



instructables

Your Own TARDIS



by nibeck

I've been a long time Doctor Who fan and an amateur woodworker. In 2013, I started a project that would combine those two interests. The following is an attempt to document my build process. All said and done, this was probably a 4-6 month project. I make no statement that this is the only, or even best way, to build a TARDIS, but I hope with the info I share, others can take on this super fun challenge. Looking back, there are a few things I might do differently, but I had a blast building it and am very proud of the results.

Tom Baker is "my" Doctor as he was on when I first discovered the show. I love the new rebooted series as well, so the design I chose for my TARDIS is founded in Bakers TARDIS, but it also adopts some of the Tenant's and Smiths' designs.

I dug through my files looking for as much detailed information about dimensions, sadly I didn't find much. I uploaded a couple of images with some dimensions, but not enough for a full blue-print. Look at the photos, I tried to annotate them with a bunch of small details that will hopefully help with the build.

I think if you get the basic outside dimensions correct, you can add the detail that looks good to you,

It's **your** TARDIS, so you can make it look anyway you want!

Supplies:

Materials:

- 1x4 Poplar lumber (approx. 120 feet)
- 2x4s (approx. 40 feet)
- 1/4" plywood (4x8 sheets (4)
- 3/4" plywood (4x4 sheet (1)
- 1/4" Frosted Acrylic (windows)
- 1/4" White acrylic (main signs)
- Wood screws
- Wood putty
- Epoxy
- Primer
- Paint
- Blue tape (you can never have enough blue tape)

Tools:

- Circular saw
- Clamps
- Table saw
- Miter saw

- Jig saw
- Drill
- Router
- Clamps, lots of clamps
- Pocket screw jig

Don't be intimidated if you don't have all those tools, this can be done with minimal tooling, including hand saws for many things. What's more important is that you have fun and learn while doing projects like this!

