

WHALEBOAT PRACTICUM

By Gene Bodnar

The intention of this practicum is to provide the scale model builder with detailed instructions, supported by numerous illustrations for building a model of a whaleboat on a scale of $\frac{3}{4}'' = 1'$ (1:16). The finished model, without its davits or rigging tackle, will look like the photo below.



The finished whaleboat.

In order to participate in building the whaleboat, you are required to purchase a set of 6 plans (3 sheets printed on both sides) for the vessel, along with a 150-page book entitled “To Build a Whaleboat” by Erik A. R. Ronnberg. Both the plans and the book may be purchased from Model Expo for a cost of \$23.99, plus shipping and handling. No plans for the vessel will be published on this site.

The plans consist of the following sheets:

Sheet 1 – The lines of the whaleboat.

Sheet 1A – Construction Mold Set-Up.
Sheet 1B – Patterns.
Sheet 2 – Hull Construction.
Sheet 3 – Whaling and Boat Gear.
Sheet 4 – Davits and Cranes; Sail Plan.

It is recommended that you study the plans thoroughly before diving into the project. Read Mr. Ronnberg's notes on the plans, and also skim over his book to get an idea of the general construction methods required for the project.

Brief History of the Whaleboat

In his book, Mr. Ronnberg provides a fairly comprehensive history of whaleboats. He also tells us that the particular whaleboat that we will be building in this project originates from the whaler "Lagoda."

The "Lagoda" was built in 1826 at a merchant ship, not as a whaler. Originally intended to be named "Ladoga" after Lake Ladoga in Russia, the letters "d" and "g" were accidentally switched and, due to the superstition that correcting the name of a vessel would bring bad luck, it remained as the "Lagoda" The ship was a three-master constructed of oak.

In 1841, it was purchased by Jonathan Bourne of New Bedford who converted it into a whaling vessel by adding a trywork - an onboard hearth to convert blubber into whale oil.

In 1860, the ship was converted to a barque rig in order to reduce the crew needed and to allow the ship to sail closer to the wind.

In 1871, the Lagoda was among 40 ships whaling in the Arctic. Toward the end of the season, the ice began to surround the ships, and crushed 33 of them. The Lagoda narrowly escaped and, with the remaining ships, picked up some of the 1200 survivors.

In total, the ship made almost \$652,000 of profit for Bourne until he sold the ship in 1886. It sailed from the United States in 1889 and worked as a coal hulk, being used to fuel steamboats in Yokohama, Japan until it was sold again and eventually broken up in 1899.

In 1915, Jonathan's daughter Emily donated the Bourne Building to the New Bedford Whaling Museum in memory of her father, and the Museum commissioned shipwrights to build the half-size model of the Lagoda in 1916 with funds also provided by Emily. At 89 feet in length, it remains the largest whaling ship model in existence (see photo below). You can visit the museum and see the model at this website:

<http://www.whalingmuseum.org/exhibits/lagoda.html>



The Whaler "Lagoda"

Principles That Apply to All Modeling

1. Take your time. If you haven't completed a part of the project before the next part begins, don't worry about it. All instructions for this practicum will remain on this site for a long time to come.
2. If something goes awry, do it over. Do not settle for a second-rate model. The second time around will be much better.
3. Do not make a difficult thing simple, and do not make a simple thing difficult. Think it through first, then build.

4. Use tools that you are comfortable with. Many different kinds of tools can be substituted for those used in this practicum.
5. Enjoy yourself and have fun. This is the ultimate goal of our hobby.
6. Do not religiously follow every step of this practicum. Think for yourself. It is quite likely that you know a better way of doing a certain step. If so, do it your way.

Tools and Supplies You May Find Useful

A. Cutting tools:

1. Jig saw or band saw.
2. X-Acto knives, especially a #11 blade.
3. Razor saw.
4. Single-edged razor blades.
5. Small chisels for cutting rabbets.
6. Small pair of sharp scissors.

B. Files and Sandpaper:

1. A set of needle files.
2. Hand files.
3. Medium and fine grit sandpaper.
4. Sanding sticks.

C. Clamps:

1. Spring clothespins.
2. "Bulldog" clamps
3. Rubber bands.

D. Boring Tools:

1. 1/16" drill bit.
2. #60-#80 set of drill bits.
3. Pin vise.

E. Miscellaneous Tools:

1. Tweezers.
2. Miniature pair of pliers.
3. Soldering iron, with solder and flux.

4. Thread for sail and rigging.
5. Beeswax (for thread)
6. Masking tape.
7. Assortment of paint brushes.

F. Supplies:

1. Primer.
2. Paint.
3. Sanding sealer.
4. Stains.
5. Varnish.
6. White glue.
7. Cyanoacrylate (CA) glue
8. Wood filler.

Construction Materials

Mr. Ronnberg recommends cherry or maple wood for the hull planking, with woods of contrasting color for other parts. For metal parts, he recommends photo-etched nails, brass straps for the mast hinge, turning and photo-etchings for rowlocks, castings for the compass bowl and the whaling gun, and various wire and copper shim.

HOWEVER, as with everything else, substitutes may be chosen by each modeler himself, based on his own personal preferences. For this practicum, the only wood employed on the model will be basswood, which can be stained to look like any other wood one chooses. If one chooses to avoid working with metal, many metallic parts can be constructed of wood and treated to look like metal. Various options will be discussed throughout this practicum as the need arises.

STAGE 1: Building the Mold

The “mold” is the framework upon which the whaleboat itself is built. The mold is affixed on top of three “horses” for support, and the horses are

pinned and glued to a baseboard that is slightly longer and slightly wider than the whaleboat. The mold, horses, and baseboard are temporary structures that allow you to build the whaleboat. All planking is shaped, fitted, and installed in upside-down fashion upon the mold.

STEP 1: LAYING OUT THE PARTS ON BASSWOOD SHEETS

Using 1/8" basswood, carefully lay out all the required parts of the mold found on Sheet 1A of the plans. All the parts are 1/8" thick, and you will need about a sheet and a half of 6" x 24" basswood for all of them.

How do you get the lines on the plans onto the basswood? Here are several suggestions:

- If you are lucky enough to have 6 separate sheets of plans, you can merely cut out each part and rubber-cement it to the basswood.
- If you don't wish to destroy your set of plans, you can duplicate each part with your copier and then cut it out and rubber-cement it to the basswood. Beware of this method, however, because many copiers do not copy at 100% of the original size; 99% or less is common. Test your own copier before using this method.
- If your copier doesn't do a good job, you can copy each part into a Brava Reader program, which is described elsewhere on this site, and then print out an EXACT duplicate of each part, with no distortion of any kind.
- If you don't like any of the above methods, you can trace each part onto the basswood with carbon paper.

As you lay out each of the following parts, make sure you include the lines described below for each part, where noted, especially if you are tracing with carbon paper:

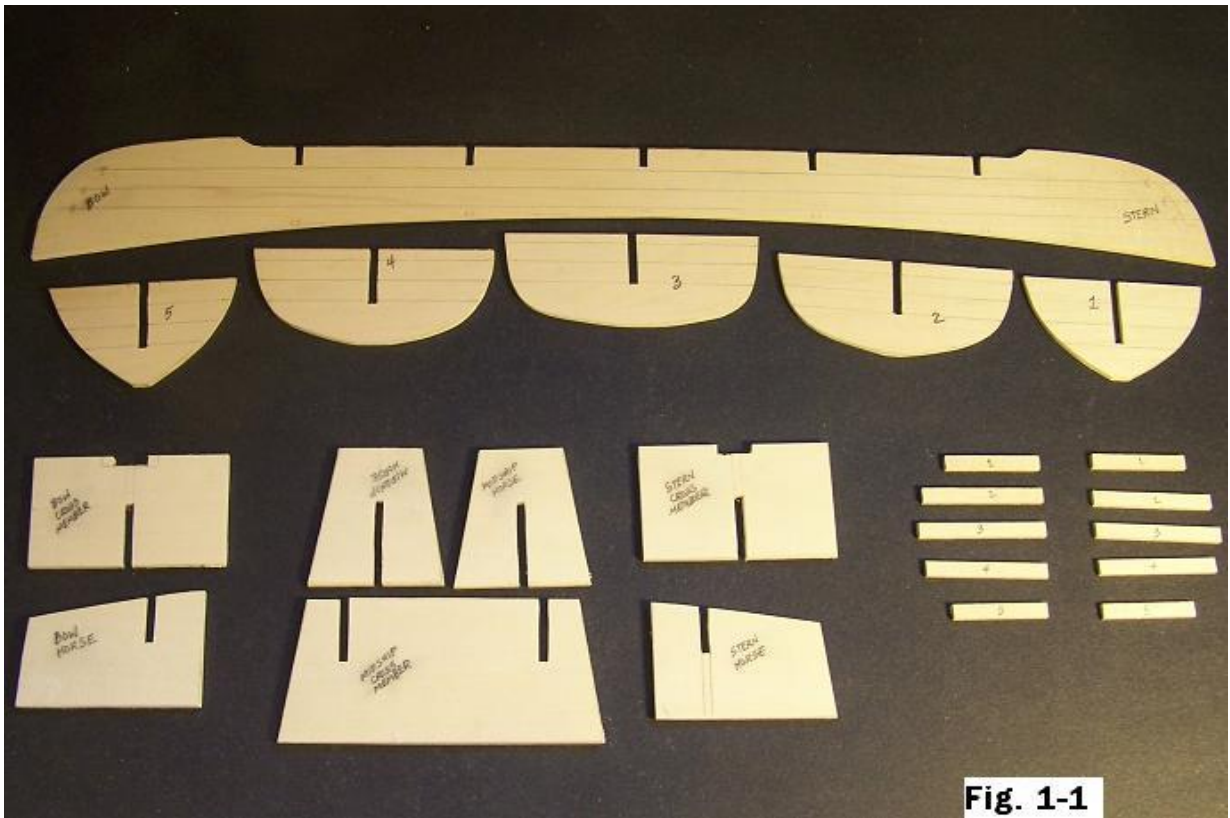
- a. Profile Mold – This is the “backbone” of the mold. Use the inner line of its shape on the plans for laying it out

for cutting. Do NOT include the Profile Mold Cap Strip, the stem post, or the keel. You should definitely include the bow and stern bevel lines that receive seam battens. Locate and draw Waterlines 2, 3, and 4 on at least one side of the mold. Note that the cutaway of the bottom of the Profile Mold follows Waterline 1.

- b. Section Molds #1-#5 – Do NOT include the Cap Strips in your layout. Note that the slots that will be cut out will only extend to the solid line, not the dashed line.
- c. Bow Horse
- d. Bow Horse Cross Member
- e. Midship Horse
- f. Midship Horse Cross Member – Note that 2 are required.
- g. Stern Horse
- h. Stern Horse Cross Member
- i. Cap Strips of varying sizes (10) – Each Section Mold requires 2 cap strips. The length of each pair is measured from the edge of the Profile Mold Cap Strip to its outer edge shown on the plans.

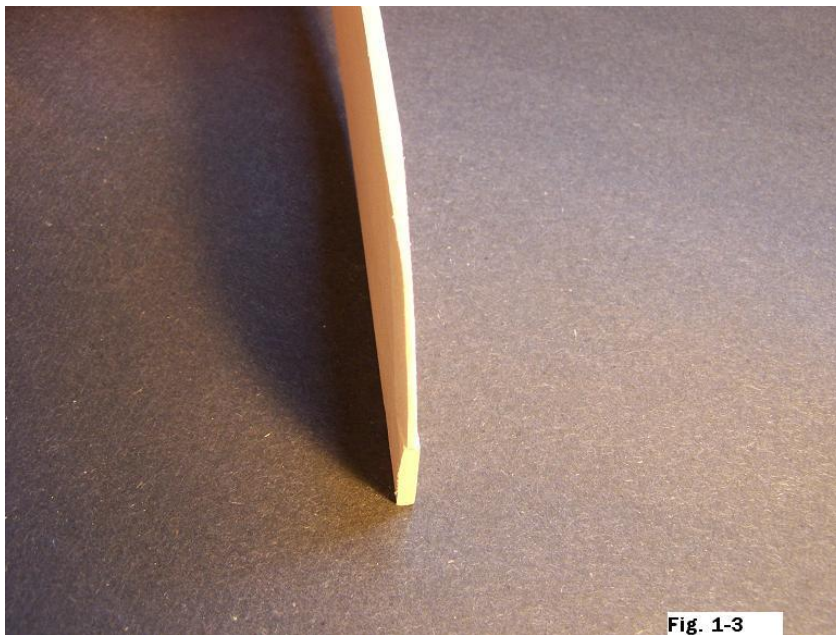
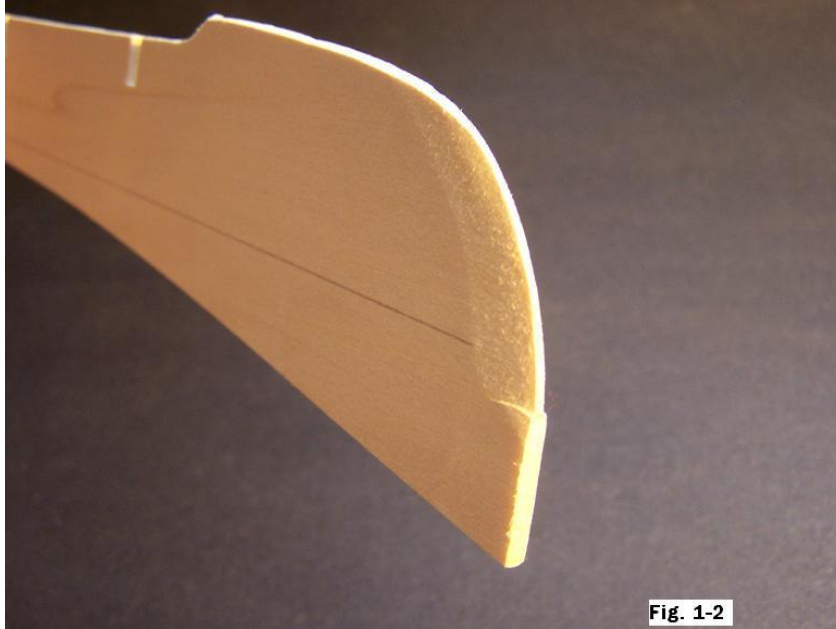
STEP 2: CUTTING OUT ALL THE PARTS

You can use either a band saw or jig saw to cut out the parts. The more accurately you cut out each part, the more accurate the resulting model will be. Stay just outside the lines when you make your cuts. Sand all cuts smooth. Figure 1-1 shows most of the parts cut out and sanded smooth.



STEP 3: FINISHING THE PROFILE MOLD

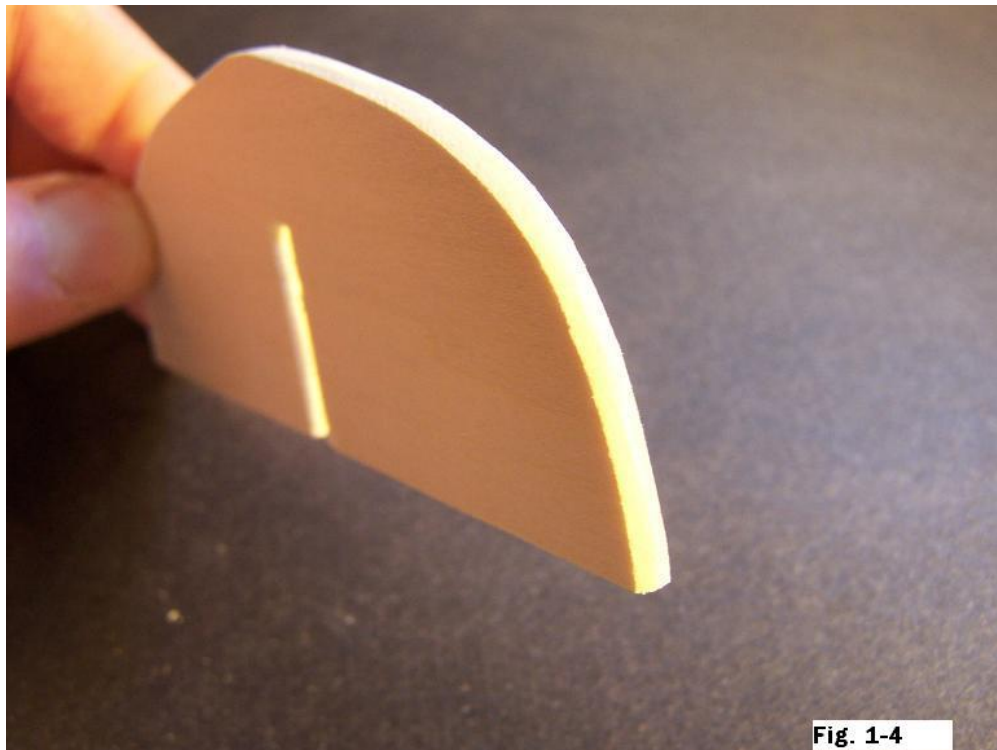
1. Bevel the bow and stern areas that you marked previously for the seam battens. There should be a maximum of 1/16" between Waterlines 2 and 4. The area between Waterlines 1 and 2 will taper gradually to its 1/8" width. This can be seen in Figures 1-2 and 1-3.



2. If you haven't already done so, make sure you mark Waterlines 2 through 4 at least on the bow and stern areas.
3. Using the top drawing on Plan Sheet 2 as your guide, mark the locations of the plank laps and seam battens on the edges of the Section Molds. These marks will help guide you to the approximate placement for all planking on the whaleboat. Do this at both the bow and stern areas of the Profile Mold.

STEP 4: FINISHING THE SECTION MOLDS 1-5

1. Bevel the edges of Section Molds 1, 2, 4, and 5, as shown in Figure 1-4 and as shown in the Top View of Plan Sheet 1A. Note that only one-half of the edge requires a bevel, and the required bevel is on the same have that points either to the bow or stern. In other words, Section Molds 1 and 2 will be beveled on the side facing the bow, and Section Molds 4 and 5 will be beveled on the side facing the stern. Note that Section Mold 3 requires no bevels.



2. Mark Waterlines on at least one side of each of the Section Molds. These lines are found on the bottom right-hand drawing of Plan Sheet 1.
3. Mark the locations of the plank laps and seam batten on the edges of all five Section Molds. These are found on the same drawing as the above Waterlines. Mark them on the port and starboard sides of each Section Mold. They provide the approximate location for all planking for the whaleboat. An example is shown in Figure 1-5.

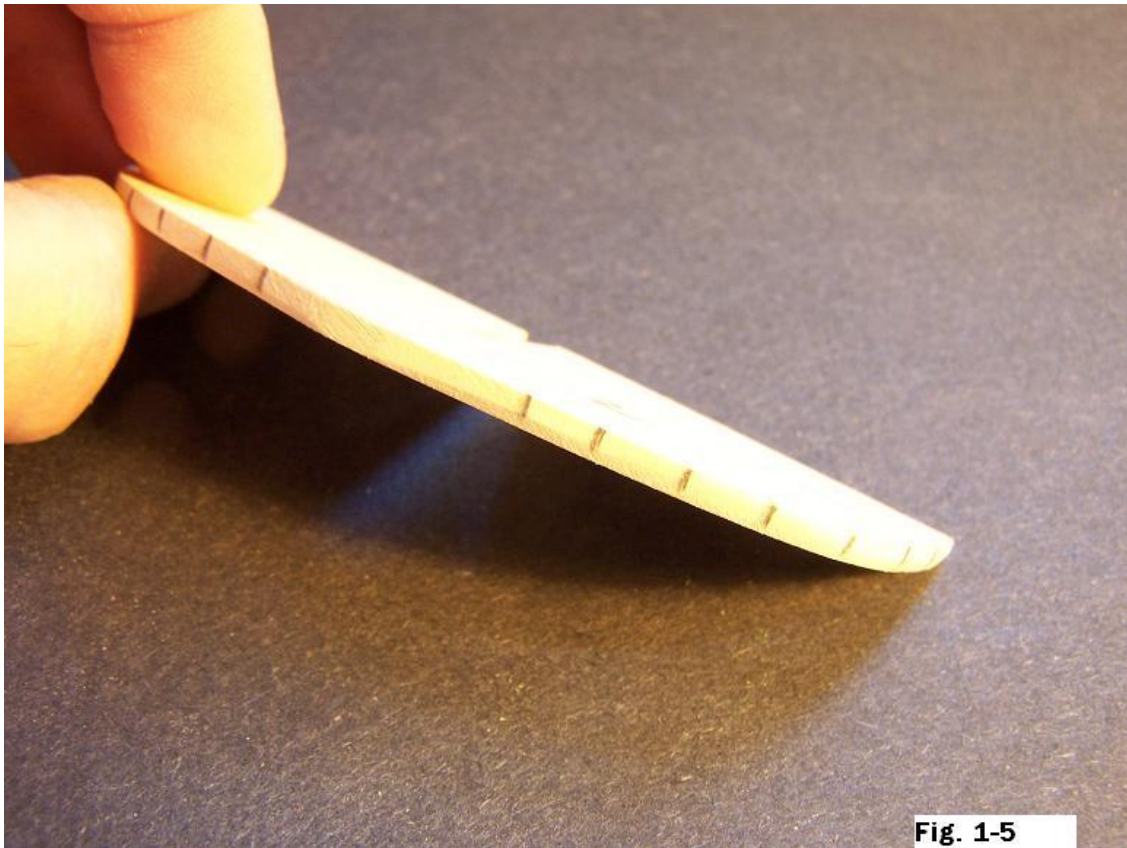
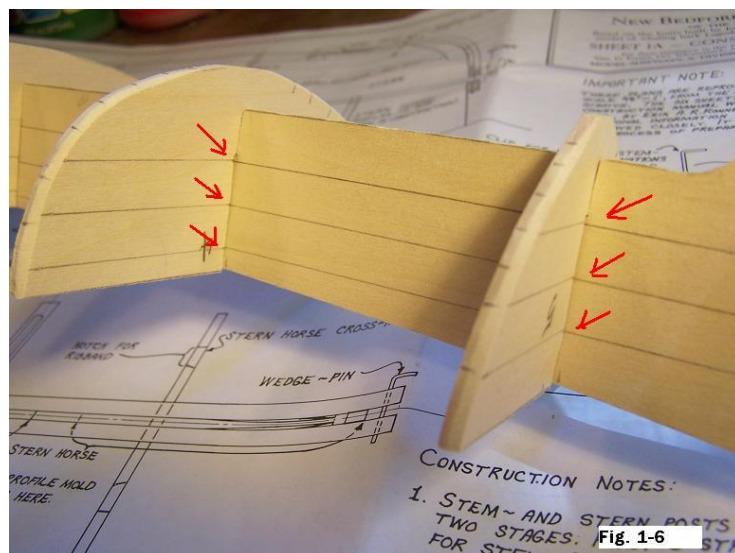


Fig. 1-5

Next, fit the Section Molds to the Profile Mold in their proper slots, but do not glue them in place yet. Check to ensure that the Waterlines on the Section Molds align with the Waterlines on the Profile Mold. See Figure 1-6.



While the Section Molds are still inserted in their slots on the Profile Mold, note that the top edges of Section Molds 1, 2, 4, and 5 require a slight bevel so that they follow the sheet of the top edge of the Profile Mold. This requirement can also be observed in the Side View Plan on Sheet 1A. Using a file or a sanding stick, bevel these areas carefully. Section Mold 3 has no bevel.

STEP 5: FINISHING THE MOLD ASSEMBLY

Cut out the Profile Mold Cap Strip shown in the Top View of Sheet 1A. Note that it, too, is cut from 1/8" basswood and has a 1/8"-wide notch on each end.

Glue and pin it in place on the top edge of the Profile Mold directly in the center, as shown in Figure 1-7. Make sure that it is perfectly perpendicular to the Profile Mold and that the notches at each end will be exposed to accept the keel material. Allow the glue to dry thoroughly.

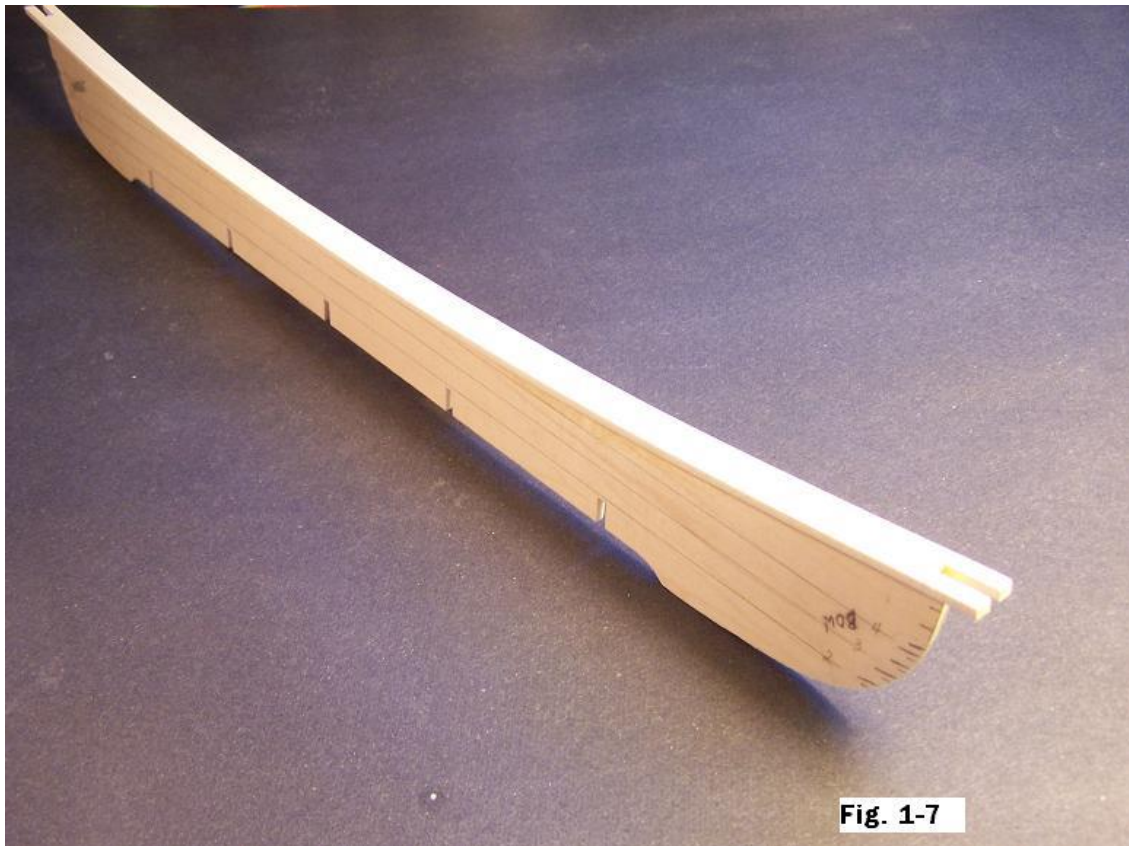
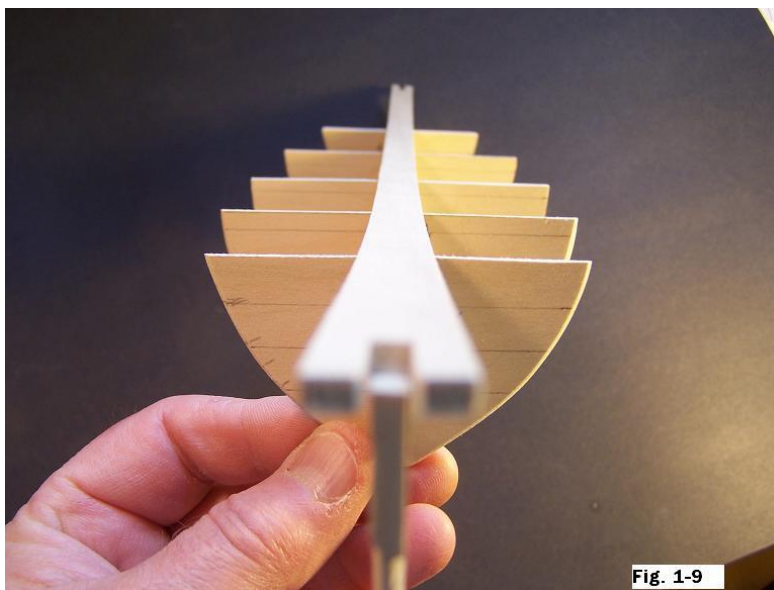
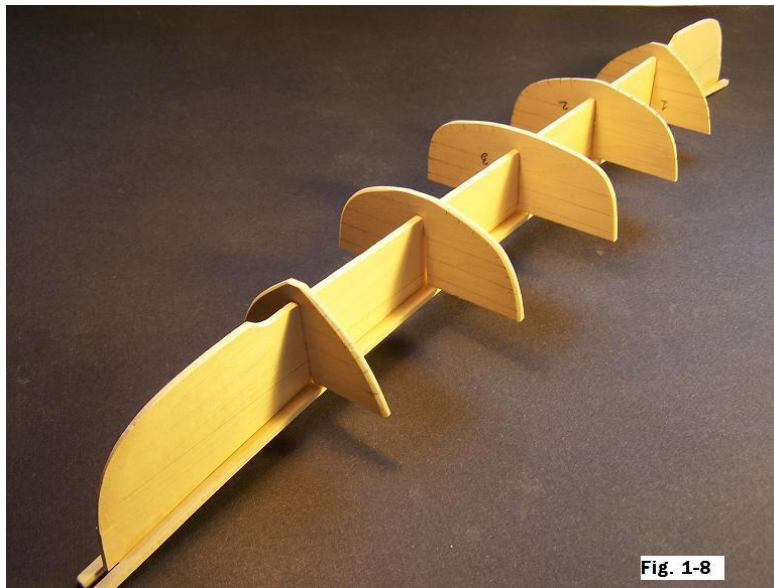


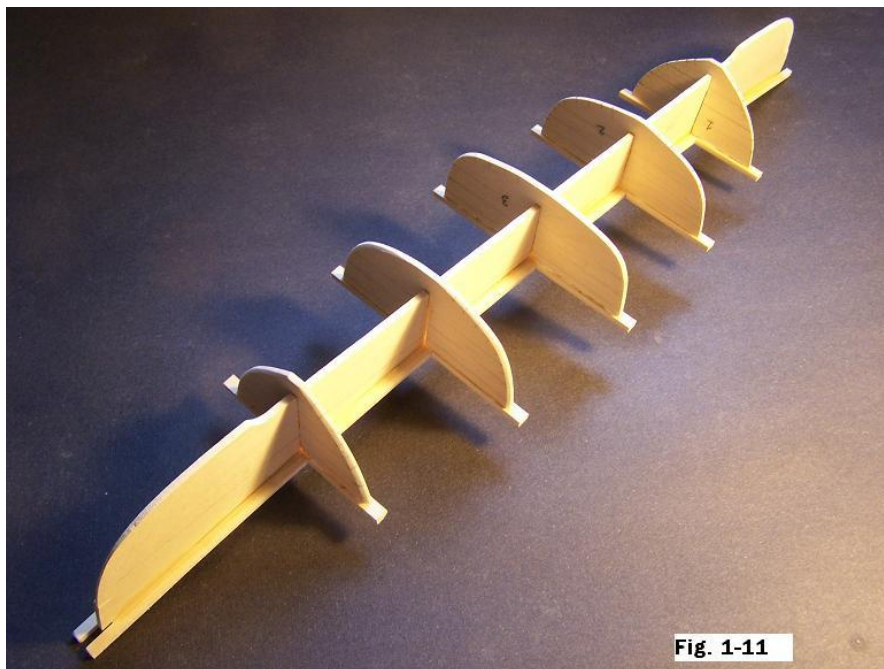
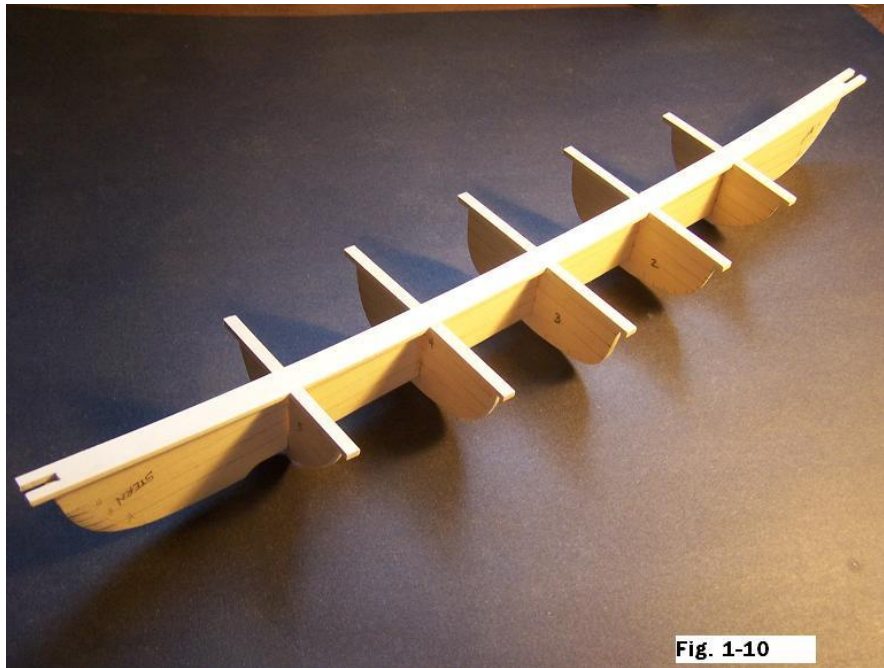
Fig. 1-7

Next, test the fit of each of the five Section Molds, ensuring that Water-lines are still aligned. Also be sure that the top edges of each Section Mold reaches the bottom edges of the Profile Mold Cap Strip. If everything is properly aligned, glue the five Section Molds in place, checking to ensure that each mold is perfectly perpendicular to the Profile Mold. This is shown in Figures 1-8 and 1-9.



Finally, install the Cap Strips by pinning them and gluing them on the top edges of the Section Molds, abutting them to the Profile Mold Cap Strip and centering them as neatly as possible. Note that they protrude about $\frac{1}{4}$ "

beyond the edges of the Section Molds. This is shown in Figures 1-10 and 1-11.



The “mold” upon which the whaleboat will be built is now finished. Next, we will build the horses upon which the mold will be affixed.

