14a. Undercarriage Fit-up - - - Rocker:



Preparation:

It is difficult to do finish work on the undercarriage parts after assembly. Before starting on the undercarriage assembly the chair parts should be at the following stage.

- a. The seat should have its bottom sanded, any lettering complete, and at least one coat of finish. The top of the seat can be rough, but should be close to its final contour. All the holes are drilled in the seat, but should be undersized at this point.
- b. The rockers should be sanded on all sides and have at least one coat of finish.
- c. The legs and stretcher should be final sanded with at least one coat of finish. Unlike the photo, the cookies should be removed.



Most if the joints in our chairs are through wedged tapered tenons. We have found that the most efficient and accurate way to make these is using tapered tenon cutter and tapered reamers. These tools have matched 12.8 degree tapers and are both available from Lee Valley Tools. I made the extensions on a metal lathe.



There are a couple of fixtures that are great assistants during the undercarriage assembly.

The first, I call a "rocker horse" (hopefully not a rocking horse). The rocker horse registers the seat and rockers in their final relative positions. The leg holes can be drilled and reamed in their right directions with no measurements. The centerline for the seat is marked front and back. The rockers are clamped with the front flush on the forward support. Arrows are drawn to show where the legs are to enter the rockers.



This simple support frame is essential when the assembly is upside down and the legs are being pounded into the seat. The frame needs to be tall enough so the ends of the inserted legs come short of the bench. Also shown is my favorite hammer for assembly. The hammer has a hard plastic face for pounding things together and a soft rubber face for taking things apart.

HERE WE GO!



1. Examine the side faces of the two rockers and plan to put the best faces outward. Hold the rockers together and mark the bottoms with an arrow pointing outward.

2. Put the rockers in their position on the fixture and mark the four location where the legs will enter the rockers.





3. Use a marking gauge to find the exact center at the leg locations, and center punch the 4 leg locations with an ice pick.



4. Clamp the rockers and seat in their final location on the fixture.

5. Using a long 3/8 inch spade bit, pass it through the leg hole in the seat and drill (enter slowly) into the rocker, stopping when the pilot point breaks through the bottom of the rocker. This assures alignment of the holes. Repeat in 4 places.



6. Turn the whole

assembly upside down and complete the 3/8 inch rocker holes from the bottom side of the rockers. Again enter slowly and eyeball aim at the corresponding hole in the bottom of the seat. I use the Quick Clamp beams to hold the seat up well off the floor.





Check the diameter of the legs where they will enter the rockers. All four diameters should be 11/16 inch or a little bigger. Use the small taper reamer passed through the seat. Ream the rocker holes out to 11/16 (smaller for under-sized legs) at the upper rocker surface – the big end of the tapered hole in the rocker.



8. Taper the top ends of the 4 legs using the ½ inch tenon cuter. The taper should clean up the entire tapered surface up to the sharp cusp at about 1 inch diameter.

9. Examine the legs and plan for the best looking legs in the front.
Number the legs and the leg holes in the seat. From here on, the legs are not interchangeable.





10. The 1 inch cusp on the upper part of the legs should end up about 1/2 inch from the bottom of the seat, so mark that upper spot on the taper. Measure and record the diameters of the 4 legs at that point. On the legs measure and mark where they will enter the top of the rockers. For an average height rocking chair measure 13 inches down from the upper spot.



12. Taper the bottom of the legs using the 3/8 tenon cuter so that the taper approaches the lower spot. Dress the 3/8 taper extension so they fit easily into the rockers and show no gap as seen from above. The legs and rocker will be assembled and disassembled many times and the process should be easy, or things will get broke.

11. Pass the large tapered reamer through the rocker holes and ream the seat hole from the bottom side to the diameters recorded above – typically about .9 inches, but probably all different. At this point, we are finished with the rocker horse fixture.



13. Put the seat upside down on the support frame and assemble the legs and rockers. Measure and record the distance from the seat to the rocker. Re-taper and re-dress the legs. Don't give up until all 4 seat-to-rocker distances are the same

Tip: cutter, mark on the exit side before starting the cut. Twist the part by hand. When the mark has advanced χ^{th} inch, the part is χ^{th} inch shorter.

14. Pound the legs and rockers tight into the seat and set it for the first time on the floor. The rear tips of the rockers should be the same distance from the floor. If there is ¼ inch or more difference in the height of the two tips, make some small adjustments to the leg lengths to make it right.





15. If the lower tapers on the legs are going to be visible, mark around the leg where it enters the rocker. Return the legs to the lathe. Trim and refinish the exposed area. Avoid the tapered area below the mark which will be within the rocker gluing area.

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17. On the back legs mark the location of the stretcher holes about 8.75 inches from the seat bottom.

16. Rotate the legs in the seat to expose their best face outward and mark that rotation on the legs and bottom of the seat.





18. Rotate the first leg slightly and drill a 3/8 hole for the stretcher stopping when the pilot point breaks through. Back drill, entering slowly as always.



19. Drill the 3/8 hole in the second back leg using the long spade point bit through the hole made in the first back leg. Stop and back drill as usual to avoid blow out.



20. Measure the diameter of the stretcher where it will enter the rear legs. It should be 11/16 inch or a little more. Use the small tapered reamer passed through the opposite hole and ream the stretcher holes in the rear legs to 11/16 inch (or less for an undersized stretcher). Hand support the leg while reaming. If the leg is allowed to deflect the final stretcher fit will be gapped.



21. With the rear legs in place, measure the distance "x" between the stretcher holes. I use two sliding sticks to get an accurate inside measurement.



22. Mark off $\frac{1}{2}$ of "x" each way from the center of the stretcher. This is a rare opportunity to use my favorite ruler.



23. Cut the tapers a little short of the above mark using the 3/8 tenon cuter. Dress the 3/8 stubs and small end of the tapers for easy insertion.

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24. Number one end of the stretcher with its corresponding rear leg. Test fit the stretcher in the correct rear legs. Record how far each white mark is from its leg. That is the amount that needs to be removed in the 3/8 taper cutter. You should be able to get the stretcher length right in one try.



25. Put the whole undercarriage together tightly and set the chair right side up. Mark around where the legs enter and leave the seat – top and bottom. Use a red pencil on the bottom, which means "no no!". Here I used a white line on for the top. Also mark the direction for where the wedges will go.



26. renumber the legs on the bottom, because the numbers on the tops will soon be cut off.



27. Sawoff the tops of the legs leaving about a half inch above the seat top. Don't ever saw on the red line, unless you want a three day funk. Then make a kerf for the wedge, stopping short of the red line so it won't show under the seat.

Okay, we've run the alphabet, so we must be done. Take a break.