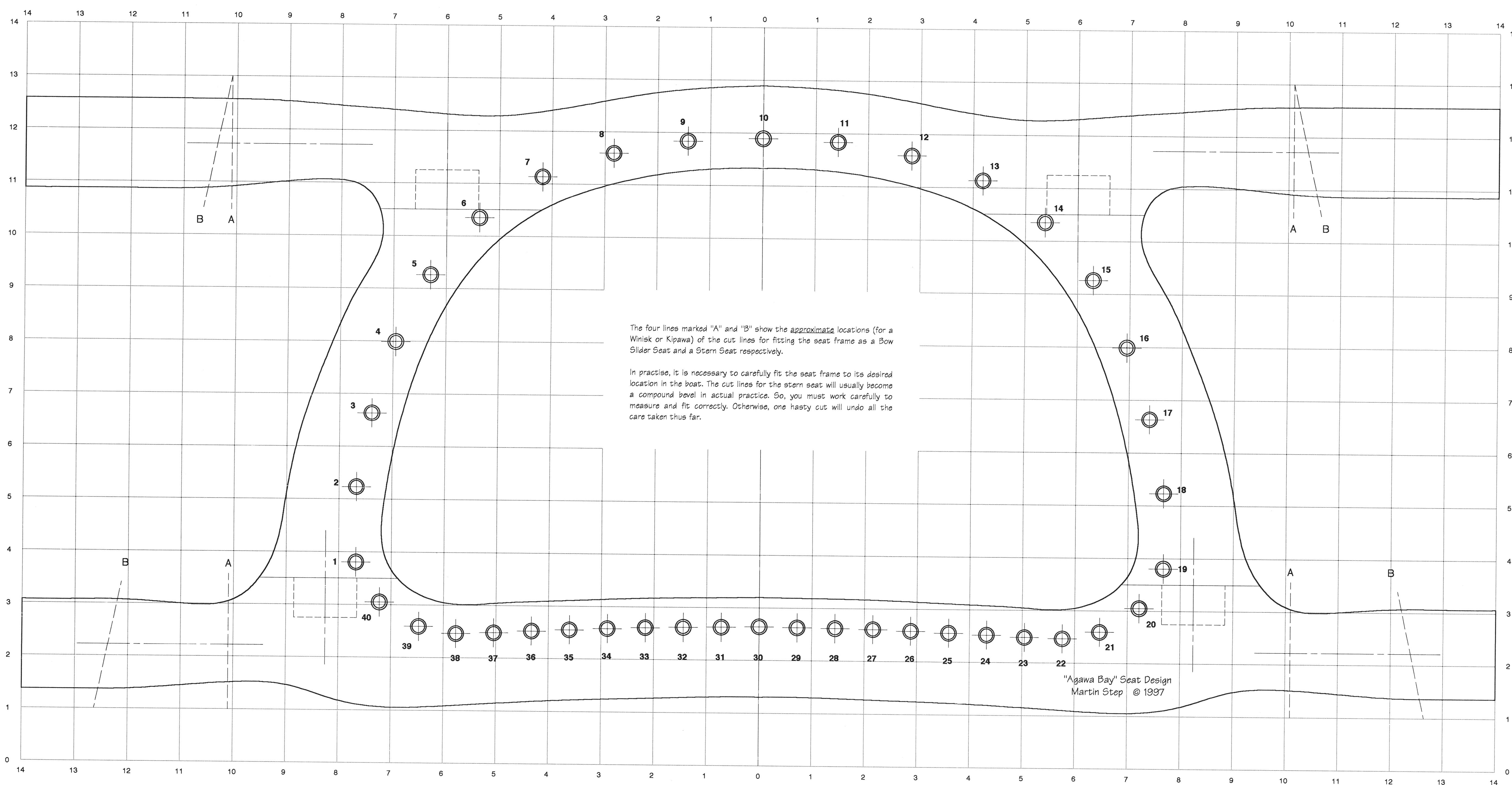




The four lines marked "A" and "B" show the approximate locations (for a Wink or Kipawa) of the cut lines for fitting the seat frame as a Bow Slider Seat and a Stern Seat respectively.

In practice, it is necessary to carefully fit the seat frame to its desired location in the boat. The cut lines for the stern seat will usually become a compound bevel in actual practice. So, you must work carefully to measure and fit correctly. Otherwise, one hasty cut will undo all the care taken thus far.

