

Build This  
MODEL OF

*Flying  
Cloud*

By James Tate



DONALD McKAY'S

most

*Famous Clipper Ship*

of the year

1851



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MODEL OF**

# **Flying Cloud**

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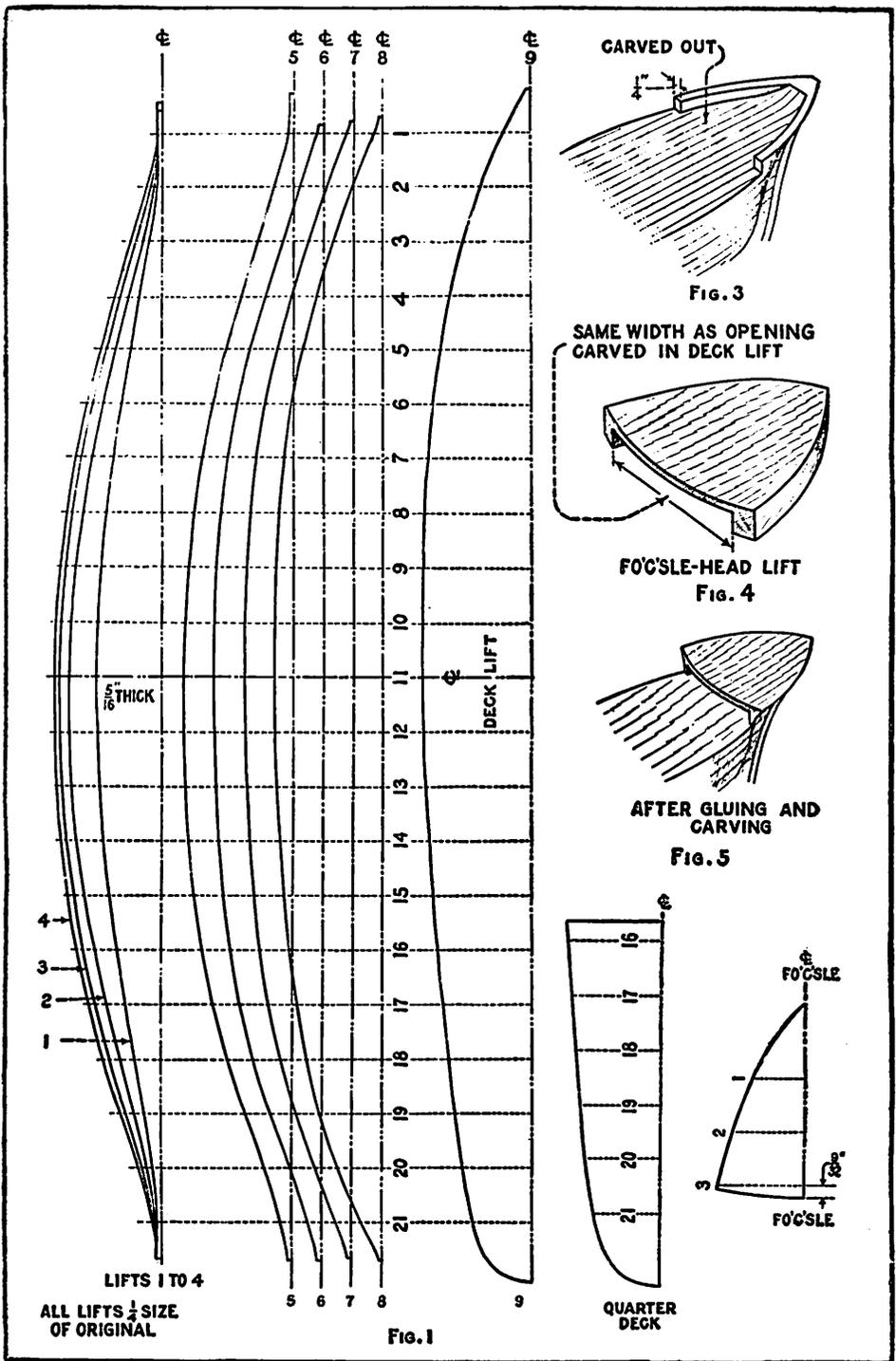
*Donald McKay's  
Most Famous  
Clipper Ship  
Year 1851*

**Length of Model, 37"  
Height, 27"**

*Scale, 1/8" to the foot.*

## **BUILDING A MODEL OF THE FLYING CLOUD**

After reading the achievements of the Flying Cloud you will find a great deal of pleasure in building a model of the once peerless clipper. There is no real skill required in building a ship model, just the average use of tools, nimble fingers and plenty of patience. Do not "rush" your model. It takes time to do a good job. The work is most fascinating, and an occasional peek at the finished model will recall pleasant hours spent in building your model of the vanished age of sail.



Quarter-Size Drawings for Making Hull, Deck, Quarterdeck and Fo'c'sle Templates

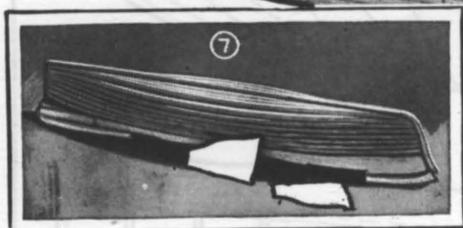
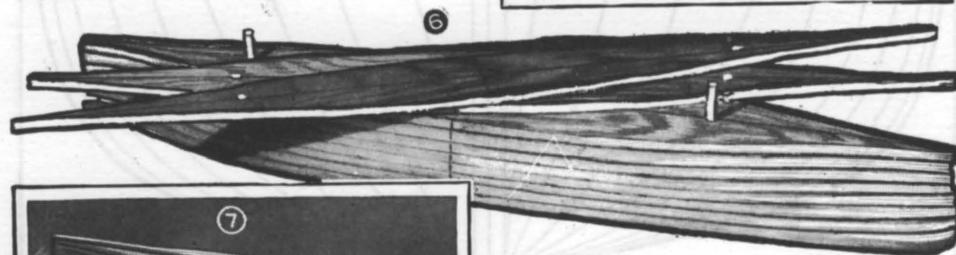


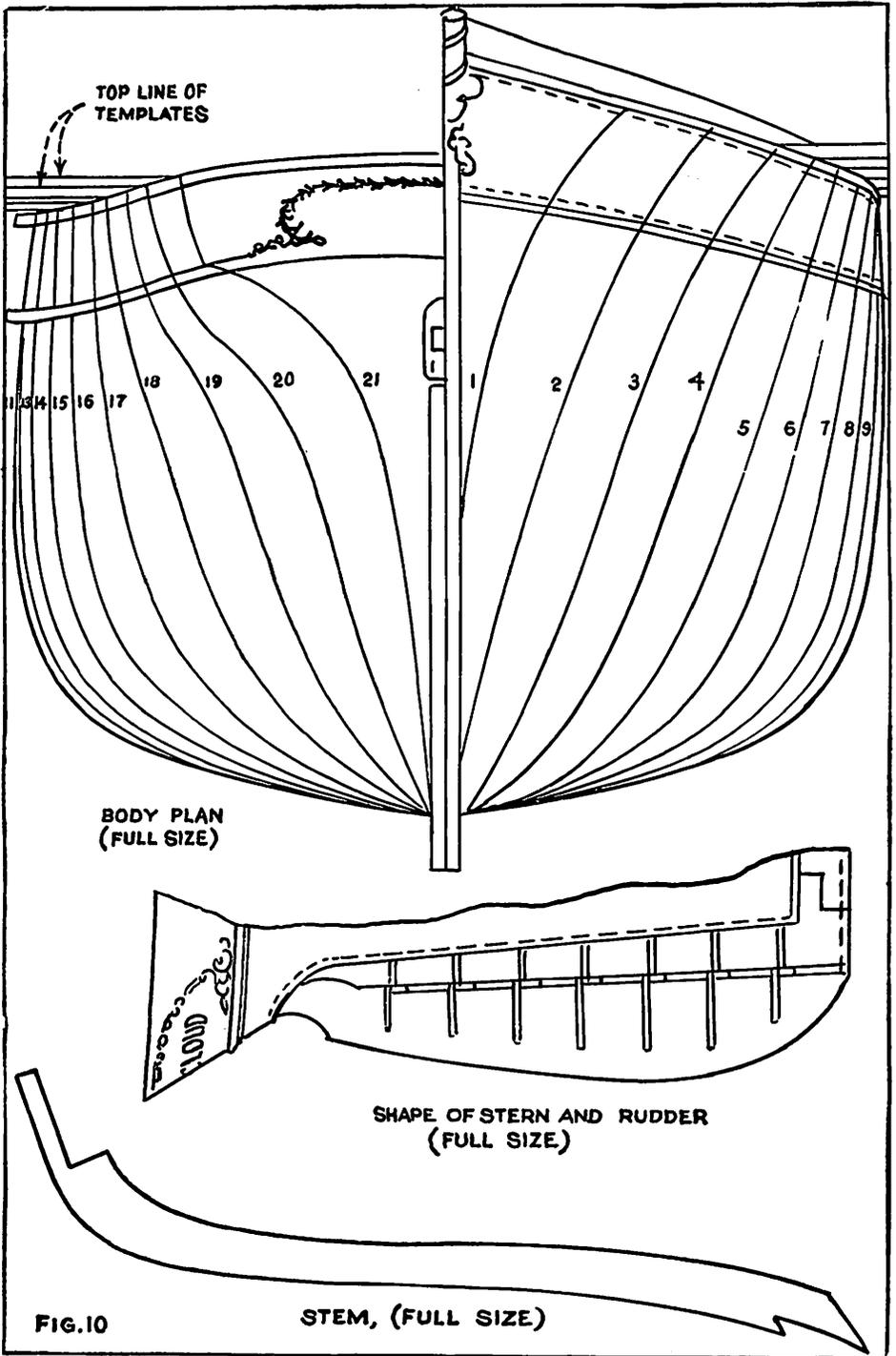
Fig. 6, Assembly of Lifts; Fig. 7, Glued-Up Hull; Fig. 8, Carving Corners off Hull with Chisel; Fig. 9, Testing Hull Contour with Body Mold

You will note that Fig. 1 is a quarter size drawing for making the lifts. The reader can save time and trouble of enlarging by obtaining full size blue prints of lifts, location and sizes of deck houses, furnishings, etc. and enlarged rigging plan for about \$ 3.80



Marking Off One of the Lifts from the Wrapping-Paper Template

THE "Flying Cloud" record of 89 days 18 hrs. from New York to San Francisco around Cape Horn was equalled only once by a sailing vessel, but never beaten.



Full-Size Drawings for Making Body Molds, Stem and Stern Templates



Fig. 11, Finishing Stern with Spokeshave; Fig. 12, Sighting for Smooth Curves; Fig. 13, Stern, Showing Knuckle Line; Fig. 14, Partly Carved Hull

The first step in making the model is to lay out the templates for the lifts, or planks, that are glued together in "bread-and-butter" fashion to form the rough hull. Get some sheets of stout brown wrapping paper, 30 in. long and cut into strips 8 in. wide. Draw a line down the center of each strip and erect perpendiculars to this line all along its length,  $1\frac{1}{4}$  in. apart. Number these from 1 to 21, as in Fig. 1. The drawings for the lifts given therein are exactly one-fourth the size of the original, so,

taking lift No. 18 as an example, measure with a pair of dividers the distance from the center line to the curved line representing the outer edge of the lift, along line No. 1, and step this distance off four times along line No. 1 on the wrapping paper. Do the same with lines Nos. 2, 3, and so on, until you have a series of points on the paper through which a smooth curve can be drawn, and which will look exactly the same as lift No. 8 in Fig. 1, but four times the size. Use a French curve in drawing

the line through the points marked, and make the curve "easy" from end to end. Now fold the wrapping paper exactly along the center line and cut through the doubled paper along the curved line. When cut and opened, you will have a template for lift No. 8 on which both sides will be exactly alike. Lay out the remaining templates in the same manner. Templates 1 to 4 are shown with a common center line, to save space, and 5 to 9 are separated, to avoid confusion in measuring. Mark the exact position of line No. 11 on all templates, squaring a line right across the paper. The templates will be found to fold easily along the center line if the rounded point of a pair of scissors is drawn along the line before the paper is removed from the board for cutting.

The lines given are for lifts  $\frac{7}{16}$  in. thick. There are eight of these, and one deck lift  $1\frac{1}{16}$  in. thick. It is practically as satisfactory to make the lower lifts  $\frac{5}{8}$  in. thick, and to cut only four of them, and, if this is done, templates need only be made for lifts Nos. 2, 4, 6 and 8. In some cases it may be easier to get lumber planed to  $\frac{7}{16}$ -in. thickness and in others  $\frac{5}{8}$ -in. lumber, so lines for both thicknesses are given here. Make templates for the quarterdeck and fo'c'sle (forecastle) in the same way as for the others. Mark all templates for bow and stern; in Fig. 1 the bow ends of all lifts are at the top of the page.



## Making the Hull

The lumber used for the hull lifts is white pine, or sugar pine,  $\frac{7}{16}$  or  $\frac{5}{8}$  in. thick, well seasoned and free from knots. Eight pieces of the  $\frac{7}{16}$ -in. size or four of the  $\frac{5}{8}$ -in., will be required, 27 in. long, and one piece,  $1\frac{1}{16}$  in. thick and 29 in. long, for the deck lift. Also a short piece of  $\frac{1}{2}$ -in. pine, 9 in. long, for the quarterdeck, and one piece  $\frac{1}{2}$  by 4 by 5 in., for the fo'c'sle head. All pieces, except the last, are 6 in. wide. It is difficult to give an exact material list for a job of this kind, since so many of the smaller fittings are made from scraps. For example, the

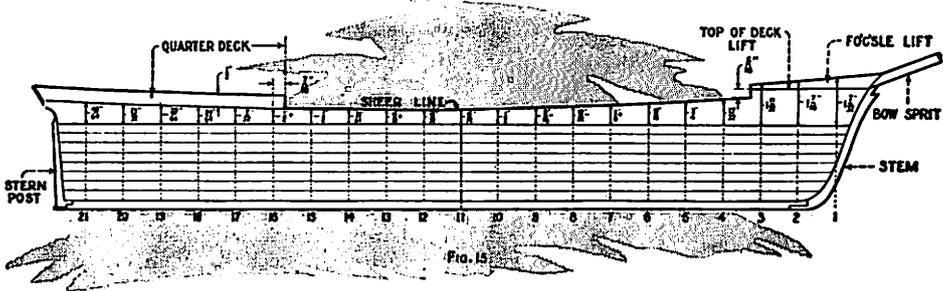
keel, stem, sternpost and rudder in the original model were ripped from a scrap piece of birch chair rail, and the bulwarks were cut out of the scrap left over from the deck lift.

The templates having been made, take No. 1, or No. 2, as the case may be, and pin it down on one of the boards, stretching it so that it lies flat, then run a pencil around the edge as in Fig. 2, to lay out the curves on the board. Transfer the center lines to the board also. Do the same with all lifts, then cut them out with a compass saw, fretsaw or frame saw, as convenient, cutting just outside the line. After sawing, clamp the lifts in the vise individually, and trim them down to the line with a spokeshave. Mark the bow and stern on all pieces, so that they do not become reversed when gluing; also mark the center line down the middle and at each end and line No. 11 square across each piece at the proper place. Line No. 11 is after this called station No. 11. All lines at right angles to the center of the lifts are stations. Cut a notch,  $\frac{7}{8}$  in. deep,  $2\frac{1}{8}$  in. wide, out of the center of the forward edge of the quarterdeck, as in Fig. 16.

Lay lift No. 8 down on the bench with the center marks uppermost, coat this side, and the plain side of No. 7, with glue, set No. 7 on the lower one, lining it up in position by means of the center marks and with station 11 on No. 7 exactly over station 11 on No. 8. (See Fig. 6.) Drive in a couple of short brads to keep the lifts from shifting, and glue and set all the other lifts in the same fashion. You will have to work fast here. When the assembly is complete, clamp it firmly, so as to force all the lifts into good contact, and set aside for 24 hours to set. If desired, before gluing, the lifts can all be assembled and drilled for two  $\frac{1}{2}$ -in. dowels, as indicated in Fig. 6. This makes it easier to assemble the lifts when gluing, but the dowels must be a trifle shorter than the combined height of the lifts, or they may interfere with the clamping. If large enough clamps are not at hand to take in all the lifts at once, the hull may be glued up in two or more sections. Now lay the deck lift flat on a board or on the bench, mark the position of each station on the edges, and with a pair of dividers, and measuring from the bottom edge of

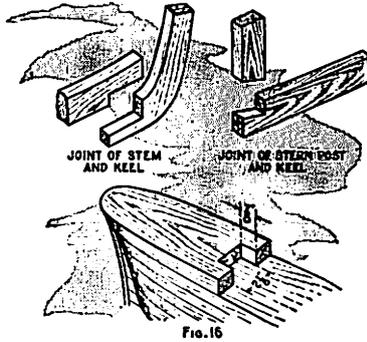
the lift, lay off the sheer line from the measurements given in Fig. 15. The positive sign behind some of the figures indicates that the distance is "just a hair" more than the measurement given, and the negative sign behind others that the distance is a trifle (not quite  $\frac{1}{64}$  in.) less. In other words, one measurement is "full"; the other "scant." Lay off all

the edge of the fo'c'sle, on the forward end of the deck, and carve out between the marks as shown. Clamp the fo'c'sle lift in place temporarily on the deck lift, placing it according to the station lines, and mark the curve of the fo'c'sle deck from the dimensions given at stations 1, 2 and 3 in Fig. 15. Cut the deck down to this line, then carve out the underside to



these points, on both sides, from station 4 clear back to the stern, then draw the sheer line on both sides, through these points, continuing the curve forward from station 4 for a distance of  $\frac{3}{8}$  in.; at this point draw a vertical line from the sheer line to the upper edge of the lift, on each side, and connect the two by a pencil line drawn square across the lift. This represents the after edge of the fo'c'sle. A saw cut is made down this line to meet the sheer line, then the remainder of the lift is cut away, with chisel and drawknife, down to the sheer line. Leave the deck "crowned," or  $\frac{1}{8}$  in. higher along the center line than at the edges. Square and smooth the after end of the lift and glue on the quarterdeck,  $\frac{1}{2}$  in. in thickness. To make a good joint between the two, lay a sheet of sandpaper, abrasive side up, over the after end of the deck. place the quarterdeck over the sandpaper, and move it back and forth over the abrasive until the underside of the quarterdeck fits the deck perfectly. See that the station marks on the quarterdeck line up with the corresponding lines on the deck lift when gluing, as indicated in Fig. 15, above.

Mark, as in Fig. 3, a line  $\frac{1}{4}$  in. inside



the same size as the opening carved in the deck, leaving the fo'c'sle deck  $\frac{1}{8}$  in. thick, and glue the fo'c'sle head in place. When the glue has set, glue the deck lift to the remainder of the assembly. Crown quarterdeck and fo'c'sle deck  $\frac{1}{8}$  in., like the main deck.

Now make up a set of body templates or molds from the body plan, Fig.

10. The lines in this plan represent what each section of the hull would look like if it were sliced like a loaf of bread at each station line. The lines on the left represent sections of the hull as viewed from the stern; those on the right, sections as sliced and viewed from the bow. Trace each line separately on a piece of stout bristol board, or heavy cardboard, then cut out carefully along the curve, and leave enough of the cardboard to enable it to be handled easily, as shown in the photo, Fig. 9. Taking mold 1 as example, it is cut along the curved line, straight down the stem, down to the bottom of the keel, then across to the center of the keel, and cut off at this point. Note the molds in the photo, Fig. 7. Number the molds as they are drawn and cut. Make a stem template from the full-size drawing in Fig. 10, also a template for the shape of the stern, inside

the sternpost, and one for the sternpost. Cut a temporary stem and sternpost out of  $\frac{3}{16}$ -in. wood, and carve and file the stern and bow of the model until the stem



"Crowning" the Surface of the Fo'c'sle Deck; Note Improvised Cradle Holding Hull

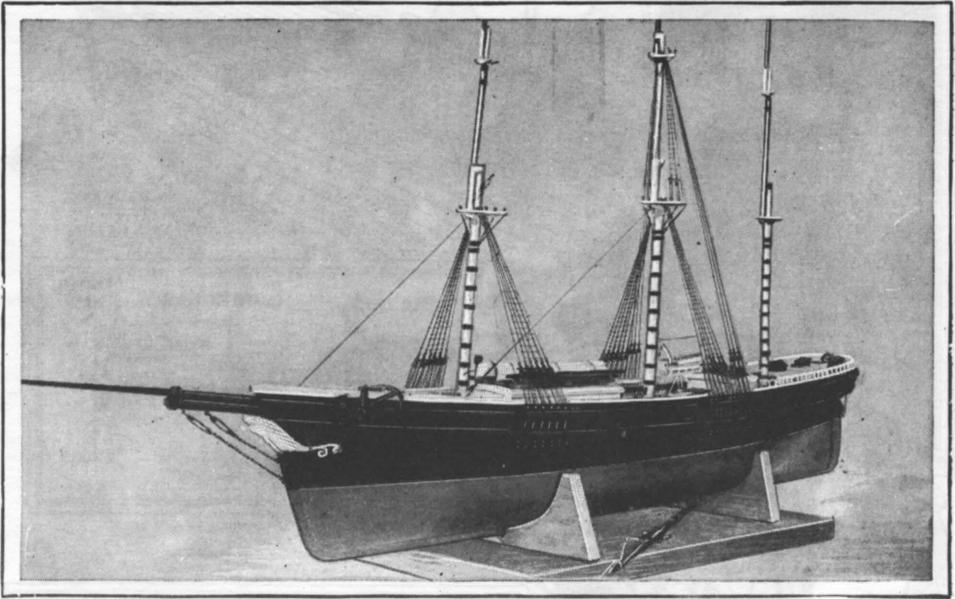
and sternpost fit correctly, then cut a temporary keel from  $\frac{3}{16}$  by  $\frac{1}{4}$ -in. wood and tack all in place. These pieces help a lot in carving the hull, and the reason for using temporary ones is that, in carving near the ends, it is almost impossible to avoid digging slightly into the stem and sternpost, so that if permanent pieces were fitted they would be badly marred. Mark the station points on the keel and stem, where station 1 runs through the latter, then fasten a block to the deck by means of a couple of screws, so that the hull can be held in the vise while carving, and you are ready for the next operation. When drilling the screw holes in the holding block, place these so that one screw will come  $5\frac{1}{4}$  in. from the forward edge of the quarterdeck and the other the same distance aft of the edge of the fo'c'sle head, on the center line of the deck. In this position, the screw holes in the deck will afterward be covered by deck erections, so they will not have to be filled.

