Instructions for the

Catspaw Dinghy Builder's Model

THE BACKGROUND

The original Catspaw Dinghy was developed by Joel White in late 1977 in response to a need for a boat similar to, but a little larger than, Nathanael G. Herreshoff's *Columbia*-type dinghy. The Columbia Dinghy had been described by Barry Thomas in his Mystic Seaport monograph entitled *Building the Herreshoff Dinghy*, and the result was that a large number of individuals became interested in the boat. And there was good reason: the dinghy was lovely, light and fast, and fairly easy to build. But unlike the Columbia Dinghy, the Catspaw was developed for carvel construction, since the first owner had required a boat for beaching on rocky shores. As with the Columbia Dinghy, interest in the Catspaw exceeded all expectations. Over the years, many boats have been built to these plans, and the design has been very successful. As a boat for both sailing and rowing, it is hard to improve upon.

THE MODEL

This model kit is designed to help you learn the processes involved in traditional boat construction. The instructions, therefore, are written with that purpose in mind and do not suggest shortcuts in any process. Of course, you may wish to take shortcuts wherever possible. If you do, the results will, in many cases, look much the same, so it is simply a matter of how thoroughly you wish to duplicate the full-scale steps. No parts have been pre-cut, so builders must work up each piece using plans, patterns, and careful measurement. The plans are scaled from the original Catspaw plans, and are not the inexact caricatures that are often found in model kits. In this way, you proceed through the steps as if building the boat on a larger scale, and you come away from the project with a clear sense of what is involved in the construction of a small lapstrake boat. It may be just the accomplishment you need to take on a full-scale project.

The text and photographs were prepared by Rob Wadleigh, a professional model builder from West Barnstable, Massachusetts. Rob developed the instructions and shot the photos while building the prototype model. His high standards are apparent throughout the construction.

MATERIALS AND TOOLS

The plans serve both as a guide and as patterns, in certain instances, for cutting out parts from the wood supplied. We suggest that, rather than cutting the plans sheets themselves, you use carbon paper to transfer the shapes either directly to the wood, or to a piece of light cardboard which can be cut out as a pattern. In this way, the plans can remain intact. In any case, be precise in your pattern and cutting work. A very small error can create problems as the construction proceeds. Most of the joints are glued with ordinary woodworking glue, although certain joints require the so-called "superglue." USE EXTREME CAUTION WHEN USING SUPERGLUE! DO NOT ALLOW IT TO COME IN CONTACT WITH YOUR SKIN! READ ALL INSTRUCTIONS AND CAUTIONS THOROUGHLY!

You will need a 6 x 24″ piece of ¾″ wood for the building-jig base. Hardwood plywood is best, but basswood or pine will do fine. The object is to provide a firm and stable base upon which to set up the molds and construct the hull.

You will also need 16 1″ #10 pan-head screws (or flathead wood screws) for fastening the station mold cleats down to the building-jig base, and three dozen ½″ #2 brads for fastening the molds to their cleats.

Additional tools and materials needed or recommended are:

Carpenters' glue (yellow or white)
Fine sandpaper (220 grit)
Paint or varnish
Common pins
Single-edged razor blades or X-ACTO knife
Centerpunch
1/16″ twist drill
#66 twist drill
#68 twist drill
Pin vise for small drills
6″ steel rule, graduated in 64ths
A few 3 x 5″ cards
Tin snips
A few toothpicks
Two dozen wooden spring-type clothespins
Hard (2H) pencil
Jigsaw or coping saw
Tablesaw or handsaw with fine-toothed cut
Small square
Small hand plane
Mortising and/or butt chisel
Solder and iron
Small quantity of polyethylene plastic
Small hammer
Small gouge

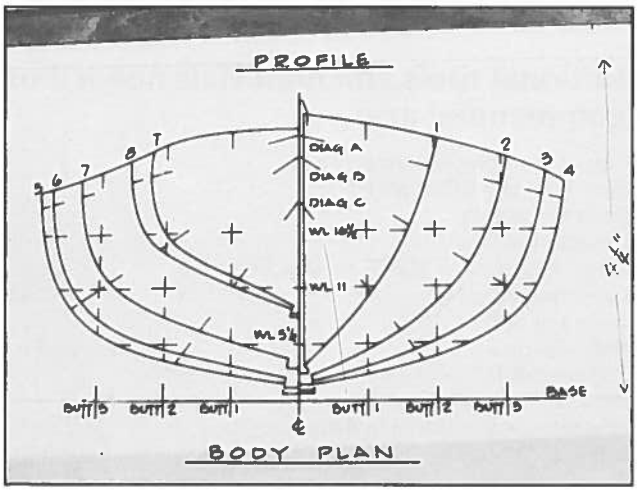
Materials supplied with this kit:

(2) 1/2 x 3 x 24″ basswood (mold cleats, transom frame)
(2) 3/32 x 6 x 24″ plywood (molds)
5/16 x 1 x 24″ basswood (keel, guardrails)
5 mm x 3 x 12″ basswood (stem, knee, gripe, oars)
1/8 x 2 x 10″ basswood (skeg, transom knee, trunk posts, oarlock pads)
(1) 3/32 x 4 x 12″ cherry (transom)
(1) 1/32 x 3 x 12″ cherry (rudder, seats, trunk cap)
1/32 x 4 x 24″ cherry (sheerstrakes)
(8) 1/32 x 3 x 24″ basswood (remaining planking)
(2) 3/32 x 3 x 12″ basswood (centerboard, trunk sides, seat stretcher, thwart knees, tiller, thumb cleats)
(36) 1/16 x 3/32 x 12″ basswood (frames, battens)
(2) 1/16 x 3 x 14″ basswood (floorboards)
1/16 x 2 x 22″ cherry (bilge stringers, risers, inwales)
(2) 1/32 x 1/8 x 12″ basswood (laminated quarter knees)
1/8 x 1 x 4″ cherry (breasthook)
5/16 x 5/16 x 18″ basswood (mast)
5/32 x 5/32 x 18″ basswood (sprit)

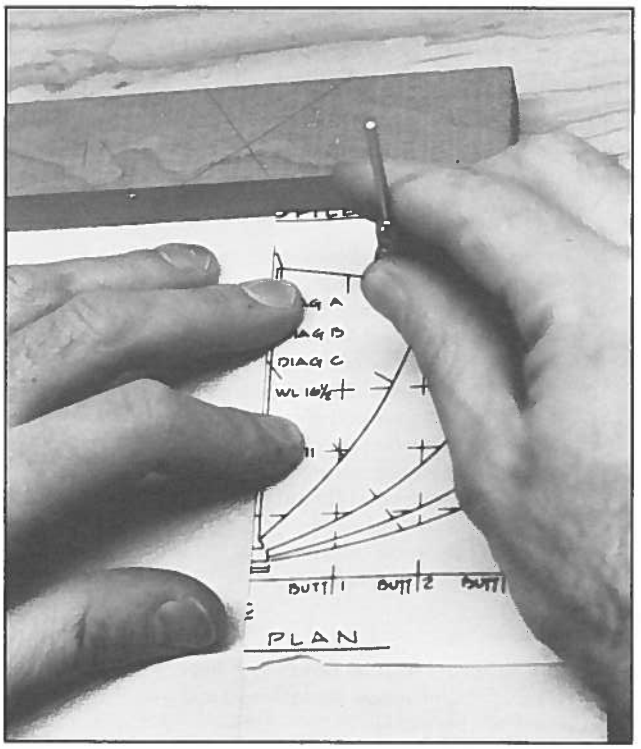
Metal:

.016 x 1 x 12″ brass strip, to be cut as follows:
  .016 x 3/32″ (tiller straps, oarlock sockets)
  .016 x 1/16″ (oarlocks)
  .016 x 1/8″ (rudder hardware)
  .016 x 5/16″ (rudder hardware)
.047 x 1/2″ machine screw & nut (centerboard pivot pin)
.032(ID) x 4″ brass tube (oarlock sockets, rudder hardware, centerboard trunk bushing)
(2) 1/32 x 4″ brass rod (oarlocks, rudder rod)
20 gauge x 42″ copper wire (fastenings)
500 copper nails, for plank fastenings
100 copper roves, for inwales and knees

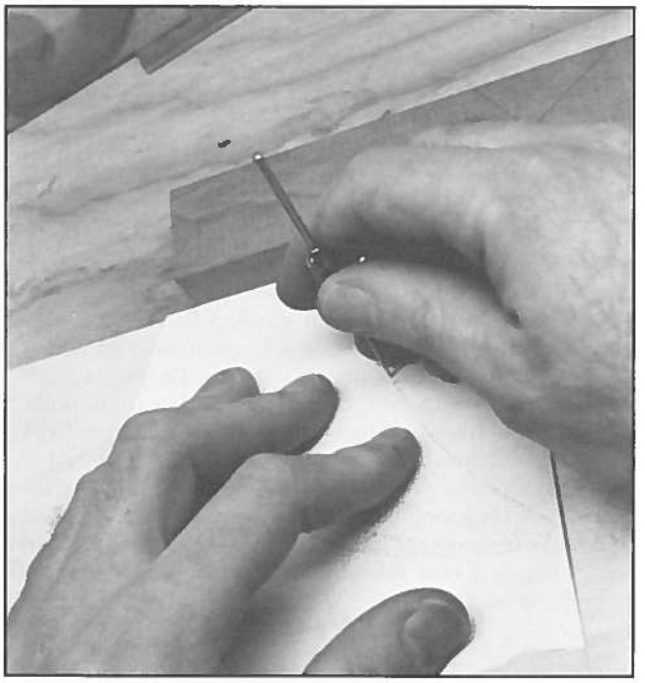
MAKING THE MOLDS



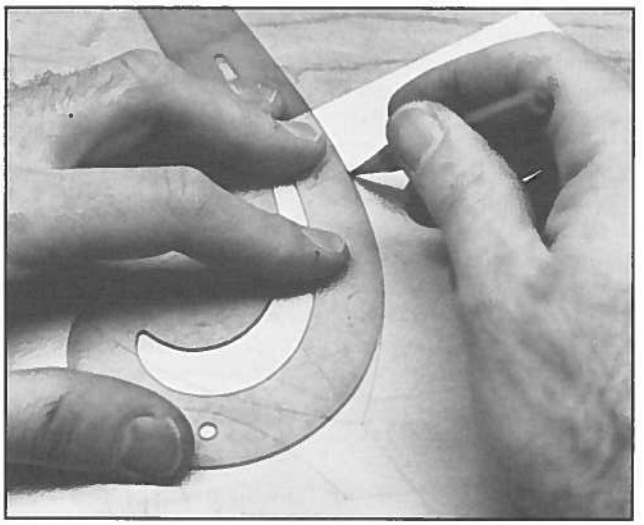
1 Use the body plan as a pattern for making the molds. Measure up 4¼" from the baseline and draw a line parallel to it, to be known henceforth as the construction baseline. (Do the same on the profile drawing for later use.) This construction baseline will be the bottom edge of the molds. Using a single-edged razor blade and a straightedge, cut along this line, then cut the body plan in half along its centerline.



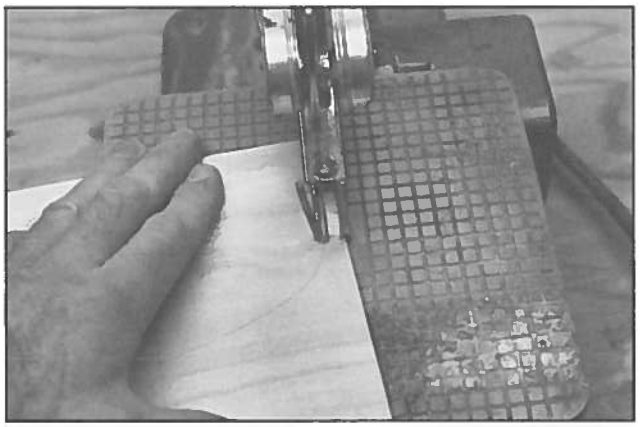
2 Using a square and a sharp hard pencil, draw a centerline on the 3/32" plywood used to make the molds. Place half of the body plan along this line and along the upper (straight) edge of the plywood, and prick through about every ⅛" along the line of one station. A needle placed in a pin vise is good for this.



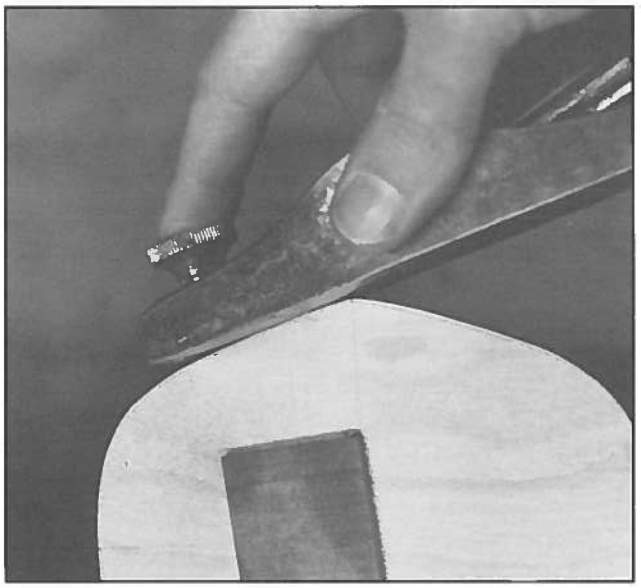
3 Flip the body plan over and, using the same holes, prick through to mark the other side of the mold. Repeat this for each mold and for the transom.



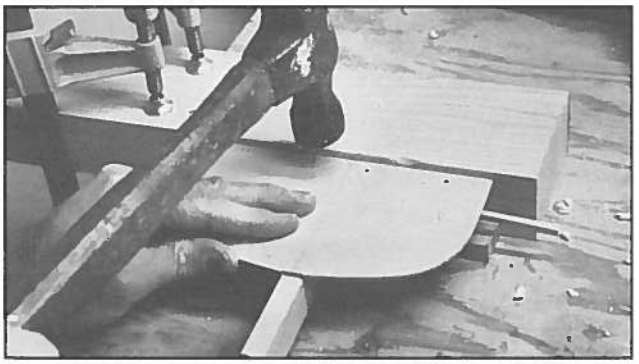
4 Connect the prick marks to form a fair line, using a suitable curve.



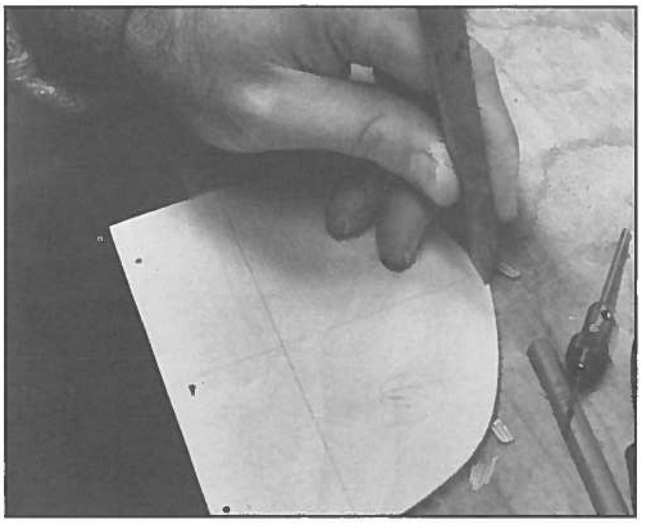
5 Cut out the molds with a jigsaw or a coping saw, leaving a little extra wood outside the line.



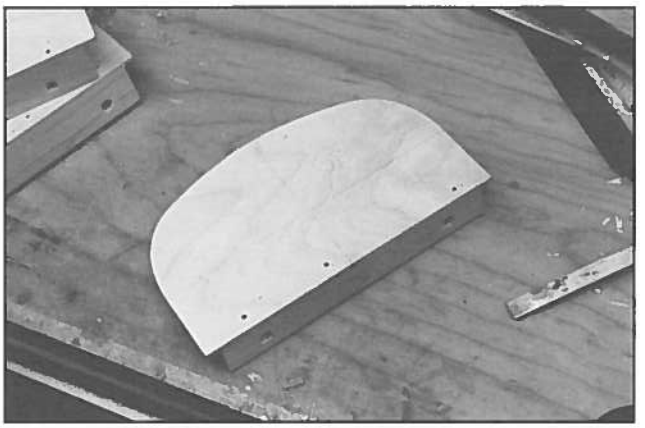
6 Then plane to the line, and finish off with a sanding block, if necessary.



7 Each mold is then glued and nailed to a cleat placed flush with its straight edge. The cleat is 1 x ½" and about ½" shorter than the width of the mold. Be sure the top edge of mold and cleat are aligned flush.



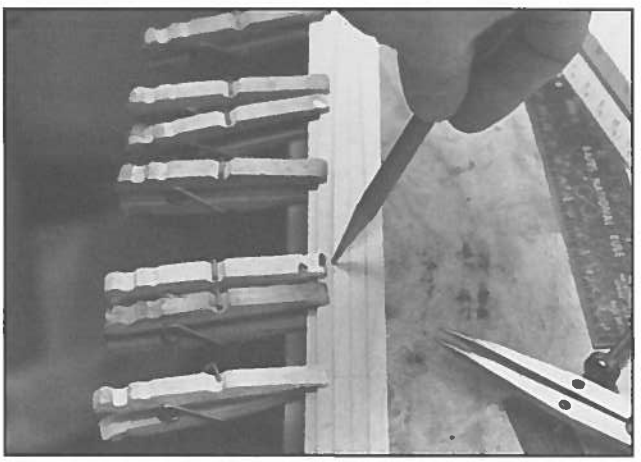
8 Cut notches in each mold for the keel. Each can be measured from the drawing, or measured from the keel after it has been made. Use a fine saw and a small chisel.



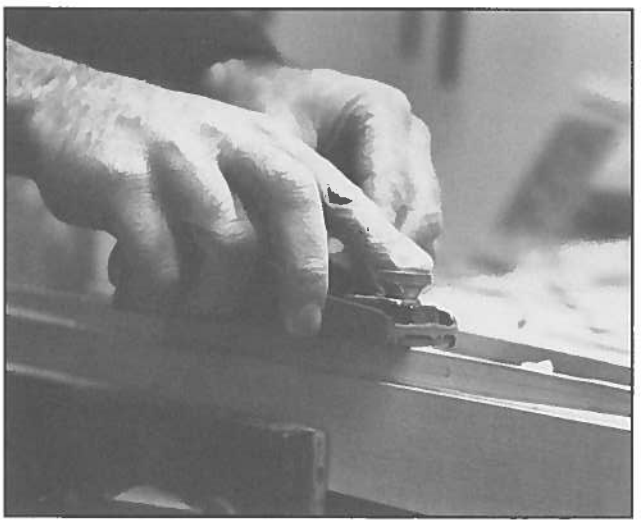
9 The photo shows the completed mold. When drilling holes through the cleats (for 1" #10 panhead screws), make them a little larger than necessary to allow for minute lateral adjustments when attaching the molds to the building board.

KEEL ASSEMBLY

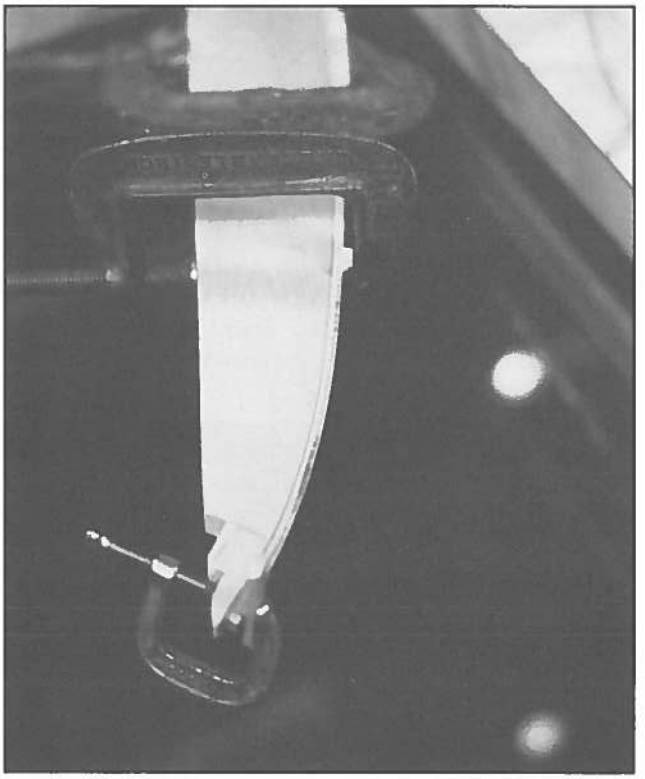
10 The keel is laid out in the same manner as described in the plans; be sure to leave about 2″ extra at each end. (Don't forget the centerboard slot.) The 1½″ = 1′ conversion chart, dividers, and a steel rule graduated in 64ths are very useful.



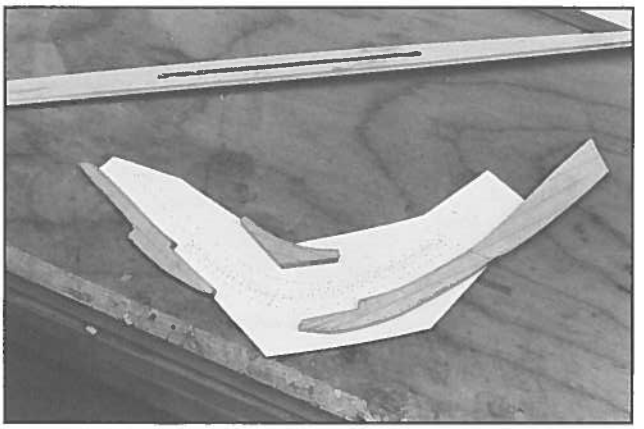
11 To draw the curves of the keel, align and clamp a batten to it, and connect the points with a pencil line. Then, cut it to shape.



12 Plane the keel to the lines. The extra length is used for clamping. Then, rough-cut the keel rabbet parallel to the outlines.