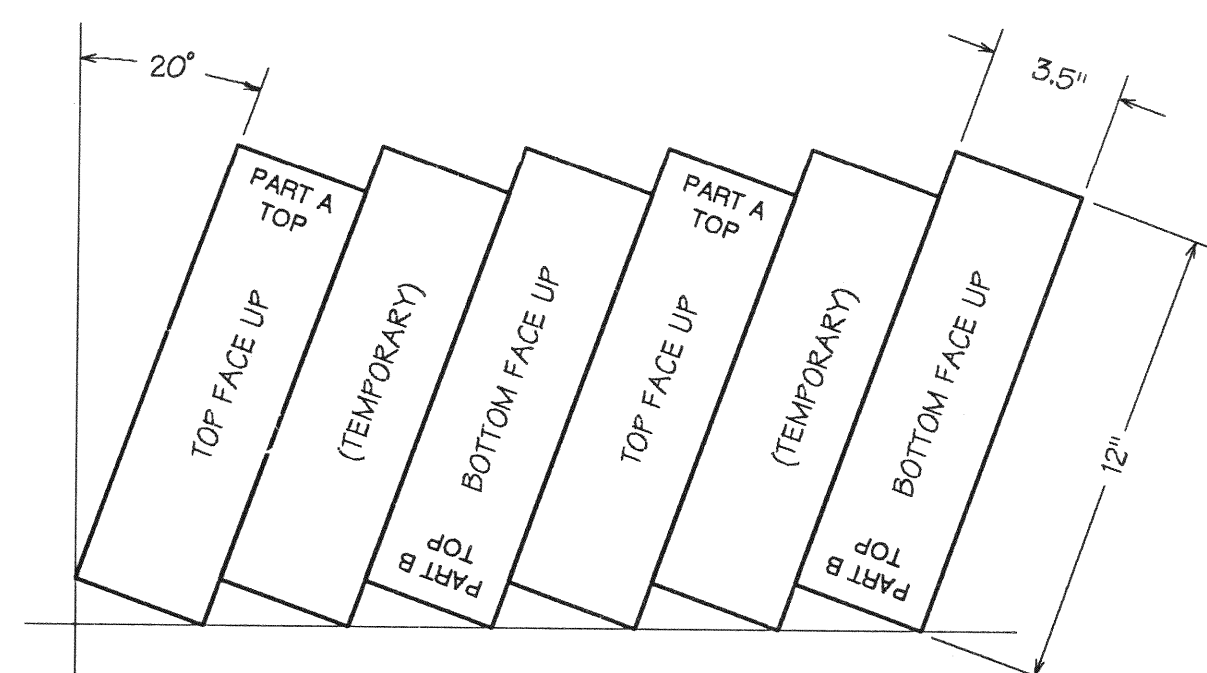


Figure 1

Construction

Although mortise and tenon joints are common, you won't often find them arranged on an angle such as these. Although there are many ways in which the advanced woodworker can make these joints, here is one way in which you can do it with only a router, a mortise and tenon attachment for the router, and a few basic tools. The trick is to find an easy way to ensure that each piece is cut to the same angle and the same length.

This can be done by starting out with 6 pieces of dressed hardwood, finished size 3/4 x 3 1/2 x 12. The best 4 pieces will become part of the pair of seats, while the two least attractive will be used temporarily to aid in the clamping process, as shown in the following.

Arrange the pieces as shown in Figure 1 above. Note the placement of the 4 "good" parts. (If this isn't clear, lay the pieces on top of the full scale plot above just the way you want to arrange them, and then mark the pieces.) On masking tape, pencil in the part no. and direction, taking care to keep the top edge and the good face of each facing either up or down, as shown. The angle from the vertical should be 20°. Glue the parts together edge to edge.

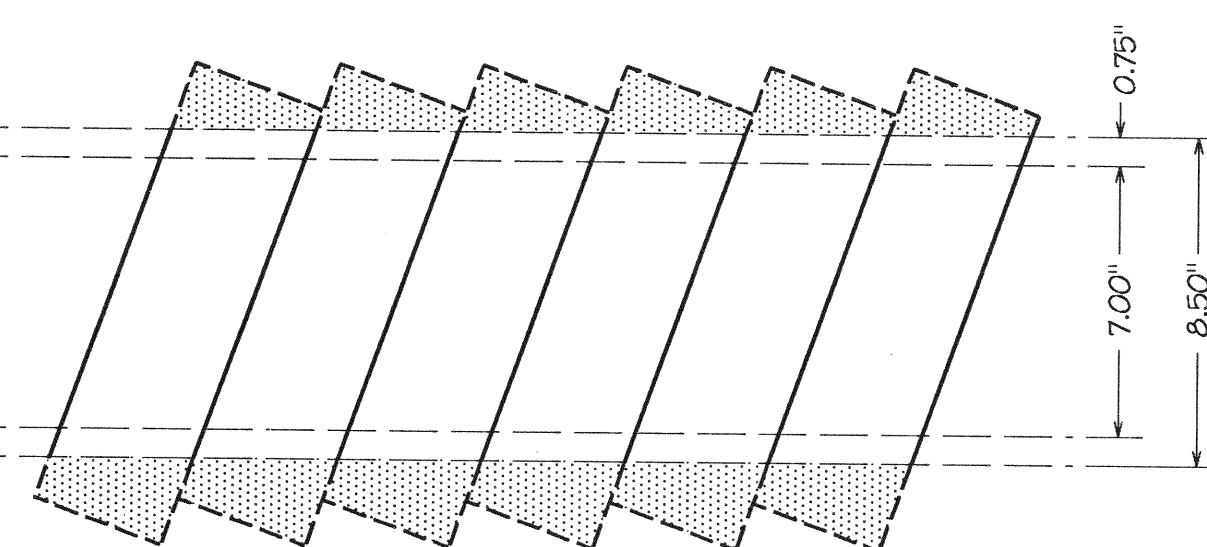


Figure 2

Lay out the four lines as shown in Figure 2 above, with the two innermost lines 7.0 inches apart, and the two outermost lines spaced 0.75 inches further out (or 8.5 inches apart). Cut off the waste (the shaded areas) past the outermost lines, and carefully plane or joint up to the outer lines.