Now, starting at station 11, begin carving the hull down to the outline given by

mold 11. The corners of the lifts can be carved off with the chisel, but when the contour of the hull begins to approach that of the mold, it is well to supplement the chisel with a small spokeshave, set to take a very fine shaving. Always work one or two molds ahead of the station you are finishing; that is, when working on station 11, and carving toward the bow, carve stations 10 and 9 roughly to shape also. This helps to indicate the sweep of the curves in the hull. Also, be sure to keep the mold, when trying it against the hull, as in Fig. 9, exactly at right angles to the center line of the hull, not at right angles to the hull surface. Proceeding from the center station to the ends, carve each station point until the mold for that particular station fits exactly, and the curves of the hull, when viewed from any angle, as in Fig. 12, are "sweet" and true, showing no humps or hollows. Be particularly careful when carving at stem and stern. The bow on this ship has a pronounced flare or outward curve, and if the carver is not careful at this point, there is a tendency to destroy the true shape of the fo'c'sle deck. Also, at the stern, you will notice that mold 21 flares outward from the keel until it meets a molding; from there it runs up in an almost straight line to the deck. The line where the curve changes is called the "knuckle," and the way it looks when carved is shown in Fig. 13. From this knuckle to the deck, from a point about midway between stations 20 and 21 on one side, right around to the same point on the other side, this part of the hull is practically straight in the vertical plane, although the angle of the straight part changes rapidly as it approaches the stern, when it becomes as shown in the stern template, Fig. 10. The knuckle shows as a decided line all around the stern, following the line of the deck, and about  $1\frac{1}{16}$  in. below it. "Fair up" all the curves in the hull with spokeshave and sandpaper, until they are sweet and sweeping when viewed from any angle. A mold is not shown for station 12, to avoid confusion in the drawing, but the change of section from 11 to 13 is slight, and the hull is easily carved by eye at this point.

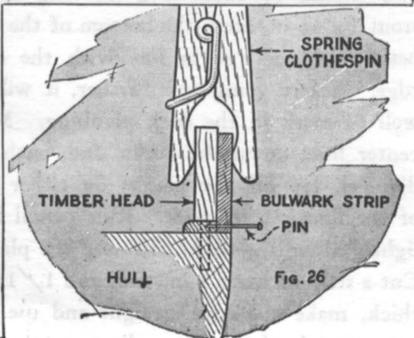
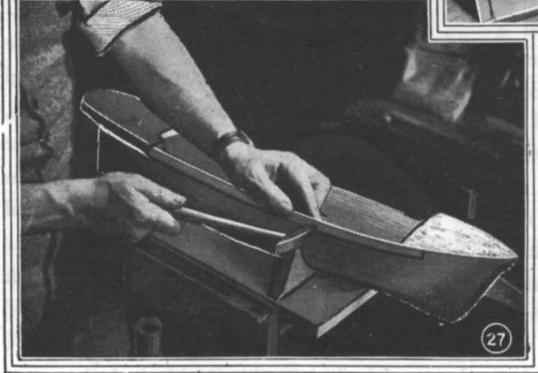
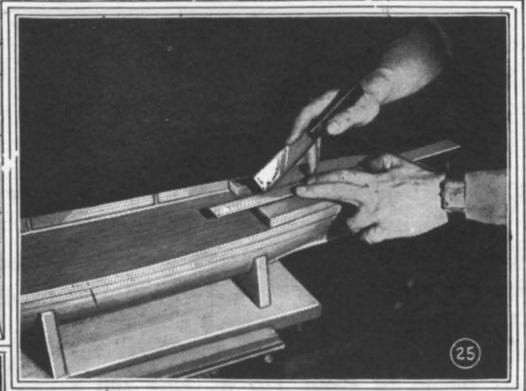
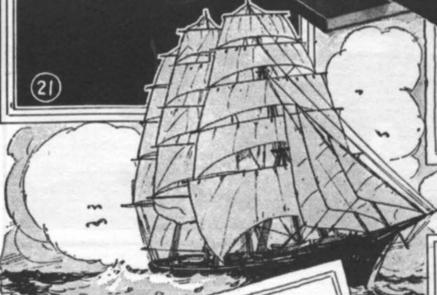
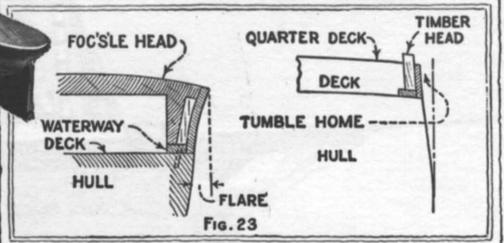
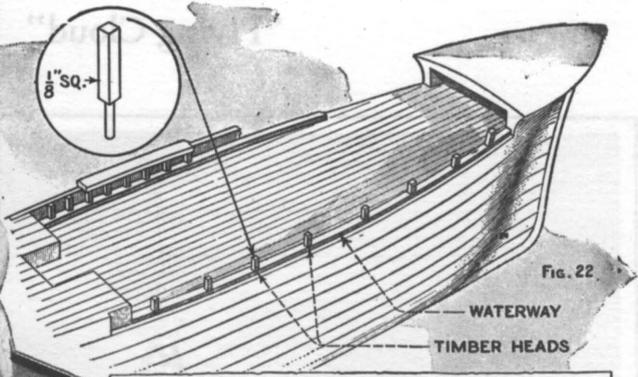
Now drill a  $\frac{3}{16}$ -in. hole in the bow for the bowsprit, at the angle indicated

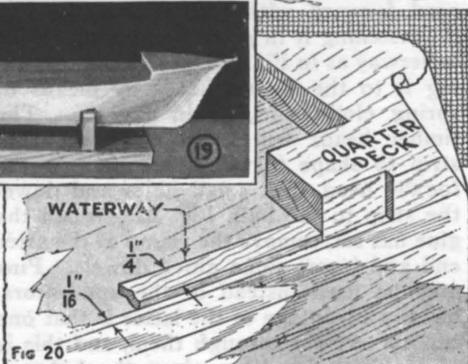
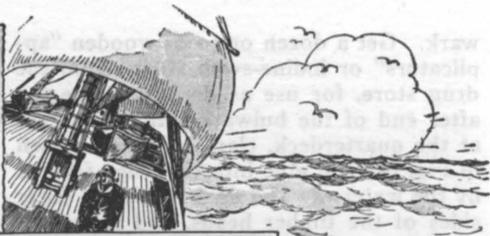
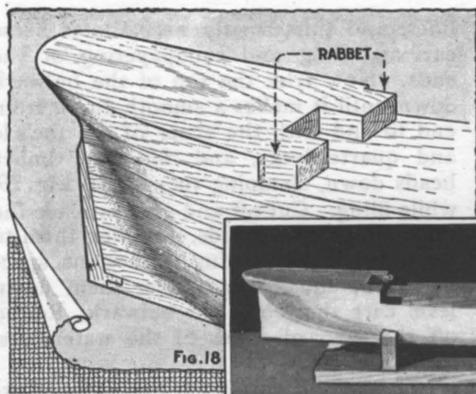
## "Flying Cloud"



**W**ITH the hull carved to shape, as in Fig. 19, the next step is the erection of the bulwarks. Cut a rabbet on each side of the quarterdeck, as shown in Fig. 18, and a similar one on each side of the after end of the foc's'le head. These rabbets should be about  $1\frac{1}{4}$  in. long and a stout  $1/16$  in. deep; the bottom of the rabbets should be cut in line with the deck edge. Before going any further, it will be well to mark in the deck planking. Mark center lines down the decks, and, with the dividers, lay off the planks on either side of the lines,  $1/8$  in. wide. Rule pencil lines lightly along the decks, defining the planks. Cut a strip of wood 1 in. wide and  $1/16$  in. thick, make one edge straight and use this as a straightedge when ruling and scoring

the lines; the flexible wood will lie closer to the deck than a regular straightedge. Now take a putty knife or similar tool, and score in the planking lines as shown in Fig. 25. A scribe will do for this job, but the point must be slightly rounded, else it has a tendency to follow the grain of the wood, and produce crooked "planks." The putty knife, used as shown, is an excellent tool for the job. After the deck lines have been scored in, stain the decks slightly with light-oak wood dye, made very light with turpentine. The object here is to get a deck that will look weather-worn yet "clean." The deck should be very slightly brownish-yellow. Don't leave the decks white; ships' decks were





never so. After the stain has set, give the decks three coats of varnish, rubbing each coat down with the very finest steel wool; the last rubbing should leave the decks smooth, but not shiny.

Take a piece of wood,  $\frac{3}{32}$  in. thick and about 3 in. wide, and cut it to length, so that it will fit snugly between the after end of the foc's'le and the forward edge of the quarterdeck, just back of the rabbets. Hold the strip down on the deck, projecting over the edge of the hull, as in Fig. 21, and run a pencil around the hull as indicated, to mark the shape of the deck edge on the strip. Cut this edge to the pencil line, and then, with the dividers set to  $\frac{1}{4}$  in., run another mark along the strip inside the curved edge. Cut to this line, and you have a waterway strip,  $\frac{1}{4}$  in. wide, which is glued to the deck, as indicated in Fig. 20, the outer edge of the strip being even with the back of the rabbets at each end, and an even distance from the edge of the hull all along. A few pins will assist the glue in holding. Fit a similar strip on the other side.

Make some  $\frac{1}{8}$ -in. square strips of wood, and from them cut the timber heads, shown in Fig. 22, in the circle. The peg portion is  $\frac{3}{8}$  in. long, and the square part 1 in. long. Here we digress a little. Amidships the sides of our model are approximately vertical and the bulwarks correspond. From amidships aft, the upper part of the hull leans inward or "tumbles home" as the nautical term has it, and the bulwarks tumble home in the same degree. From amidships forward the upper part of the hull curves outward, or "flares,"

and the flare becomes more pronounced the further forward we go, and, as the timber heads represent the upper part of the ribs in a real ship, they consequently follow the tumbling or flaring lines of the hull. (See Fig. 23.) So, in drilling the holes for the timber heads through the waterways, the flare or tumble home must be taken into account, and the holes drilled to correspond. When marking off for drilling, make the holes come so that the outer edges of the timber heads will be exactly on the outer edges of the waterways. Only four timber heads with the pegs are needed on each side; the remainder may be dummies, glued on later. There are 23 timber heads on each side, hence the pegged ones must be spaced so that, when the others are glued on, the spaces between all will be equal. Make the pegged heads the second and fifth ones from the foc's'le; one about amidships and the second one from the quarterdeck. Drill the holes and glue the heads in place, on each side.

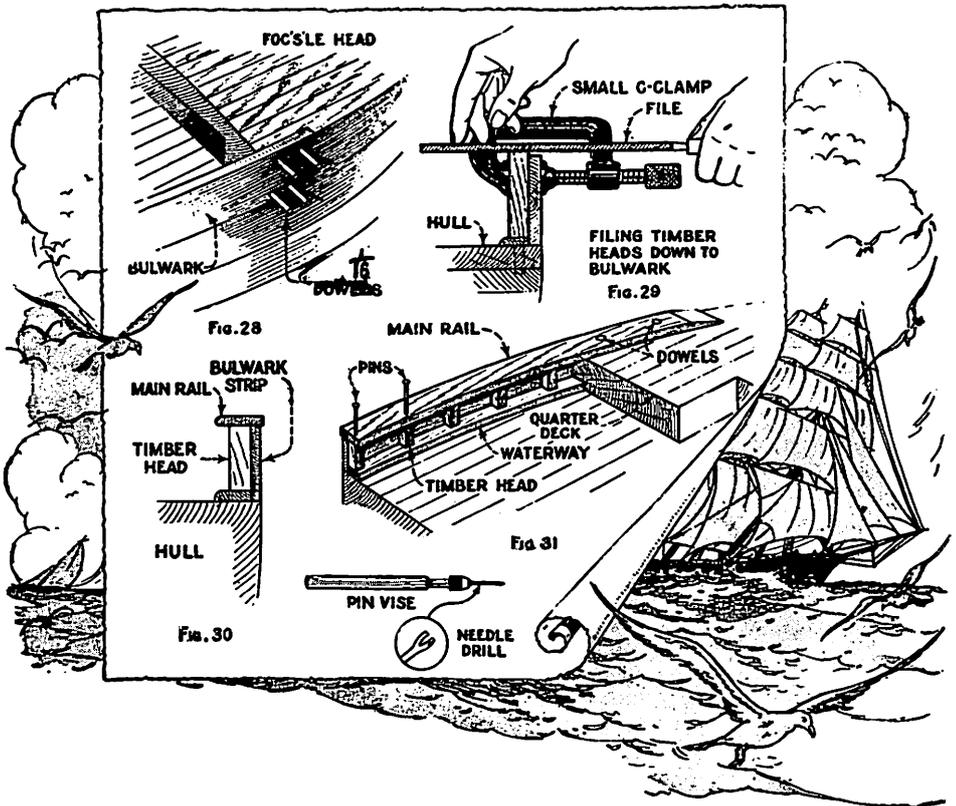
Now cut a strip of wood a stout  $\frac{1}{8}$  in. thick, long enough to reach from the outer end of the foc's'le rabbet to the outer end of the quarterdeck rabbet, and about 2 in. wide. Shape one edge very carefully until it fits the deck perfectly from rabbet to rabbet. This strip will form the bul-

wark. Get a dozen or so of wooden "applicators" or iodine-swab sticks from the drug store, for use as dowels. Glue the after end of the bulwark into the rabbet at the quarterdeck, clamping it as shown in Fig. 24; run glue into the ledge formed by the waterway and deck; glue the outer sides of the timber heads, and then proceed forward with the strip, as in Fig. 27, fastening it in place by pinning to the waterway as in Figs. 24 and 25, and clamping it to the timber heads by means of spring clothespins, as in Fig. 26. The timber heads will help spring the thin strip to shape forward and aft. At the foc's'le head, drill small holes and dowel the strip to the hull, Fig. 28. When the glue has set, remove the clamp at the after end and insert some glued dowels. Pins may be used instead of the applicators, but the advantage of the latter is that one can carve right through them, and this is of special value here, since the bulwark should run smoothly along with the hull

lines, and this usually necessitates some carving, filing and sandpapering at the ends. Now trim the top of the bulwark down until it makes a smooth curve from end to end with the sheer of the foc's'le and quarterdecks, and file the timber heads down, clamping them as in Fig. 29, while filing. Cut off and glue in place the remaining timber heads, clamping them to the bulwark with spring clothespins, spacing them equally and filing them down level with the top of the bulwark. Round off the inboard edges of the waterways, as in Fig. 30.

For work of this kind, get some packages of ordinary dressmakers' pins, and also a package or two of the very small pins known as "Lills." These are about 1/2 in. long, and are essential.

It is wise, at this time, to paint the inside of the bulwarks, since they are hard to get at later. Give them three or four coats of white japan color, thinned with turps, then a final coat of eggshell-gloss



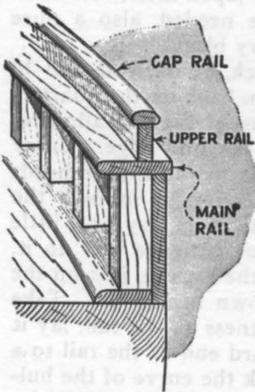


Fig. 32

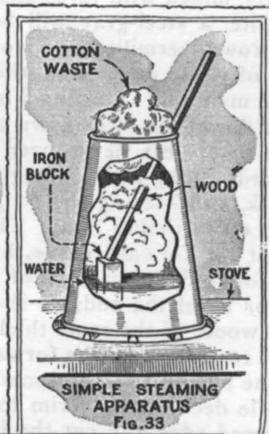


Fig. 33

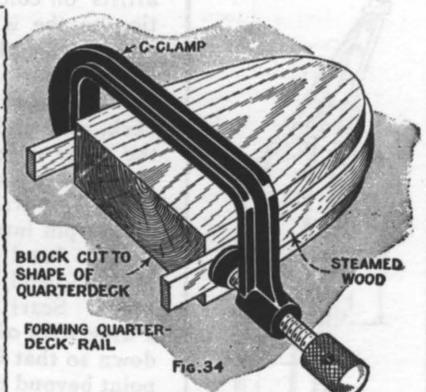
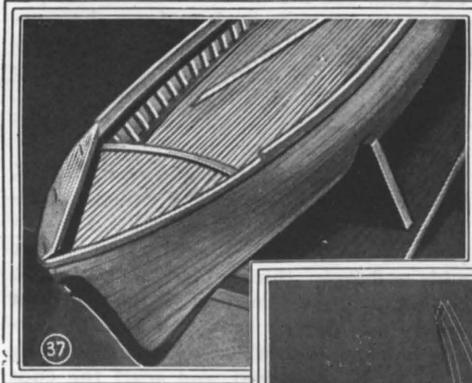


Fig. 34



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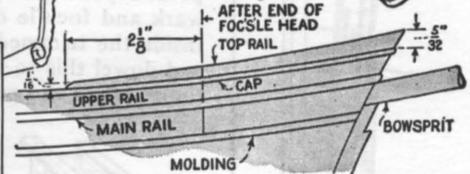


Fig. 35

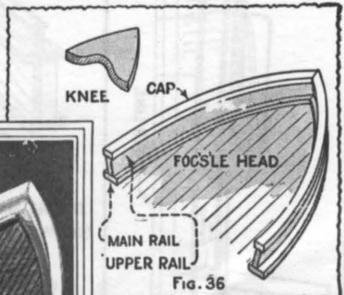
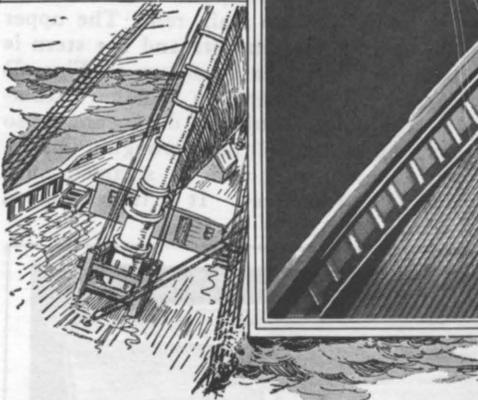


Fig. 36

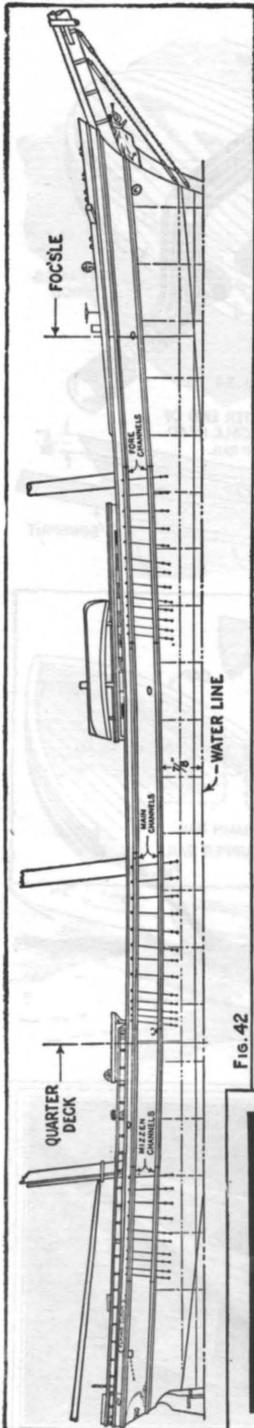


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white enamel. Don't use a full-gloss enamel anywhere on the model. The japan paint is known variously as "colors in japan," "carriage colors" and "japan colors" and they are simply what the names indicate: pigments ground in japan drier instead of in oil. They dry fast and flat. If they cannot be obtained locally, use



artists' oil colors, mixed with turps and japan drier. In addition to the white, a steel-gray will be needed, also a pure green, cream, brown, vermilion and ivory black.