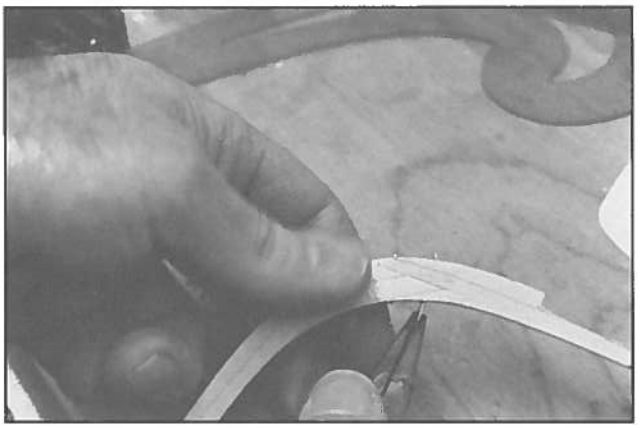
13 To bend the after end of the keel, steam it by inserting it into a teakettle for a few minutes. Clamp it to a form that will overbend the keel to allow for springback. Although this step is not absolutely necessary, it makes things easier when fitting the skeg and setting the keel assembly upon the molds. After the keel cools overnight, the centerboard slot can be cut out and the rabbet reference line drawn.



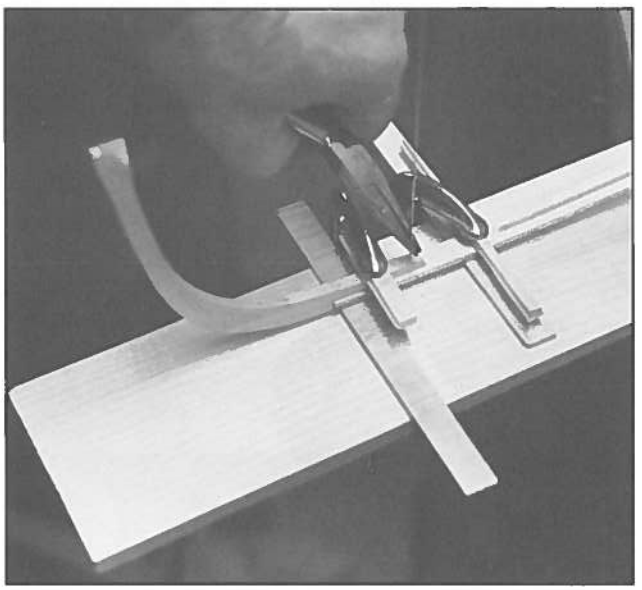
14 Make a pattern for the stem and forefoot structure as you did for the molds, making sure the rabbet, bearding, and middle lines are marked on it, as well as the stem outline. Using the pattern, mark out the stem, knee, and gripe. Be sure to cut the stem long enough to attach to the building board, just as you did

the molds. Holding a mortising chisel firmly against the work when trimming the parts helps ensure right angles.

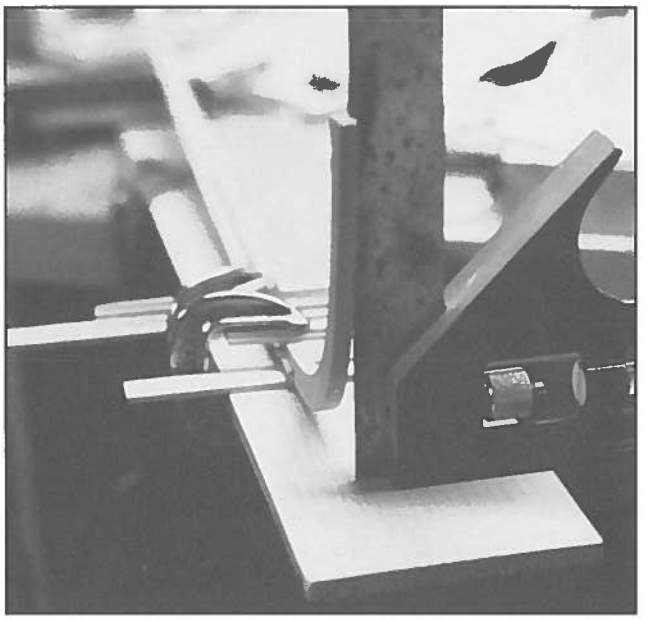
Before gluing the parts together, assemble them over the pattern to make sure they fit properly. Clamp them down (over waxed paper) to a flat surface to keep them in the same plane, then glue and clamp the pieces together with clothespins.



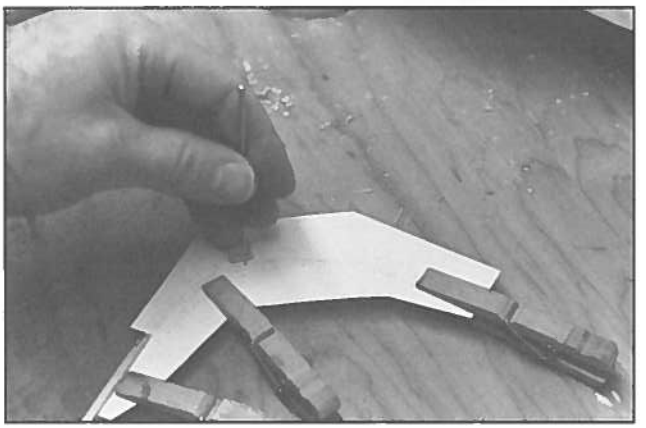
15 When the stem assembly is dry, mark out and drill holes for the bolts, using a #68 drill. Pieces of 1/32" brass rod, driven through, simulate bolts. Excess length is snipped off and filed flush to the surface.



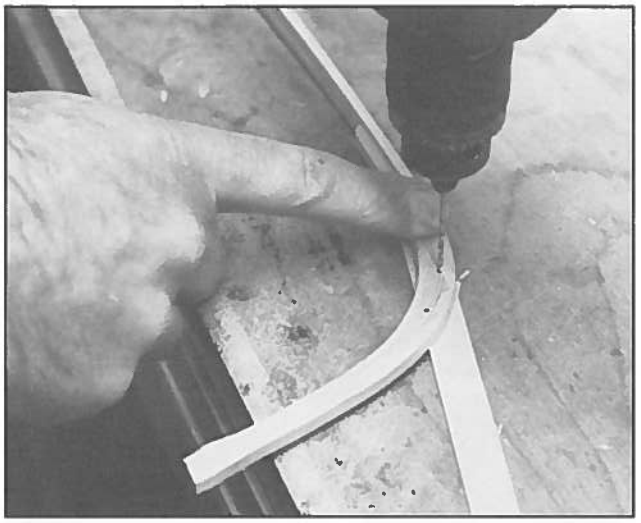
16 The stem assembly is then fitted to the keel; cut only the forward end of the keel to length at this stage, and fit it tightly to the stem. Drill holes for the keelbolts, and press the brass rod partway through—and then disassemble.



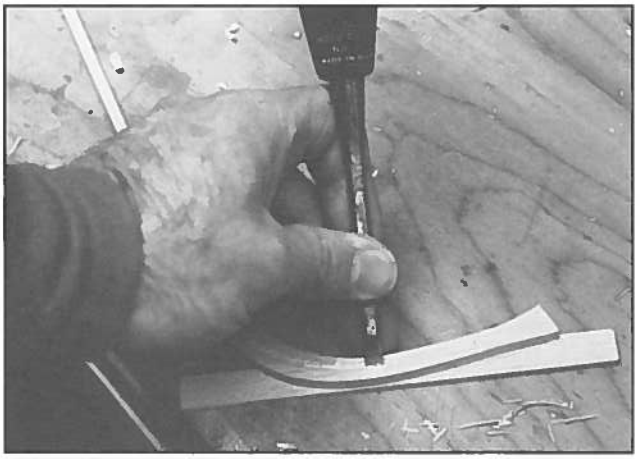
17 Now glue the keel and the stem assembly together. The brass rod and a square will hold everything in alignment until the glue dries.



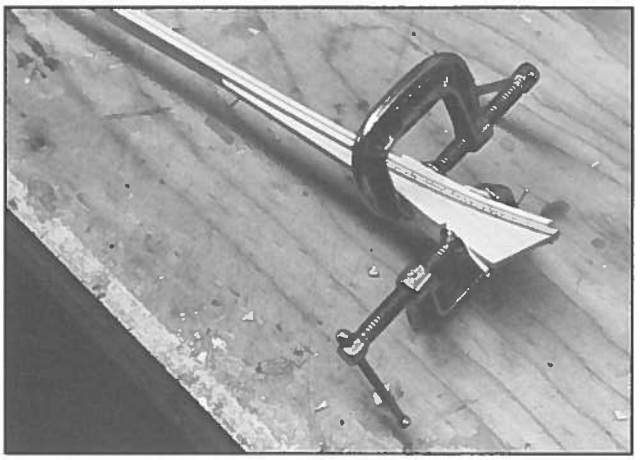
18 Use the stem pattern to mark out the rabbet, bearding, and middle lines on both sides of the stem, and connect the points with a drafting curve.



19 To be truly authentic, you can mark out and drill 1/16″ holes for the stopwaters. Shave the stopwater from soft wood, and then press it through.

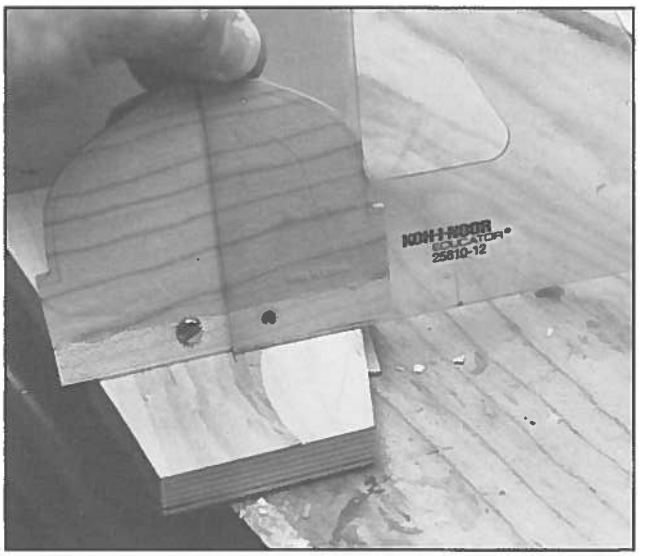


20 Now the rabbet is rough-cut into the stem.



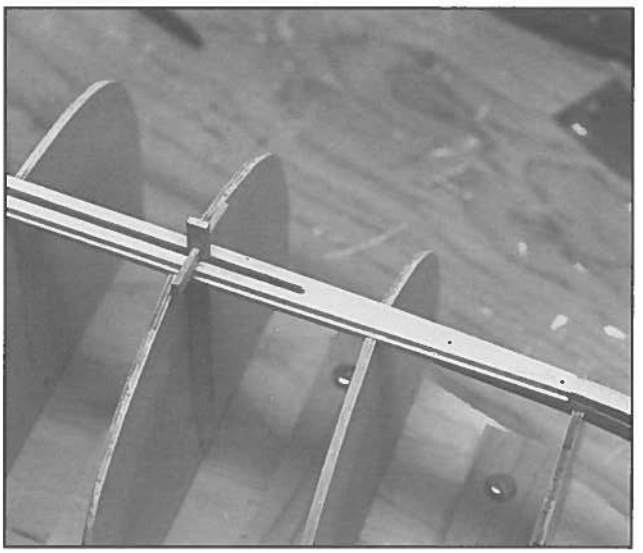
21 Cut out the skeg and fit it to the keel. Pin it in position, as with the stem, then disassemble and glue it. The skeg will help give the keel its proper curve.

THE BUILDING JIG

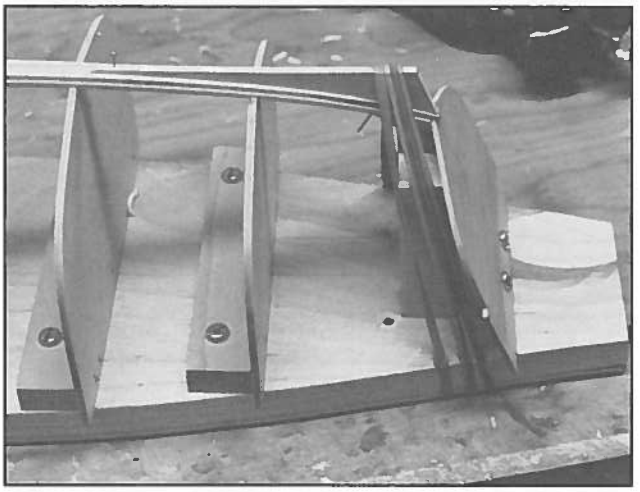


22 Draw a centerline on a piece of 3/4 x 6 x 24″ hardwood plywood, and lay out the station lines with a square. Pick out the stem and transom locations by projecting their lines up to the 4 1/4″ construction baseline on the profile plan. Measure from there to the nearest stations. Cut out the blocks to hold the transom in position and a small cleat to hold the stem. Cut the building board to a shape that allows each mold to project about 1/4″ beyond the edge on each side.

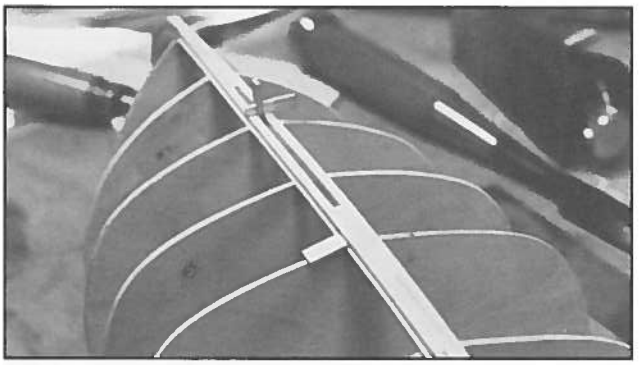
Fasten the molds and cleats down to the building board. The molds forward of amidships are *aft* of the station lines and those aft of amidships are *forward* of the station lines, and corresponding centerlines and station lines are aligned. Cut out and fasten the transom in position and make sure the screw holes are clear of what will be the *finished* transom (see photo). Note that the transom is slightly oversized, for beveling as you plank.



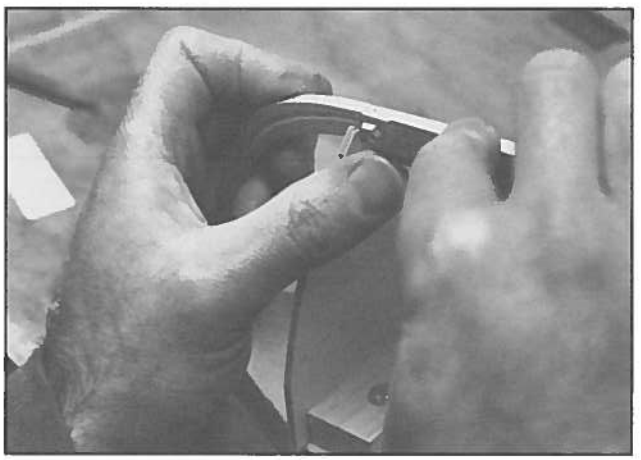
23 Fit the keel-and-stem assembly to the molds. A wedge-and-mortise arrangement through the centerboard slot can be used to hold the keel in position.



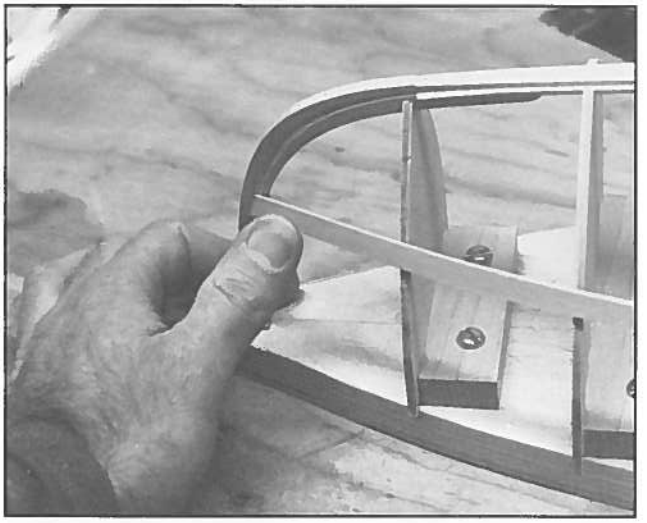
24 Notch the transom for the keel. The notch is as deep as the middle line on the keel rabbet. Glue the keel to the transom. When it has dried, fit and glue the stern knee in position. Pin the knee to the transom and keel with brass rods.



25 To finish the rabbet, use a piece of wood as long as the *width* of the garboard; it will show the proper bevel necessary in the rabbet. Trim the rabbet with a chisel.

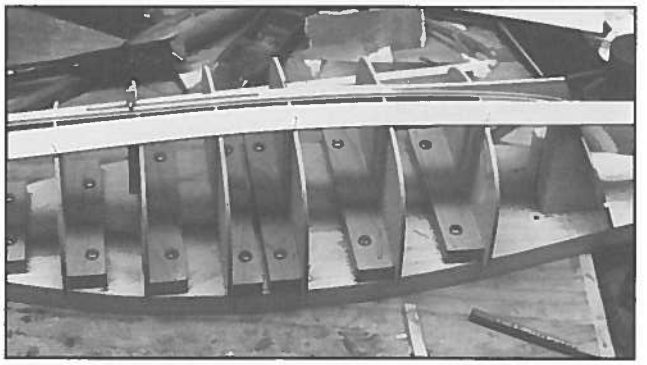


26 Fair the keel-and-stem-assembly rabbet together to make a good landing for the garboard planks.

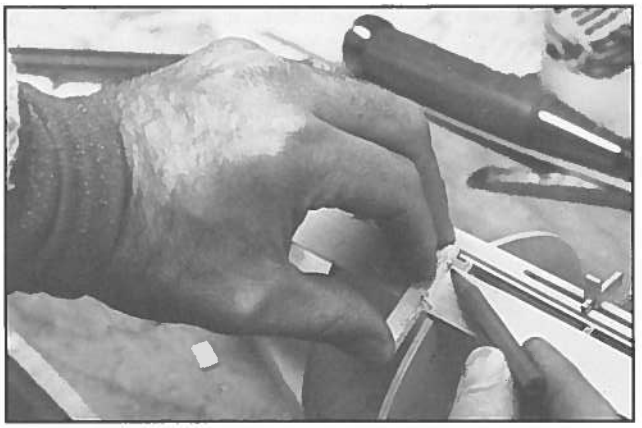


27 Spring a 1/32" batten—the same thickness as the planking—over the molds and trim the stem rabbet, if necessary, for a snug fit. Use the same batten to get the correct bevel at the transom when trimming down to the drawn line.

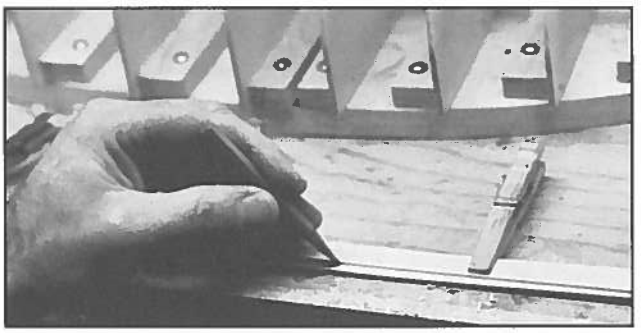
PLANKING



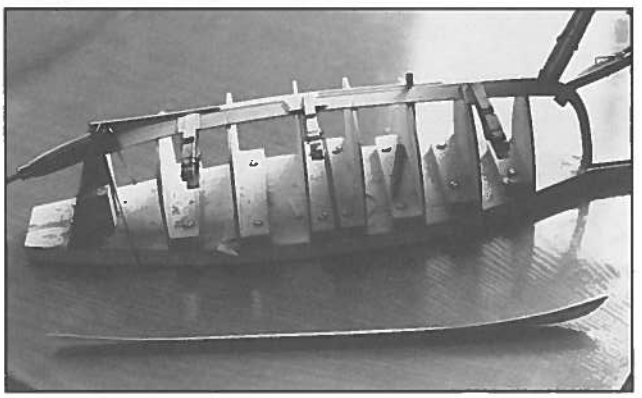
28 The method I used for lining off and spiling for planking is the same as used in Barry Thomas's book, *Building the Herreshoff Dinghy*, published by Mystic Seaport Museum, Inc. The spiling need be done only for one side, since the other will mirror the first. To "spile" the garboards, cut and pin a piece of 1"-wide plank stock to the molds about 1/4" away from the keel rabbet. Be sure that it lies straight, with no edge-set in it.



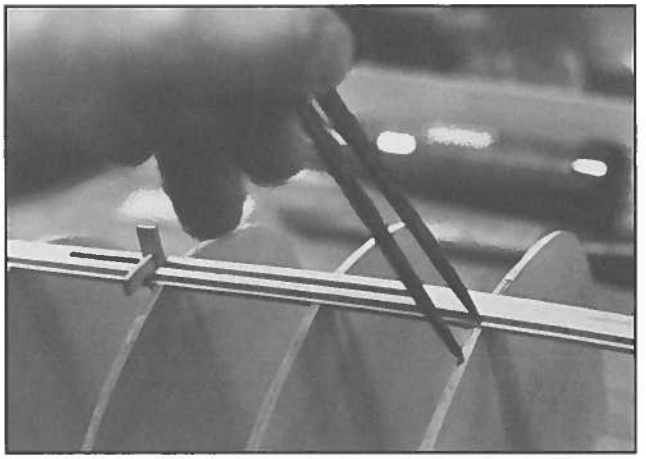
29 Cut a notch about 3/8" from the end of a piece of scrap wood. Use it as a gauge, and put a small tick mark on the plank stock at each mold. Sketch in the curve at the stem, and leave a little extra wood to which to trim down.



30 Spring a batten through the marks and draw a line; then cut near the line with a single-edged razor blade, and plane carefully to the line. Make a second garboard, using the first as a pattern.