Lay out the locations of the tenons and the three cut lines as shown in Figure 3 above. Depending on what you are going to use to cut the tenons, you will either cut them before separating the sections, or after.

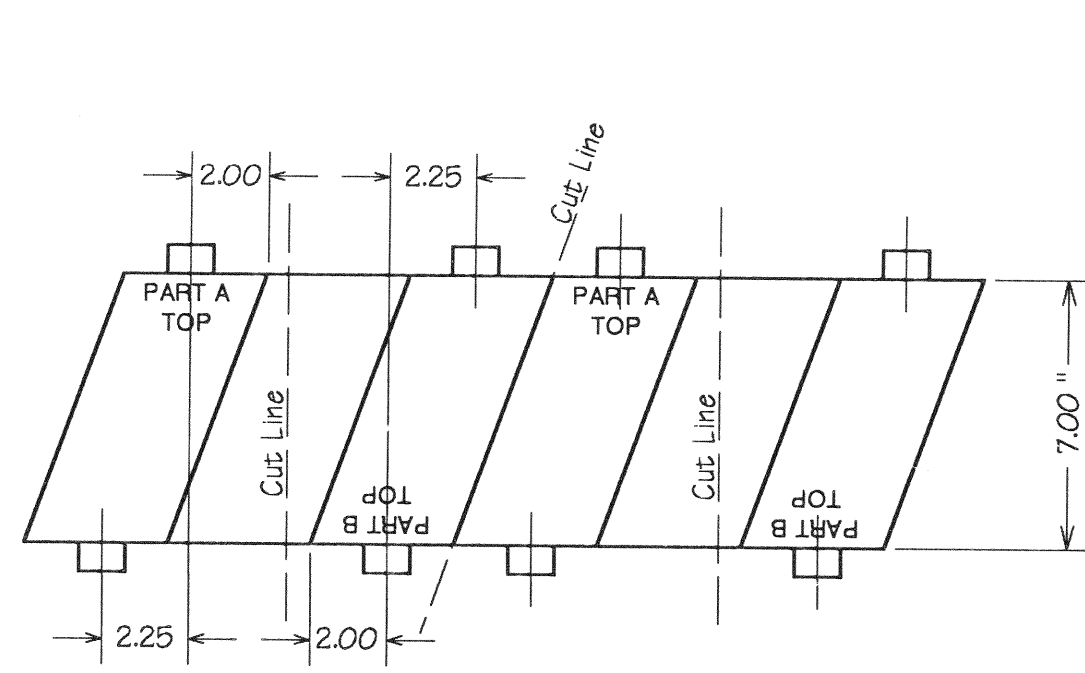


Figure 3

Given that two of the parts are good face down at this stage, make sure that the tenons are either perfectly centered within the thickness of the part, or spaced away from what will be the upper side of the finished seats by a consistent amount, so that these sections will match up properly with the mortises in the longitudinal pieces.

There are many ways to cut Mortise and Tenon joints. One way is with a Porter-Cable™ Morfen™ Jig, Part No. 5009, which lets you make perfect mortises and tenons with just your router.

Once the tenons have all been cut, and the sections separated, you will have four parts as shown in Figure 4. Note that the Part B's are still shown with the good face down.

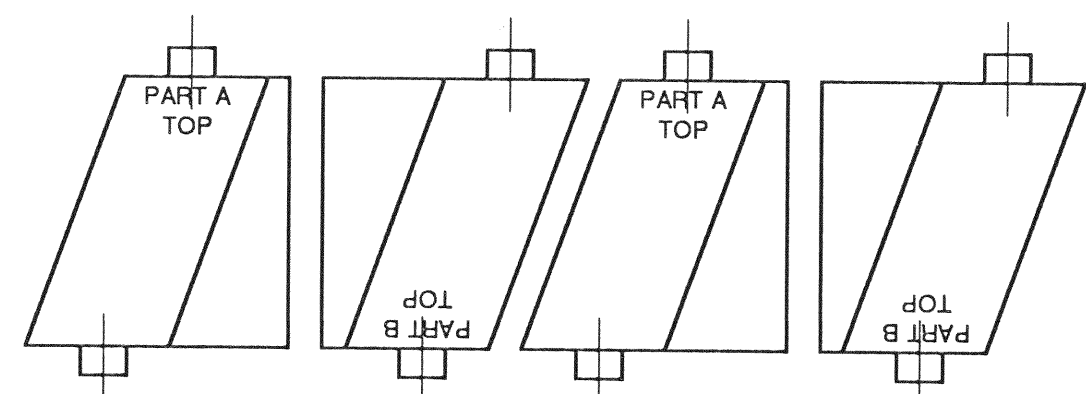


Figure 4

Next, cut the four sections apart along the cut lines as shown in Figures 3 and 4. Then, the Part B's can be flipped over to their final orientation, ready to match up with the longitudinal.

