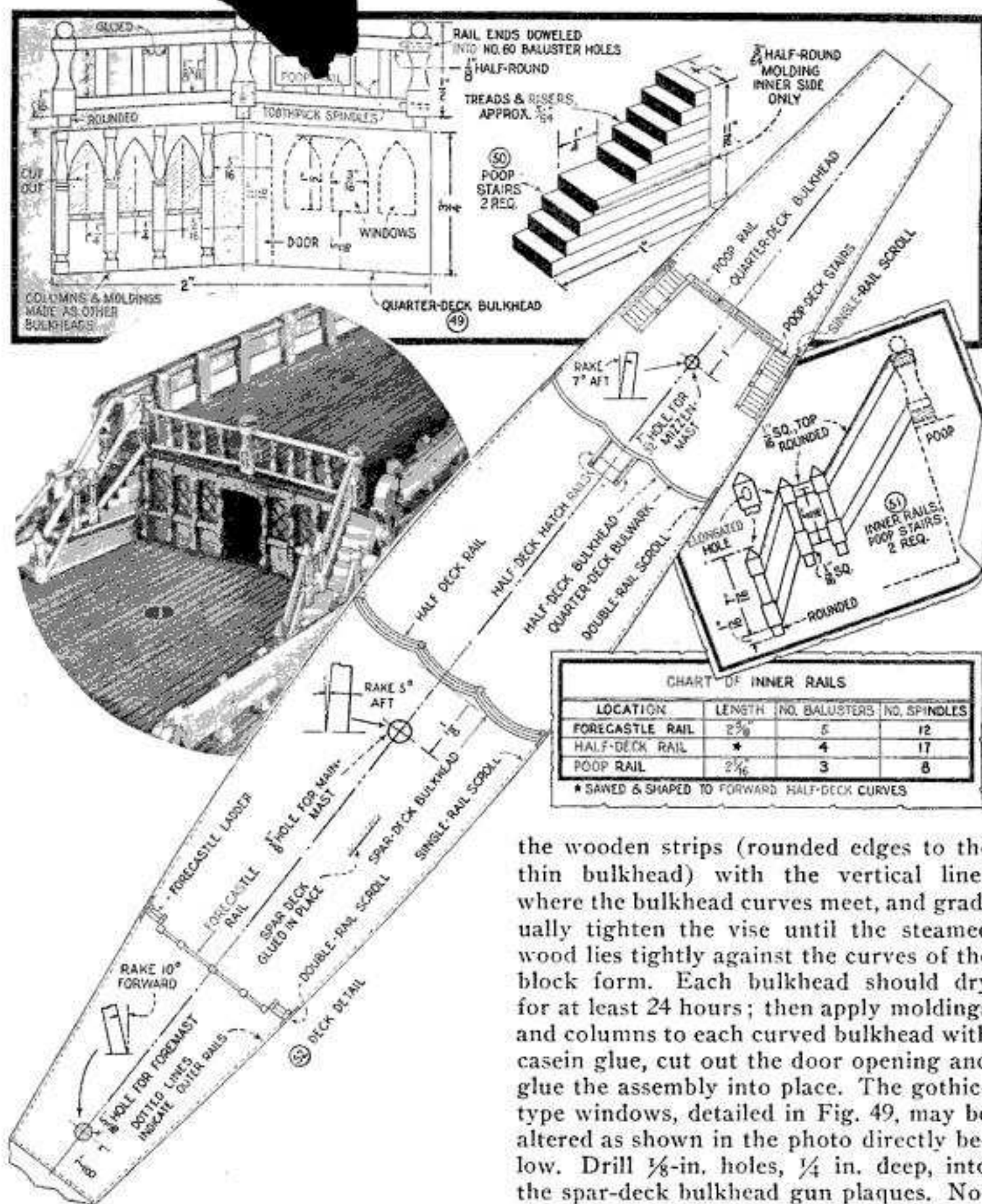


By HAROLD T. BODKIN

PART V—Beakhead Decoration,  
Bulkhead and Rails, Etc.

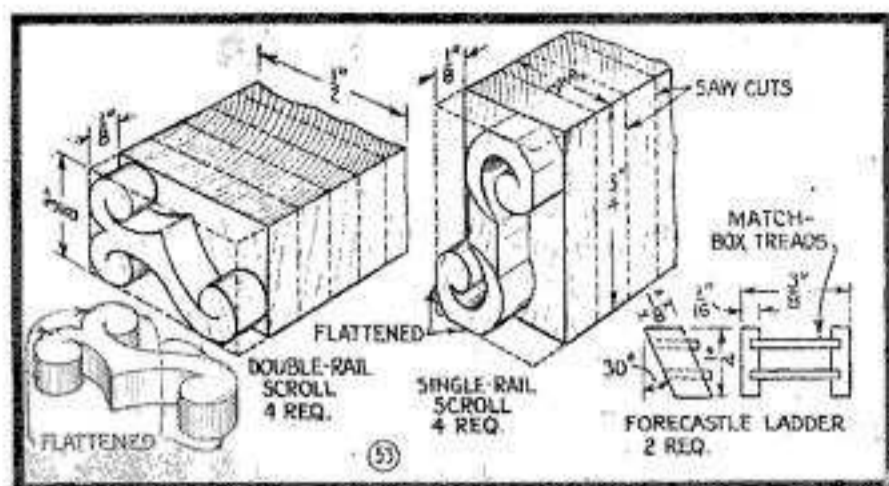
TO provide panels for the carvings on the beakhead, six maple uprights,  $\frac{1}{8}$  in. wide and  $\frac{3}{16}$  in. thick, are half-lapped into the beakhead wales and are attached with toothpick dowels and glue as shown in Fig. 58. Wale No. 3 is extended forward to meet the upward curve of wale No. 4. When these units are dry and sanded flush with the wales, carvings A are fitted into the panels, as was done on the hull. It is necessary to trim very closely to the carving designs to do this; in some cases, parts of the design itself must be cut away. In the smallest panels and on the vertical strips, carvings B may be used. Two gunport wreaths, with ribbands cut off, should be glued into place centrally between wales Nos. 5 and 6 and on the

center lines of the after, short uprights. When dry,  $\frac{3}{16}$ -in. holes are drilled upward and backward into the hull through the wreath centers, into which anchor hawsers will be run later. See Fig. 58. Three bulkheads are required for the after ends of the spar, half and quarter decks as in Fig. 52. These are detailed respectively in Figs. 49, 54 and 57. Except for length, the moldings and columns are all the same. The round columns can be turned from toothpicks and their contours formed with a small round file. When shaped, the columns are split in halves with a razor blade and glued to the bulkheads. The bulkheads proper can be made from thin wooden trays such as are used as lard containers. Cut the half-deck and quarter-



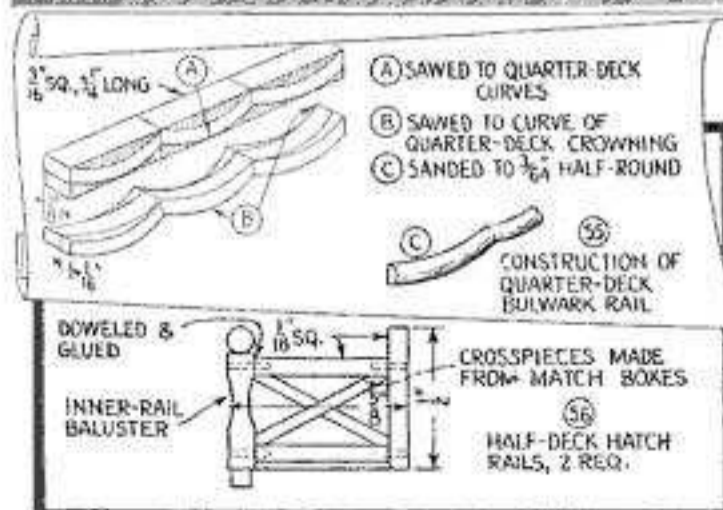
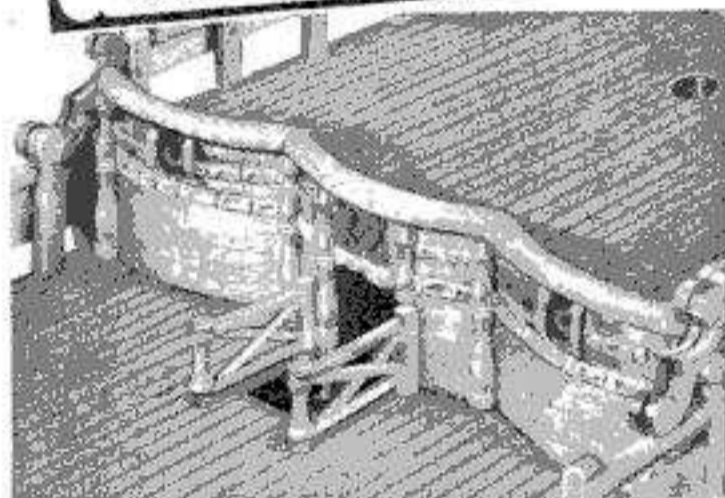
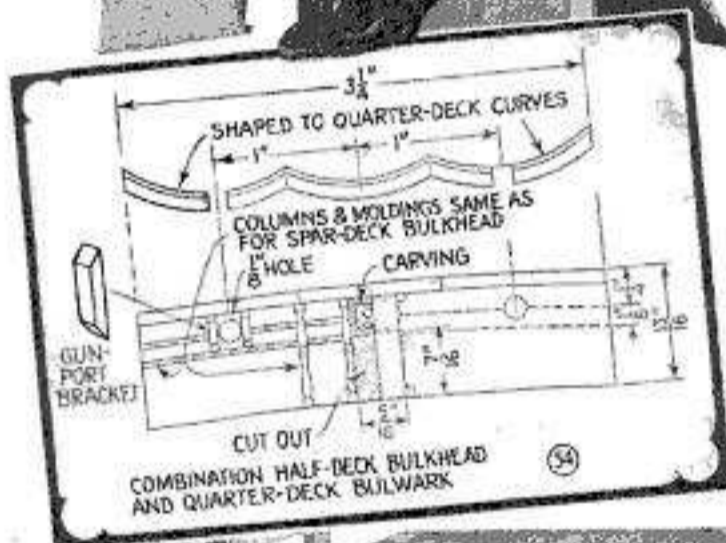
deck forward curves from two pieces of soft wood about 1 in. thick. Also, cut pieces of the same width from the trays, about 1/4 in. longer than the finished length of each curved bulkhead. Steam these pieces for about 20 minutes, then bow them and cleat the outer ends to the ends of the curved block. Round one long edge of two 1/16-in. hardwood strips, 2 in. long. Then, put the block in a vise, aline

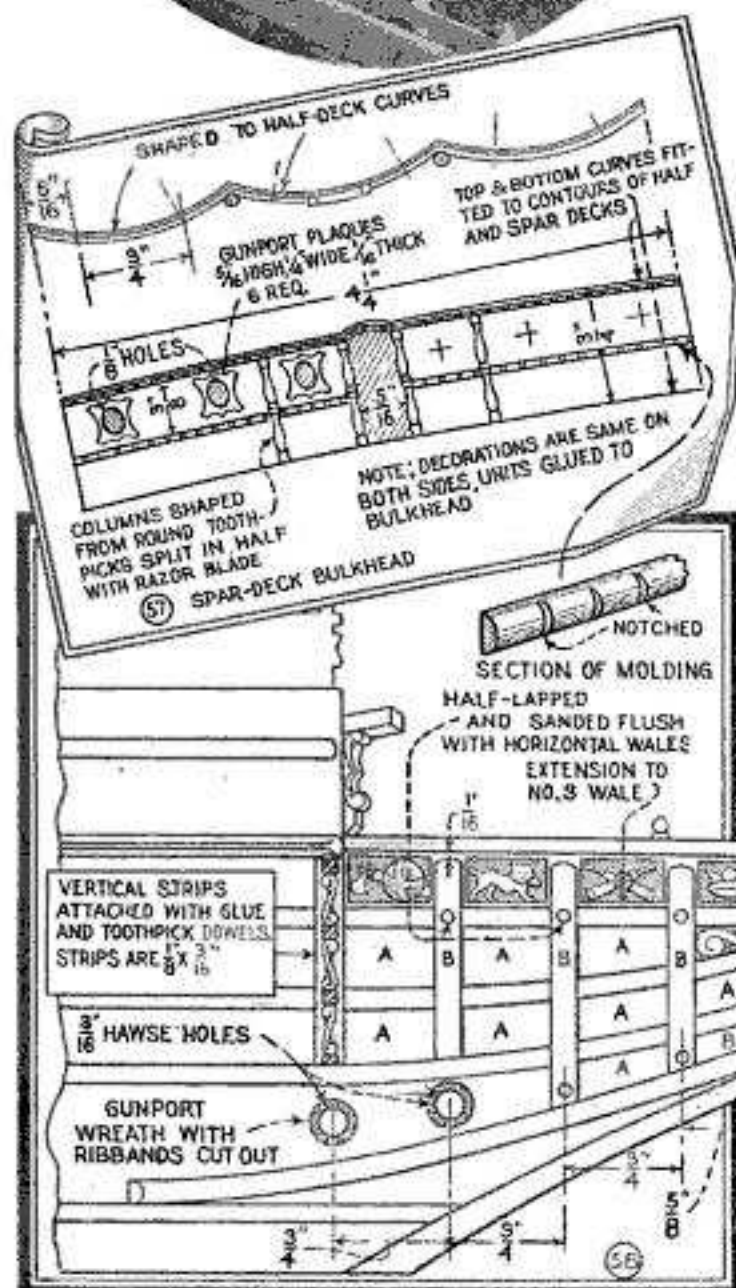
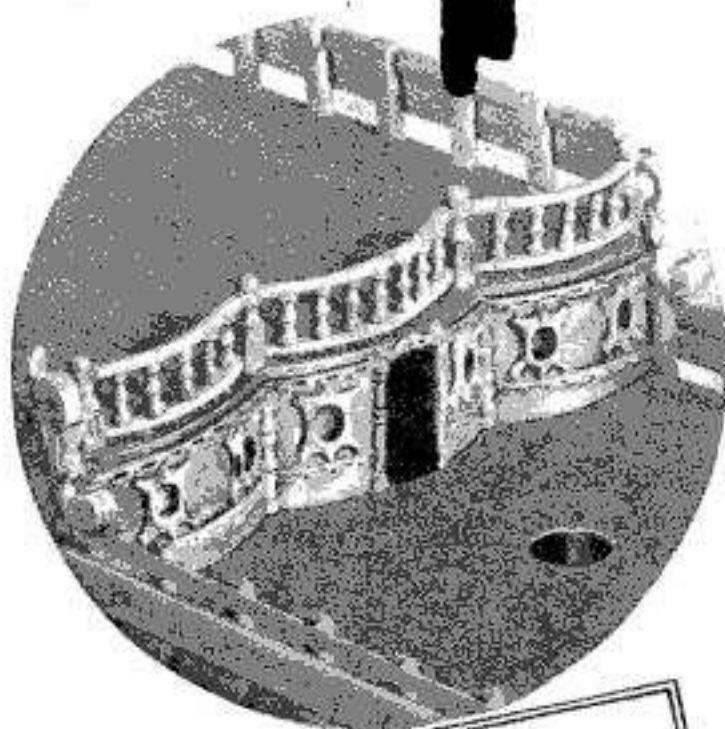
the wooden strips (rounded edges to the thin bulkhead) with the vertical lines where the bulkhead curves meet, and gradually tighten the vise until the steamed wood lies tightly against the curves of the block form. Each bulkhead should dry for at least 24 hours; then apply moldings and columns to each curved bulkhead with casein glue, cut out the door opening and glue the assembly into place. The gothic-type windows, detailed in Fig. 49, may be altered as shown in the photo directly below. Drill 1/8-in. holes, 1/4 in. deep, into the spar-deck bulkhead gun plaques. Notice that the half-deck bulkhead extends high enough to form a forward bulwark for the quarter deck, and that its top is finished off with a half-round rail, made as in Fig. 55. The quarter-deck bulkhead is simply a flat piece of the same thin wood, decorated similarly to those just described. However, before gluing this one in place, cover the window openings from the back side with book-mending tissue tape, available at stationery stores. This



is first ruled on the back side with India ink into  $\frac{3}{64}$ -in. diamond panes and touched up lightly with red, blue and purple oil or water colors to simulate leaded stained glass. The exposed forward side should be covered with very thin orange shellac to age and protect the windows against dampness.