Cut a strip of white pine,  $\frac{1}{8}$  in. thick,  $\frac{3}{8}$  in. wide and 16 in. long, for the main rail. Starting 3 in. back on the quarter-deck, glue and dowel the strip down as in Fig. 31, allowing the outer edge to project  $\frac{1}{16}$  in. over the hull edge. Carry the strip forward, gluing and pinning it to the timber heads and the bulwark, and keeping the projection  $\frac{1}{16}$  in. over the latter; pin into every timber head. The strip may be a little hard to bend at the forward curve, but patience will do it. It should end, forward,  $2\frac{3}{4}$  in. back of the foc's'le, just on the curve. Scarf or bevel the ends as shown in Fig. 31. Take a wide strip of wood, of the same thickness as the rail, lay it down so that it reaches from the forward end of the rail to a point beyond the bow, Fig. 37, and mark the curve of the bulwark and foc's'le deck on it. Trim to this line, mark  $\frac{3}{8}$  in. inside the trimmed edge and cut the inner curve. Glue, pin and dowel this to bulwark and foc's'le deck to form the continuation of the main rail. Cut the portion of the rail running

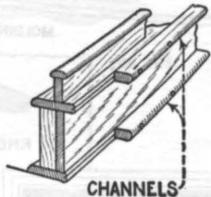


Fig. 43

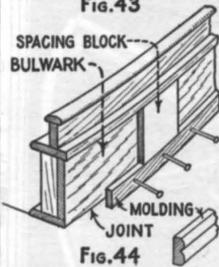
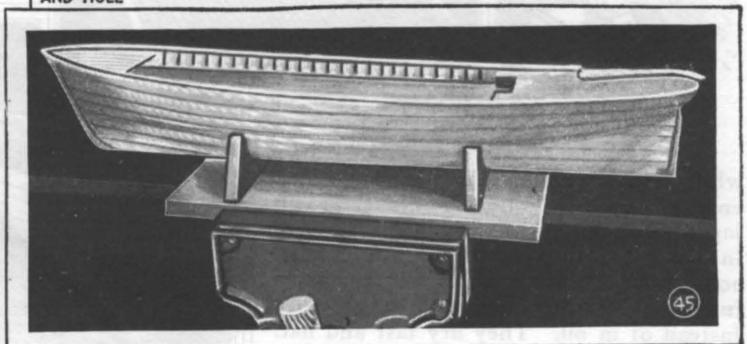


Fig. 44

Fig. 42  
FITTING MOLDING OVER  
JOINT BETWEEN BULWARK  
AND HULL

around the quarterdeck in the same manner, then file and sand the joints. Fig. 45 shows part of the rail around the quarterdeck cut and ready for gluing.

Above the main rail, as shown in Fig. 32, is an upper rail (sometimes called topgalant rail) and a cap or cap rail. The upper rail is formed from a piece  $\frac{3}{16}$  in. wide and  $\frac{3}{32}$  in. thick, glued and pinned to the main rail,  $\frac{1}{16}$  in. back from the outer edge of the latter. Make the midship portion the same length as the corresponding part of the main rail, and scarf the ends for joints like the main rail. The upper rail around the quarters and the stern is best bent to shape as shown in Figs. 33 and 34. The receptacle used for steaming the strip should be deep enough so that the center will be thoroughly pliable, and the wood should be steamed until this will be attained. It is then clamped



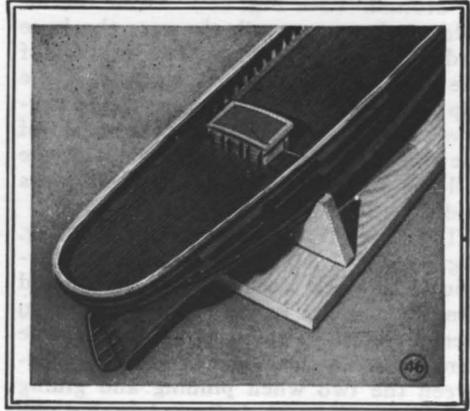
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around a piece of wood cut to the same shape as the quarterdeck, and left for twenty-four hours to dry. Since the upper rail on the foc's'le head should carry out the flare of the hull, it is best to cut it from a wider piece of wood, in the same manner as the main rail was fashioned, then carve it carefully on the outboard side to follow the flare of the hull lines, carving the inboard side afterward until the strip is of the proper thickness. The forward end of the first portion glued on should also be flared as it approaches the foc's'le, so that it will make a fair joint with the foc's'le rail. This may be accomplished by beveling the underside slightly, so as to make the top lean out. The flare at the bow is a little too extreme to make this easy to do with the foc's'le rail, hence the advice to cut this from a solid piece. A small knee, Fig. 36, is cut and fitted in the joint at the bow, down on the waterway, and the bow ends are glued and pinned to this.

When pinning small pieces like this, use the "Lills," and where there is danger of splitting the piece, screw a small C-clamp on the wood at the point where the pin is to be driven, and drive the pin down between the jaws of the clamp. The secret of driving these small pins straight is to use a very light hammer, and only the lightest blows; they will bend at once if struck hard. Where possible, a leading hole should be drilled for the pin, to help in keeping it straight. If small drills are hard to obtain, get a package of assorted needles, choose the size you want for the drill, and snip the eye off, leaving two little projecting prongs, as shown in Fig. 31. Take a three-cornered oil slip and sharpen the prongs in the same way as a flat drill is sharpened, slip the needle drill into a pin vise, and you will have the handiest drill possible for fine work. The modeler should have two sizes of the pin vises; one holding a drill around No. 65, the other the small needle drill. The larger drill will make leading holes for the larger pins.

When gluing the various pieces forming the bulwarks and rails together, be sure that both surfaces to be glued are well coated with the glue, but do not apply too much; then, when the pieces are pinned together and before the glue has

set, run over the joints with a sharpened toothpick or similar tool and remove the surplus glue. Nothing looks worse than to see blobs and beads of glue in the joints,



and it is only a matter of a second to remove the surplus while the glue is still soft.

The cap rail is stout  $\frac{1}{16}$  in. thick and  $\frac{5}{32}$  wide. The midship and foc's'le portions are easy to bend and apply "cold," using the points of small pins for fastenings, but the after part must be steamed and bent. Use the same block as before. Since it is difficult to bend a thin strip in the direction of its width without having it buckle, cut the piece to be bent  $\frac{5}{32}$  in. square, steam and bend it, then, after it is glued and pinned in place, file it down to the same thickness as the rest of the cap. Make scarf joints in the cap as in the other parts. Sandpaper the cap and the inboard edge of the main rail to the shape shown in Fig. 32.

One more rail must be added; the top rail on the foc's'le. This must be as thin as it can be made without splitting in applying, not over  $\frac{5}{64}$  in., and better  $\frac{1}{16}$  in. Remember that in this scale ( $\frac{1}{8}$  in. to the foot)  $\frac{1}{16}$  in. represents 6 in., and a 6-in. timber is a pretty "hefty" one. This rail runs from the bow to a point on the cap  $2\frac{1}{2}$  in. aft of the foc's'le; it is  $\frac{5}{32}$  in. high at the bow and  $\frac{1}{16}$  in. high at the after end. Notice, in Fig. 42, that the bow ends of the upper rail and this top rail slope forward, and make allowance for this in fitting. Some readers may find it easier to carve the top rails from the solid in the same way as the upper rail for the foc's'le,

but, with care, they can be formed from thin strips, bent and twisted into place.

After sanding everything smooth, paint the inboard part of the main rail steel-gray all around. (See Fig. 38.) Paint the inside of the upper rail, the cap, the knee and the top rail white. The outside of the upper rail is painted black, and the cap is white all over, thus making a narrow white bead all around the outside of the ship. Do not paint the outside of the rail just yet. Notice the flare of bulwarks and rails, in Fig. 38.

The next step is to apply the molding, Fig. 44. This is a  $\frac{1}{16}$  by  $\frac{1}{8}$ -in. strip, covering the deck and bulwark joint, and running parallel with the main rail from stem to stern. To insure that they are parallel, use a small block as a spacer between the two when pinning and gluing on the molding, as indicated in Fig. 44, sliding the block along as the molding is fastened. Steam the molding piece for running around the stern. After the glue has dried, cut off and drive in the pins, then take a small triangular or knife file and file grooves right down the center of

both molding and main-rail projection, so as to bead them, then sand until the molding and rail look as in the detail, Fig. 44. This is a small point, but it makes a great difference in appearance of the moldings.

The channels are the timbers on the ship's side that carry the ends of the mast shrouds, and they are shown in Figs. 42 and 43. They are  $\frac{1}{8}$  in. thick and  $\frac{5}{32}$  in. wide. The fore and main channels are  $3\frac{1}{2}$  in. long and the mizzen channels,  $2\frac{1}{2}$  in. long. See also Fig. 46.

The foremast comes  $2\frac{1}{8}$  in. aft of the end of the foc's'le, and the forward ends of the fore channels are  $\frac{1}{8}$  in. forward of the center line of the mast. The mainmast is  $8\frac{1}{16}$  in., center to center, from the foremast, and the forward ends of the main channels are  $\frac{1}{8}$  in. forward of the center line of the mast. The mizzenmast is  $6\frac{1}{2}$  in., center to center, aft of the main, and the mizzen channels are  $\frac{1}{8}$  in. forward of the center line, at their forward ends. Glue and pin these on strongly, using large pins, well driven in, at each end. Fig. 44 is one-fourth the size of the model.



**T**HE next thing that should be done now is to paint the hull. The upper part, down to the water line, is black, and below the water line the object is to simulate the appearance of old, water-stained copper. First turn the model upside down on blocks, Fig. 48, on a level surface, and make a simple scribing block from a scribe or sharpened piece of wire, a couple of staples and a block of wood, as shown. Bend the wire so that it touches the hull at a point  $\frac{1}{8}$  in. down from the deck line, at station No. 11; see that the hull is level in a fore-and-aft direction, then run the scribing block around the hull, pressing the water line into the soft pine with the scribe. Now paint down from the rail to the water line with several coats of black japan color, allowing each coat to dry thor-

oughly. The color below the line should be a sort of yellowish salmon pink, and may be obtained by mixing some red, cream and light brown. A little taste is necessary here. Get an old piece of weathered copper, and try to imitate the color. Don't on any account, use a metallic copper paint.

Space will not permit a complete and thorough explanation of the method of making each individual piece of the deck furniture, but the reader should have no trouble in doing this work from the drawings and text herein.

The method of making the rudder is illustrated in Fig. 47. The rudder itself is of the same thickness as the sternpost, and the forward edge, next to the sternpost, is beveled  $30^\circ$  on each side. Make hooks and eyes (pintles and gudgeons)



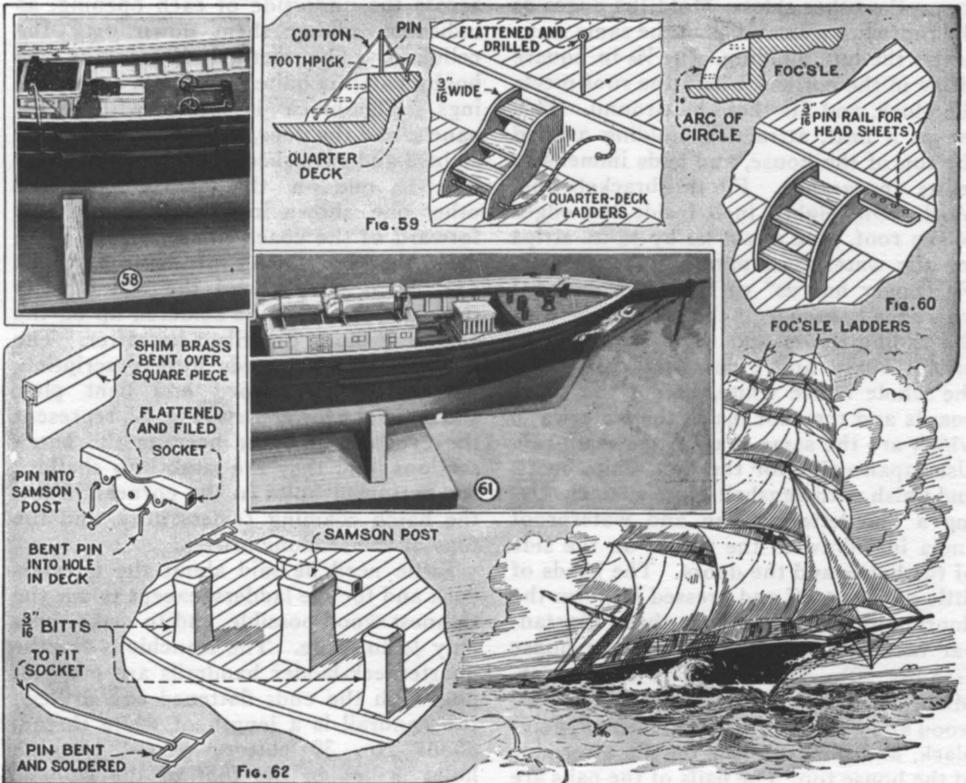


in. on the other sides. Mold the edges of the roof with a small file, in the same manner as the hull molding, glue  $\frac{1}{10}$ -in. square strips in the corners where the roof meets the block, and file these half-round. This makes a neat, attractive molding around the top of the house, and adds immensely to its appearance. Fit the brackets forward. One-eighth inch inside the edges of the roof, glue down  $\frac{1}{32}$  by  $\frac{1}{8}$ -in. strips for the waterways, mitering the corners. Fit "cover boards" of the same material where the house meets the main deck. Cut the sliding doors and their frames from bristol board and glue them on. Paint the whole house white, except the cover boards and the roof inside the waterways, which are the same gray as the main rail. Use japan color for the first white coats, and finish with eggshell-gloss enamel. Using a fine lettering pen and waterproof India ink, draw in the panels on the side of the house and the doors. The heads of little pins, cut off and pressed in, form the doorknobs. Make and fit three capstan-bar racks to the after side of the house (see Fig. 50). Stain light oak and varnish. Make a fire-pail rack from a thin slip of wood and the pails from dowel stock, paint black, and glue in place on the after side of the house top. The bails of the pails are made of white thread, glued on.

The same methods are used in building up all the other deck erections. When making the steering-gear housing, for example, the block is first cut to shape and size, then the ridgepole and the top boards are glued on, the latter projecting about  $\frac{1}{32}$  in. beyond the block edges. The legs are made from toothpicks, with the beading cut on them with a small file. They should be of such a length that the steering wheel will just clear the deck. The wheel is better purchased than made, although one can be made from the drawing, Fig. 52, if a small lathe is available. The housing is stained light oak and varnished. The skylight, Figs. 53 and 55, is built up in two separate blocks, the lower one white, with inked panels, and the skylight proper light oak, varnished. When the block has been made for the skylight, paint the slanting upper surfaces black, glue on slips of celluloid to represent the glass, then cut the openings in the tops and glue in two short lengths of fine wire

across the underside of each opening, as indicated, gluing them down over the celluloid. The method of making the booby hatch is quite clear from the drawings. The block is white, with inked panels, and the door, sliding top and slides stained and varnished. Make two of these hatches, one on the quarterdeck; the other one, shown in Fig. 58, stands just forward of the coach house, on the main deck, the door facing aft. The binnacle, Fig. 56, is simple, and the bell and its standard can easily be soldered up on the soldering block described hereafter. The main hatch also needs little description, except that the looped and bent pins, shown in the lower view, Fig. 57, represent the eyebolts used for hoisting the hatch sections, and they are sunk into shallow, flat-bottomed holes in the corners. Paint the hatch coaming (sides) gray, and the tops of the sections brown.

Little need be said about the quarterdeck and foc's'le ladders, except to use the thinnest wood possible, and to make them only  $\frac{1}{2}$  in. wide. The stanchions for the quarterdeck-ladder handrails are made of pins with the ends flattened and drilled; the handrail is a length of white thread, about No. 30 cotton, passed through holes drilled in the foot of the ladders, then through the holes in the stanchions, and the ends stuck in small holes in the deck, where they are fastened by driving in the glued end of a toothpick. This is cut off carefully when the glue has set. Foc's'le ladders have no handrails. At the after edge of the foc's'le deck are two  $\frac{3}{16}$  by  $\frac{1}{2}$ -in. bits, and a  $\frac{1}{4}$  by  $\frac{9}{16}$ -in. samson post. These are shown in Fig. 62, and have a round peg end like the timber heads, glued into holes in the deck. The forward side of the samson post carries the pump brake for the windlass under the foc's'le. The pivot part of this is bent, soldered and filed from a piece of shim brass, and the pump-brake handles are made from  $\frac{1}{16}$ -in. brass, with soldered-pin handles. Paint all black. The windlass underneath was turned by pumping up and down on these handles, rods running through the deck from the pivot piece operating on the windlass ratchets. The rods, on the model, are represented by pins, bent at the top into holes in the pivot, and passing down through small holes in

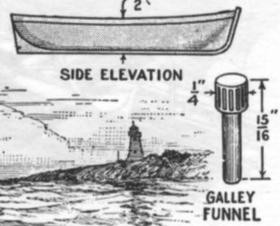
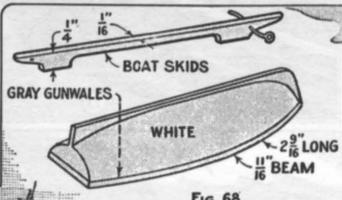
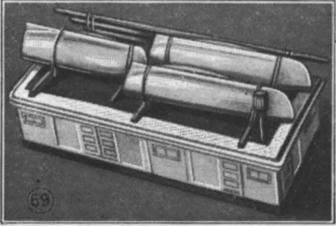
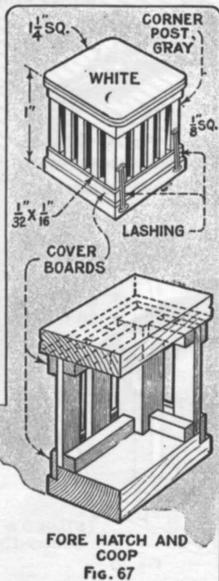
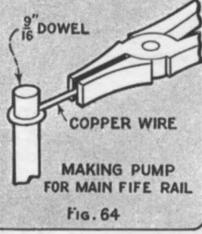
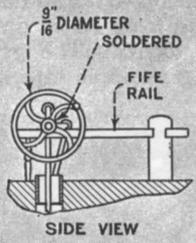
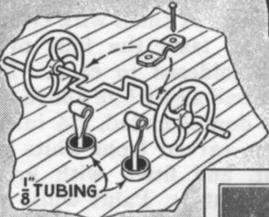
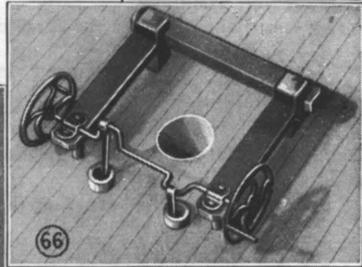
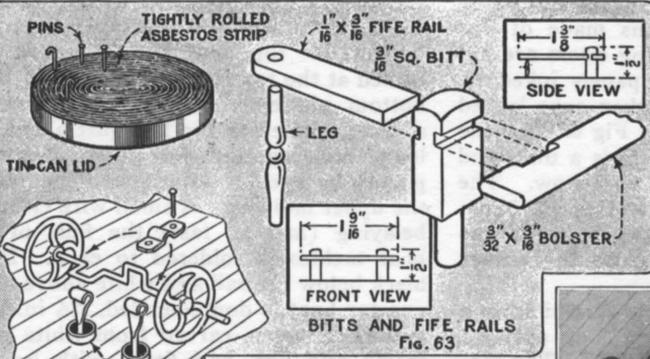


the deck. Between the foc's'le ladders and the rail, on each side, glue on small pieces of  $\frac{3}{16}$ -in. wood (Fig. 60) to carry belaying pins for the head sheets. These will be explained later.

Around the fore and mainmasts are what is known as bits and fife rails, Fig. 63. The drawing gives full dimensions for these. They are painted gray. The after end of the main fife rail carries a pump (Figs. 64 and 66), and the making of this is a nice little job. Get a tin-can lid, 4 or 5 in. in diameter, cut a strip of asbestos paper to the same width as the lid depth, then roll the strip up tightly and force it into the lid. This forms a soldering block, and small pieces can be held in position for soldering on it by means of straight and bent pins pressed down into the asbestos. To make the pump flywheels, form two rings of No. 20 copper wire around a  $\frac{1}{16}$ -in. dowel, then cut four pieces of No. 24 wire and bend them S-shaped, to fit inside the rings and form the spokes of the wheels. Pin them down

on the block and solder, attaching at the same time two short pieces of wire to the rims to form the wheel handles. Bend the crankshaft from a length of No. 20 wire, and carefully solder the hubs of the wheels to each end. Cut off the heads of two stout pins, flatten the ends for about  $\frac{1}{8}$  in. and bend them around the cranks to form the pump connecting rods. Drill two holes in the deck on the same centers as the cranks, and drive in two short pieces of  $\frac{1}{8}$ -in. brass tubing, letting them project  $\frac{1}{16}$  in. above deck. Place the pump cranks in position on the fife rails and fasten them with two little bearings made of shim brass. Paint the rods, crankshaft, wheel rims and handles green and the spokes red, and varnish.