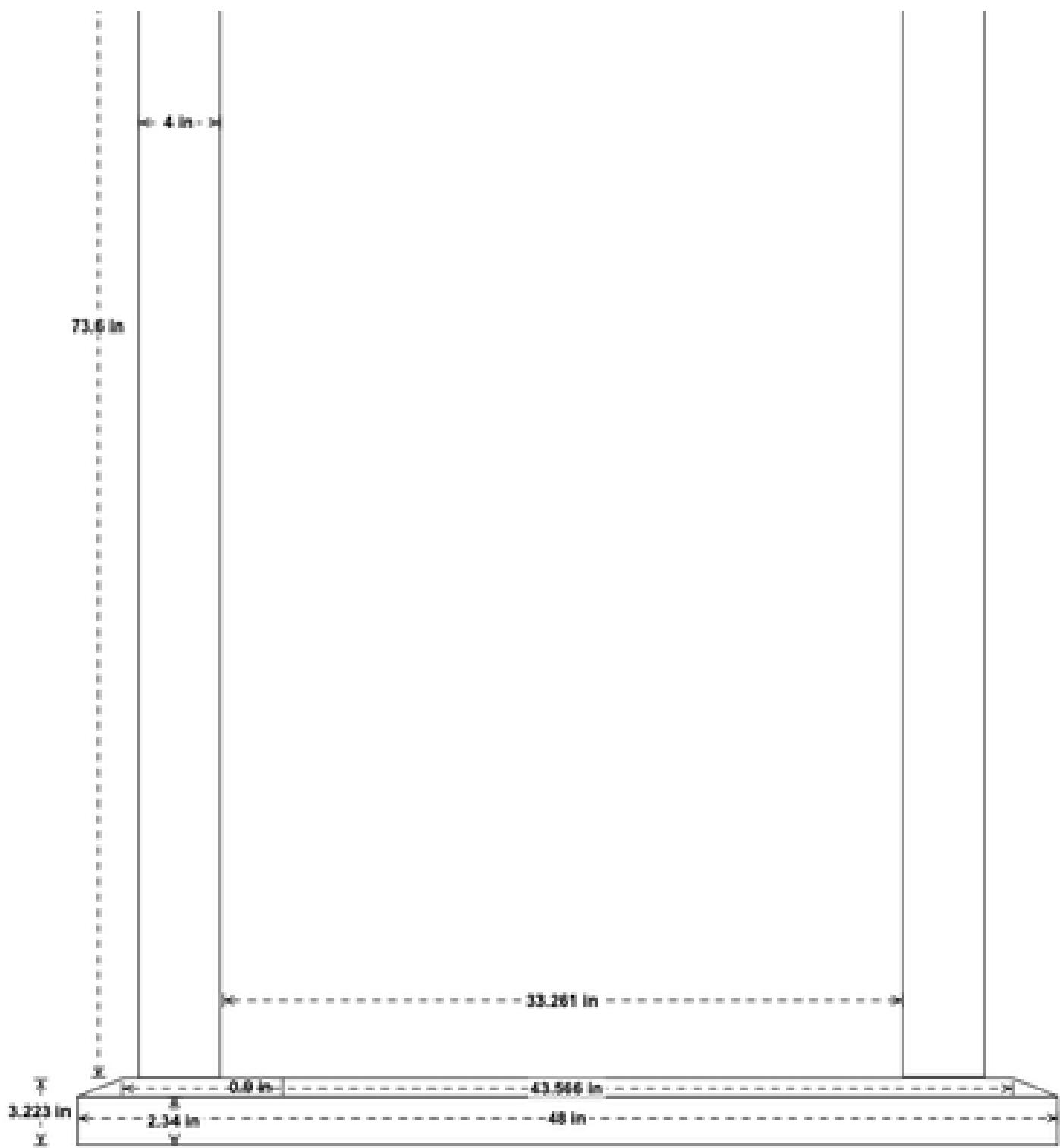


Your Own TARDIS: Page 3

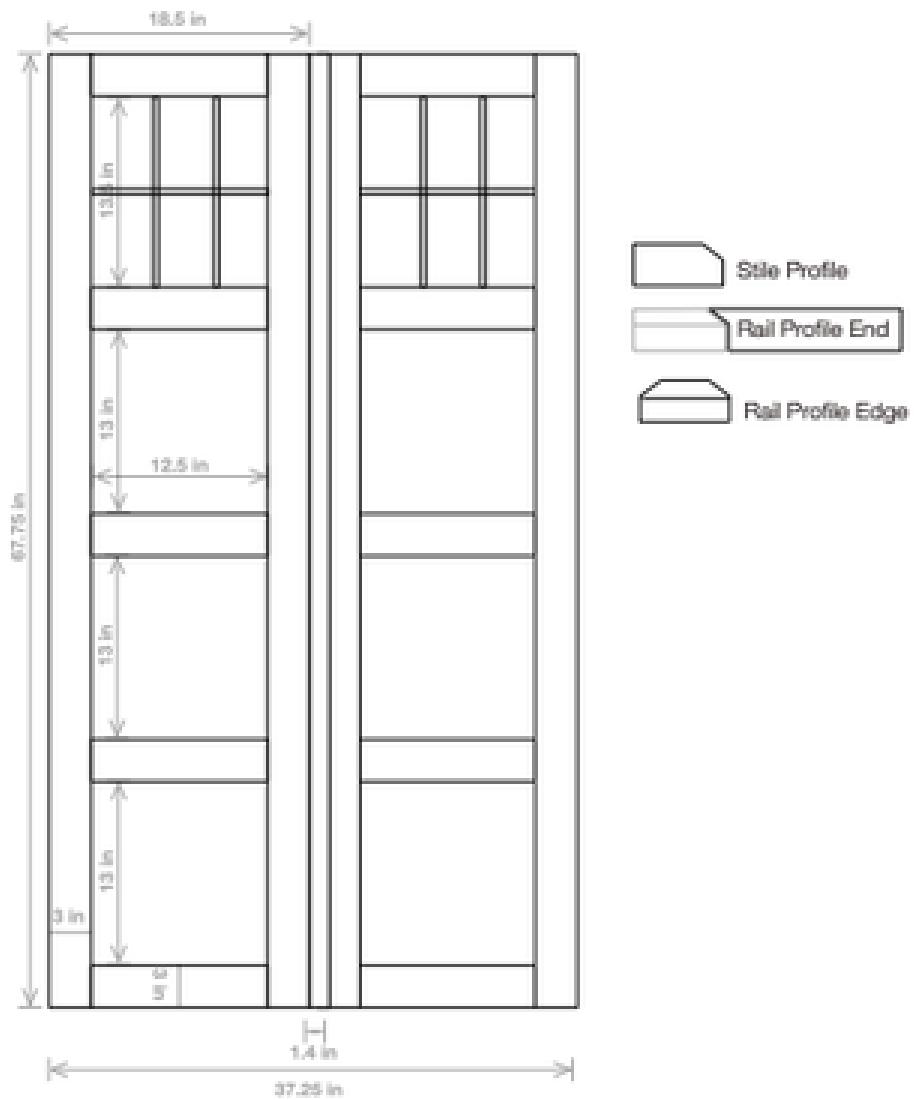


Your Own TARDIS: Page 4





TARDIS Side Panel (Left)