You can finish off the quarter-deck bulkhead by making and placing the two poop stairs, Figs. 50 and 52. Use  $\frac{3}{64}$ -in. hardwood strips,  $\frac{1}{4}$  in. wide, gluing them together to form steps, and then cutting each assembly to proper size. Note the molding on the inner side. Glue and pin it in place, the forward end of each slanting outward parallel to the outer rail. The inside stair rails are detailed in Fig. 51. Round the ends of the horizontal rails and glue them into the holes of the balusters. Instead of regular balusters to support the outside stair rails at the landings, use  $\frac{1}{16}$ -in. square hardwood sticks, pointed at the upper ends. The horizontal outside stair rails are matched for angles with the inside rails and their free ends are joined with the quarter and poop-deck rails. The half-deck hatch requires two rails, made as in Fig. 56. The two balusters are like those used for the other inside rails described below. Horizontal rails,  $\frac{1}{16}$  in. square, the top ones slightly rounded, are joined to each baluster by means of glue and dowels to a third stick, baluster-high, that is glued and pinned vertically against the half-deck bulkhead. The center cross-pieces are made from safety-match boxes and glued in place as shown. Balusters for the forecastle, half and poop-deck rails and half-deck hatch are turned and filed to shape the same as the columns used for the bulkheads, 14 being required. They are equally spaced along each rail as speci-

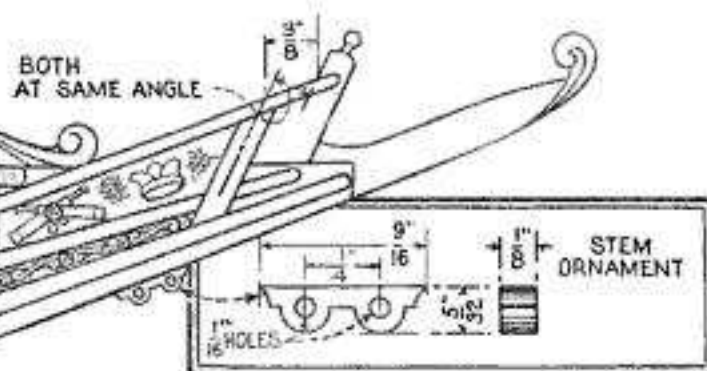




fied in the chart of inner rails. Being straight, the forecastle and poop-deck rails are joined with  $\frac{3}{16}$ -in. half-round maple rails, doweled at each end and glued into holes in the balusters, as in Fig. 48. The curved half-deck rails should be sawed and sanded to shape, as the quarter-deck rail,

and doweled at the ends and glued into the baluster holes. Spindles between the balusters are made from toothpicks, glued equidistantly between the upper and lower horizontal rails, the number required being specified in the chart. First assemble these rails on separate blocks, and install them on the ship after the glue has set, the doweled lower ends of the balusters being glued into holes drilled into the decks. Single and double scrolls, made as in Fig. 53, are used to join the free ends of the outside rails, their locations being indicated in Fig. 52. Glue their flattened areas to the tops and ends of the outside rails in a straight fore-and-aft alignment with the rails. Use strong linen thread to tie the scrolls in place while the glue is drying.

Now, locate the exact centers for the mast holes and drill these into the hull, being sure to observe the rake of each. After drilling through the spar deck and slightly into the deck below, you may remove the spar deck to finish drilling the mainmast hole. All three mast holes should be about 1 in. deep. It will help, if the holes must be drilled by hand, to first drill holes of the same size and slant through small hardwood blocks, and then tack these to the deck to act as guides. Don't overlook the slope of the decks fore and aft, however, when you tack the blocks in place. The rakes of the masts



are given in relation to the vertical; hence the blocks should rest horizontally, in order that they may be true guides. After drilling the mainmast hole, you can glue the spar deck permanently in place.

Two forecastle ladders, Fig. 53, are made the same as the beakhead ladder and are attached as shown in Fig. 52. Glue these in position. Also, pin and glue the stem ornament to the underside of the stem, as in Fig. 58.

# Sovereign of the Seas

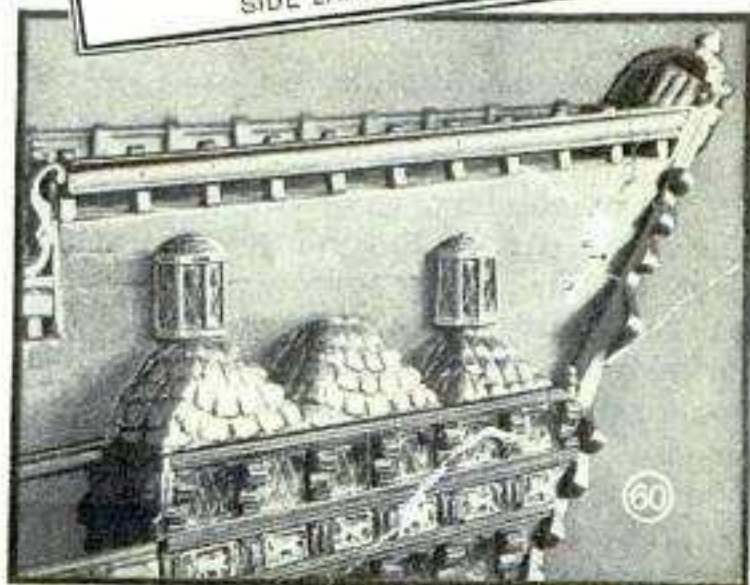
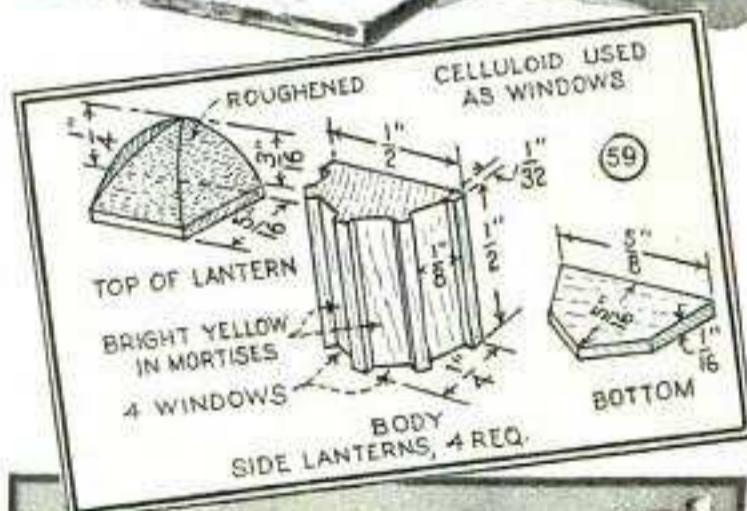
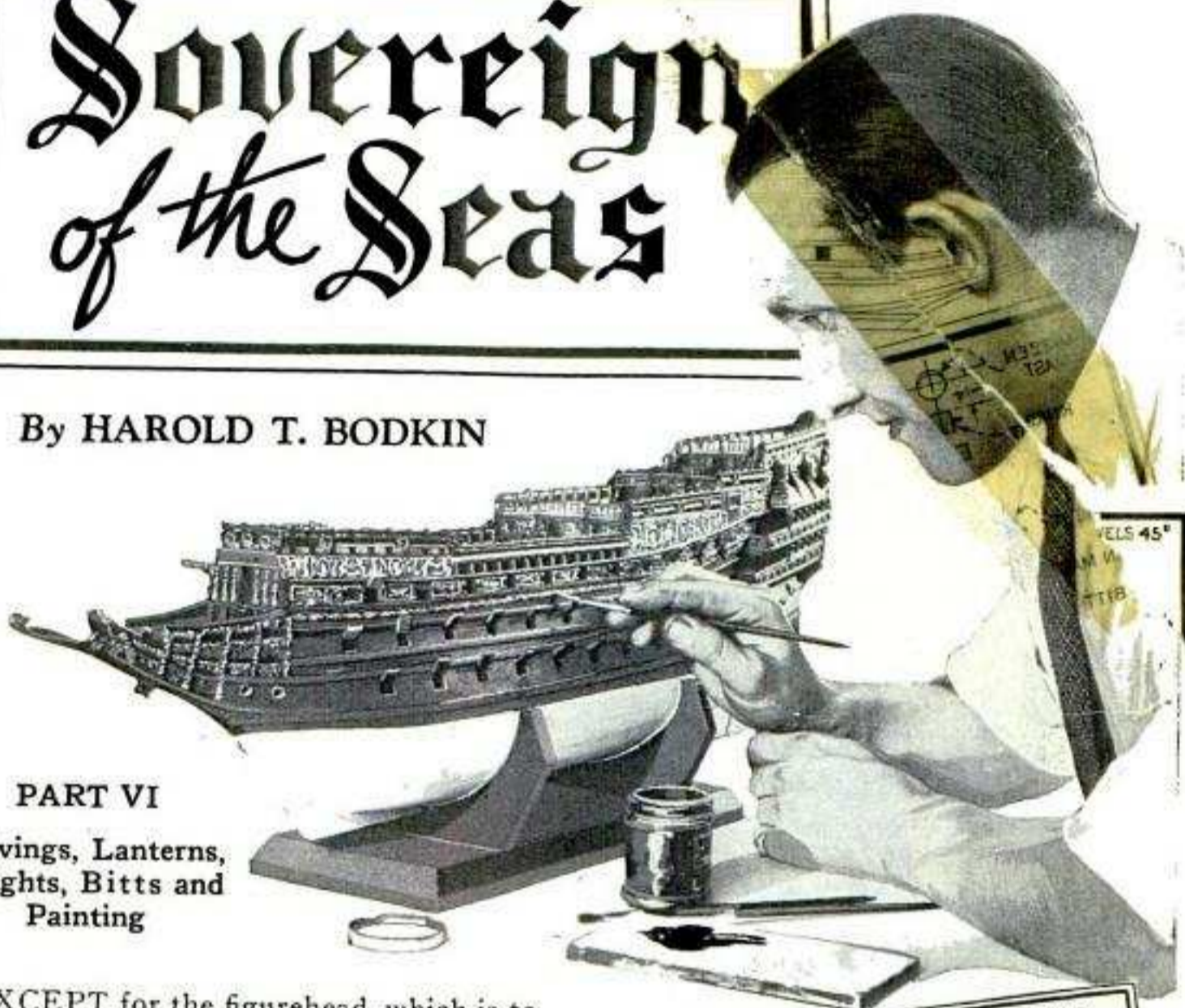
By HAROLD T. BODKIN

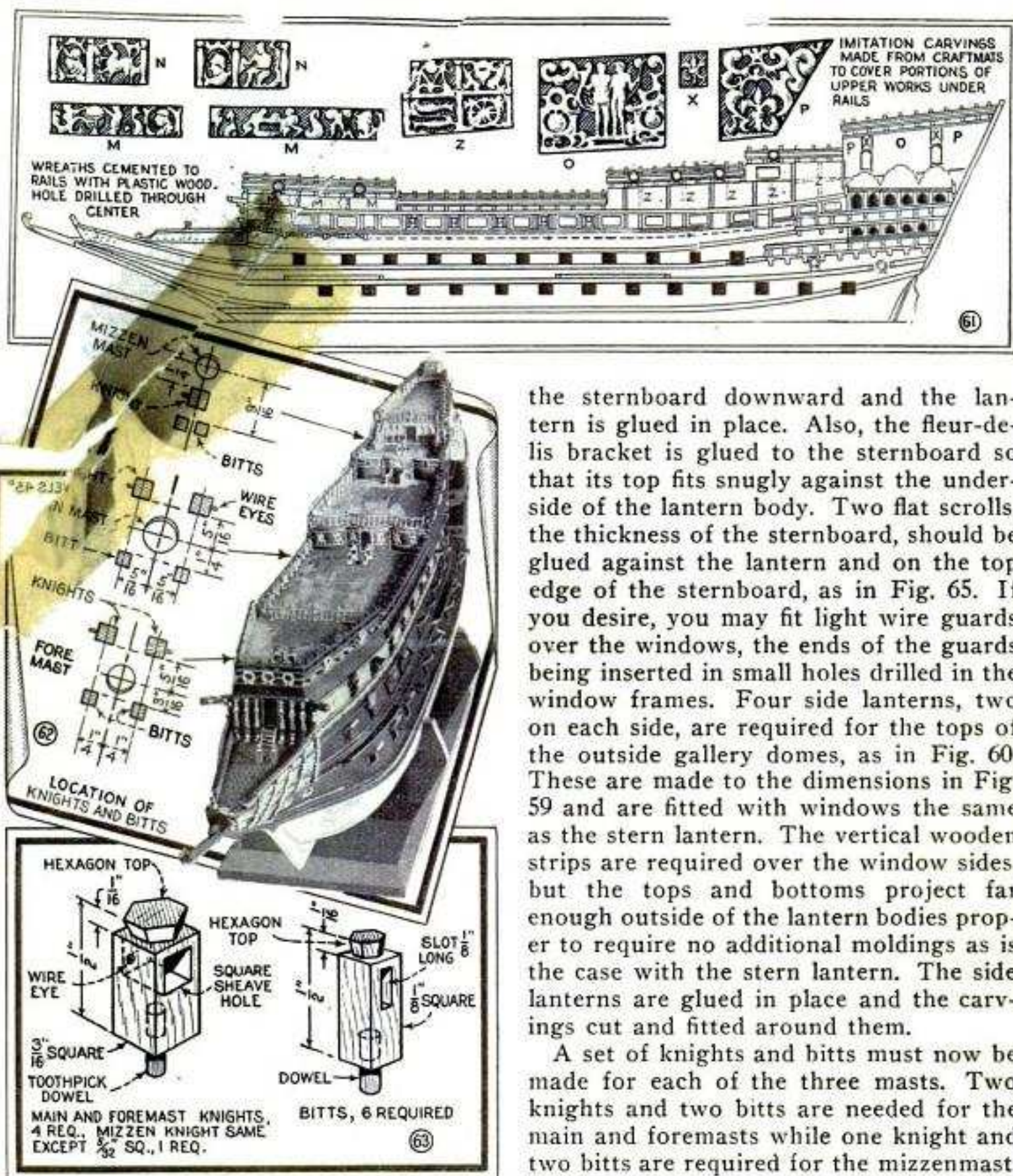
## PART VI

Carvings, Lanterns,  
Knights, Bitts and  
Painting

EXCEPT for the figurehead, which is to be made later, we can now add the final carvings on the "Sovereign" for which purpose a second craftmat is obtained. These carvings, lettered M, N, O, P, X and Z, are glued to the hull in the positions indicated in Fig. 61. Fifteen more gunport wreaths, the same as those previously made for the hull, must also be attached to the outer rails. Three of these are on the forward forecastle rail, as shown in the title illustration, the others being placed six on a side as in Fig. 61. All can first be cemented on with plastic wood, clamping them down with a spring clothespin until dry. For added security, however, bamboo splints used as dowels can be inserted through the wreaths and at the top and bottom of each wreath, holes being made with a pin vise and drill, or with a red-hot needle.

