



Making Windsor Chairs

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What do you do when your daughter asks for chairs for a wedding present?

- You learn to make chairs of course
- Where I got the plans and methods: https://www.curtisbuchananchairmaker.com/store/c1/Featured_Products.html
- He has loads of videos on Youtube, but he uses all hand tools and traditional methods
- I could not master all these methods, so I invented my own
- I will try to cover the whole process, but it is very involved so I can't go into a lot of detail



A little history of the Windsor Chair

- Believed to have originated around 1710 from the town in England
- By 1730 it had made its way to the colonies (that's us)
- Of course, the Americans improved the style and introduced new wood species
- In this picture of the Second Continental Congress, you can clearly see our founding fathers chilling in Windsor chairs
- I think I see Nancy giving her approval



Why are Windsor Chairs Normally Painted?

- Windsor chairs are normally made from a variety of woods and they would look too chaotic if they weren't painted
- Seat: Pine, Basswood, or Poplar are recommended for carvability
- Spindles and Combs: White Oak, Red Oak, Hickory, or Ash for strength and bendability
- Legs and Posts: Hard Maple is preferred for strength and turnability





Some new tools I had to make/master

- Draw Knife
- Radius Spoke Shave
- Low Angle Spoke Shave – magical on end grain
- Travisher
- Scorp – didn't bother
- Made a Bodger's (Brit term for chair maker) shave horse, didn't get much use
- Froe for splitting stock

Back Story

- There are many different styles of Winsor chair, my daughter chose the Fanback Side Chair from the gallery on Buchanan's site
- The plans came with two styles, the Baluster and the Double Bobbin, we ended up using the comb from the double bobbin and the posts and legs from the Baluster
- For the rocking chair (new set of plans), I used the Double Bobbin because I had a lot of Ash left over, and the turnings are much simpler

What I used and where I got it

- The comb and spindles I made from Ash.
- I got an Ash tree they cut down at work and split it with wedges. This is very hard work, I don't recommend it
- Chair makers tell you to rive the stock so you always follow the grain. Good luck with that, I mainly made firewood that way.
- I quartered the log with wedges and then used a jointer and bandsaw.
- I bought thick poplar from a guy and glued it up for the seats
- I used hard maple from a tree a friend cut down and Tony and I milled it into 10/4 slabs on his fancy new bandsaw mill.