After the longitudinal are prepared as shown in Fig. 5, you test fit the assembly, and if everything fits well, take it apart and glue it with epoxy. While the glue is setting, clamp the assembly with bar or pipe clamps and padded jaws. At this point, you will see the need for the triangular and padded jaws. Without them, there would be a tendency for the sides to tilt inward as you apply clamping pressure, due to offset of the joints.

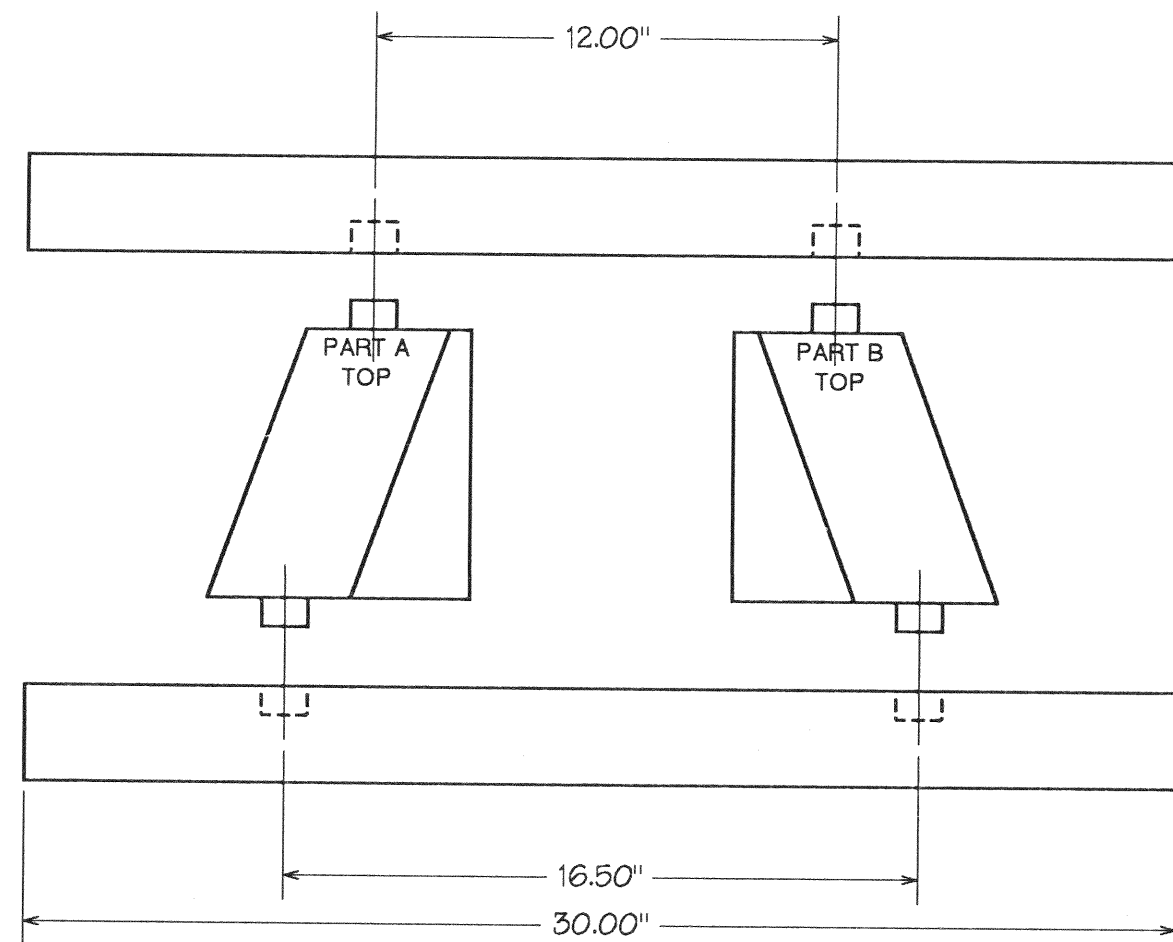


Figure 5

Cut two longitudinal per seat. Suggested size is 3/4 x 2 1/2 x 30 longitudinal should be enough for most boats. On large canoes, make certain that the length is greater than the inside width of the boat at the point where the seat will be attached.

Carefully mark out and cut the mortise locations as shown. Keep in mind that the depth and length of the mortises should be slightly greater than the tenons cut in the previous steps in case slight adjustments are necessary when fitting all four pieces together.