66 gives full details on the construction of the stern lantern, which is maple except for the celluloid or windows. Before applying the win-





dows, draw diagonal lines, closely spaced, with India ink on the material, to represent leaded glass panes, as in Fig. 64. When assembling, have the ink lines on the inside. After the windows are in place, glue thin strips of wood over the celluloid at the corners of the lantern body, to more suitably frame the windows. Triangular molding strips are glued horizontally around the top and bottom sides, aft of the sternboard, as shown in Figs. 65 and 66. A square section, the exact size of the lantern body, is then cut from the top of

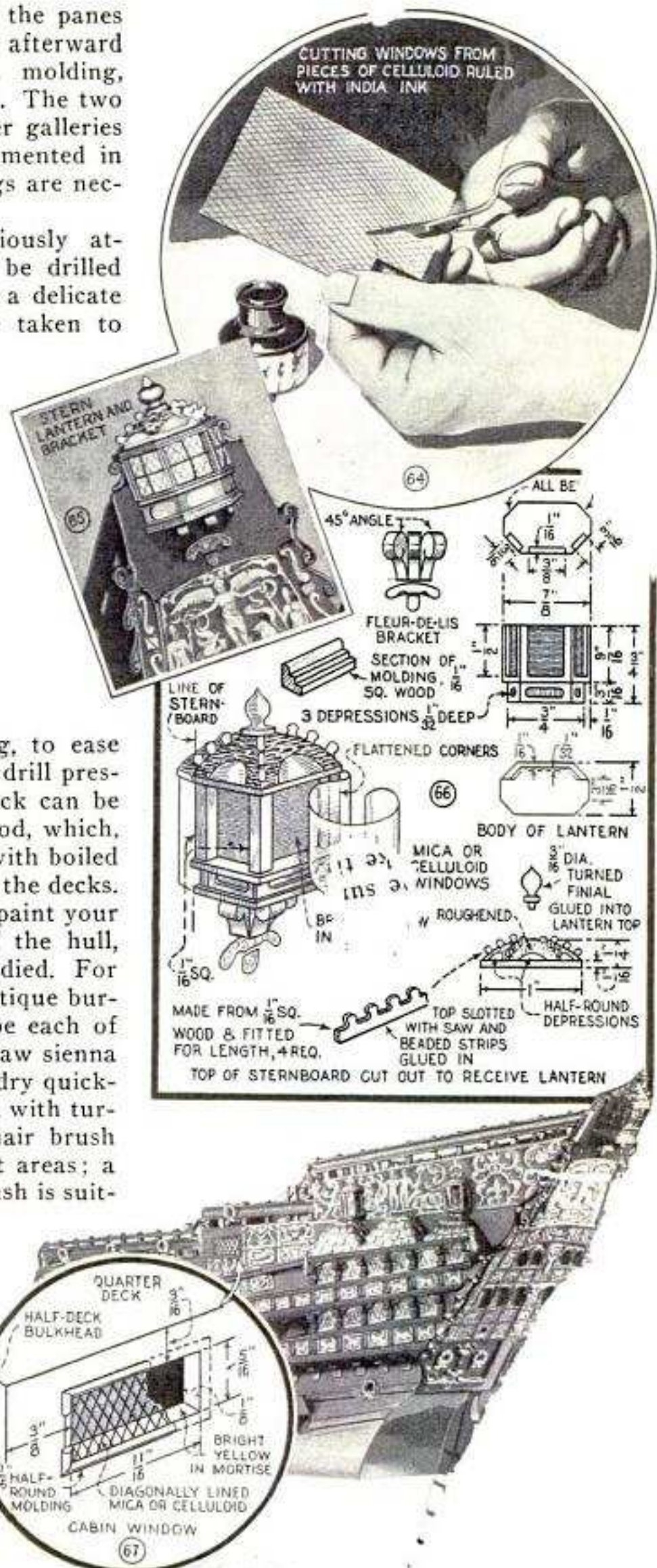
the sternboard downward and the lantern is glued in place. Also, the fleur-de-lis bracket is glued to the sternboard so that its top fits snugly against the underside of the lantern body. Two flat scrolls, the thickness of the sternboard, should be glued against the lantern and on the top edge of the sternboard, as in Fig. 65. If you desire, you may fit light wire guards over the windows, the ends of the guards being inserted in small holes drilled in the window frames. Four side lanterns, two on each side, are required for the tops of the outside gallery domes, as in Fig. 60. These are made to the dimensions in Fig. 59 and are fitted with windows the same as the stern lantern. The vertical wooden strips are required over the window sides, but the tops and bottoms project far enough outside of the lantern bodies proper to require no additional moldings as is the case with the stern lantern. The side lanterns are glued in place and the carvings cut and fitted around them.

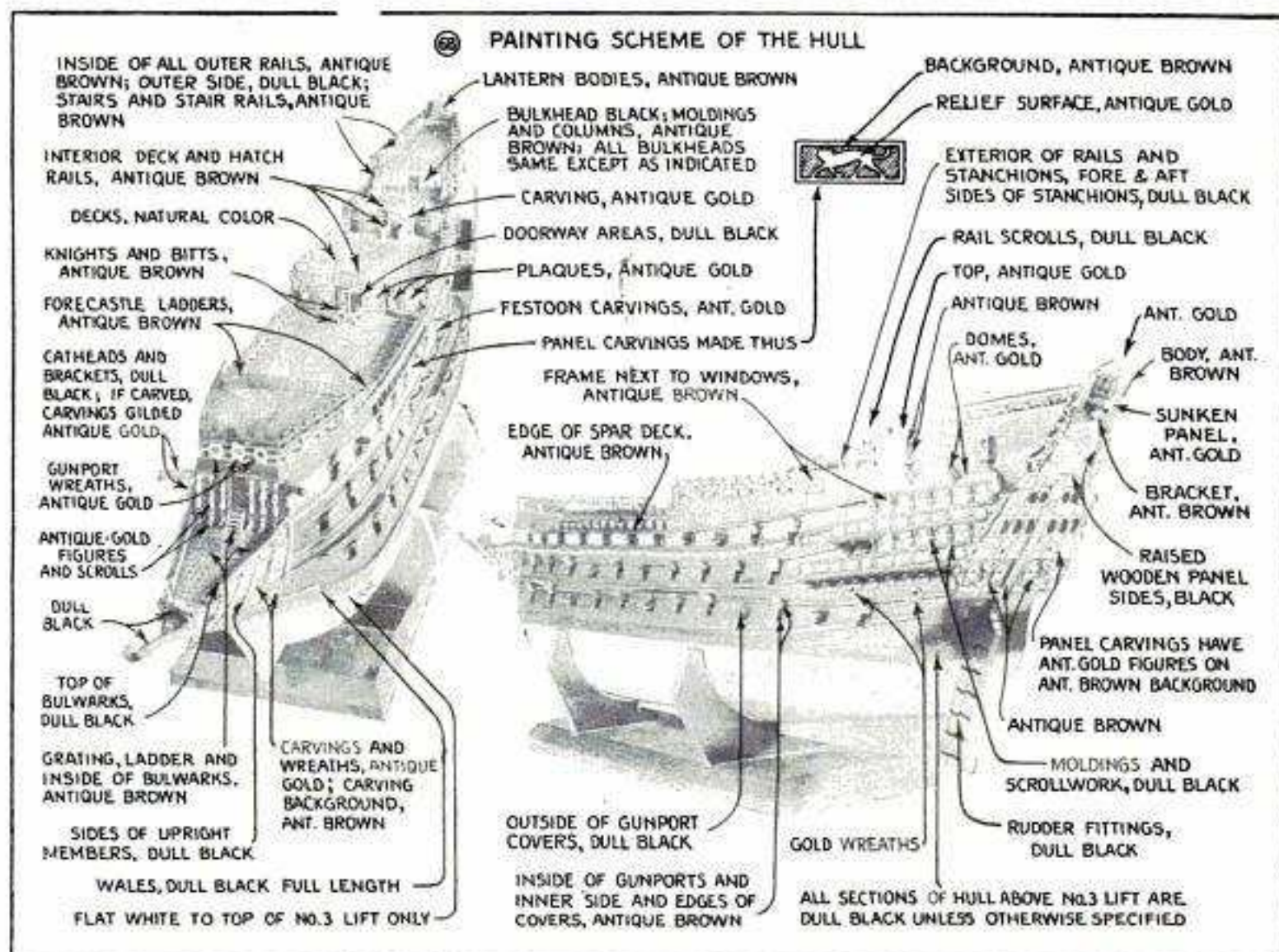
A set of knights and bitts must now be made for each of the three masts. Two knights and two bitts are needed for the main and foremasts while one knight and two bitts are required for the mizzenmast. They are made of maple to the dimensions given in Fig. 63. Note that the mizzen knight is slightly smaller than those required for the other two masts, and that it is located forward of its mast. Lay out the holes in the decks to receive the dowels of these pieces in their respective locations, shown in Fig. 62, and glue the knights and bitts solidly in place. Fig. 67 shows the cabin windows, which are cut into the hull, one on each side, just below the edge of the quarter-deck and aft of the half-deck bulkhead. These windows are covered with the diagonally lined cellu

loid, the same as the lanterns, the panes being cemented to the hull and afterward reinforced with a half-round molding, placed over the edges as shown. The two rows of windows in the quarter galleries are made similarly, and are cemented in place as in Fig. 60. No moldings are necessary for these.

The gunport wreaths previously attached to the rails must now be drilled through their centers. This is a delicate job and utmost care must be taken to avoid splitting the rails or breaking away pieces of the wreaths themselves. Make sure that they are solidly attached and then, using a light hand drill, make a  $\frac{1}{16}$ -in. hole through the exact centers of the wreaths. This done, change to a  $\frac{1}{8}$ -in. drill, or a small reamer, and carefully enlarge the holes to this size. It will help, if you lightly tack a block of soft wood to the deck and against the inner side of the rails before drilling, to ease the strain on the rails from the drill pressure. The tack holes in the deck can be filled afterward with plastic wood, which, when dry, may be touched up with boiled linseed oil to match the color of the decks.

Before beginning to gild and paint your model, the painting scheme of the hull, Fig. 68, should be carefully studied. For finishing, you will need some antique burnishing bronze powder, one tube each of white, black, ultramarine blue, raw sienna and burnt sienna. Japan paints dry quickly to a flat finish and are thinned with turpentine. A  $\frac{1}{2}$ -in. flat camel's-hair brush should be used on the large flat areas; a medium pointed camel's-hair brush is suitable both for the gilding and fine paint work. If these materials are not obtainable in your locality, they can be ordered through art-supply stores in the larger cities. Antique brown, to represent aged wood, is mixed as follows: Squeeze one part of raw sienna, one part of burnt sienna and one-quarter part of ultramarine blue into a mortar and mix. Turpentine is





added to produce a fairly thick, but easy-flowing consistency. All parts indicated as antique brown, Fig. 68, are given two coats. Note that the taken surfaces of all panel carvings take this color, which, if carefully applied, may be used to sharpen the edges of the gilded portions. The black and white paints are handled in the same way, two coats being used for each. If a semi-antique effect is desired, merely leave the paint finish exposed, and atmospheric conditions will, in time, soften the finish. If a soft gloss is wanted, a thin, clear varnish coat may be applied and fully rubbed down with rottenstone.

In gold-burnishing the raised portions of carvings, you will need a small can of clay and a small sheet of rabbit-

To prepare the clay, soak a piece in water for a couple of days until it becomes soft. Then put the clay dish with warm water and glue has been entirely dissolved. The mixture is then added to the mixture. The gilded are first given a coat of shellac, which is al-

lowed to dry, and then the clay mixture, just described, is applied with a camel's-hair brush. The fine gold bronze is next mixed with a little alcohol, and the mixture is then poured into another dish of thin glue water, after which it is applied to the raised portions of the carvings. Burnishing is later done by gently rubbing a smooth, rounded metal surface, such as the handle of a small spoon, over the gilded portions.