The deckhouse, Fig. 69, is made in exactly the same manner as the coach house, but the block is 5 by  $2\frac{1}{4}$  by  $1\frac{1}{16}$  in. in size. The galley funnel goes on the starboard (right) side, forward, and the spare spars on the port, lashed down to the boat skids. The boats are carved from white-pine

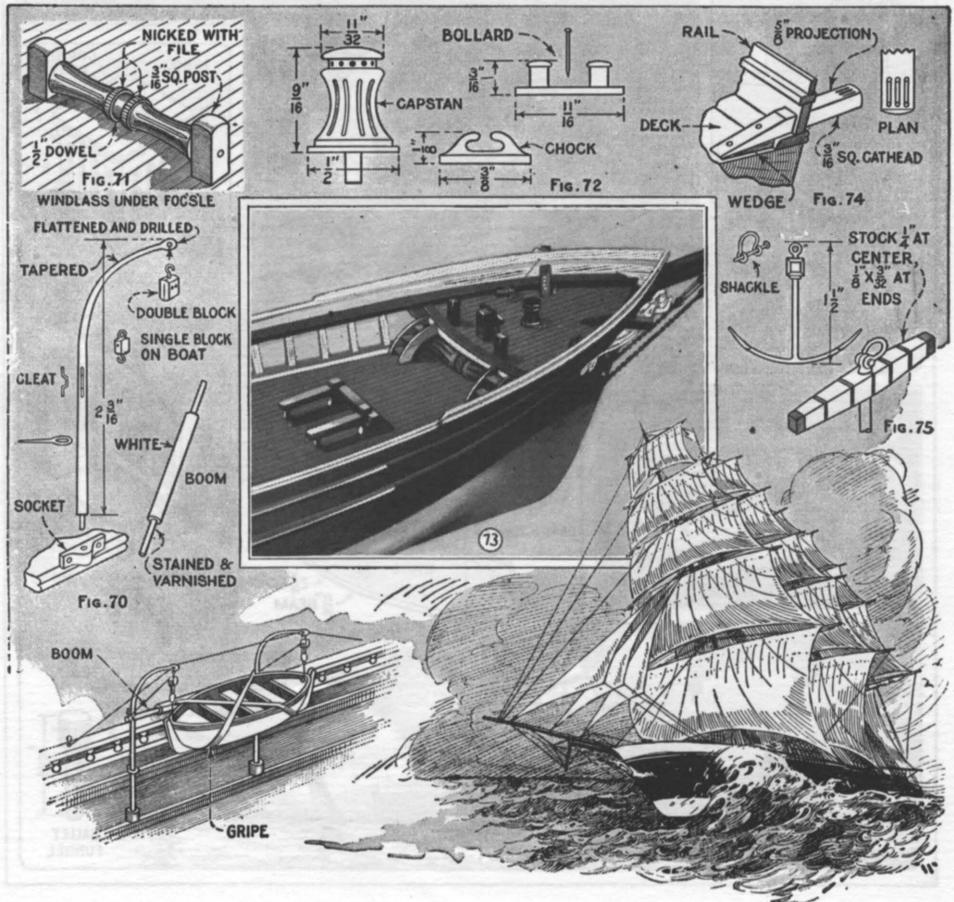


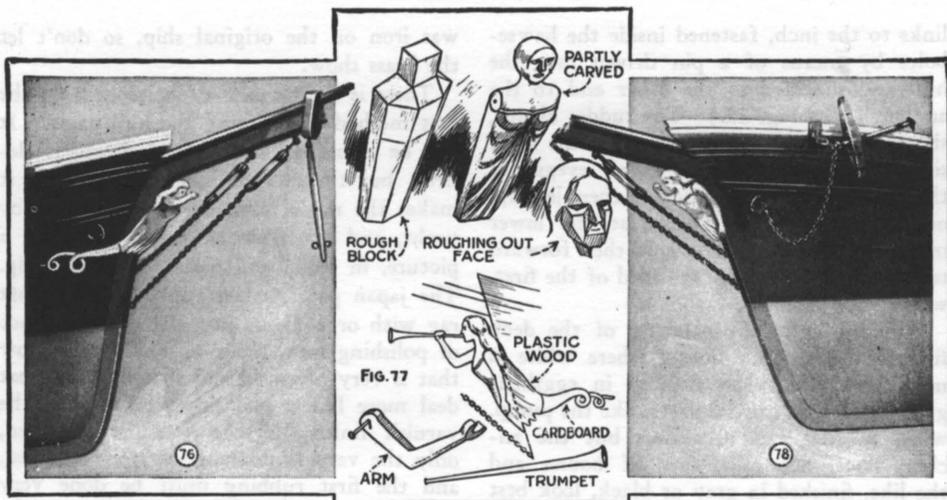
blocks, painted white with gray gunwales, and are lashed to eyepins made of fine wire, on the skids. Sliding doors are cut from bristol board and panels inked in. The fore hatch has a chicken coop lashed on top of it, as shown in Fig 67; for the model, the whole structure is a unit, and the lashings are merely for show. The hatch is  $1\frac{1}{4}$  in. square and  $\frac{1}{4}$  in. high; other dimensions are given in the drawing. Paint all white except the corner posts, which are gray.

The windlass, Fig. 71, is turned from a  $\frac{1}{2}$ -in. dowel, and is  $2\frac{1}{2}$  in. long over all. Its position is shown in Fig. 73. The capstans, of which there are four, can be turned from dowel stock, as shown in Fig. 72, or purchased. This applies also to chocks and bollards.

The davits on the starboard quarter,

shown in Figs. 55 and 70, are made from  $\frac{3}{8}$ -in. brass wire. They taper from the bottom to top, and are flattened and drilled at the top for a double block. The bottom pin ends fit into small wooden sockets, pinned to the hull just above the lower molding, and they are further supported by eyepins driven into the rail at the upper molding. A small wire cleat for belaying (making fast) the falls of the boat tackles is soldered to each. Paint black below the rail and white above. The quarter boat is double-ended,  $2\frac{1}{2}$  in. long and  $\frac{7}{8}$ -in. beam, carved from white pine, inside and out, and fitted with bristol-board thwarts (seats). Paint white with gray gunwales; brown thwarts and inside. Make the boom shown from  $\frac{3}{16}$ -in. dowel, and lash across the davits. The gripes are made by doubling adhesive tape over





a small thread, then trimming  $\frac{1}{16}$  in. wide, and are used to hold the boat firmly against the boom. The single block at each end of the boat hooks into an eyepin.

The catheads, Fig. 74, are stout square timbers projecting from the bows, and are used to hoist the anchor up to the rail. On the model, they are fitted through the rail, as shown, at right angles to the hull, and project  $\frac{5}{8}$  in. outside and  $\frac{3}{4}$  in. inside the rail. Paint the inside part gray and the outside black. The outer end has six small holes drilled through it, to represent the sheaves. The anchor is shown in detail in Fig. 75. This can be purchased, or made in any way that the builder desires. The wooden stock is usually fitted by gluing two strips together with the anchor shank between, the stock being carved to shape when the glue has set. Paint the anchor flat black, stain the stock, paint on the black bands and varnish the stock. The anchor shackle is bent from copper or brass wire and the anchor is fitted with a double block. The lead of the tackle runs from an eye on the anchor block through the forward hole in the cathead, down through one hole in the block, up through the next hole in the cathead, down through the block again, through the next hole in the cathead, then through a hole in the rail, and is layed around a bollard on the deck aft of the cathead. (See Fig. 73.)

The carving and fitting of the figurehead is a delicate job, although not such

a hard one with a little patience. The writer is a very poor wood carver, but he managed to make a fairly decent-looking figurehead in about an hour by the method shown. Cut the block, which should be of hardwood, to the shape shown in Fig. 77,  $1\frac{3}{8}$  by  $\frac{1}{2}$  by  $\frac{1}{2}$  in., then proceed to carve the face roughly by means of angular cuts somewhat as shown in the detail; the features can be rounded and fixed up afterward, the main thing at first being to get in the bold outlines of the face and body. Fit the carved block to the stem, then cut the arm that holds the trumpet (the right) roughly to shape, trying it often to the body to see that it is going to hold the trumpet in the correct position, which should be parallel to the bowsprit. When correct, round off the curves of the arm and body and pin and glue all in place. Add the hair to the figure with plastic wood or gesso, as desired, and make the trailing tail of bristol board, gesso or plastic wood. The figure is white, and the trumpet, made from a toothpick, is gold. The trumpet is better left until the model is finished, however, or it may be knocked off.

The hawsepipes, through which the anchor chains pass, are made of  $\frac{1}{4}$ -in. copper tube, with the end cut on a bevel to suit the holes drilled for them in the hull. The outer beveled ends have washers soldered on, filed to elliptical shape and rounded. The rims of the pipes are black and the inside red. The anchor chain is fourteen

links to the inch, fastened inside the hawseholes by means of a pin driven into the hull and shackled at the other end to the anchor. (See Fig. 78.) The rudder chains, shown in Figs. 50 and 55, are of the same size. They are fastened to an eyepin at the water line on the rudder, then led up, on each side, to an eyepin at the lower molding, leaving a little slack, then forward to another eyepin, 2 in. forward of the first, where they are made fast.

A word as to the painting of the deck fittings: The deck houses where white is used, look best when finished in eggshell-gloss enamel, and metal parts, like the pump, when painted and varnished, but the anchor, bits, fife rails, tops of houses and the like, finished in gray or black, look best left flat. Paint all chains black; chain of this size comes in brass, and of course it

was iron on the original ship, so don't let the brass show.

There is a difference of opinion as to the best method of finishing the hull paint. It can be varnished and rubbed down, if desired, but the author does not like this; it makes the model look too much like a toy yacht, and not what it should look like, a picture, in wood and metal, of a real ship. The japan paint, when rubbed with a soft rag with or without just the slightest trace of polishing wax, takes on a soft, dull glow that is very pleasing, and that looks a great deal more like a real ship's paint than the varnish finish. If the wax is employed, only the very slightest trace must be used, and the first rubbing must be done very lightly, or the wax will lift the paint right off.



**T**HE names of the various masts and spars of a ship are often confusing to the amateur, although the system is really very simple, once explained. Starting from the bow, the first mast is the foremast, the second the mainmast and the third the mizzen. These names, however, are only applied by the sailor to the lower masts. Each mast consists of two or more separate "sticks." Taking the fore as an example, the lower stick is the foremast; above this, and joined to the lower mast by the cross-trees and cap, is the fore topmast; above this again are the topgallant, royal and skysail masts, in the order named. The last three are usually in one stick, and they are

so in our model. The same system applies to the yards that carry the sails. The lower yard on the foremast is the fore yard; the next above, the topsail yard (the yards being named from the sails), then the topgallant yard, the royal yard and the skysail yard. Topgallant is usually abbreviated to t'gallant (and pronounced t'garn) and skysail to skys'l.

One of the things that spoils the appearance of the ordinary ship model is that the spars, especially the upper yards, are far too heavy for good proportion. The measurements given for the spars in this model will be found somewhat difficult to work to in the case of the royal and skys'l yards, and

they can be increased in diameter slightly, if the dimensions given are found too delicate. They can be made to these sizes, with patience, and the builder is urged to keep close to the diameters given, so that the appearance of the finished model will be as fine as possible. The lengths, of course, must be adhered to strictly.

When drilling the holes in the deck for the lower masts, drill so that the masts, when set in place, will present the appearance shown at the left in Fig. 79. Do not allow the masts to lean together at the top; they should spread a little. Do not give them too much rake or slant aft. The foremast should rake back about  $1^\circ$  at the skys'l pole, the main a trifle more and the mizzen just a little more. Drill the holes in the deck at least 1 in. deep and preferably two inches.

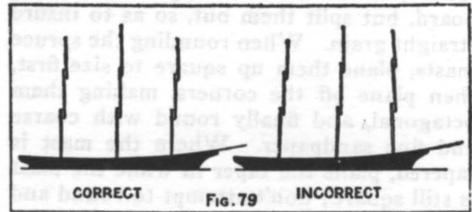
The lengths and diameters (in inches)

LENGTH OF MASTS, INS.			
	FORE	MAIN	MIZZEN
A	$6\frac{1}{2}$	$7\frac{3}{2}$	$5\frac{3}{2}$
B	$1\frac{1}{8}$	$1\frac{3}{8}$	$1\frac{3}{2}$
C	$3\frac{3}{8}$	$3\frac{1}{2}$	$2\frac{3}{8}$
D	$\frac{3}{16}$	1	1
E	$2\frac{1}{8}$	$2\frac{3}{8}$	$1\frac{3}{2}$
F	2	$2\frac{3}{8}$	$1\frac{1}{4}$
G	$1\frac{1}{2}$	$1\frac{3}{8}$	$1\frac{1}{4}$
H	$\frac{5}{8}$	$\frac{13}{16}$	$\frac{1}{2}$

DIAMETER OF MASTS, INS.			
	FORE	MAIN	MIZZEN
LOWER	$\frac{3}{16}$	$\frac{3}{8}$	$\frac{1}{4}$
TOPMAST	$\frac{3}{16}$ TO $\frac{1}{4}$	$\frac{1}{4}$ TO $\frac{1}{4}$	$\frac{3}{16}$ TO $\frac{3}{2}$
T'GALLANT	$\frac{3}{64}$ TO $\frac{3}{32}$	$\frac{1}{4}$ TO $\frac{3}{32}$	$\frac{3}{32}$ TO $\frac{3}{64}$
ROYAL	$\frac{3}{64}$ TO $\frac{1}{8}$	$\frac{3}{64}$ TO $\frac{1}{8}$	$\frac{1}{8}$ TO $\frac{3}{32}$
SKYSAIL	$\frac{3}{64}$ TO $\frac{3}{32}$	$\frac{3}{64}$ TO $\frac{3}{32}$	$\frac{3}{64}$ TO $\frac{1}{16}$
POLE	$\frac{3}{64}$ TO $\frac{1}{16}$	$\frac{3}{64}$ TO $\frac{1}{16}$	$\frac{1}{16}$ TO $\frac{3}{64}$

of all masts are given in Fig. 80, and the key to the lettering will be found at the right of the same drawing. The length



of lower masts (A plus B) is the length above deck, and to this must be added the length that is set into the deck. The length of the topmasts is obtained by adding lengths B, C and D together, plus  $\frac{1}{8}$  in. for the heel of the mast, and the combined length of the t'gallant, royal and skys'l masts by adding together dimensions D to H inclusive, plus  $\frac{1}{8}$  in. as for the topmast.

In making the masts, either of two methods may be adopted. They may be made of ordinary round dowel stock, which may be purchased true to size in 3-ft. lengths, or they may be split from

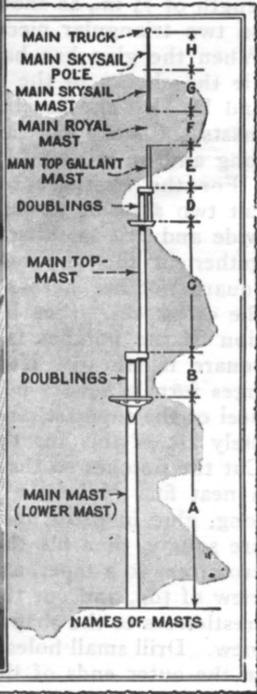
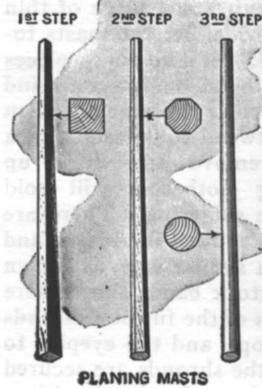


FIG. 80

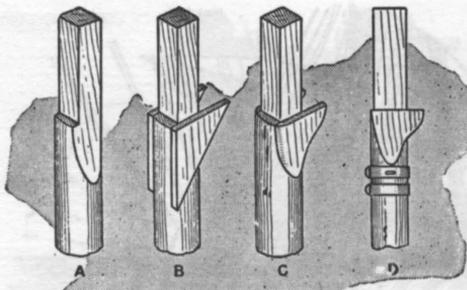
clear straight-grained spruce or white pine. If dowel stock is used, select the straightest pieces you can obtain. If spruce, do not saw the lengths out of the board, but split them out, so as to insure straight grain. When rounding the spruce masts, plane them up square to size first, then plane off the corners, making them octagonal, and finally round with coarse and fine sandpaper. Where the mast is tapered, plane the taper in while the mast is still square; don't attempt to round and taper it at the same time, or to taper after rounding. The lower masts in this model have no taper, and the upper ones very little taper to each individual mast.

Dimensions B and D in Fig. 80 indicate the "doublings," where the upper mast overlaps the lower. The lower masts being cut to length and fitted to the hull, file the masthead down square for the length of the doublings, B, plus  $\frac{3}{16}$  in. for the width of the trestle trees. These are the fore-and-aft timbers that support the crosstrees and the top. On the lower masts they rest on "cheeks" (Fig. 81), and the method of fitting the cheeks is shown in Fig. 81. File down the sides of the mainmast, below the squared head, for a length of  $\frac{3}{4}$  in., as shown at A, then glue on two triangular pieces of  $\frac{1}{8}$ -in. wood. When the glue has hardened, carve and file the cheeks to the shape shown at C and D. No cheeks are used on the topmasts. Cheeks on foremast are  $\frac{5}{8}$  in. long and on mizzen  $\frac{1}{2}$  in.

For the trestletrees of the mainmast, cut two slips of  $\frac{1}{8}$ -in. hardwood,  $\frac{3}{16}$  in. wide and  $1\frac{1}{8}$  in. long. Clamp these together in the vise and file four  $\frac{1}{8}$ -in. square notches across the pair to take the crosstrees. (See Fig. 82.) The position of the notches is marked from the square masthead. Note that the crosstrees form a square hole forward for the heel of the topmast, and another immediately aft of this for the mainmast head. Cut the notches so that the masts will be a neat fit. Make the crosstrees  $1\frac{1}{8}$  in. long, glue in place, making sure that all are square, then file the underside of the crosstrees to a taper, as shown in the rear view of top, and cut the underside of the trestletrees to the shape shown in the side view. Drill small holes with a No. 60 drill in the outer ends of the crosstrees. Cut

the top from  $\frac{1}{8}$ -in. wood or celluloid as shown in the plan view, cut the square hole as indicated and glue on top of the crosstree assembly. Drill the No. 60 holes through the top and, on the forward curves of the top, put in four little eyepins on each side, with the eyes underneath. Glue the whole assembly to the masthead, making sure that the top lies parallel to the waterline, regardless of the rake of the mast. The trestletrees and crosstrees for the topmast head are made in exactly the same manner, except that there are only two projecting crosstrees instead of three, and no top platform. The lengths of the lower-mast trestletrees on the fore and mizzen are  $1\frac{1}{16}$  in. and  $1\frac{1}{16}$  in., respectively, and of the crosstrees,  $1\frac{1}{4}$  in. and  $1\frac{1}{16}$  in. The trestletrees on fore, main and mizzen topmast heads are  $\frac{3}{4}$  in.,  $\frac{7}{8}$  in. and  $\frac{3}{4}$  in., respectively, and the crosstrees  $1\frac{1}{16}$  in.,  $1\frac{1}{16}$  in. and  $\frac{7}{8}$  in., in the order named. The heels of the upper masts are supported on the trestletrees by a "fid" which in our model is a pin driven through the heel of the mast, about  $\frac{1}{8}$  in. from the lower end, as in Fig. 83.