STEP 6: INSTALLING THE HORSES ON THE CONSTRUCTION BOARD AND FINISHING THE MOLD

1. Assemble and glue the 7 parts for the three Horses that you have previously cut out. Remember to cut out notches on the Bow and Stern Horses before assembling them permanently (see the Top View on Sheet 1A). Make sure that the cross members are perpendicular to the Horse parts when you glue them together.
2. Prepare a Construction Board, which is a piece of wood measuring 7” wide by 23” long. Its thickness should be a minimum of ¼”, but ½” or ¾” is better, and it should be free of any warp. Draw a pencil line directly down the full length of the Construction Board. Draw another centerline (11 ½” from one end) perpendicular to this one. The Midship Horse will rest on this latter line.
3. Glue the Midship Horse to the Construction Board, centering the Horse perfectly.
4. Position the Bow and Stern Horses at their approximate locations, as seen from the Top View on Sheet 1A, but do not glue them in place yet.
5. Place the assembled Mold upside down on the Horses, with the Midship Mold centered over the Midship Horse. Now, while keeping the Midship Mold perfectly centered, align the Bow and Stern Horses by shifting them slightly until the ends of the Profile Mold are in alignment with the ends of the Horses at both ends. Make sure that both are perfectly aligned, because the trueness of the whaleboat planking depends on it. This is shown in Fig. 1-12 below.

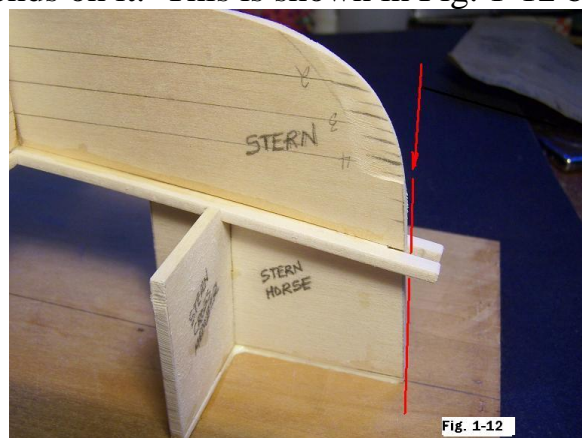
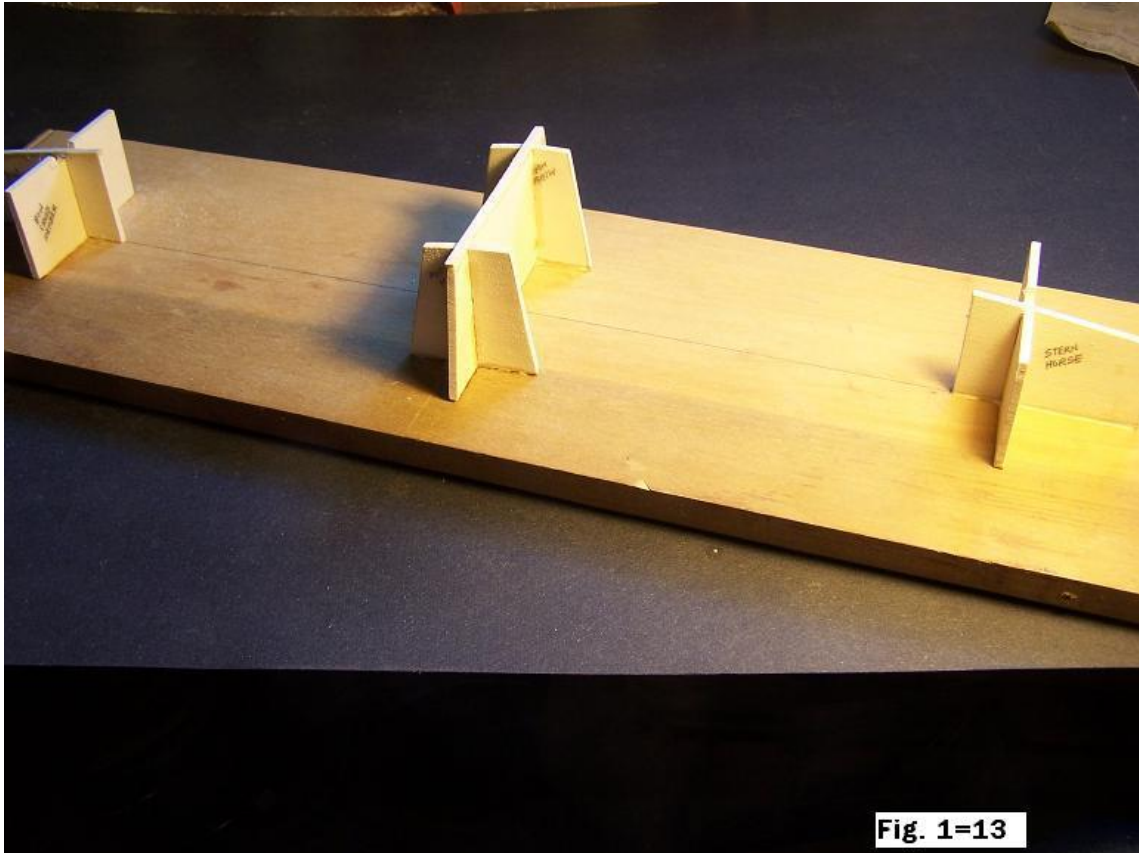
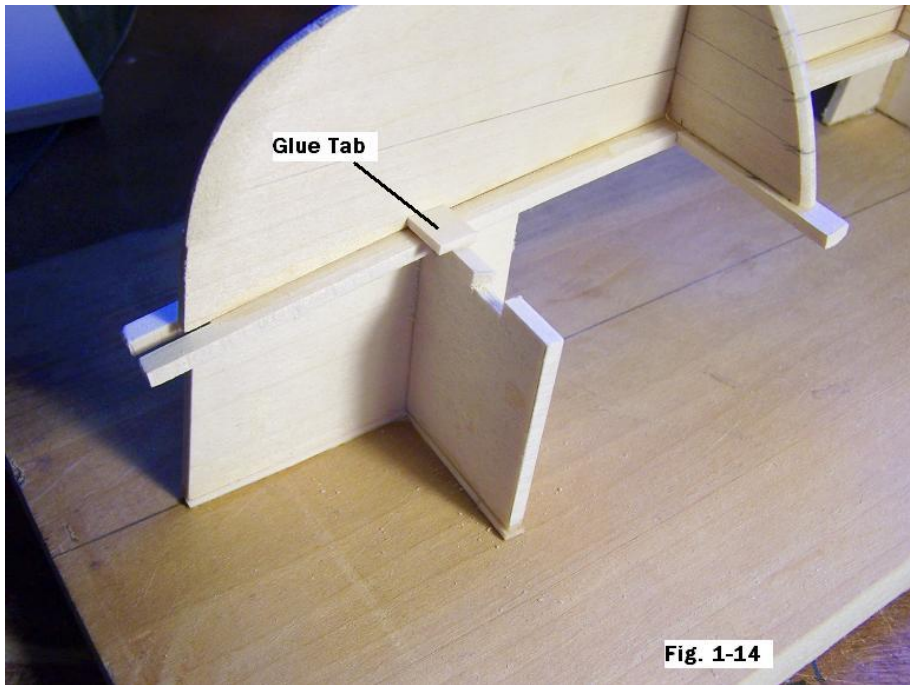


Fig. 1-12

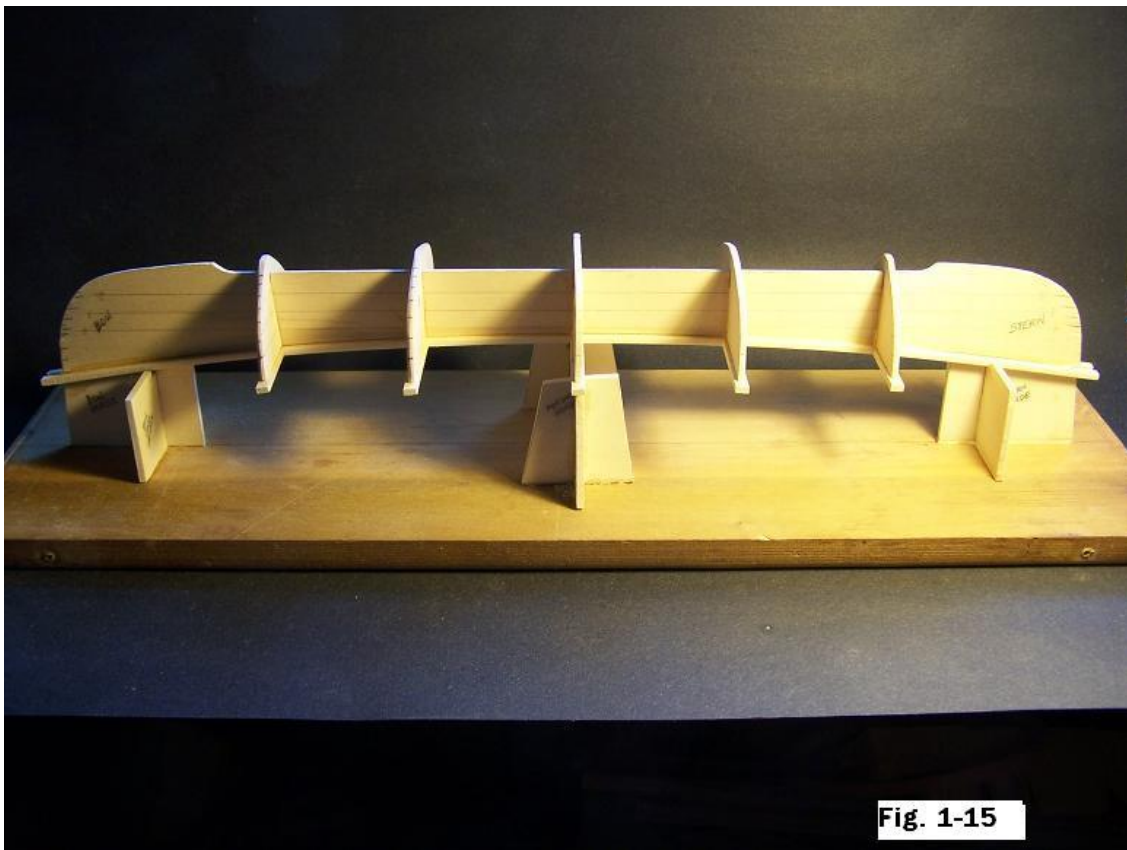
6. Mark the locations of both Horses on your Construction Board with a pencil. Remove the Mold and glue the Horses in place at your markings. See Fig. 1-13.



7. Now place the Mold back on the Horses. Does the Mold rest comfortably on the Horses without any rocking motion? If not, gently file the Horses down a bit in appropriate areas until the Mold makes contact with all three Horses. Perfection is not necessary here – only good contact is required.
8. Finally, SPOT-GLUE the Mold onto the Horses. Only five spots are sufficient, because you want to be able to remove the Mold easily when you begin the framing. First, spot-glue the Midship Horse with a spot of glue at its very center and place the Mold in its proper position. The other four spots require “glue tabs,” as shown in the End View of Bow or Stern Horse on Sheet 1A and in Fig. 1-14 below.



When the glue dries, you will then be ready to begin construction of the whaleboat itself. The finished Mold appears in Fig. 1-15.



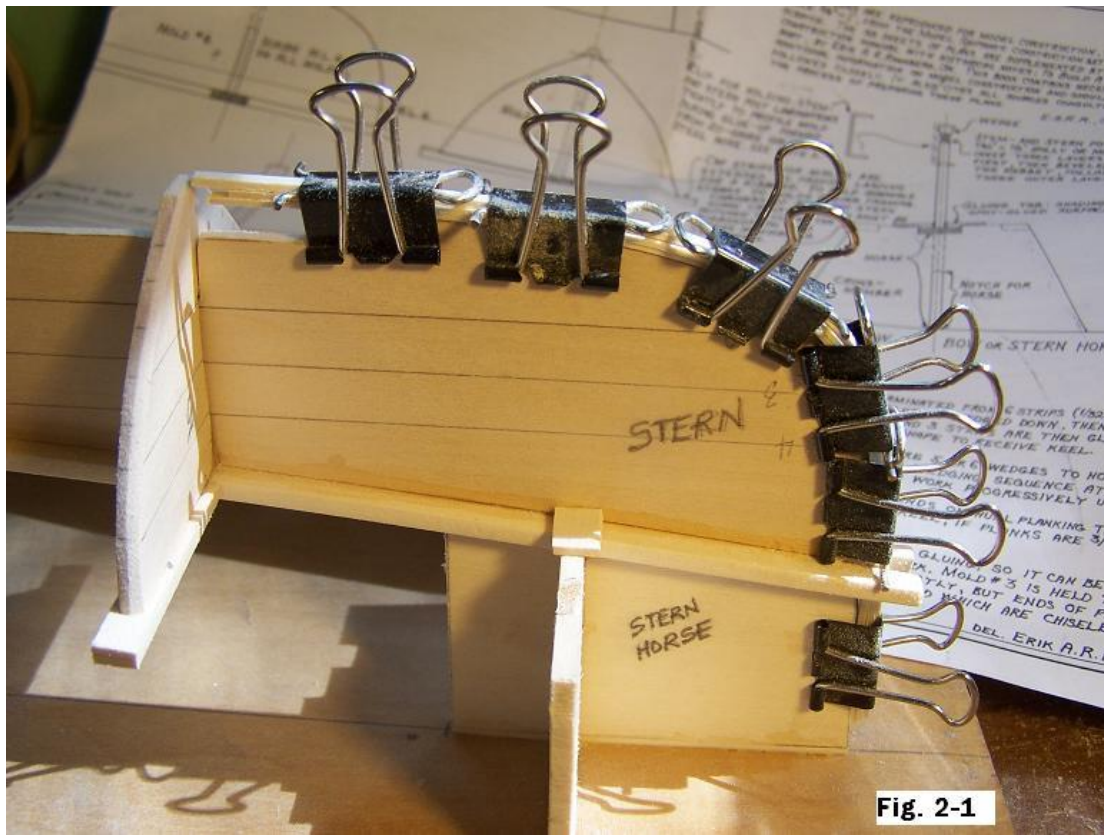
STAGE 2: MAKING THE KEEL, STEM, AND STERNPOST

STEP 1: MAKING THE STEM AND STERNPOST – FIRST STAGE

Cut 6 strips of 1/32" x 1/8" basswood into 7" strips. Three strips will be used for the stem and three for the sternpost.

Glue two of the strips together with carpenter's glue. Immediately bend the two glued strips around the stem, clamping firmly in place with six clamps. Make sure that none of the glue touches the mold, because you don't want the strips to adhere to the mold. Note that it is not necessary to soak basswood in water in order to achieve a bend – the basswood will bend easily. However, if you are using a hardwood, you may find that soaking and bending the wood is necessary.

After the glue sets well, remove the clamps. Then glue a third strip in place on top of the other two strips. Align them properly, and then replace the clamps, as shown in Fig. 2-1 below.



Repeat the above two paragraphs for the sternpost.

Allow the glued and clamped laminations for the stem and sternpost to dry completely.

Remove the clamps. File the scarf joints on the stem and sternpost, as shown on the uppermost drawing on Plan Sheet 1A. Note that the lamination next to the mold is not included in making the scarf joint. The scarf joint extends 9/16" in the other two laminations. This is shown in Fig. 2-2 below.

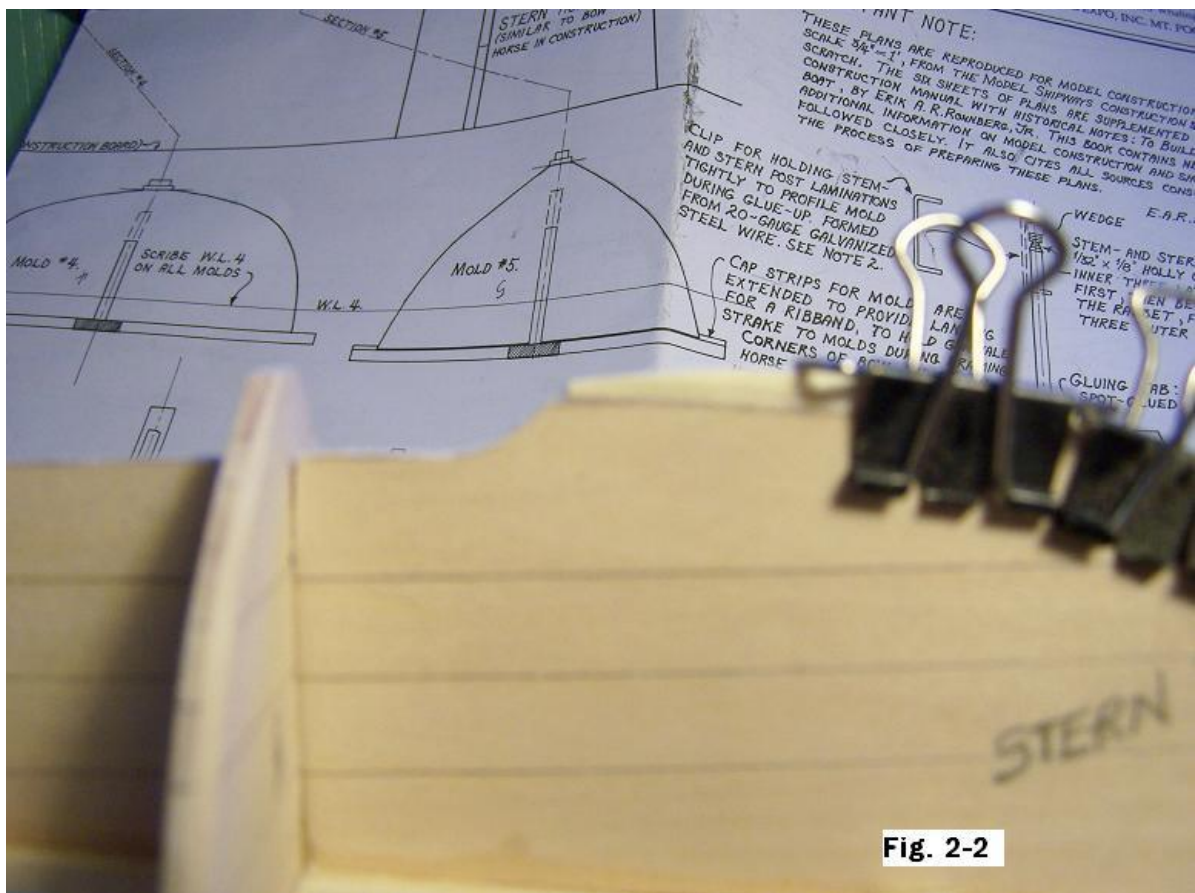


Fig. 2-2

Now file a bevel in both the stem and sternpost between the scarf joint and the cap strip. The angle of the bevel is shown in the figure on page 53 of Ronnberg's book. Clamp the stem and sternpost back into position.

STEP 2: MAKING THE KEEL

The keel consists of two or three pieces, depending on which way you choose to install it, as will be explained shortly. The first layer of the keel is called the “upper layer” and its pattern is found at the bottom of Plan Sheet 1A.

A standard thickness for basswood is 1/16”. Cut the upper layer of the keel from a piece of 1/16” basswood. Note that the piece tapers at both ends, and its full length, when installed, will rest perfectly in both scarf joints in the stem and sternpost. When installed properly, it will just touch upon each of the five molds, and it will be perfectly even with the stem and sternpost. Make whatever adjustments that may be necessary. Note also that the upper layer of the keel contains the centerboard slot that should NOT be cut out until after the frames have been installed.

The lower layer of the keel should not be cut out EITHER from one piece of 3/32” basswood OR from two pieces of basswood (one of 1/16” thickness and one of 1/32” thickness, with both pieces glued together). If you are fortunate enough to own a planer, the one-piece construction is better. Mark and cut out the centerboard slot from this piece. Taper the piece at both ends, as you did for the upper layer. Note that this piece will not be scarf-jointed; instead, it will rest flush above the scarf joints of the upper layer, as shown in the top drawing of Plan Sheet 1A.

Glue the upper and lower keel pieces together, Make sure that the upper layer is centered perfectly on the lower layer. Place weights on it on a flat surface, and let the glue dry thoroughly.

Now glue the keel in place on the scarf joints at the stem and sternpost, centering it carefully. Clamp with larger clamps. Let the glue dry. See Figs. 2-3, 2-4, and 2-5 below.

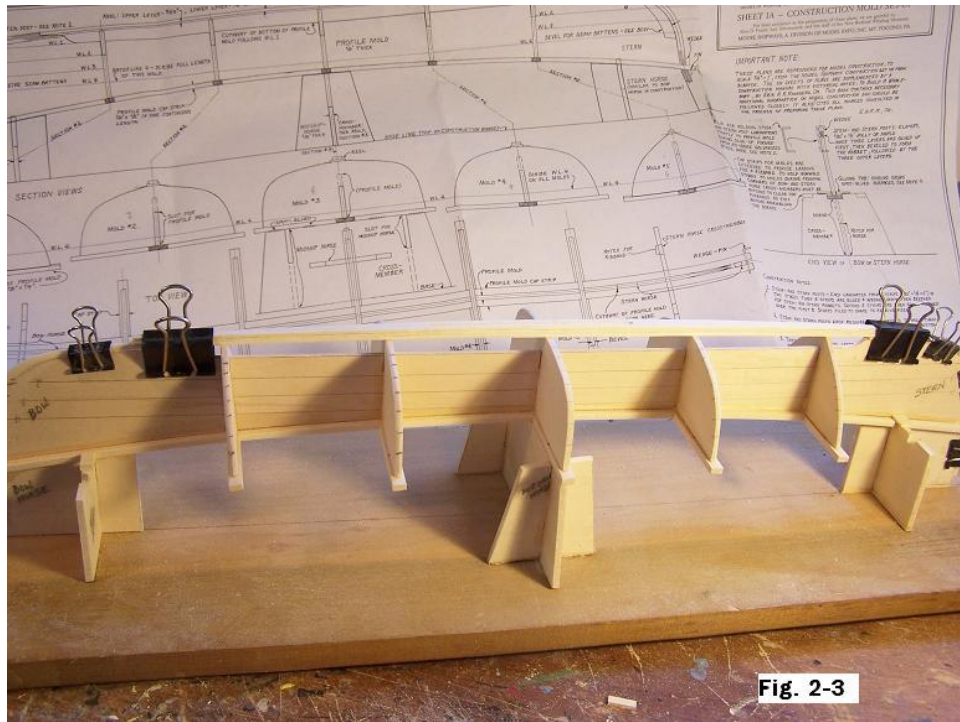


Fig. 2-3

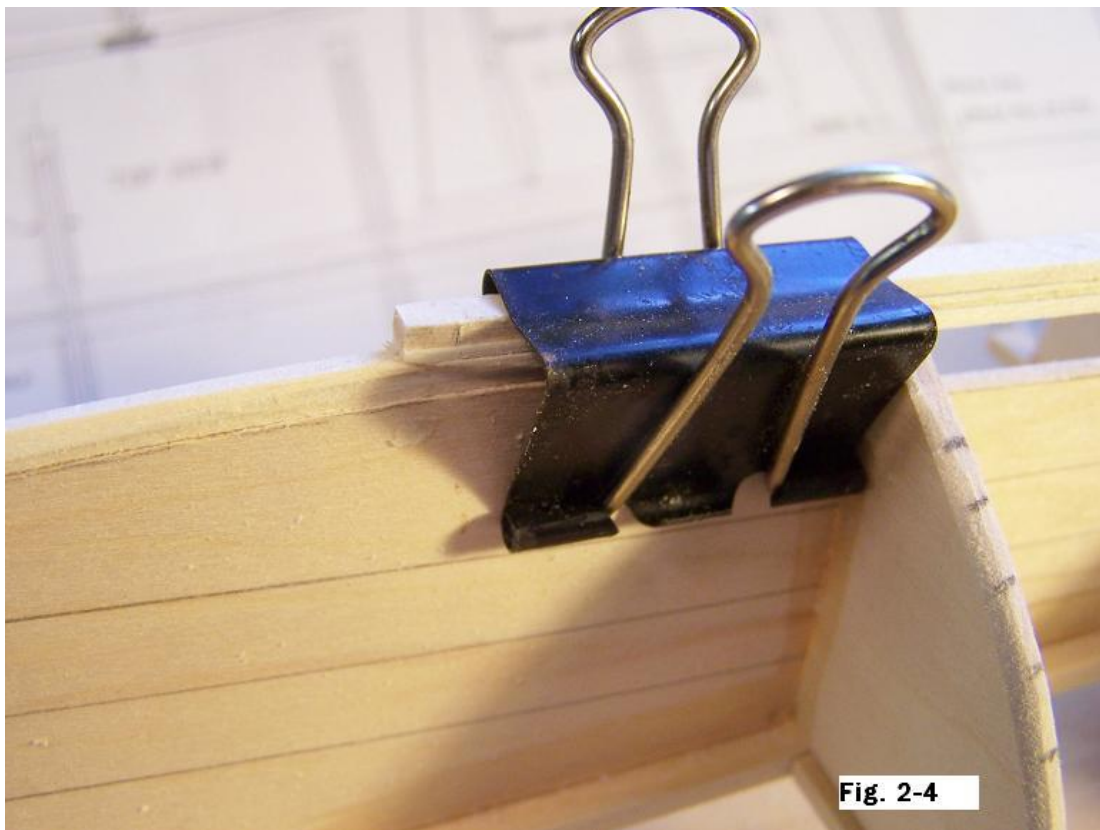


Fig. 2-4

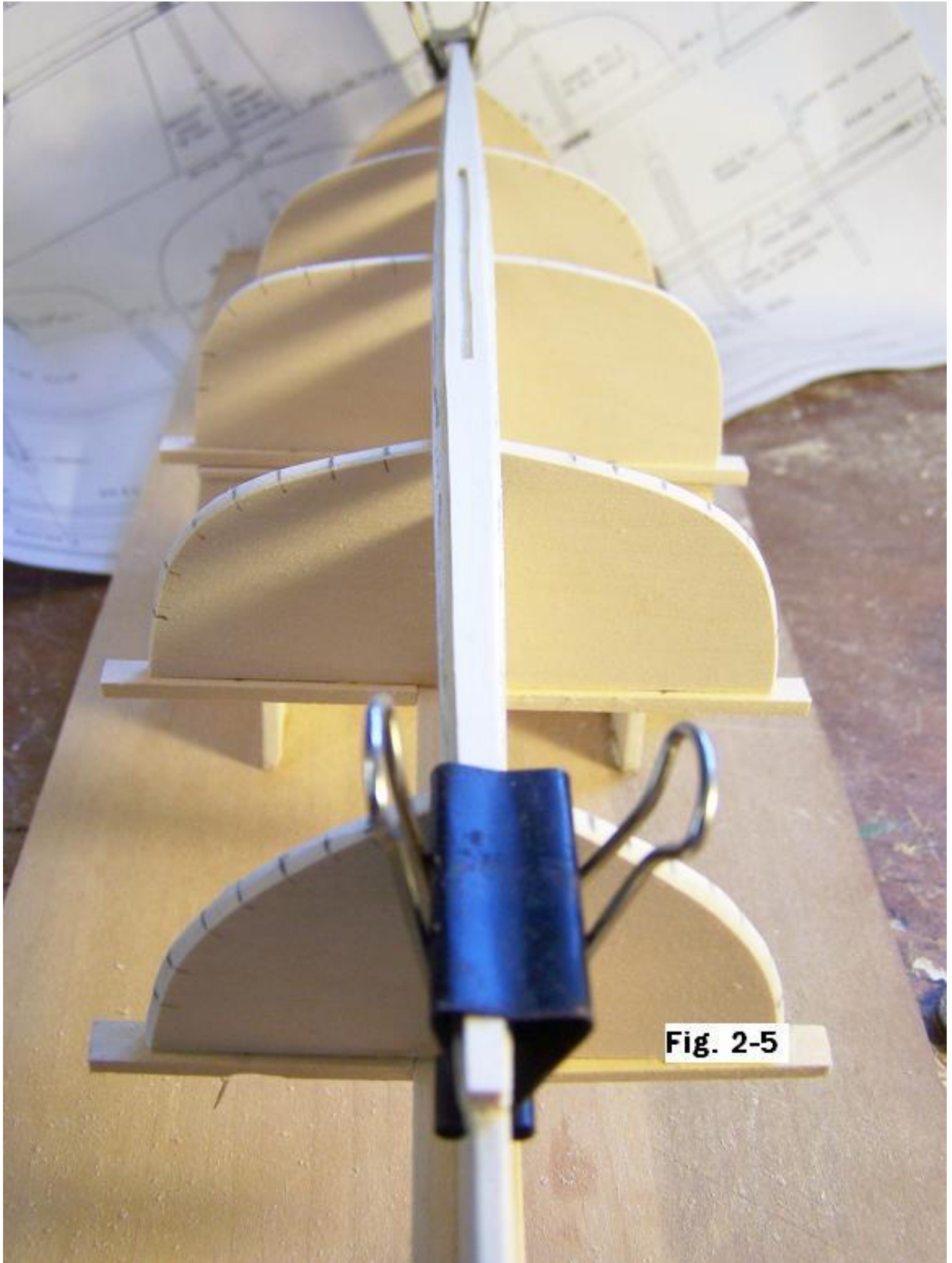


Fig. 2-5

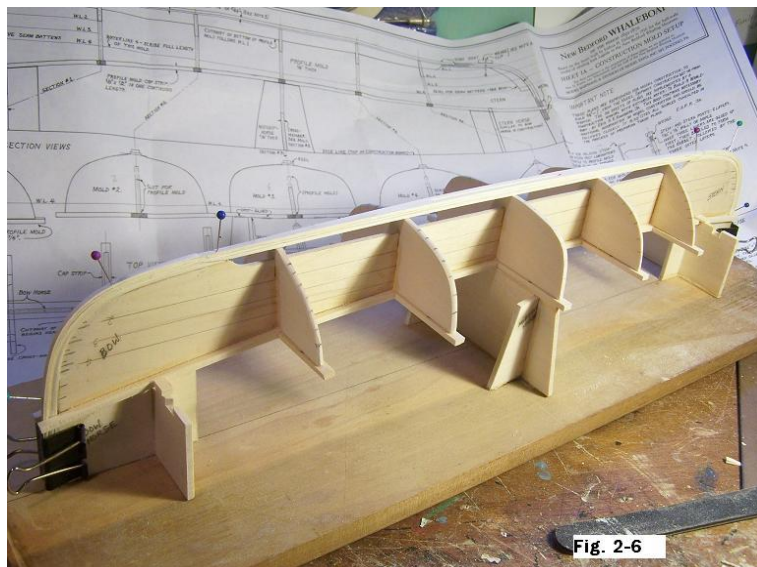
STEP 3: MAKING THE STEM AND STERNPOST – SECOND STAGE

Cut out six more strips of 1/32" x 18" basswood into 6-7" lengths. Glue and clamp 3 of the strips, one at a time, at the stem, and do the same at the sternpost, just as you did in the first stage of making the stem and sternpost. Abut each piece snugly against the keel as you go. Let the glue dry completely before removing the clamps.

STEP 4: FINISHING THE KEEL, STEM, AND STERNPOST

Examine the keel, stem, and sternpost assembly to make sure that all bevels have been made accurately, as Ronnberg describes in detail on page 55 of his book. Remove the keel assembly from the molds, if necessary, to make adjustments. To make adjustments use chisels, knives, files, or sanding sticks, especially as the scarf joints. Use the test piece that Ronnberg describes until it sits nearly in the rabbet.

Place the keel assembly back on the mold. Drill starter holes for the three pins that should be placed at the stem and the three pins that should be placed at the sternpost. Drive the pins deep enough so that the keel assembly will remain immovable through the planking process. Make sure that the keel is perfectly centered on the mold. One clamp can be positioned at each end of the mold – these will not interfere with the planking process. See Fig. 2-6 below.



STAGE 3: PLANKING THE WHALEBOAT

STEP 1: CUTTING OUT THE PLANKS

Patterns for all strakes of planking are found on Plan Sheet 1B. Transfer the patterns to 3 sheets of 6" x 24" x 1/32" basswood. Identify each strake with an appropriate label, and mark which end is the bow and which end is the stern for every strake. Also indicate the centerline.

Using an X-Acto knife, very carefully cut out each strake. Using a sanding stick, smooth out all edges. (If you overcut any of the strakes, make another one.)

STEP 2: INSTALLING THE GARBOARD STRAKE

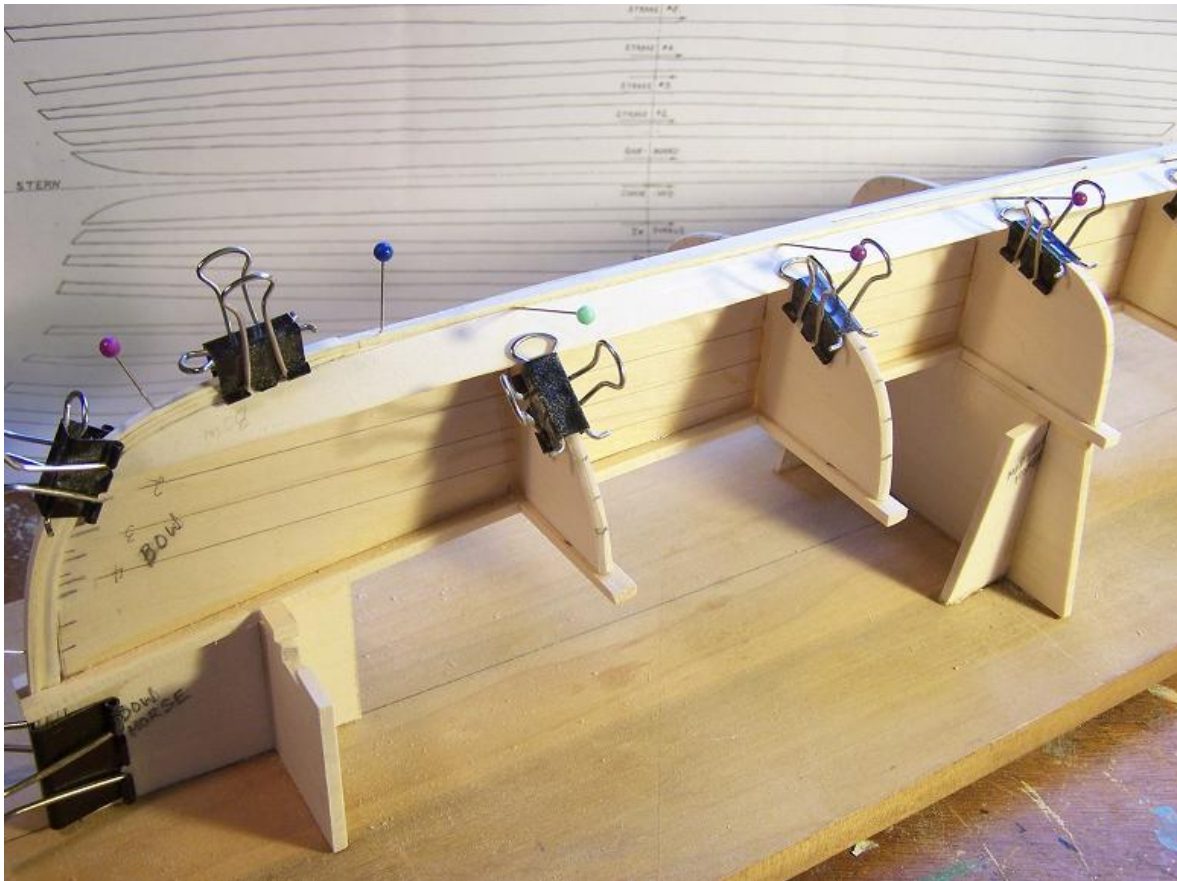
Make sure that you orientate the bow end of the garboard strake (the strake that abuts the keel) toward the bow. It is very easy to use the wrong strake, which will definitely have an adverse affect on the shape of the hull, so be cautious here. Also make sure that you use the port and starboard strakes on the correct sides of the whaleboat.