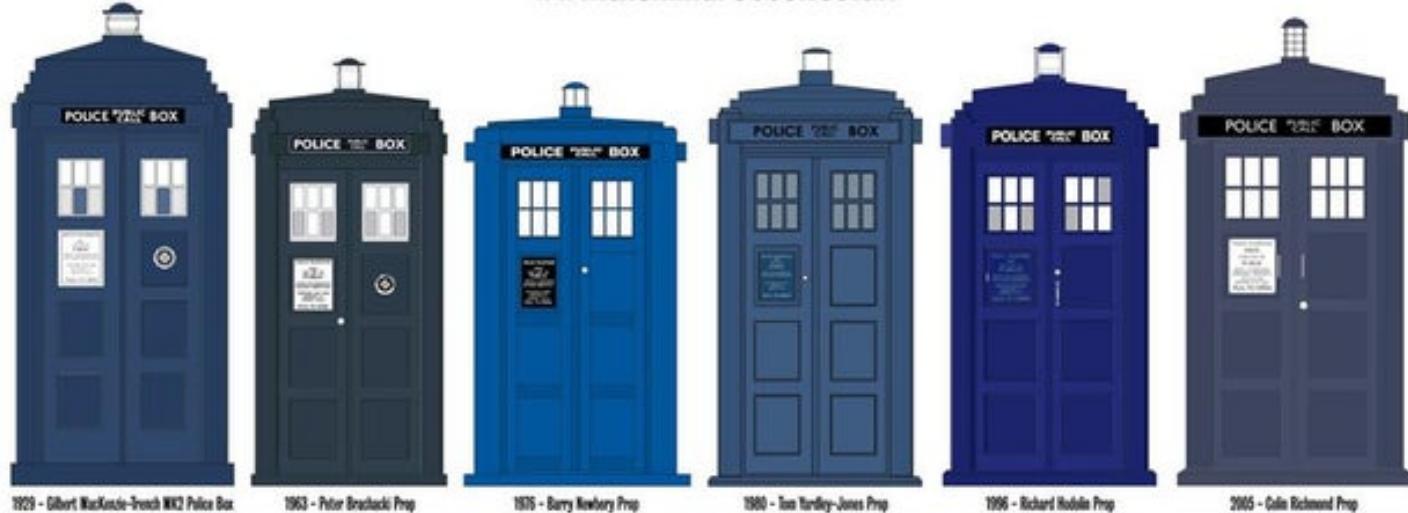
Step 1: Gathering Data

I scoured the internet and found a handful of builder's guides, which I read through multiple times. I also spent a lot of time simply looking at the changes of the TARDIS over the years.

Download a bunch of reference images for your own build. Pick and choose what details you like.

A Thousand Years of Phone Box Travel

www.themindrobber.co.uk



A scale comparison of a Metropolitan Police Box versus the five main TARDIS props built for the television series 'Doctor Who'. From left to right they are: 1) The original Police Box design upon which the TARDIS's camouflage unit based its shape before getting stuck. 2) The first TARDIS prop built for William Hartnell's Doctor which suffered much damage and had many modifications through the tenure of Patrick Troughton, Jon Pertwee and the early years of Tom Baker. 3) The prop built for Tom Baker's third year as the Doctor. 4) The fibreglass prop built for the start of John Nathan-Turner's era as producer. 5) The prop built for Paul McGann's TV movie. 6) One of several props built for the re-launch of the series in 2005.

Step 2: Base & Corner Columns

Bottom Frame and Floor

The bottom frame is built from 2x4s, heavily re-enforced to hold the weight of the TARDIS, and ensure it remains very stable as you enter and exit. The top of the 2x4s are bevelled. There are also a series of small blocks attached around the side of the frame, these are there to support the floor panel that will be placed on this frame.