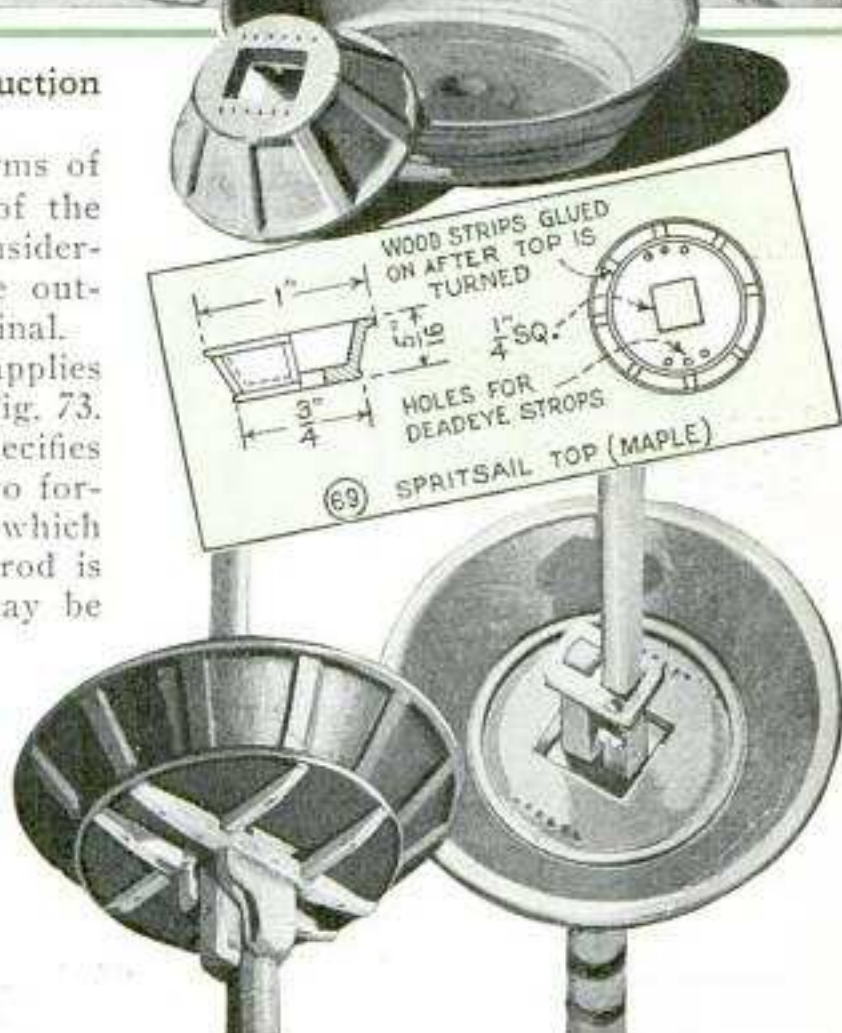
# Sovereign of the Seas

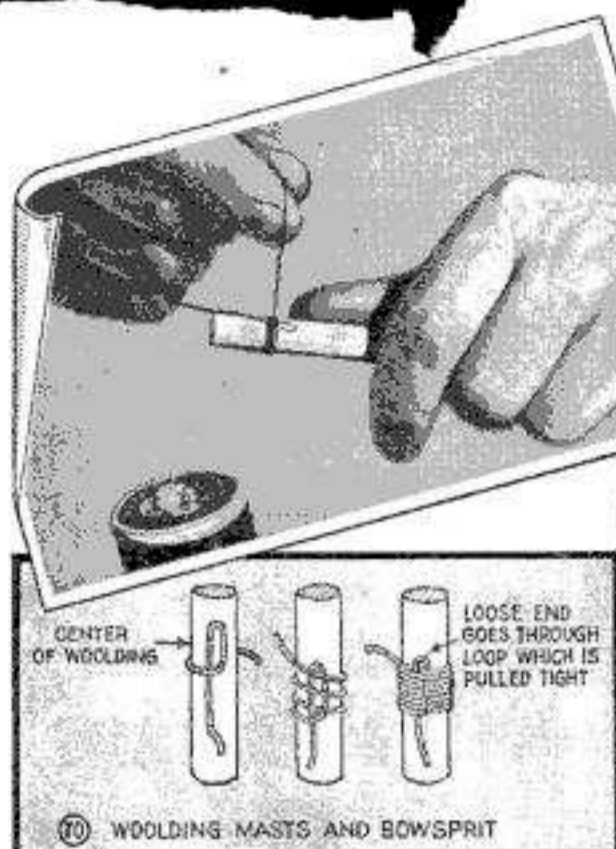


## PART VII—Details of Mast Construction

UNLIKE the more simplified forms of ship-model masts, the masts of the "Sovereign" are carried out in considerable detail to simulate closely the outstanding characteristics of the original.

The same general construction applies to both main and foremasts. See Fig. 73. The table headed "Lower Masts" specifies the lengths and diameters of the two forward masts, as well as the mizzen, which will be treated separately. Dowel rod is used to make the masts. They may be chucked in a drillpress and tapered first with coarse and then fine sandpaper, as in Fig. 75, or a block-plane can be used to shave the masts to an octagonal tapered section, after which they can be rounded by hand-sandpapering. This done, the mastheads must be squared off at the upper, smaller ends, to receive the trestletrees, crosstrees

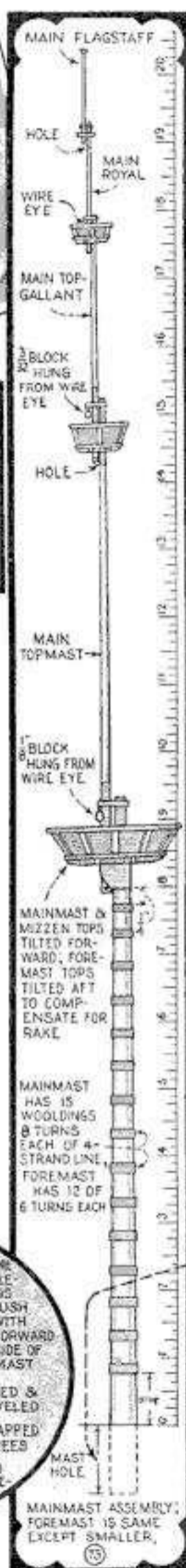
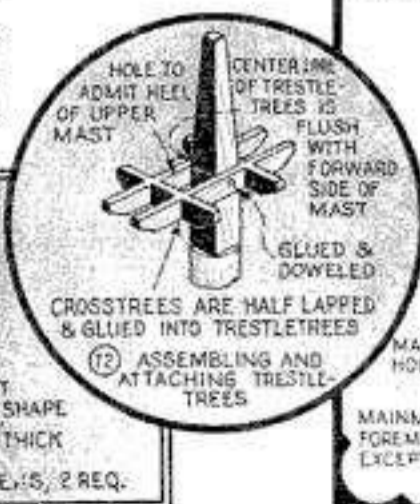
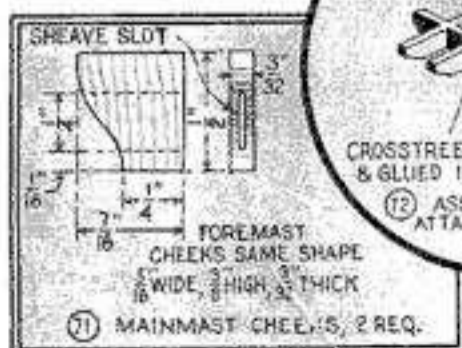




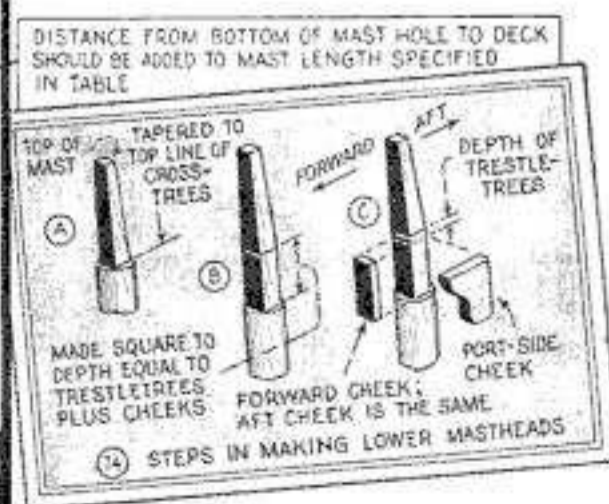
and cheeks. Fig. 74, details A, B and C, shows the three steps required to make the mastheads. The taper extends downward to the top edge of the trestletrees, and the squared sections below this point have vertical sides.

Next the cheeks are fitted. Those for the sides of the masts are made as in Fig. 71. They can be made with a simple slot for a sheave hole, or they may be slightly thicker to provide a wider slot, into which a very thin sheave pulley can be fitted. Cheeks on the forward and after sides are thin wooden strips glued to the masts between the side cheeks; their thickness must not exceed the diameter of the round mast section below. Note detail C, Fig. 74.

The sizes of trestletrees (fore and aft) and crosstrees

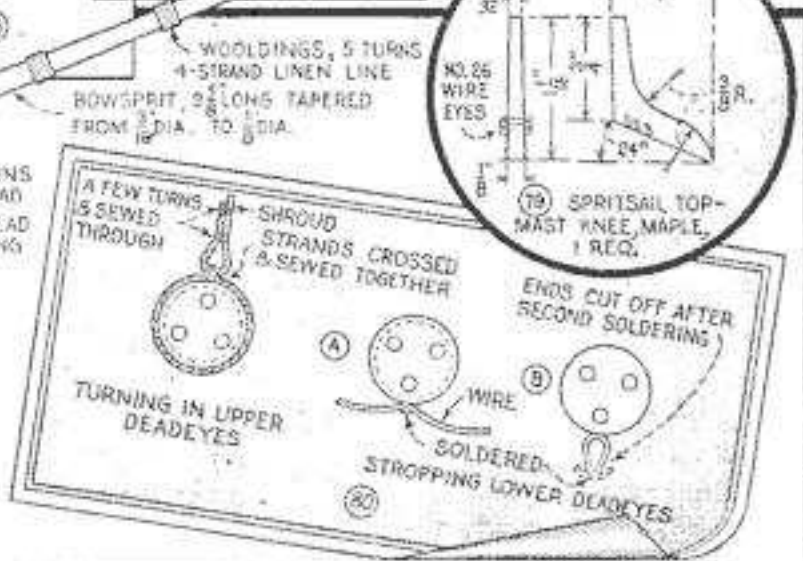
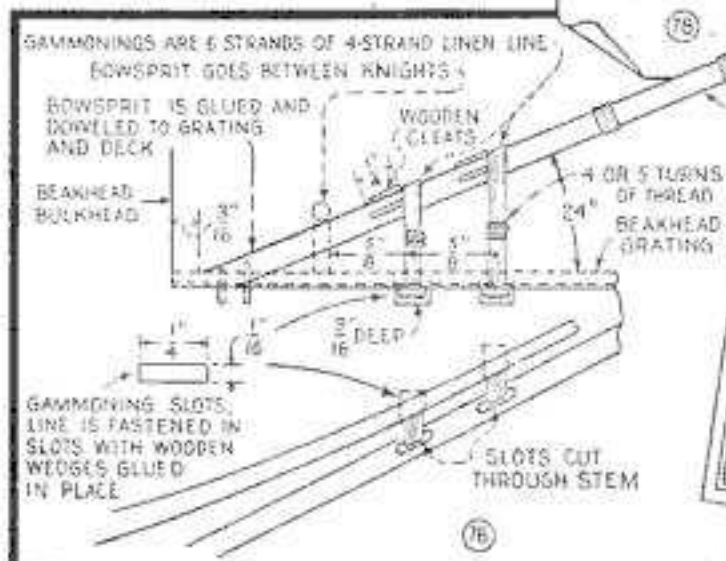
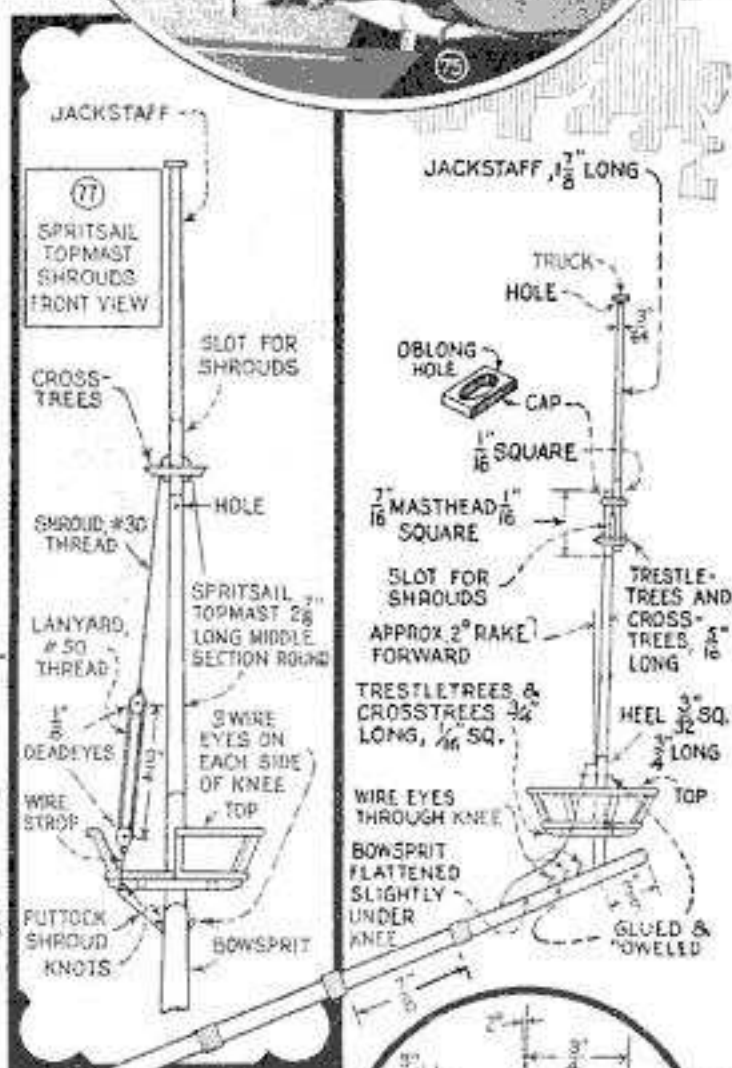


(athwartships) are given with the respective masts to which they are attached. Their lower edges are tapered from about half the depth to one-quarter of their lengths from the ends inward. Those for the lower and topmasts have the crosstrees half-lapped into the trestletrees; topgallant and royal crosstrees are thinner in proportion and rest in notches filed into their trestletrees to receive them. See Fig. 72. Be sure that the center line of the trestletrees is flush with the forward side of the mast, to provide a square opening for the heel (lower end) of the mast above. This should be a loose fit, as certain rigging lines must also pass through the same opening as the upper mast. The top surfaces of trestle and crosstrees are flush, or nearly so, to seat the tops which rest upon them. The upper mast trestle and crosstrees are glued in place; the larger, lower trees should also be doweled with bamboo splints to make them more secure. No cheeks are required on the upper masts, their squared sections being satisfactory for attachment of the trestletrees. We can dispose of the mizzenmast by noting its exceptions to the first two. Its masthead is simply "padded out" with rectangular wooden strips on all four sides, similar to the forward cheek shown at C, Fig. 74. Just below its masthead, a sheave slot passes fore and aft through the mast itself. And, unlike the other two masts, the miz-



zen is not woolded. Reference to Figs. 70 and 73 shows the method and locations of the wooldings on the bowsprit, fore and mainmasts. Manufacturers' numbers vary for the same diameter linen line used for wooldings. However, the correct diameter is that which will pass cleanly through a No. 69 drilled hole. Beeswax is rubbed on the line before turning it on the mast, after which the wooldings are covered with a coating of thinned orange shellac.

The masthead caps are all made similar to that for the spritsail topmast, Fig. 76. Their respective sizes are given in the mast tables. The smaller caps for the upper masts may be made from several thicknesses of matchbox wood glued together and sanded to the correct thickness. This prevents them from splitting. Also, make these caps about double length and width, drill holes through them to take their mastheads and upper masts, and glue in place. When dry, they can be filed and sanded down to size on the mast. As shown in Fig. 73, the lower, top and topgallant mast caps are fitted at their forward ends, on both sides, with small wire eyes. The royal caps need not be so fitted. In the starboard eyes, only, of the lower and topmast caps, single blocks are hung. Their sizes for the three mast assemblies are given in Fig. 73. The diameters and depths of all tops, given in the mast tables, are made similar to the spritsail top, Fig. 69, with the exception of the number of holes for deadeye strops, which will be given later when they are rigged. The rectangular hole in the bottom of





each top (except the spritsail top) is wider than its fore-and-aft dimension. It should extend outboard beyond the outside of the trestletrees, to provide a free slot about as wide as half the trestletree thickness, through which the shrouds will be rove later.