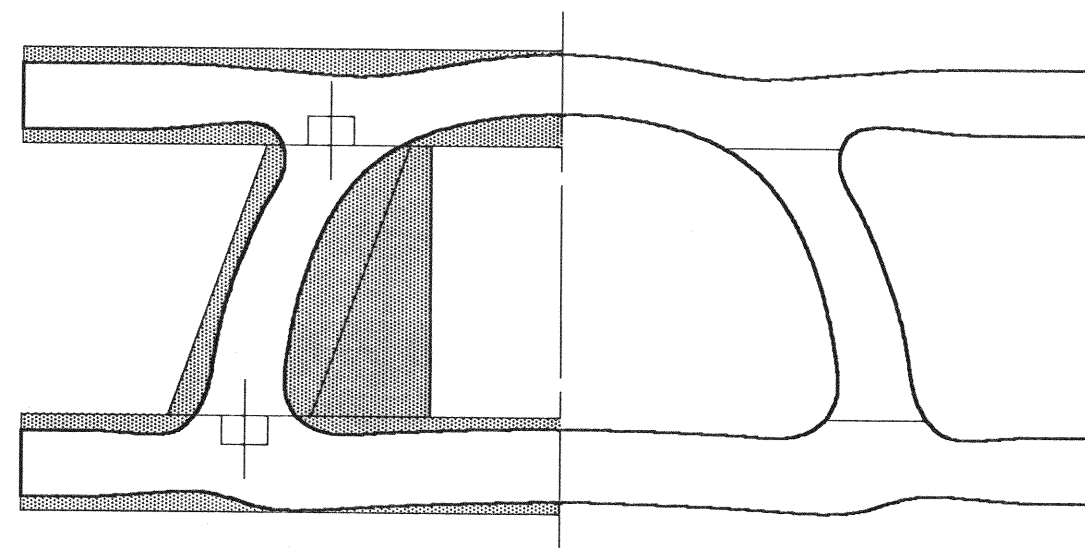


Figure 6

After the glue has set, transfer the entire pattern including holes to the wood using the full size template above, and remove the waste. A router is a handy tool to remove the waste inside, and a router or band saw for the outside. Sand carefully up to the line with a spindle sander, or a drum sanding attachment on a drill press.

Use a router with a 3/8" radius round-over bit with a pilot bearing to round the outside edges, top and bottom. Use a 3/16" radius bit for the inside, top and bottom.

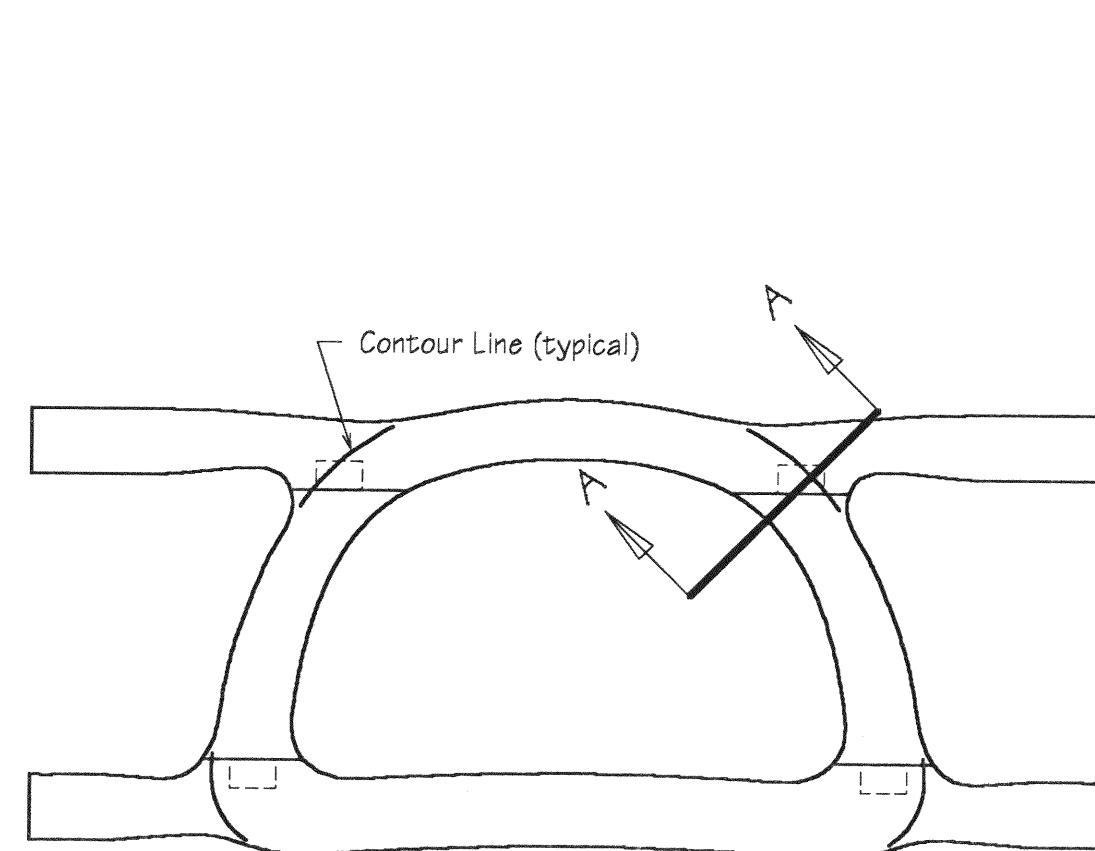
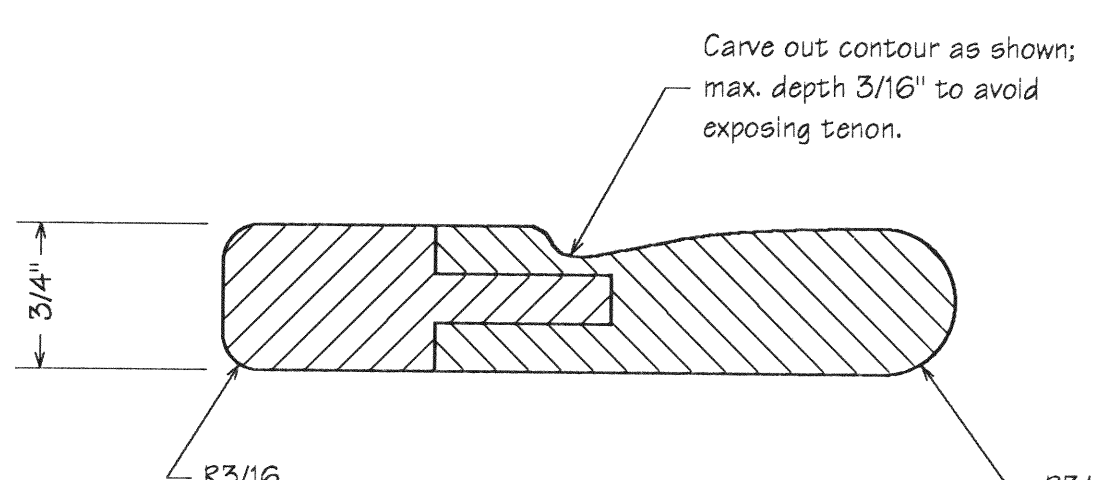