The frame is 48" on each side (outside edges).

Notice the square "holes" at each corner. These were specifically sized so that the 4 corner posts that make up the vertical support structure of the TARDIS have a solid base to fasten to. These columns go down "into" the base where they are fastened.

I wanted to add wheels to the TARDIS to make it easier to transport. I also didn't want the wheels to be visible under the TARDIS, so I built the bottom frame in such a fashion that it was about 1/2" shallower than the wheels. That way, the wheels would stick out from the bottom about 1/2" and allow the TARDIS to be moved around. This has worked out really well.

The floor of the TARDIS is plywood, with the corners cut-out to account for the columns. Wheels attached to this floor panel.

Columns

The 4 corner support columns are each made up of 4 pieces of 1x4" poplar, glued together into a column.

The finished columns are 4" on each side and about 73 1/2" tall.

Clamps! The edges of the columns are routed to provide detail. Routing is dusty business. The routed edge ends about 4-5" inches from the bottom of each column. This creates square edges that extend into the base and become part of the frame providing a lot of rigidity.

A plywood "plug" was cut to fit snugly into the top of each column. This is held in with glue. You can shoot small nails in from the side if you want.

The completed columns are then screwed into the 2x4 base structure, ensure they are plumb and level.



















Step 3: Sign Holder / Top Frame

The build up to this point has been pretty straight forward. The next few steps start to get a little more complex. Please review all of the photos to ensure you have a pretty good idea of the overall project before you start on the individual parts. I wanted the top to be removable from the TARDIS for easier storage, so this particular design accounts for that. The entire top portion is made up of two main parts; 1) Sign & Top Frame structures and 2) Roof Panels. The roof will be discussed in the next section.

Sign Frames

The 4 individual sign frames are identical and made up of more 1x4 poplar. These sign holder "wrap around" the 4 support columns, so they need to be cut to account for the routed edge. I made a template of that shape (see photo) and used that to transfer the cuts to the actual frames.

The sign holders are 40 3/4" wide and 5 1/2" tall.

Each individual sign holder is made up of 6 individual pieces, glued and screwed/nailed together. More clamps.

These sign holder mount between each of the columns. They sit about 3/4" below the top of the columns. Once these 4 are installed, you start getting some structural integrity to the top of the frame.

Top Frame / Roof Support

Sitting "behind" and slightly above the sign frames is a square frame that creates a "rim" around the top. Each side of this top frame is made from 3 1x4 poplar boards. Two of these are glued together to create a single 1 1/2" board and the third piece attached to those, offset to create a 1-2" rim that extends above the other pieces. Review the images to try and get an idea of what the final piece looks like. This 2" extension was beveled to match the angle of the roof (see roof section).