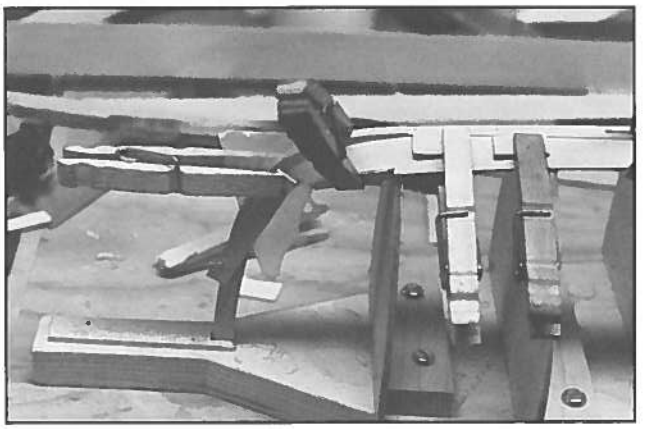


31 Soak each end of the garboards in warm water for a few minutes, and then clamp them to the molds to take a "set." When they are dry, remove and trim them individually for a snug fit along the keel and stem rabbet.

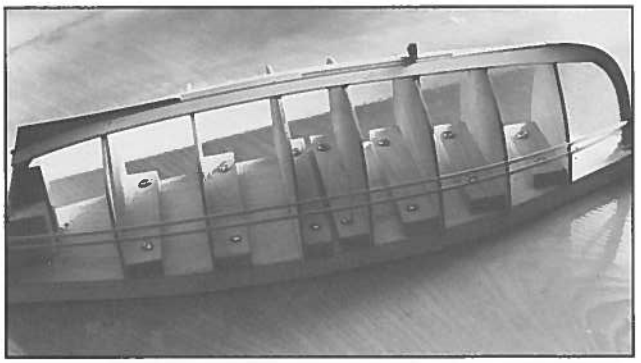


32 The garboard is about 4 3/4" wide amidships (in scale). Use a batten pinned to the molds to determine where the outboard edge of the garboard will fall. (It should run about as shown on the straight molds.) Mark each mold where the batten crosses it, then remove the batten and, using dividers, transfer these marks to the corresponding garboard. Connect these marks with a batten, and cut out both garboards to this shape.

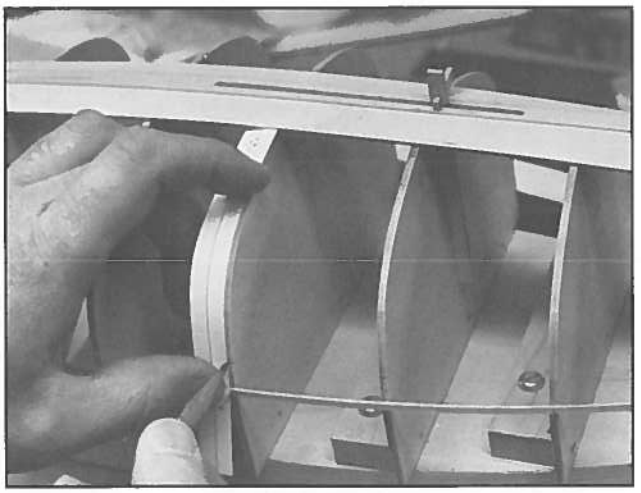
Sand off the pencil marks before the plank is glued on. Be sure to sand away from where you are holding the plank to avoid breaking it.



33 Clamp the plank in position, and glue it on by running "superglue" into the joint. Be careful not to glue the clamps on. Stop the superglue about 1" from the stem and transom. Pry up the ends of the planks, and glue them to the stem and transom with white glue applied with a toothpick.



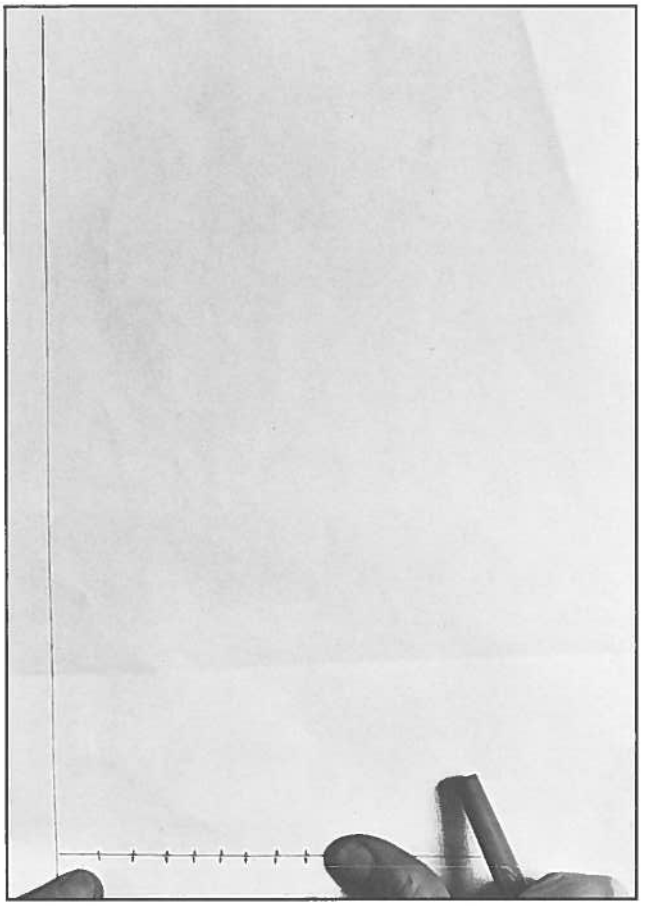
34 Use battens to define the top and bottom edges of the sheerstrake. Mark both edges on the mold. The top batten is not really necessary, because the sheerline is already marked on the molds, but using it helps you to visualize the sheerstrake and serves to correct minor unfairness in the critical sheerline.

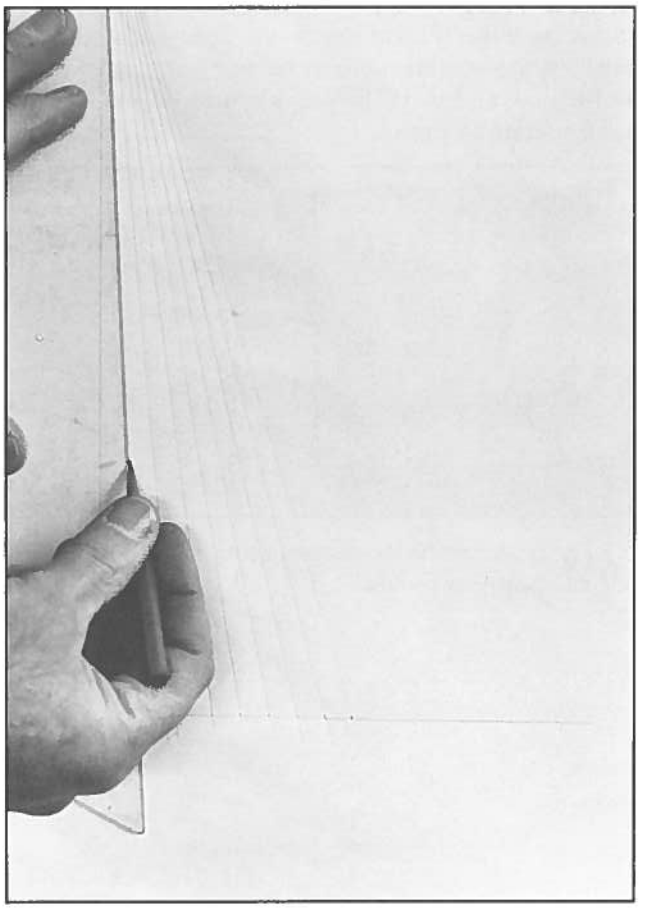


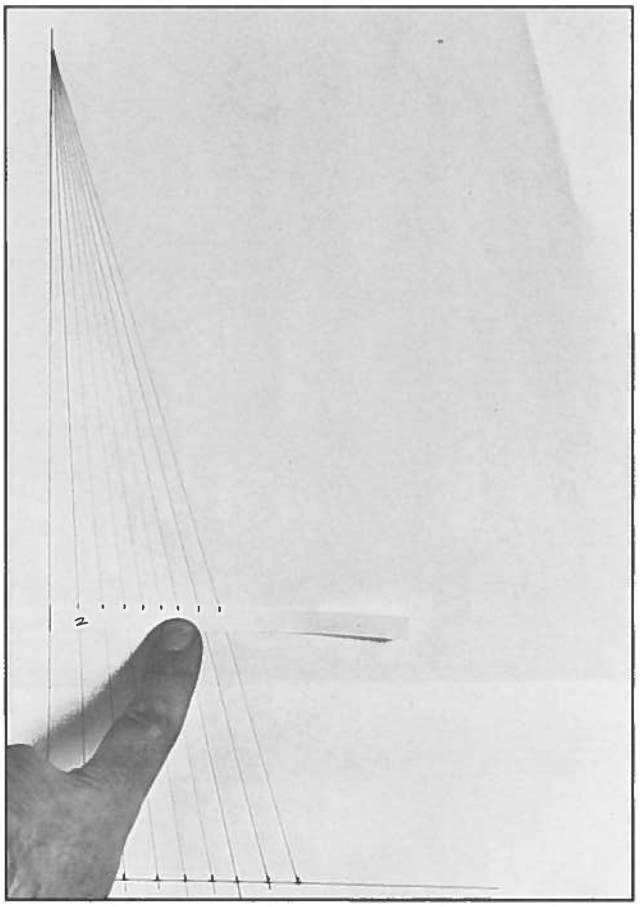
35 Use strips of 3 x 5″ card to measure the distance from the garboard to the bottom of the sheerstrake. Use a separate strip for each station.

36 Lay off the desired widths of the planks on the strip representing the number 5 (amidships) mold. The planks on the bottom should be wider than those at the turn of the bilge. Draw a large right angle on a piece of paper, using the number 5 strip to determine the length of the horizontal line. Mark off the plank widths. Make the vertical leg as long as possible (at least 10″).

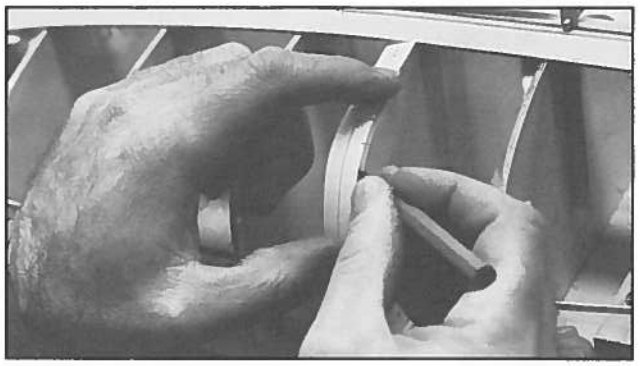
37 Draw lines from a single point at the top of the vertical (longer) leg, intersecting the horizontal at each plank width.



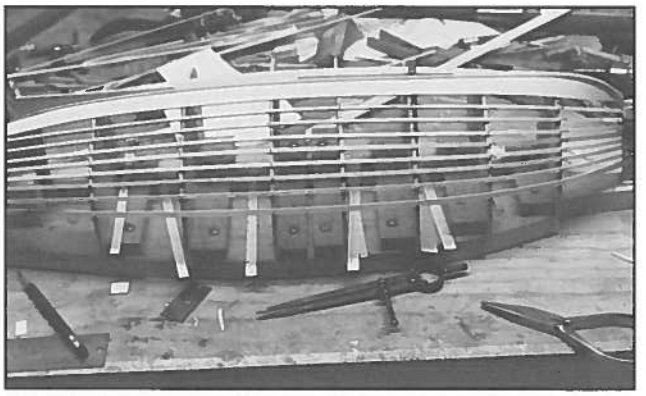




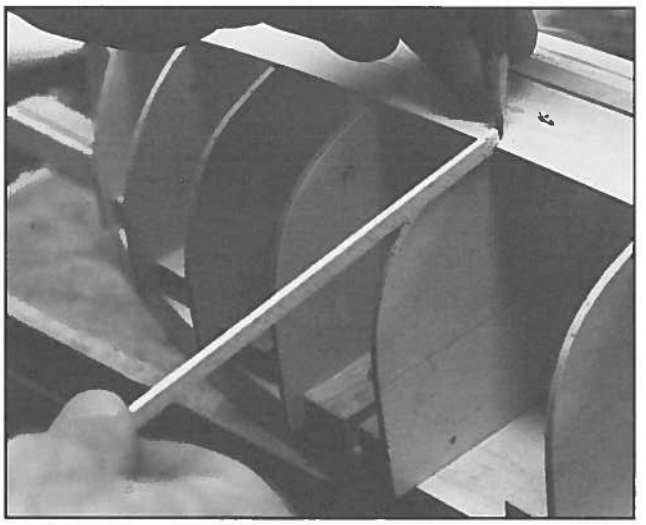
38 The plank widths at the remaining stations are determined by placing each strip so that the distance from the vertical line to the right is equal to the girth of the station mold to be marked next. Keep it horizontal, and mark the plank widths on the strip for each station, as shown.



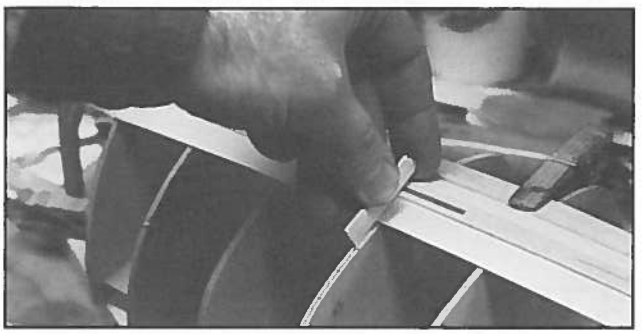
39 Transfer the marks from the strips to the corresponding molds.



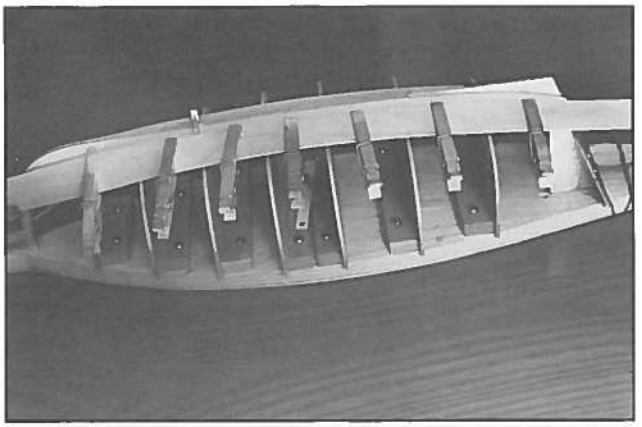
40 It may also be helpful to spring 1/16 x 3/32" battens through the marks to help visualize the planking and establish where the planks will land on the stem and transom. What is all-important is that the sweep of the battens be pleasing to the eye.



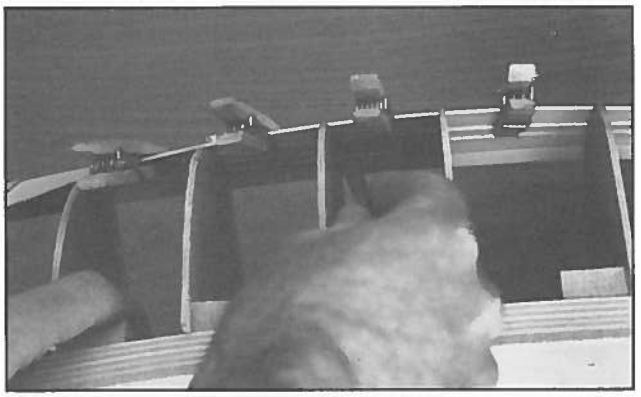
41 Cut a notch the width of the planking laps (1/16") on a piece of basswood. Use this as a lap-width gauge, and put light marks along the plank that is already hung. A mark at each station and one between is enough to guide in beveling the planks.



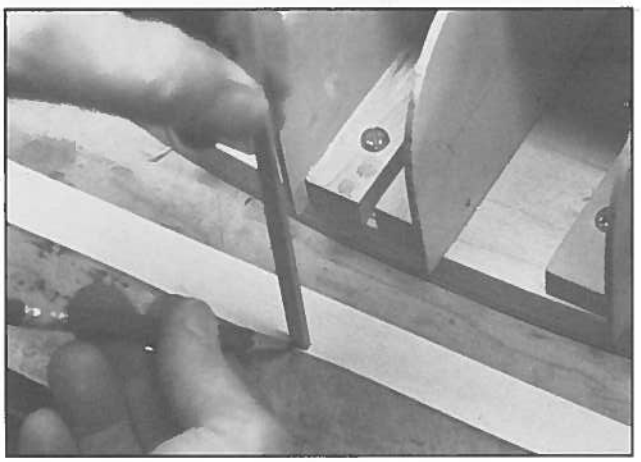
42 Plane a bevel on the previously hung plank so that the next one will be a tight fit for the full width (1/16") of the lap. Use a scrap of wood as a gauge, placing its corner at the mark for the next plank, as shown.



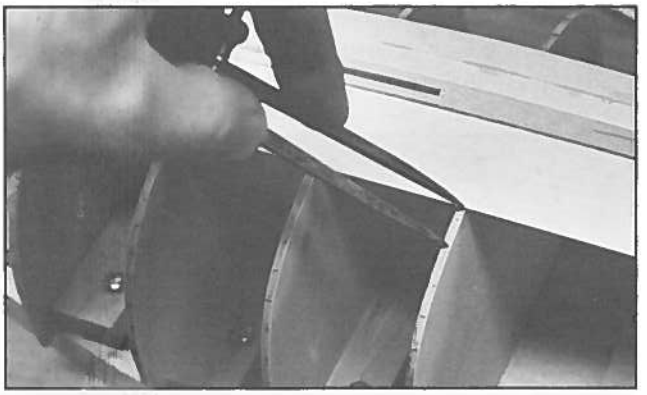
43 Clamp and pin the next plank in place. Make sure it is wide enough to cover the marks on the molds and those along the edge of the previous plank. Locate the snap clothespins so that they grip the edge of the finished plank.



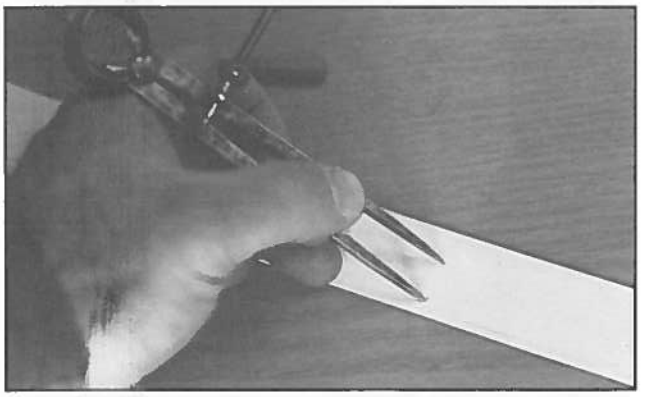
44 Reach underneath and make a light, L-shaped mark at each mold, using the mold and the edge of the previously hung plank to make the L. Use a very sharp soft pencil.



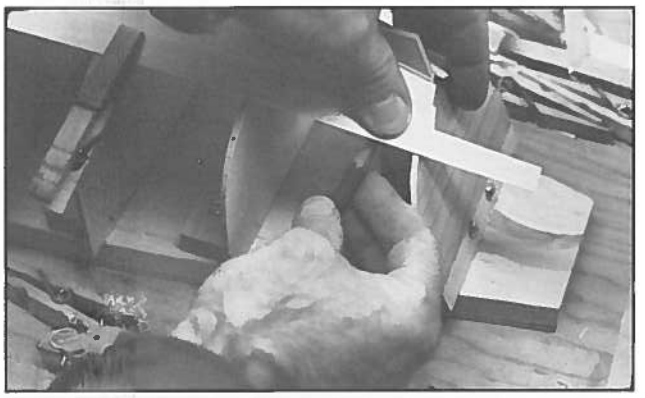
45 Remove the plank. To add the necessary overlap, use a piece of hardwood the same width as the lap for a gauge, and, with it placed as shown, add to the plank's width, measuring outward from the L-shaped mark. Connect these marks with a batten.



46 With dividers, measure the width of the plank at each mold. Measure from the edge of the previous plank to the mark on the mold for the next one.



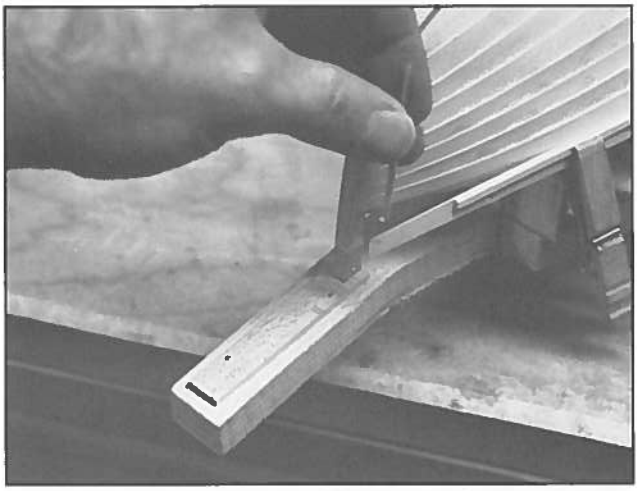
47 Transfer this measurement (the distance from the L to the mark on the mold) to the plank. Do this for each mold, and for the stem and transom. Spring a batten through the marks, extending it in a fair curve to the stem and transom plank endings, and cut the plank to shape. Use a spokeshave to plane the concave curves to shape. Remember to use each finished plank as a pattern for its mate on the other side.



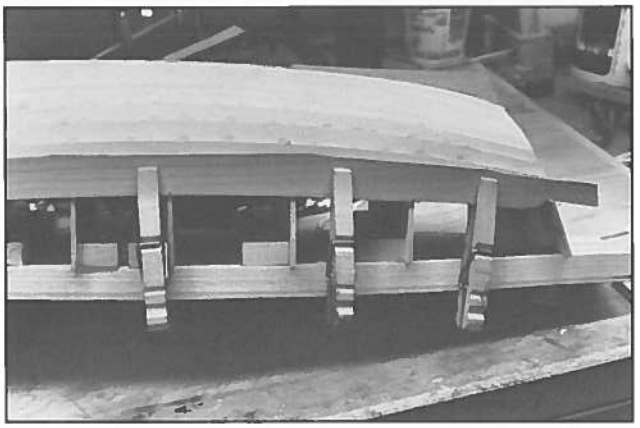
48 Draw a line on each plank to mark the gain (the 1½" extremities in which the planks are shiplapped so as to be flush at the ends) at the bow and stern. It is easier to cut the gain with the previous plank already glued in place. Getting the gains to fit properly is the

most time-consuming part of the planking.