Fit a garboard strake in position. Center it at Mold #3, and make sure it fits snugly in the rabbet at the stem and sternpost. In most cases, a slight trimming will be necessary to make it fit perfectly.

The upper edge of the garboard strakes requires a bevel so that Strake #2 can rest properly upon it. Using a sanding stick or a file, bevel the edge as shown on page 58 of Ronnberg's book. This should definitely be done before installing the strake permanently; otherwise, it will be quite difficult to form a consistent bevel at each of the molds.

A glue injector is recommended for applying glue along the rabbet in the keel. It will work much better than a toothpick, for example. Start at the Mold #3 and apply the glue to about one-third of the rabbet. It is best to do this in thirds. Glue and in the middle third of the strake in place; then pin and glue the bow third, and finally the stern third. Press it well into each end

of the rabbet. Use pins, clothespins, or clamps to hold the strake in position until the glue dries thoroughly. See Fig. 3-1 below.



Incidentally, it is recommended that you install only one set of strakes in any given session. For example, install both garboard strakes and then stop. Allow the glue to dry thoroughly before you install the next pair of strakes. And so forth.

STEP 3: INSTALLING STRAKE #2

Since this lower edge of Strake #2 has a clinker lap over the garboard strake, file or sand a bevel on this edge, which will abut the garboard strake. Follow Ronnberg's detailed directions on pages 58-59.

Trim the bow and stern edges of Strake #2 to fit precisely into the rabbet.

Now, Strake #2 can be installed, but first you must make a decision: You have three alternatives. Choose the one that fits your own persuasion:

-- You can pin a seam batten to the molds where the upper edge of the strake will land, keeping it clear of the plank area, or

-- You can glue the strake onto the garboard strake and then later slide the seam batten under the upper edge of Strake #2 before installing the strake in position, or

-- You can first glue a seam batten directly to the upper edge of Strake #2 before installing Strake #2 in position. Use tiny clamps to install the seam batten right onto the strake. Ronnberg doesn't mention this method, but I found it to be easiest to accomplish with some accuracy.

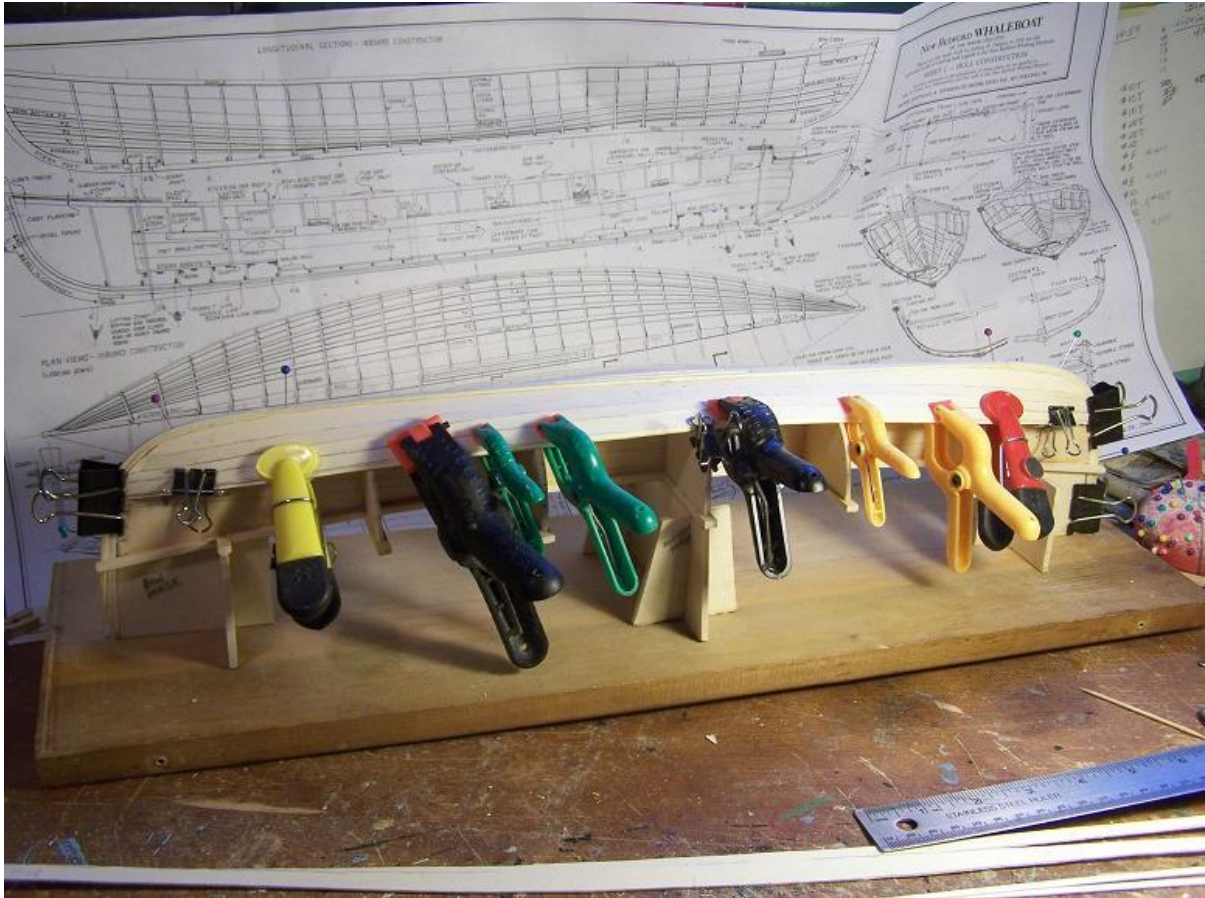
Incidentally, you will need a total of 8 seam battens, which measure 1/32" x 1/8" x about 22" long. Each seam batten is lapped over one half of a strake, with the other half providing a rabbet to receive the bottom edge of the next strake.

After you have chosen your method of installing Strake #2 and its corresponding seam batten, start at the center of the whaleboat and glue it in place. Apply the glue sparingly but thoroughly. Use pins and bulldog clamps to hold them in place. Use two clamps between each of the molds – this seems to work best. Place the clamps directly over the clinker overlap. Scrape away any unsightly glue before it dries.

STEP 4: INSTALLING STRAKES #3 AND #4

Strakes 3 and 4 rest on seam battens at the top and bottom edges. Bevel the strakes where necessary before installing them permanently, ensuring that they fit properly in the rabbet. Also check to see if the strakes lie approximately in the markings you made on the profile molds for the locations of the strakes and corresponding seam battens.

Apply glue and clamp the strakes in place. See Fig. 3-2.



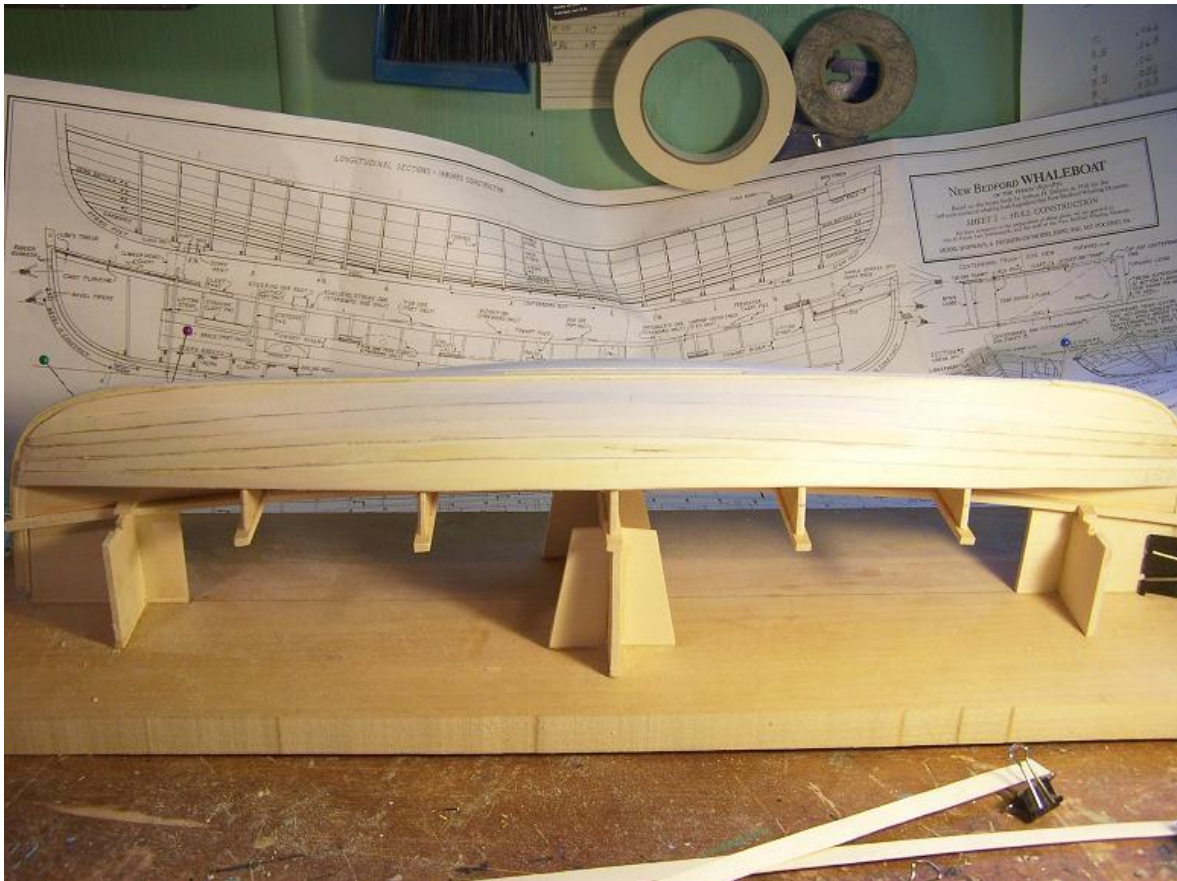
STEP 5: INSTALLING STRAKES #5 AND #6

These two strakes must be cupped in the central 12 inches of each strake. This is quite important, because I tried NOT cupping them, which resulted in an improper fit on the profile molds. Ronnberg shows the cupping process on page 63 of his book. Soak each strake in water – this applies to basswood, too. Then clamp the strake to the hollow of a ½” cove molding about 12” long, leaving it to dry for several hours before using it.

Fit and glue these strakes immediately after removing them from the cove molding; otherwise, the strakes will tend to return to their flattened shape quite quickly.

The top and bottom edges of Strake #5 is secured to a seam batten, but only the bottom edge of Strake #6 is secured to a seam batten. The top edge

of Strake #6 should be beveled, just as you did for the garboard strake. See Fig. 3-3.



STEP 6: SANDING THE HULL

Now is a good time to sand the hull that has been built so far to remove unwanted glue specks and minor flaws in the wood that may cause unevenness.

STEP 7: INSTALLING THE SHEER STRAKE

The top and bottom edges of the sheer strake contain bevels. Make sure you make them in the correct directions, but do not bevel the last inch at the bow end.

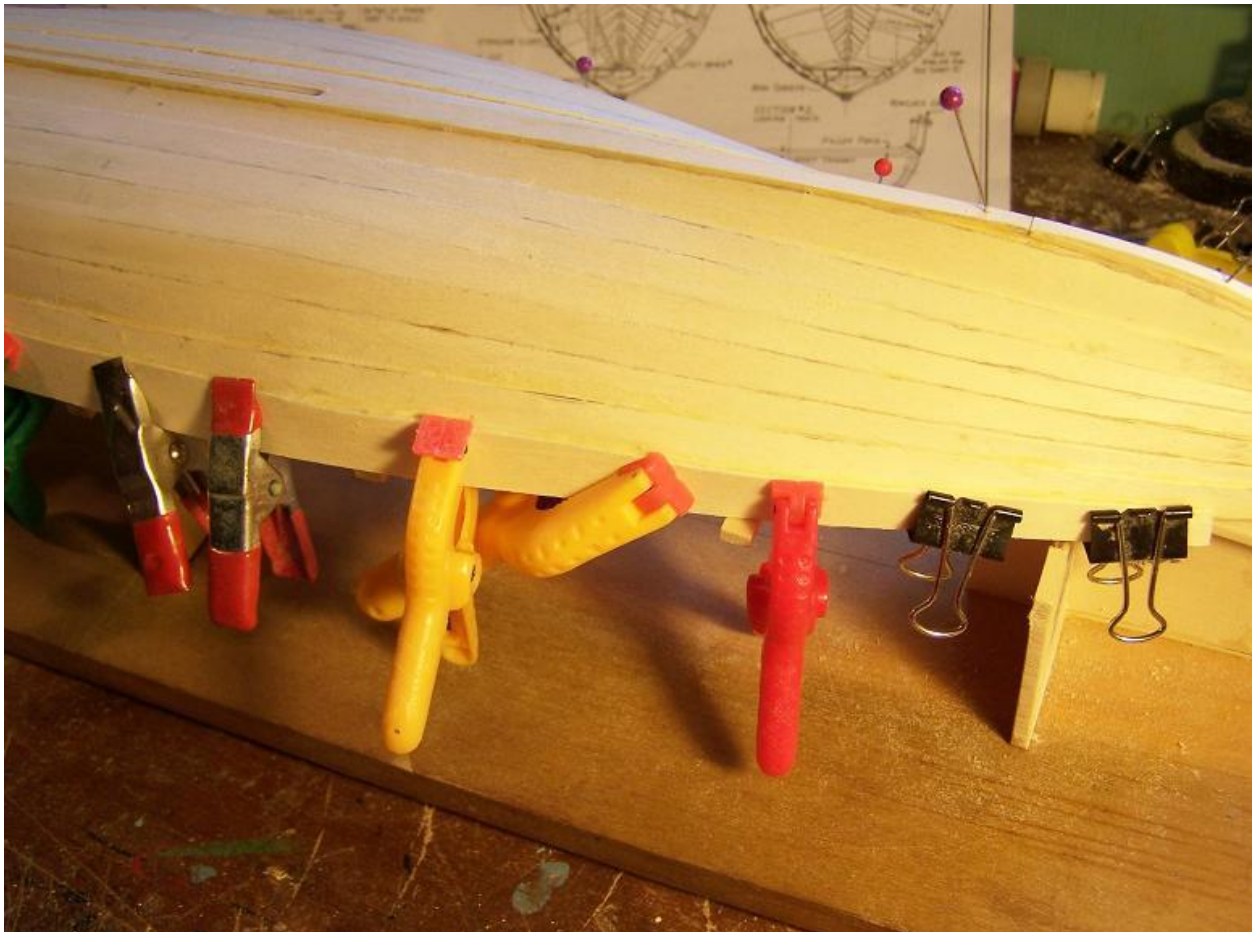
Glue and clamp the sheer strakes in position. If you have cupped Strakes #5 and #6 properly, the sheer strake should pose no problems.

STEP 8: INSTALLING THE GUNWALE STRAKE

This final strake – the widest strake – is only beveled on its bottom edge. Note that it is about 1” short from reaching the sternpost – cheek pieces, which will be explained later, will be fitted here.

Again, apply glue and clamp in place. Make sure the top edge of the gunwale strake touches all the cap strips as you go. Use clothespins or other clamps that will fit and hold the gunwale strake in place.

After the glue has dried completely, pin a 1/8”-square strip of basswood to the mold cap strips all the way from stem to stern on the port and starboard sides. See Fig. 3-4 below.



We have now completed the planking stage of the build. Next, we will begin framing the hull.

STAGE 4: FRAMING THE HULL

STEP 1: REMOVING THE HULL FROM THE MOLD

Using a single-edged razor blade, slice through the glue tabs where they are accessible. Otherwise, use a small chisel or pry bar, as shown laying on the Construction Board in Fig. 4-2 below, to release the five points where you glued the mold onto the horses. Pull gently as you pry and twist. If you applied too much glue, this may be a problem, but persistence works. See Fig. 4-1 and 4-2 below. Note that the 1/8"-square strip of wood that you pinned to the cap strips still remains intact.

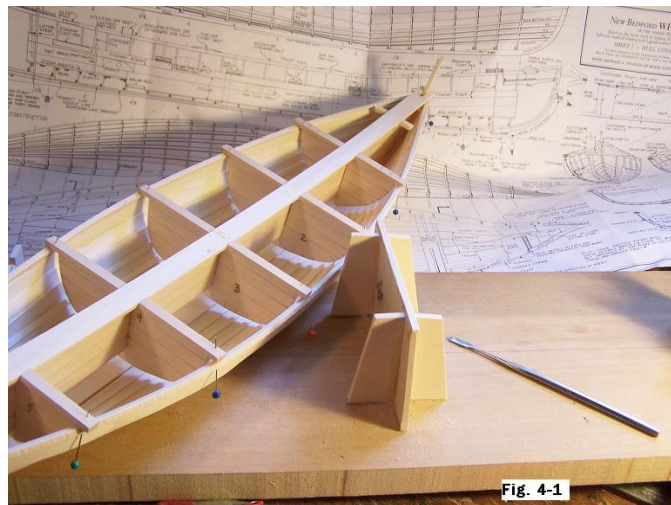


Fig. 4-1



Fig. 4-2

STEP 2: CUTTING OUT THE FRAMES

You will need at least 96 pieces of basswood 1/32" thick by 1/16" wide and about 3 1/2" long for the frames. Some will break, so make a few more than you need.

The whaleboat has 24 frames on the port side and 24 frames on the starboard side. Each frame consists of two strips of basswood.

Ronnberg recommends holly or maple for the frames. I will be using basswood.

STEP 3: MARKING THE LOCATIONS OF THE FRAMES

Ronnberg describes the method of marking out the frames in his book on page 68. I cannot think of an easier way to do this, so follow his instructions. I marked all frames except the 3 cant frames at the bow and the 3 cant frames as the stern.

The 1/8"-square pieces of basswood pinned to the cap strips were left in place by Ronnberg until you installed all the frames between Molds #1 and #5. Instead of doing this, I remove these pieces immediately after marking the frame locations, and I found that installing the frames was much easier, allowing the fingers much more room to maneuver the frames into position.

STEP 4: INSTALLING THE FRAMES

Frames on the port side of the hull will be fitted on the forward side of the line you marked for the locations of the frames, and frames on the starboard side of the hull will be fitted on the aft side of this line.

Fit one layer of frames at a time. Before installing them, hold the lower end of the frame in place by placing a pin in the keel where the frame should be stopped. The upper end of each frame will end exactly 3/32" below the top of the gunwale strake.

Fit each frame in place before installing it, making sure that it will fit properly. Apply a small but sufficient amount of glue along the frame, and

then clamp it in position with a clothespin, ensuring that the frame makes uniform contact with all seam battens.

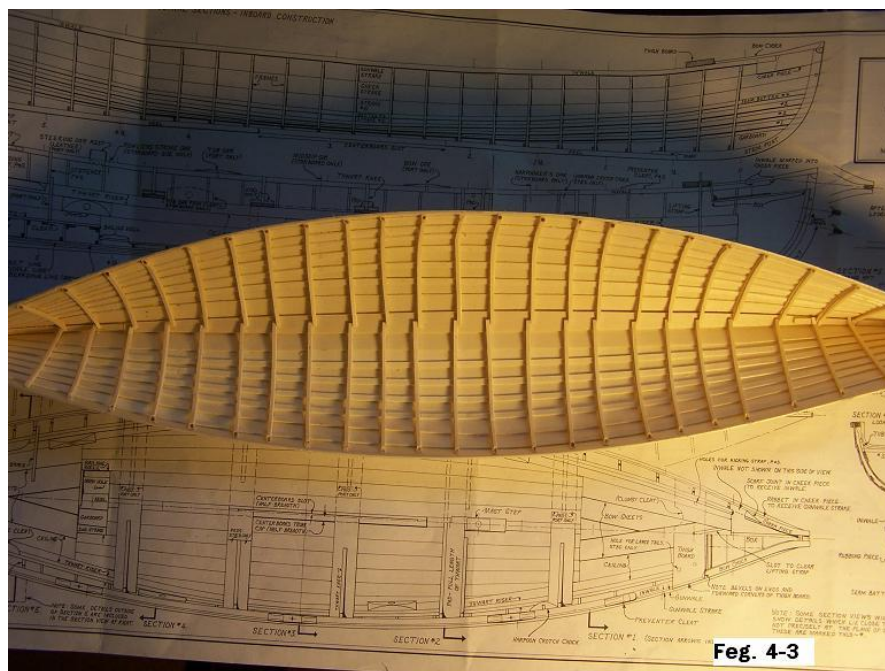
Repeat this procedure for a second layer of frames.

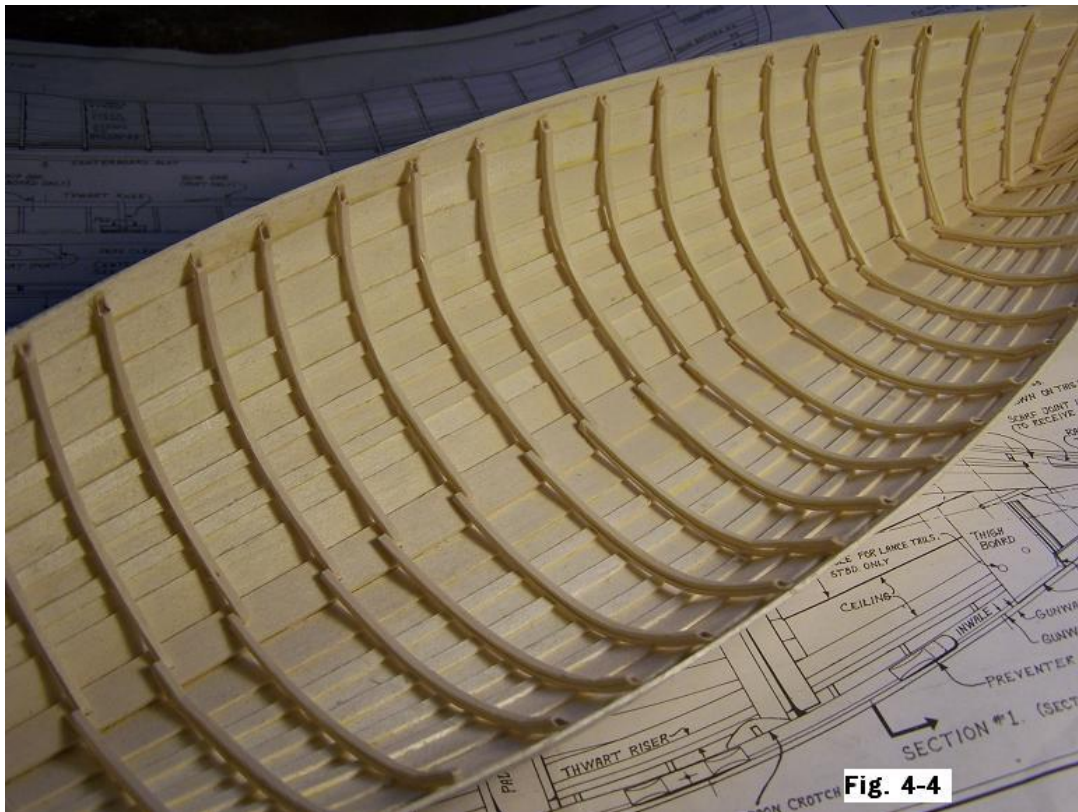
Note that the first three strakes at the bow and stern areas are canted frames, which means that they lie at a slight angle to the centerline. Install them at the angles shown on Plan Sheet 2. Form the bends at the keel with needle-nose pliers.

STEP 5: TRIMMING AND TAPWERING THE UPPER ENDS OF THE FRAMES

Remember that the upper edges of all frames end precisely $\frac{3}{32}$ " below the gunwale strake. As Ronnberg describes on page 70 of his book, trim the upper edges of the strakes so that they are shaped as shown in Fig. 3-51 of the book. Instead of a router blade fitted in an X-Acto #5 knife handle, use whatever tool with do the job. I used a router bit chucked in my Dremel rotary tool. Riffler files work well but are rather time-consuming.

So far, your whaleboat should look like what is shown in Figs. 4-3 and 4-4 below.





STEP 6 (OPTIONAL): FASTENING THE HULL

If you plan on leaving your hull unpainted or only treated with stain, Ronnberg recommends that you fasten the hull with copper nails. Somewhere in the neighborhood of 2,000 nails are required, which is obviously labor-intensive and quite uninteresting. However, if you decide to finish this optional step, your model will be a beautiful thing to behold. Ronnberg provides detailed instructions on pages 72-74 of his book.

Personally, my own whaleboat model will be fully painted and will become a part of a Charles W. Morgan diorama that I've been working on for some months, so I will not be installing nails because the nails would not be seen anyway.

STAGE 5: INTERIOR STRUCTURES

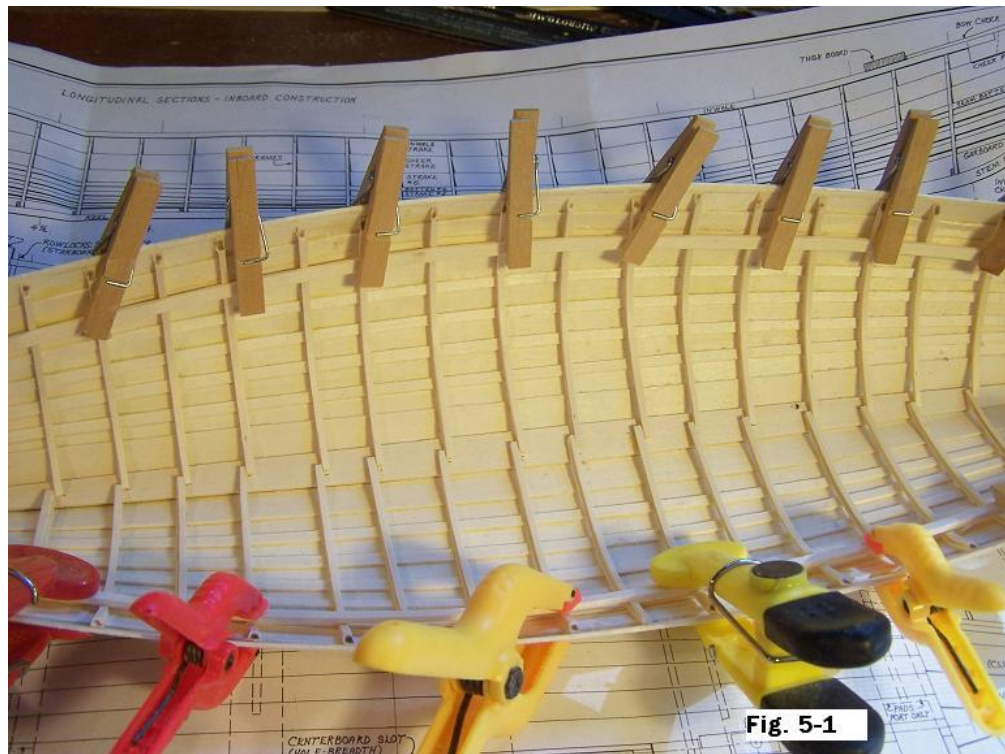
STEP 1: INSTALLING THE THWART RISERS

Cut two pieces of basswood that measure $1/16''$ thick by $3/16''$ wide by about 17'' long. The thwart riser is found on the Longitudinal Section view on Plan Sheet 2.

Using a compass, mark a pencil line at each frame that extends from Station $1\frac{1}{2}$ to Station $4\frac{1}{2}$ exactly $5/8''$ below the top of the gunwale strake. Mark another line $11/16''$ below the top of the gunwale strake at the second-last frame at the stern, and do the same at the last frame at the bow.

Place a thwart riser on the frames so that its top edge fits along the pencil line you just drew. Trim off the ends until it fits exactly as shown in the Longitudinal Section view.

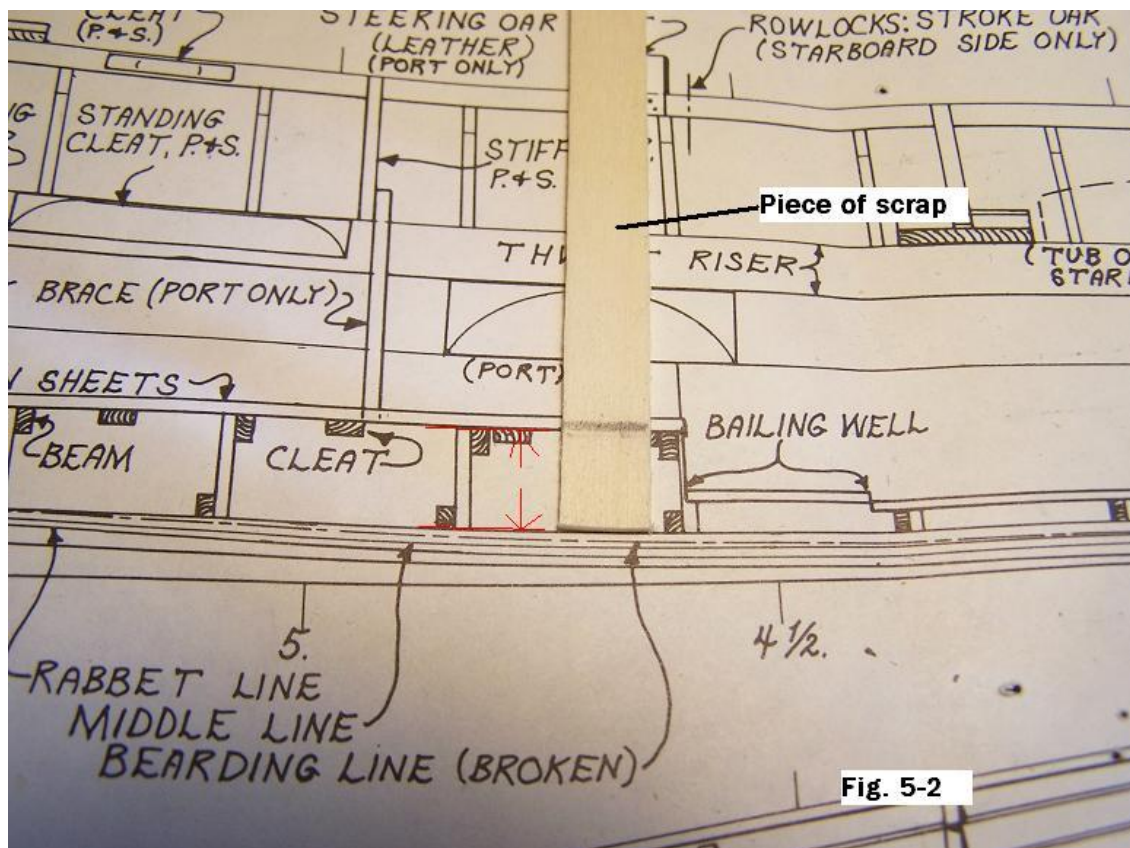
Remove the thwart riser. Place a drop of glue at each frame just below your marked pencil line. Install the thwart riser with clamps or clothespins. See Fig. 5-1 below.



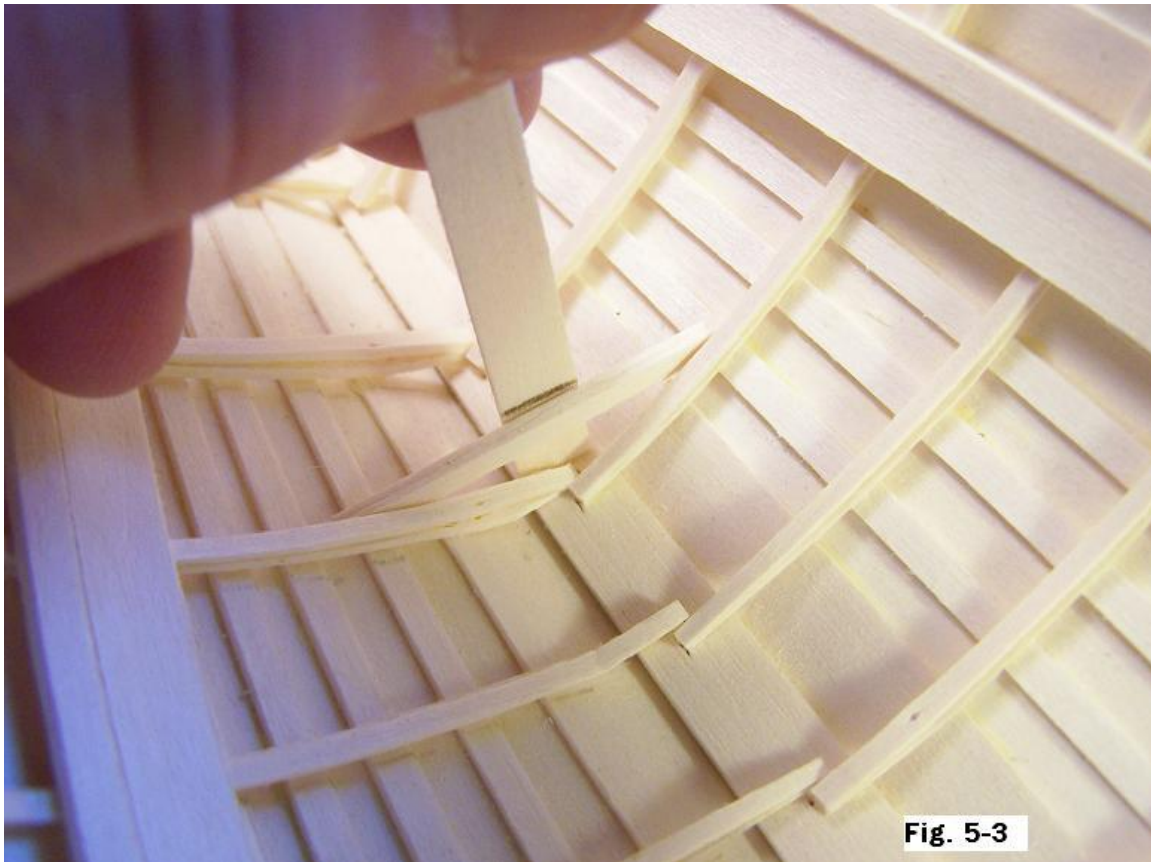
After the glue has dried, Ronnberg recommends that you install two nails at each frame, especially if your model will not be painted.