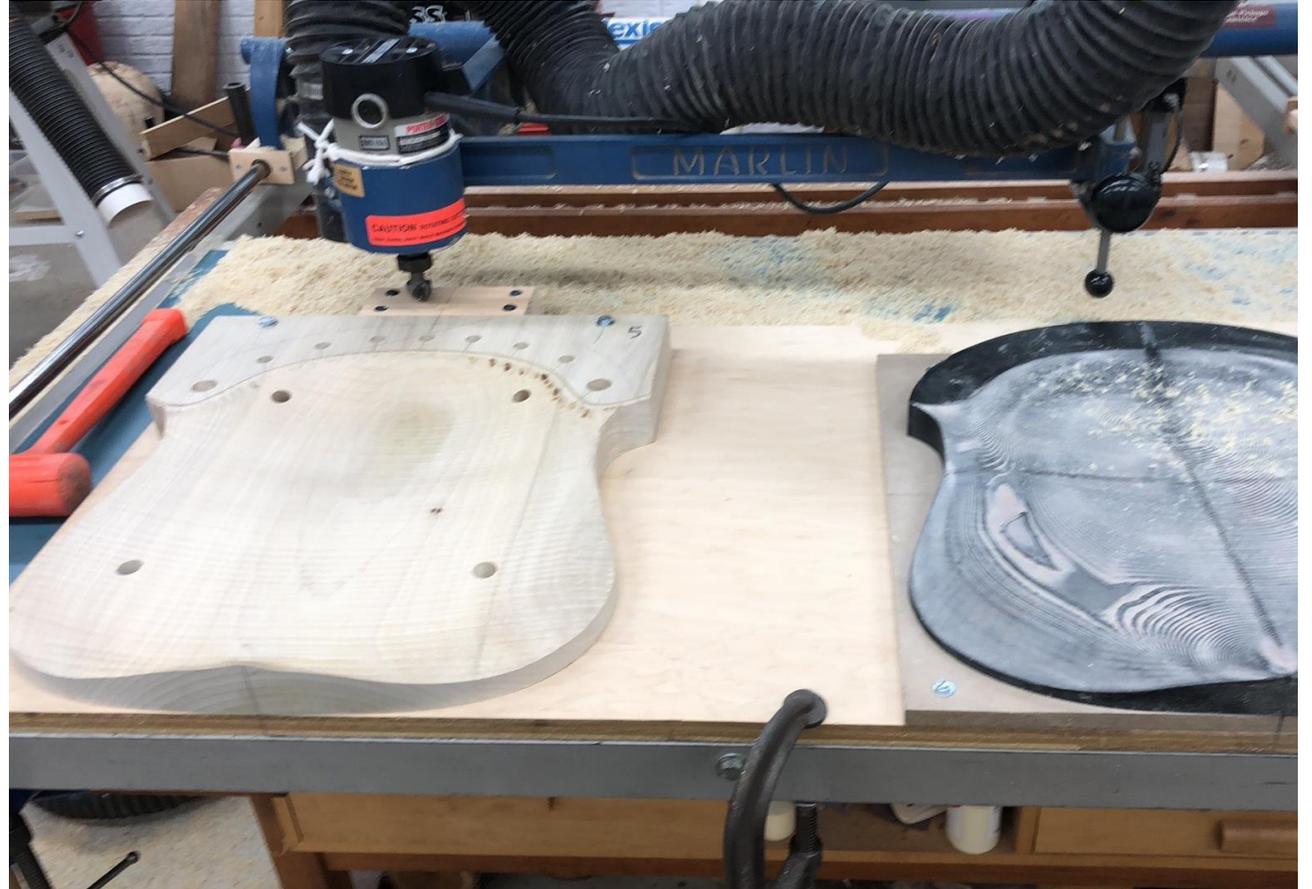


The challenges

- If I were making one chair, consistency would not have mattered much, but I was making a set of six.
- The turnings are very long and slender which is a challenge to turn.
- The spindles are normally roughed out with a draw knife and then finished with a spoke shave when dry. After six failed attempts I quit.
- I needed 42 nearly identical spindles.
- Every piece is unique at final assembly and match fit to its mating piece, front/back, left/right, grain orientation/angles. You need a good marking system.
- A chair is structural, it can't just look pretty, but it should

Challenge 1: six identical seats

- I spent hours making a 3D model in Cad from the contour map provided in the plans
- I traded a friend at work some motorcycle mirrors for a 3D print of the seat.
- I barrowed a router duplicator to contour the seat using the 3D print as a pattern. It worked, sort of.
- For the rocking chair seat, I drilled depth holes from the contour map and carved by hand. This is far simpler and probably as good.



Challenge 2: 42 long skinny spindles

- I found a method to apply tension to the piece while turning
- I made a template and used a router to make most of the spindles
- I have since discovered ways to do it without the template and router, as you will see.

Challenge 3: lots of duplicate parts

- Make templates/ story sticks
- Pick a process and stick with it. They don't need to match the plan as much as each other. You are more likely to replicate what comes naturally. In other words, make the first piece as best you can to the plans, and then make the rest match that one.
- I started with the complex sections first so I could do those when the blank was the stiffest.
- Then I worked from the center to the ends.
- There is a lot of stock removal and the blanks often warped during turning(went off center, started to wobble). Finish a section at a time because you probably won't be able to come back.





More about the wood

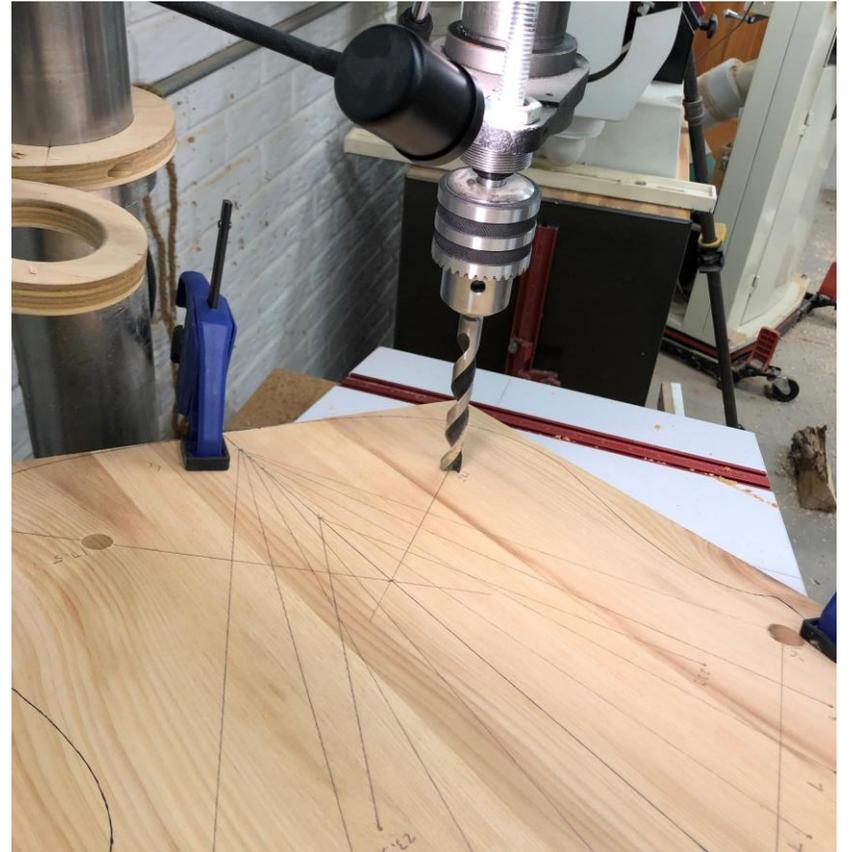
- Chair makers like to use green wood and use drying and shrinkage to their advantage
- I dried most of the wood myself
- You want the mortises green (dampish) and the tenons bone dry. Once they stabilize, they are locked together.
- I “super dried” the tenons in my kiln using a board with holes in it. I use an electric hot plate (under the board) and an Inkbird controller.
- I kept the seats and combs (mortises only) in a plastic container with a pan of water in it (wet box).
- I used balloons to keep the tenons dry while conditioning the legs (legs have both tenons and mortises)