The lower masts are sanded to an easy sliding fit in the mast holes, the clearance permitting a slight side-to-side adjustment.

Details of the bowsprit mast are given in Figs. 76 to 80. Rig the shrouds before permanently installing the bowsprit on the model. Six three-hole,  $\frac{1}{8}$ -in. black deadeyes are required. Fig. 80 shows how to attach the shrouds to the upper deadeyes. The wire stoppers for the lower deadeyes must pass through the floor of the top and provide an eye for the puttock shrouds below. The shrouds are paired, those to starboard going on first. The odd third shroud is simply turned once around the masthead and seized to the paired shrouds on both sides. See Fig. 78. Note also, that the center strand of the lanyard between upper and lower deadeyes is longest. Fig. 76 shows how gammonings on an actual ship may be simulated, the



slots through the stem alining with the gammoning lines above. Three wooden cleats are glued to prevent the upper gammoning lines from slipping aft. The bowsprit is glued and doweled to the beakhead grating so that it appears to pass into the hull. The gammoning lines are then wedged into their slots and the whole is glued in position. Be sure not to spring the bowsprit downward by having the gammoning too tight as only a firm, easy strain is required.

## UPPER MASTS

| Name of Part or Section   | Mainmast Assembly   | Foremast Assembly  | Mizzen Assembly  |
|---|---|--|--|
| Topmast   | 7 $\frac{1}{2}$ " Long, $\frac{1}{2}$ " Dia. Bot. $\frac{3}{32}$ " Dia. Top | 4 $\frac{1}{2}$ " Long, $\frac{1}{2}$ " Dia. Bot. $\frac{1}{8}$ " Dia. Top   | 4 $\frac{1}{4}$ " Long, $\frac{1}{2}$ " Dia. Bot. $\frac{1}{4}$ " Dia. Top |
| Topgallant  | 3 $\frac{1}{2}$ " Long, $\frac{1}{2}$ " Dia. Bot. $\frac{1}{8}$ " Dia. Top  | 3 $\frac{1}{2}$ " Long, $\frac{1}{2}$ " Dia. Bot. $\frac{1}{4}$ " Dia. Top   | 2 $\frac{1}{2}$ " Long, $\frac{1}{2}$ " Dia. Bot. $\frac{1}{2}$ " + Top    |
| Royal   | 1 $\frac{1}{2}$ " Long, $\frac{1}{2}$ " Dia. Bot. $\frac{1}{4}$ " Dia. Top  | 1 $\frac{1}{2}$ " Long, $\frac{1}{2}$ " Dia. Bot. $\frac{1}{2}$ " + Dia. Top | Has None   |
| Flagstaff   | 1 $\frac{1}{4}$ " Long, $\frac{1}{4}$ " Dia. Full Length                    | 1 $\frac{1}{4}$ " Long, $\frac{1}{2}$ " + Dia. Full Length                   | 1 $\frac{1}{4}$ " Long, $\frac{1}{2}$ " + Dia. Full Length                 |
| Stern (Ensign) Flagstaff—4" Long, $\frac{1}{8}$ " Dia. Bot., $\frac{1}{4}$ " Dia. Top |   |  |  |
| <b>Main Topmast</b>   |   |  |  |
| Trestletrees  | 5 $\frac{1}{2}$ " Long, $\frac{1}{2}$ " Wide, $\frac{1}{2}$ " Thick         | 5 $\frac{1}{2}$ " Long, $\frac{1}{2}$ " Wide, $\frac{1}{2}$ " Thick          | 5 $\frac{1}{2}$ " Long, $\frac{1}{2}$ " Wide, $\frac{1}{2}$ " Thick        |
| Size of Cap   | 5 $\frac{1}{2}$ " Long, $\frac{1}{2}$ " Wide, $\frac{1}{2}$ " Thick         | 5 $\frac{1}{2}$ " Long, $\frac{1}{2}$ " Wide, $\frac{1}{2}$ " Thick          | 5 $\frac{1}{2}$ " Long, $\frac{1}{2}$ " Wide, $\frac{1}{2}$ " Thick        |
| Size of Top   | 1" Dia. Top, $\frac{1}{2}$ " Dia. Bot. $\frac{1}{2}$ " Deep                 | 1" Dia. Top, $\frac{1}{2}$ " Dia. Bot. $\frac{1}{2}$ " Deep                  | Has None   |
| Length of Masthead Taper  | 1 $\frac{1}{2}$ "   | 1 $\frac{1}{2}$ "  | 1 $\frac{1}{2}$ "  |
| <b>Fore Topmast</b>   |   |  |  |
| Trestletrees  | 5 $\frac{1}{2}$ " Long, $\frac{1}{2}$ " Wide, $\frac{1}{2}$ " Thick         | 5 $\frac{1}{2}$ " Long, $\frac{1}{2}$ " Wide, $\frac{1}{2}$ " Thick          | 5 $\frac{1}{2}$ " Long, $\frac{1}{2}$ " Wide, $\frac{1}{2}$ " Thick        |
| Size of Cap   | 5 $\frac{1}{2}$ " Long, $\frac{1}{2}$ " Wide, $\frac{1}{2}$ " Thick         | 5 $\frac{1}{2}$ " Long, $\frac{1}{2}$ " Wide, $\frac{1}{2}$ " Thick          | 5 $\frac{1}{2}$ " Long, $\frac{1}{2}$ " Wide, $\frac{1}{2}$ " Thick        |
| Size of Top   | 1" Dia. Top, $\frac{1}{2}$ " Dia. Bot. $\frac{1}{2}$ " Deep                 | 1" Dia. Top, $\frac{1}{2}$ " Dia. Bot. $\frac{1}{2}$ " Deep                  | Has None   |
| Length of Masthead Taper  | 1 $\frac{1}{2}$ "   | 1 $\frac{1}{2}$ "  | 1 $\frac{1}{2}$ "  |
| <b>Mizzen Topmast</b>   |   |  |  |
| Trestletrees  | 5 $\frac{1}{2}$ " Long, $\frac{1}{2}$ " Wide, $\frac{1}{2}$ " Thick         | 5 $\frac{1}{2}$ " Long, $\frac{1}{2}$ " Wide, $\frac{1}{2}$ " Thick          | 5 $\frac{1}{2}$ " Long, $\frac{1}{2}$ " Wide, $\frac{1}{2}$ " Thick        |
| Size of Cap   | 5 $\frac{1}{2}$ " Long, $\frac{1}{2}$ " Wide, $\frac{1}{2}$ " Thick         | 5 $\frac{1}{2}$ " Long, $\frac{1}{2}$ " Wide, $\frac{1}{2}$ " Thick          | 5 $\frac{1}{2}$ " Long, $\frac{1}{2}$ " Wide, $\frac{1}{2}$ " Thick        |
| Size of Top   | 1" Dia. Top, $\frac{1}{2}$ " Dia. Bot. $\frac{1}{2}$ " Deep                 | Has No Top   | Has No Top   |
| Length of Masthead Taper  | 1 $\frac{1}{2}$ "   | 1 $\frac{1}{2}$ "  | 1 $\frac{1}{2}$ "  |

## LOWER MASTS

| Name of Part or Section                              | Mainmast   | Foremast   | Mizzen   |
|--|--|--|--|
| Over-All Length from Deck Surface                    | 9 $\frac{1}{2}$ "  | 8 $\frac{1}{2}$ "  | 7 $\frac{1}{2}$ "  |
| Diameter at Deck                                     | 1"   | 1"   | 1"   |
| Diameter under Trestletrees                          | $\frac{3}{4}$ "  | $\frac{3}{4}$ "  | $\frac{3}{4}$ "  |
| Square at Cap  | $\frac{1}{4}$ "  | $\frac{1}{4}$ "  | $\frac{1}{4}$ "  |
| Size of Cap  | 5 $\frac{1}{2}$ " Long, $\frac{1}{2}$ " Wide, $\frac{1}{2}$ " Thick          | 5 $\frac{1}{2}$ " Long, $\frac{1}{2}$ " Wide, $\frac{1}{2}$ " Thick          | 5 $\frac{1}{2}$ " Long, $\frac{1}{2}$ " Wide, $\frac{1}{2}$ " Thick          |
| Size of Trestletrees (Crosstrees are same)           | 11 $\frac{1}{2}$ " Long, $\frac{1}{2}$ " Wide, $\frac{1}{2}$ " Thick         | 11 $\frac{1}{2}$ " Long, $\frac{1}{2}$ " Wide, $\frac{1}{2}$ " Thick         | 11 $\frac{1}{2}$ " Long, $\frac{1}{2}$ " Wide, $\frac{1}{2}$ " Thick         |
| Size of Top  | 2 $\frac{1}{2}$ " Dia. Top, 1 $\frac{1}{2}$ " Dia. Bot. $\frac{1}{2}$ " Deep | 2 $\frac{1}{2}$ " Dia. Top, 1 $\frac{1}{2}$ " Dia. Bot. $\frac{1}{2}$ " Deep | 2 $\frac{1}{2}$ " Dia. Top, 1 $\frac{1}{2}$ " Dia. Bot. $\frac{1}{2}$ " Deep |
| Length of Masthead Taper (to Bottom of Trestletrees) | 1"   | 1 $\frac{1}{2}$ "  | 1 $\frac{1}{2}$ "  |

\* To this length must be added length of mast that goes into mast hole

# Sovereign of the Seas

By H. T. BODKIN



## PART VIII—Standing Rigging

**S**TANDING rigging material for the "Sovereign" are: Single blocks, 47,  $\frac{1}{16}$ -in.; 33,  $\frac{3}{32}$ -in.; 28,  $\frac{1}{8}$ -in.; 5,  $\frac{5}{32}$ -in.; double blocks: 6,  $\frac{3}{32}$ -in.; 4,  $\frac{5}{32}$ -in. fiddle blocks, 5,  $\frac{1}{8}$ -in.; three-hole black dead-eyes: 64,  $\frac{3}{32}$ -in.; 58,  $\frac{1}{8}$ -in.; 22,  $\frac{5}{32}$ -in.; five-hole black deadeyes: 2 each,  $\frac{1}{4}$ -in.,  $\frac{3}{32}$ -in. and  $\frac{1}{16}$ -in. Four single  $\frac{3}{32}$ -in. blocks, with hole reamed oversize, may be substituted for special spritsail topmast-backstay blocks detailed in this article. For rigging line, one 100 to 200-yd. spool each of linen thread, Nos. 30, 35, 60 and 70, and one spool of No. 50 cotton thread will be required. Also, a piece of beeswax, with which every line is thoroughly impregnated. Now, we can proceed with the job.

The first step is to drill at an angle through the forward edge of the forecandle deck and connect these holes with those previously made in the beakhead bulkhead just below this deck level, so that the

mainstay can pass through and down around the inboard end of the bowsprit. The main-hatch grating is glued and pinned to the spar deck on the centerline about 1 in. forward of the mainmast bitts. Two small wire eyes are set into the after port corner, to belay the garnet tackle described later. Sixty wire chain plates are now made as detailed. Of these, the fourteen required for the mizzen chain plates are cut to about  $\frac{1}{2}$ -in. length. The ends opposite the eyes are bent inboard to provide hooks for the wire strops of the lower-shroud deadeyes. The chain plates are fastened to the hull with small round-headed escutcheon nails. Before attaching, study the illustrations carefully. Chain plates of the fore and mainmasts are not evenly distributed along the channels, but are grouped as shown. This is required in order that the guns, in the ports partly covered by the shrouds, may be pushed outward without forcing the rigging aside.

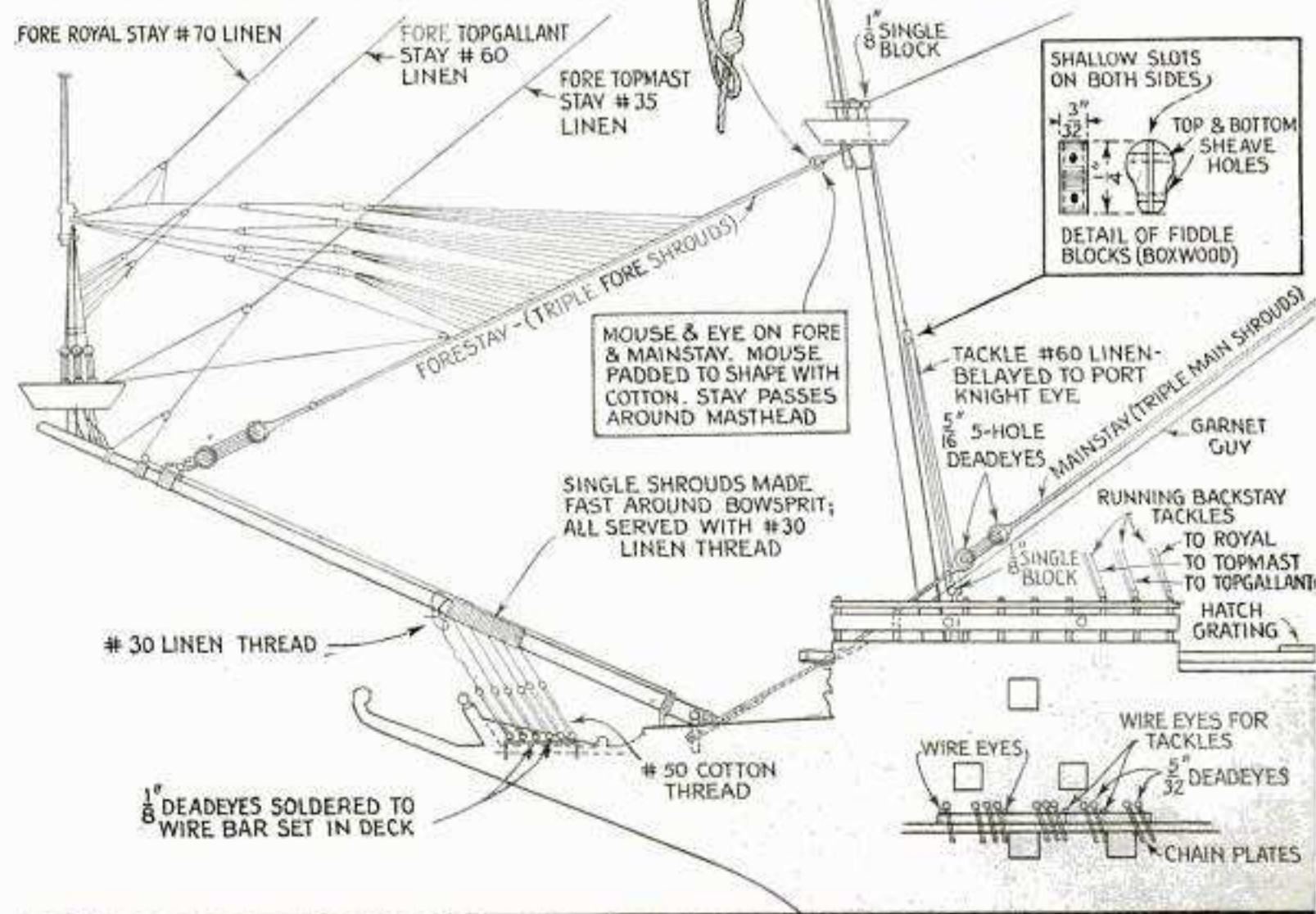
The mizzen chain plates can be evenly spaced. All the plates should line up with the angle of the shrouds attached to them. Therefore, the nails should not be driven home solidly until the shrouds have been rigged, which will allow proper adjustment of the plate angles. Complete the channel fastenings by putting four wire eyes just inboard of the fore and main-channel edges, and two eyes in the mizzen.