Figure 7

Carve and sand the contours in the four corners as shown in Fig. 7 above on the top side of the frame only. The curve of the contour should approximate the shape around the "seats" portion as though the four seat frame extensions were not there.

Note Section A-A below: carve the contour to a depth of no more than 3/16" so that there is no chance of exposing the tenon.

Note the 3/4" thickness shown above in hardwood, such as white ash, this thickness would be good for persons weighing up to 200 lbs. For over 200 lbs, we recommend 7/8" thick wood. Be careful to adjust the mortise and tenon positioning to compensate, paying attention to the orientation of each component as you follow the construction steps at left.



Section A - A

Drill each hole, at 1/4 inch diameter (see notes in Caning Instructions). Ideally, you should use a drill press for accuracy, and back up the seat frame on another piece of wood to prevent damaging the seat bottom when the drill breaks out. Chamfer the holes top and bottom at approx. 176° to 45°. Here again, a drill press can be used to good advantage to keep the chamfer depth absolutely uniform.

Caning Instructions

These instructions are to be combined with the black and white print of the finished seat frame which was enclosed with this drawing. If you are lacking the print, use the hole numbers referred to below are also shown on the full-size plan at right. The instructions which follow explain the hole-to-hole direction for each pass across the frame. However, except where indicated, the order or direction in which each part of a pass is done is not needed here. There are a couple reasons for that.

First, cane comes in various lengths, which could have some bearing on where you start and end each strand. Second, and probably most important, you will want to choose your starting point carefully for each successive pass so that the cane on the BACK side of the seat frame does not always wind up between the same holes. For example, if during the first pass, a strand passes between Holes 2 and 3 on the back side, then be sure that on the next pass, the strand will pass between Holes 3 and 4. This will even out the build-up of cane on the seat bottom.

If you are not already familiar with caning, we recommend you get some additional information on the process. One publication we like very much is called "Repairing Chair Seats With Cane," by Sam D. Black of the Penn State College of Agriculture. This pamphlet is all you need, and it's available for about \$5.00 from the cane supplier we have been using. They are...

W.H. Kilby and Co. Limited,
1640 Davenport Road,
Toronto, Ontario
Canada M6N 1S7
Ph: 416-656-1065

The holes shown on the plan at right are 15/64th inch diameter, and the size cane we use is Common Cane. This is a snug fit, and you can see that we do not finish the pattern with binder cane running from hole to hole around the edge. If you wish to do so, you'll probably want to go to 5/16 in. dia. holes. Or, if you just want a little easier fit, go to 1/4 in. dia.

As stated above, the following tells you where the strands are, not the order or direction they are woven in. Thus, a strand running between Holes 2 and 3B is exactly equivalent to a strand running between Holes 3B and 2, except on the Fifth and Sixth passes. For those two, the direction IS critical, as you will see.

The First Pass:

2 - 3B, 3 - 37, 4 - 36, 5 - 35, 6 - 34, 7 - 33, 8 - 32, 9 - 31, 10 - 30, 11 - 29, 12 - 28, 13 - 27, 14 - 26, 15 - 25, 16 - 24, 17 - 23, 18 - 22.

The Second Pass:

This pass goes all over top the First Pass - no weaving yet!
1 - 19, 2 - 18, 3 - 17, 4 - 16, 5 - 15, 6 - 14, 7 - 13.

(continued)

The Third Pass:

Again, over top the preceding - no weaving. And, although the pattern is identical to the First Pass, change the direction so that the strands on the bottom do not always build up between the same two holes.