The upper masts are further bound to the lower by means of the caps. These may be of wood, metal or celluloid. To make a wooden cap, cut a piece of boxwood from an old rule, and file down to  $\frac{1}{8}$  in. thick. File a little round tenon (Fig. 84) on the square masthead, then drill two holes in the boxwood, located so that the space between the two masts, when the cap is fitted, will be the same as the width of the crosstree between the two. File the cap sides down to the shape shown, making it as narrow as possible. To make a metal cap, cut a piece of thin shim brass,  $\frac{1}{8}$  in. wide, set the masts together as in Fig. 85 (or two scrap pieces the same size) and bend the brass around them as shown. Solder the rear lap, then fill in the space between the masts with a drop of solder, remove and dress up square. A spring clothespin will hold the assembly while soldering. There are several bands to go around the masts, and these are made in a similar way, as shown in Fig. 87. The futtock bands shown here hold the lower ends of the futtock shrouds coming from the tops, and the eyepins to which the ends of the shrouds are secured should be fastened to the band with a



SQUARING LOWER MASTHEADS AND FITTING CHEEKS

Fig. 81

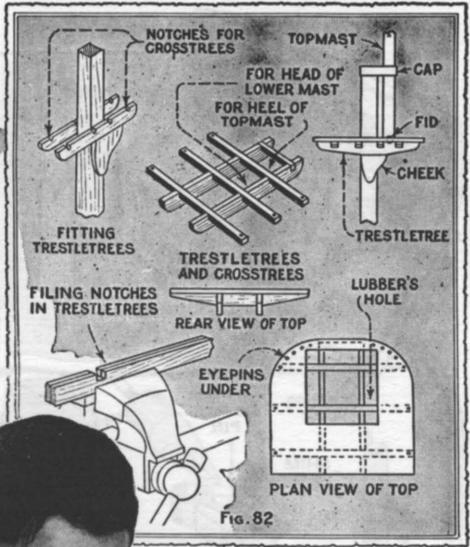


Fig. 82

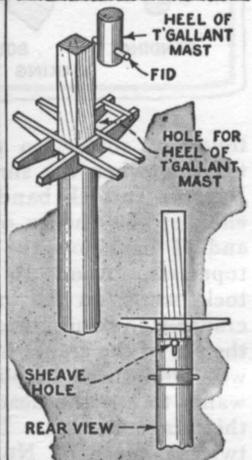
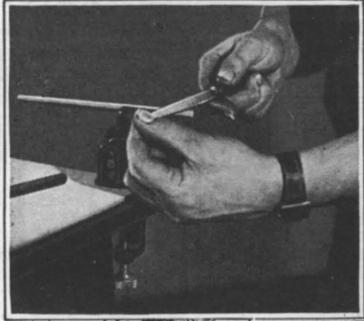


Fig. 83

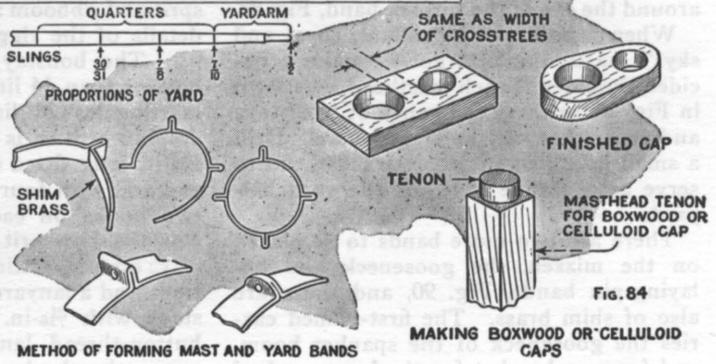
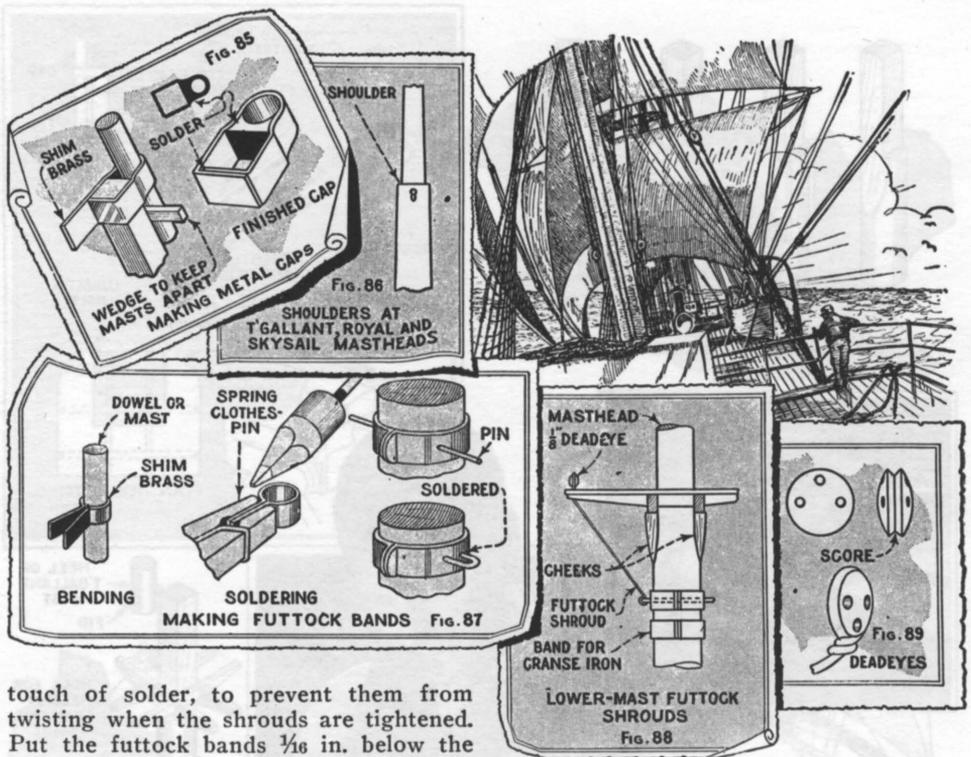


Fig. 84



touch of solder, to prevent them from twisting when the shrouds are tightened. Put the futtock bands  $\frac{1}{16}$  in. below the ends of the cheeks on the lower masts, and  $\frac{3}{8}$  in. below the trestletrees on the topmasts. About  $\frac{1}{16}$  in. below the futtock bands, on the lower masts, are the crane-iron bands, made in the same way; the pin of the crane irons, described later, will hold these in place. If the builder wants to put the deadeyes in the tops at this stage he can. Use  $\frac{1}{8}$ -in. deadeyes, twist a piece of No. 30 soft-iron wire around the score (Fig. 89), pass through the hole in the top and crosstree and hook around the eye in the futtock band, Fig. 88.

When tapering the t'gallant, royal and skys'l masts, don't forget to make a decided shoulder at each masthead, as shown in Fig. 86, to carry the gangs of backstays and stays that will be rigged here. Drill a small hole just under each masthead to serve as a sheave hole for the yard hal-yards.

There are two more bands to be placed on the mizzen, the gooseneck and belaying-pin bands, Fig. 90, and these are also of shim brass. The first-named carries the gooseneck of the spanker boom, and forms a bracket for the lower end of

the spencer or trysail mast that runs from the top to the deck just behind the mizzen. This mast is only  $\frac{5}{16}$  in. in diameter, and is best made from a straight length of wooden applicator. The upper end is set in a small hole in the top, and the lower in a slight depression in the deck. The belaying pins for the other band can be  $\frac{1}{2}$ -in. lengths of common pins, soldered as shown.

The lengths and diameters of the bowsprit and jibboom are shown in Fig. 93, and details of the rigging in Figs. 91, 92 and 93. The bobstay chains should not be heavier than 14 links to the inch, and the martingales 20 links to the inch. The dolphin striker is  $\frac{3}{8}$  in. in diameter and  $1\frac{1}{4}$  in. long, fitted with a hook at the upper end and with four eyes at the lower, with two hooks on each side, spaced evenly. Put the bowsprit shrouds and the bobstays on first, setting the first up with small rings and a lanyard (Fig. 93) and the bobstays with  $\frac{3}{16}$ -in. deadeyes and a black button-thread lanyard. Be sure to arrange the deadeyes with the holes cor-

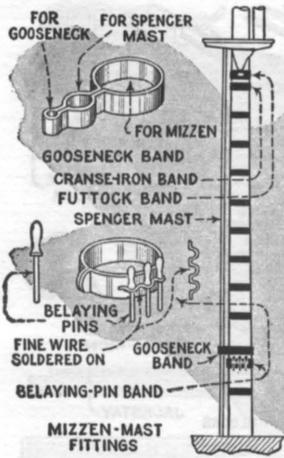


Fig. 90

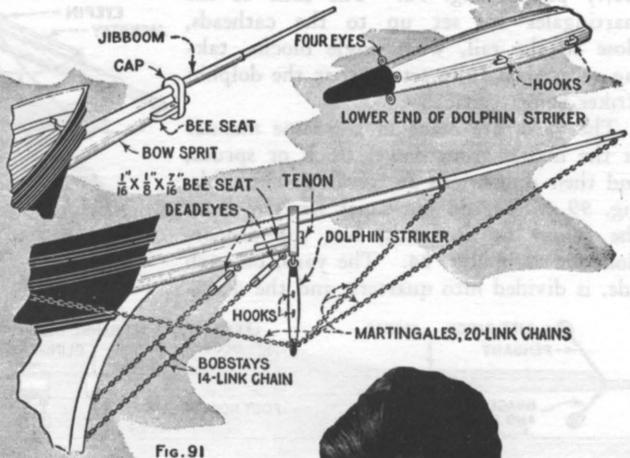


Fig. 91

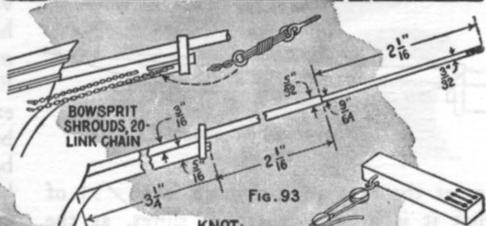
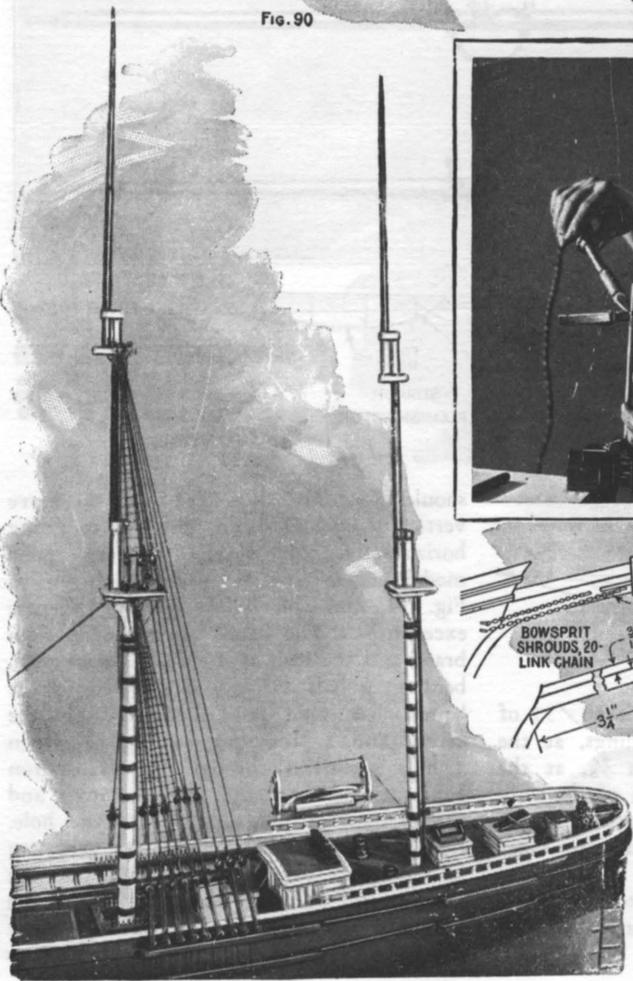


Fig. 93

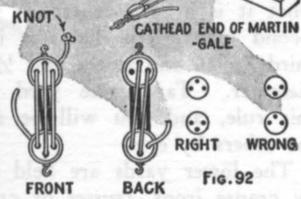
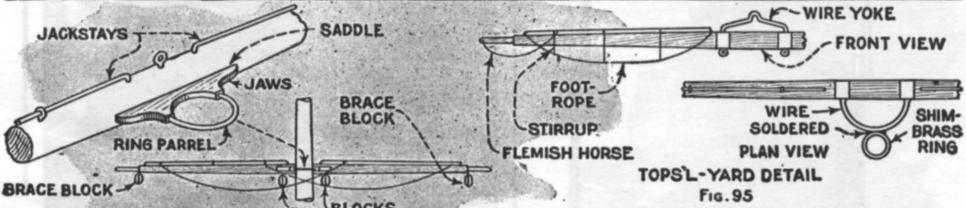
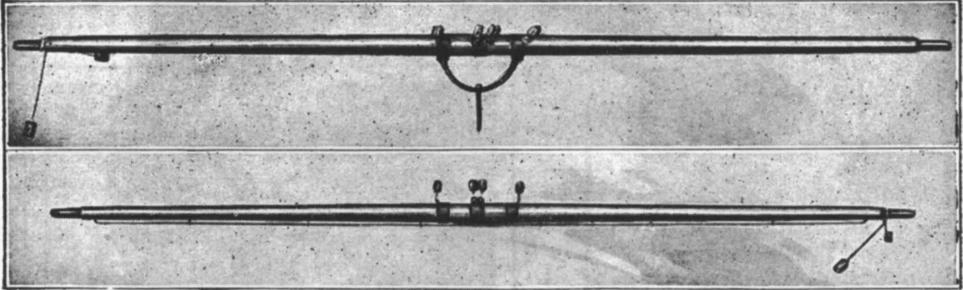
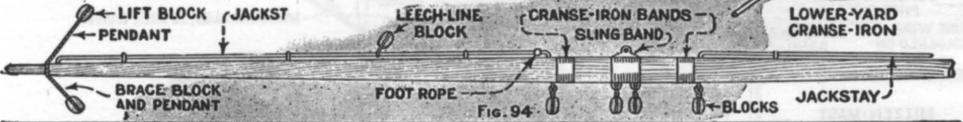
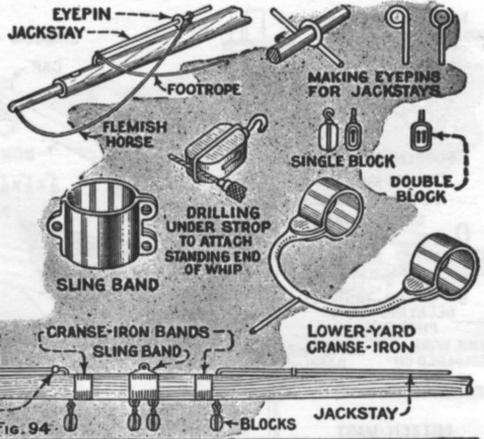


Fig. 92

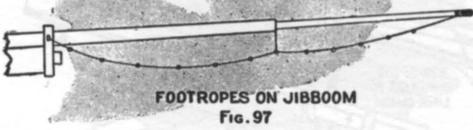
REEVING LANYARD THROUGH DEADEYES

rectly placed, Fig. 92. The ends of the martingales are set up to the catheads, close to the rail, with single blocks, taking care when fully set up that the dolphin striker hangs vertically.

The yards are made in the same manner as the masts, from dowel stock or spruce, and their dimensions are given in the table, Fig. 99. They do not taper straight from the center to the ends, but the proportions are as in Fig. 84. The yard, on each side, is divided into quarters, and the diam-



HOW FOOT ROPES ARE FITTED ON T'GALLANT, ROYAL AND SKYSAIL YARDS  
Fig. 96



should not only allow the yard to move vertically up and down, but also to swing horizontally. However, a very good model crane iron is made as shown in Fig. 94, and this will serve our purpose excellently. The bands are made of shim brass, and the iron of 1/16-in. brass wire, bent to a half circle and soldered to the bands. A hole is drilled through the center and a stout pin soldered in, then a hole is drilled through the crane-iron band on the mast and into the mast and the crane-iron pin slipped into the hole. By bending the pin slightly, the yard can be set square across the hull, which is the way we will want it. The sling band at the center of the lower yard is bent up in the manner shown in Fig. 84, and finished as

eter at the first quarter mark is 30/31 of what it is at the center or slings, at the second quarter the diameter is 7/8, at the third 7/10 and at the end 1/2 of the sling diameter. Taper one yard according to this rule, and you will be able to taper the others by eye.

The lower yards are held to the masts by crane irons, trusses or cranes, as they are variously called. The crane iron

in Fig. 94. The jackstays on top of the yard, to which the sail is fastened, are made for the lower yards of No. 24 iron wire. They must, of course, decrease in size in proportion to the size of the yards, as you go up. When making the eyepins that fasten them to the yard, use a smaller size of wire and form the pins around the jackstay itself.

If the model is afterward to be fitted with sails, the builder will find it convenient to fit all the blocks shown, to avoid later trouble; if not, the only blocks necessary on the lower yards are the lift and brace blocks at the stops on the yard-arms. Fit these to the yards with twisted-wire pendants to resemble rope, about  $1\frac{3}{4}$  in. long.

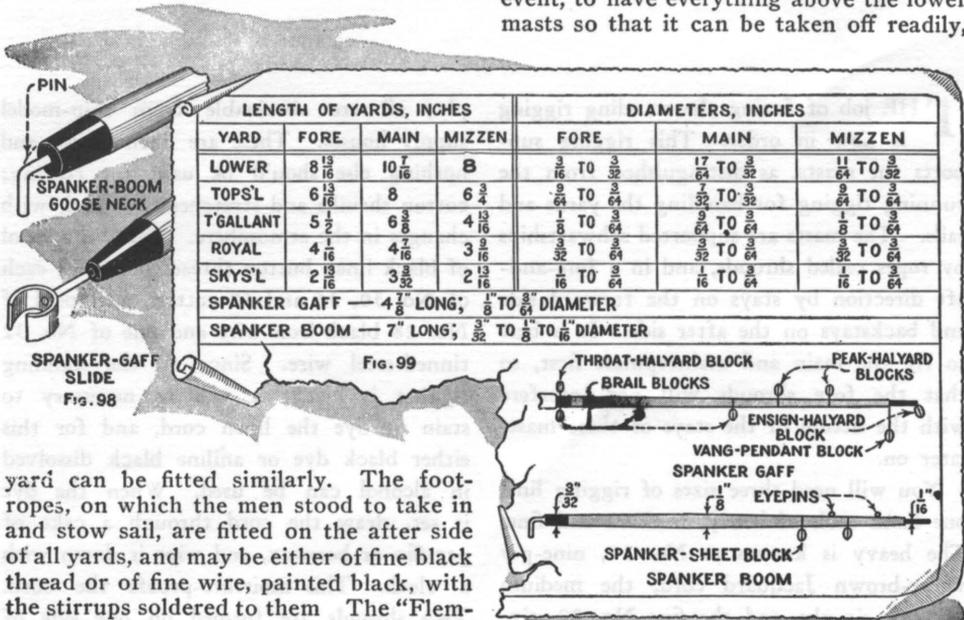
The topsail yard fittings are shown in Fig. 95. Jackstays, etc., are fitted in the same way as before. The mast ring or parrel should be soldered up and the yard fitted over the mast before the latter is finally put in place, else it will be necessary to leave the ring open. The crane-iron bands may be narrow strips of black paper, glued round the yard, if soldering is difficult, with the ends of the crane iron driven into small holes drilled into the yard through the center of the paper strips. The yoke for the tops'l tye on top of the

ish horse" is a short footrope on the outer ends of lower and tops'l yards, for the man who had to sit astride the yardarm.

The t'gallant, royal and skys'l yards are fitted to their masts as shown in Fig. 96. Glue a thin strip of wood to the after side of the yard, file it to fit the mast, forming the saddle, then file the jaws to shape. The yard is slung to the mast with a wire ring or parrel. Note how the footropes are fitted so as to form an easy curve. They are aft of the yard, but forward of the mast. Footropes for the jibboom are made of knotted thread, and fitted as in Fig. 97. Little need be said about the spanker boom and gaff, except that the gaff tapers from the throat (inner) end to the outer end, while the greatest diameter of the boom is a little aft of the center. The brail blocks may be omitted on a model not intended to be fitted with sails.

Use  $\frac{3}{16}$ -in. blocks for the lower yards, and decrease the size of the blocks and rigging as you go aloft.

Many of the points that may not be clear in this chapter will become perfectly clear when we come to the rigging, and if difficulty is encountered in determining the purpose of any block or other fitting, put the part aside and go on with something else. It will be found convenient, in any event, to have everything above the lower masts so that it can be taken off readily,



yard can be fitted similarly. The footropes, on which the men stood to take in and stow sail, are fitted on the after side of all yards, and may be either of fine black thread or of fine wire, painted black, with the stirrups soldered to them. The "Flem-

as, if all masts and yards are fitted permanently, they will be found to make the job of fitting the standing rigging much harder.