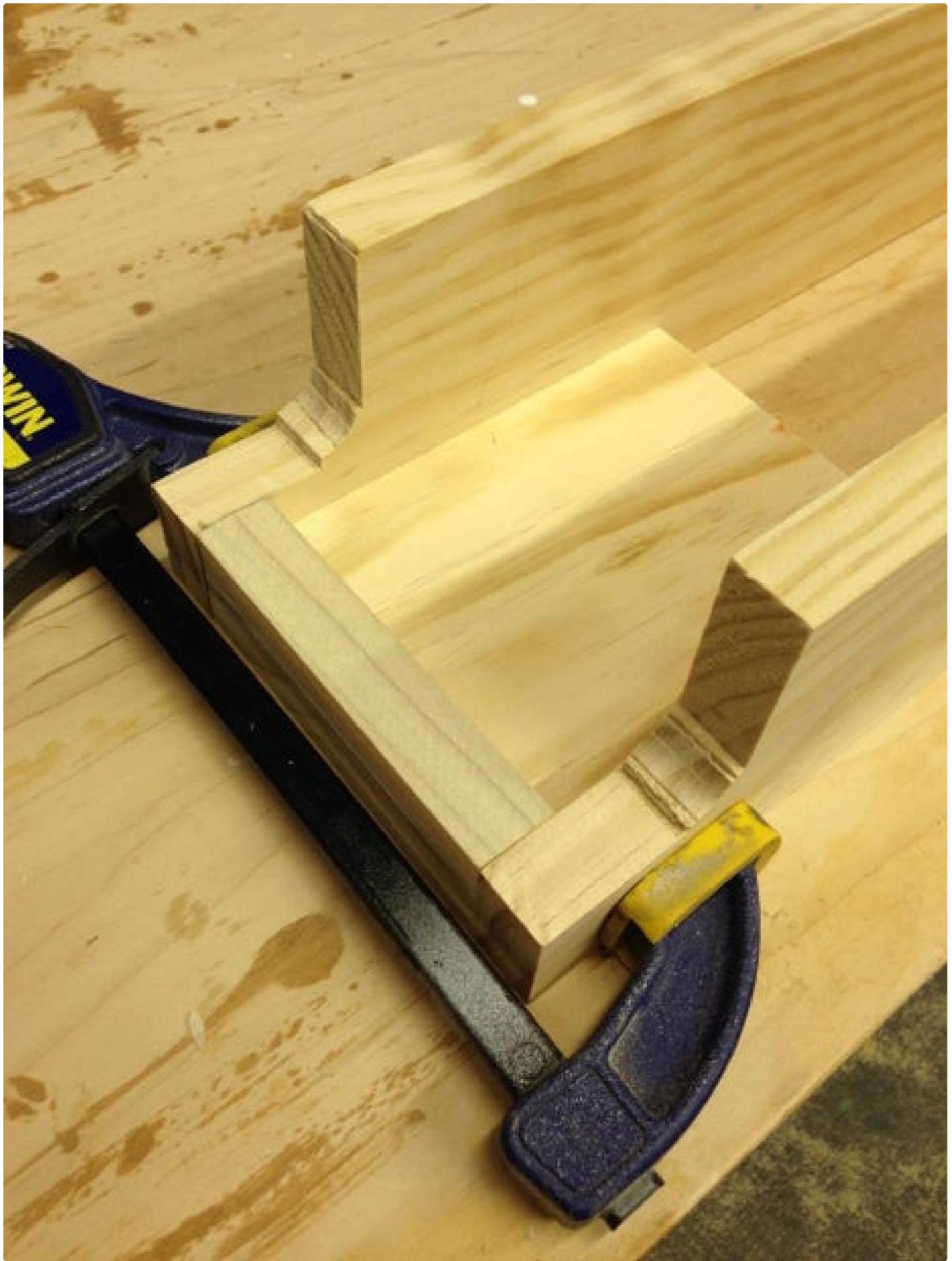
These are glued and screwed together to form a framing board that runs around the entire top between the columns. Each corner of the top frame has notches cut from the ends so they "sit on" the corner posts. The corners are also cut at 45 degree angles to create a miter cut. All 4 pieces of the frame are connected, creating a "frame" that fits into the top of the TARDIS. This is a fairly complex piece, but if you study the photos, you should be able to see how this was built. Note: This entire frame piece is not attached to the columns, this is what allows the roof to be removed. It is only held in place by gravity.

Mini Column Toppers

On top of each column, are smaller versions of the column. These mini-columns are notched to allow the top frame to sit flush on the main support columns. See photos above, as this detail is a little hard to explain. They are built the same way as the other columns, just with smaller dimensioned boards. Build one that is like 12"+ long and then just cut into 4 pieces, each 2-3" tall.