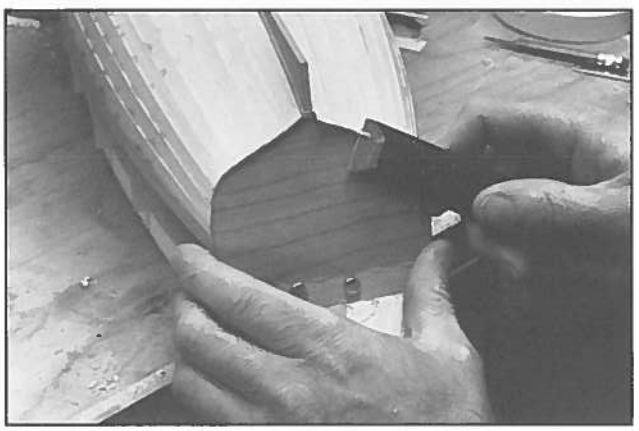
Clamp a scrap of wood on to act as a fence while cutting the gain.



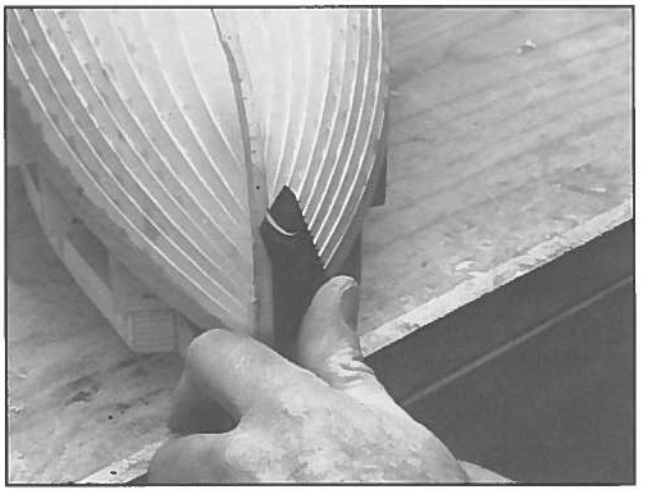
49 Clamp a batten to the plank when gluing to help make a tight joint between the laps.



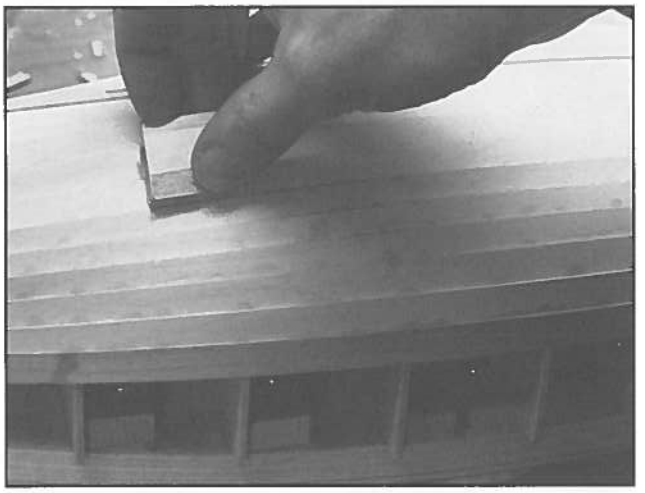
50 Make the sheerstrake of cherry. It is helpful to rough-cut planks like this (with pronounced curve) to make spiling them easier. Keep in mind that the sheerstrake is a little wider than the other planks, so that it will look right when the guardrail is in place. Be sure that the sheer of the sheer is pleasing to the eye, without humps and hollows.



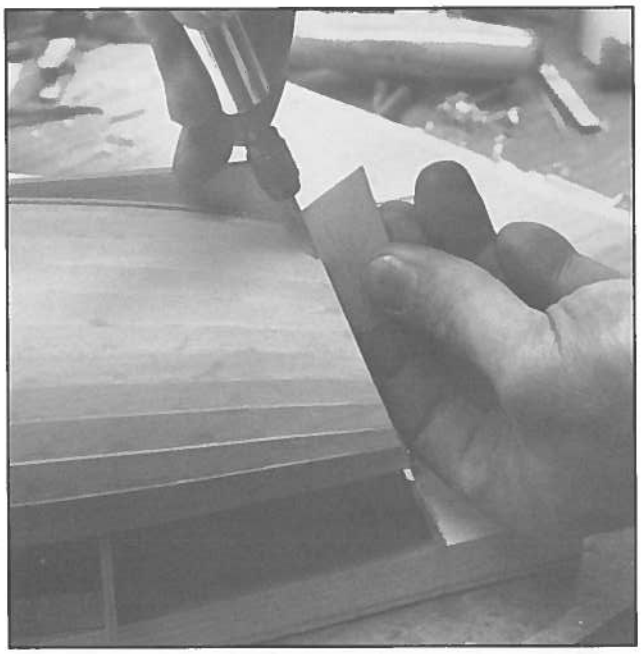
51 When the planking is complete, trim off the planks at the transom. Cut inward with the chisel, toward the transom, to avoid tearing the planking.



52 Trim the stem outside of the rabbet, bringing it down to its proper face width. Clamp the building board to the workbench, and use two hands to guide the chisel.



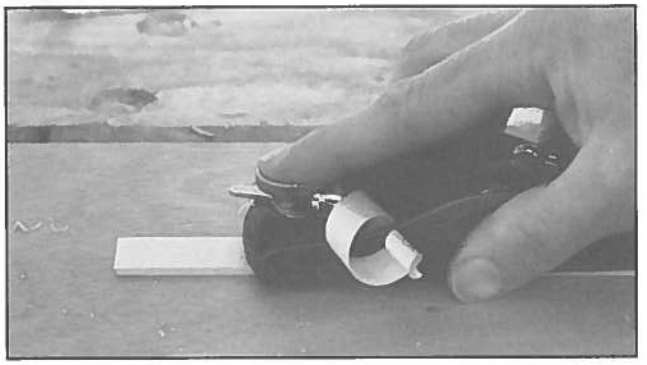
53 Glue sandpaper to a piece of maple, and sand along the laps to smooth areas where the super-glue has fuzzed the wood.



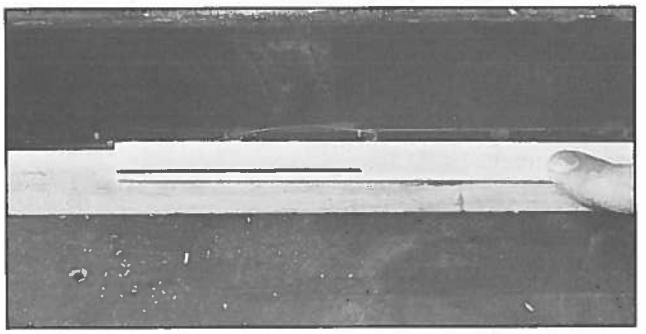
54 Mark out the locations of the planking "screws" at the stem and transom. Drill the "screw" holes carefully with a #68 drill; use a straightedge to avoid running out the sides of the transom. Make the holes about 1/8" deep.

55 File a point on the end of a length of copper wire. Cut off a piece slightly shorter than the holes drilled in the preceding step. File the cut end square, and insert the piece of wire into the hole to simulate a screw. Repeat the process until each hole is filled.

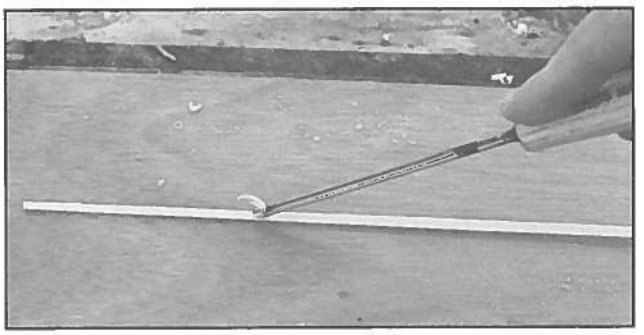
GUARDRAILS



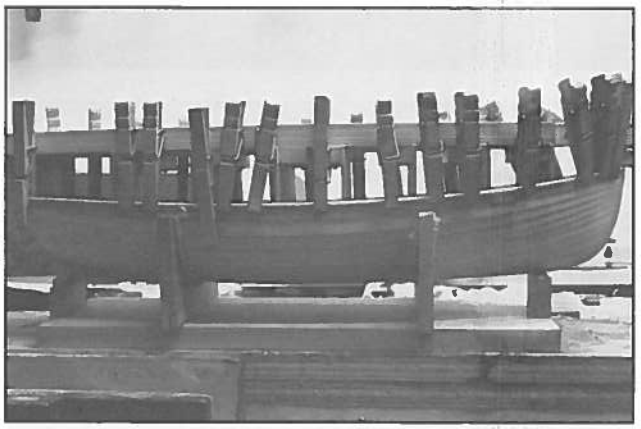
56 To make the guardrails, cut two pieces of 3/16" basswood (or pine) to the maximum width of the rails. Plane a taper on both faces at each end to correspond to the taper shown on the drawing. Plane one edge of each plank to create a half-round. Finish the planks with sandpaper.



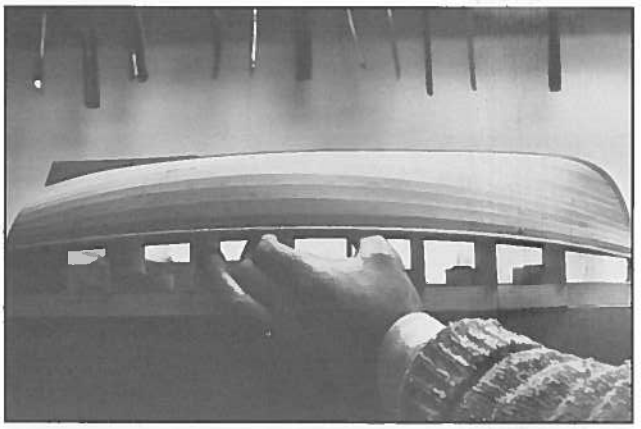
57 Use a table saw to strip off the guardrail as shown, adjusting the fence so the guardrail will be the correct thickness. (The half-round edge faces away from the fence and forms the guardrail.) Use a backing board or a close-fitting table insert for this delicate operation.



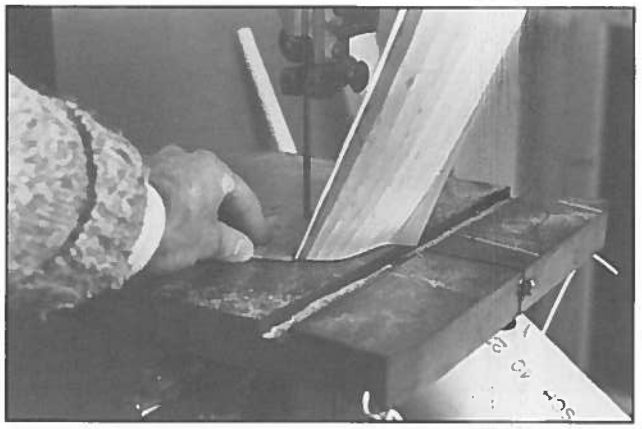
58 Using a gouge, cut a slight hollow in the back side of the guardrail so that it will be a tight fit, top and bottom, against the sheerstrake.



59 Make up a cradle to hold the hull. Clamp the guardrail to the hull and attach it with superglue.

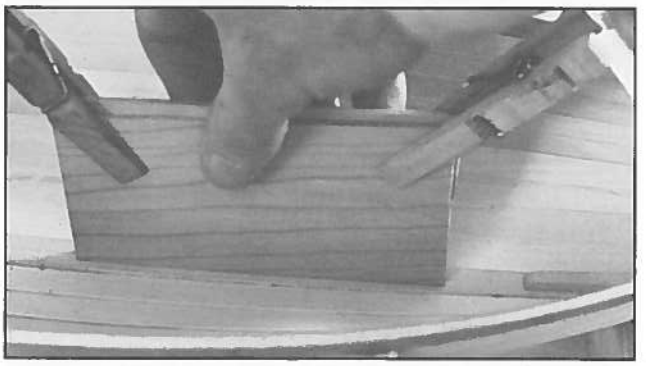


60 Remove the hull by cutting the stem extension and unscrewing the transom. It may be necessary to reach underneath and squeeze the molds together to break any glue that may have inadvertently gotten in the wrong place.

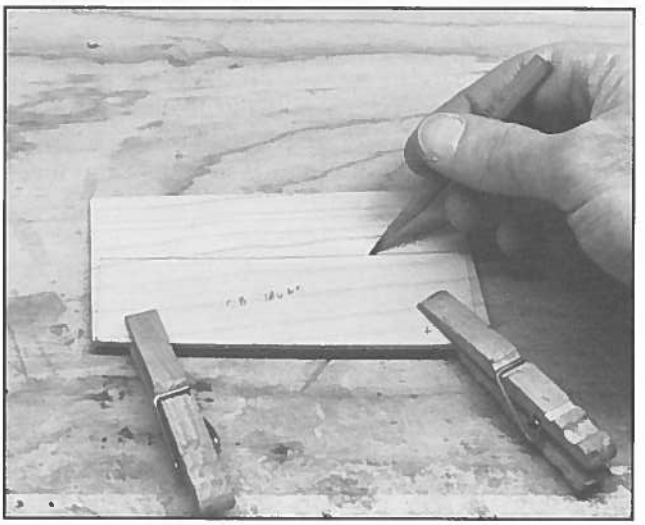


61 Cut the transom extension off to the marked line and finish to that line with a chisel and plane.

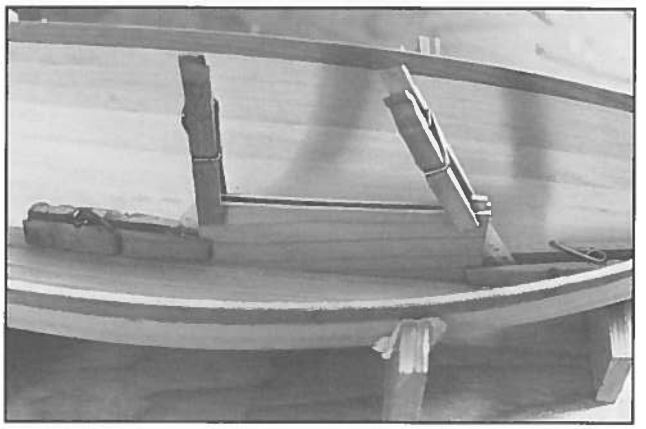
CENTERBOARD AND TRUNK



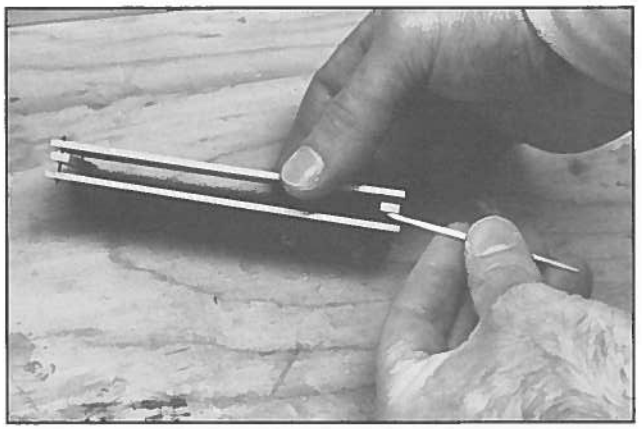
62 Clamp two pieces of centerboard trunk stock together, leaving them a bit oversized. Trim their bottom edges for a good fit along the keel.



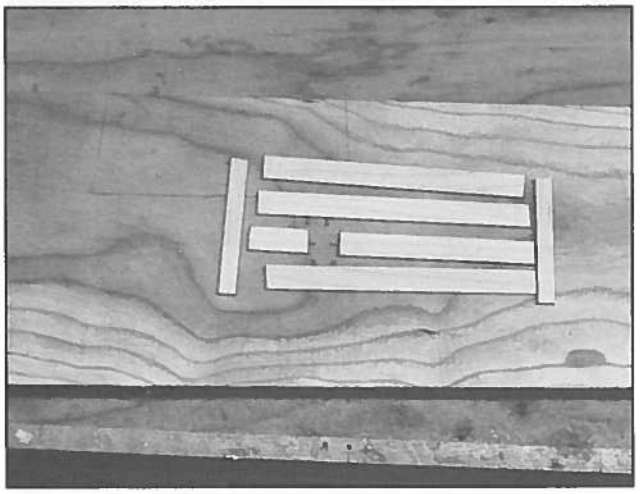
63 Line the centerboard trunk pattern up with the bottom edge, and draw the three remaining sides and cut them to shape.



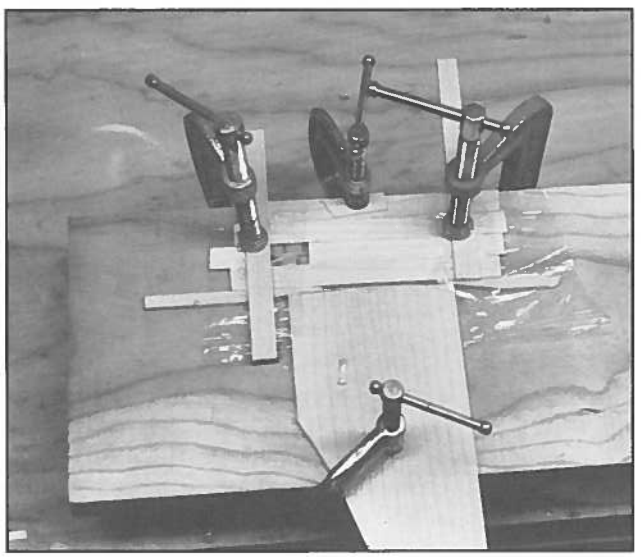
64 Cut out and fit the centerboard trunk posts as shown on the plans. Use templates to make sure the posts are at the correct angle in relation to the keel, and clamp the sides in place as shown.



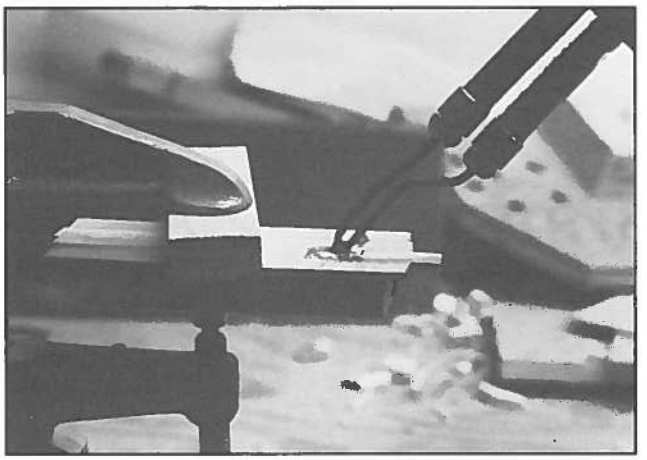
65 Without moving anything, remove the assembly from the hull and drill three #68 holes through the trunk and posts at each end. Insert lengths of 20-gauge copper wire. Pull the pieces apart far enough to put glue on the joint, then clamp them back together. When the glue is dry, cut and file the wire flush with the sides.



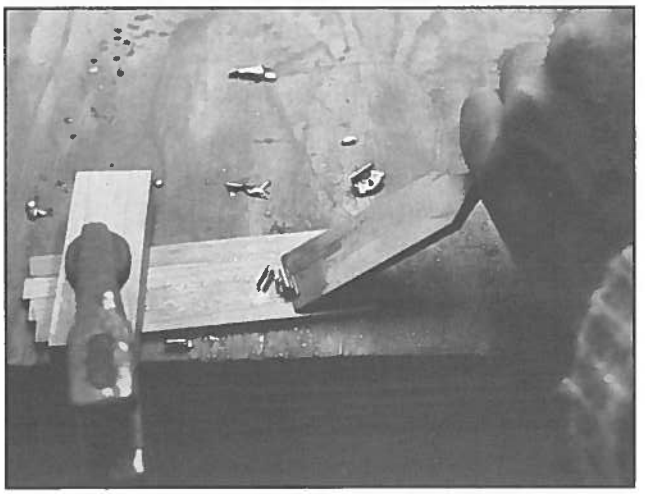
66 Cut out the pieces for the centerboard. Insert the pins that hold the lead weight in place.



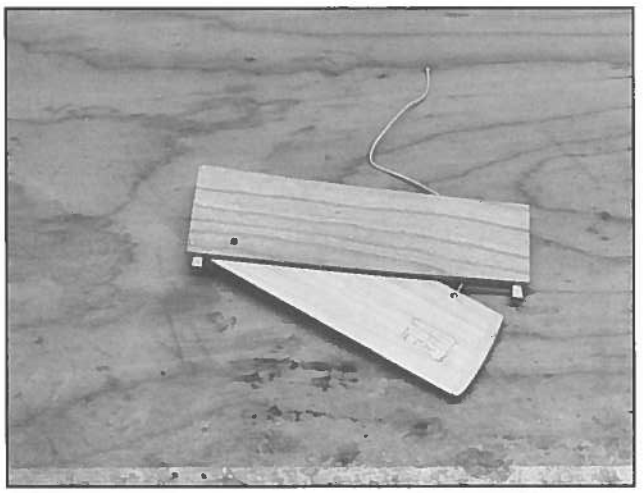
67 Glue the pieces together on a flat surface protected with plastic. The ends will be trimmed and end caps put on after the lead weight is "poured."