As a standard for rigging sizes, the foremost shrouds are triple-wound strands of No. 35 thread; the mainmast shrouds are triple No. 30 thread, and the mizzen shrouds, triple No. 60 thread. You can make your own shrouds by twisting triple thread strands together, fastening one end of the threads to a hook in the wall and the other end to a hook chucked in a hand-drill. Twist the strands tightly, wax heavily and then stretch them as tightly as possible and pass rapidly over a flame. This melts the wax and prevents the line from unraveling. The stays are triple shroud thickness.

The fore, main and mizzen lower masts are set up in their holes in the decks. Then the stays are looped around each of their

respective mastheads, over the forward crossrees and down through the square holes in the tops, which should be large enough to allow passage of lines on all four sides. The mizzen stay is sewn through with thread and served (wrapped with thread) to represent a long eyesplice. The fore and mainstay loops are secured with the eye-and-mouse detail illustrated in the rigging plan. The forestay is set up with two  $\frac{1}{8}$ -in. deadeyes, the lower being fastened to a collar of stay-thickness which, in turn, is attached to the bowsprit with several turns of shroud line. The

mizzen stay is set up similarly with a collar and seized to the mainmast, its angle just clearing the half-deck railing. The collar of the mainstay is much longer. It passes on either side of the foremast, through the holes in the deck, crosses itself above the beak-head and passes under the bowsprit, where

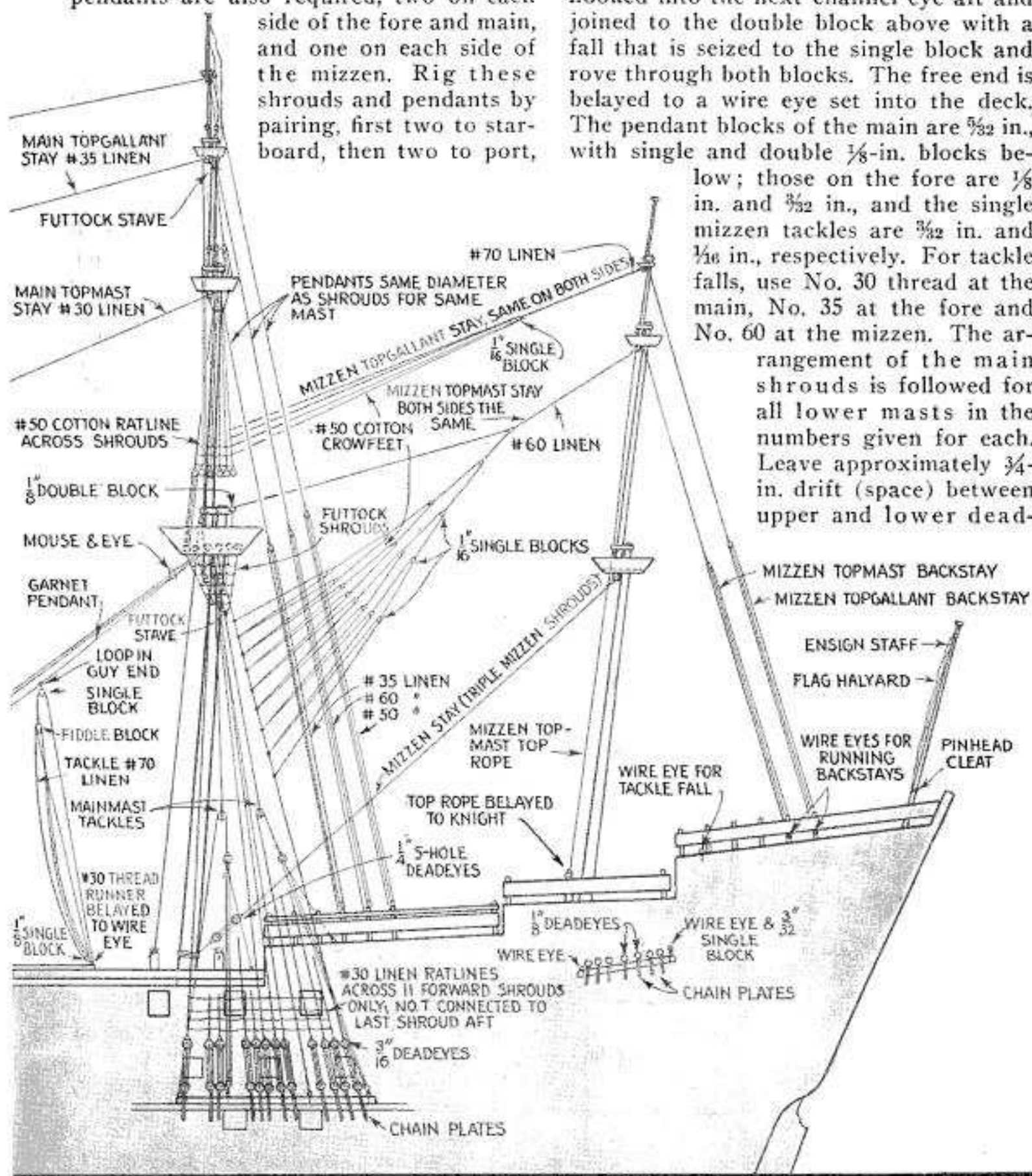


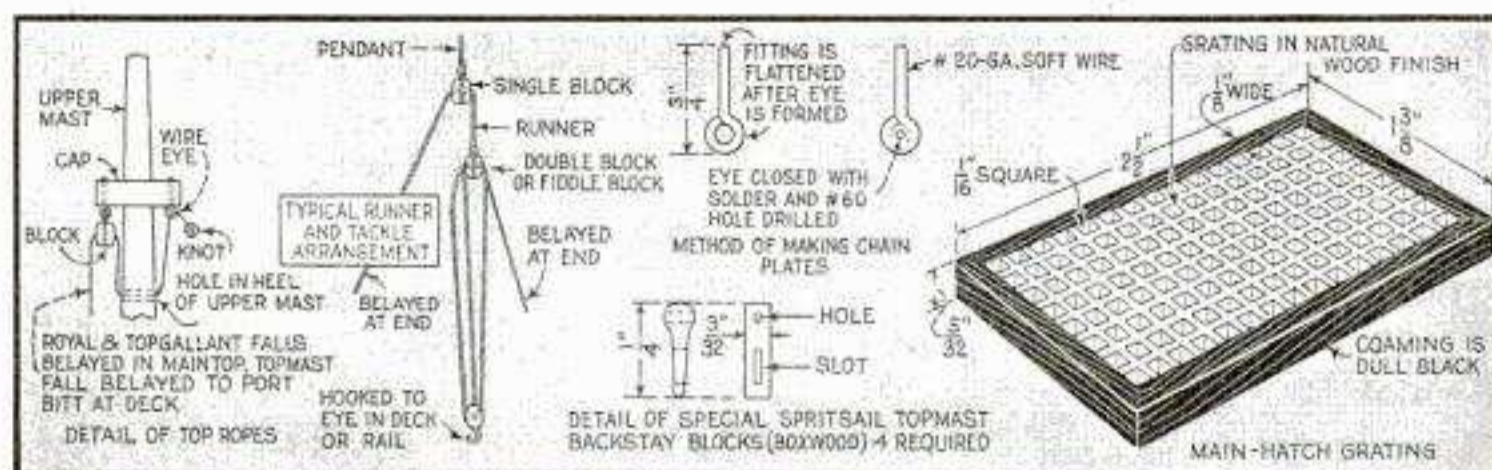
the free ends are seized to the adjoining part of the collar. For the deadeye lanyards, use No. 30 for the mainstay, No. 35 on the forestay and No. 60 for the mizzen. Take up firmly on all stays by means of the lanyards and secure the latter with a couple of half-hitches at the backs of the lower deadeyes.

There are 11 shrouds on the fore, 12 on the main and 7 on the mizzen. Tackle pendants are also required, two on each side of the fore and main, and one on each side of the mizzen. Rig these shrouds and pendants by pairing, first two to starboard, then two to port,

and so on. They should be long enough to reach just below the channels to give you a convenient length for seizing the upper deadeyes into them. Now, rig the shroud tackles by seizing single blocks into the pendants, starting a "runner" of shroud thickness at an eye in the channel, up through this block and down to be seized into another smaller double block at the opposite end. A single block is hooked into the next channel eye aft and joined to the double block above with a fall that is seized to the single block and rove through both blocks. The free end is belayed to a wire eye set into the deck. The pendant blocks of the main are  $\frac{5}{32}$  in., with single and double  $\frac{1}{8}$ -in. blocks be-

low; those on the fore are  $\frac{1}{8}$  in. and  $\frac{3}{32}$  in., and the single mizzen tackles are  $\frac{3}{32}$  in. and  $\frac{1}{16}$  in., respectively. For tackle falls, use No. 30 thread at the main, No. 35 at the fore and No. 60 at the mizzen. The arrangement of the main shrouds is followed for all lower masts in the numbers given for each. Leave approximately  $\frac{3}{4}$ -in. drift (space) between upper and lower dead-





eyes, their sizes being in the plan. For lanyards, the same thread sizes as for tackle falls are suitable.

You can rig shrouds on the upper masts before placing them on those below. No tackles are required. The main topmast has 6 shrouds on a side; the fore topmast 5, and the mizzen topmast, 4. Nos. 30, 35 and 60 thread sizes are suitable. The bottom deadeyes are made with a wire strop sufficiently long to pass through holes at the outer edges of the top flooring and to be formed into eyes just below; this applies to all upper masts. The topgallant and royal masts take deadeyes, shrouds and lanyards one-half the diameters of those on respective masts below. They also require one-half the numbers of shrouds. Let the heel of each mast come below each top not less than  $\frac{1}{8}$  in. and glue in place before rigging.

Beginning with the highest, the shrouds are rigged as noted. The assembled upper masts are glued on the lower masts. Using No. 20 wire, we now seize futtock staves, made from it, across the main shrouds about 1 in. below the main top and, from the eyes of the topmast shrouds (under the top flooring), the futtock shrouds are run downward to be seized around the futtock stave. This step is repeated on all masts except the uppermost, using proportionately smaller wire for staves and reducing their distances under the tops likewise. The futtock shrouds are the same diameters as those above. Running backstays are then rigged. The pendants are shroud thickness; the tackle falls of the fore and mizzen are smaller than those specified at the main. The blocks at the lower ends hook into wire eyes set into rail posts on the inboard sides. Blocks for the upper mast stays

begin with  $\frac{1}{8}$ -in. size, then  $\frac{3}{32}$ -in. and  $\frac{1}{16}$ -in. The spritsail-topmast backstay uses a series of  $\frac{3}{32}$ -in. blocks, and four special boxwood blocks, if you decide to make the latter as detailed. If not, ream out the sheave holes in four  $\frac{3}{32}$ -in. blocks and pass the crowfeet and running lines through the same oversize holes. The running lines are the same as used for the fore topgallant stay; all crowfeet are No. 50 cotton thread. You can use fore-shroud line for the garnet guy, main-shroud line for its pendant, and the other thread sizes for runner and tackle. The mizzen-topmast stay tackles, one on each side, are duplicates of the arrangement of the main-topmast stay. As a general rule, all lines, blocks, deadeyes, etc., are about one-half the size of those immediately below, and all rigging for the mainmast is largest, the foremast smaller and the mizzen smallest.

For halyards, use No. 50 cotton for all except the ensign, which uses No. 60 linen. The plan gives the mainmast ratline sizes. The fore ratlines are No. 35, and the mizzen, No. 60. The fore topmast ratlines are No. 60, and mizzen, No. 70 linen. No ratlines are rigged to the topgallant and royal masts. The ratlines are all started about  $\frac{3}{16}$  in. above the lower deadeyes and continue horizontally across the shrouds, upward with the same spaces between them. Use clove hitches to attach to shrouds. The futtock shrouds, attached to lower and topmasts, are also "rattled down." Note that ratlines do not join the aftermost main, fore and mizzen shrouds. They do cross all topmast shrouds, but to avoid obscuring other details, are not shown.

As a final caution, before you begin, thoroughly wax all lines you use, or they may shrink or expand with disastrous effect on your mast alinement.

# Sovereign of the Seas



by  
H.T. Bodkin

## PART IX—Running Rigging and Final Details

ONLY the running rigging and a few other details now remain before our gallant "Sovereign" will be completed. To vary the work, it is better to take up the construction of some fittings and thus gain a breathing spell between the standing and running rigging jobs.

Fourteen yards are required, made as specified in the yard chart at the end of the article. The chart also enumerates the number and kinds of blocks and rigging lines required for attaching each of the yards to its respective mast. The yards are all natural wood color and are fin-

ished exactly the same as were the masts.