STEP 2: FITTING THE BOW AND STERN SHEET BEAMS

There are four beams at the bow and five beams at the stern, as shown on the Longitudinal Section view on Plan Sheet 2 (and in Fig 5-2 below). They consist of slightly varying lengths of 1/16" x 1/8" basswood.



Note that the stern sheets run from the second frame at the stern to the sixth frame at the stern. Using a scrap piece of wood, measure and mark the distance from the top of the keel to the top edge of the stern sheet beam at the sixth stern frame. See Fig. 5-3 below. This represents the upper edge height of the beam at the sixth frame.



Cut the beam at angles to fit against the planking on each side, making sure that it rests exactly at the height you marked on your measuring stick. Trial-and-error is the only way to find the perfect length. When the beam is glued in place, it should be exactly on the same plane at the top of the keel.

Follow this same procedure for the beam located at the second frame. Glue it in place.

Now place a length of basswood on top of both beams. As you can see, you can now cut the beams located at the third, fourth, and fifth frames to the height indicated by the strip of basswood. Cut and glue these beams in place. All of these beams rest on the same plane; they have no camber. Just make sure they're all on the same plane at the top of the keel. See Figs. 5-4 and 5-5 below.

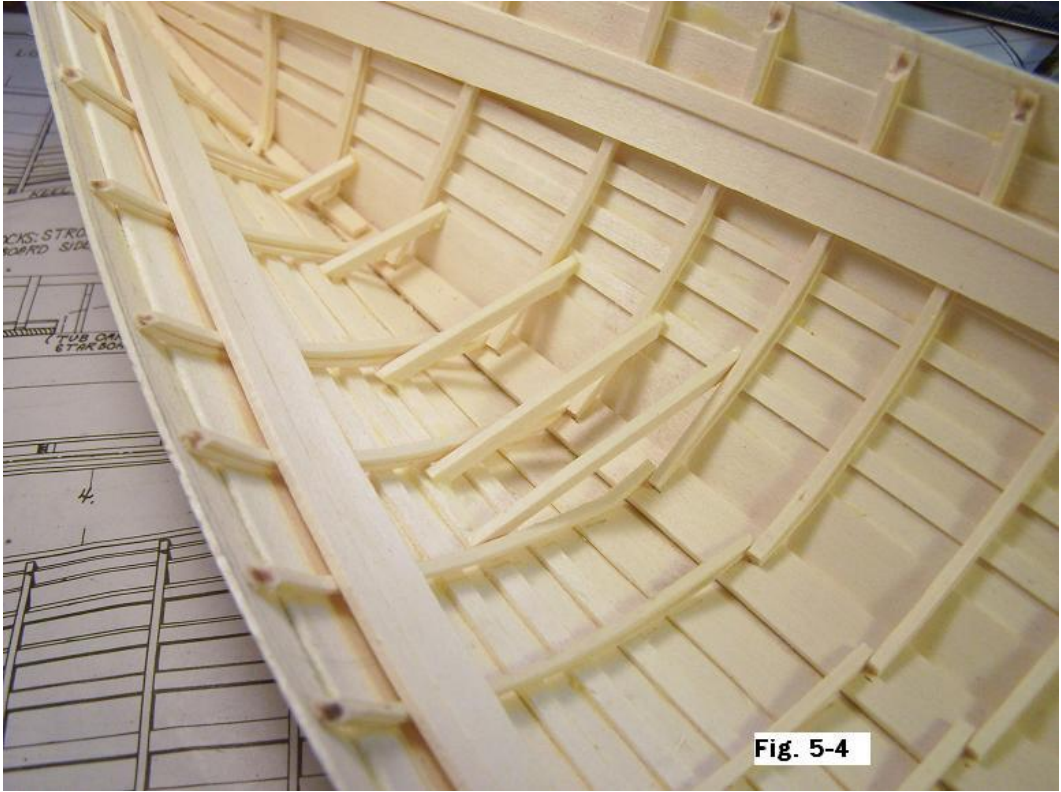


Fig. 5-4

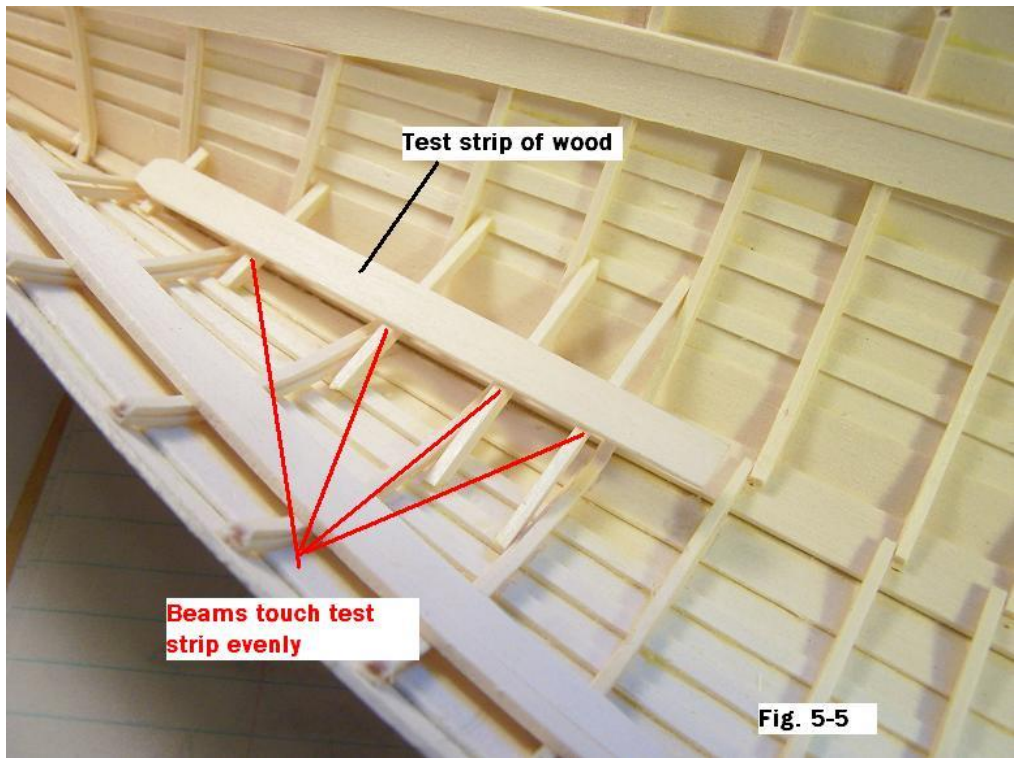


Fig. 5-5

Repeat this same procedure for the four beams shown at the bow on the same Plan Sheet. Be sure to measure the height of the first and last beams carefully.

STEP 3: FINISHING THE CEILING AT THE BOW AND STERN

The bow and stern ends of the ceiling are finished with short, wide pieces of 1/32" basswood. The two pieces (one on each side of the bow) will be identical in size and shape, so cut one piece by trial-and-error to fit, and then cut another duplicate piece for the other side.

Apply glue and clamp in place until the glue dries.

Repeat the same procedure for the stern pieces. See Fig. 5-6 below.

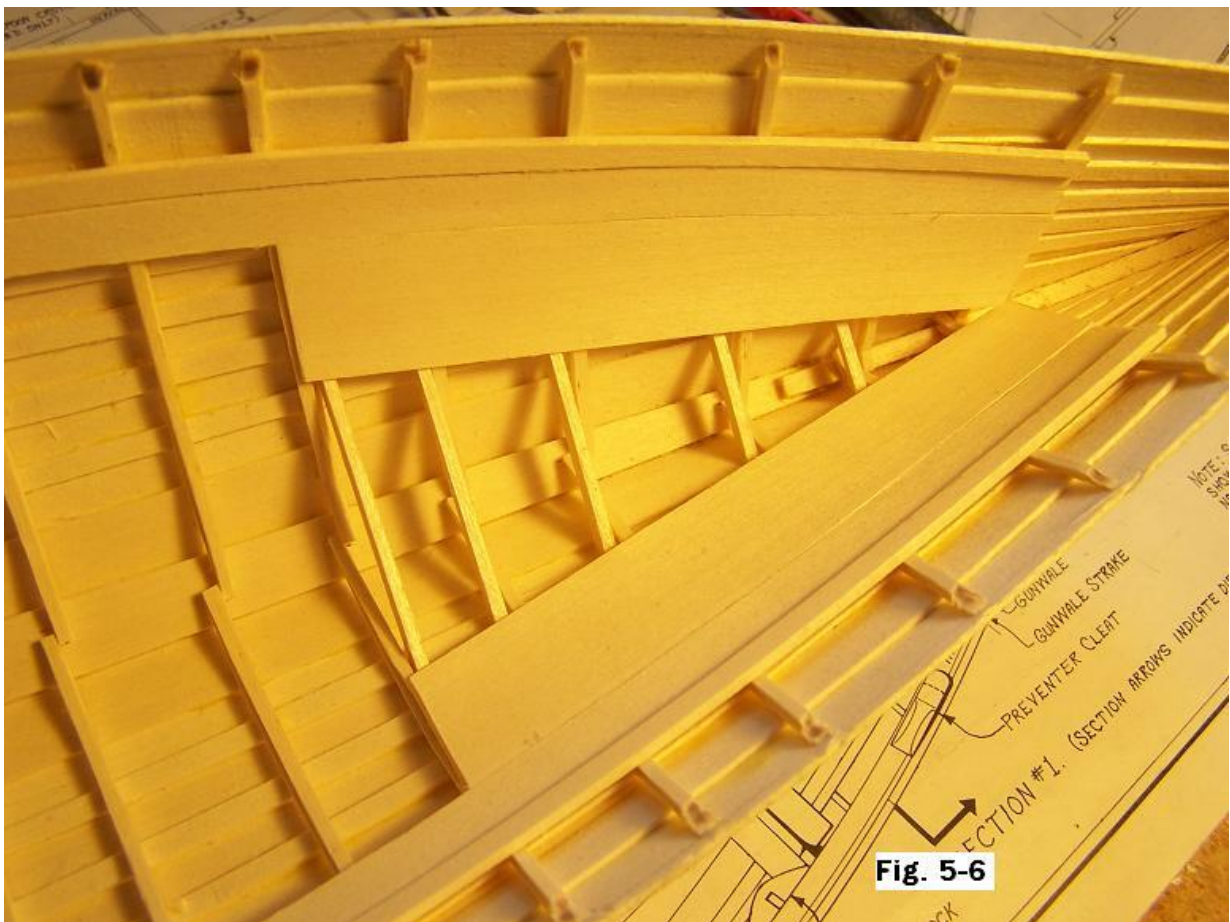


Fig. 5-6

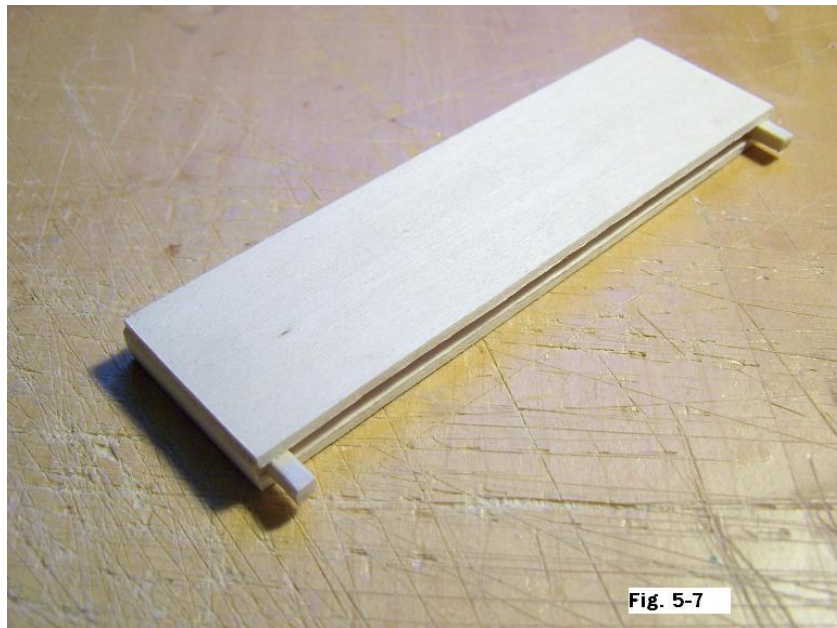
STEP 4: MAKING THE CENTERBOARD TRUNK

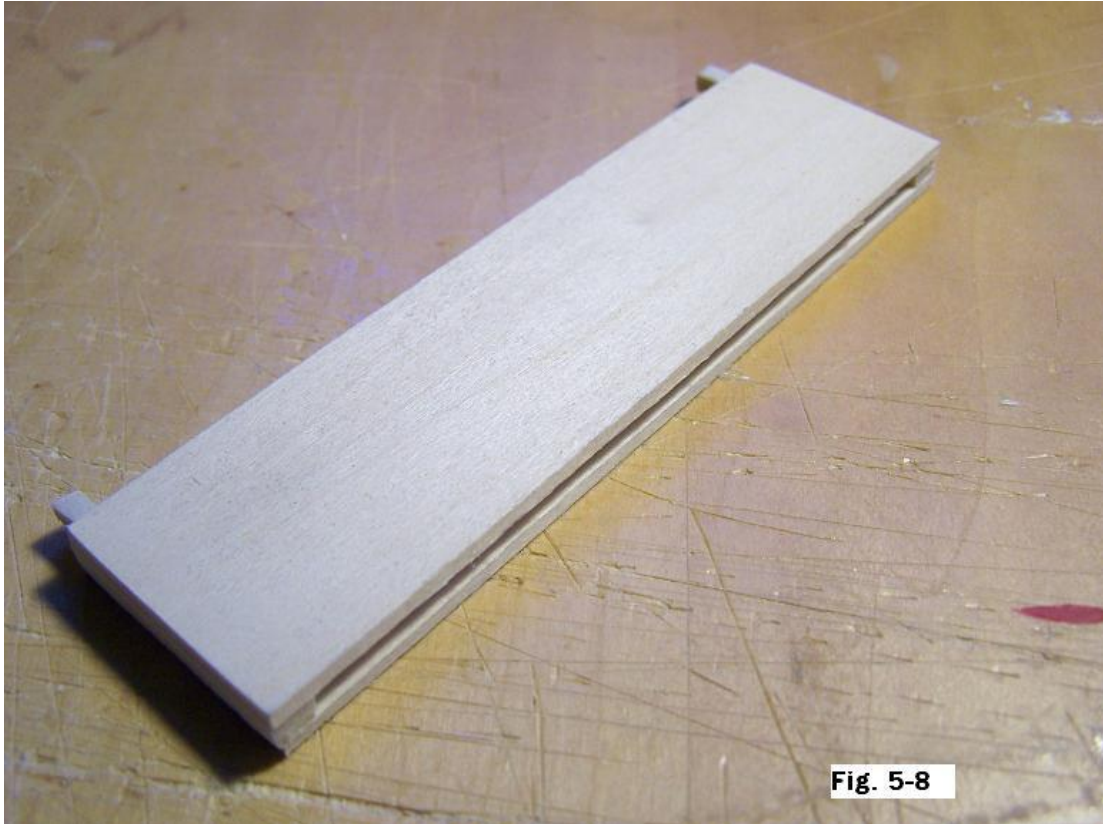
From the underside of the whaleboat cut out the slot for the centerboard. Bore a hole at each end of the slot first, and then use a single-edged razor blade to slice both sides of the slot. Finish smoothing it out with a flat miniature file.

Make the fore and aft ledges for the centerboard trunk. Patterns are found on Plan Sheet 2 in the Side View just below the title of the Plan Sheet. They are made of $3/32'' \times 3/16'' \times 1\ 3/16''$ basswood. Note that a tenon is cut in the bottom edge to fit into (and abut) the outer edges of the centerboard slot. Fit them in place to be sure they fit properly.

Measure the exact length between the outer edges of the ledges while they are still in the slot – this represents the length of the two sides required for the centerboard trunk. Remove the two ledges from the slot and place them on your workbench. Measure the height of the ledge from the top of the tenon to the top of the ledge – this represents the height of the two sides required for the centerboard trunk.

Using the two measurements you just determined, cut out the two sides needed for the centerboard trunk. Carefully glue both sides to the two ledges. Let the glue dry. This should look like what is shown in Figs. 5-7 and 5-8 below.





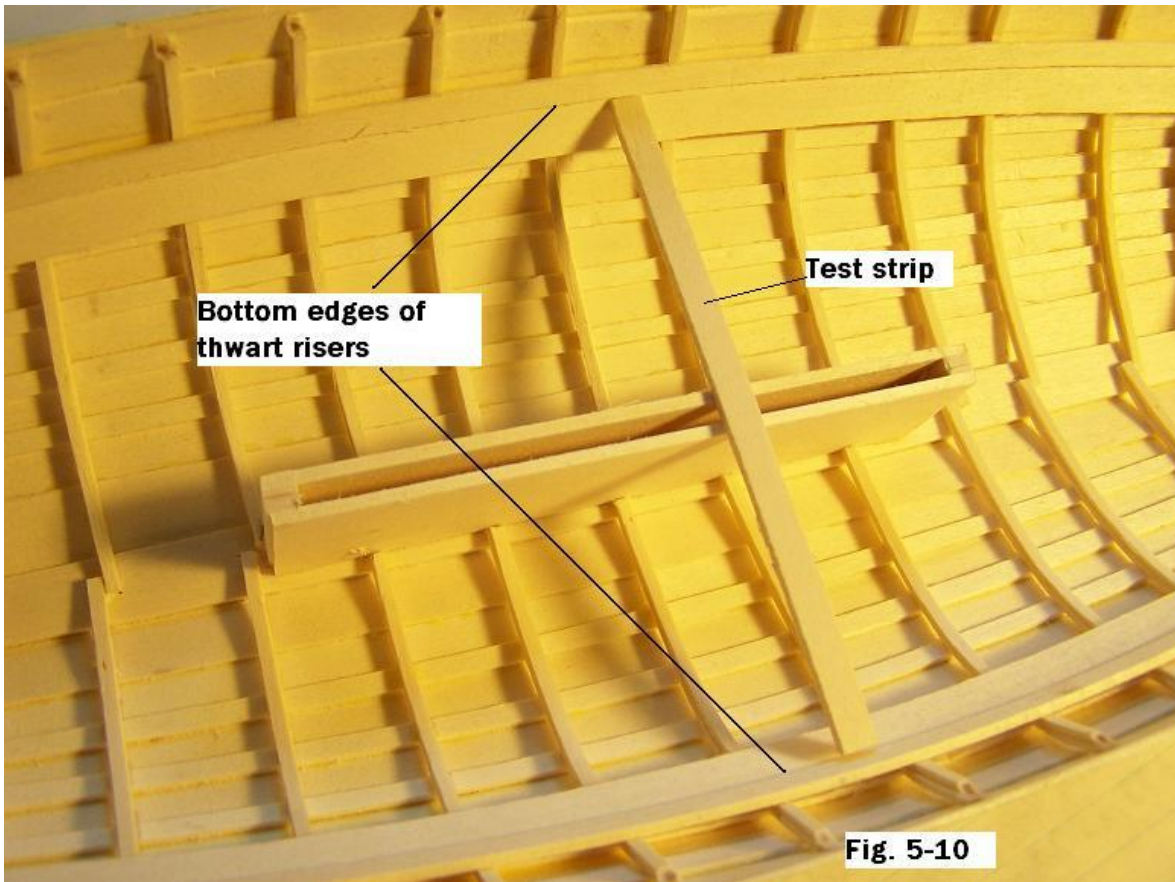
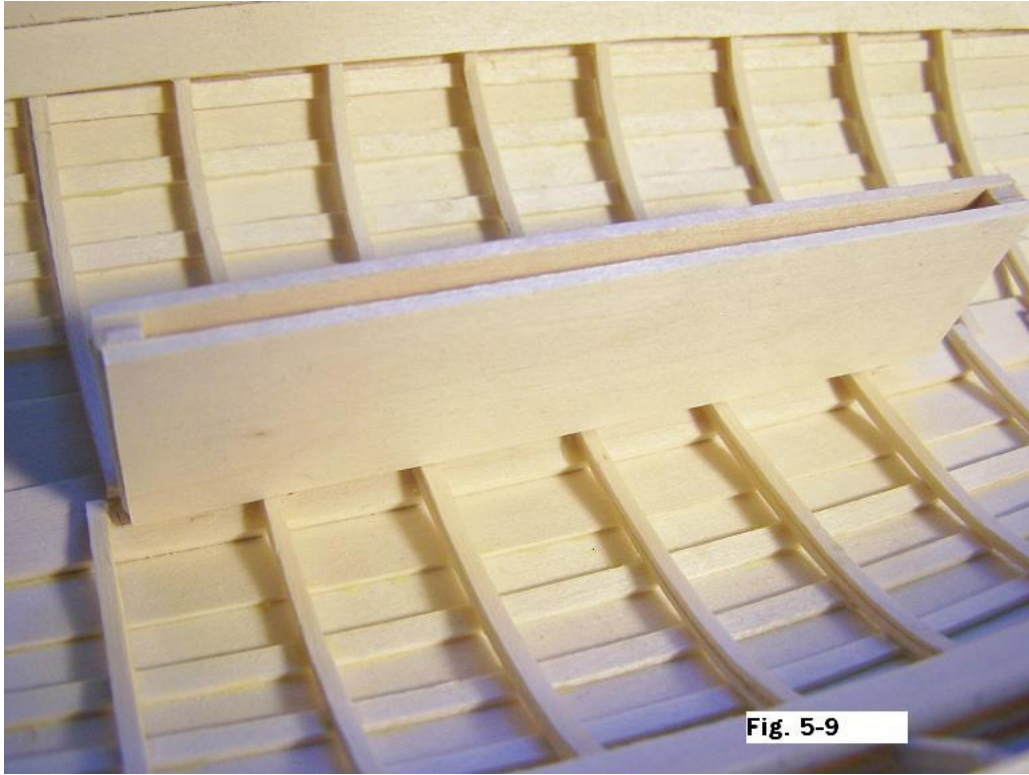
Not fit the centerboard trunk in place. You will find that it does not fit against the keel because the frames are in the way. While the centerboard trunk is still in place, mark the frames with a sharp pencil. Remove the centerboard trunk and cut off the frames at your marks with a single-edged razor blade.

Use a #56 drill bit and drill a hole through the centerboard trunk at the pivot point shown on Plan Sheet 2.

Apply glue to the centerboard trunk and insert it in place on the keel, making sure you have the pivot hole facing the correct direction. Also make sure the centerboard trunk is perfectly upright in position with no lean. Let the glue dry.

Finally, the top of the centerboard trunk must be trimmed so that the underside of the Midship and tub-oar thwarts just touch the underside. Cut or file the top of the centerboard trunk until it is at thwart level. Use a test strip of wood at these areas. See Fig 5-9 and 5-10 below.

The centerboard itself will be completed later.



STEP 5: MAKING THE MAST STEP

Start with a piece of basswood that measures $\frac{1}{4}$ " x $\frac{1}{4}$ " x $1\frac{1}{4}$ ". Make the mast step as shown by the measurements you take from Plan Sheet 2.

Note that there is a rabbet on the aft side that supports a length of the ceiling. It must also be notched at its middle where it crosses a frame.

Do not bore a mast hole yet.

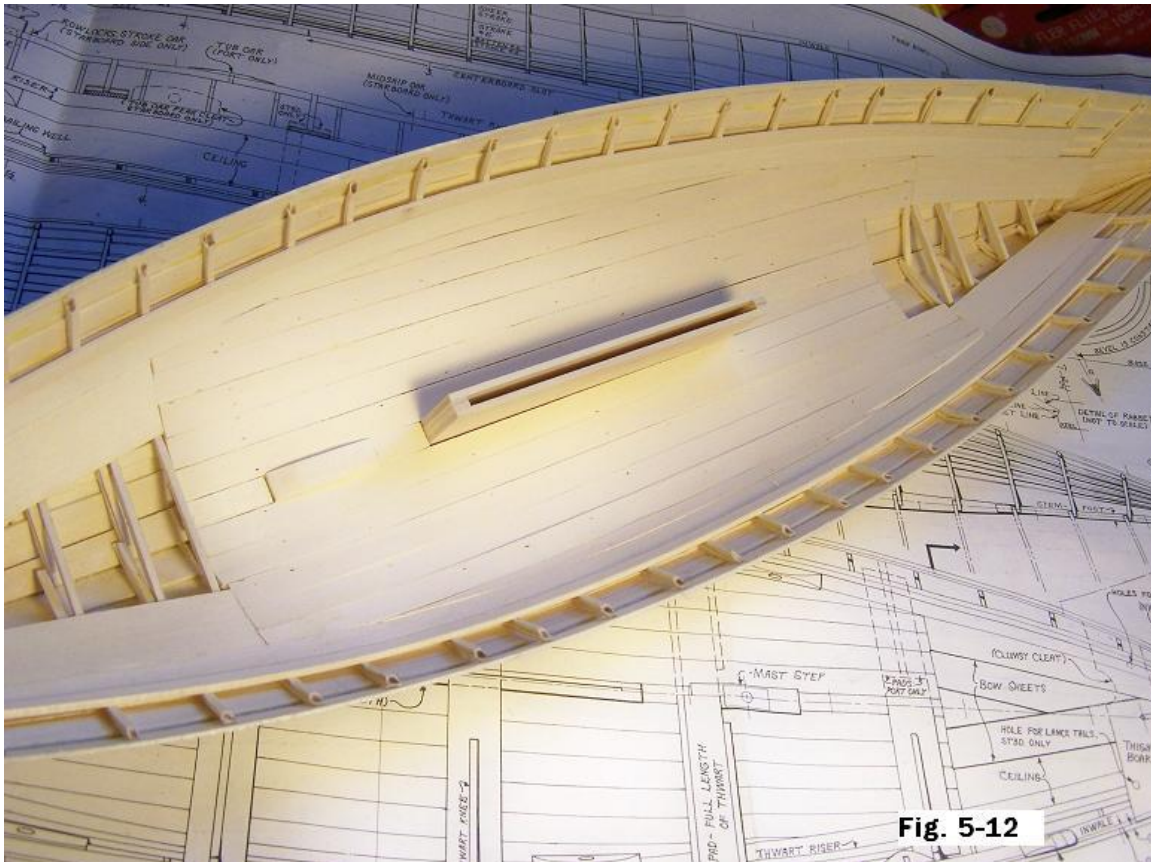
Glue the mast step in place. See Fig 5-11 below.

STEP 6: FINISHING THE CEILING

Use $\frac{1}{32}$ " x $\frac{5}{16}$ " strips of basswood to install the remaining ceiling planks. Start at either side of the centerboard trunk and work outward. Glue and clamp them in place, or use pins to hold them while the glue dries. You will use six planks on each side of the centerboard trunk; however, the last two on either side will require trimming to make them fit. Only trial-and-error works here.

Do not plank over the bailing well area, which is located just forward of the stern sheets.

Remember to plank the keel areas fore and aft of the centerboard trunk as well as aft the mast step. See Fig. 5-12 below.



STEP 7: MAKING THE CHEEK PIECES

Cut two pieces of basswood that measure $\frac{1}{4}$ " thick by $\frac{3}{8}$ " wide by $1\frac{1}{2}$ " long.

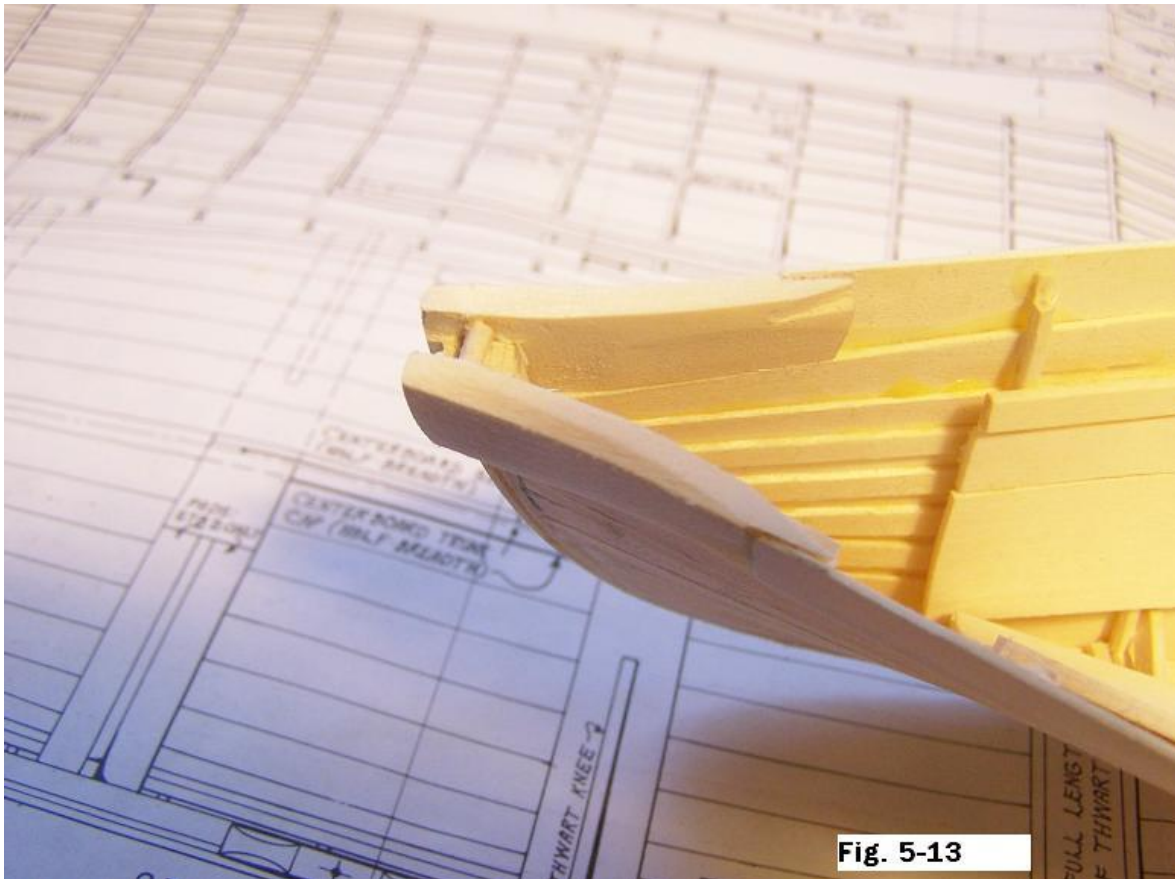
Ronnberg shows the complex cuts required to shape the cheek pieces on page 79 of his book. Plan Sheet 2 also shows their precise shape in various views.

Mark the shape with a pencil. There are many ways to shape the cheek pieces, but here's the one I used – working carefully sand away the required shape with a Dremel-type drum sander. Then use a single-edged razor blade to cut the rabbets.

Before gluing into position, check to make sure the pieces are uniform and fit properly at the bow.

Glue and clamp them in place. Let the glue dry.

Cut off the stempost with a razor saw just even with the top of the cheek pieces. See Fig. 5-13 below.



Using a small rattail file, file out the stempost between the cheek pieces so you can fit the bow roller at the stem head. A small dowel may be used for the roller (a round toothpick is just right). Glue it in place.

STEP 8: INSTALLING THE INWALES

The two inwales measure $3/32$ " b $1/8$ " and run from the stem to the sternpost on the inboard side of the whaleboat just above the top edges of the frames.

Fit one of the inwales in position for a test-fit before applying glue. Start at the scarf joint in the cheek pieces. Cut a corresponding scarf joint on the inwale. Run the inwale with clothespins all the way to the stempost, cutting

off excess basswood at this point. A perfect fit at the stempost is not required, because this area will soon be fully covered.

Remove the clothespins. Apply glue to the edge of the inwale. Hold it in place with clamps or clothespins. See Fig. 5-14 below.



Fig. 5-14

Repeat this procedure for the other inwale.

STEP 9: INSTALLING THE GUNWALES

The two gunwales measure 1/16" x 3/32" and run from the stern to the sternpost on the outboard sides of the whaleboat even with the top edge of the gunwale strakes.

Fit the sternpost end first, making a bevel so it rests snugly on the side of the sternpost. Clamp with clothespins for a test-fit. Taper the gunwale at the cheek piece so it matches the flare of the cheek piece. A sanding stick is useful here.

Remove the clothespins. Apply glue to the edge of the gunwale and hold it in place with clamps or clothespins.

Repeat this procedure for the other gunwale.

Now bevel both gunwales along their two exposed edges at a 45-degree angle, as shown in Ronnberg's drawing on p. 82 of his book.

See Figs. 5-15 and 5-16.