Paint all lower masts, tops, trestle and crosstrees, doublings and caps flat white. Stain the topmasts, t'gallant, royal and skys'l masts medium oak, outside of the doublings. Stain the spencer mast and the yards in the same way. Paint the ends of the yards outside the stops, and all yard

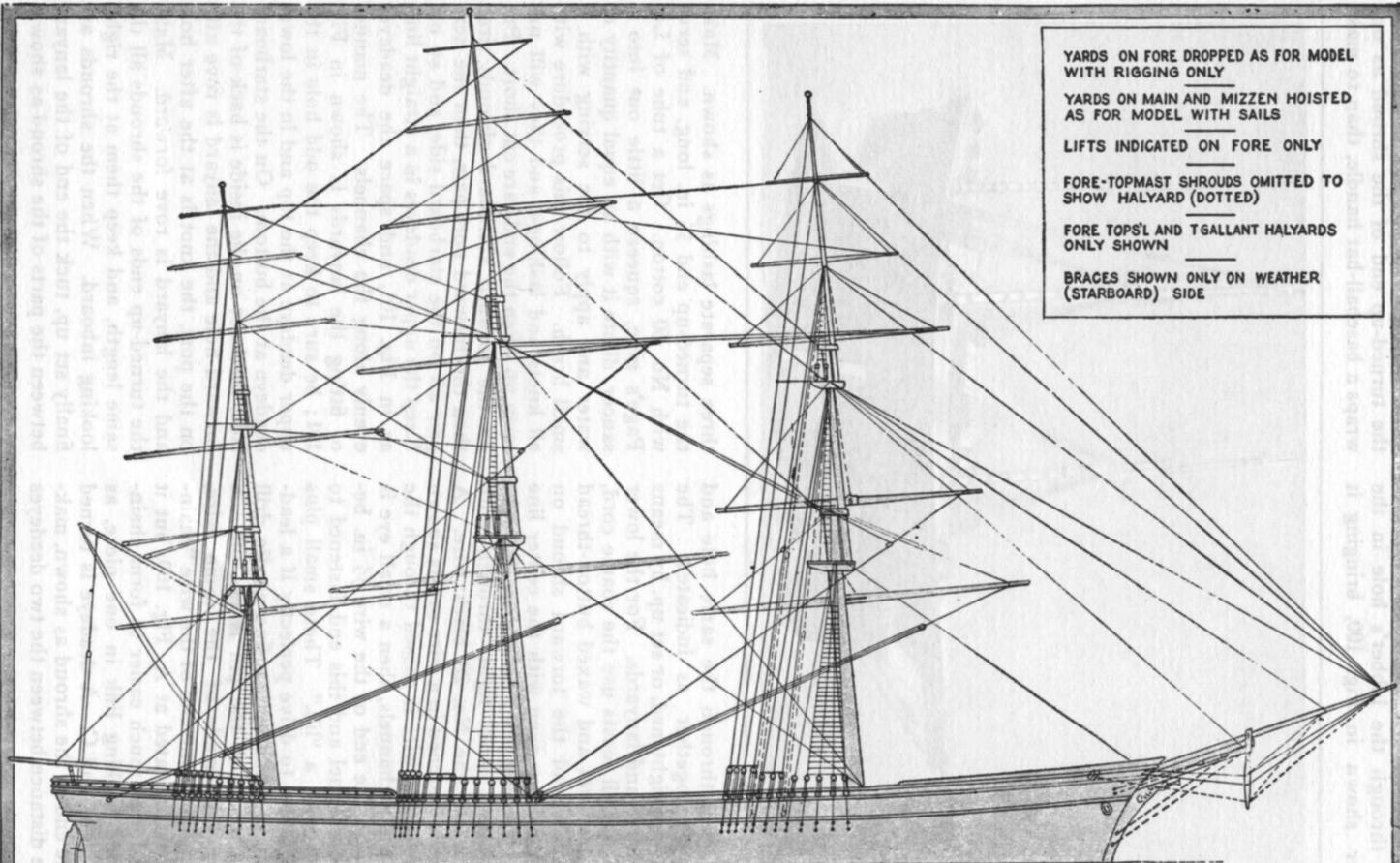
fittings, black, and varnish all stained and black work. Stain the b'locks light oak. The bands on the lower masts are simply made by gluing strips of black passepartout paper,  $\frac{1}{8}$  in. wide, around the masts after painting, although of course, they can be painted on if the worker is skilful enough. Space these bands  $9/16$  in. apart. Use the paint thin, but put on enough coats to cover the wood thoroughly.



**T**HE job of fitting the standing rigging is now in order. This rigging supports the masts, as distinguished from the running rigging for handling the yards and sails. The masts are supported athwartships by ropes called shrouds, and in a fore-and-aft direction by stays on the forward side and backstays on the after side. It is best to rig the main and maintopmast first, so that the fore shrouds will ~~not~~ interfere with the fitting of the stays of these masts later on.

You will need three sizes of rigging line, one hank each of heavy, medium and fine. The heavy is known as No. 18, nine-ply white-brown Jacquard cord, the medium No. 25, six-ply, and the fine No. 80, six-

ply; all are obtainable from ship-model supply houses. These are linen cords, and nothing else shou'd be used for rigging; cotton shrinks and stretches too much with changes in the atmosphere. Get also a spool of black linen button thread, one spool each of No. 30, 36 and 60 cotton, one spool of No. 28 black-iron wire and one of No. 32 tinned-steel wire. Since all the standing rigging is black, it will be necessary to stain or dye the linen cord, and for this either black dye or aniline black dissolved in alcohol can be used. When the dye is set, draw the cord through a cake of paraffin or beeswax, and wipe it down with a cloth. This moisture-proofs the cord. Two shrouds are formed on one side of

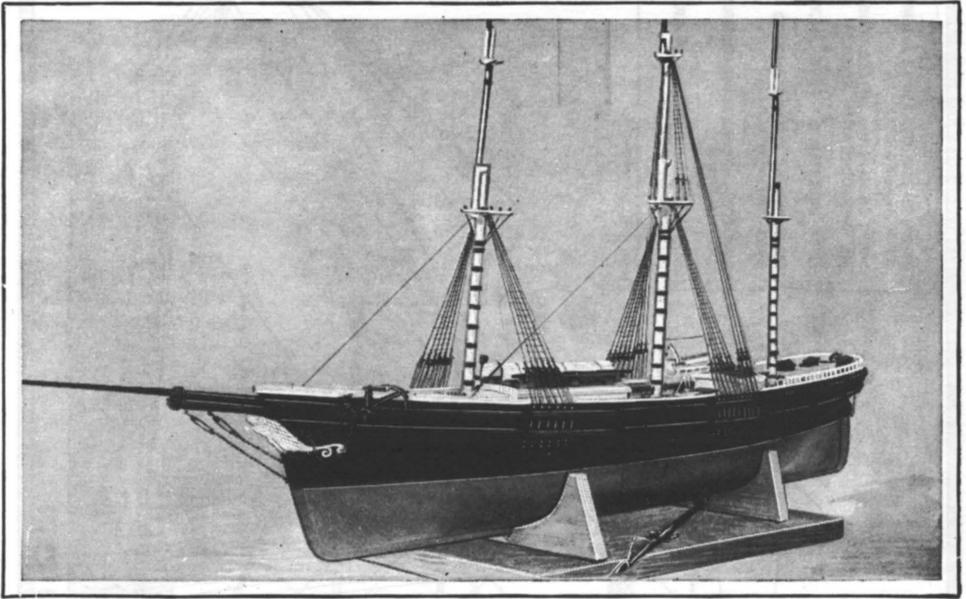


YARDS ON FORE DROPPED AS FOR MODEL WITH RIGGING ONLY  
YARDS ON MAIN AND MIZZEN HOISTED AS FOR MODEL WITH SAILS  
LIFTS INDICATED ON FORE ONLY  
FORE-TOPMAST SHROUDS OMITTED TO SHOW HALYARD (DOTTED)  
FORE TOPS'L AND T'GALLANT HALYARDS ONLY SHOWN  
BRACES SHOWN ONLY ON WEATHER (STARBOARD) SIDE

GENERAL RIGGING PLAN

the mast from one length of cord by passing it through the lubber's hole in the manner shown in Fig. 100, bringing it

1 in. It will be easier, however, to serve the turned-up end of the shroud as one wraps a baseball-bat handle, than to make



down again through the same hole and seizing it together as indicated. The shrouds are tightened, or set up, by means of deadeyes and lanyards. For the lower shrouds on all masts use the coarse cord,  $\frac{3}{16}$ -in. deadeyes and waxed button-thread lanyards. Lead the forward shroud on each side down even with the center line of the mast, Fig. 101; make a mark in the channel and drill right through both channels for the No. 28 black wire. A deadeye is fastened in a wire eye as shown (Fig. 100), the wire is passed through the holes in the channels, then a small eye is formed on the end of the wire  $\frac{1}{2}$  in. below the channel and this end fastened to the hull with a "lill." These small pins will be found to drive perfectly if a leading hole is made with a fine needle drill and the point of the pin is cut off. A backing link, made of the same wire, should go over the end of the wire "chain-plate," as indicated at A, Fig. 100, but it will be found much easier to form chain-plate and backing link in one piece, as shown at B and C. A deadeye is turned into the end of the shroud as shown, making the distance between the two deadeyes

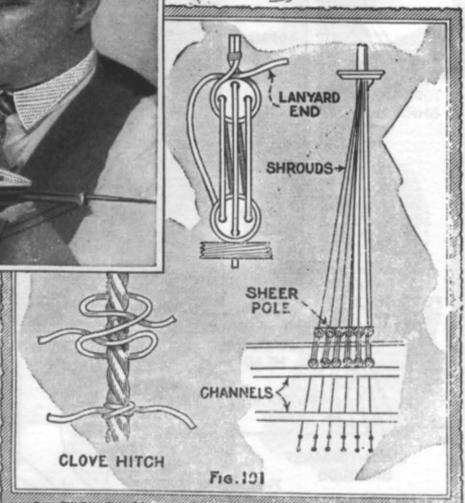
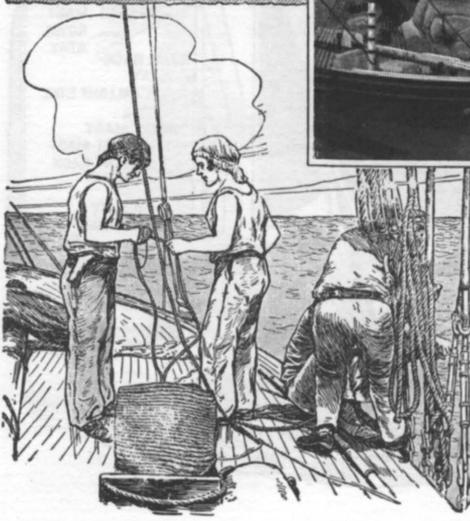
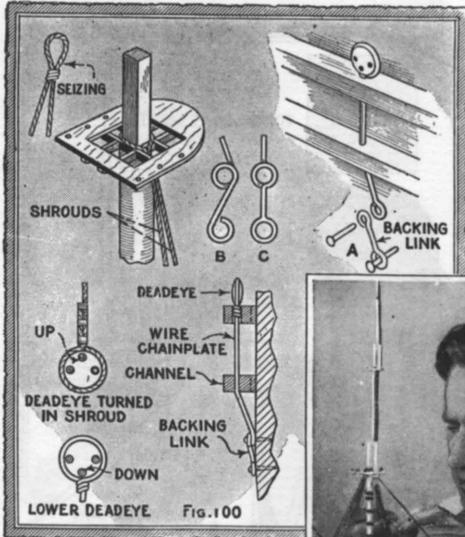
three separate lashings as shown. Make the turned-up end  $\frac{1}{2}$  in. long, and serve with No. 60 cotton. Get a tube of Le-Page's glue, squeeze a little out into a saucer, dilute it with an equal quantity of water and apply to the serving with a small brush. Follow this procedure with all knots and lashings, and they will not open up when the ends are cut short. Put on the forward starboard shrouds first, then the forward port pair, then the next pair aft on the starboard side, and so on. Keep the upper deadeyes in a straight line, as in Fig. 101, and space the deadeyes evenly along the channels. The manner of fitting the lanyards is shown in Fig. 101; be sure to keep the odd hole in the upper deadeye at the top and in the lower deadeye at the bottom. On the starboard side, the knot on the inside is back of the forward hole and the lanyard is rove aft; on the port, the knot is at the after hole and the lanyard is rove forward. Make the turned-up ends of the shrouds all the same length, and keep them at the right, looking inboard. When the shrouds are finally set up, tuck the end of the lanyard between the parts of the shroud as shown,

pull tight, apply a touch of glue, and, when dry, cut off close.

A good pair of tweezers is indispensable when setting up the lanyards and for similar work around the rigging. Be careful to keep all the masts perfectly in line when setting up, tightening and slackening the shrouds on each side until they are so. There are six shrouds on each side on fore and main, and five on the mizzen. The odd shroud on the mizzen can go straight over, forward of the lower mast. It is best to have the topmasts in place when fitting the lower shrouds.

After all the shrouds have been placed on the main and set up, lash them all together just under the top, so that they will line as nearly even as possible, then set up the mainstay. This is double, of the coarse cord, passed around the mast-head to make a loop like the maintopmast stay in Fig. 107, and set up to eyepins driven into the tops of the fore bitts. The upper ends of the fore, main and mizzen stays go between the crosstrees, but the upper ends of the fore, main and mizzen-topmast stays go outside the crosstrees.

Next set up the maintopmast shrouds, three on each side, from the crosstrees to the topmast head, using the medium cord,



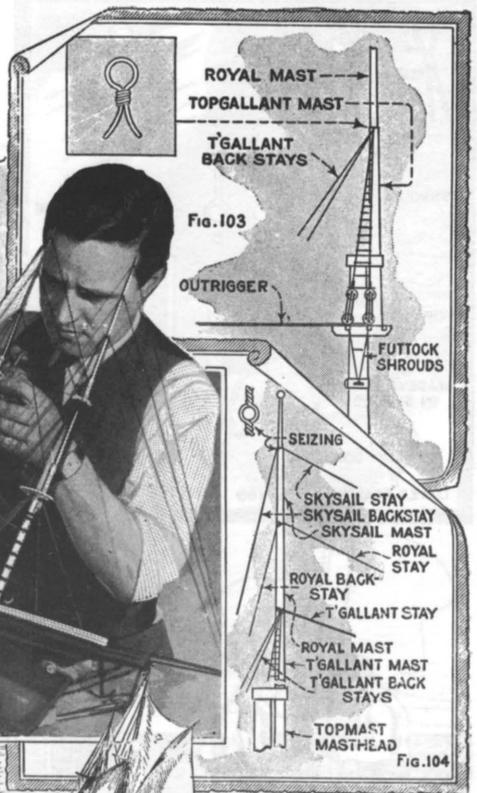
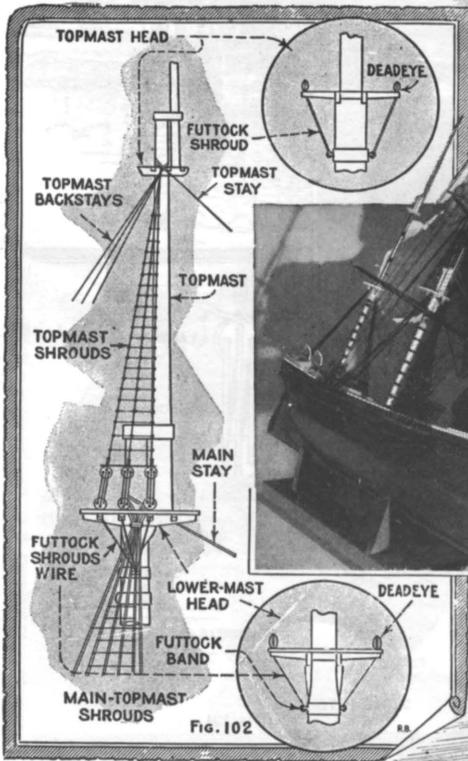
$\frac{1}{8}$ -in. deadeyes and No. 60 cotton lanyards. These are fitted in exactly the same manner as the lower ones, but

the distance between the deadeyes is  $\frac{1}{2}$  in. The futtock shrouds are of the No. 32 wire, fitted as in Figs. 102 and 105, and painted black. With these in place, fit the topmast backstays, three on each side (see Fig. 106), and finally the single topmast stay, all of the medium cord. Note that the upper deadeyes for the backstays are a trifle higher than those on the shrouds. The maintopmast stay is doubled and goes to a cleat on the foremast 1 in. above deck. (See Fig. 107.)

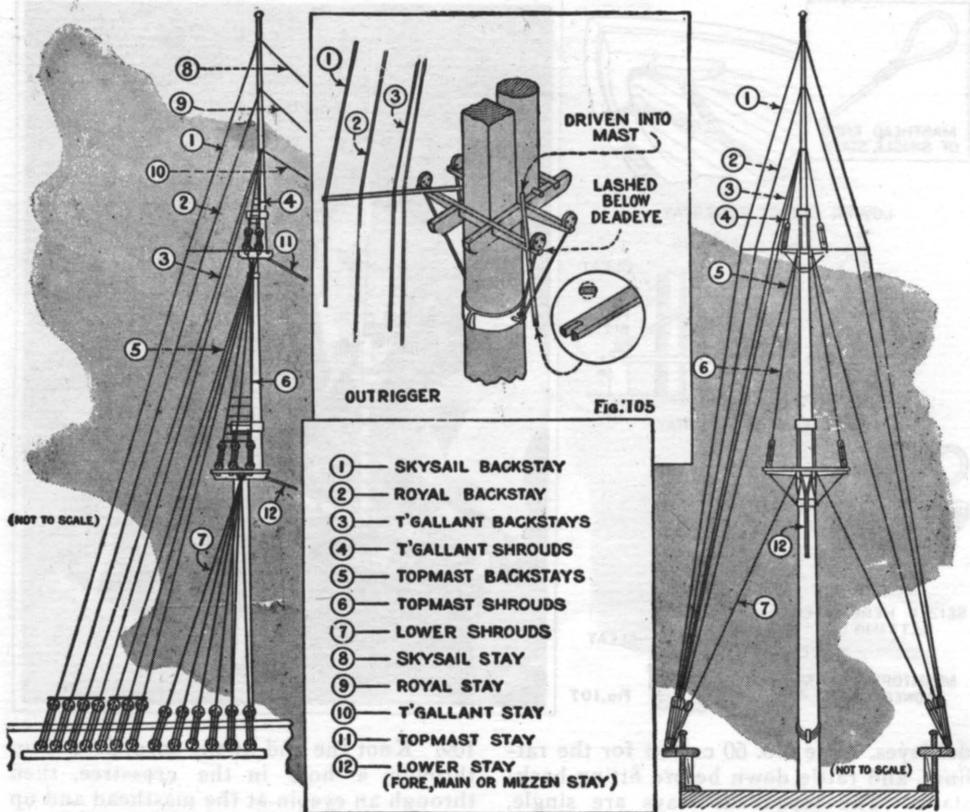
It is well to "rattle down" the lower and topmast shrouds before setting up the backstays. The ratlines are the ropes that cross the shrouds to form ladders. Lash a sheer pole, made from a heavy pin, across the tops of the deadeyes, Fig. 101, tie one end of a length of No. 30 cotton to the eye of a needle, and  $\frac{3}{16}$  in. above the sheer pole, clove hitch the cotton to the next to the last shroud aft. Carry it

fifth ratline across all six shrouds. Rattling down must be done carefully if it is to look right and it is a rather tedious job, but practice soon develops a technique that makes it comparatively simple. Where the shrouds converge, a simple overhand knot may be used instead of the clove hitch, but the latter is the better lower down. Leave the ends of all the cottons long, secure all knots with thin glue, then, when this is dry, cut the knots off close with a pair of manicure scissors. The ratlines on the topmast shrouds are No. 36 cotton.

The fore and mizzen are then rigged in the same way. The ratlines on the mizzen run across three shrouds, every



one, cut off, and hitch on another,  $\frac{3}{16}$  in. above the first. Carry every

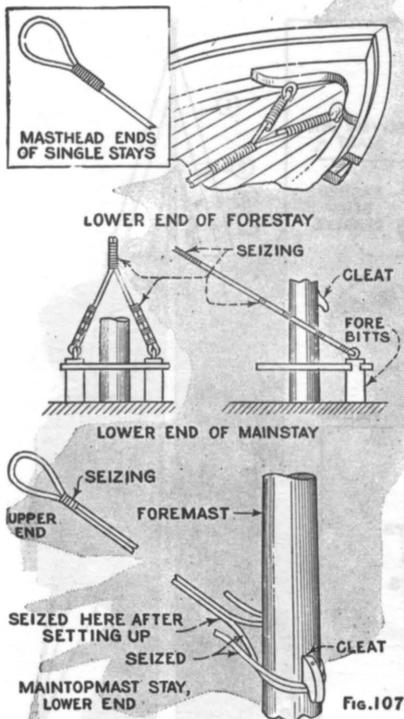


fifth one, as before, being carried clear across. The doubled forestay, of coarse cord, runs down to two eyepins behind the knee on the foc's'le deck, as in Fig. 107, and the doubled mizzen stay to a cleat on the mainmast. The foretopmast stay runs doubled down to the bowsprit. Just above the bee seat the parts are seized together, then each "leg" is carried through a hole in the bee seat (see Fig. 110), a  $\frac{1}{8}$ -in. block is turned in the end, a similar block is hooked on an eyepin straight aft on the bow, and the stay set up with this tackle, on each side.

Two other stays go to the foretopmast, the jibstay and outer-jib stay, Nos. 4 and 5 in Figs. 108, 110 and 112. The single jibstay, medium cord, goes down through a hole in the jibboom at the first stop or shoulder, down under the upper hook on the starboard side of the dolphin striker, and it is set up to an eyepin in the bow, under the cathead and between the mold-

ings. The single outer-jib (see Fig. 110) stay, medium cord, goes through a hole at the outer stop on the jibboom, under the upper port hook on the dolphin striker, and to a similar eyepin on the port side. To keep the dolphin striker from swinging sidewise as these are set up, it is well to fit the whisker boom first. This is a  $2\frac{1}{8}$ -in. length of  $\frac{1}{16}$ -in. brass wire, driven through a hole in the bowsprit cap as in Fig. 110. File the ends flat and drill No. 60 holes through them, as in the insert, Fig. 110. File flat and drill three more holes on each side,  $\frac{1}{4}$  in. apart, and fit the boom in place. Fit the guys, of 20 or 22-link chain, and the stays then can be fitted without the dolphin striker swinging. Paint boom and guys black.

The next step is to set up the topgallant shrouds, backstays and stays, using the medium cord on the fore and main, and the fine on the mizzen. There are two shrouds on each side, set up with  $\frac{1}{8}$ -in.



deadeyes. Use No. 60 cotton for the ratlines, and rattle down before fitting backstays. The topgallant stays are single, and the way they lead is shown in Fig. 108. Where stays run to a masthead, an easy way of fitting them is shown in Fig.