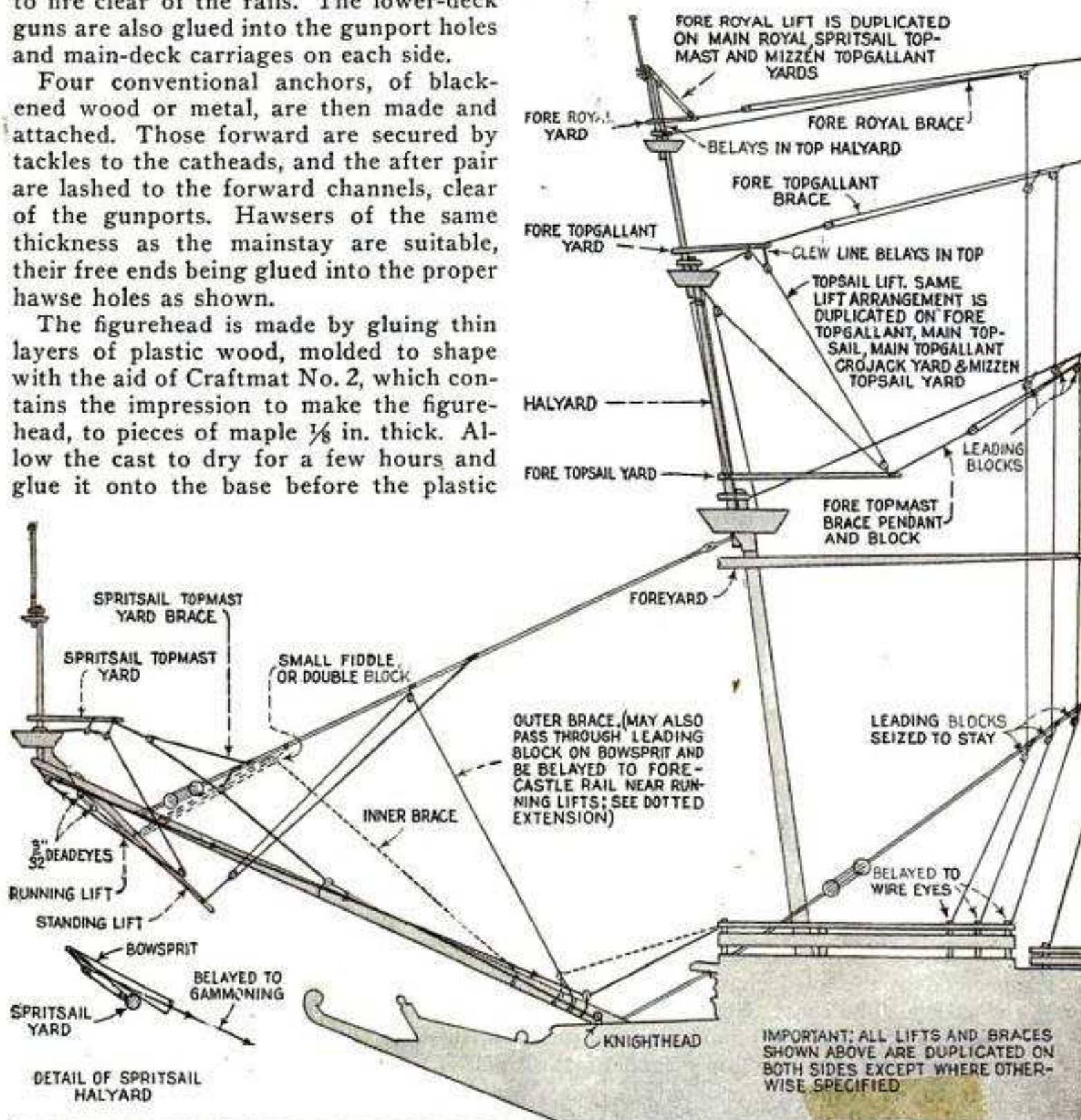
Next, the guns and carriages are made. The sixteen deck gun carriages are made the same as those for the main-deck guns under the spar deck except that a channel, instead of a hole, is cut into the tops of each, in which the gun will rest. Color the carriages dull black as before, and glue and pin in place in alinement with the deck ports. Sixteen deck guns and seventy-four lower-deck guns are then turned in a lathe. In addition, ten bulkhead guns are also turned. These are the same as the deck guns except that the inboard ends

are cut like the lower-deck guns so that they may be inserted into the holes made for them in the bulkheads. If the guns are made of wood, gild them with antique gold to represent brass. Then dry-brush dark green over the gilt to imitate verdigris discoloration. If the guns are turned from brass, leave in natural-metal finish, which will, in course of time, corrode to some extent. Two guns are glued into the stern; four into the outer and inner spar-deck bulkhead (middle holes on each side not fitted); and four into the beakhead-bulkhead holes. Elevate the spar-deck guns to fire clear of the rails. The lower-deck guns are also glued into the gunport holes and main-deck carriages on each side.

Four conventional anchors, of blackened wood or metal, are then made and attached. Those forward are secured by tackles to the catheads, and the after pair are lashed to the forward channels, clear of the gunports. Hawasers of the same thickness as the mainstay are suitable, their free ends being glued into the proper hawse holes as shown.

The figurehead is made by gluing thin layers of plastic wood, molded to shape with the aid of Craftmat No. 2, which contains the impression to make the figurehead, to pieces of maple  $\frac{1}{8}$  in. thick. Allow the cast to dry for a few hours and glue it onto the base before the plastic

wood gets too brittle. Then trim to shape, and glue both to another piece the same thickness as the figurehead support. The latter piece is not flush with the bottom of the figurehead casts. It is assembled so that the mounted casts project about  $\frac{1}{16}$  in. below its bottom edge to form a channel for the figurehead support. The whole is glued and pinned in place. If desired, the carving of the figurehead may be accentuated by tooling the recesses deeper than they are when they come from the mat. This should be done only after the plastic wood is dry, and care must be taken

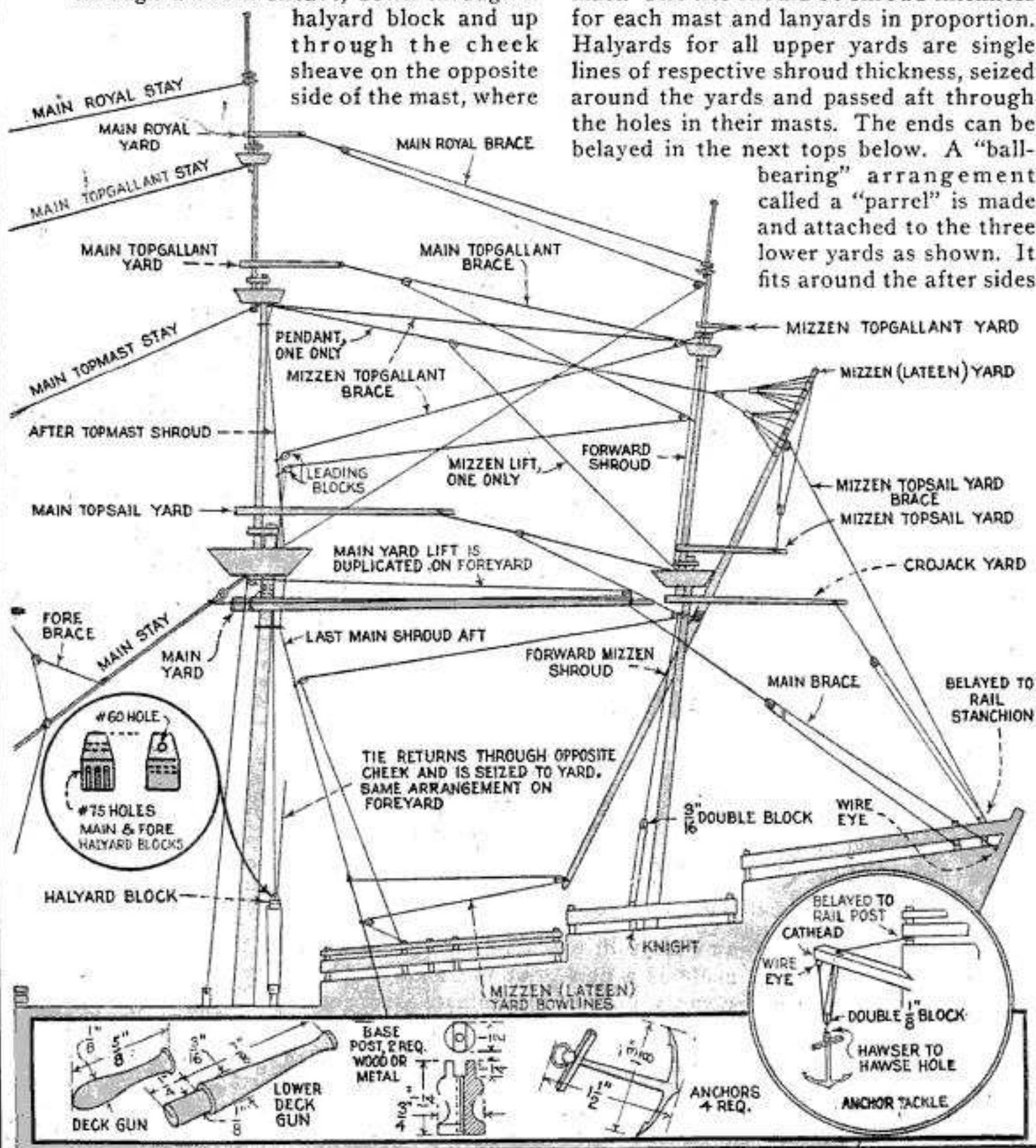


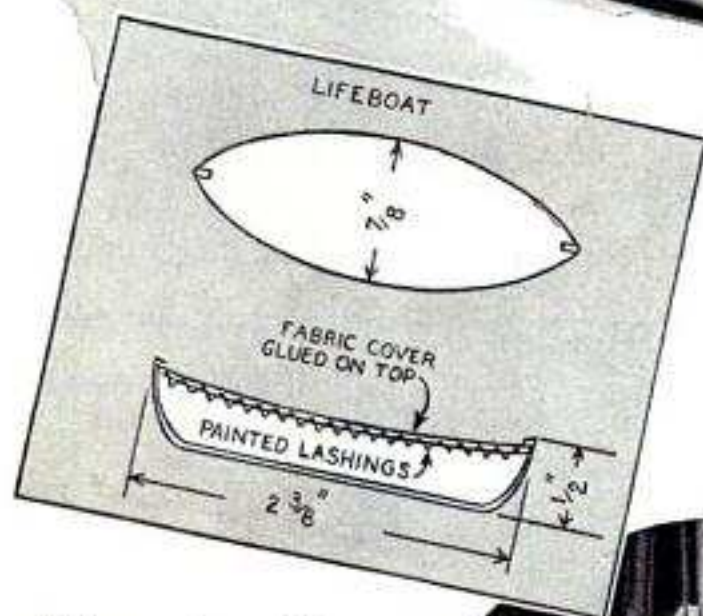
not to spoil the contour. The lifeboat may be of the simplified type detailed or, it can be carved out and fitted with ribs and thwart as is the original model. It rests in two chocks (cradles) on the main-hatch grating, being glued and pinned to the grating to keep it in place.

Now for the running rigging. The first job is to attach the yards to the masts. The mainyard is fastened with a one-piece tie, which is seized around the yard, passed through a cheek sheave, down through a halyard block and up through the cheek sheave on the opposite side of the mast, where

the loose end is also seized around the yard. The halyard block is set up with a lanyard, which passes through the sheave of the port knight, aft of the mast. The tie should be long enough to permit lowering the yard to the rails. The foreyard has the same arrangement. The mizzen-yard is similar except that the tie is seized to the halyard block at one end and to the yard at the other, passing forward through the central sheave of the mizzen-mast. The ties should be shroud thickness for each mast and lanyards in proportion. Halyards for all upper yards are single lines of respective shroud thickness, seized around the yards and passed aft through the holes in their masts. The ends can be belayed in the next tops below. A "ball-bearing" arrangement called a "parrel" is made and attached to the three lower yards as shown. It fits around the after sides

of the masts. The halyard block is set up with a lanyard, which passes through the sheave of the port knight, aft of the mast. The tie should be long enough to permit lowering the yard to the rails. The foreyard has the same arrangement. The mizzen-yard is similar except that the tie is seized to the halyard block at one end and to the yard at the other, passing forward through the central sheave of the mizzen-mast. The ties should be shroud thickness for each mast and lanyards in proportion. Halyards for all upper yards are single lines of respective shroud thickness, seized around the yards and passed aft through the holes in their masts. The ends can be belayed in the next tops below. A "ball-bearing" arrangement called a "parrel" is made and attached to the three lower yards as shown. It fits around the after sides



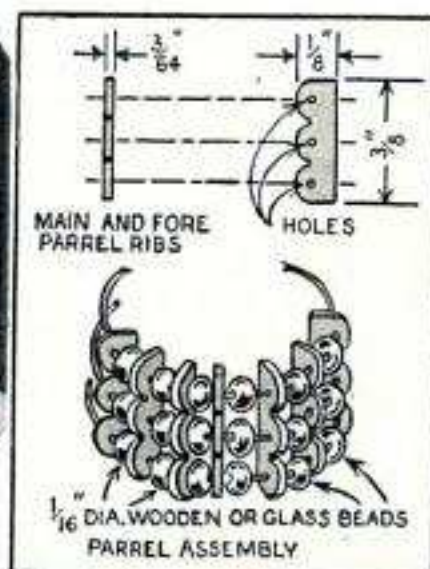
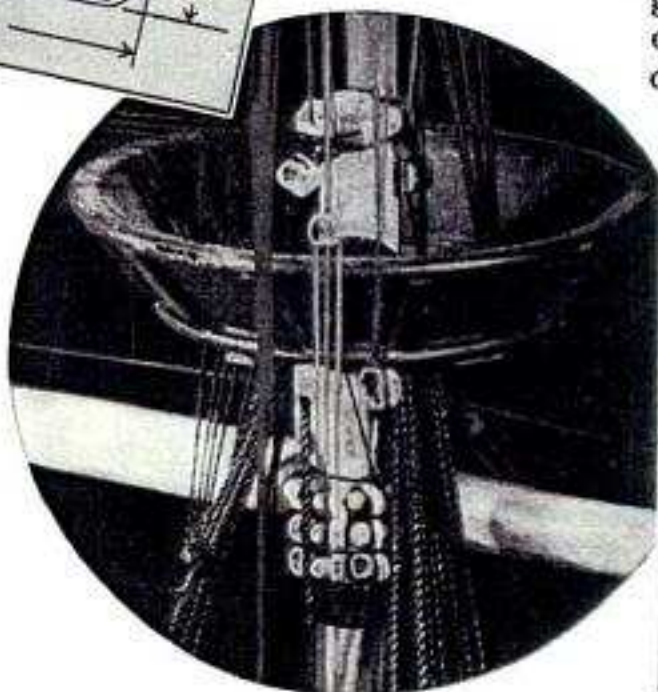


of the masts and its lines are secured directly around the main and foreyards to hold these firmly against the forward sides of their masts. It should be noted, however, that the mizzenyard parrel has but two rows of trucks (balls) and that it holds the mizzenyard tie, rather than the yard, in place. The tie of the crojack yard is an exception to other upper yards, being made as a non-adjustable sling. All upper yards, including the crojack yard, are held firmly downward and backward with simple strops passed around the masts.

With the yards attached, we can proceed with the running rigging. You will

have a number of blocks to attach. The writer discovered that the quickest way to handle these was to first seize all blocks into pendants of the correct thread sizes, about 6 in. long, before beginning to attach them into place. Regardless of their purpose, you will then have ample line to secure the blocks and can clip off the free ends as necessary. It is also safer to put a touch of shellac on the blocks and threads to make sure that none of them will come loose when adjusting the rigging tension. This applies also to all knots the rigging requires.