2 - 3B, 3 - 37, 4 - 36, 5 - 35, 6 - 34, 7 - 33, 8 - 32, 9 - 31, 10 - 30, 11 - 29, 12 - 28, 13 - 27, 14 - 26, 15 - 25, 16 - 24, 17 - 23, 18 - 22.

The Fourth Pass:

Same as the Second Pass, except NOW you must weave. Refer to the print, and to the small detail below. And again, watch out for the build-up on the bottom side:

1 - 19, 2 - 18, 3 - 17, 4 - 16, 5 - 15, 6 - 14, 7 - 13.

The Fifth Pass:

This one weaves all the way, and now, the order IS critical, because of the tricky transitions near the middle of the pattern where the strand goes into the same hole twice in a number of locations - watch for them, and do this one in the strict order given:

40 - 9, 10 - 39, 3B - 11, 12 - 37, 3C - 12, 13 - 35, 34 - 13, 14 - 33, 32 - 14, 15 - 31, 30 - 15, 16 - 29, 28 - 16, 17 - 27, 26 - 17, 18 - 25, 24 - 18, 19 - 23, 22 - 19, 21 - 19.

The Sixth Pass:

Same instructions as for the Fifth Pass:

20 - 11, 10 - 21, 22 - 9, 8 - 23, 24 - 8, 7 - 25, 26 - 7, 6 - 27, 28 - 6, 5 - 29, 30 - 5, 4 - 31, 32 - 4, 3 - 33, 34 - 3, 2 - 35, 36 - 2, 1 - 37, 3B - 1, 39 - 1.

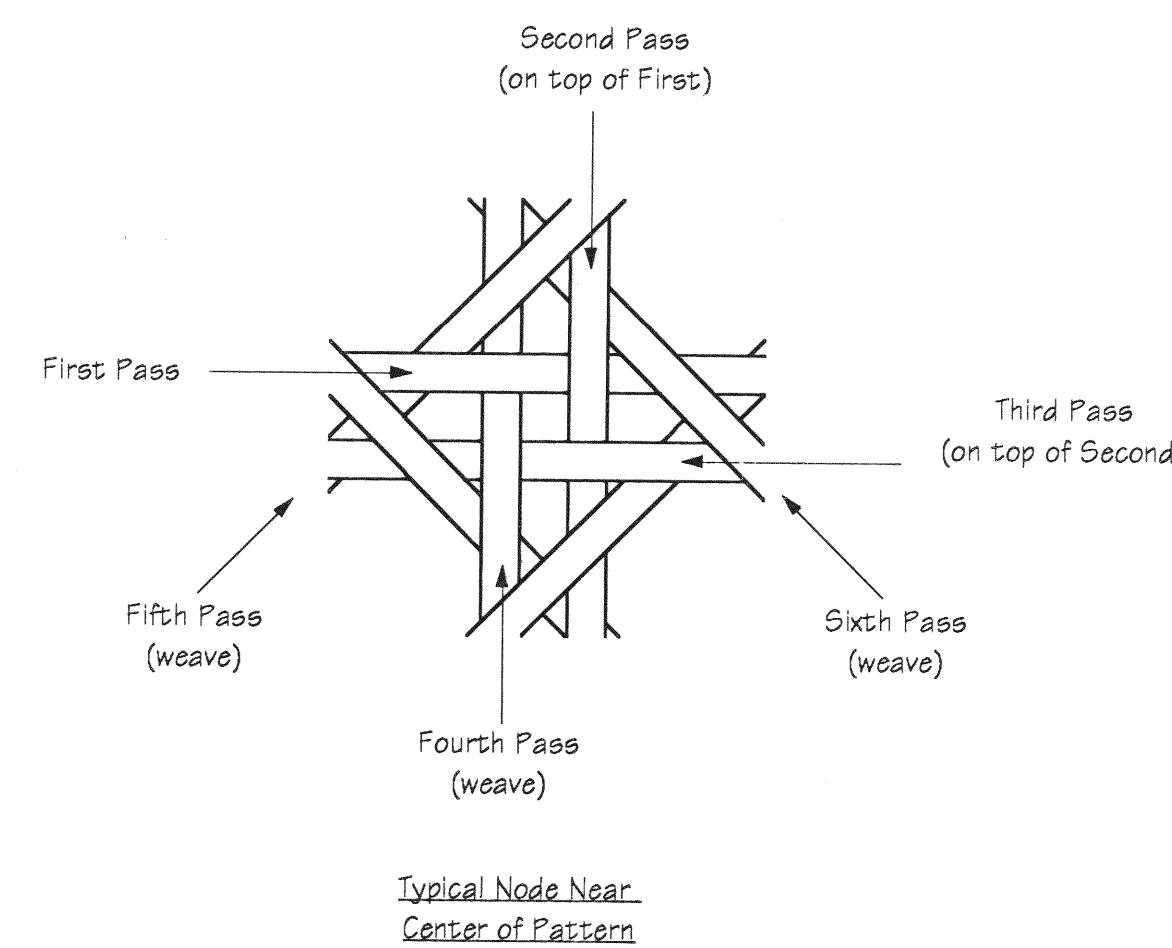
Finishing Off:

Now, finish off all knots, trim, and let the seat dry thoroughly. After at least a few days drying, seal all the cane with a liberal application of Thompson's Water Seal or similar, top and bottom. This won't hurt the varnish, and it works great.