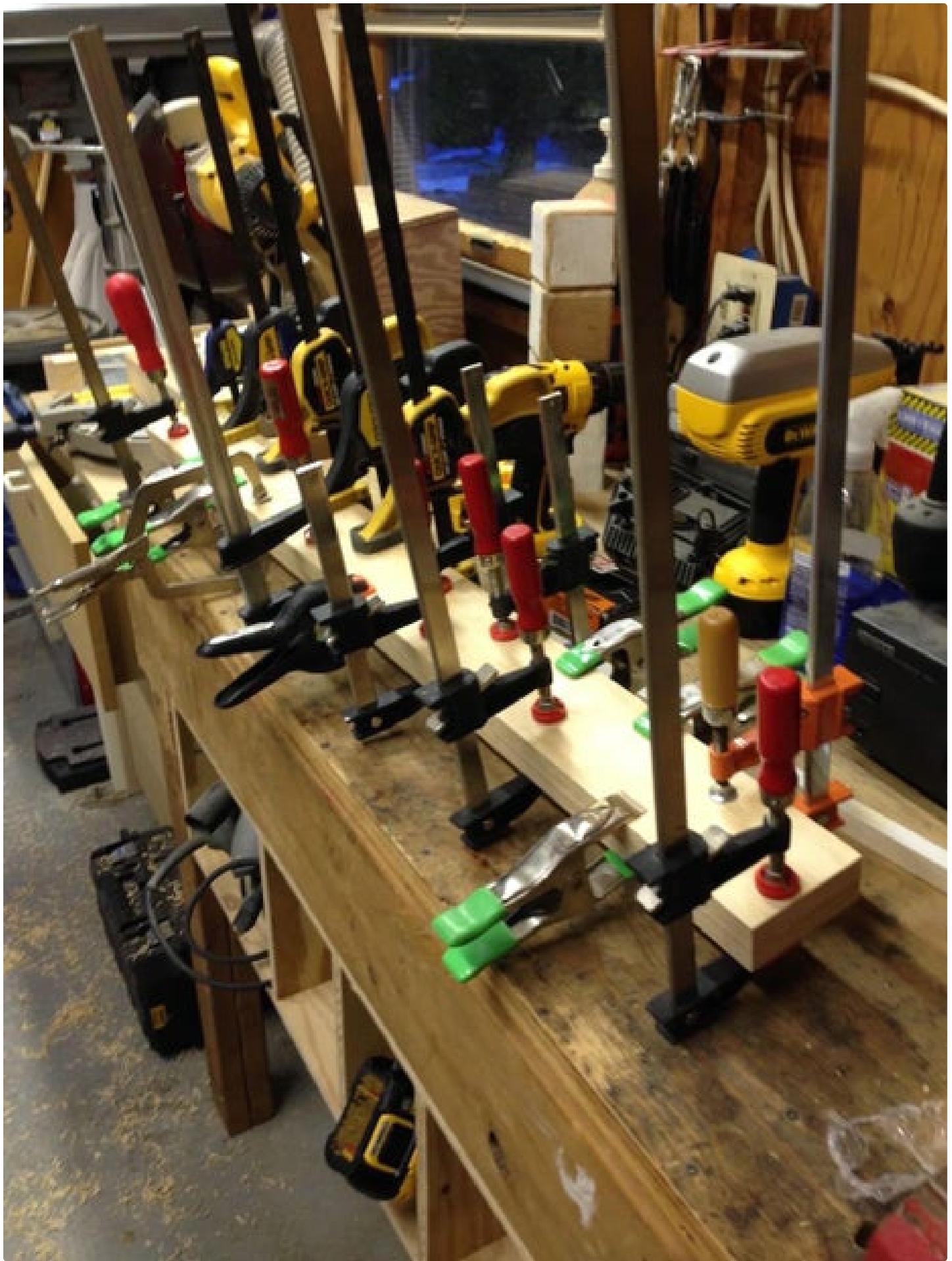






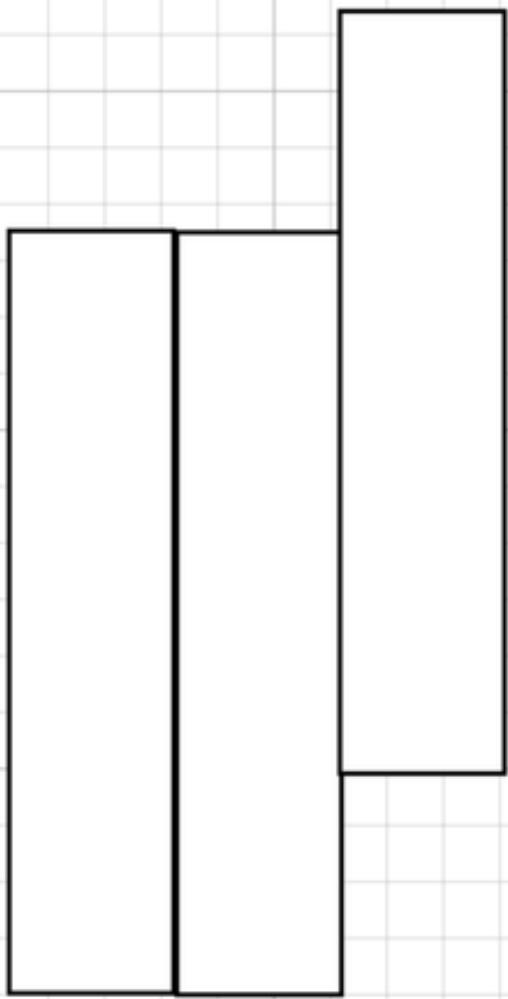