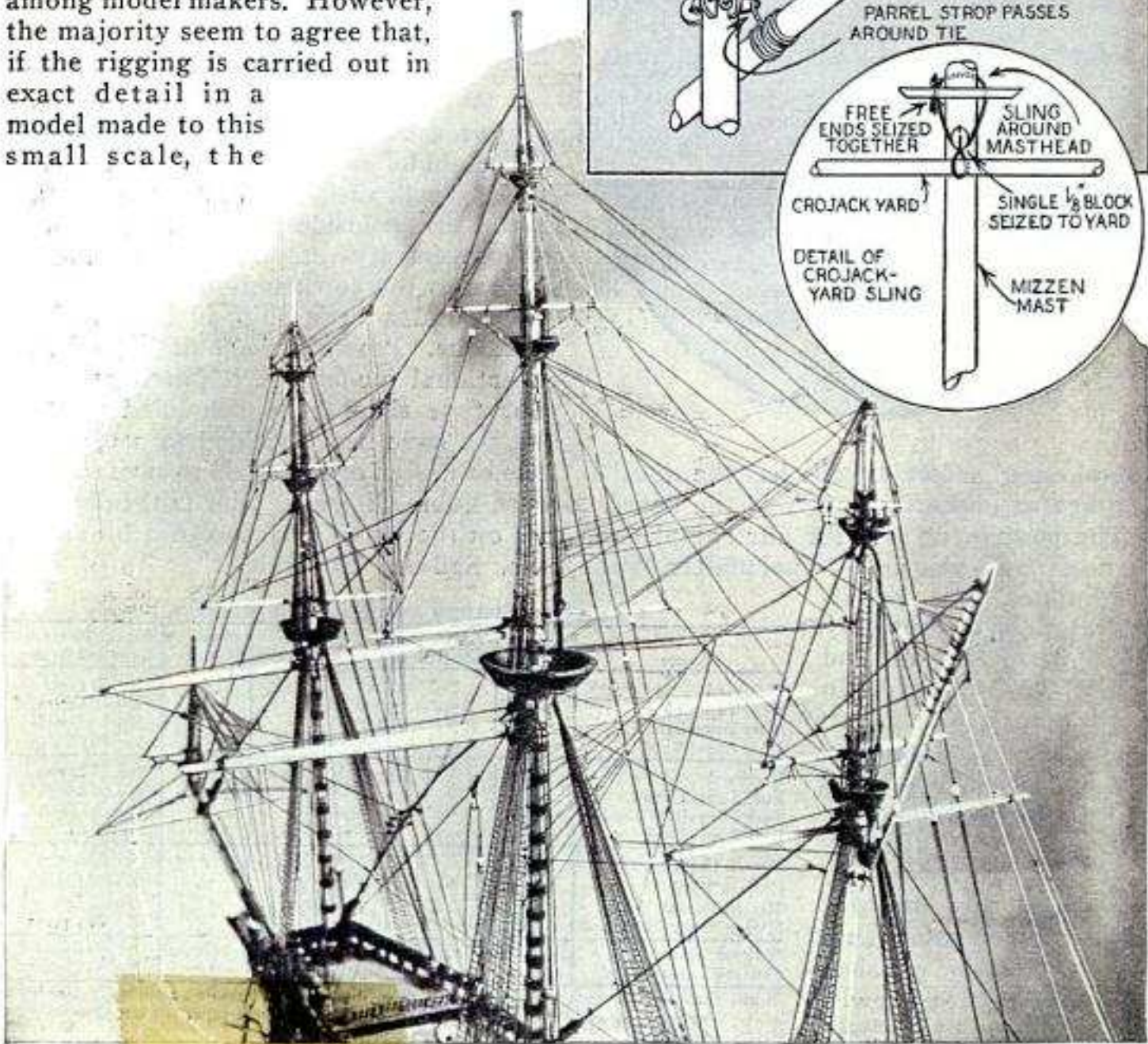
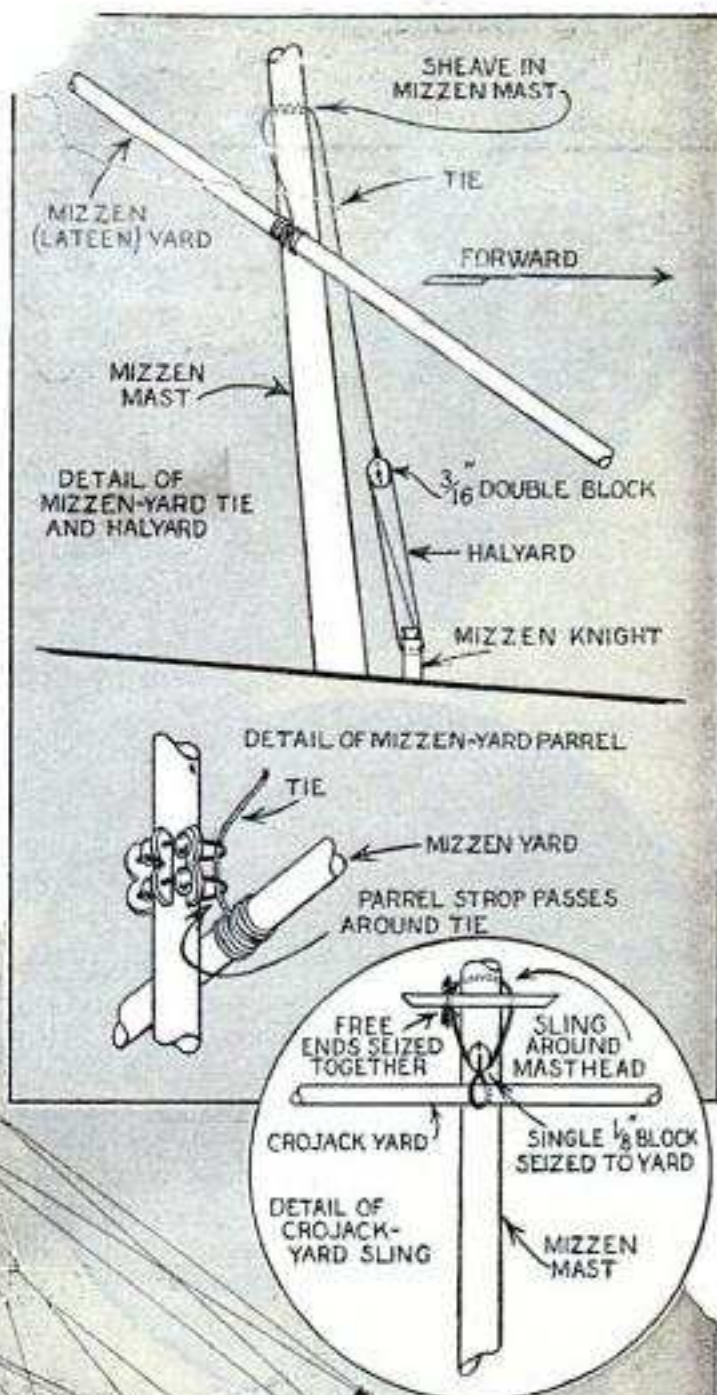
A study of the rigging plan shows that all lifts (vertical adjustment for the yard ends) and braces (horizontal adjustment) are duplicated on both sides of each yard. Hence, only one side of the rigging and yards is shown to simplify the plan and to help you understand just where each line runs. The one exception to this is the lift for the mizzenyard. It is single. Also, the fore topsail yard, and fore royal yard rigging, is duplicated on the other yards as described on the plan at those points.

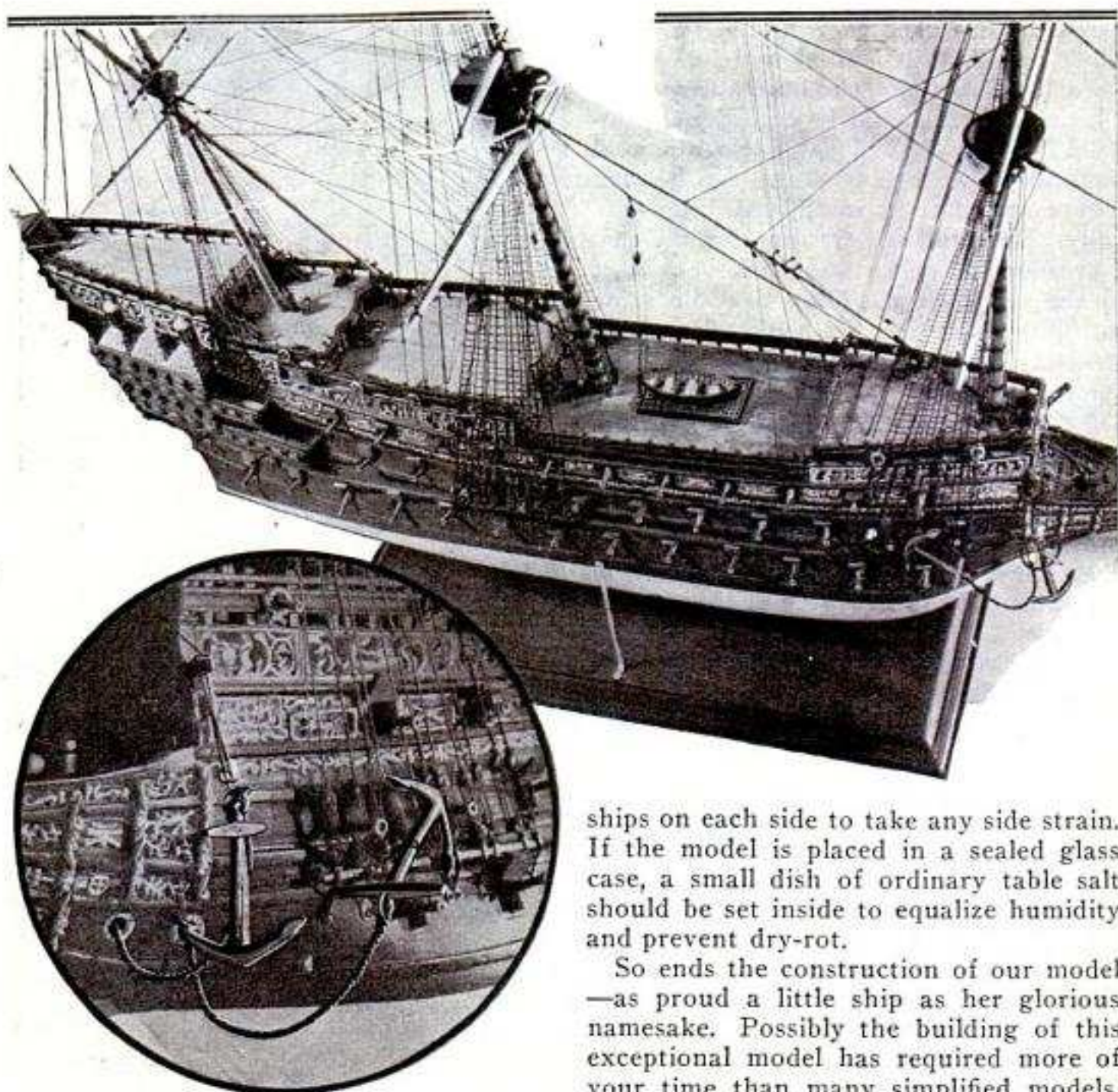


The foreyard duplicates the arrangement of the mainyard. Where lines appear to terminate as, for example, in the tops, they are to be belayed at such points. It is well to begin with the lower yards. Carefully note where each line starts; then trace its course to the belaying point at the other end. The fore topsail yard and fore royal

yard lifts are used as guides for rigging other upper yards, and should follow lower-yard rigging. The braces vary a bit and each should be considered individually. If you will get a clear mental picture of each line as shown on the plan before you place it, you'll have little difficulty. No detail is necessary for the two "spreaders" used to attach the crowfeet to the mizzenyard. These are the same as those used for the spritsail-topmast backstay, described previously with the standing rigging.

As now rigged, the lower yards are in positions to bend on their sails, while the upper yards appear lowered to the positions they would occupy with sails removed. This eliminates the obstructions that the lower yards would represent at rail level if they, too, were in the relative positions of the upper yards. As for fitting the sails, this is an arbitrary point among model makers. However, the majority seem to agree that, if the rigging is carried out in exact detail in a model made to this small scale, the





"blanketing" effect of sails has the disadvantage of obscuring much of the detail.

The permanent base for our completed man-of-war is also an optional matter with the builder. The type illustrated is commonly used in museums and shows the hull lines to good advantage. Two posts, as detailed, support the keel, and 3-in. wood screws of small diameter are driven through the base, through the center-post holes and into the hull. Supplementary supports of  $\frac{1}{8}$ -in. polished brass rod are then screwed to the hull and base mid-

ships on each side to take any side strain. If the model is placed in a sealed glass case, a small dish of ordinary table salt should be set inside to equalize humidity and prevent dry-rot.

So ends the construction of our model—as proud a little ship as her glorious namesake. Possibly the building of this exceptional model has required more of your time than many simplified models, but, we have never yielded to a compromise of design or materials to save the few extra hours of work. She faithfully carries on the brave tradition of a brave old ship. Sail on, "Sovereign!"

CHART OF YARDS AND RUNNING RIGGING

| Name                   | Length             | Dia. Middle Two-Thirds | Size, All Blocks                     | Number of Blocks | *Sizes: Pendants Lifts and Braces |
|------------------------|--------------------|------------------------|--------------------------------------|------------------|-----------------------------------|
| Mainyard               | 13"                | $\frac{5}{16}$ "       | $\frac{1}{8}$ " Except Halyard Block | 6                | No. 30 Linen                      |
| Main Topsail Yard      | 6 $\frac{1}{2}$ "  | $\frac{3}{16}$ "       | $\frac{1}{16}$ "                     | 14               | No. 60 Linen                      |
| Main Toppallant Yard   | 3 $\frac{1}{4}$ "  | $\frac{3}{16}$ "       | $\frac{1}{16}$ "                     | 14               | No. 70 Linen                      |
| Main Royal Yard        | 1 $\frac{1}{2}$ "  | $\frac{1}{16}$ "       | $\frac{1}{16}$ "                     | 8                | No. 70 Cotton                     |
| Foreyard               | 11 $\frac{1}{2}$ " | $\frac{1}{4}$ "        | $\frac{1}{8}$ " Except Halyard Block | 8                | No. 35 Linen                      |
| Fore Topsail Yard      | 5 $\frac{1}{4}$ "  | $\frac{1}{16}$ "       | $\frac{1}{16}$ "                     | 14               | No. 60 Linen                      |
| Fore Toppallant Yard   | 2 $\frac{3}{4}$ "  | $\frac{1}{16}$ "       | $\frac{1}{16}$ "                     | 16               | No. 70 Linen                      |
| Fore Royal Yard        | 1 $\frac{1}{2}$ "  | $\frac{1}{16}$ "       | $\frac{1}{16}$ "                     | 14               | No. 70 Cotton                     |
| Mizzen (Lateen) Yard   | 11 $\frac{1}{2}$ " | $\frac{5}{16}$ "       | $\frac{1}{8}$ " Except Halyard Block | 7                | No. 35 Linen                      |
| Crojack Yard           | 6 $\frac{1}{2}$ "  | $\frac{1}{16}$ "       | $\frac{1}{16}$ " Except Sling Block  | 10               | No. 60 Linen                      |
| Mizzen Topsail Yard    | 3 $\frac{1}{4}$ "  | $\frac{3}{16}$ "       | $\frac{1}{16}$ "                     | 12               | No. 70 Linen                      |
| Mizzen Toppallant Yard | 1 $\frac{1}{2}$ "  | $\frac{1}{16}$ "       | $\frac{1}{16}$ "                     | 8                | No. 70 Cotton                     |
| Spritsail Yard         | 7"                 | $\frac{1}{16}$ "       | $\frac{1}{16}$ "                     | 14 or 16         | No. 60 Linen                      |
| Spritsail Topsail Yard | 3 $\frac{1}{4}$ "  | $\frac{3}{16}$ "       | $\frac{1}{16}$ "                     | 10               | No. 70 Cotton                     |

Note: Diameters at ends of yards approx.  $\frac{1}{2}$  of diameters at middle sections. Yards have flat taper to within  $\frac{1}{4}$  their lengths at outer ends, where taper is more pronounced.

\*Halyards same diameters as given mast shrouds.