Let's start at the top- the comb

- I used green ash
- Made a template and cut out the outside shape
- I cut the taper with a quick fixture for my planer
- I cut the groove with a combination of a Dremel tool and a scratch stock
- After all shaping, I steam bent the comb around a form and air dried it on the form for a week or two.
- Then it went into the kiln for a couple days at 140F. This helps set the bend, and I got minimal spring back
- After that they went in the wet box to await drilling

The seat

- I made blanks about 17" square from glue ups. A single piece is preferred for carving, but who has wood that big?
- Then I laid out and drilled the angled holes. I started with a hand drill like the videos, ended up in the drill press because it's hard to make a clean hole at an angle
- The tapered holes were made with my homemade reamer. Later, I bought a reamer that works way better, but they're not cheap.
- I fit each leg and post to a hole in the seat, all matched fits.
- Then I cut the gutter groove with a router and template.
- Buy high quality brad point bits for this



The seat - continued

- Then I cut the outside profiles and sanded
- At this point you are ready to do the contouring of the seating area.
- For the six chairs, I roughed it with a router duplicator and finished with gouges, travisher, scrapers, and of course sandpaper
- For the rockers shown, I drilled depth holes from the contour map and hand carved
- Then the bottom front was done with a draw knife, spoke shaves, and pattern maker's rasp.
- The lower back is similar.



Legs and posts

- The legs and posts are attached to the seat with tapered tenons and wedges
- I made a simple gauge to get the tapers right on the lathe. I roughed the leg tenons first and then final sized the tenon after super drying
- The posts were turned under tension fully dry
- After the tenons are fitted to the seat, the length and angles for the stretchers are measured and marked on the pieces. I used a worksheet for each chair. I will demo this later.

Drilling the comb

- Mark comb front for post locations and center spindle
- Dry fit the posts and center spindle into the seat
- The posts and spindles are bent outward to form a fan, thus the name. Therefore, the holes are not square to the centerline.
- Spread the posts and clamp in place, then mark the angle of the post on the comb front.
- Mark the length of the posts and the center spindle. There is a specified height from the seat to the comb
- Continue this way for the rest of the spindles
- Drill holes at marked angles in the comb.
- Final fit spindles and posts to the comb holes

Final Assembly Steps

- Cut leg bottoms to level and achieve front and rear seat height
- I used Titebond Extend glue, but not sure it helps. The joints want to lock instantly because the tenons expand as soon as glue hits them.
- Gluing the comb is a struggle because you are making 9 joints at once with parts that don't want to line up. You need a helper. This will test your marriage more than hanging wallpaper!
- The wedges change sound when they bottom
- The tapered tenons and wedges are trimmed flush after the glue dries
- Use hot water and a toothbrush to clean up glue squeeze out.

Demo for tension turning

- See AAW article: **An Engineer's Look at Turning Slender Wood Spindles** by Dennis J Gooding for all the nerdy engineering stuff
- Jet live center was tapped to add drawbar
- Remove quill screw and handle
- I used a 250# die spring purchased from McMaster Carr 250 lbs/in
- I made "cool hand Luke" out of 3/8" HDPE from Grainger. I had this on hand for resin molds. Very slippery stuff.
- 3/4" to 1 1/4" adapter made by Oneway
- Start with octagon shape, square is miserable



Demo on angled seat holes

- The string method: there are many ways to do this, but I like the string method the best
- The posts and legs have both rake (front to back) and splay (side to side) angles, but the plans also have the sight line and resultant angles. This reduces the problem to one angle and a right angle.

Demo on measuring for legs and stretchers

- Rubber bands
- Angle gauge
- DIY Tee gauge



Assemble the Rocking Chair

Stretchers to leg

Legs to seat

Posts and spindles to seat

Add the comb

Rocker rails

Conclusion

- I have always wanted to make chairs, but I doubt I would have tackled it if my daughter hadn't asked
- I took about a year with a lot of research and hard work
- Determination and patience are the main requirements
- I really enjoy the process now that I am comfortable with it, and I plan to make more
- I would be happy to help anyone if they want to attempt it

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