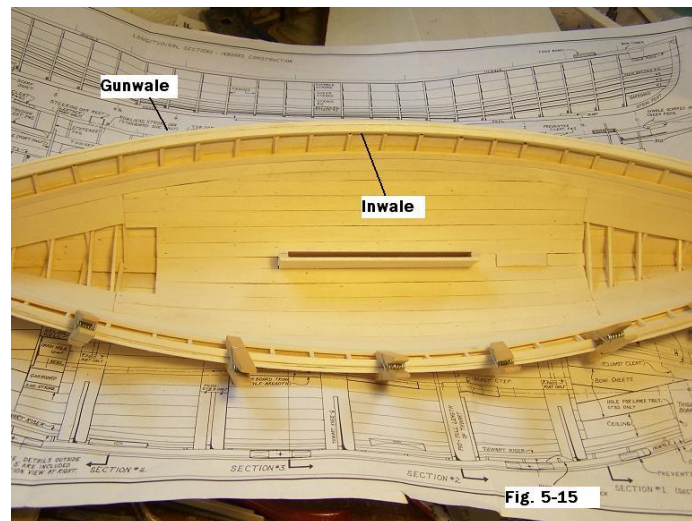




Fig. 5-16

STEP 10: PAINTING THE INTERIOR OF THE HULL

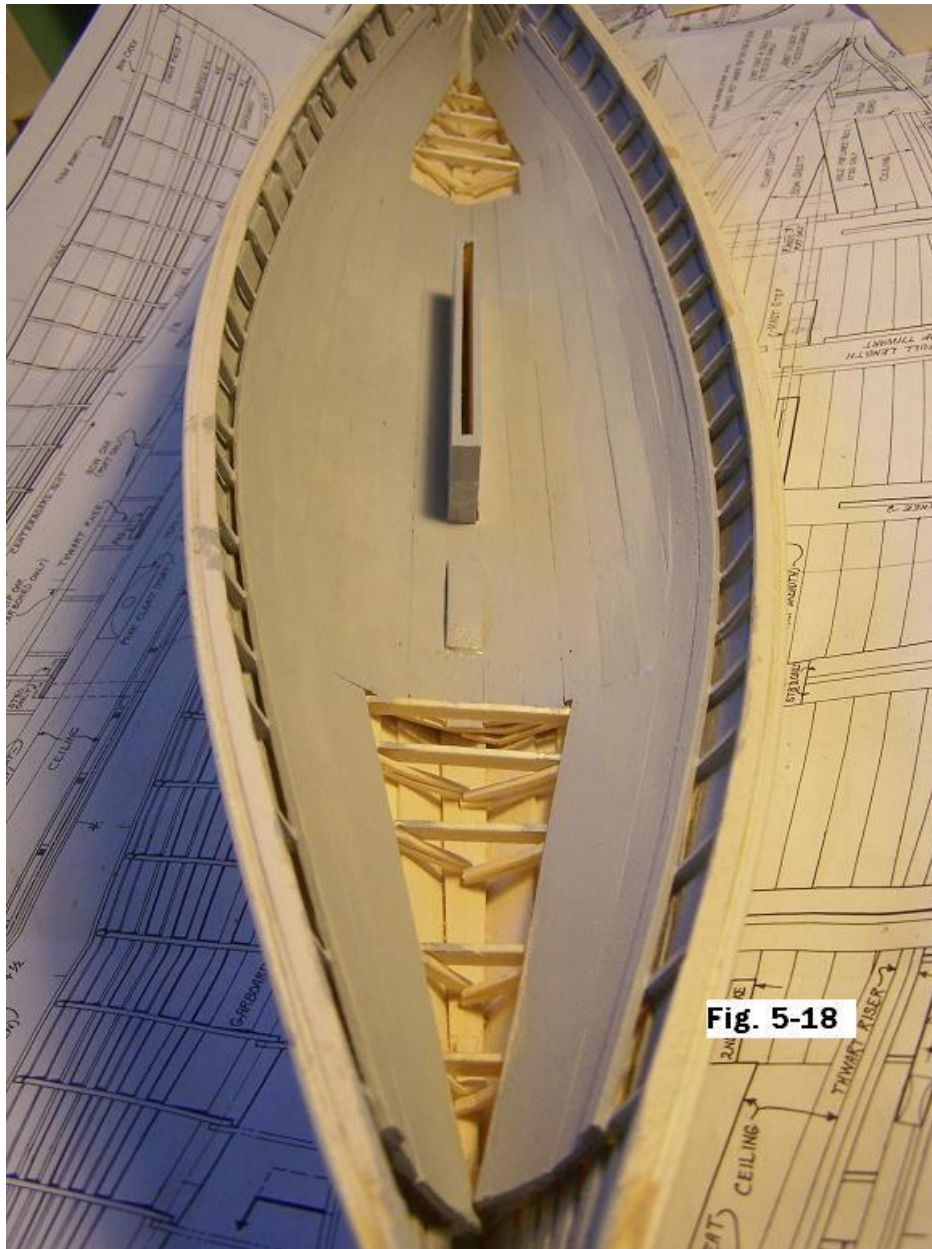
Now is a good time to paint or varnish the interior that you've finished building so far. Make sure everything is smooth and clean. Sand where necessary with fine-grit sandpaper and dust it out completely. I use a soft brush that the ladies use for applying cosmetics. See Fig. 5-17.



Fig. 5-17

I highly recommend that you first apply a coat or two of primer or sanding sealer. Brush it on carefully; don't overload the brush. Follow this with a light sanding.

Since my whaleboat will be a part of a Charles W. Morgan diorama, I decided to paint the interior with a medium gray acrylic paint. See Fig. 5-18.



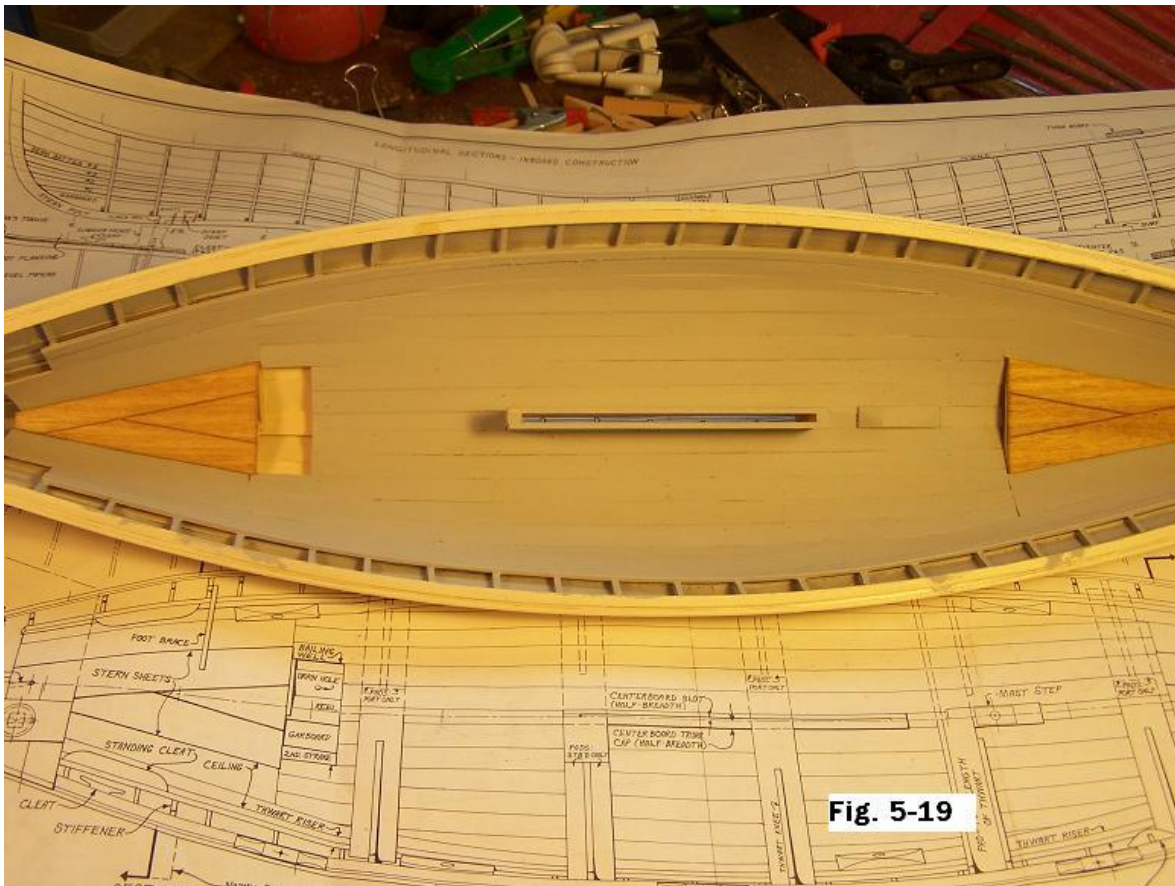
STEP 11: INSTALLING THE BOW AND STERN SHEETS

For each of these parts cut out a triangular piece of 1/32" basswood to fit in their respective areas at the bow and stern. Do not cover the bailing well at the stern. Ronnberg recommends three separate planks for each of these areas, but this is not necessary.

Score each piece with an awl to represent the three planks, as shown in the bottom drawing on Plan Sheet 2.

Stain each piece with Golden Oak Stain (or a stain of your choice). Let dry.

Glue and pin the sheets to the beams. Let the glue dry. See Fig. 5-19 below.



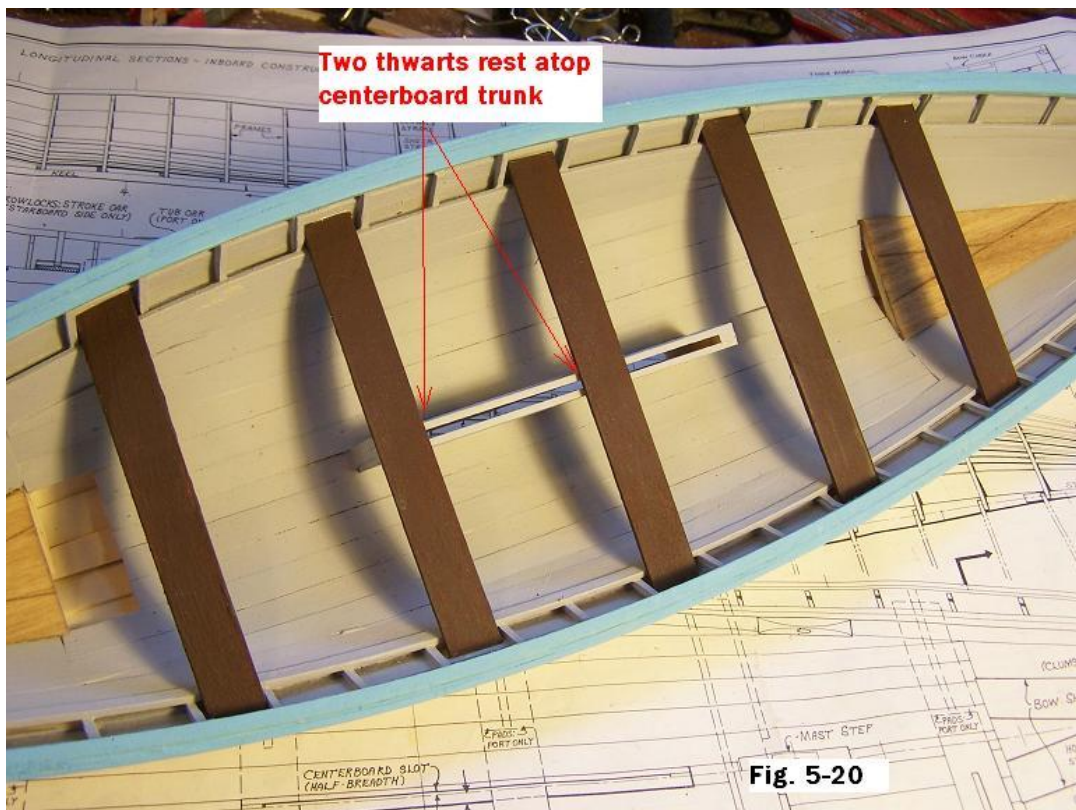
STEP 12: INSTALLING THE THWARTS

Cut five pieces of basswood that measure 1/16" thick by 1/2" wide by 4 3/4" long.

Mark the locations of each of the five thwarts on the top edge of the thwart risers on your model. Double-check your markings.

Each thwart will extend all the way across the whaleboat, resting atop the thwart risers, and abutting directly against the interior planking between a pair of frames. Trim each thwart to fit perfectly. With a slight cut of a single-edged razor blade, level off each thwart riser at the places where the thwarts will rest.

Before installing the thwarts permanently, I recommend that you finish them with the color of paint, stain, or varnish of your choice. It's a lot neater and easier to finish parts BEFORE they are installed. However, don't paint or finish areas that make a contact with glue. See Fig. 5-20 below.



STEP 13: INSTALLING THE THIGH BOARD

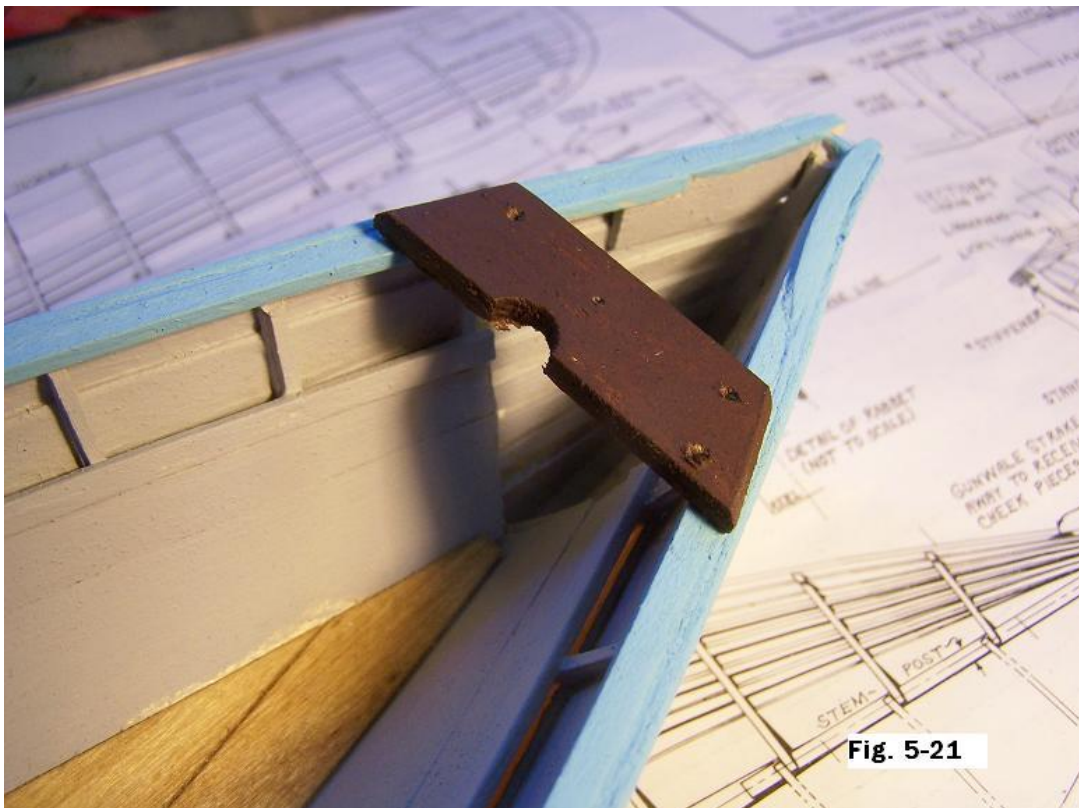
Cut a piece of basswood that measures 1/8" thick by 5/8" wide and about 2 1/2" long. The pattern for the thigh board is found in the bottom drawing of Plan Sheet 2 near the bow.

Shape this piece to fit your model. Bevel the two sides near the gunwale edges. File out the "clumsy cleat" with a rattail file. Bore two 1/16" holes for the kicking straps. Bore one 3/32" hole for the lance tails. Finally, bore one 1/32" hole for the lifting strap.

Paint or finish the thigh board with a color of your choice.

You may wish to paint or finish the inwales and gunwales before installing the thigh board.

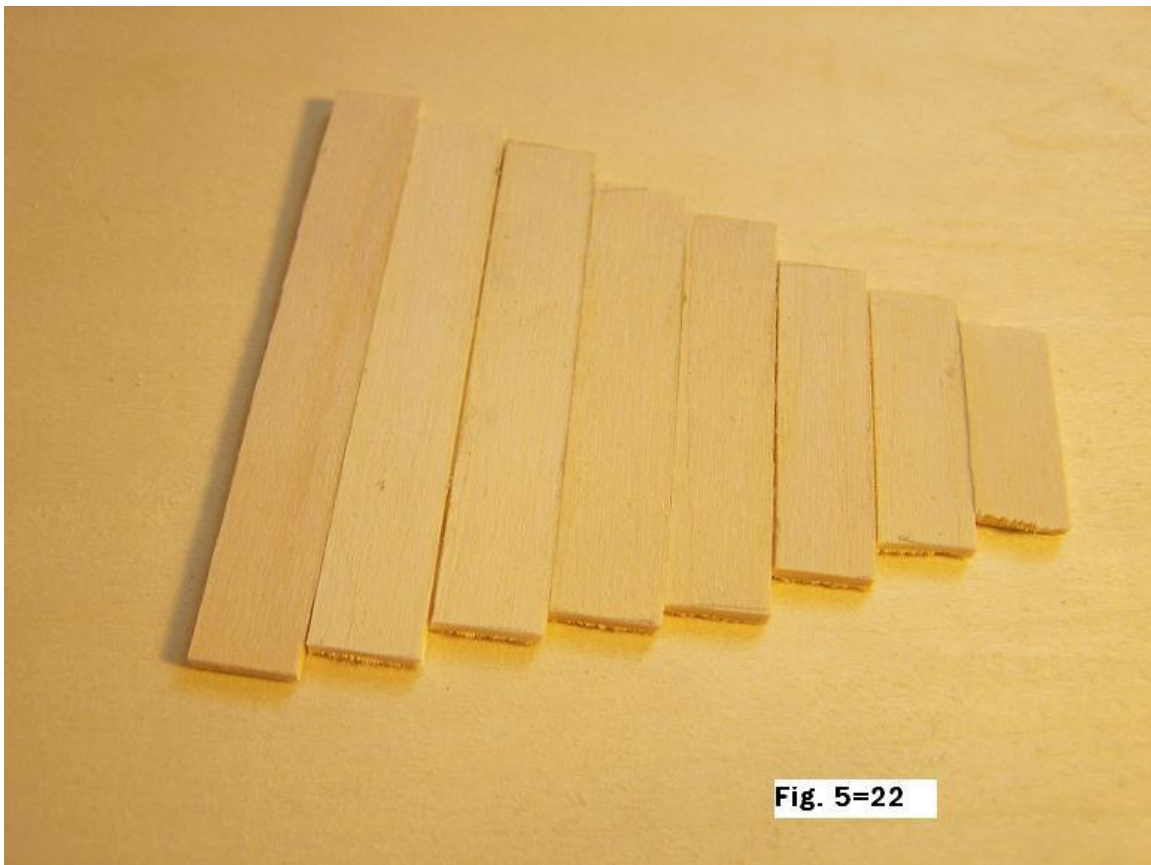
Glue the thigh board in place, as shown on Plan Sheet 2. Also see Fig. 5-21 below.



STEP 14: INSTALLING THE CUDDY BOARD PLANKING

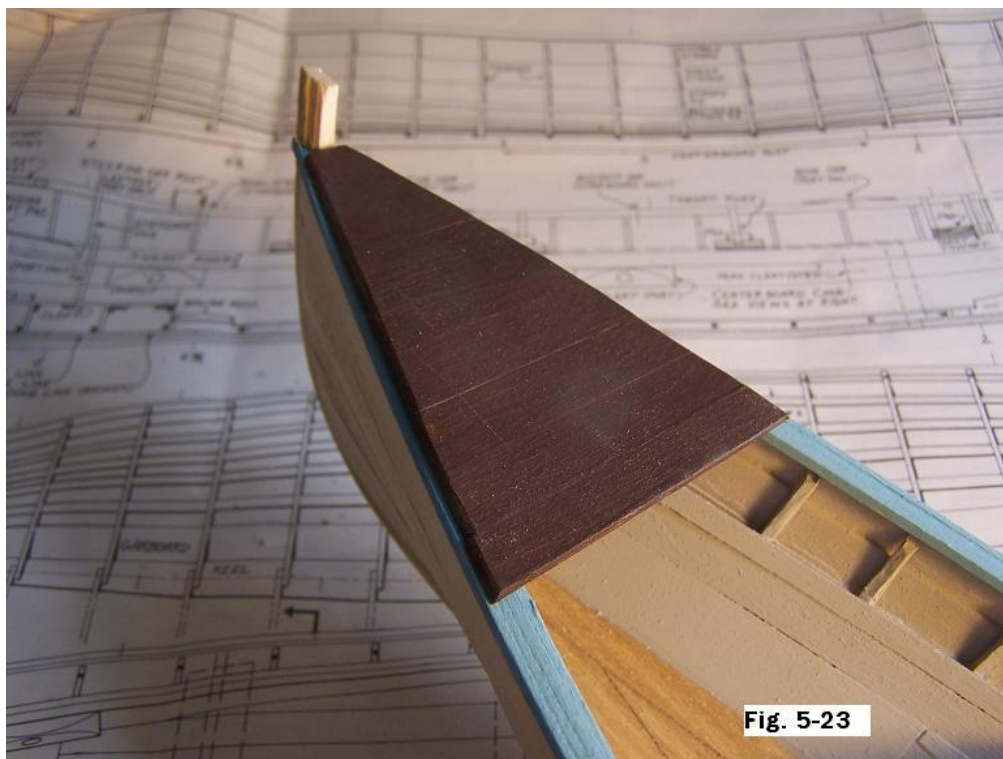
The planking consists of eight pieces of basswood 1/16" thick by 3/8" wide by varying lengths to fit the stern area – a total length of about 15". The cuddy board planking is shown in the bottom drawings of Plan Sheet 2.

Instead of installing one plank at a time, it is much easier to glue the eight planks together on your workbench, forming a triangular piece that is a little larger than the area to be covered. See Fig. 5-22 below.



Place this triangular piece on top of the gunwales. Mark the outline of the underside with a pencil. Cut it to this shape. Trim off the edges so that the cuddy boards fit just inside the gunwales. Bevel the edges slightly.

Paint or finish as you wish. Glue in place. See Fig. 5-23.

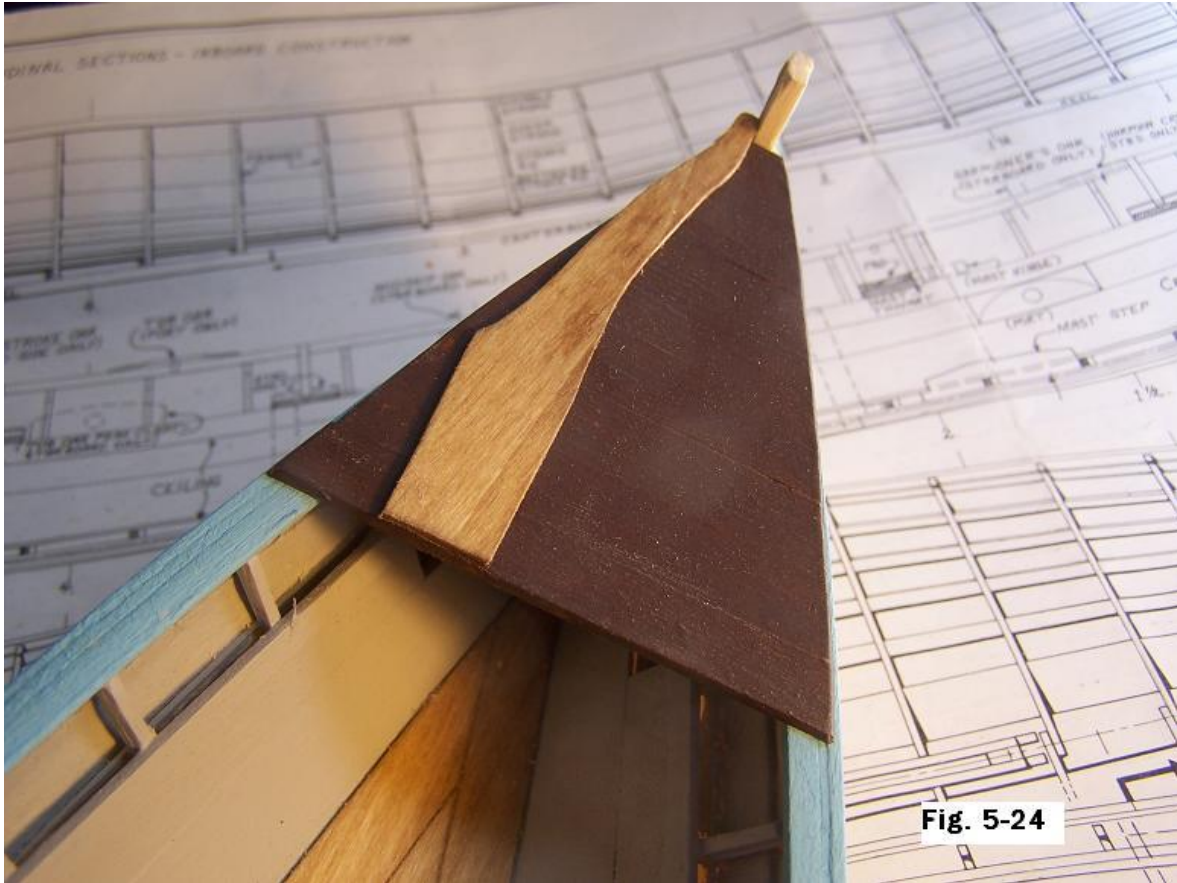


STEP 15: INSTALLING THE LION'S TONGUE

Cut a piece of basswood to measure $1/32$ " thick by $3/4$ " wide by about $3\ 1/2$ " long. The lion's tongue pattern is found atop the cuddy board planking on Plan Sheet 3.

Cut the basswood to the shape of the pattern. Drill a $1/32$ " hole at its after end, as shown on Plan Sheet 2. The after edge of the lion's tongue rests against the starboard side of the sternpost and also rests flush against the foremost edge of the cuddy board planking.

Finish to you own liking. Glue in place. See Fig. 5-24 below.

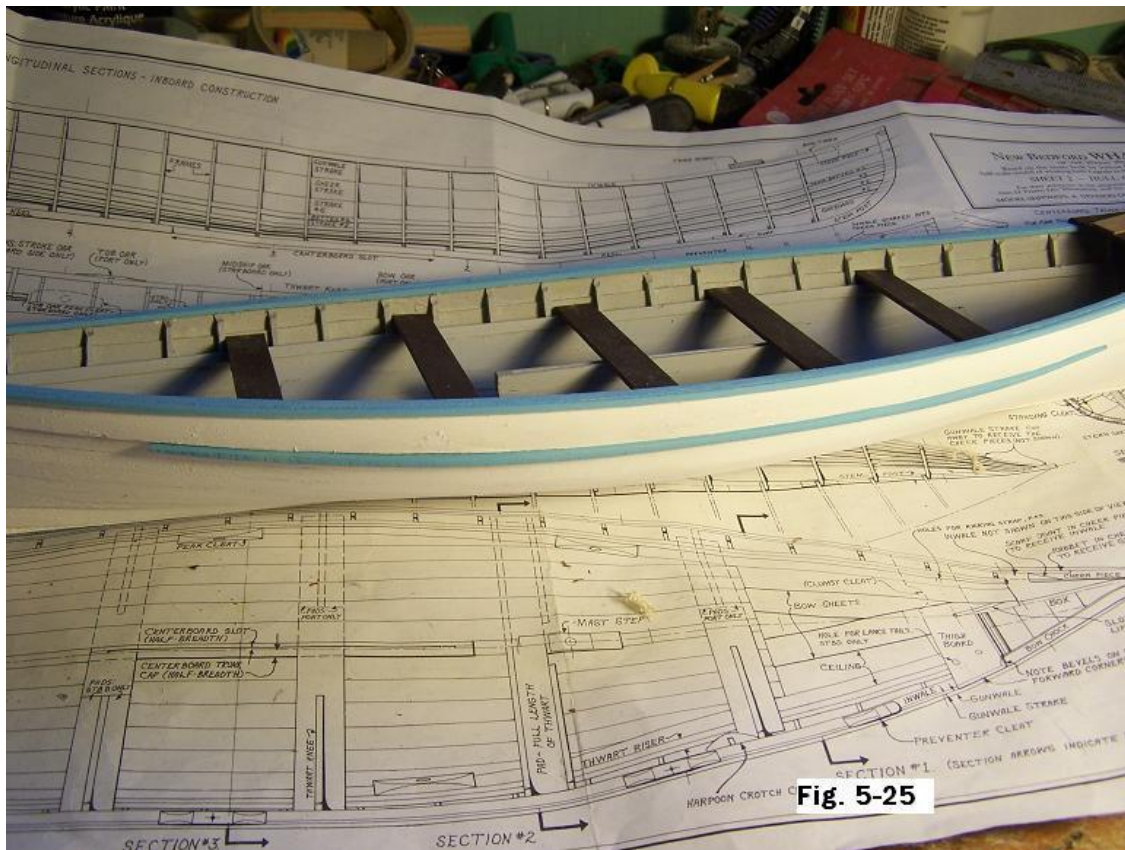


STEP 16: INSTALLING THE RUBBING PIECES

Cut two pieces of basswood to measure 1/16" thick by 1/8" wide by 12" long.

Taper both ends as shown in the Hull Planking Profile on Plan Sheet 1.

Finish as you wish. Glue and pin the rubbing pieces immediately below the gunwale strake. See Fig. 5-25.



STEP 17: INSTALLING THE THWART KNEES

Cut 12 pieces of basswood to measure 1/16" thick by 1/2" wide by 2" long.

Every thwart knee must be shaped individually and test-fitted in place, because no two of them will be exactly alike. Referring to Fig. 5-26 below, note the following points:

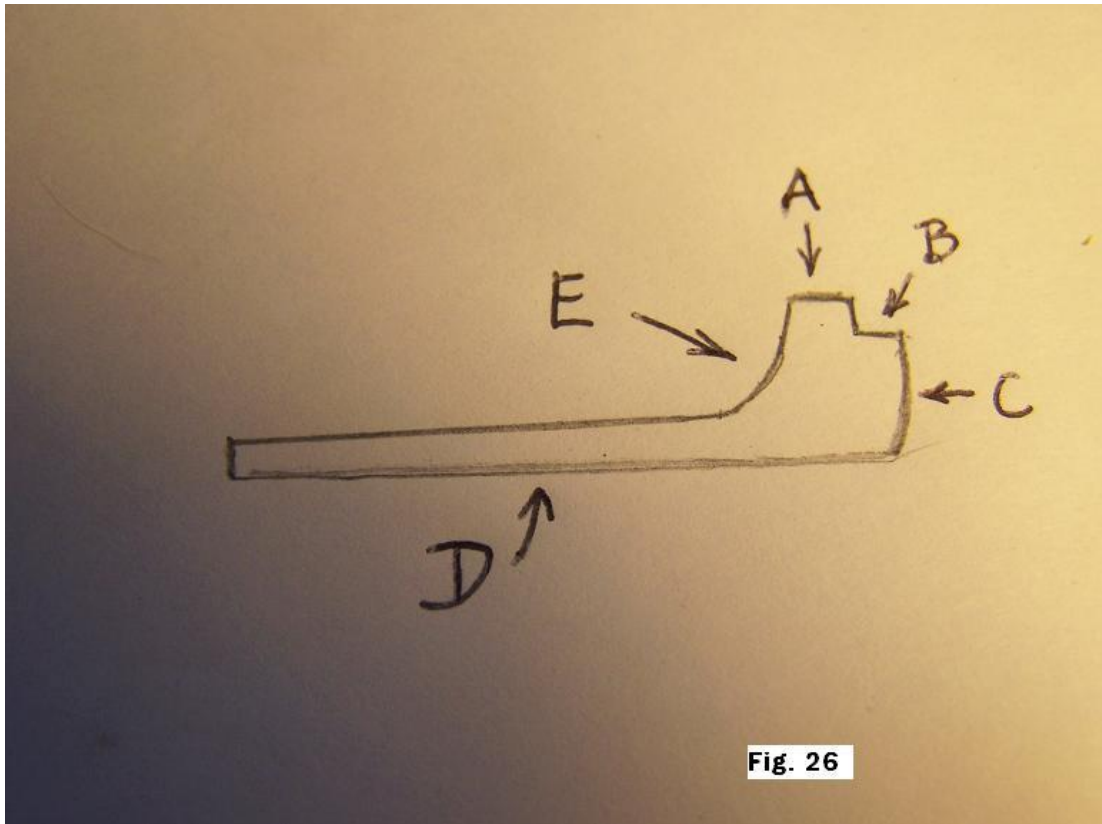


Fig. 26

“A” should be 1/16” wide and be even with the top of the inwale.

“B” is a notch that is cut so that the knee sits under the inwale and allows “C” to abut against the interior planking.

“C” is the shape of the interior planking upon which the knee will rest.

“D” is tapered until its outer projection is about 1/16” high. Its length is taken from the bottom drawing on Plan Sheet 2.

“E” is an arc that should be consistent on all knees.

Use tools that you are comfortable with. For each knee I used an X-Acto knife, a Dremel drum sander, and a sanding stick. I recommend that they should be at least partially painted or finished before gluing them in place.

All knees are glued in the exact centers of their respective thwarts, except for the thwart directly above the mast step. Here, a knee is glued to each side of the thwart. Note also that these two knees require special treatment – the one abaft the thwart extends all the way from port to starboard and rests

slightly lower than the thwart itself. The one on the fore side is interrupted by the location of the mast hinge and mast itself. See Figs. 5-27 and 5-28 below.