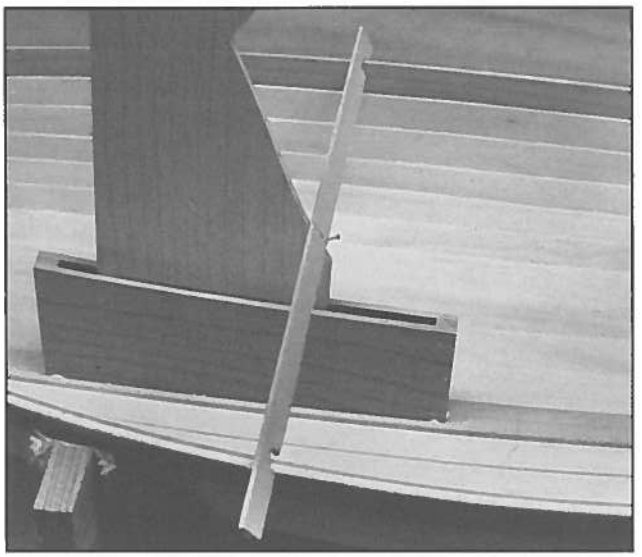
68 The weight is made from solder. If all you have is rosin- or acid-core solder, melt it into a pool on a scrap piece of wood to let the rosin or acid float to the top, then scrape it off when cool. Remelt the clean solder into its place in the centerboard with a piece of maple clamped underneath. Let the melted solder stand a little proud of the centerboard's upper surface.



69 Chisel off the excess solder, then cut the board to length. Glue on end caps and pin them with brass rod. Drill the two lanyard holes and secure the lanyard.

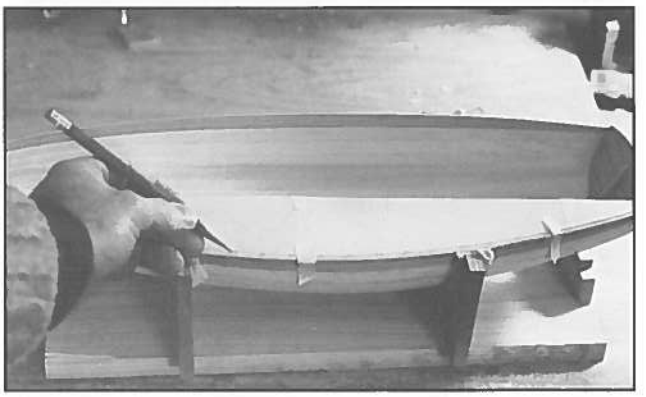


70 Drill the hole for the pivot pin in the trunk. Insert the board and start a pin through the hole. Move the board until the pivot point is correct, then mark the board with the pin. Remove the board and drill the hole, and bolt the board in place.

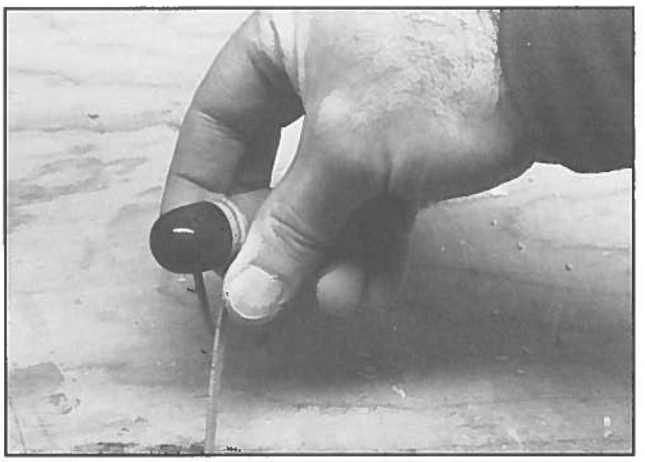


71 Glue the centerboard trunk in place. Use a scrap piece of post stock and a cross spall to keep the case vertical while the glue sets up.

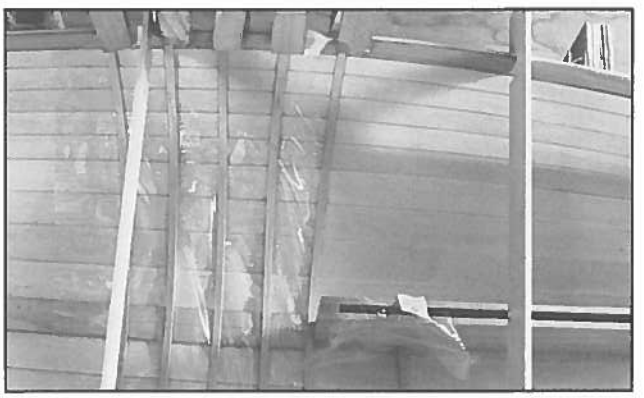
FRAMES



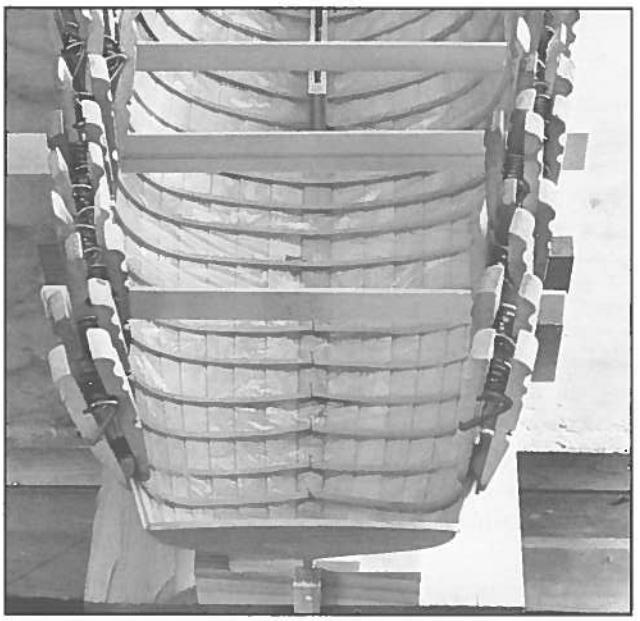
72 Tape a pattern for the frame locations at the sheer and mark them, and do the same with the frame locations at the keel.



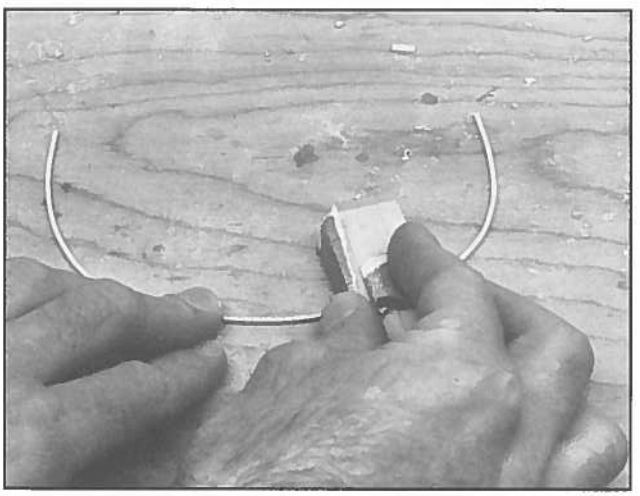
73 The frames are cut from 3/32" stock; dimensions are 1/16 x 3/32". Soak them in water for a few hours to limber them up. Place some clear plastic wrap in the hull to keep it dry. Prior to inserting the frames, overbend them carefully around a tool handle, as shown.



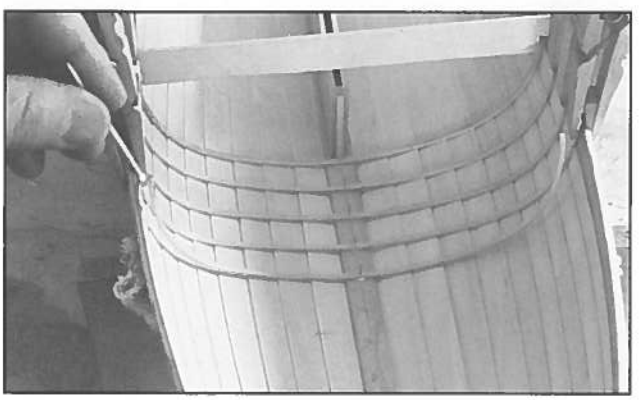
74 Insert the frames in the hull, making sure they fit snugly, then clamp them in place. Start from the middle of the boat and work toward the ends.



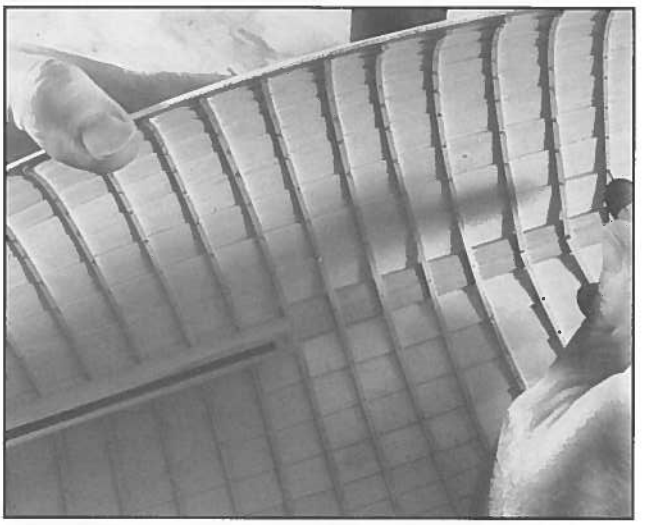
75 In the bow and the stern where the frames are canted, it will be necessary to fit them in two halves. Use a pin in the keel as a stop to push each frame against.



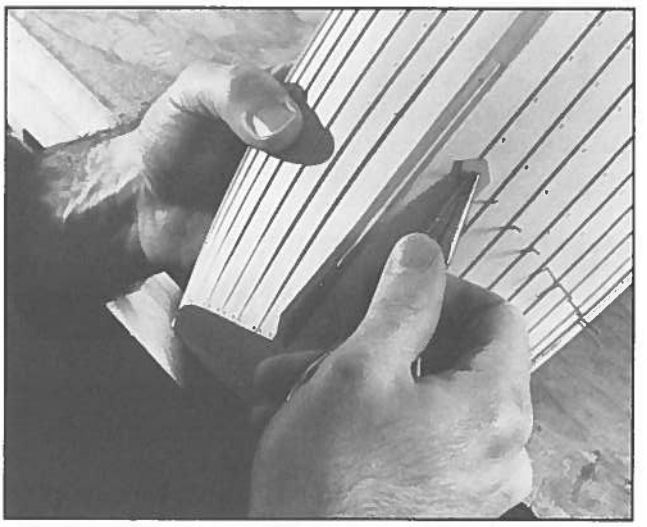
76 When the frames are dry (overnight), remove them and sand off any fuzz or saw marks. Before removing them, be sure to mark references so that they go back in their original positions.



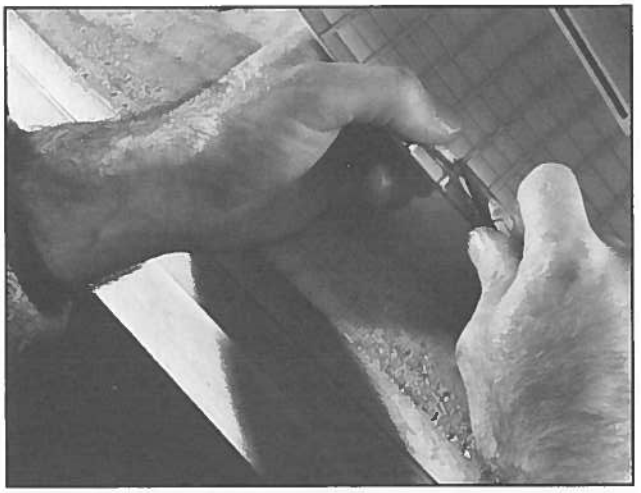
77 Remove the plastic and trim the frames to length, then glue them back in their correct positions with a spot of glue at the keel and at the sheerstrakes. Put pins through each frame and into the keel to help hold their position while gluing.



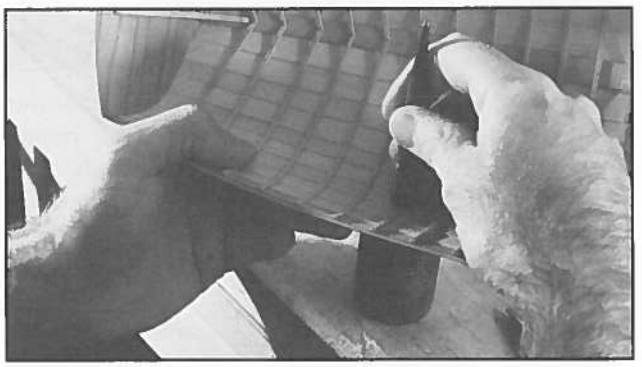
78 Drill holes for the hull fastenings, from inside the hull, so that they will be centered in the frames and the lap. In the bow, where there is not enough room for the drill, they can be drilled from outside. Hold the hull up to a light to see where the frames are. *Do not* drill holes along the top of the sheerstrake at this time, where the inwale is to run.



79 Push the nails in through a scrap piece of wood with a hole big enough to clear the head. This will keep the hull from being damaged by the pliers if the nail bends, or when it breaks through the frame.

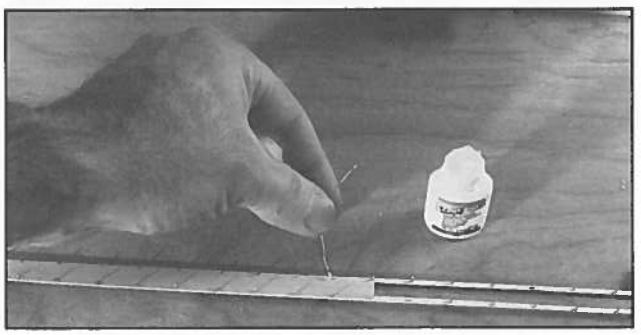


80 Pull the nailhead flush into the planking by twisting the pliers against a scrap piece of maple placed against the frames.

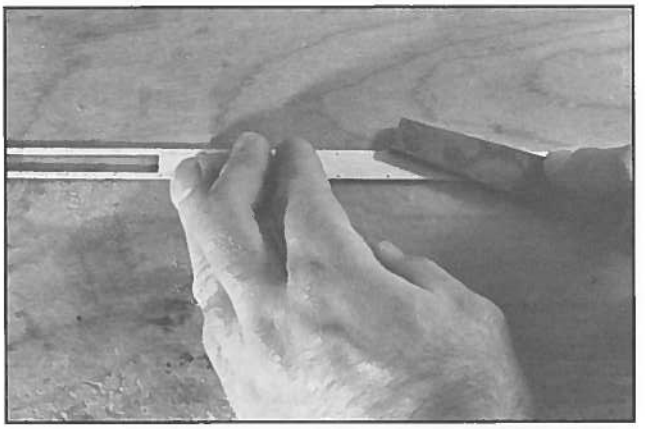


81 Cut the nail off about one diameter from the frame. Form a head by peening it with light taps. I used the big end of a centerpunch for this. Back up the nail with a heavy object (such as a hammerhead) held in a vise.

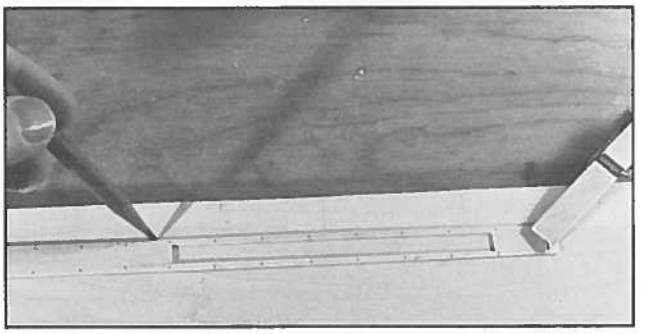
FLOORBOARDS



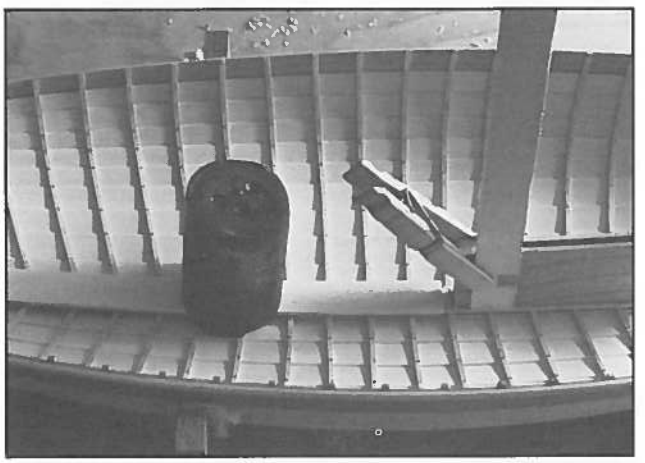
82 Cut the center floorboard of 1/16" basswood. To simulate fastenings, make a prick mark on each side where the plank lands on a frame. Drill a #68 hole at each mark, remove the plank, insert the wire, and secure it with a drop of superglue from underneath.



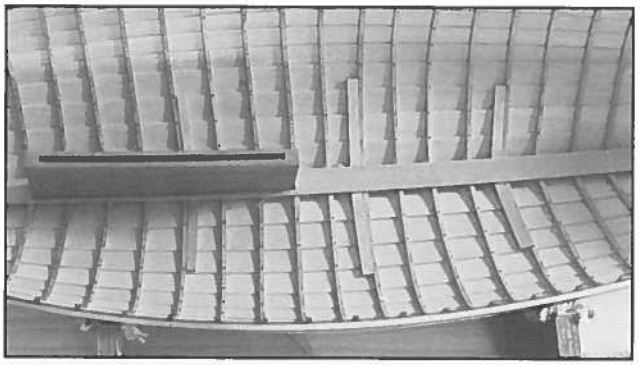
83 Cut the wire, and file it flush with the surface. *Leave a few pieces* on the bottom long enough to fit into holes drilled in the frames.



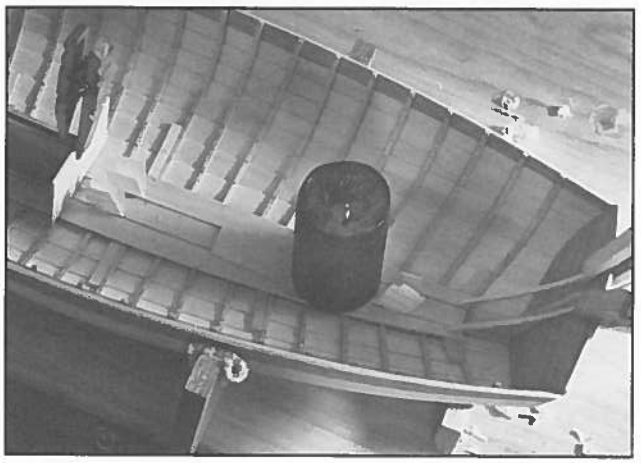
84 Before gluing the floorboard into position, use it as a pattern to mark the inboard edges of the next two floorboards, unless you plan to spile the floorboards.



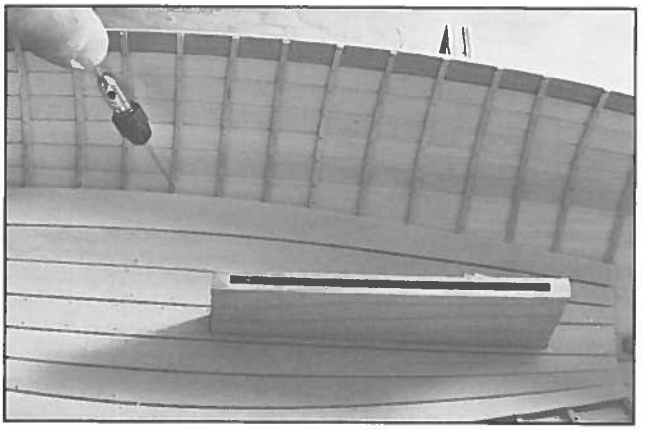
85 Glue the center floorboard into place, using a weight, and a couple of shores clamped in place at the centerboard trunk, as shown.



86 Make up cleats for the adjoining floorboards. Laminate them in two layers to fit the curve of the planking. When the glue is dry, trim off any high spots so that they are flush with the tops of the frames. The inboard end of each cleat fits under the center floorboard. The length can be measured from the plans.

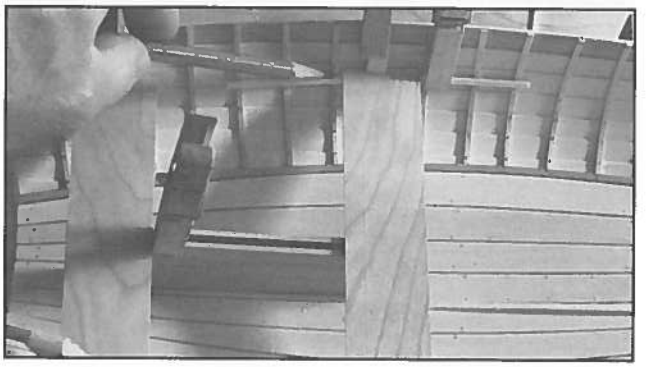


87 Divide the cleats into thirds (for the three floorboards on each side of the center one), using strips of 3 x 5″ card in the same manner as for lining off the hull planking. Mark each cleat with dividers and fair the marks with a batten, then take spilings to establish the shape of each floorboard as was done with the planking. Simulate screws at each floorboard/cleat intersection in the same way as was done for the center floorboard. Repeat this process for the remaining two floorboards on each side.



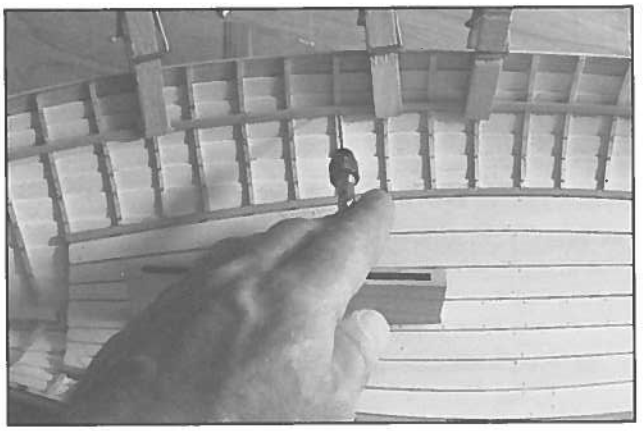
88 The cherry bilge stringers are sawn out straight and sprung into place. Simulate a screw at each frame, every third one going *through* a frame to hold the stringer in place while gluing.