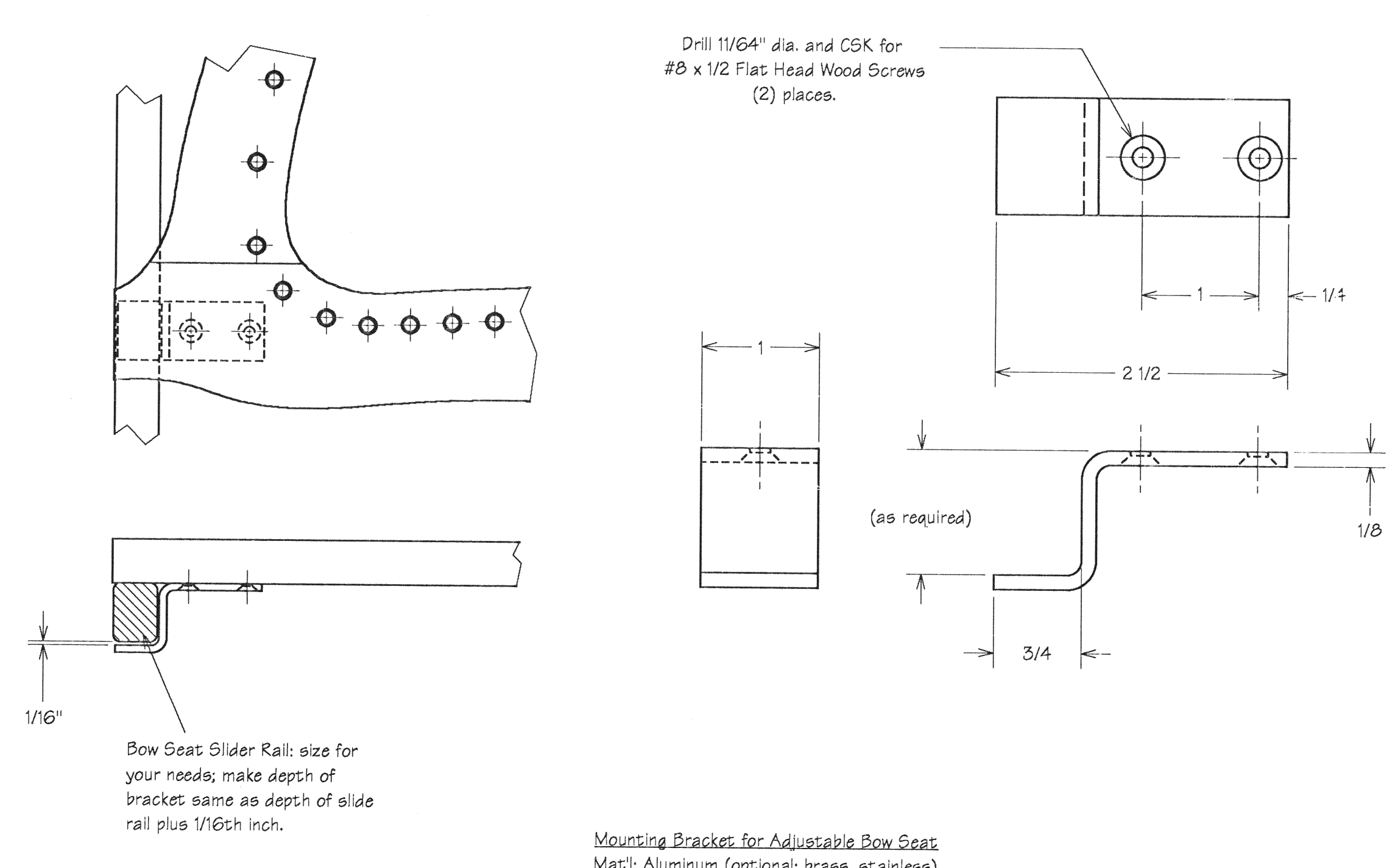
(We have tried the varnish applied carefully from just the top as recommended by many 'experts', but we have found it doesn't work. After a season, the cane started to mildew from underneath.)

Have fun, and remember, if you aren't happy with the results of your first effort, just do it again! We often do these seats in front of the TV. Its a good excuse if you don't want to waste time watching the tube. Our typical time for one of these seats is around 4 to 5 hours.

- Martin Step



Typical Node Near Center of Pattern



Mounting Bracket for Adjustable Bow Seat. Mat: Aluminum (optional: brass, stainless)

The Fine Print:

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Martin Step, P. Eng.
Green Valley Boat Works

Green Valley Boat Works

P.O. BOX 2004, PIONEER PARK POST OFFICE
KITCHENER, ONTARIO, CANADA N2P 2B4

MODEL:	SEAT FRAME, AGAWA BAY		
DESIGNER:	M.P. Step	SCALE:	Full Size
DWG NO:	S1		
OWN BY:	M.P. Step	DATE:	Jan 7, 1997
REV NO:	R00		
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