Fig. 5-28

STEP 18: INSTALLING THE THWART PADS

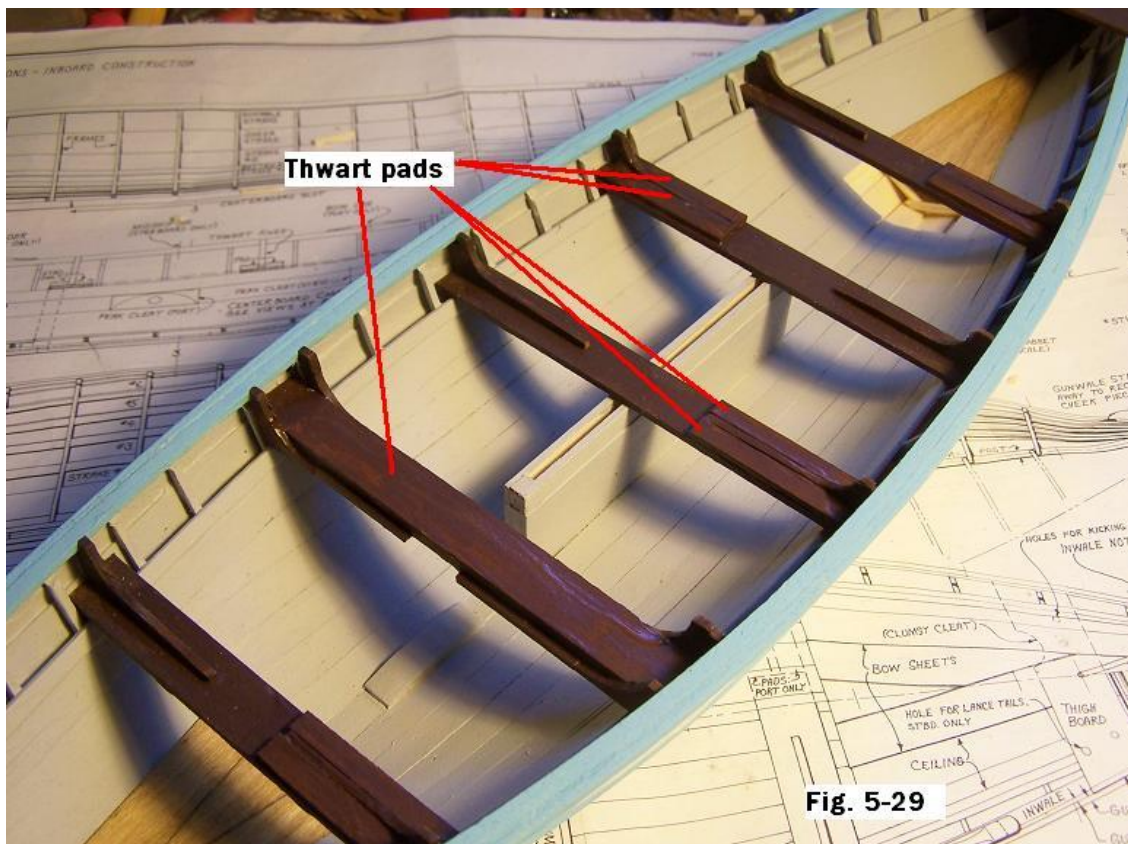
Cut 8 pieces of basswood to measure 1/16" x 3/16" x 2" and one piece to measure 1/16" x 1/2" x 4 1/2".

Make the thwart pads as shown on the drawings of Plan Sheets 2 and 3. Note that the thwart pad just above the mast step extends all the way across the thwart from port to starboard. The remaining thwarts only have a single pair of thwart pads on EITHER port or starboard, not on both sides. Follow the plans meticulously.

All thwart pads are cut to fit snugly against the inside planking and, except for the one above the mast step, extend only as far as the outer edge of the thwart knees.

Paint at least partially before installing them.

Glue in place. Finish painting after the glue has dried. See Fig. 5-29 below.



STEP 19: INSTALLING “THE BOX” AT THE BOW

Cut 5 pieces of 1/32” basswood to fit “the box” at the bow as shown in the top and bottom drawings on Plan Sheet 2.

A vertical piece is glued to the fore edge of the thigh board – 1/32” x 1/2” x 1 1/4” – and both sides of the planking. The horizontal pieces consist of four 3/8” wide planking pieces that are installed level with the lower edge of the gunwale from the vertical piece to the bow.

The inside of “the box” and the exposed underside can be finished as desired.

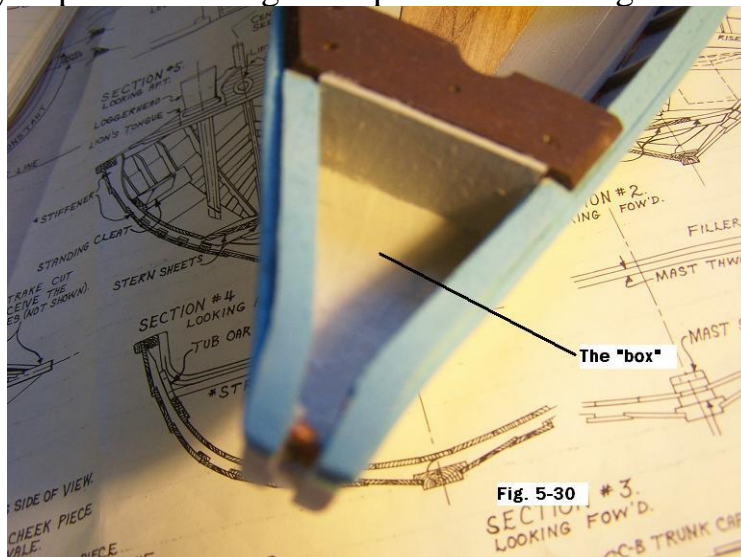
Bore the 10 holes shown on Plan Sheet 3 with a #70 drill bit, as shown on Plan Sheet 3.

STEP 20: INSTALLING THE BOW CHOCKS

Cut two pieces of basswood to measure 1/8” x 1/4” x 2 1/2”.

The patterns for the bow chocks are found on two drawings on Plan Sheet 2. Shape the bow chocks as shown on those plans, noting that they taper to 1/32” on their aft sides.

Finish as you prefer. Then glue in position. See Fig. 5-30 below.

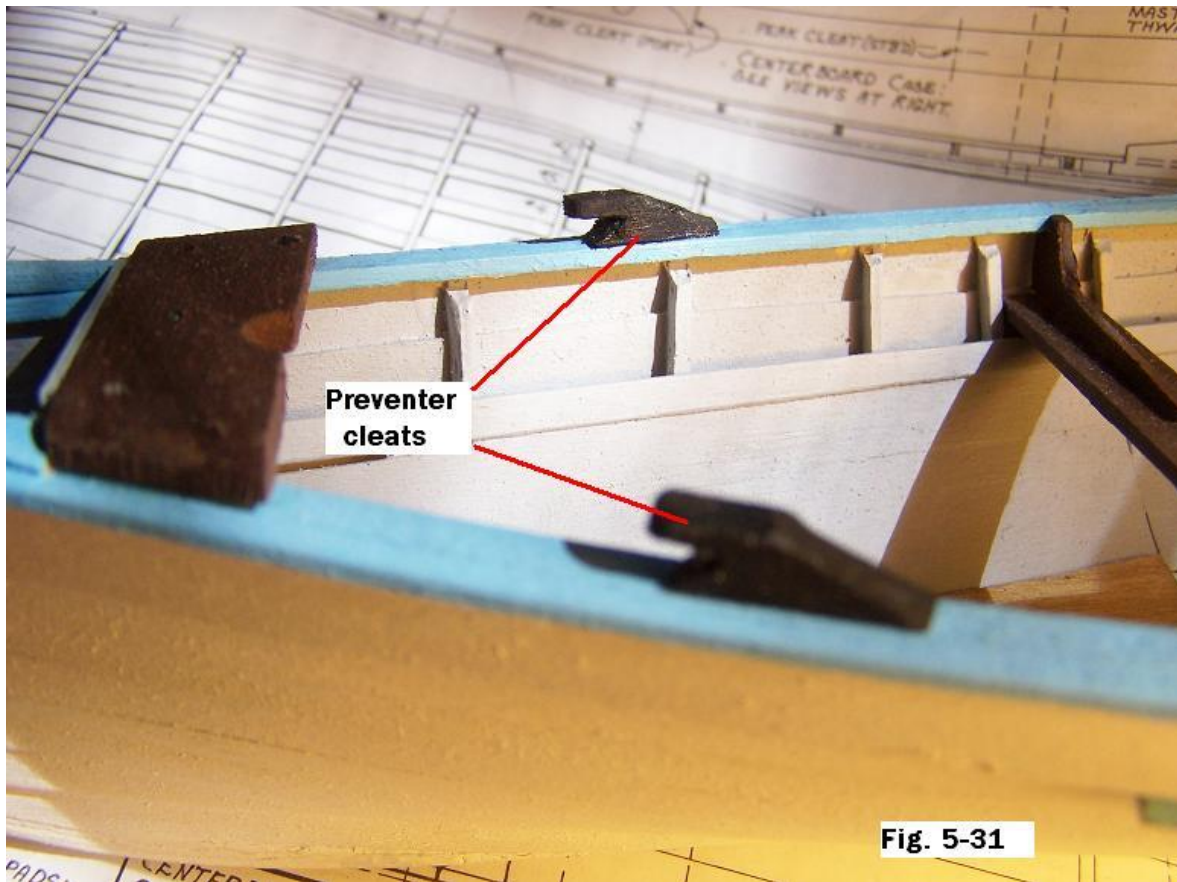


If you haven't done so already, now is a good time to bevel the stern and sternpost as shown in detail on Plan Sheet 2.

STEP 21: INSTALLING THE PREVENTER CLEATS

Cut two pieces of basswood to measure 1/8" x 3/16" x 11/16". Shape them as shown on the top and side view plans on Plan Sheet 2. Don't forget to bevel the corners as shown.

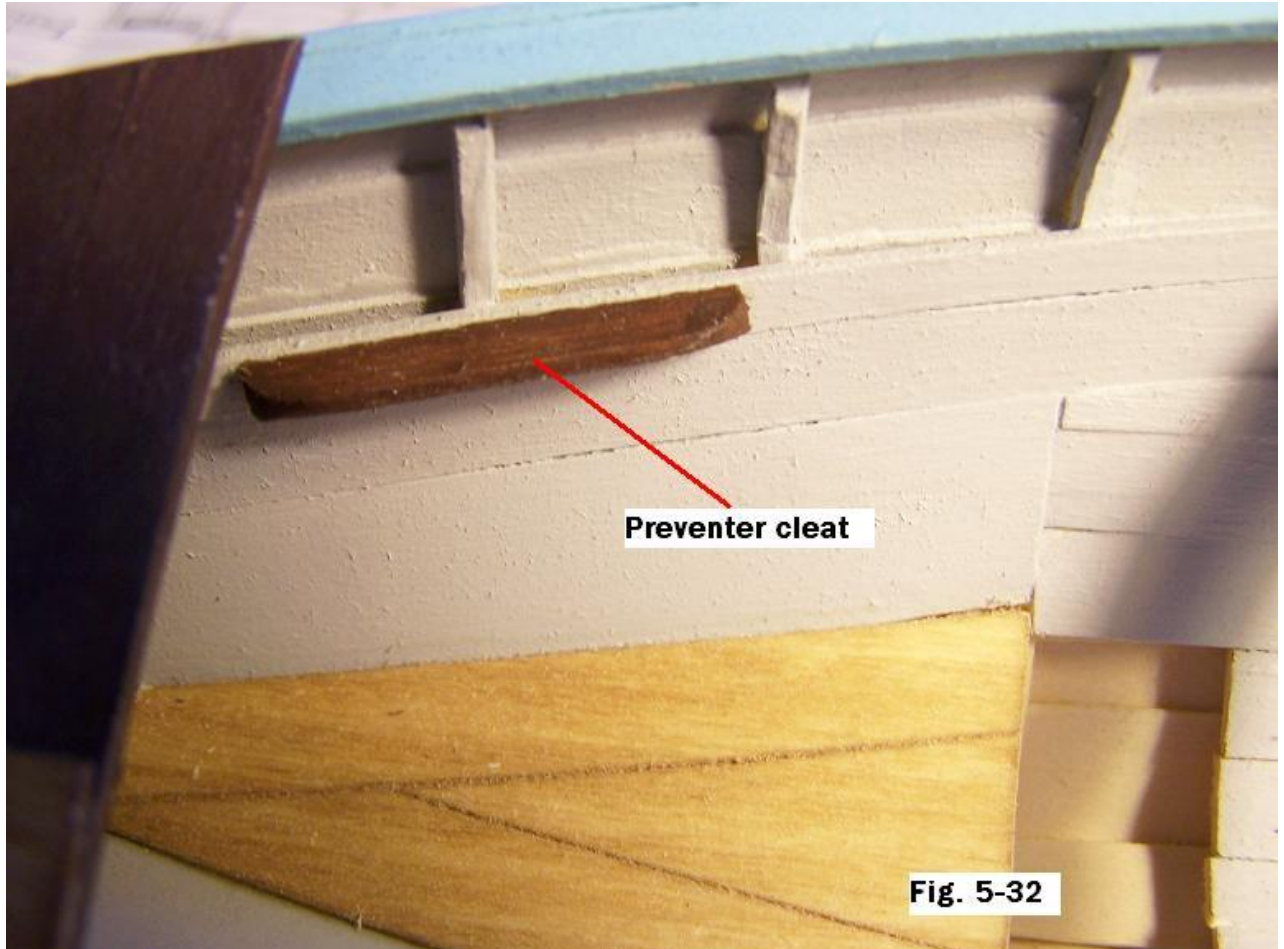
Finished as desired and glue in place about 3/4" abaft the thigh board. See Fig. 5-31 below.



STEP 22: INSTALLING THE STANDING CLEATS

Cut two pieces of basswood to measure 1/8" x 3/16" x 1 1/4". The standing cleats are found on Plan Sheet 2 near the cuddy board planking.

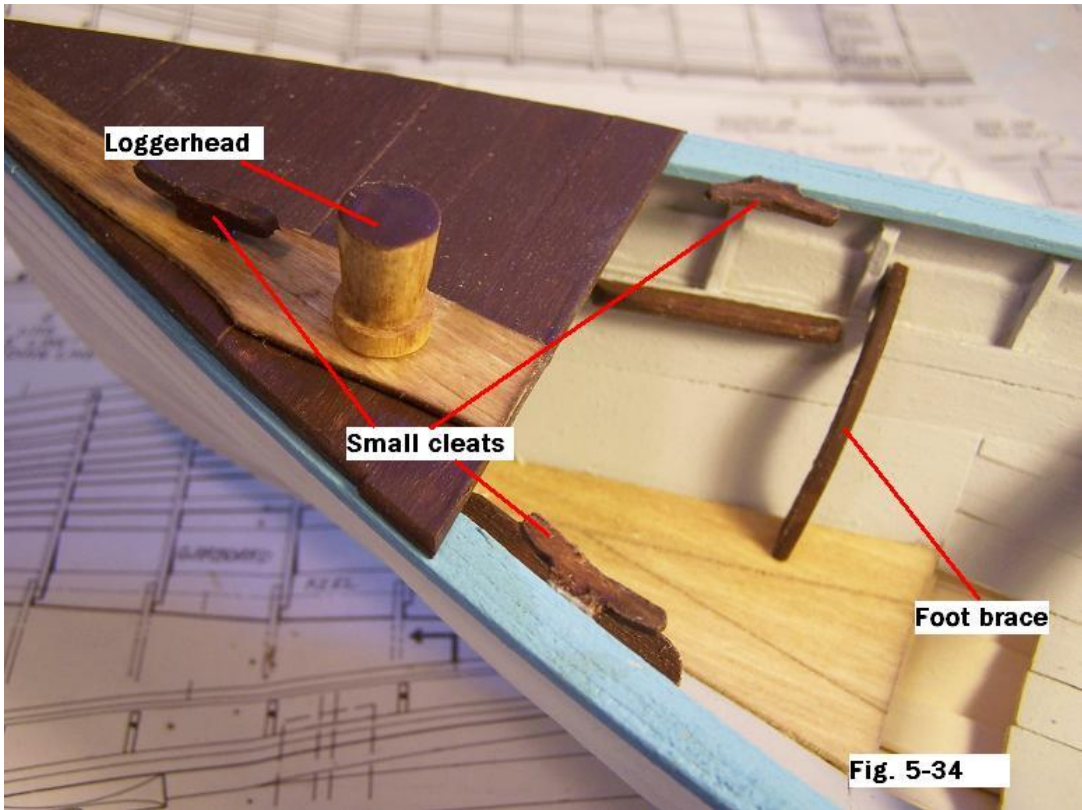
Shape each piece as shown on the plans. Finished as desired and glue in position on the thwart risers. See Fig. 5-32.



STEP 23: INSTALLING THE FOOT BRACE

Cut one piece of basswood to measure 1/16" x 1" x 1 1/2". Plan Sheet 2 shows its location, which is on the port side only. The photo on page 90 of Ronnberg's book shows its arc-like shape. Cut out this shape and test-fit into position.

Finish as desired and glue in place. See Figs. 5-33 and 5-34 below.



STEP 24: INSTALLING SMALL CLEATS FOR THE CUDDY AND INWALES

Make three small cleats from scrap basswood as shown on Plan Sheet 2. One cleat is located atop the cuddy board planking just aft of the loggerhead, and the other two cleats are located on the inwale just abaft of the cuddy board planking.

Finish as desired and glue them in place. See Figs. 5-34 and 5-35 below.

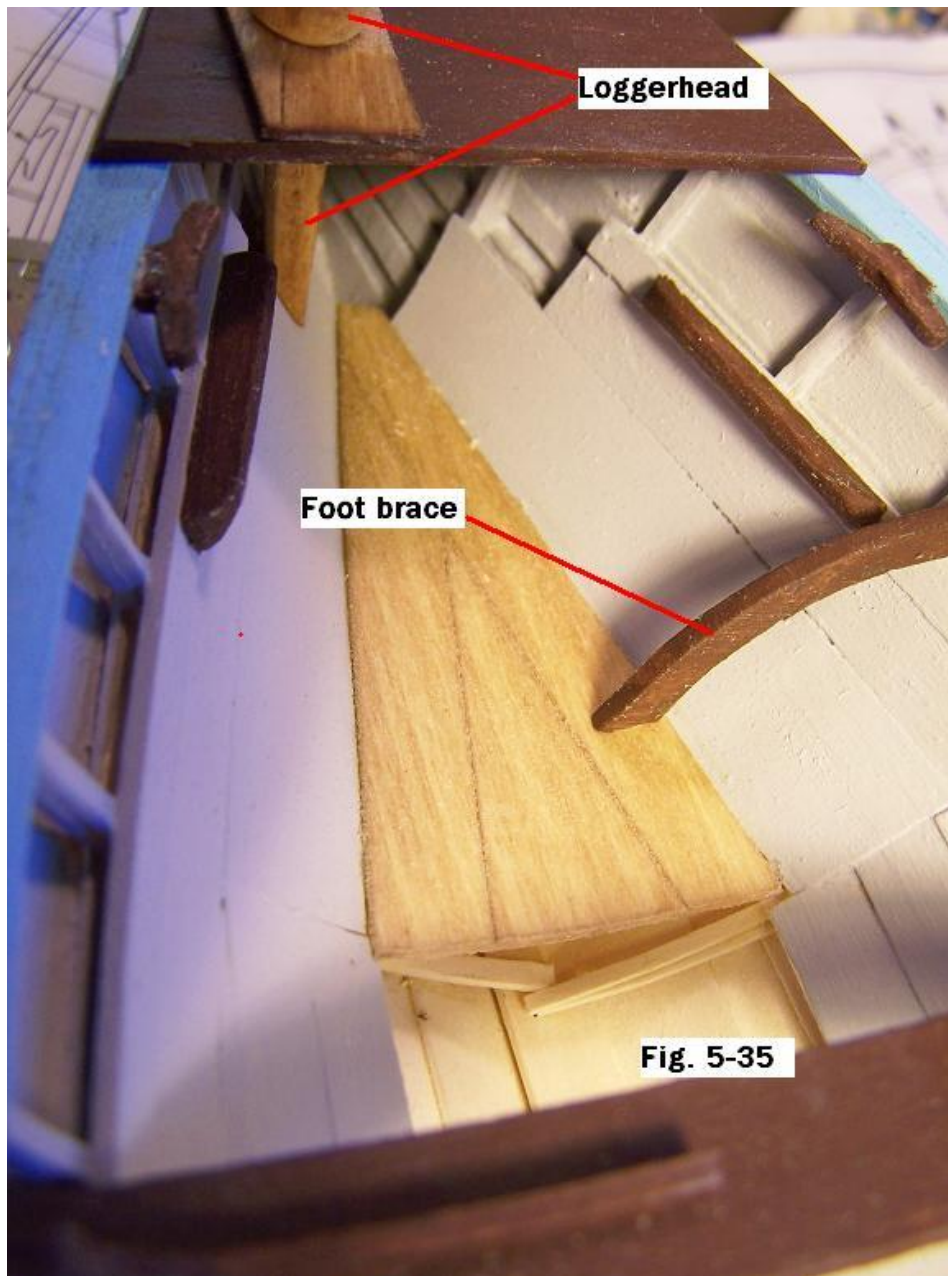


Fig. 5-35

STEP 25: INSTALLING THE LOGGERHEAD

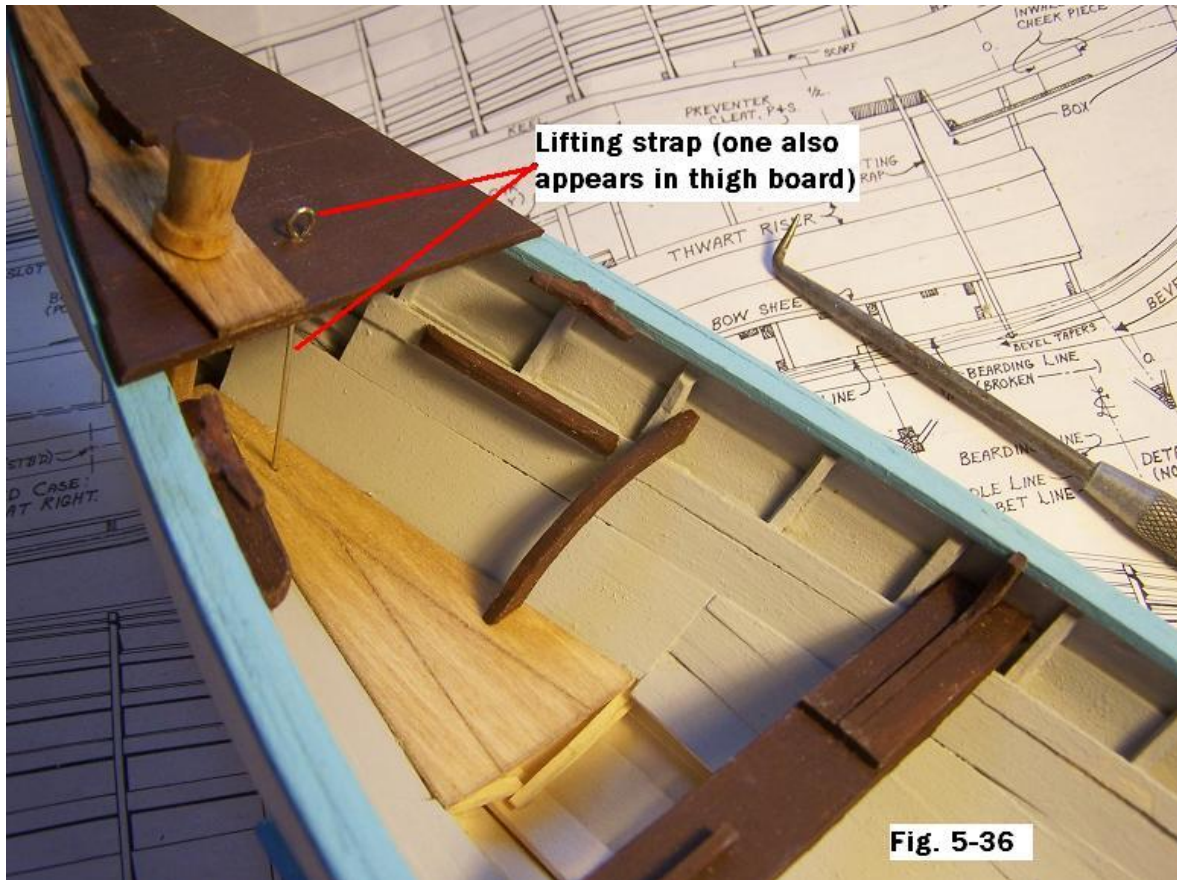
Follow Ronnberg's instructions for shaping the upper part of the loggerhead from a 3/8" dowel. The lower part of the loggerhead is made from a 3/16"-square piece of basswood that is filed to an octagonal shape and tapered to 1/16" at its foot.

Drill a 1/16" hole in the bottom of the lower part of the loggerhead and another 1/16" hole in the upper part of the lower loggerhead. Glue them together with a 1/16" dowel, so that they are securely connected. Let the glue dry.

Locate and drill a 3/16" hole through the lion's tongue and cuddy board planking. Insert the loggerhead in the hole, making sure that the bottom of the loggerhead meshes with the ceiling properly. When a good fit is achieved, apply whatever finish you like, and then glue in place. See Figs. 5-34 and 5-35 above.

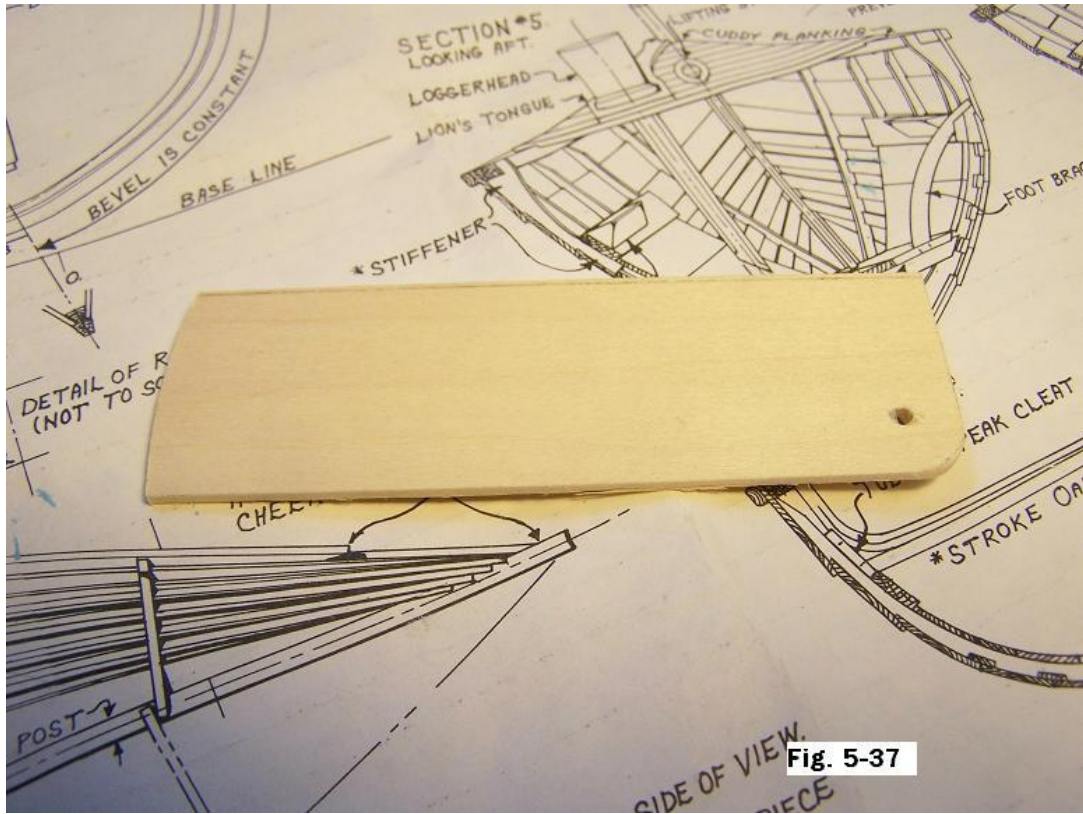
STEP 26: INSTALLING THE LIFTING STRAPS

One way to install the lifting straps at the cuddy planking and at the thigh board is by bending a paperclip to the required shape and fitting them through holes drilled according to the plans. Since my bow and stern sheets have already been permanently installed, I punched holes for the lower ends of the lifting straps with the tool shown in Fig. 5-36 below. Then I glued the lifting straps in place with CA glue. I did not incorporate the slots used for the lifting straps that Ronnberg describes.



STEP 27: FITTING THE CENTERBOARD

Cut out the centerboard from a piece of basswood that measures $\frac{1}{16}$ " thick by $1\frac{1}{4}$ " wide by $1\frac{3}{4}$ " long. Shape it as shown in Fig. 5-37 below, as shown on the plan sheet. Drill a $\frac{1}{16}$ " hole at the pivot point. Fit the board inside the trunk, making sure that it swings out without jamming. Adjust by sanding where necessary. See Fig. 5-37.



Cap the centerboard trunk with a piece of 1/32" basswood. Finish with the same style finish you used for the sides. Bore a hole for the strap. Now, you can construct the remainder of the centerboard, making it operable, if desired. Ronnberg describes this on page 93 of his book.

Since my model will be a part of a diorama, I merely suggested the various parts without making them as working parts. I also glued the centerboard in place within the centerboard trunk. See Fig. 5-38.

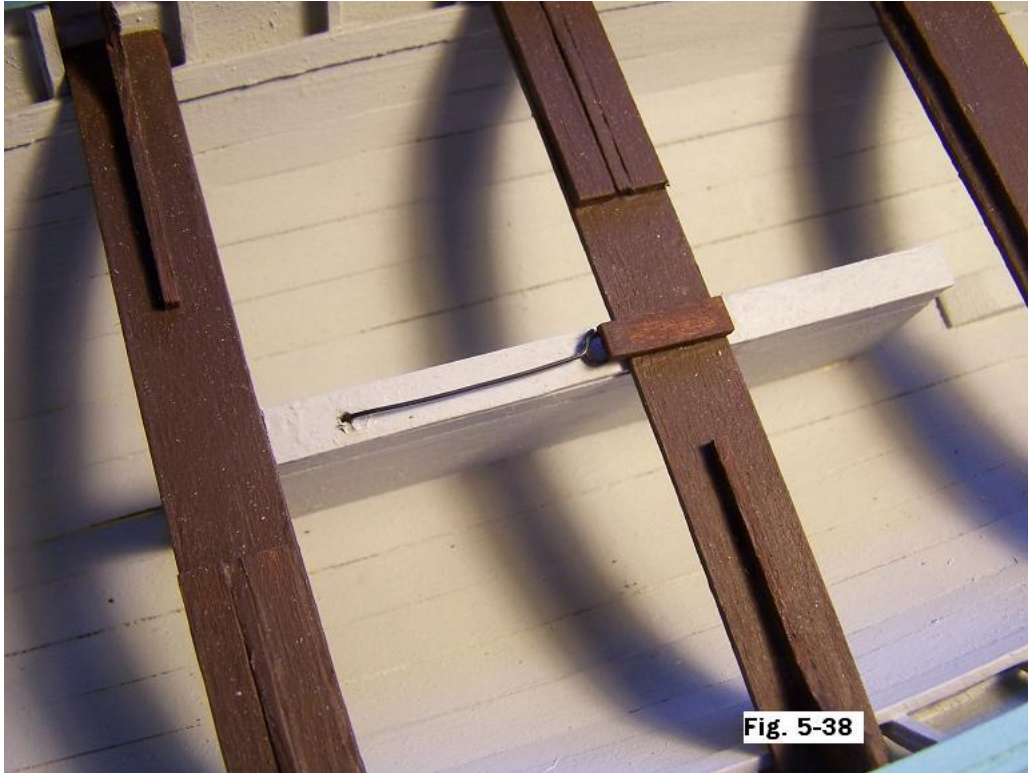


Fig. 5-38

STEP 28: INSTALLING THE ROWLOCK PADS

Cut out 5 pieces of basswood to measure 1/16" thick by 5/32" wide by 1" long. Use a sanding stick to shape them as shown on Plan Sheets 2 and 3. Paint them black. Then glue them in place as shown in the plan. See Fig. 5-39.