SEATS, KNEES, AND OTHER ITEMS

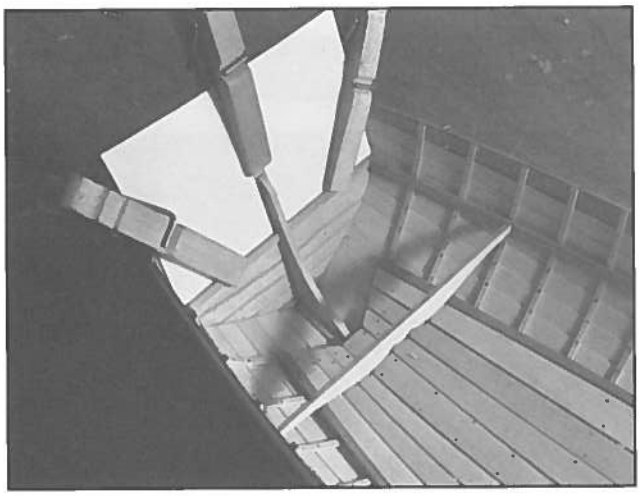


89 Fit the thwarts so that they are level and rest on the top of the centerboard case. Use short battens, and mark the bottom edge of each thwart on the nearest frames.

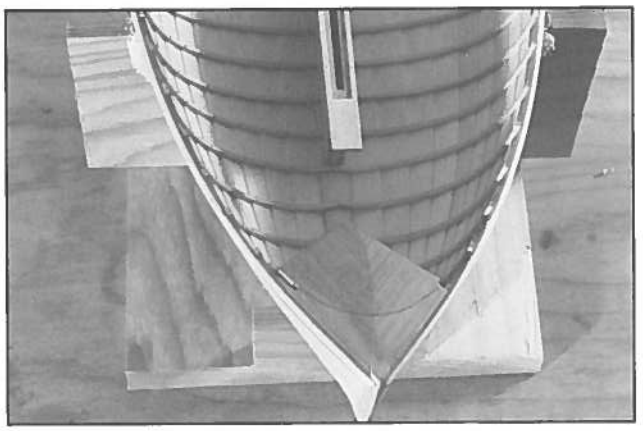
90 Use dividers to mark where the seat riser will land in the stern, and at the mast partner.



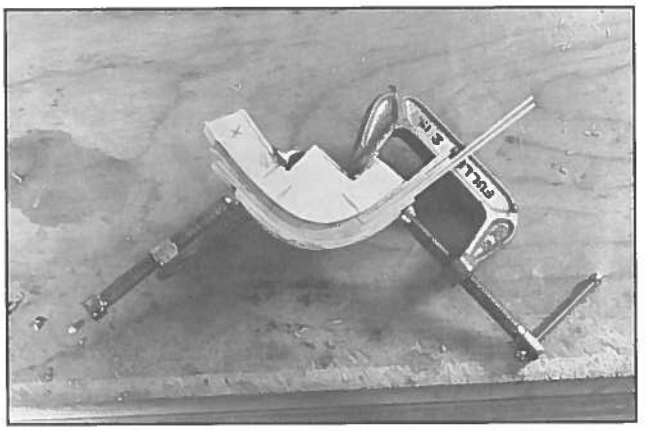
91 Spring the seat riser in position to correspond to the marks just made, and attach it in the same manner as used for the bilge stringer.



92 Fit the stern-seat stretcher to land against the risers, as shown. Use a piece of 3 x 5″ card with a notch cut to clear the stern knee to locate the top edge of the stern-seat blocking.

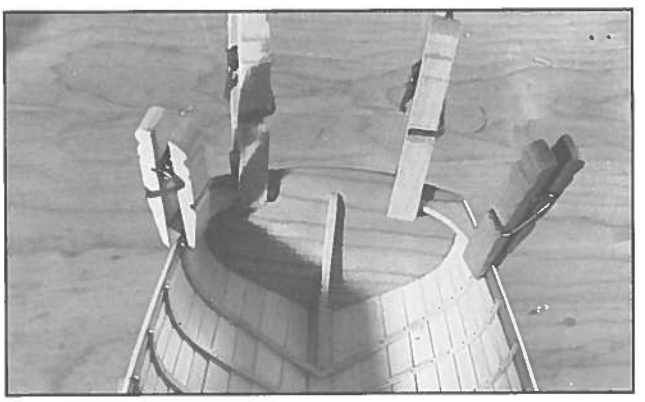


93 Make the breasthook from two pieces, as shown on the plans. Notch it around the stem, and fit it snugly against the sheerstrake and first frames. When a good fit is achieved, cut the curve on the side. This is much easier to fit before the frames are put in.

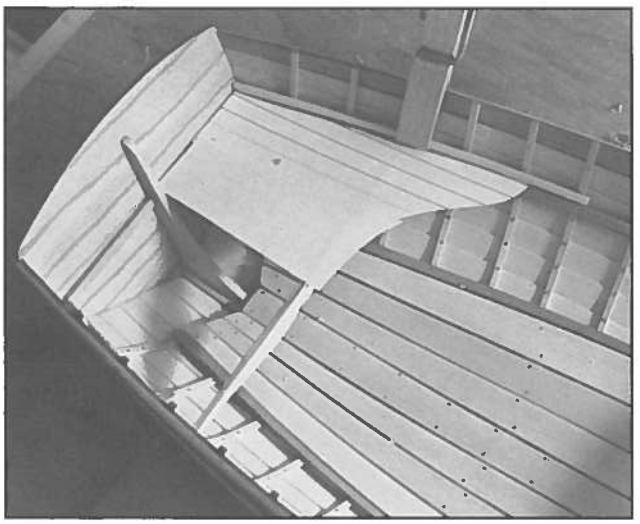


94 The quarter knees are laminated from 1/32″ basswood. Put some clear tape on the mold so the knee doesn't stick. Make the knee blank thick enough so that it can be resawn into two knees.

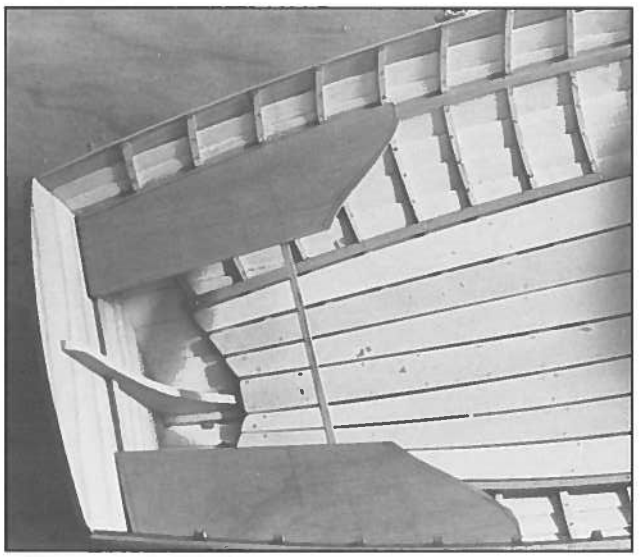
95 Trim the knees to their proper thickness with a chisel.



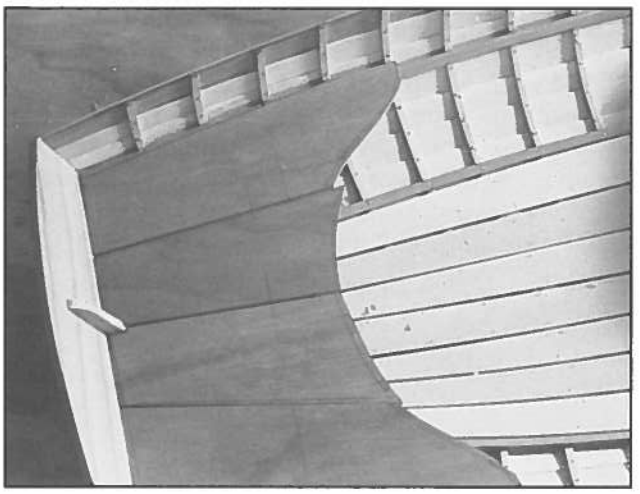
96 Fit and glue the quarter knees into position. Cant the knees upward, as shown on the plan.



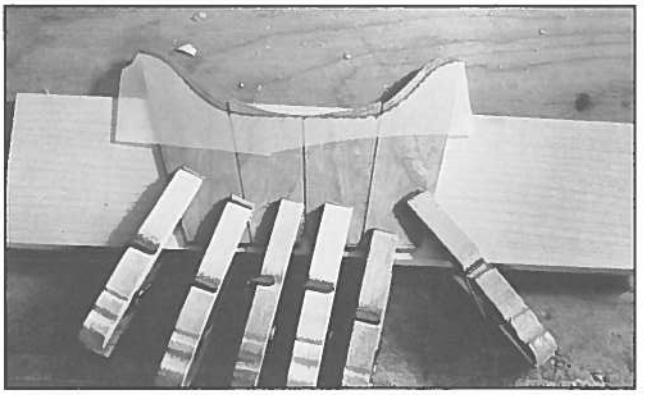
97 Make patterns for the four stern seat pieces from 3 x 5″ card, and cut the wood to shape. Clamp a short batten above the riser to keep the card from riding up the side.



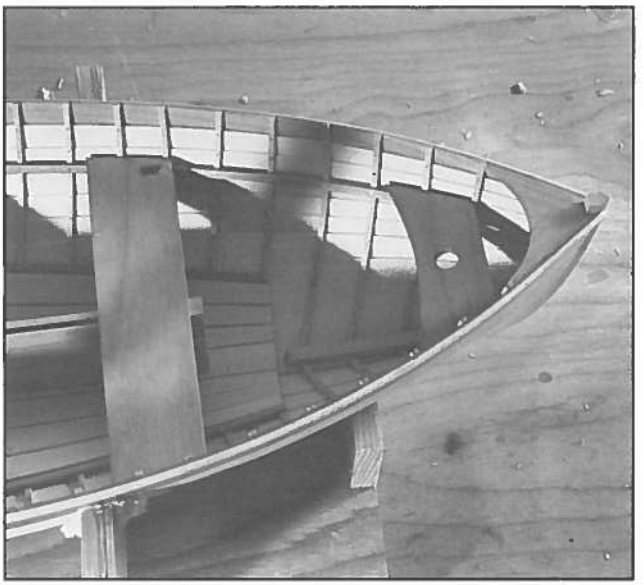
98 Fit the two outboard sections, leaving them a little long at their forward ends.



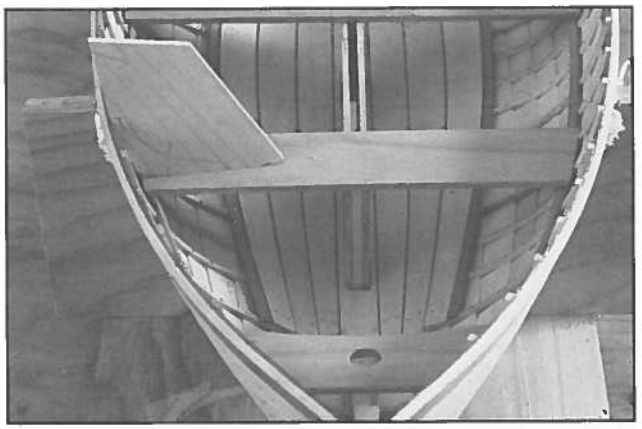
99 Fit the two inboard sections, leaving little gaps between the sections.



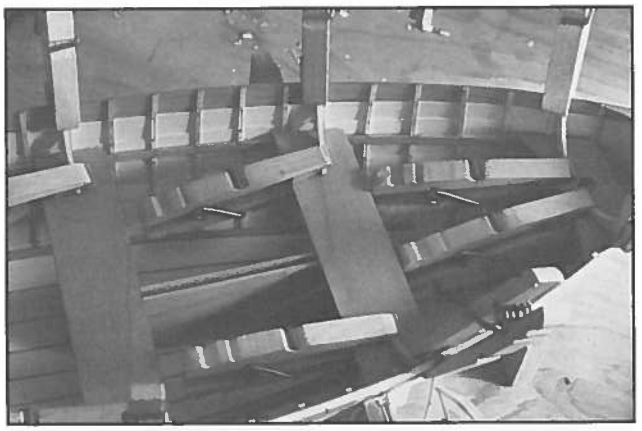
100 Remove the pieces, and clamp them to a flat surface. Maintain the gaps, and line up the after ends. Use a template to mark the forward ends. Use copper wire to simulate screws in the locations shown on the drawing. Glue the seat pieces in place.



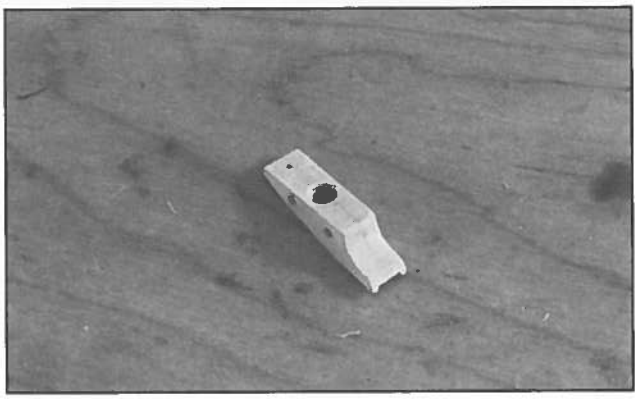
101 Glue the thwarts in place on the seat risers, and fasten the two 'midship ones to the trunk. Fit a bushing in the trunk cap, and fasten it in place.



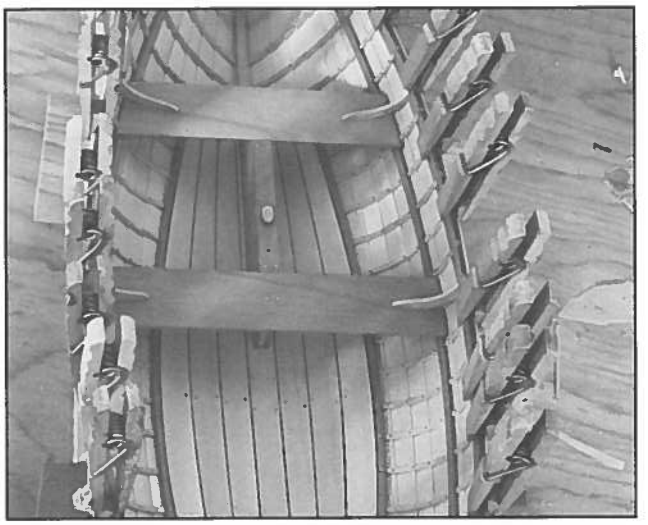
102 Cut oversized pieces (they're easier to handle) for the thwart knees. Fit them snugly against the thwart and planking.



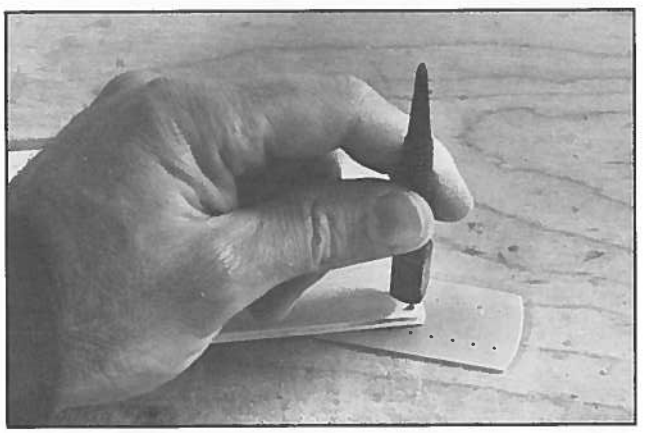
103 Use patterns to shape the knees, and glue them into position. When the glue is dry, cut a notch in the upper end of each knee—flush with the frame—so the inwales will fit snugly.



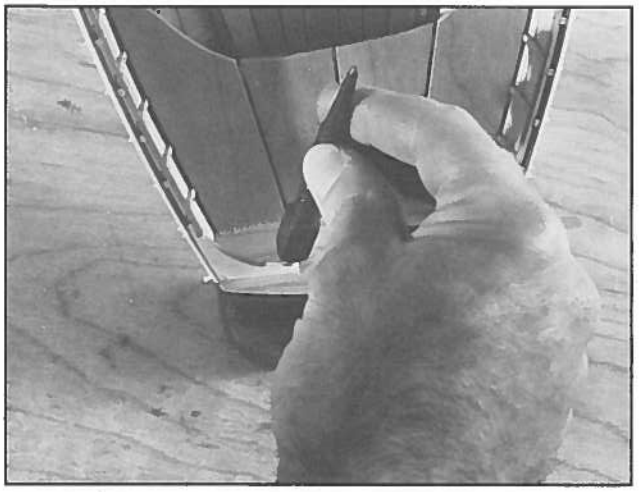
104 Cut the maststep from two pieces, as in the plan. Shape it to fit properly. Use wire to simulate the rivets. Glue it in place.



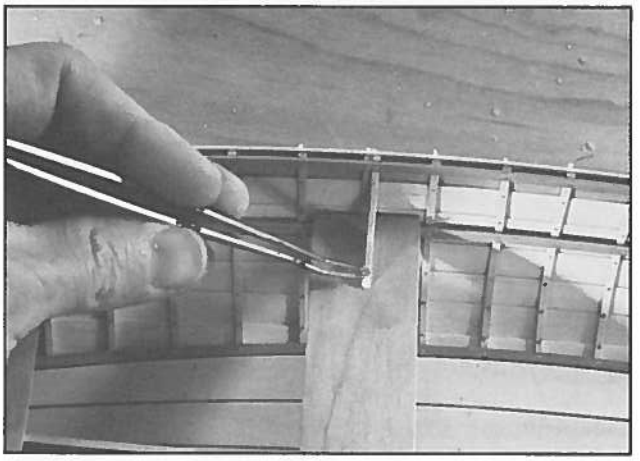
105 Trim the tops of the frames and the knees flush with the tops of the sheerstrakes (not horizontal; should be canted like a deck would be—see plan). Cut out the inwales, and glue and clamp them into position with a spot of glue where they land on each frame and at the quarter knees and the breasthook.



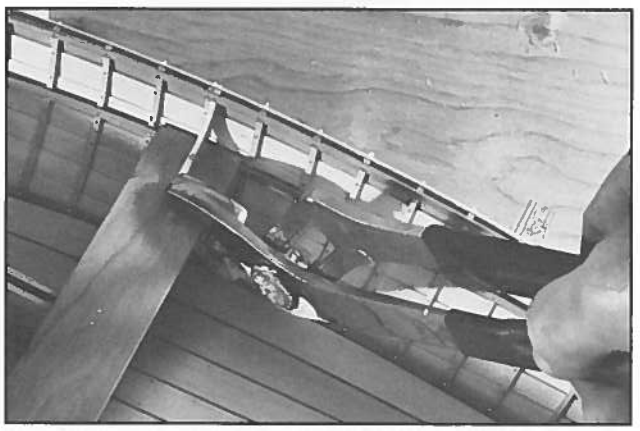
106 Rivet the knees and the inwales in position. To make your own rivets, drill a #68 hole through the roves and through a piece of basswood that is a little thicker than the length of the rivet. Anneal a length of 20-gauge copper wire by heating it red- hot and allowing it to cool. Pass the wire through the rove and the piece of wood. Cut the wire one diameter away from the rove and flush with the wood on the other side. Then place it over a piece of steel, and peen over the end the rove is on. Finally, push the rivet out of the wood. You can also use pliers for this process. They make the riveting go more quickly, but you'll find it is hard to keep the rove from bending.



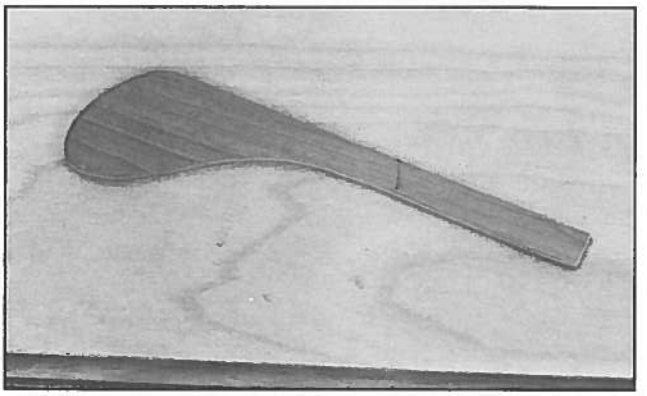
107 Drill #68 holes for the rivets through all the knees and through the inwale at each place it crosses a knee or frame, but *not* all the way through the guardrail. Insert the rivet through the transom and the knee. Place a rove on the wire. Cut the wire one diameter away from the rove, and peen it over against a heavy object, like a hammerhead.



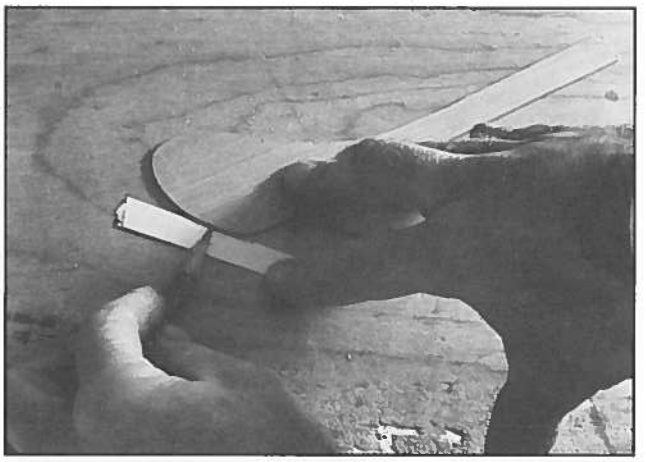
108 Insert rivets in the thwart knees and inwale. These should *not* protrude all the way through the other side.