109. Knot the end of the cord, pass it up through a hole in the crosstree, then through an eyepin at the masthead and up to its mast. If the mast cap is of metal, set the eyepin as at B. Be careful in setting up stays and backstays that the upper

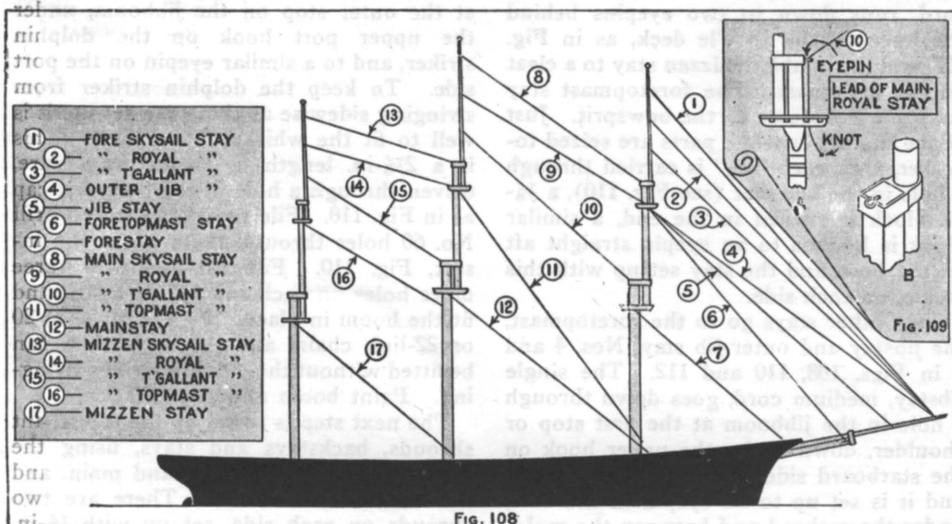


FIG. 108

FIG. 109

masts are not bent back or forward out of a straight line with the lower masts. By judicious handling of the rigging, the masts may be made to assume any rake necessary.

The foretopgallant stay goes down through an eye at the outer end of the jibboom, under the lower starboard hook on the dolphin striker (No. 3 in Figs. 108 and

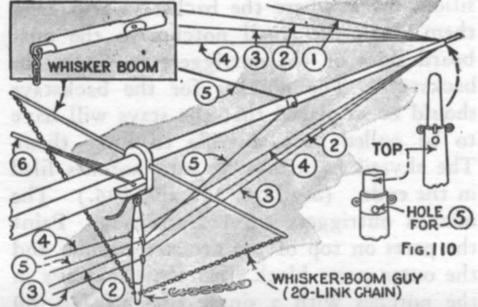


Fig. 110

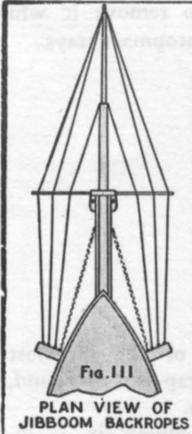


Fig. 111

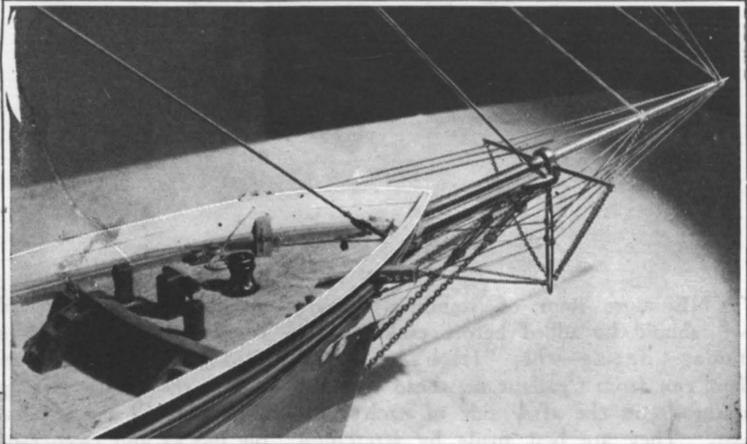
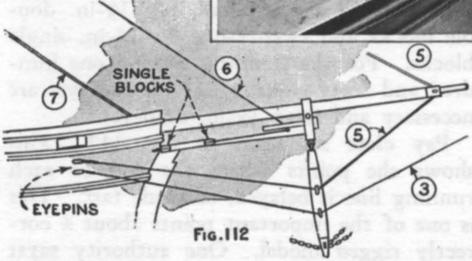


Fig. 112



110) and up to an eyepin in the bow just below the jibstay. The foreroyal stay, No. 2, leads in the same way under the lower port hook on the dolphin striker to an eyepin in the bow under the flying-jib stay. The foreskysail stay, No. 1, is seized to the royal stay just under the jibboom. All the last three stays are of the fine cord.

The jibboom backropes, Fig. 111, are of the fine cord or the button thread, and are rove, as indicated, from the jibboom through the holes in the whisker boom, and set up to eyepins in the forward sides of the catheads. This completes the head standing rigging.

The topgallant backstays on fore and main, two on each side, are of the medium

cord. On the mizzen there is one topgallant backstay on each side, of fine cord. The royal and skysail stays and backstays, on all masts, are of the fine cord. When fitting single backstays, as on the royal and skysail masts, the neatest way to do it is to open the cord by untwisting in the middle of the length, slip the eye thus formed over the mast and down to the shoulder, then apply a touch of thin glue and seize the cord on each side of the mast, as indicated in Fig. 104. The mast-head ends of single stays are treated as in the detail, Fig. 107.

Lash sheer poles made of stout pins to the backstays as in Fig. 106, and paint black. Lash smaller ones to topmast and t'gallant shrouds. The outriggers for the t'gallant, royal and skysail backstays, detailed in Fig. 105, are made from 1/16-in wire, filed down flat on two sides. Those at fore and maintopmast crosstrees are 2 in. long, pointed at one end, slipped under the shrouds and into the t'gallant masts, then lashed to the after deadeyes. Before fastening in place set them in po-

sition, mark where the backstays will cross them, then file small notches in the outboard sides of the outriggers to retain the backstays. The notches for the backstays should be so placed that the stays will have to be pulled back a trifle to enter them. The skysail backstays fit into notches filed in the ends. (See Figs. 105 and 106.) The mizzen outriggers are  $1\frac{1}{4}$  in. long. Paint the parts on top of the crosstrees white and the outer parts black, lash the backstays in the notches with a single turn of No. 60

cotton, and apply a touch of glue to each notch and knot.

Study all the drawings and directions carefully before starting to work, and be sure of each step in advance. Some may prefer to set up the lower rigging on the mizzen first, as this makes it easier to fit the mizzen stay. If the deck house has been fitted, so that it can be lifted out, it will be found a help to remove it while fitting the main and maintopmast stays.



ONE more item of standing rigging should be added before tackling the running rigging—the “Jacob’s ladders.” These run from t’gallant masthead to royal masthead, on the after side of each royal mast. They are best made by stretching two parallel lengths of black button thread, about  $\frac{3}{16}$  in. apart, in some convenient manner, and then knotting No. 60 cotton ratlines across for the length of the individual masts. Leave long ends on the ladders, tuck these ends under the shrouds at the mastheads, as at A in Fig. 113, glue and cut off.

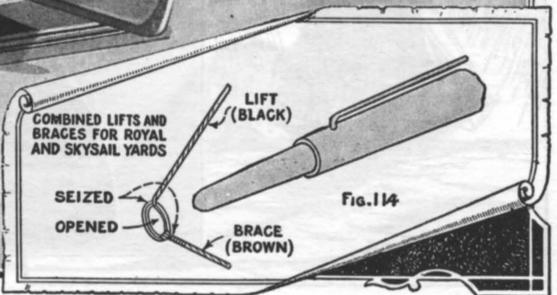
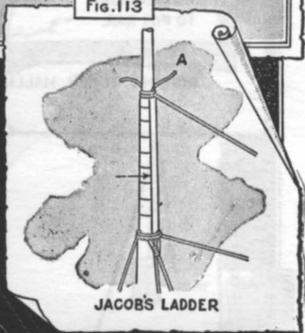
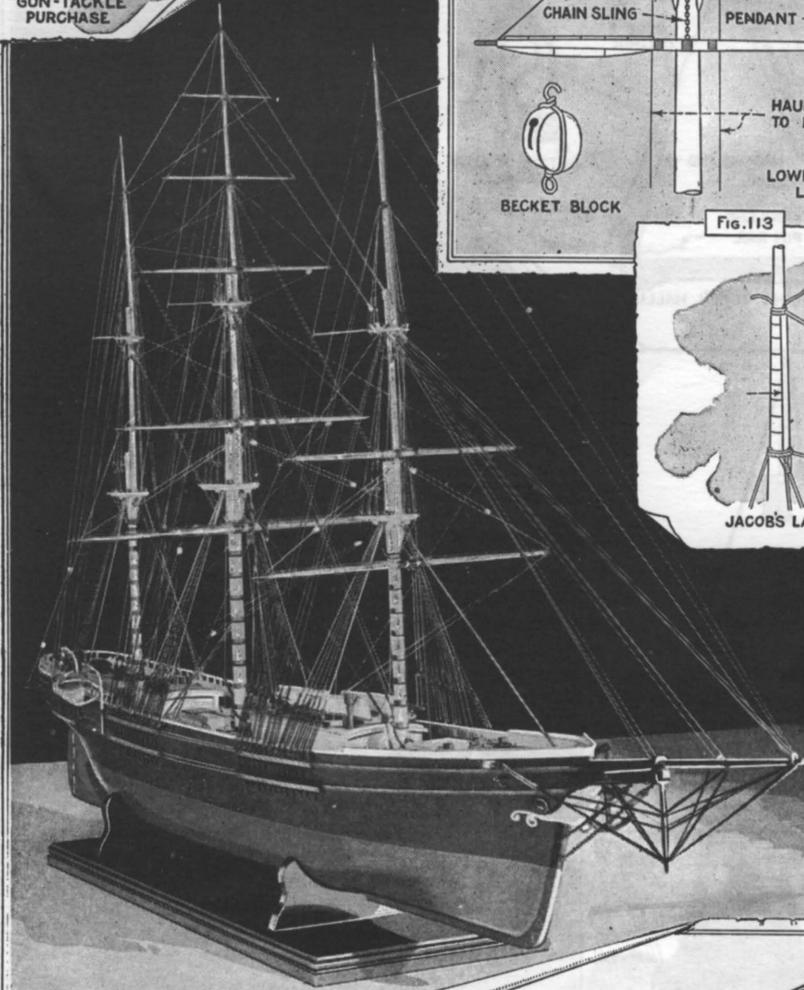
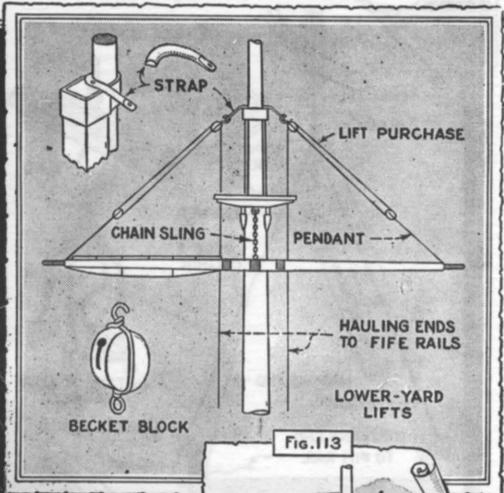
Be sure that all lines are fastened in their proper place. Do not clip your ends too short. They will look equally bad if left too long.

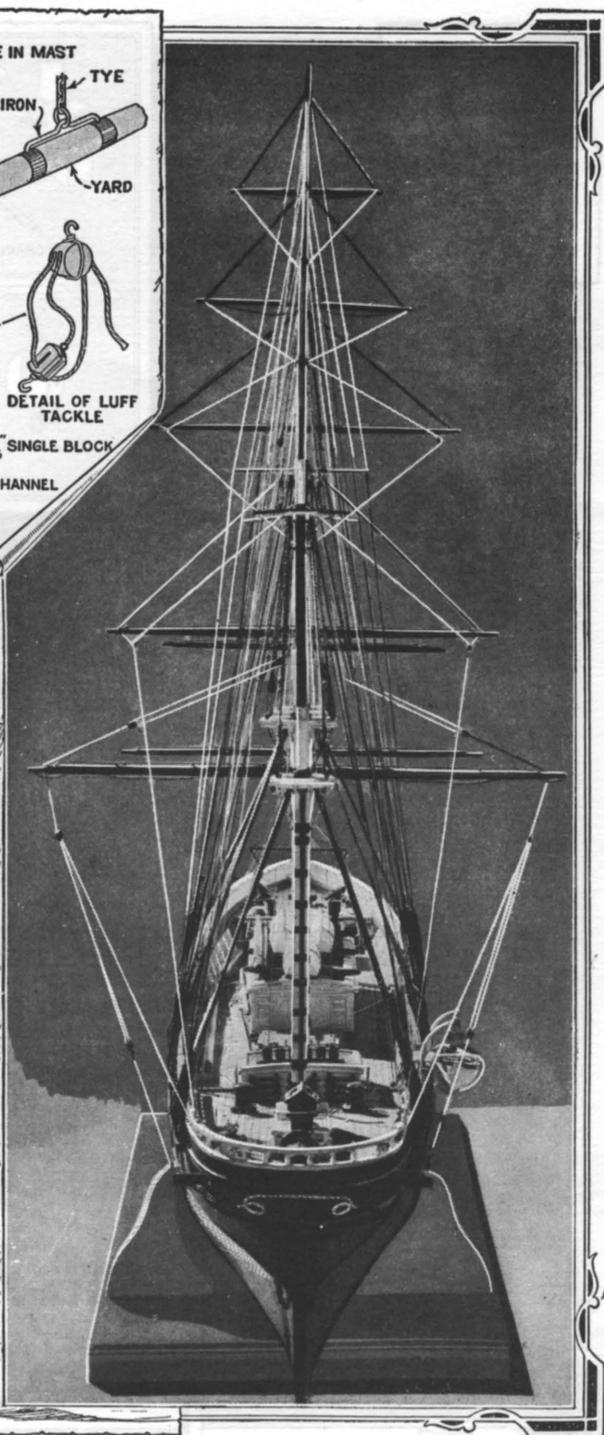
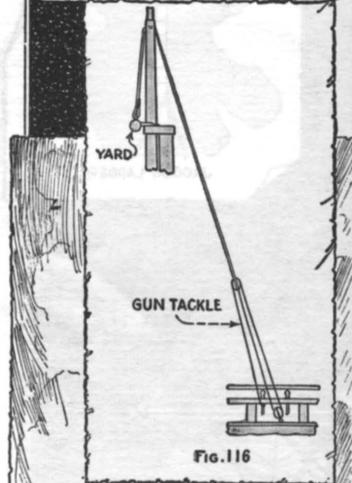
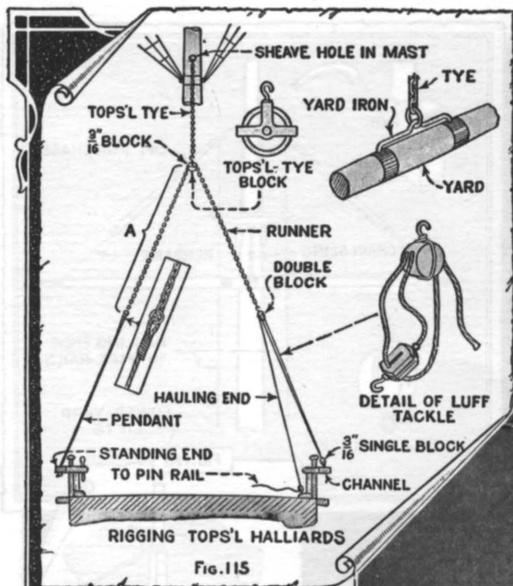
First sling the lower yards. A short piece of 22-link chain is fastened to the eye at the center of the yard and to one on the mast between the crosstrees. The yardarms are supported by the lifts shown in Fig. 113. The tackle used here is a gun-tackle purchase, and is shown in detail at the left. Use  $\frac{3}{16}$ -in. blocks for lifts and braces on fore and main lower yards;  $\frac{1}{8}$ -in. on mizzen. The pendants are of fine twisted wire, painted black. Note that the lift blocks at the masthead hook into a crescent-shaped strap, which is so bent as to bring

the tackle well forward of the foremost topmast shrouds. This strap is half-round, filed from  $\frac{1}{16}$ -in. wire.

For the entire rigging ninety-six  $\frac{1}{8}$ -in. single blocks are required, ten  $\frac{1}{8}$ -in. double blocks and twenty-one  $\frac{3}{16}$ -in. single blocks. For the standing rigging one hundred and forty-eight  $\frac{3}{16}$ -in. deadeyes are necessary and sixty  $\frac{1}{8}$ -in. deadeyes.

Pay close attention to Fig. 117. This shows the points where the end of each running line is belayed, or made fast. This is one of the important points about a correctly rigged model. One authority says: “The lead of running gear aloft may, and does, vary, but the lead on deck should be the same in every ship, so that a sailor may be able to go on any strange ship on the darkest night, and be able to lay his hand at once on any piece of running gear.” Also, use common sense in rigging. It is difficult to show the exact lead of every line, so, if any question arises as to how any particular rope reeves through a block, for example, think what the gear was intended for, and how it must have been used, and then reeve the line in the way it would have been handiest for the men. When belaying gear, wind the line on the pin in a figure-of-eight, as shown at the left, Fig. 118, not as in the center.





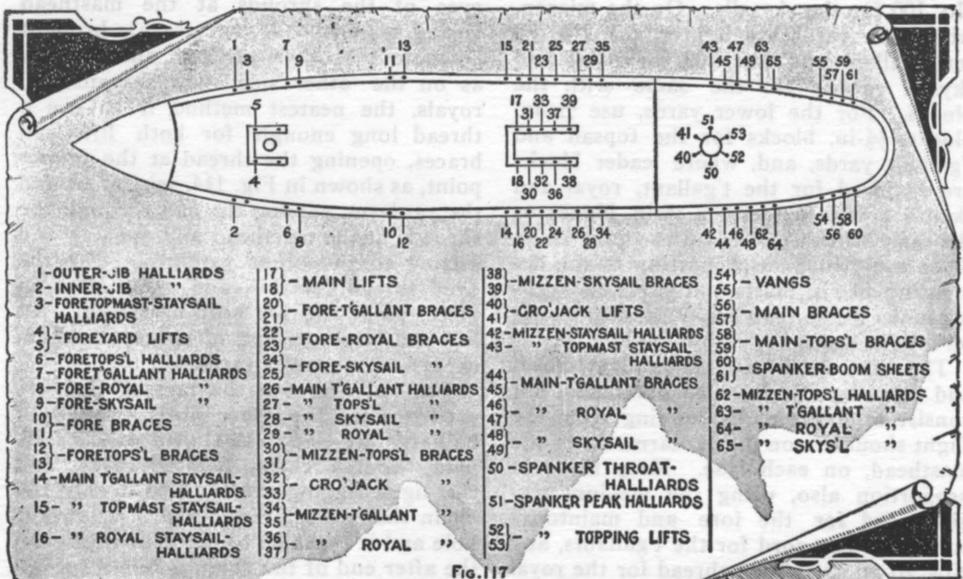


Fig. 117

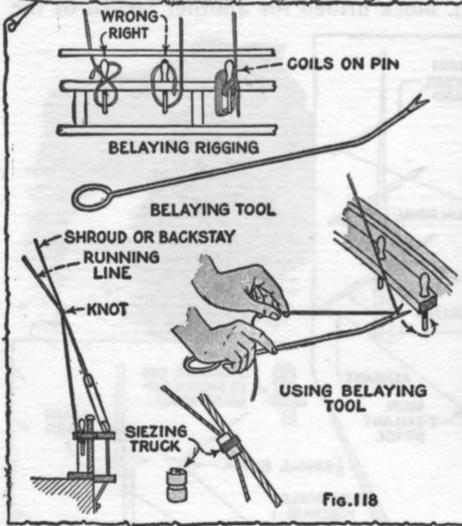
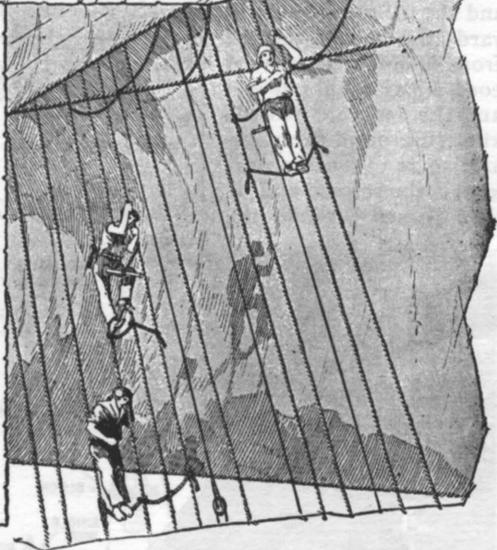


Fig. 118



Make a simple wire belaying tool as shown in the same figure, and use it from the opposite side of the model for any particular line. Then the job of belaying will be found fairly easy. A drop of glue on the pin will keep the cord from coming off after belaying. The belaying pins can be obtained from model-supply houses for a few cents a dozen. Get sixty-four pins, 1/2 in. long, and cut them off to suit the monkey rail as needed. Ordinary pins, driven through holes in the rail, can be

used if desired. The coils on the pins should be formed separately, by winding a few turns of line on a 3/16-in. dowel, afterward gluing the coil on the pin.