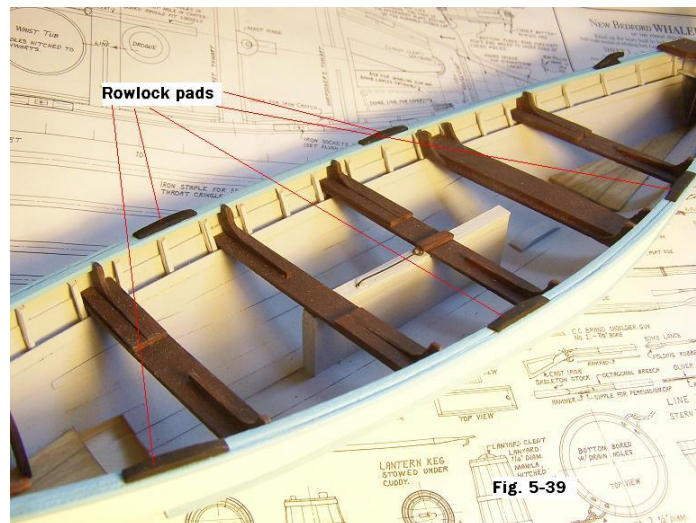
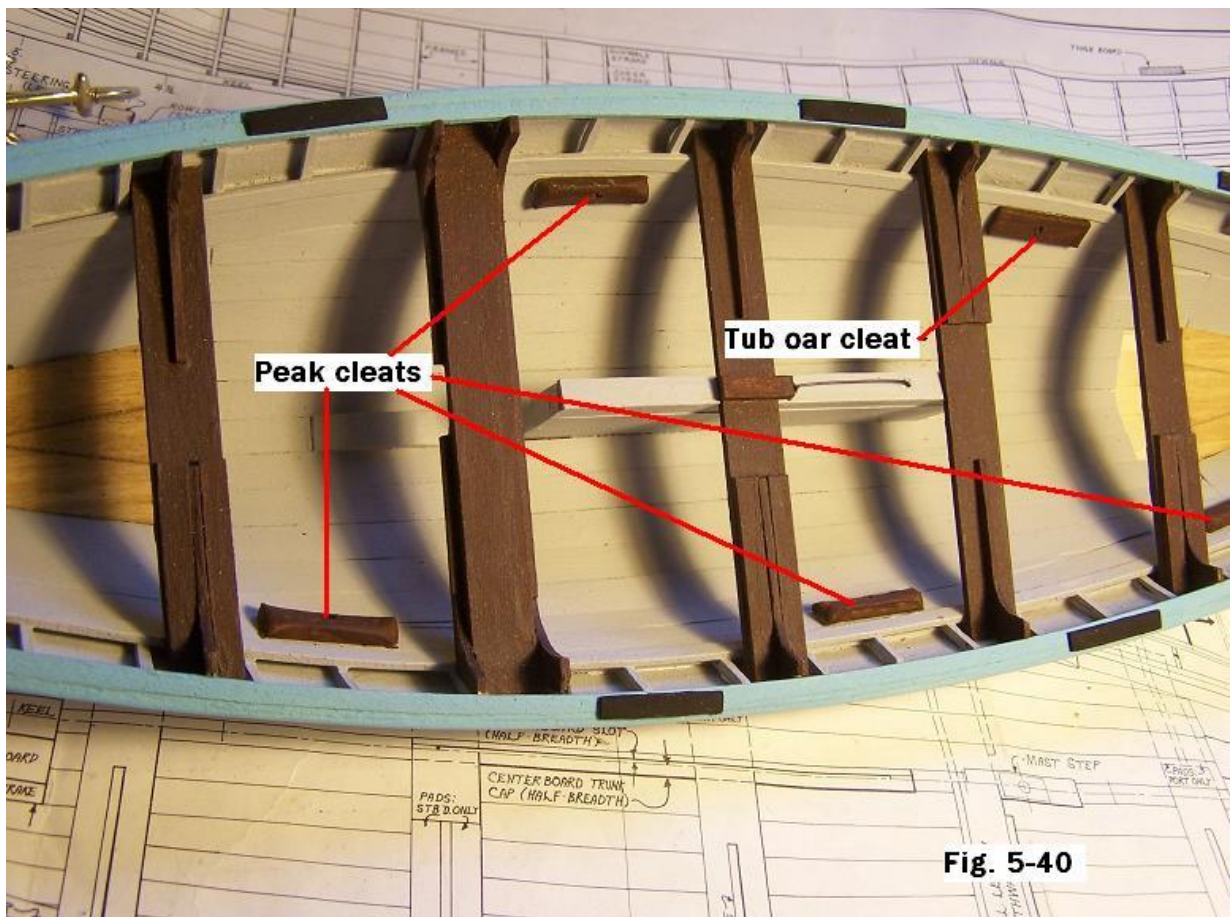


Fig. 5-39

STEP 29: INSTALLING THE PEAK CLEATS AND TUB OAR CLEAT

Cut 4 pieces of basswood to measure 1/8" x 1/4" x 1". Shape each piece as shown in the drawing on page 94 of Ronnberg's book. Remember to drill a 1/16" hole in the center of each cleat.

Finish as desired. Glue them in place as shown on Plan Sheet 3. See Fig. 5-40.



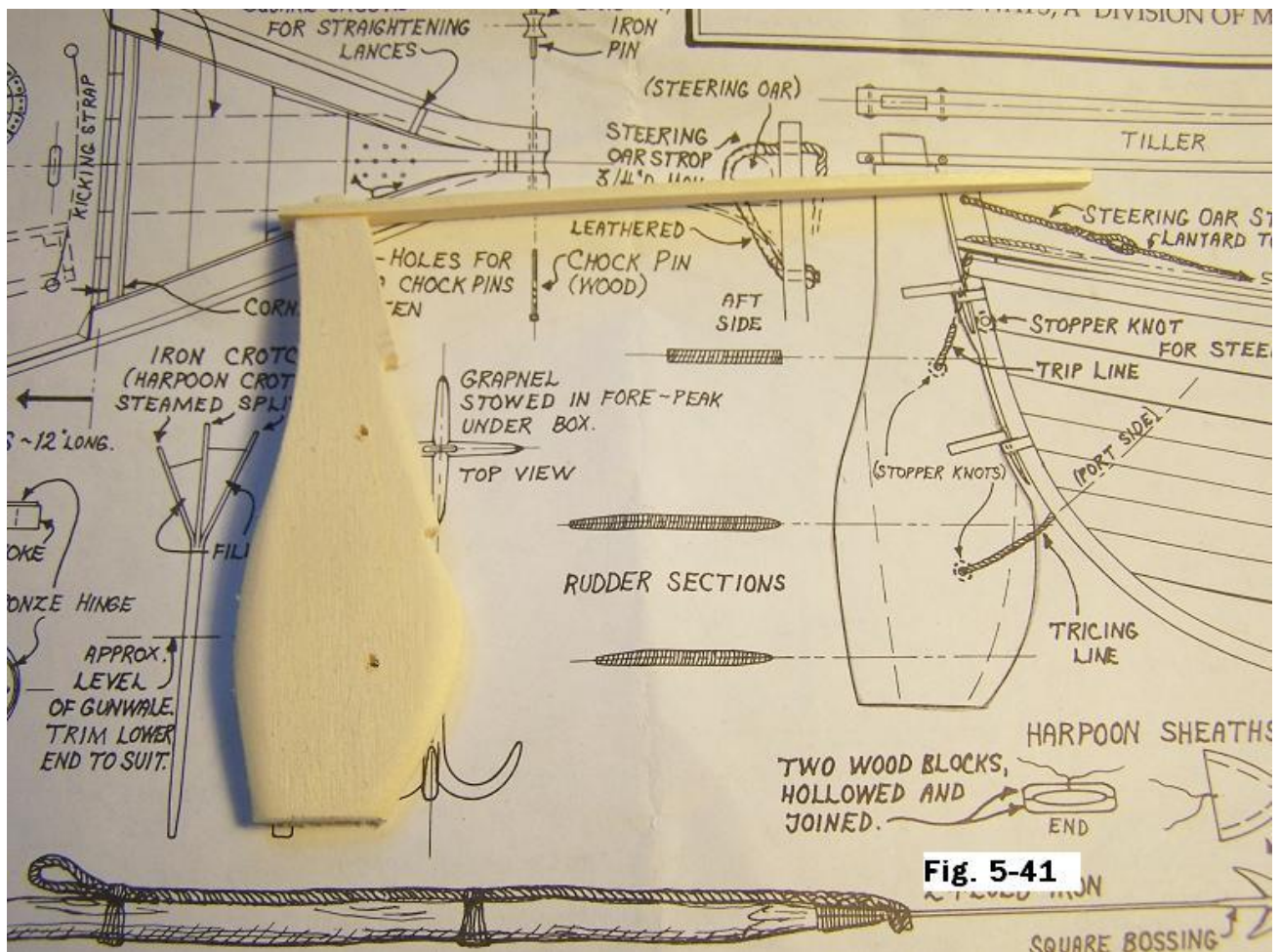
STEP 30: INSTALLING THE RUDDER, PINTLES, AND GUDGEONS

Cut out one piece of basswood 1/8" x 1" x 3". Transfer the pattern of the rudder on Plan Sheet 3 to this piece of wood. Cut out and bevel the rudder,

as shown for the rudder, paying particular attention to its shape at various sections. Bore the two holes for the trip line and the tricing line.

Cut out one piece of basswood 1/16" x 1/8" x 4 1/8" for the tiller. Taper one end to a 1/16" square. In the opposite end, cut a mortise so that the tiller will fit on the tenon at the top of the rudder. Drill a series of holes to make the mortise before trimming it to a rectangular shape.

Glue the tiller to the rudder. See Fig. 5-41 below.



Make the pintles and gudgeons like Ronnberg suggests. In my own model, I merely cut these parts from thin card, gluing them in place around a tiny dowel.

Finish as desired. Glue the rudder assembly in place. See Fig 5-42 below.

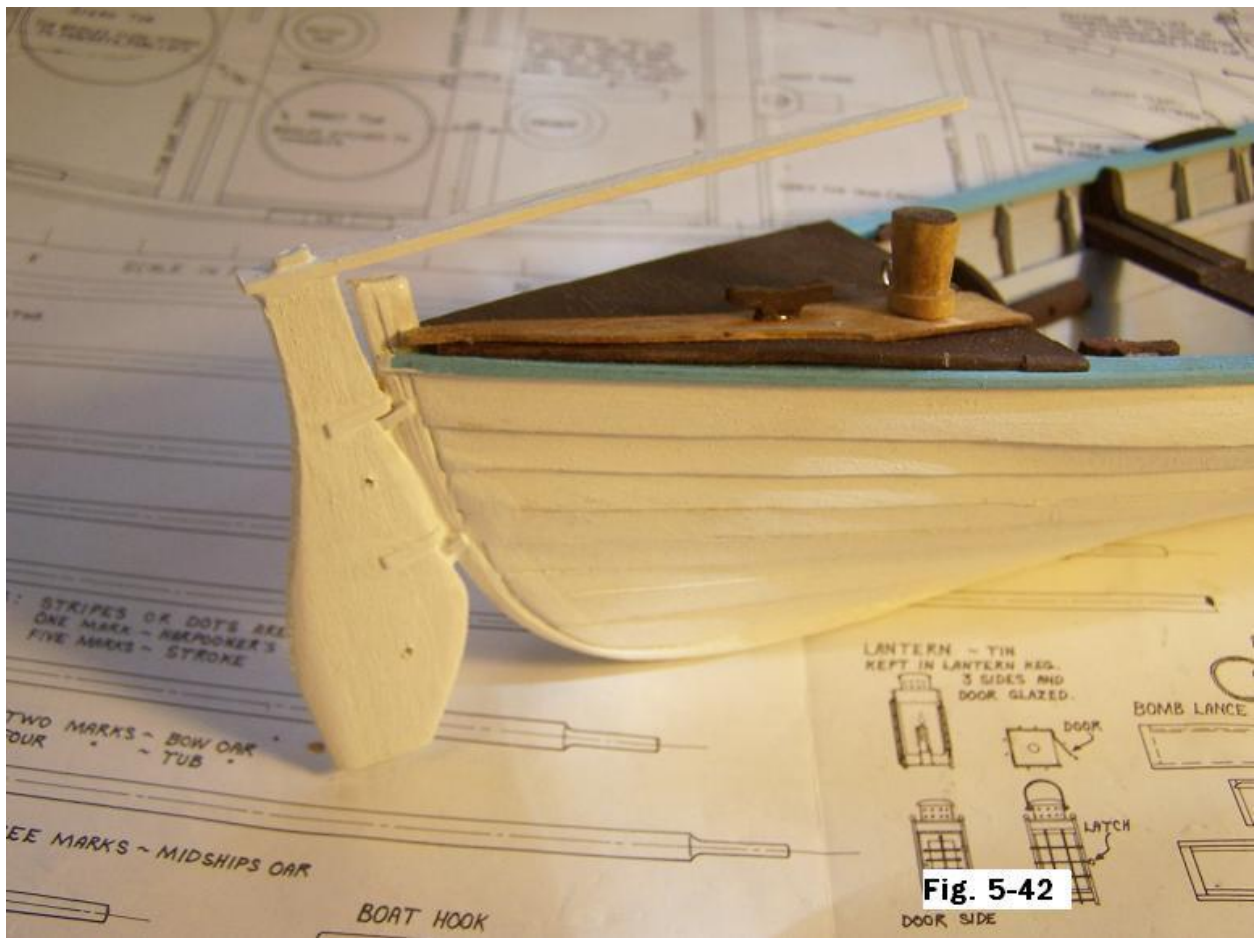


Fig. 5-42

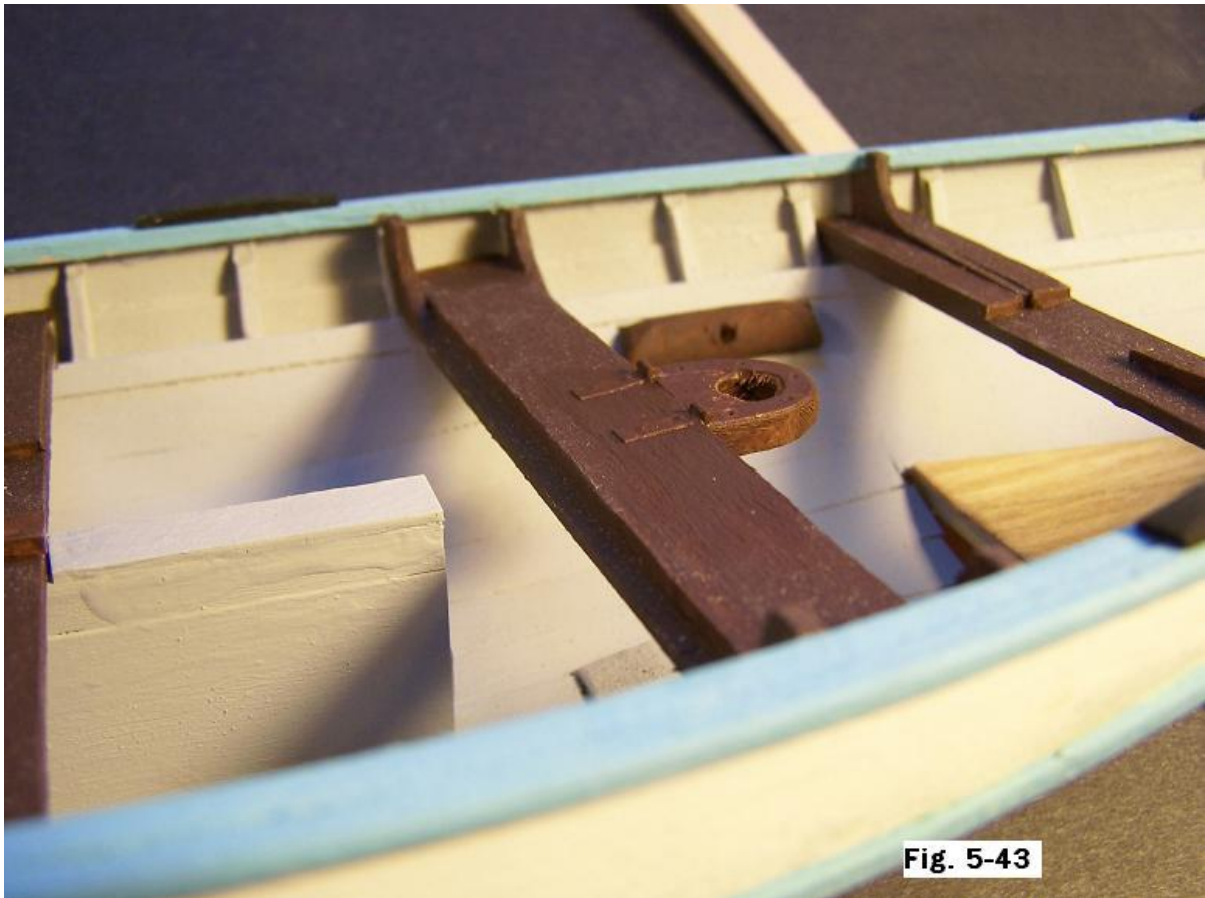
STEP 31: INSTALLING THE MAST HINGE

Cut out one piece of basswood to measure 1/8" x 5/8" x 5/8". The pattern for the mast hinge is found on Plan Sheet 3. Make sure it fits properly on the mast thwart directly above the mast step.

Drill a hole in the mast step for the mast. Use a test dowel to fit it properly.

Make the mast hinge assembly as Ronnberg describes on page 95 of his book. An alternative way to make the mast hinge is to simply cut the U-shaped piece out of thin card with an X-Acto knife. Suggest the hinge itself by using very tiny dowels.

See Fig. 5-43 below.



STEP 32: FINISHING THE HULL

If you have not yet provided a finish for your whaleboat, now is the time to finish it. Read pages 99-102 of Ronnberg's book, where he discusses this topic at length. Finish as you prefer.

Figs. 5-44 to 5-48 below display various views of the whaleboat to date.

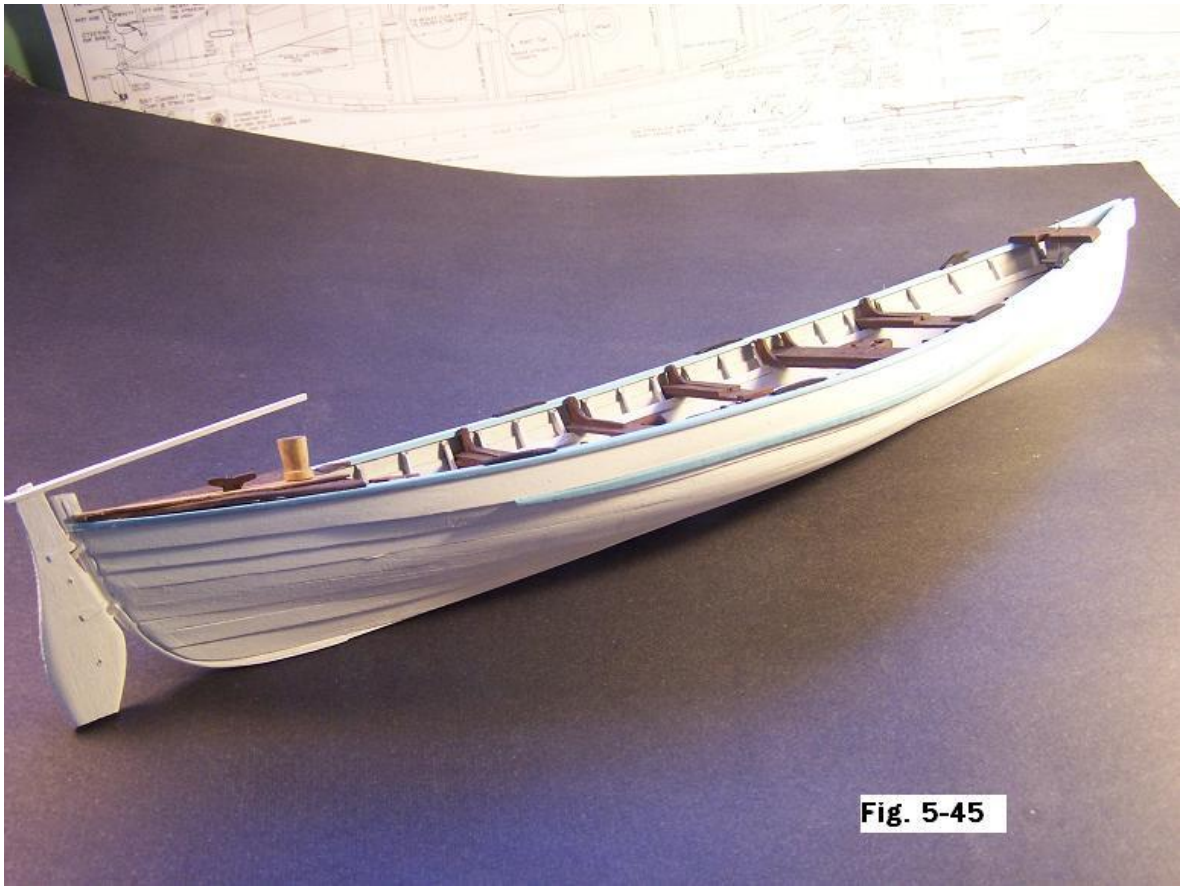


Fig. 5-45



Fig. 5-46

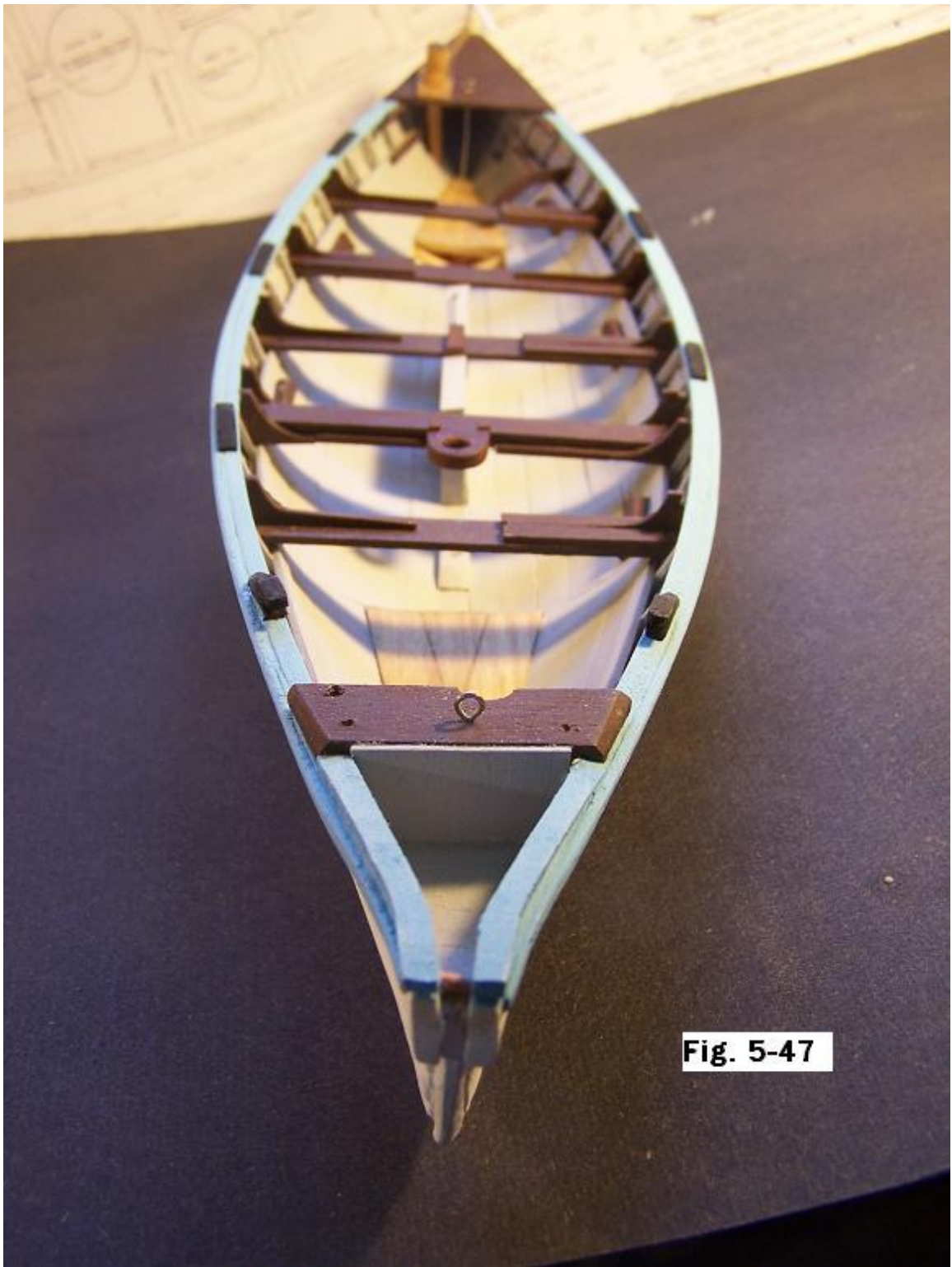


Fig. 5-47

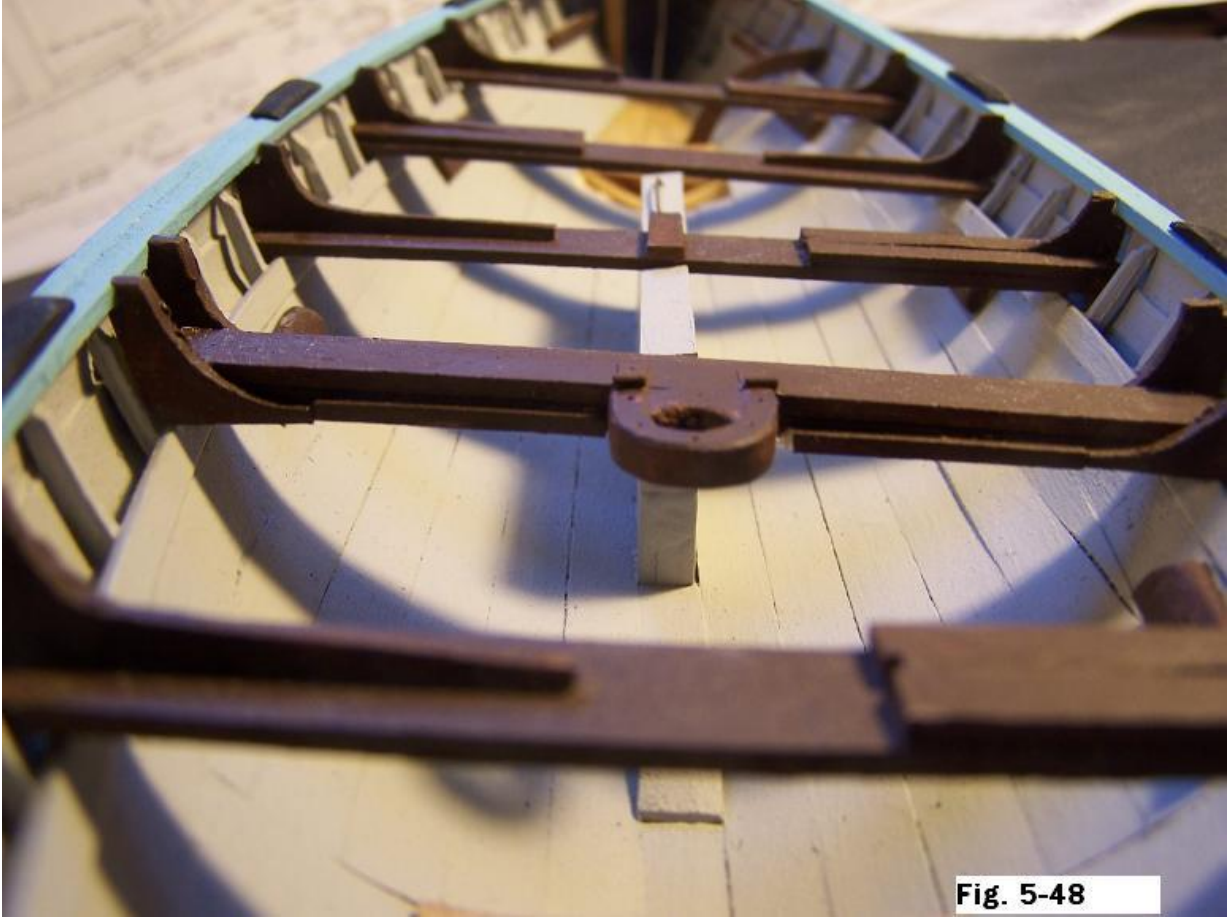


Fig. 5-48

STAGE 6: INSTALLING WHALING AND BOAT GEAR

STEP 1: OARS

Five oars are needed:

For the steering oar you will need a 12" length of $\frac{7}{32}$ " doweling, one piece of basswood that measures $\frac{1}{8}$ " x $\frac{7}{16}$ " x $4\frac{1}{2}$ ", and a $\frac{1}{2}$ " length of $\frac{1}{16}$ " doweling for the steering oar handle.

For the harpooner's oar and the stroke oar you will need two $8\frac{5}{8}$ " lengths of $\frac{3}{16}$ " doweling, and two pieces of basswood that measure $\frac{1}{8}$ " x $\frac{3}{8}$ " x $3\frac{5}{8}$ ".

For the bow oar and the tub oar you will need two $9\frac{1}{4}$ " lengths of $\frac{3}{16}$ " doweling, and two pieces of basswood that measure $\frac{1}{8}$ " x $\frac{3}{8}$ " x $\frac{5}{8}$ ".

Finally, for the midships oar you will need a 10" length of $\frac{3}{16}$ " doweling, and a piece of basswood that measures $\frac{1}{8}$ " x $\frac{3}{8}$ " x $3\frac{5}{8}$ ".

The instructions for each oar are the same.

Taper the dowel to match the profiles shown on Plan Sheet 3. Cut a slot for the blade with a razor saw, chipping it out with a razor blade.

Form the handle for the oar with a small round file. Make a groove starting about $\frac{5}{8}$ " from the end. Then finish the handle with a flat file until the handle is about $\frac{3}{32}$ " in diameter. Sand where necessary.

Make the oar blade as shown in Plan Sheet 3, paying attention to the shape that is shown on the plan, which varies from point to point.

Glue the blade into the slot cut in the handle. Make sure that it is centered and level.

After the glue has dried, use a sanding stick to carefully sand the slotted area until all is blended smoothly. See Fig. 6-1.



STEP 2: PADDLES

Six paddles are required for the whaleboat. For all 6 paddles you will need six 3 5/8" lengths of 1/8" doweling, and 6 pieces of basswood that measure 1/32" x 1/2" x 1 1/4".

All paddles are identical to each other. Taper the dowel slightly at both ends. Cut a slot for the blade with a razor saw and trim out with a razor blade.

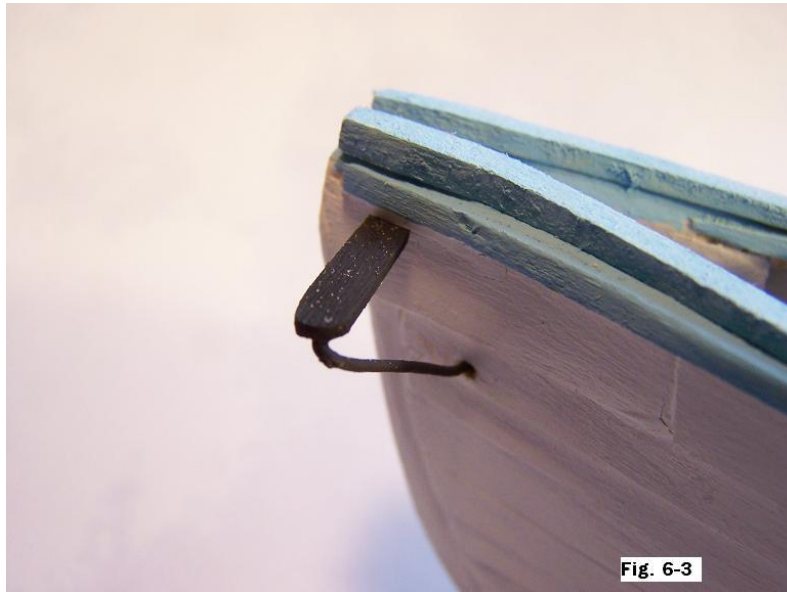
Cut out the paddles in gang fashion so that they are all identical. Round their edges and glue them in their slots.

Finish as desired. See Fig. 6-2.



STEP 3: STEERING OAR BRACE

I did not fashion the steering oar brace like Ronnberg suggested. Instead, I drilled two holes with a #60 drill bit where indicated. Then I bent a short length of 20-gauge black wire to the required shape. I glued the wire into the two holes with CA glue. Finally, I glued a small strip of painted basswood atop the upper part of the wire with CA glue. See Fig. 6-3.



STEP 4: ROWLOCKS

To make each of the 5 rowlocks pound a piece of 22-gauge black wire with a hammer until it is flat. Bend the result around a 1/4" dowel to achieve the required round part of the U-shape. Use miniature pliers to bend the top edges to shape, as shown in Plan Sheet 3.

Drill a tiny hole at the bottom of the U. Place an ordinary straight pin into the hole so it projects out of the bottom of the U. Use CA glue to glue it in place.

Cut off all but about 1/8" of the bottom of the pin. Drill a corresponding hole in the center of the rowlock. Place the cut-off pin in this hole with a touch of CA glue. Paint black to finish. See Figs. 6-4 and 6-5 below.



Fig. 6-4

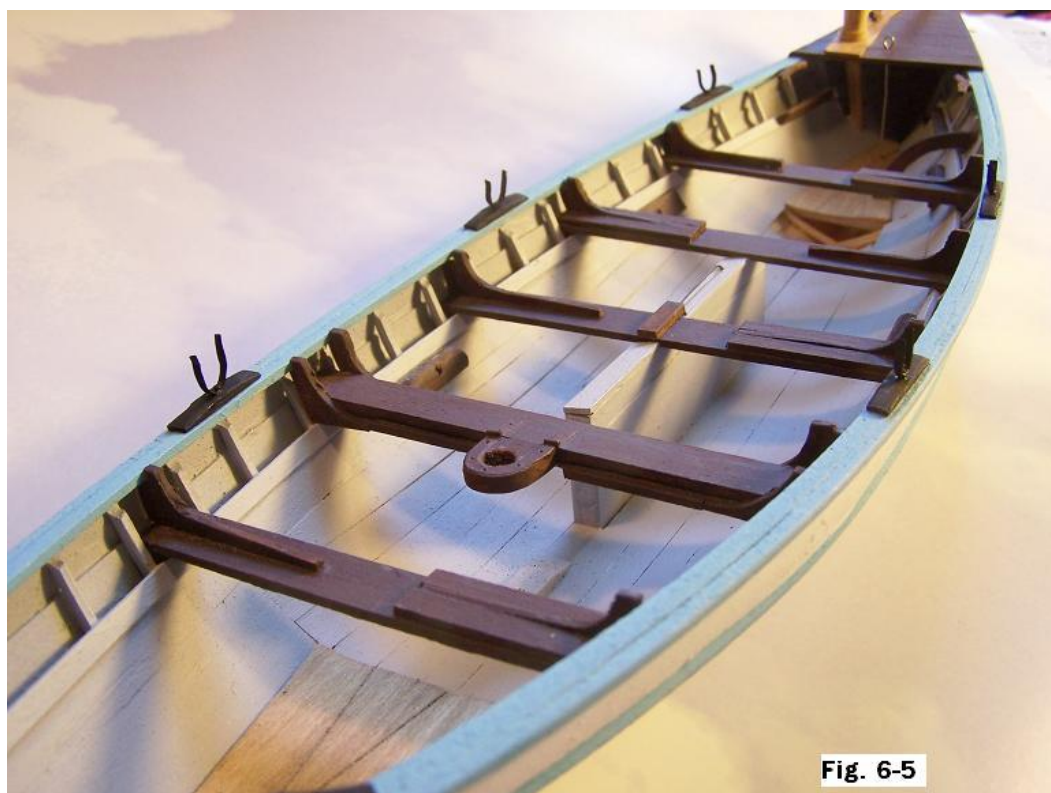
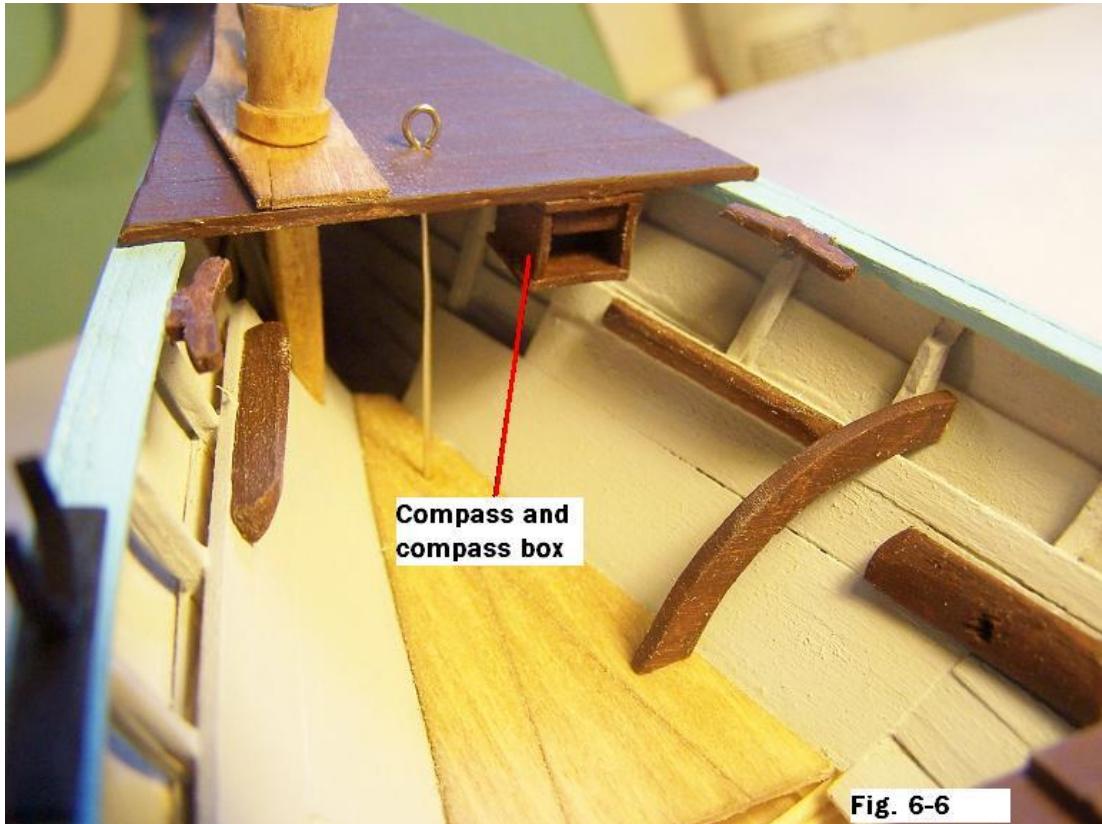


Fig. 6-5

STEP 5: COMPASS AND COMPASS BOX

I did not make my compass and compass box so that the compass slides out at will. Instead, I made a small box out of scrap basswood, installed a small block of basswood to represent the compass, painted all of the assembly brown, and glued the assembly under the cuddy board planking. See Fig. 6-6 below.