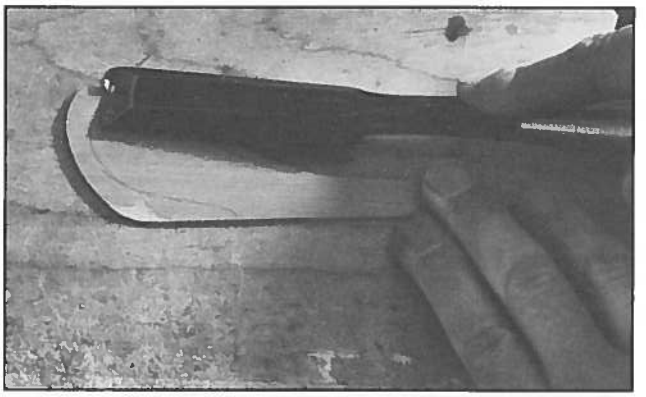
109 Squeeze these rivets in place so their exposed ends are nearly flush. Use a soft piece of wood under the thwarts and on the guardrail to keep from denting the wood. Fit oarlock socket pads according to the plan.



110 Cut the rudder to shape. Leave the top end longer for clamping.

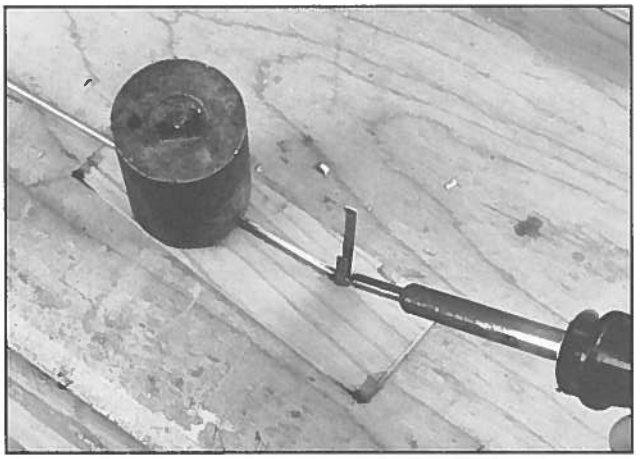


111 Draw a centerline around the edge of the rudder, using a half-thickness scrap of wood as a marking gauge.



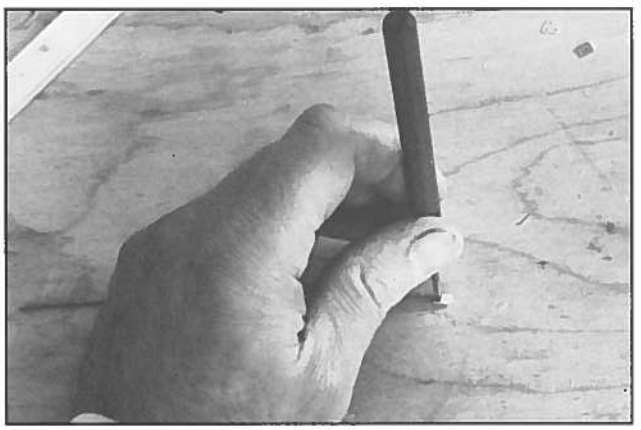
112 Sketch in the taper line. Taper the rudder with a chisel and finish it with sandpaper. Leave the leading edge square where the rudder hangers will go. Trim off the top, and cut it to shape.

HARDWARE

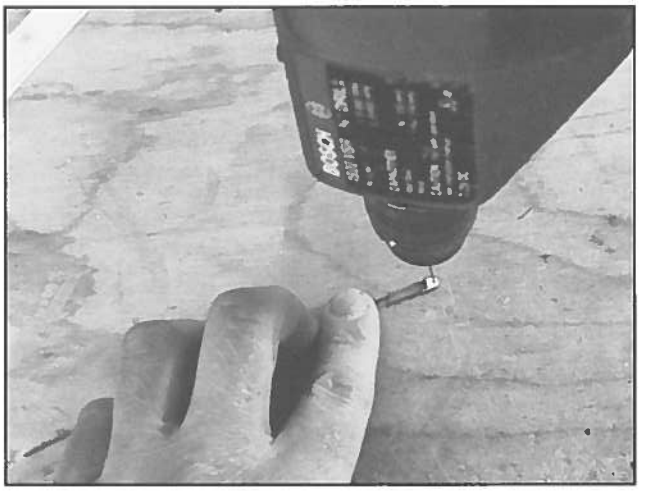


113 Wrap a piece of 1/8 x .016" brass tightly around a brass rod which is the same diameter as the rudder is thick. Flow in enough solder to cover the rod. Leave all pieces oversized.

114 Saw the rod off and file it flush with the edge of the brass strap.

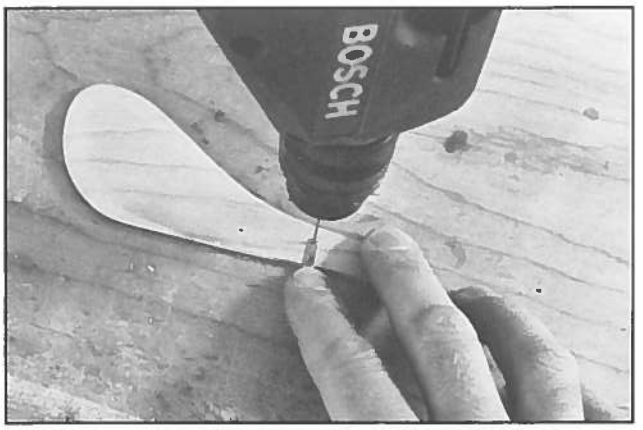


115 Chisel off the excess solder to make the inside square for a tight fit against the rudder. A small chisel can be made from the shank of a drill.



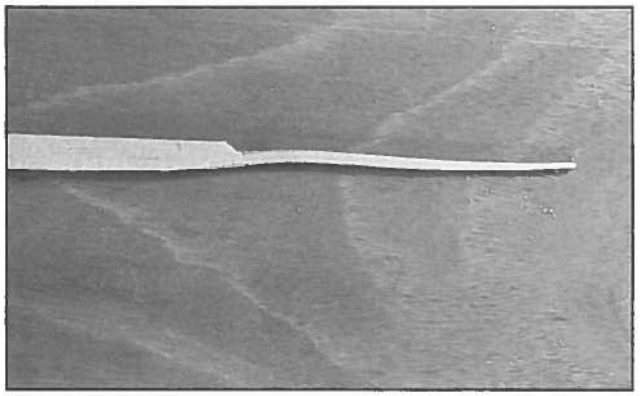
116 Centerpunch and drill a #66 hole for the rod to pass through.

117 Cut the ends of the strap to length and to shape. Punch and drill #66 holes for the rivets. Put the hanger on a scrap of wood the same thickness as the rudder to keep from pinching the straps closed while drilling. Drill in from both sides.

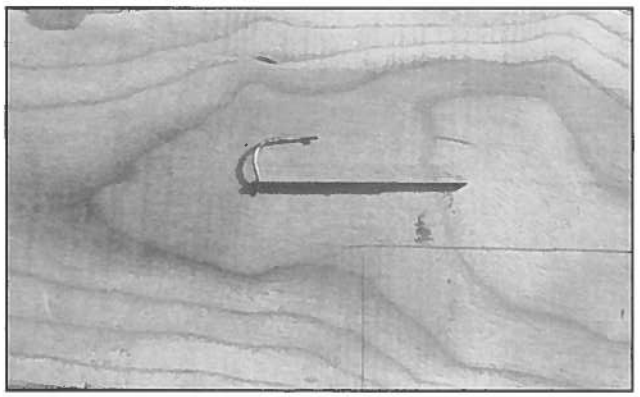


118 Fit the hangers on the rudder, and drill for the rivets. Drill in from both sides. (Put a piece of 20-gauge wire in the first hole before drilling the second

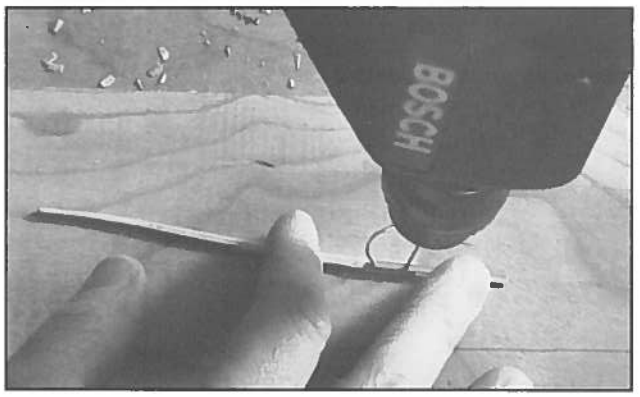
to hold things in alignment.) Cut the wire one diameter away from the strap, and rivet the hanger in place. Work both sides, using a hammerhead as an anvil.



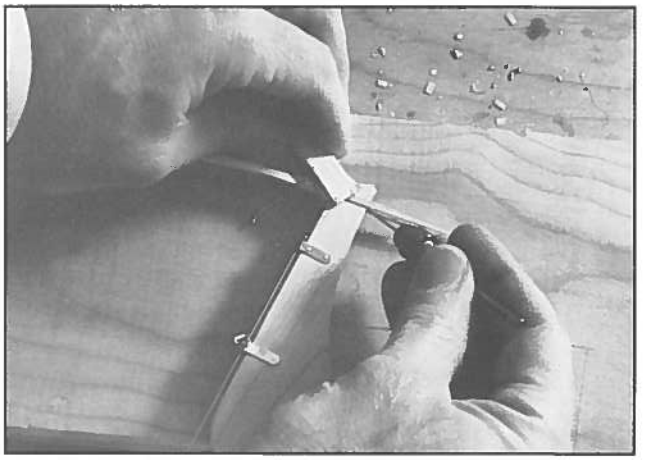
119 Carve the tiller to shape from a piece of maple the same thickness as the rudder. Leave the tiller attached to its "parent" material until it is finished, and then cut it off.



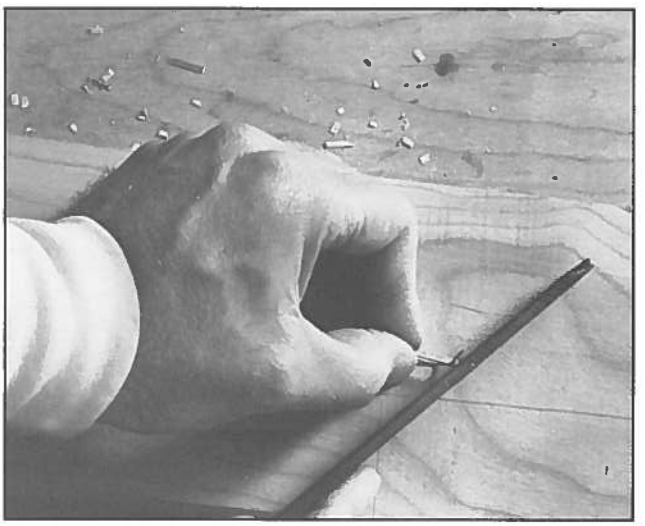
120 Centerpunch and drill two #66 holes in 3/32 x .016" brass for the tiller strap. Use it as a template for drilling the second one. Put a piece of 20-gauge copper wire through the after hole to keep the two pieces in alignment while drilling the other hole. Drill only the two holes for the tiller.



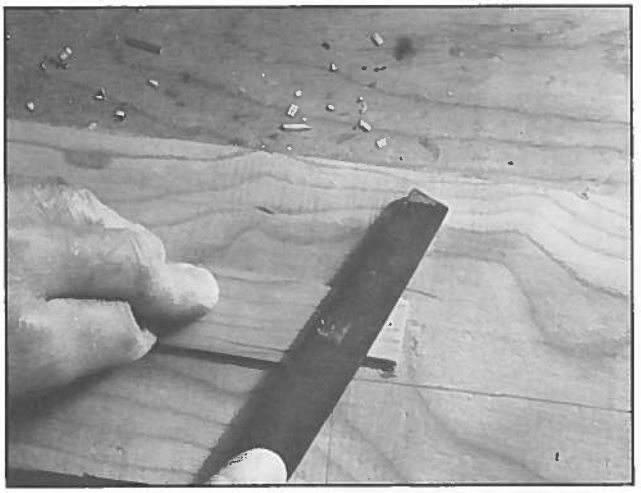
121 Fit the straps to the tiller, and insert lengths of wire to hold everything in position.



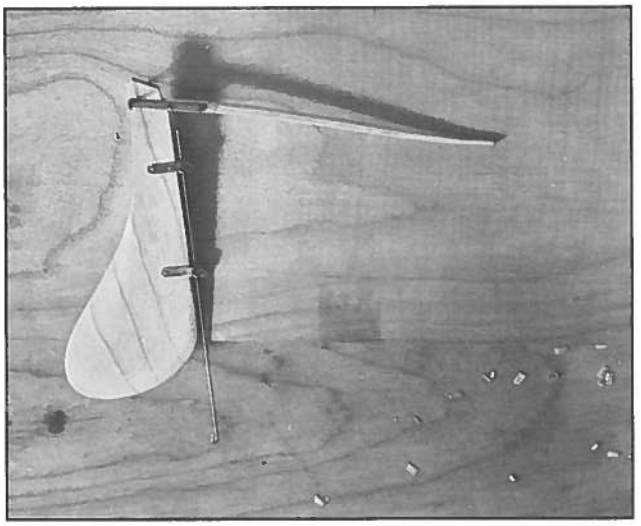
122 Fit the assembly to the rudder, and mark where the hole for the strap spacer will be. Punch and drill that hole.



123 Disassemble, and cut the brass straps to length. File their ends round.

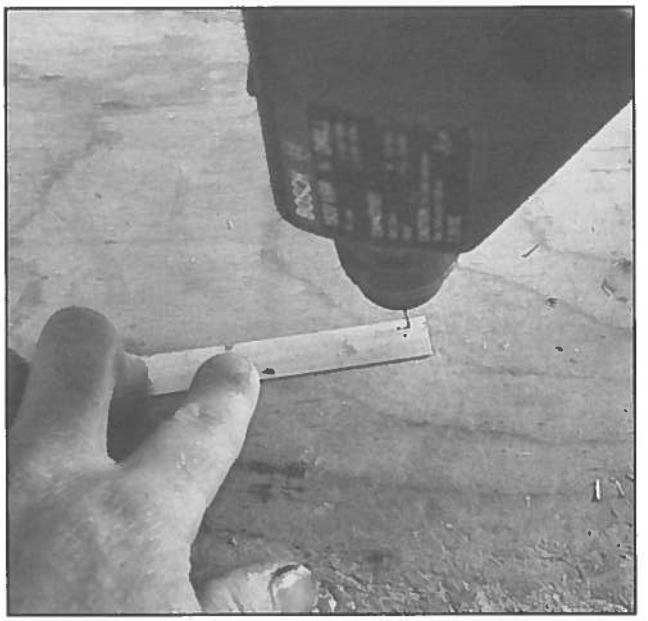


124 For the spacer, cut a section of .032" (ID) tubing a little longer than the thickness of the rudder. Insert it into a hole drilled into a scrap piece of rudder-thickness material, and file the ends flush. (This will ensure that the spacer is the right length.)

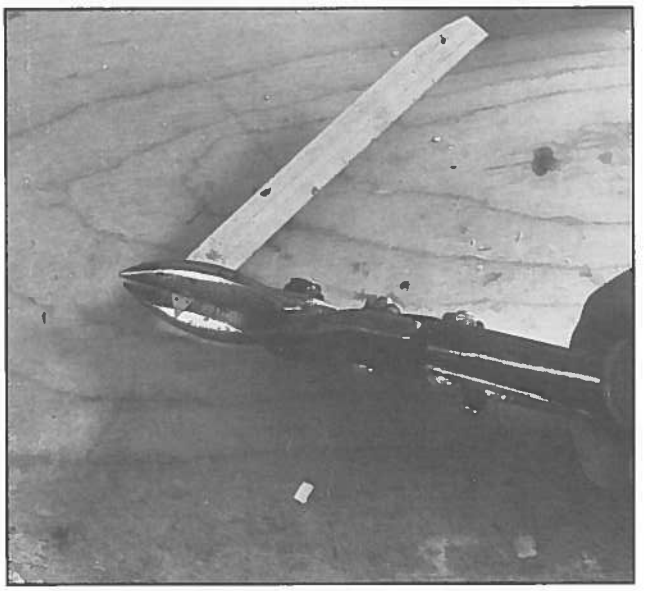


125 Push the spacer out, and place it between the tiller straps, then rivet the tiller assembly together.

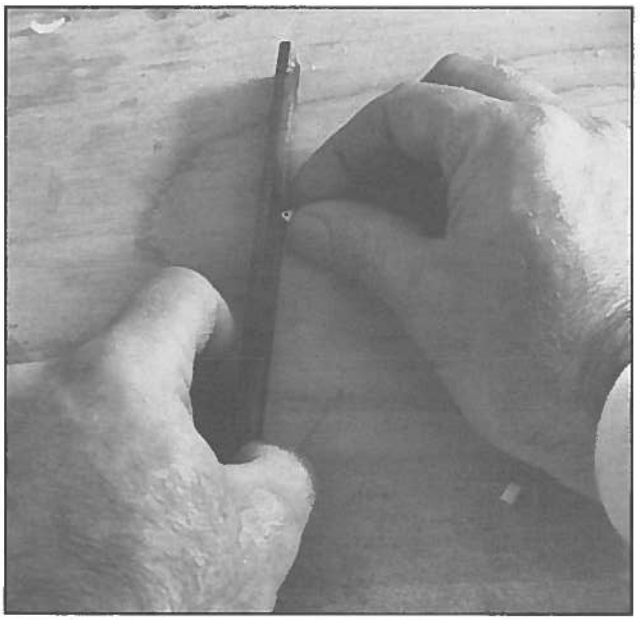
TRANSOM PLATES



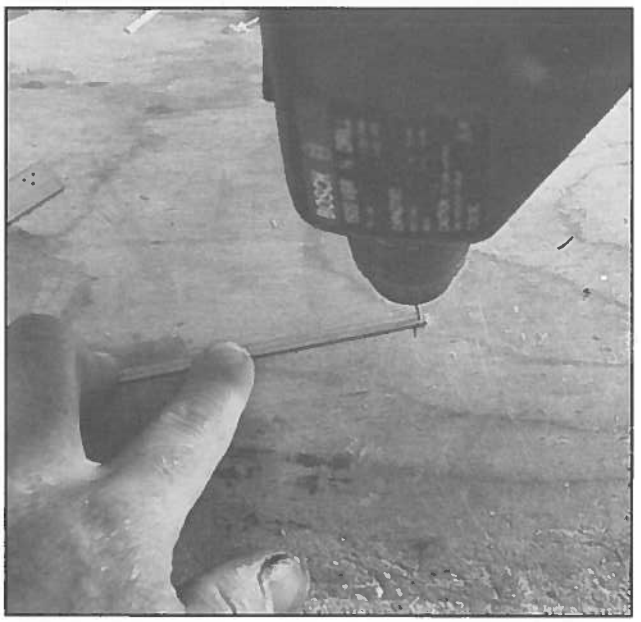
126 Lay out and drill three #66 fastening holes in a piece of 3/16 x .016" brass.



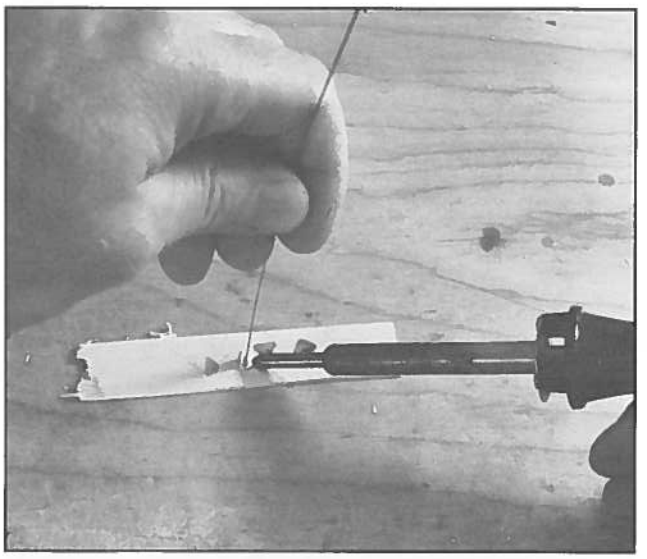
127 Cut the plates to shape.



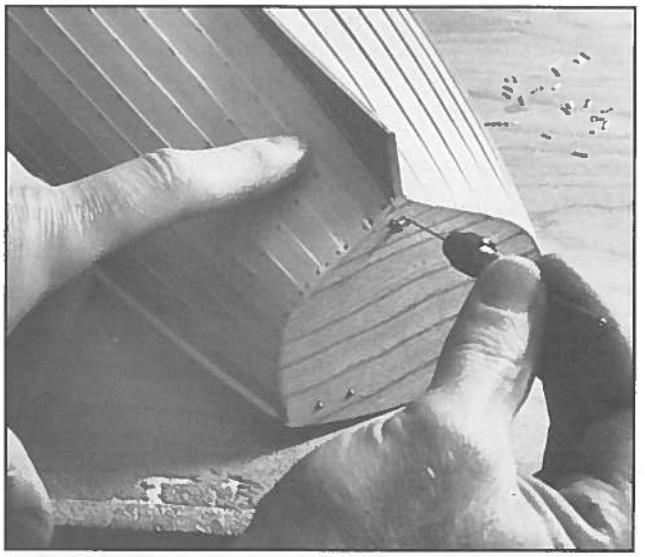
128 File their corners round.