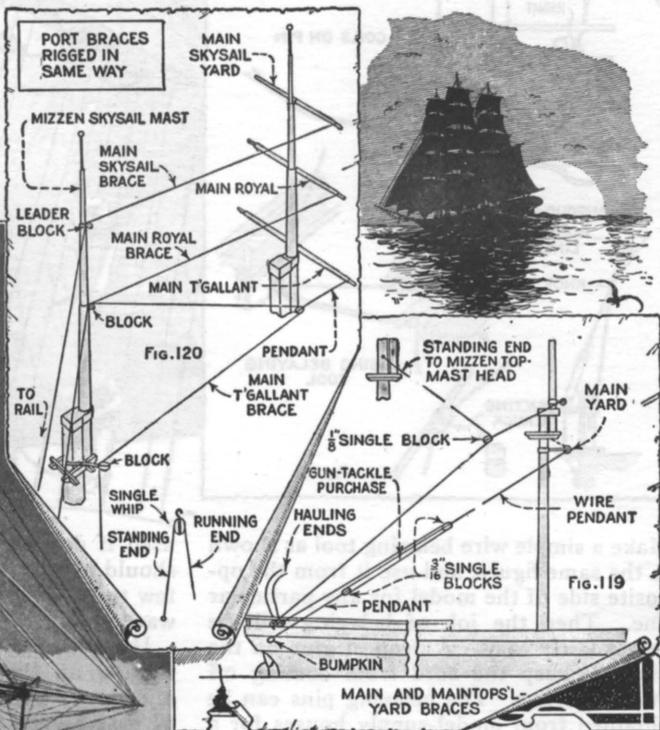
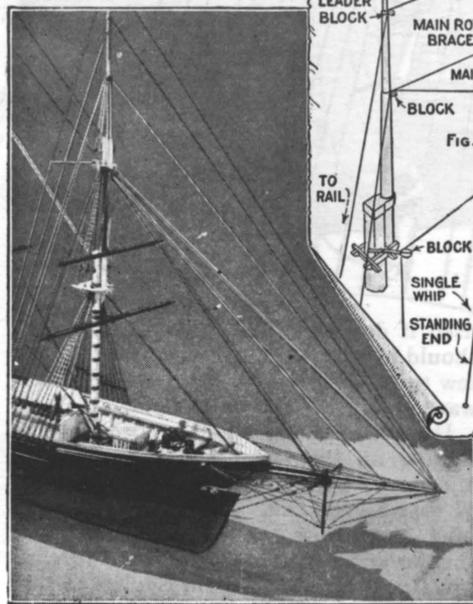
Use the lightest rigging cord for the rigging on the lower and topsail yards, and dye it light brown, as near the color of rope as you can. Don't leave the running gear white. As you go aloft, use smaller and smaller sizes of linen thread; say, No. 40 for the t'gallant rigging on fore and main, No. 70 for the royal yards and

No. 100 for the skysails. On the mizzen, where the yards are lighter, use No. 70 for t'gallant and No. 100 for royal and skysail yards. Do the same with the blocks. For the lower yards, use  $\frac{3}{16}$ -in. blocks,  $\frac{1}{8}$ -in. blocks for the topsail and t'gallant yards, and, where leader blocks are required for the t'gallant, royal and skysail braces, use either  $\frac{1}{8}$ -in. blocks or the same blocks filed down to about  $\frac{3}{32}$  in. Keep everything in proportion to the decreasing size of masts and yards, as nothing looks worse than heavy, clumsy blocks on a light spar.

The lifts on the tops'l, t'gallant, royal and skysail yards have no purchases, but consist of single cords running from the slight shoulders on the yardarms up to the masthead, on each side. Keep these in proportion also, using the medium rigging cord for the fore and maintops'l yards, the fine cord for the t'gallants, and Nos. 70 and 100 linen thread for the royal and skysail yards. On tops'l and t'gallant yards, the lifts are formed from a single length of cord, untwisted at one end and the separate strands knotted around the yardarm so as to make a neat knot; the other end is then passed through the

eyes of the shrouds at the masthead (using a needle if necessary), brought down to the other yardarm and knotted as on the other side. On skysails and royals, the neatest method is to use a thread long enough for both lifts and braces, opening the thread at the proper point, as shown in Fig. 114, seizing around the yardarm, passing the end through the shrouds at the masthead and opening and seizing to the other yardarm. Use the dyed thread for this, and, after all is in place, paint the lift portions black. All lifts are black, except, of course, the purchases on the lower yards.

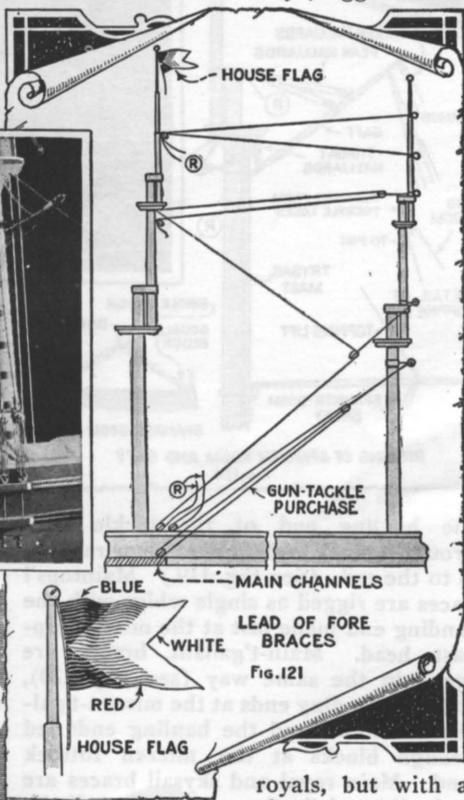
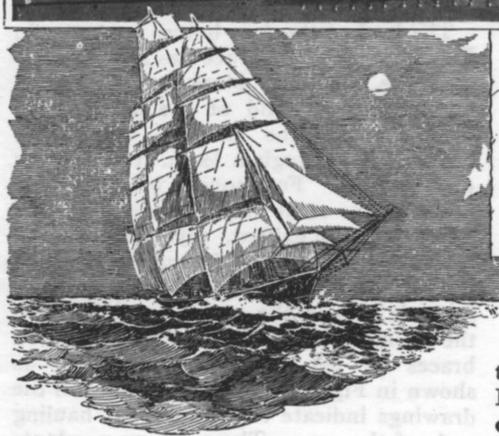
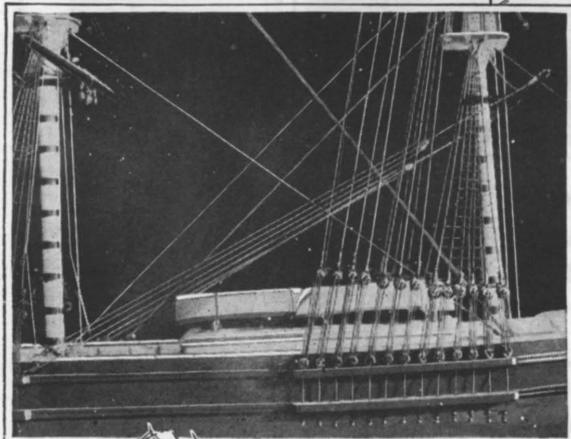
The halliards are the tackles that are used to hoist the upper yards. All tops'l halliards are rigged as shown in Fig. 115, using 22-link chain, painted black, and the light rigging cord. The tye is the chain that goes through the mast sheave hole and is shackled to the yard iron. On the after end of the chain is hooked a  $\frac{3}{16}$ -in. block drilled for another length of the



same chain, called the runner. This block should be of metal, and if a small lathe is

available, it can be made as indicated; it must not be over  $\frac{3}{16}$  in. in diameter. In the absence of a lathe, regular  $\frac{3}{16}$ -in. blocks answer very well. To the channel on one side is fastened a length of black medium cord, the upper end being fastened to the runner as indicated. On the other end of the runner a  $\frac{1}{8}$ -in. double block is hooked, through which the tackle is rove to a block in the opposite channel. This is a luff tackle. The hauling end is brought down through a single  $\frac{1}{8}$ -in. block in the waterways and then up to the rail. In order to get lifts and halliards set up tight, it will be found necessary to run a small pin through the mast above each yard parrel, so as to keep the yard down when setting up the gear. Note, in Fig. 117, that the hauling end of the foretops'l halliards is to port; on the maintops'l halliards, it is to starboard, and at the mizzen to port. This is done to distribute the

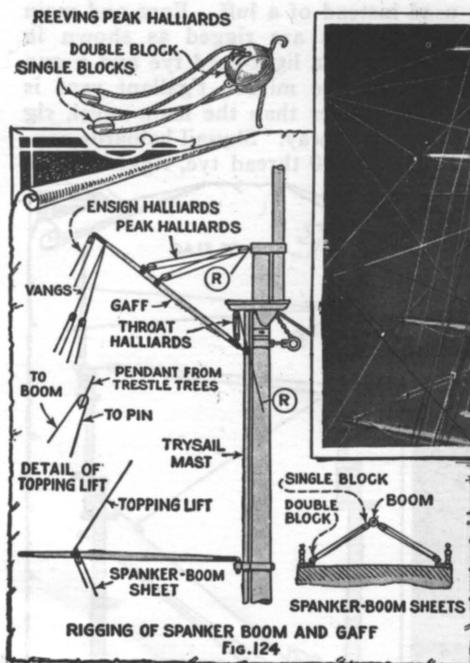
strains on the hull, and the same thing applies to all halliards, the foret'gallant halliards being to starboard, the main to port, etc. Lead the tops'l-halliard runners, tackle, etc., down in line with the topmast backstays, the t'gallant halliards in line with the t'gallant backstays, and similarly with royal and skysail halliards. T'gallant halliards on fore and main are rigged in exactly the same way as the topsail halliards, except that a gun-tackle purchase is used instead of a luff. Fore and main royal halliards are rigged as shown in Fig. 116, with a light-cord tye and a gun tackle. As the mizzen t'gallant yard is not any heavier than the main royal, rig it in the same way. Skysail halliards consist of a No. 40 thread tye, rigged as the



royals, but with a single-whip purchase on the hauling end. (See Fig. 120 for a single whip.)

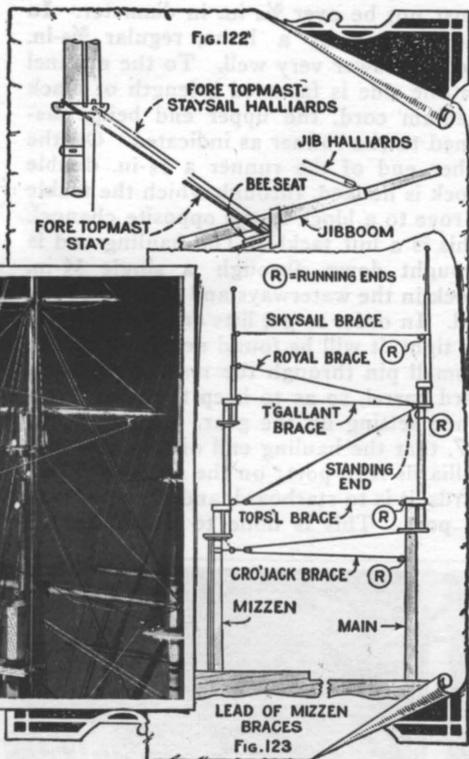
The braces are the gear that control the fore-and-aft motion of the yards: Fig. 120 will make this clear. Rig the braces on the lower yards first, starting with the

main. The main braces are rigged with a twisted-wire pendant at the yardarms, with a single block at the lower end. Into each quarter, a bumpkin, consisting of a piece of  $\frac{3}{16}$ -in. dowel, is driven, and projects  $\frac{5}{8}$  in. A medium-cord (black) pendant is seized to an eye at the outer end of the bumpkin, and a  $\frac{3}{16}$ -in. single block turned in the upper end of the pendant.



The hauling end of the tackle runs through a block under the monkey rail and up to the rail. (See Fig. 119.) Maintops'l braces are rigged as single whips with the standing end made fast at the mizzen-topmast head. Main-t'gallant braces are rigged in the same way (see Fig. 120), with the standing ends at the mizzen-t'gallant masthead, and the hauling ends led through blocks at the mizzen futtock band. Main royal and skysail braces are single lines led through  $\frac{1}{8}$  and  $\frac{3}{32}$ -in. leader blocks at the mizzen-t'gallant and royal mastheads. The leader blocks can be hooked into the eyes of the stays.

Where the ends of running gear go down to the rail on a real ship, they are led through "seizing trucks," seized to the shrouds and backstays above the rail, as in Fig. 118. These trucks cannot easily



be made small enough to look well on our model, so, after the lines have been made fast, draw them in to the nearest shroud or backstay with a black cotton thread on each, and knot the thread to the stay to represent the truck. Cut the ends off close, and keep the knots all in the same line, about 2 in. above the rail.

The lead of the fore braces is shown in Fig. 121. The fore brace has a gun-tackle purchase, the lower block being fastened on the forward end of the upper main channel, and the hauling end being brought in through a  $\frac{1}{8}$ -in. leader block on the rail. Fore-tops'l braces come down in the same way, without the purchase. Fore-t'gallant, royal and skysail braces are led back to the main, as shown, the hauling ends coming down through the lubber's hole in the main top, then down the main shrouds to the rail. The mizzen braces are led forward to the main, as shown in Fig. 123. The "R" marks on the drawings indicate the running or hauling ends of the gear. There are no pendants on the brace blocks on mizzen yards.

In making up the purchases, the standing end of the cords are made fast to a becket block, which is strapped as shown in Fig. 113. A neater way to attach the line to the block was shown in Fig. 94. Drill under the strap of the block so as to make a small groove, slip the end of the line through the groove and knot to the strap.

The rigging of the foretopmast staysail and jib halliards is shown in Fig. 122, and the outer-jib halliards are the same. All are gun tackles, the lower block of the foretopmast-staysail halliard being hooked to an eyepin in the bee seat, and the lower blocks of the jib and outer-jib halliards being hooked to the eyes on the jib-boom. All the other staysail halliards are rigged in exactly the same way. The staysails were the triangular sails that were set on the stays, as the name indicates, and the stays on which the halliards are to be rigged are indicated in Fig. 117.

No very detailed instructions are necessary for the rigging of the spanker boom and gaff since Fig. 124 shows this clearly. Note carefully how the peak halliards are rigged. The throat halliards are a luff tackle, and the spanker-boom sheets are luff tackles with the double blocks hooked to eyes in the quarterdeck waterways. Topping lifts are single whips; the vang

which steady the gaff, are also single whips, the blocks hanging from light-cord pendants, and the standing ends of the whips being knotted in small holes drilled through the lower rail. The block for the ensign halliards should be made as small as possible, and hooked to a small eyepin driven into the end of the gaff.

This completes the rigging, with the exception of the ensign and house flag. The ensign is a small American flag and can be obtained at almost any store that sells favors for parties. Don't get one that is too large in proportion to the model. The house flag will have to be made, preferably of white linen, and colored with "paintex" or similar dye colors. It should not be larger than  $\frac{3}{4}$  by  $\frac{1}{2}$  in. over all. The masts are surmounted by small gilt balls, and holes for the house flag are drilled through the ball on the main. Belay the halliards to any convenient pin. Paint the skysail poles above the skysail masts white, go over all the paintwork and touch it up where necessary, then give a final glance "alow and aloft," to see that everything is "shipshape and Bristol fashion." Cut out the name given at the end of this article and glue it on the stern, then glue around it a scroll of heavy cord, painted white, and the model is finished.



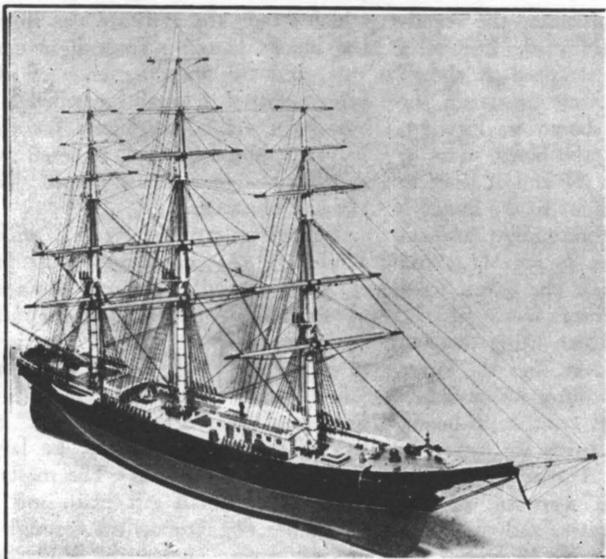
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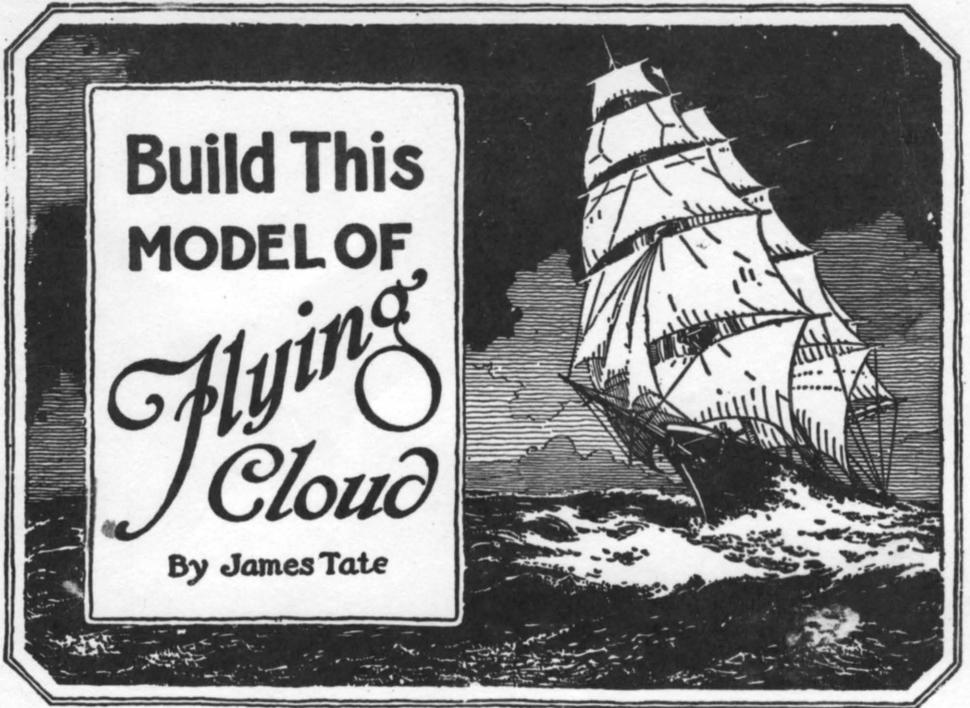
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B40..... 1	3/8" brass bell "B"	
B35..... 12	1/8" white metal bits	
B86 . . 100	1/8" brass belaying pins	
B25..... 4	1/8" white metal chocks	
B84..... 45	taffrail stanchions, and	
B	6 fiferail and wheel box stanchions	
B251..... 1	gilded figurehead	

Our Amount No. Required	FITTINGS	Price
BNP..... 1	set name plates	
BRL..... 1	set rigging line	
BBC..... 1	set oval link chain	
B142..... 1	galley funnel	
B206..... 3	brass lower yard trusses, and	
B206..... 9	brass yard hoops, set	
1 Set	Blue Prints	
BWD..... 1	set dowels for masts and yards	

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B71..... 2	$\frac{3}{4}$ " boxwood casks .....	
B147..... 9	doz. $\frac{1}{4}$ " jack stay eyebolts .....	
B24..... 4	curved wood ladders .....	
B123..... 1	brass windlass barrel.....	
B23..... 1	grating .....	
B240..... 1	pair $2\frac{1}{8}$ " brass davits	
B188..... 28	deadeyes $\frac{3}{8}$ " strops.....	
B188..... 42	deadeyes $\frac{1}{8}$ " strops.....	
B241..... 1	pair rail brackets .....	

#### Additional Fittings to Complete This Model

Our Amount No. Required	FITTINGS	Price
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	80 backing links .....	
B4..... 56	deadeyes $\frac{3}{8}$ " .....	
B4..... 84	deadeyes $\frac{1}{8}$ " .....	
B241..... 1	pair brass davit side sockets .....	
B31..... 1	brass dolphin striker.....	
B4..... 76	$\frac{1}{8}$ " blocks, single .....	
B4..... 12	$\frac{1}{8}$ " blocks, double .....	
B4..... 21	$\frac{1}{8}$ " blocks, single .....	
B4..... 48	$\frac{1}{8}$ " deadeyes .....	
B192..... 1	pair pedestals, $\frac{3}{8}$ " slot .....	
B73..... 1	$\frac{5}{8}$ " rim steering wheel .....	

Set No. B. F. 501 Consisting of all above additional fittings, postpaid .....