STEP 6: COOPERAGE

Ronberg provides detailed instructions for constructing these items, which include the line tubs, buckets, kegs, etc. Basswood can be used as a substitute for the Kraft board.

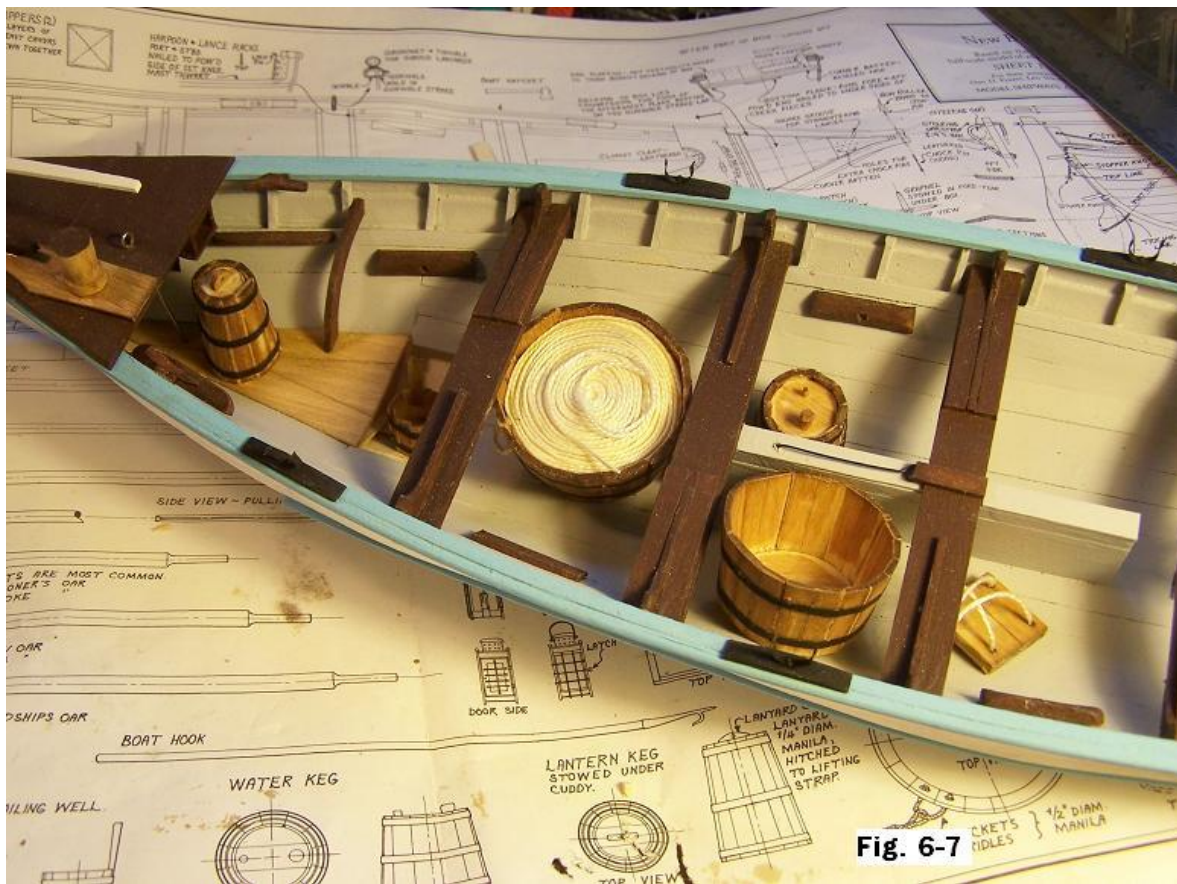
When the quarter-size staving pieces are installed, you may find it a little easier to bend them to shape by slightly scoring each of the staves first and then bending them.

Another way to make the hoops is to cut long thin strips of masking tape, stick it to a clean board, and paint them black. After the paint dries, take one

strip at a time and wind it around the bucket (or other item), finishing with a small amount of glue on the masking tape.

To fill the line bucket with rope, I use one long strand of #5 DMC cotton thread (ecru color). Apply carpenter's glue to the top plug, spreading it around with your finger. Starting at the edge of the tub, wind the piece of string in a long continuous coil, pressing it into the glue. Apply more glue as needed.

Apply a small amount of glue to the bottom of each item and glue it in place, as shown on Plan Sheet #3. Also see Fig. 6-7.



STEP 7: MAST AND SPRIT POLE

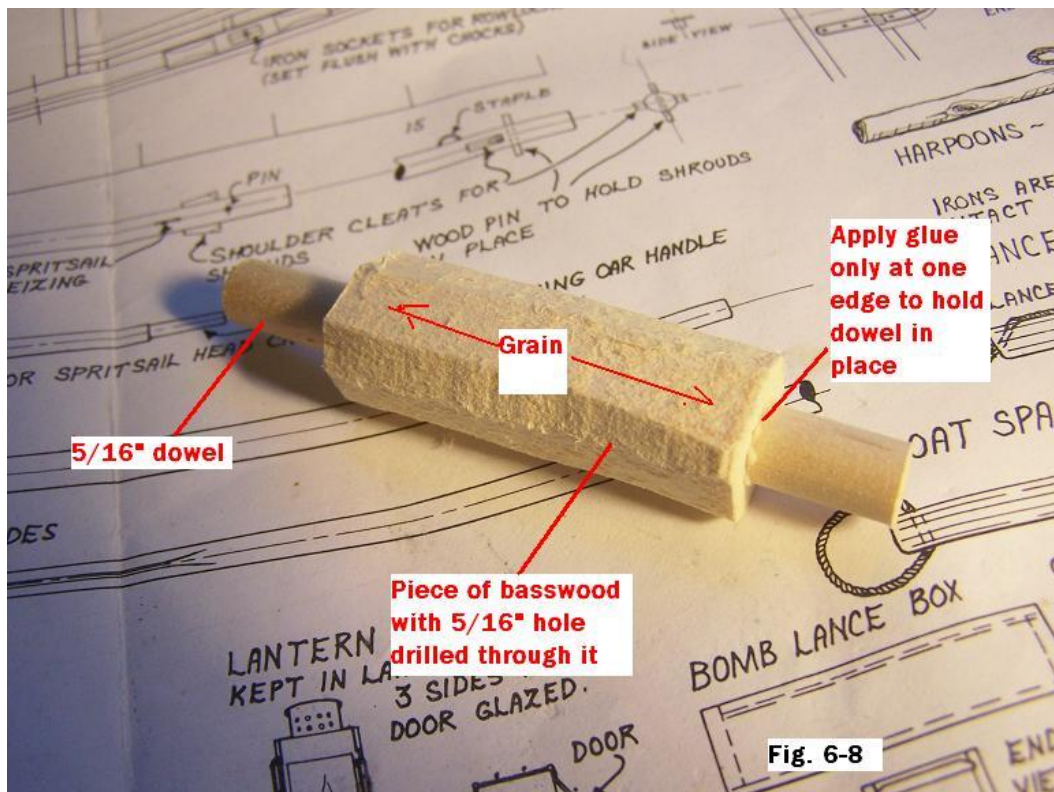
For the mast use a 14 5/8" length of 1/4" doweling.

Taper both ends as shown on Plan Sheet 3. Install shoulder cleats for shrouds, the pin, and the iron staple.

For the sprit pole use a 14 ¼” length of 3/16” doweling. Taper it at both ends as shown on Plan Sheet 3.

The mast requires 4 hoops whether you decide to rig a sail or not. An alternate way to make mast hoops is to make them from wood by turning them on a miniature lathe, which is a method I’ve used for many years.

We know the mast is ¼” thick at its widest diameter. Thus, the mast hoops should be slightly larger, say 5/16”. Therefore, use a 3-4” piece of 5/16” doweling. Then use about a 3” length of scrap wood into which you will drill a 5/16” hole into its center down the length of the grain. Trim off the edges to prepare it for chucking into your lathe, leaving at least 3/16” of wood all around the dowel area. Insert the dowel into this hole so that it projects about ½” on both sides. Make sure it does not fit too snugly; you want to be able to turn the dowel fairly easily within its hole. Now move the dowel slightly and apply a small amount of glue to only one end of the dowel, pushing it back into place. So far, it should look like Fig. 6-8 below.



Chuck this assembly into your lathe. Using a piece of medium sandpaper, sand the piece of wood smooth on the lathe until only about 1/16" remains around the lathe. Don't sand too much. Now, using a razor saw, carefully make saw cuts into the wood until you reach the dowel – you will feel the mast hoop cut itself off. Don't cut any more deeply that necessary. Repeat this with your razor saw until you have as many hoops as you need. You might want to make a few extra, because they tend to break easily. See Fig. 6-9 below.



Remove the assembly from the lathe. You will now be able to remove the mast hoops from the dowel. See Fig. 6-10 below.



Fig. 6-10

Stain or finish the mast, sprit pole, and hoops as desired. Place the hoops on the mast. Finally, install the cleat for the spritsail tack seizing, finishing it as desired. See Fig. 6-11 below.

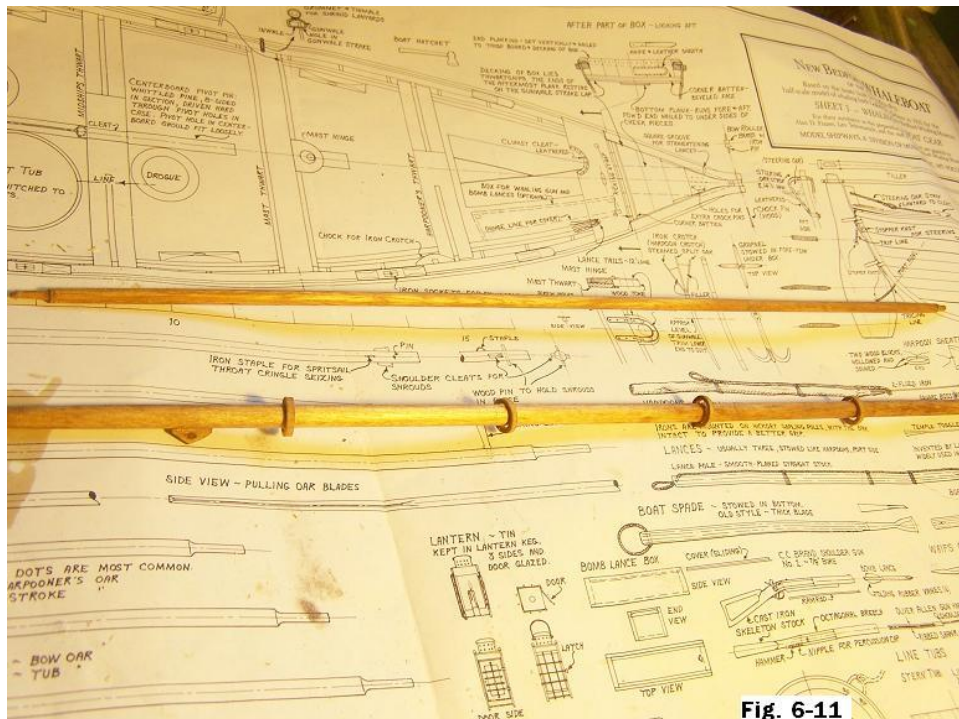


Fig. 6-11

STEP 8: SAIL AND SHROUDS

If you will be displaying your model on a stand or pedestal, I recommend that you rig it with its sail and shrouds.

If you will be displaying your model on davits, as shown on Plan Sheet 4, you may either omit the sail entirely or make the sail and stow it furled.

Read pages 108-116 of Ronnberg's book for making your sail and shrouds. Since my own whaleboat will be a part of a diorama, I will not be installing a sail on mine.

STEP 9: HARPOONS, LANCES, ETC.

If you like working with metal, you will enjoy making your harpoons and lances exactly like Ronnberg describes. Mine are all made from wood, in this case, ash – a hardwood that can be filed to knife-like edges.

STEP 10: THE REMAINING ITEMS – WHALEBOAT LINES, HARPOON CROTCH, GRAPNEL, KICKING STRAP, PAINTER, WAIF, BOAT HOOK, KNIFE, HATCHET, SHEATHS, AND CANVAS WORK

Make all these items as Ronnberg describes. I cannot improve on his instructions, which are quite thorough.

Ronnberg illustrates one way to install all the gear on the whaleboat. I have seen dozens of pictures that show other ways, some radically different from Ronnberg's. The only thing that seems consistent among these photos is the placement of the line tubs, water cask, and other buckets.

I recommend that you take a look at available photos on the internet for a few of these variances, and then decide for yourself how you wish to arrange your own whaleboat gear.

Figs. 6-12 through 6-17 show a few pictures of the whaleboat gear.

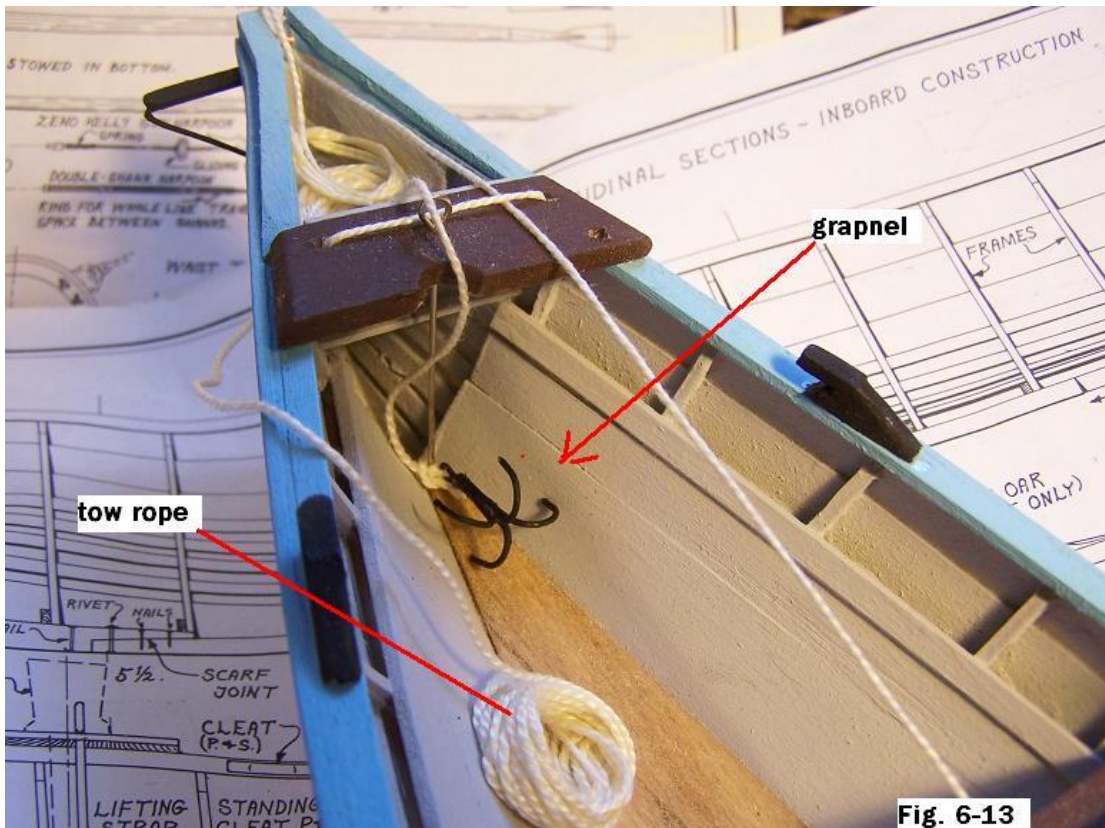
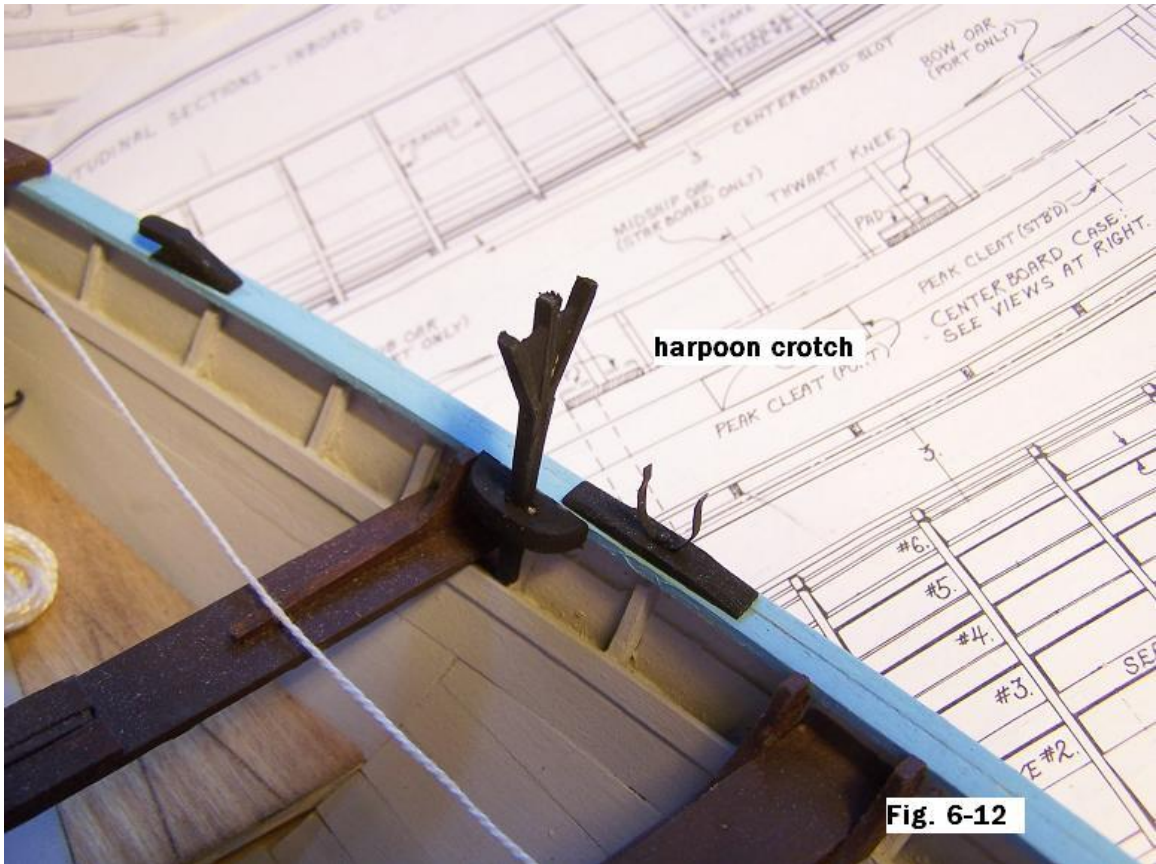




Fig. 6-14



Fig. 6-15

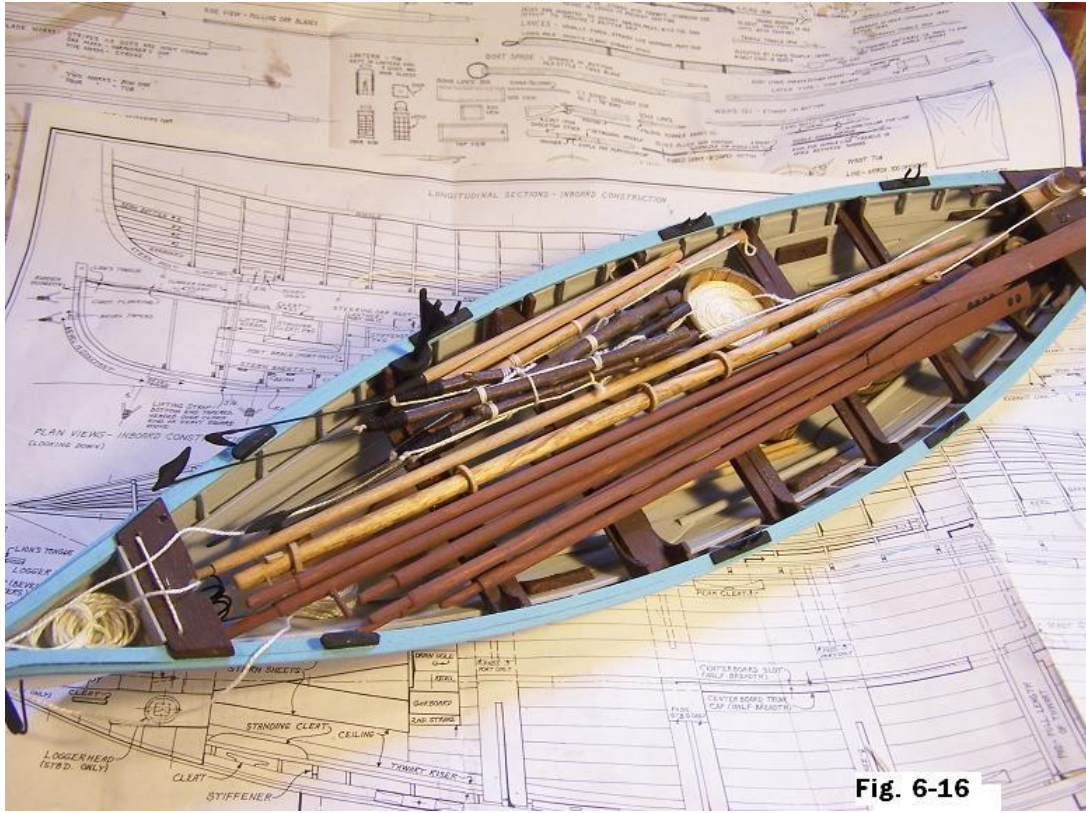


Fig. 6-16



Fig. 6-17

STAGE 7: RIGGING THE WHALEBOAT ON SHIP'S DAVITS

STEP 1: BUILDING THE AREA OF A SHIP WHERE THE DAVITS WILL BE FITTED

If you wish to rig your whaleboat on a ship's davits, first you need to build at least the area of a ship where the davits will be fitted – bulwarks. Ronnberg provides detailed plans for one on Plan Sheet 4. Note that his plans are drawn in 1:32 scale; therefore, you must enlarge them to 1:16 scale (double the drawing size) so your ship's bulwarks will be on the same scale as your whaleboat.

This step will not be described here. Ronnberg does not describe how to build the ship's bulwarks. You may wish to use plans for an actual whaler instead of using Ronnberg's plan – it's entirely up to you. I used a set of plans for the Charles W. Morgan, building about a 30-foot area aft of the foremast, which includes the tryworks, a hatch, a companionway, the head, the foremast rigged with its shrouds and ratlines, and pin rails. Finally, I made a rather crude human figure out of Sculpey to give the observer a sense of scale. See Figs. 7-1 and 7-2 below.





Upon this segment of the Morgan I will install the whaleboat fully equipped with all its gear. My plan is to build a second whaleboat for the opposite side of the vessel, but leave this one completely empty of all whaleboat gear.

STEP 2: BUILDING THE DAVITS

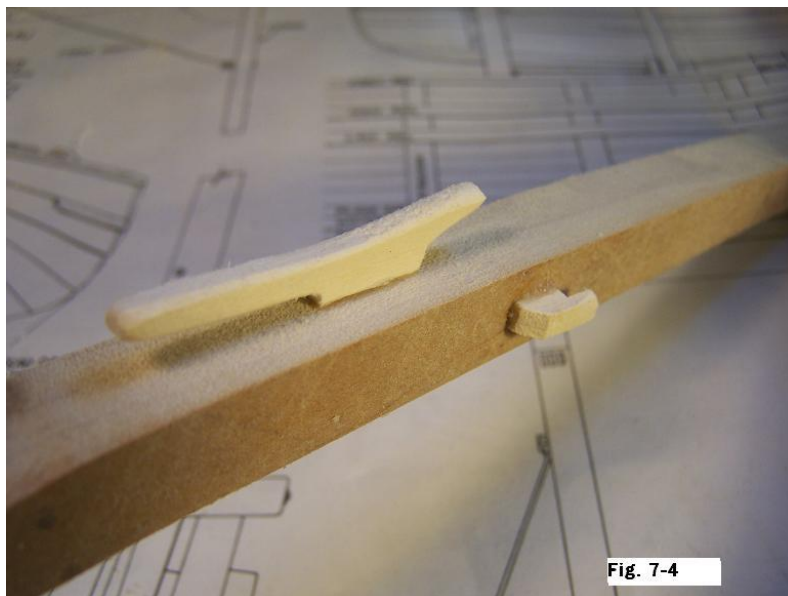
Cut two davits from a piece of $\frac{1}{2}$ " thick wood and cut it out. The pattern is found on Plan Sheet 4. See Fig. 7-3.



STEP 3: INSTALLING THE HORN CLEATS AND THUMB CLEATS

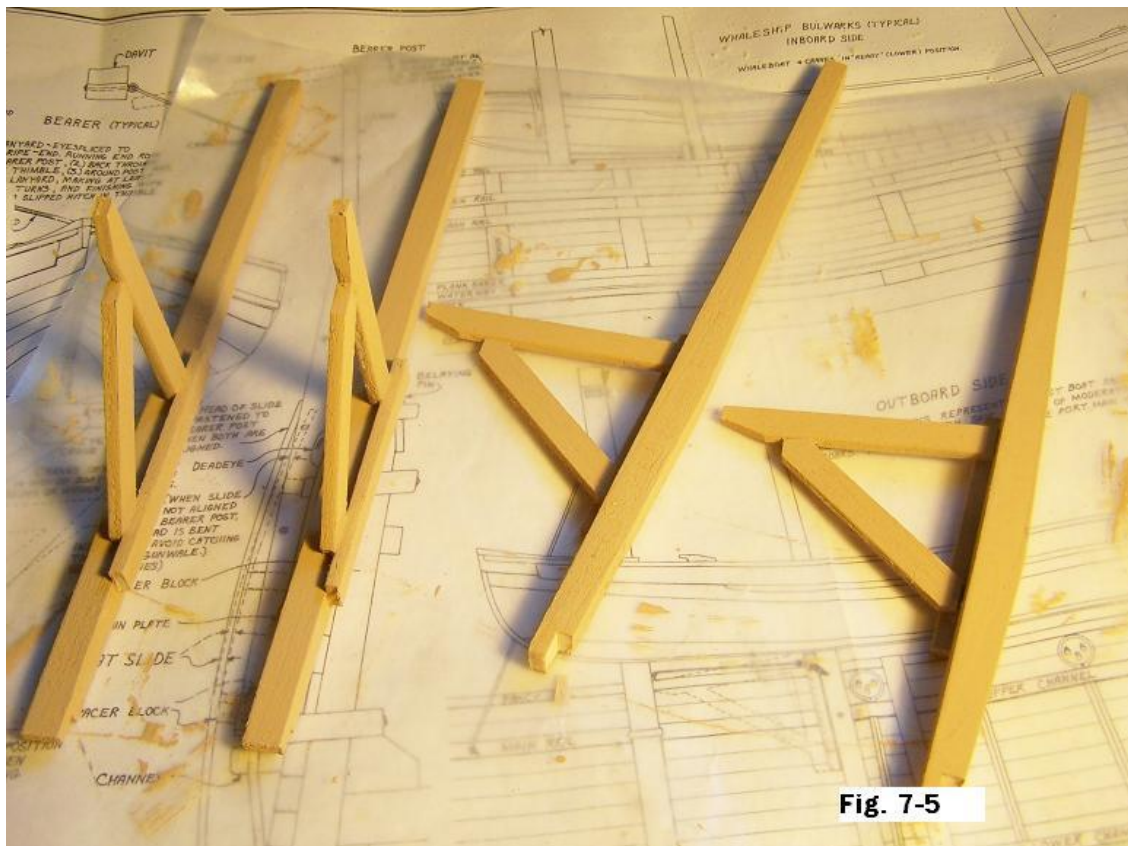
Make an install the horn cleats and thumb cleats as shown on Plan Sheet 4. Glue and dowel them in place.

Drill holes in the upper end of the davits for the boat tackle. See Fig. 7-4.



STEP 4: MAKING THE BEARERS AND CRANES

Following Ronnberg's Plan Sheet 4, make the two bearers, as shown. Make and attach a crane with a pintle and gudgeon to each of the bearers. See Fig. 7-5.



STEP 5: INSTALLING THE DAVITS AND BEARERS

Glue and dowel each davit and bearer in place on the bulwarks. See Figs. 7-6 and 7-7.



Fig. 7-6

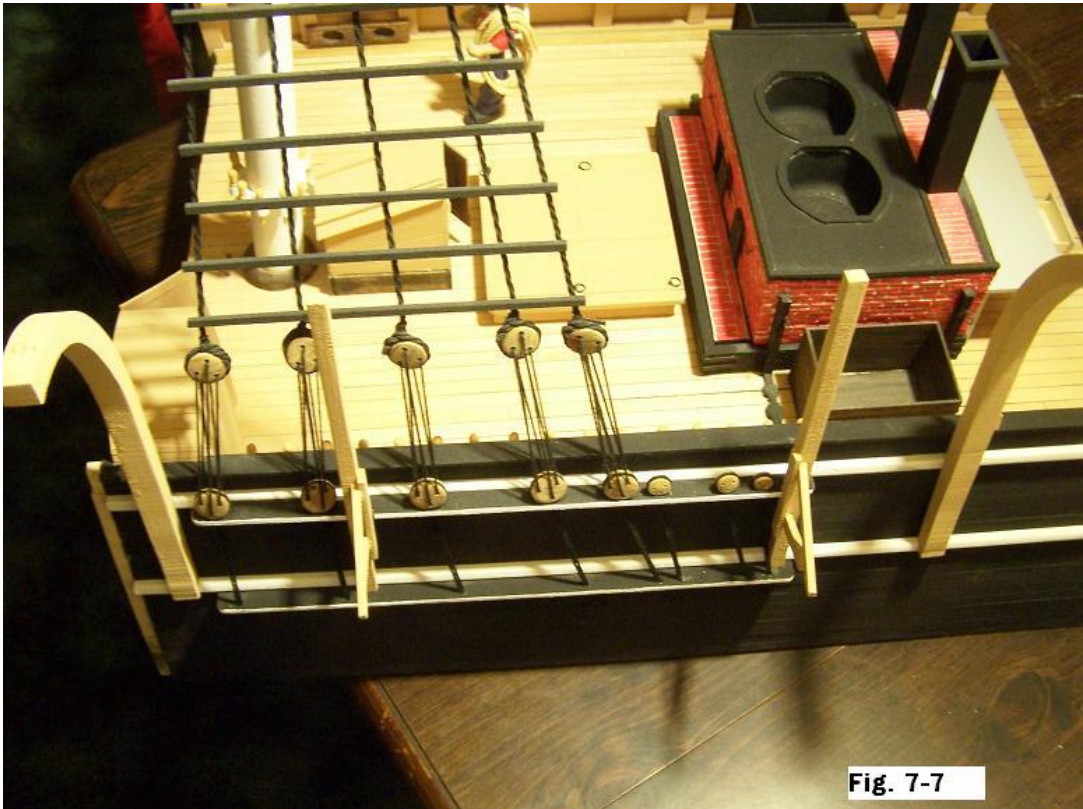


Fig. 7-7

STEP 6: RIG THE WHALEBOAT ON ITS DAVITS

Make two ½” double blocks, and stain them as desired.

Prepare the rigging tackle for the whaleboat, noting that the hauling end passes under the thumb cleat and is tied off at the horn cleat. See the finished whaleboat project in Fig. 7-8 through 7-10.



Fig. 7-8



Fig. 7-9



Fig. 7-10