129 Drill a hole in a piece of 1/8 x .016" brass 1/16" from the end.

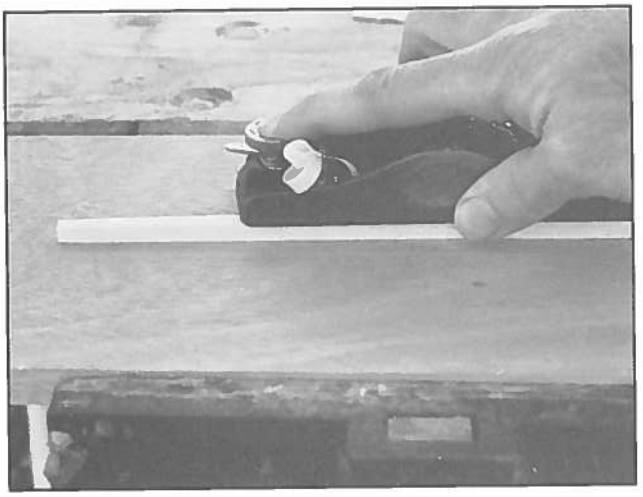


130 Solder it to the plate, then cut it to length and file it round, as shown on the drawings.

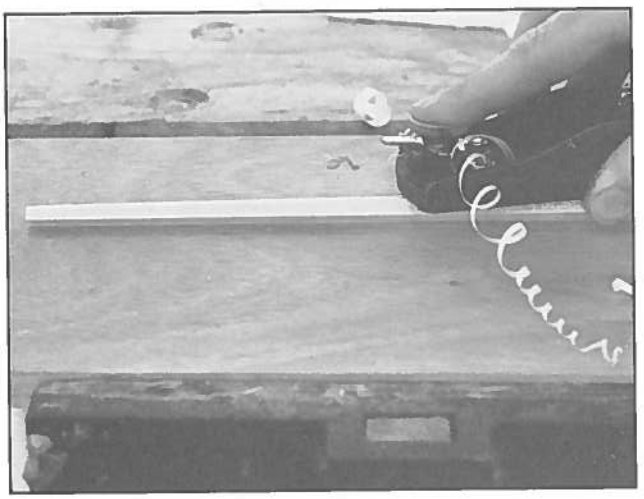


131 Mount the plates on the hull. Put a rivet in the center hole and into the transom knee. Then drill the other two holes (do not drill all the way through the transom or the knee) and insert the wire, and epoxy the hangers in place.

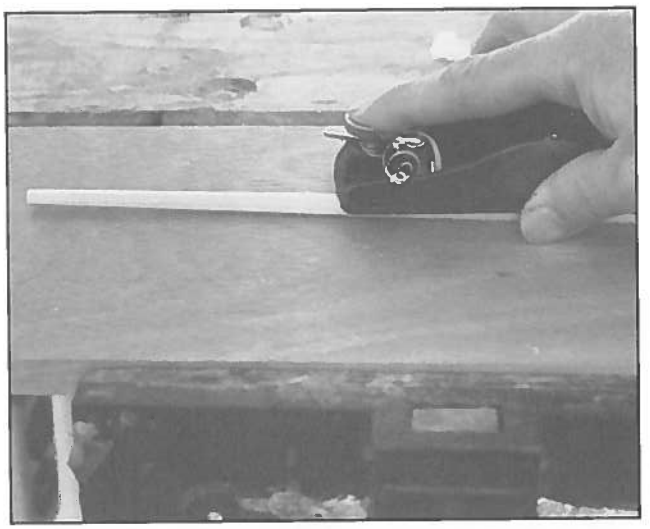
SPARS



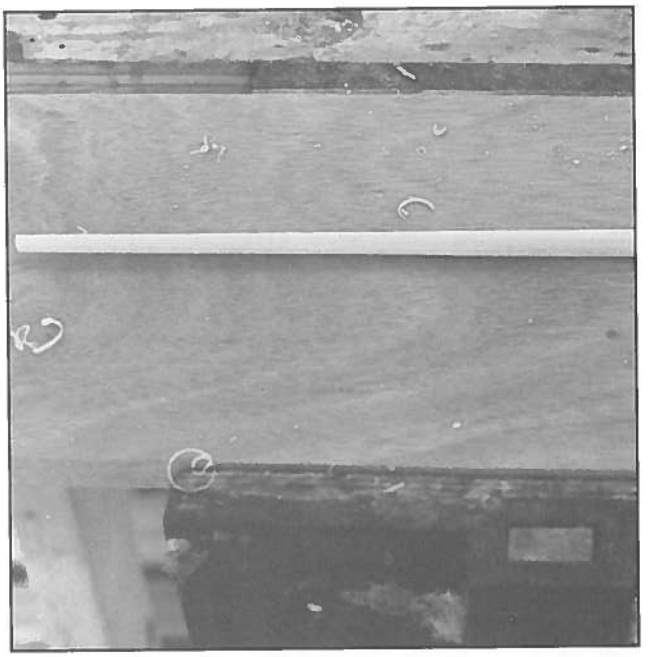
132 Spars are essentially decorative, unless you plan to set a sail on the model. Cut a piece of pine the length of the spar to be made, with the sides measuring the same as the spar's maximum diameter. Plane the taper as shown on the drawing, being sure to keep the stock square.



133 Plane it eight-sided.

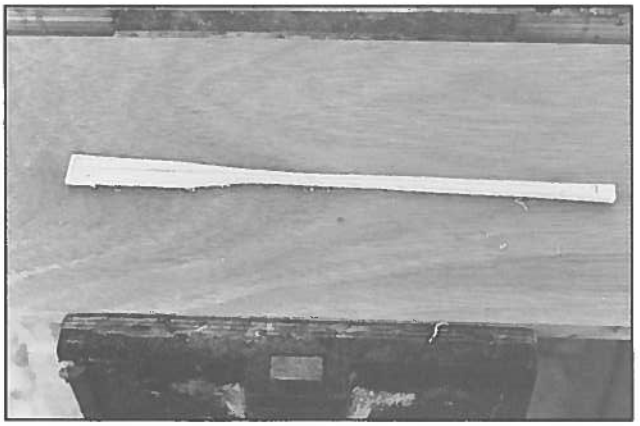


134 Plane it 16-sided.

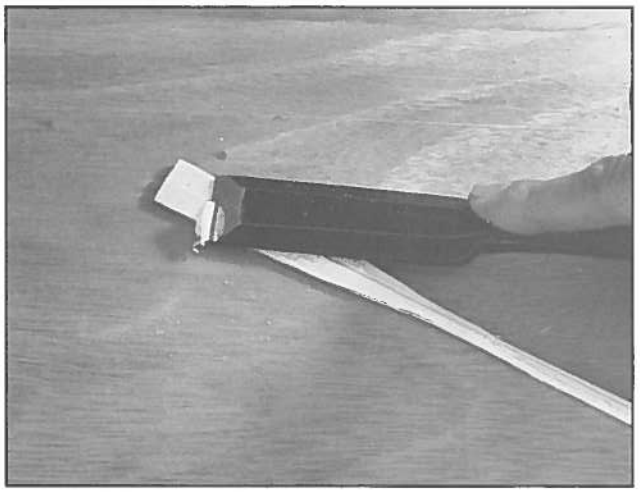


135 Finish it with sandpaper so that it is uniformly round.

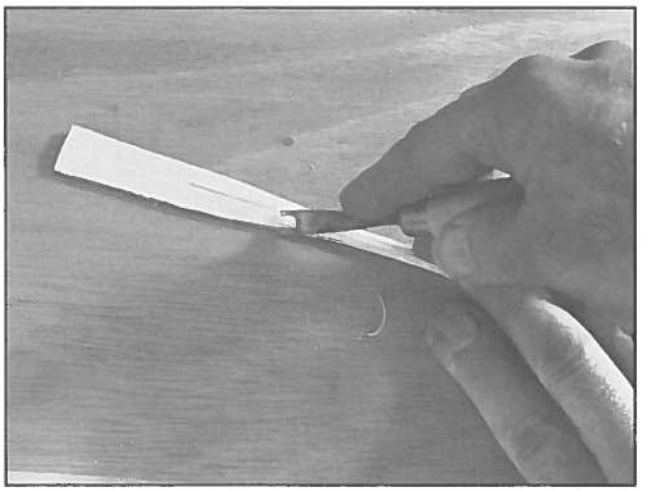
OARS



136 Oars and oarlocks are also decorative, but they add an attractive element. Trace the pattern, and cut the oars to shape from a piece of pine the same thickness as the maximum diameter of the loom. Draw a centerline on both sides. Also draw a centerline around the edge of the blade.

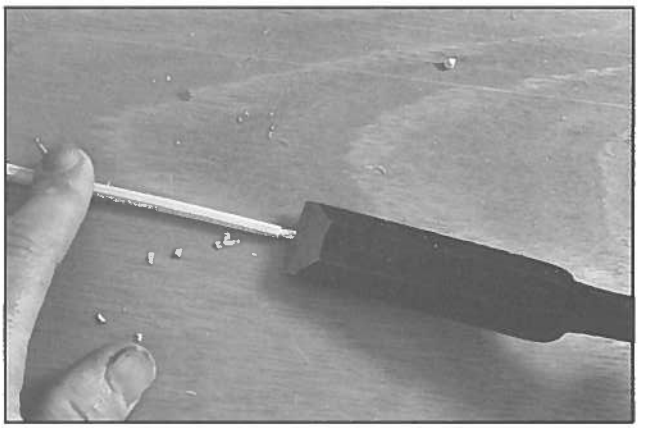


137 Use a chisel to shape the blades on both sides, using the centerlines as references.

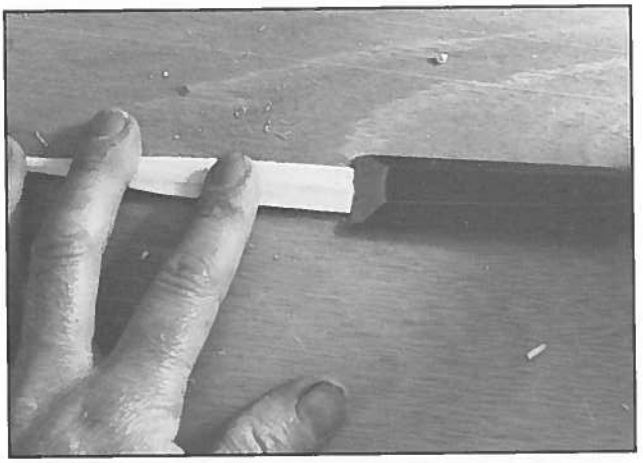


138 Use a small gouge to shape the transition area between the loom and the blade.

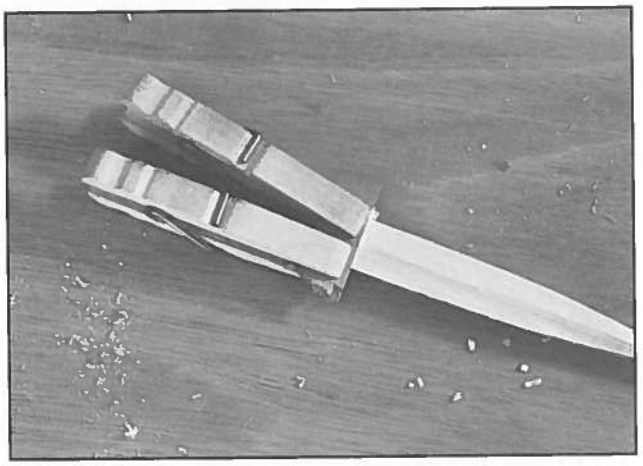
139 Shape the loom in the same way as you did the spars. Cut a slit around the base of each grip.



140 Shape the grips with chisel and sandpaper.



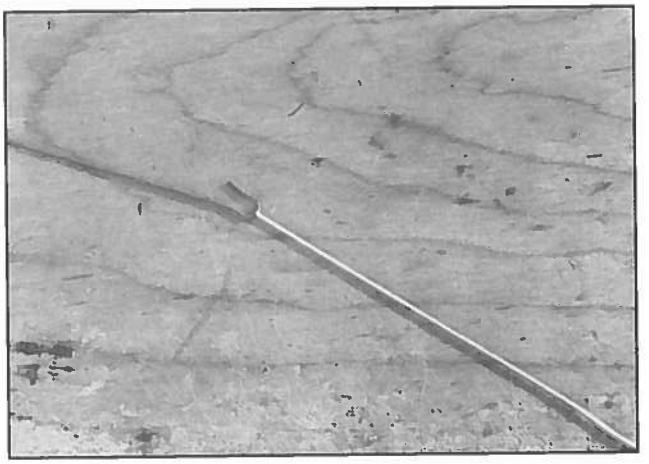
141 You can add another decorative option, on the blade tips, if you like. Using a razor, saw and cut halfway through the end of the blade. Then, using a chisel, cut out a notch.



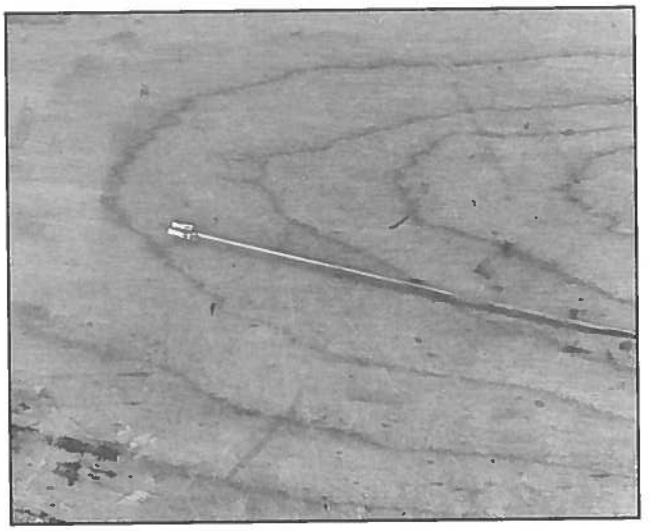
142 Glue in an oversized piece of cherry. When the glue is dry, trim the cherry to size, and finish the oars.

OARLOCKS

143 Drill a #66 hole in a piece of 1/16 x .016" brass. Insert a piece of .032" brass rod and solder. Use plenty of solder, and file the rod flush on one side. Make four of these.

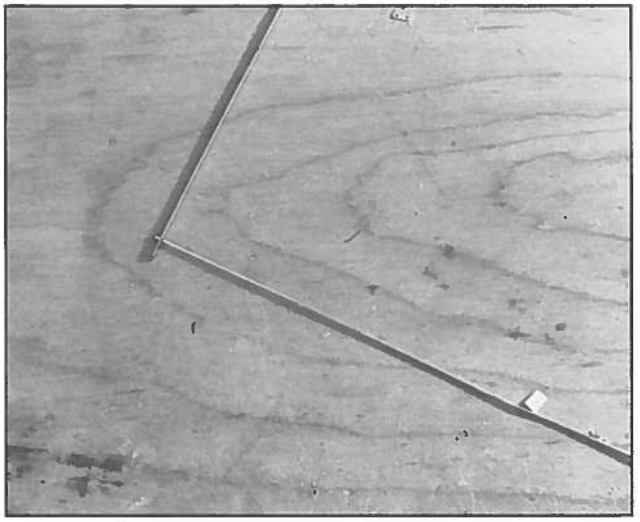


144 Bend the strap around a suitably sized drill shank.

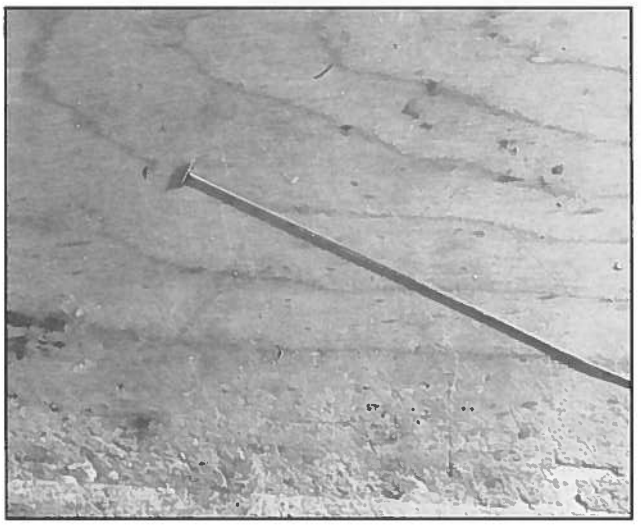


145 Trim the strap to length, and file it to shape. When the oarlock is finished, cut the rod to length.

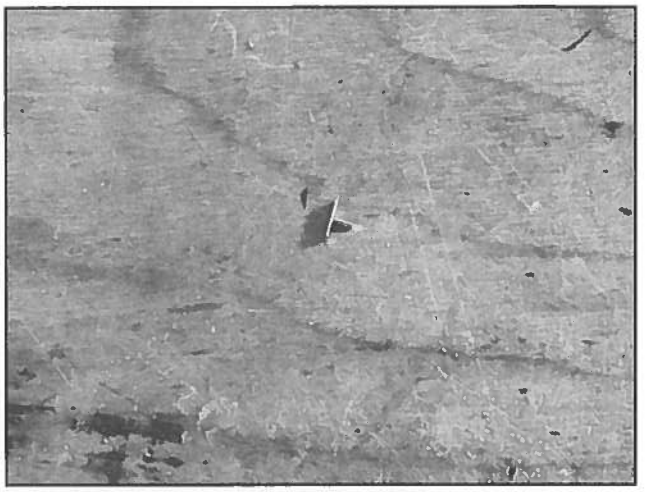
OARLOCK SOCKETS



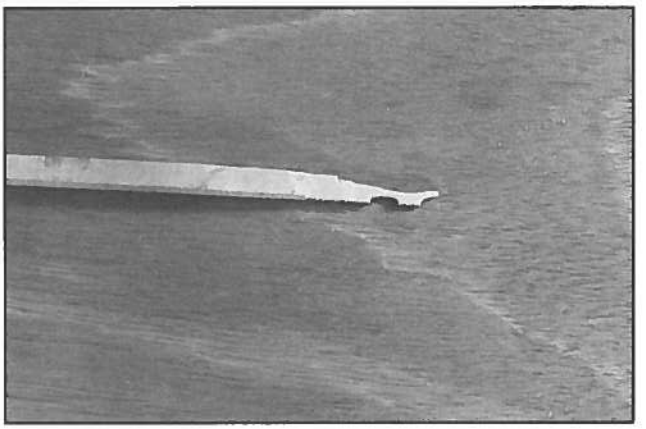
146 Solder a piece of .032 (ID) tube into a hole drilled in a piece of 3/32 x .016" brass. Make four of these.



147 File one end of the tube flush with the strap, and trim the ends of the strap to length.



148 Cut the tube to length. Before inserting the sockets into their wooden pads, cut a relief in the hole of each pad to clear the solder fillet.



149 Carve the centerboard cleat to shape, but drill the two fastening holes beforehand.

FINISHING

The prototype was finished on the outside with three thin coats of Interlux 60 "rubbed-effect" varnish, sanding well with #220 paper between coats. The inside was finished with one application of Watco oil. Because the Watco soaks right through the thin basswood planking, it may be wise to finish the outside first.

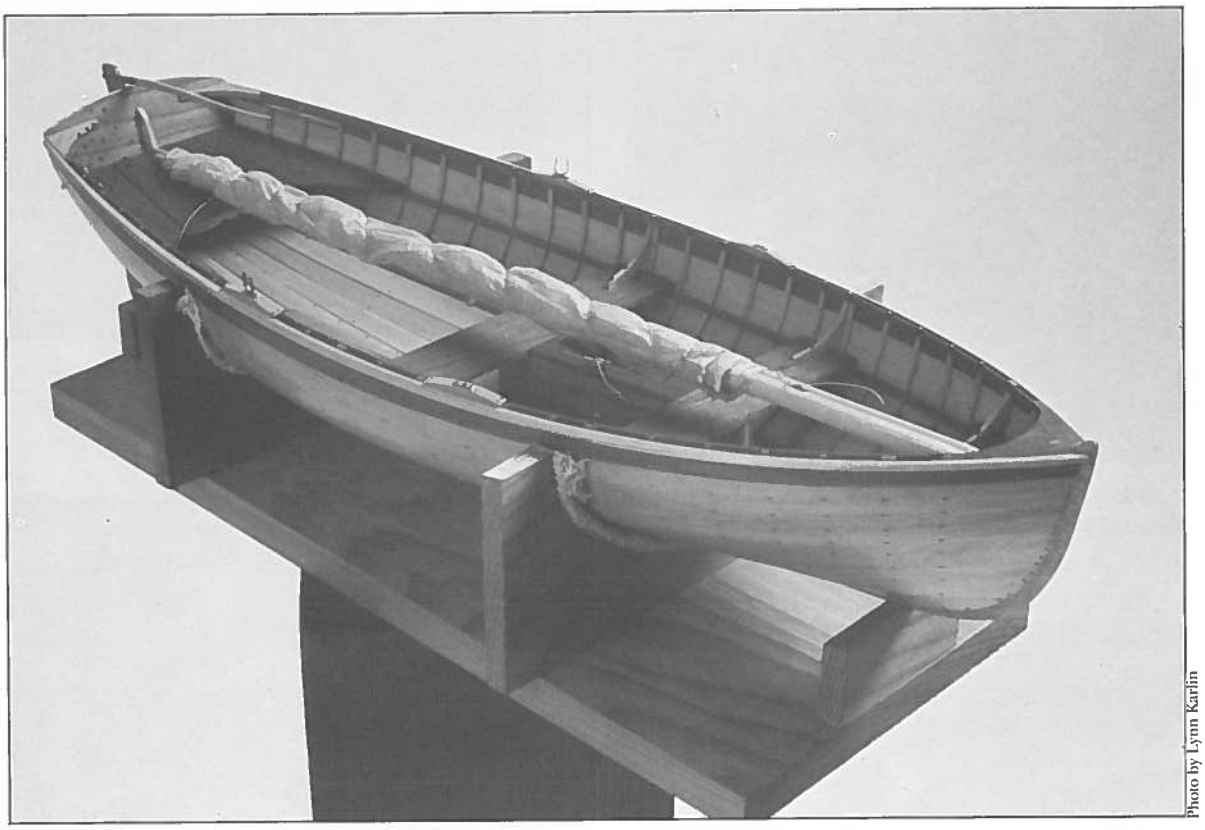


Photo by Lynn Karlin

The finished model on its temporary stand. The furled sail was created from a heavy tissue paper, and is meant to stay furled. If you choose to set the sail for display, it will be prudent to use some lightweight fabric.