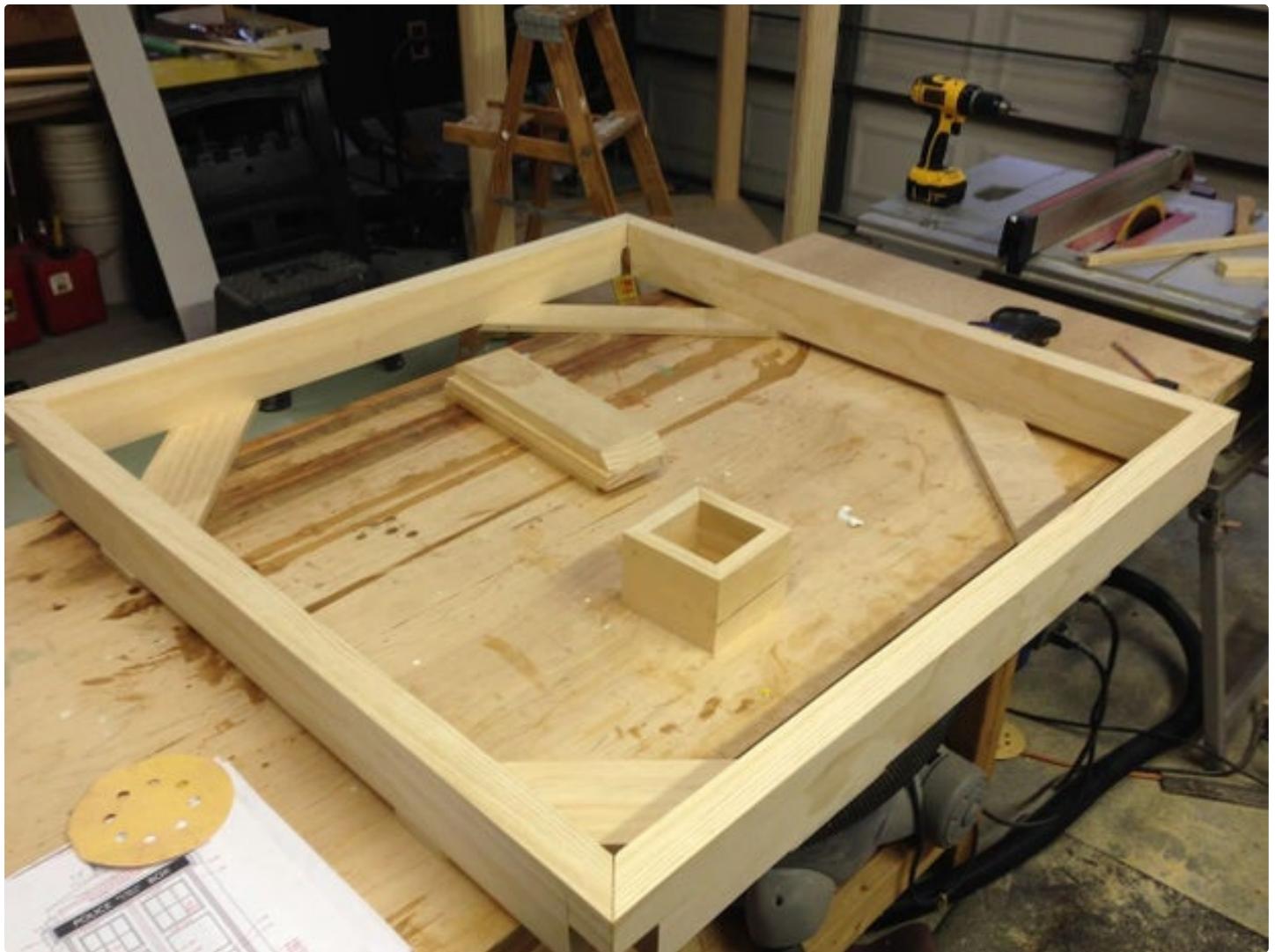








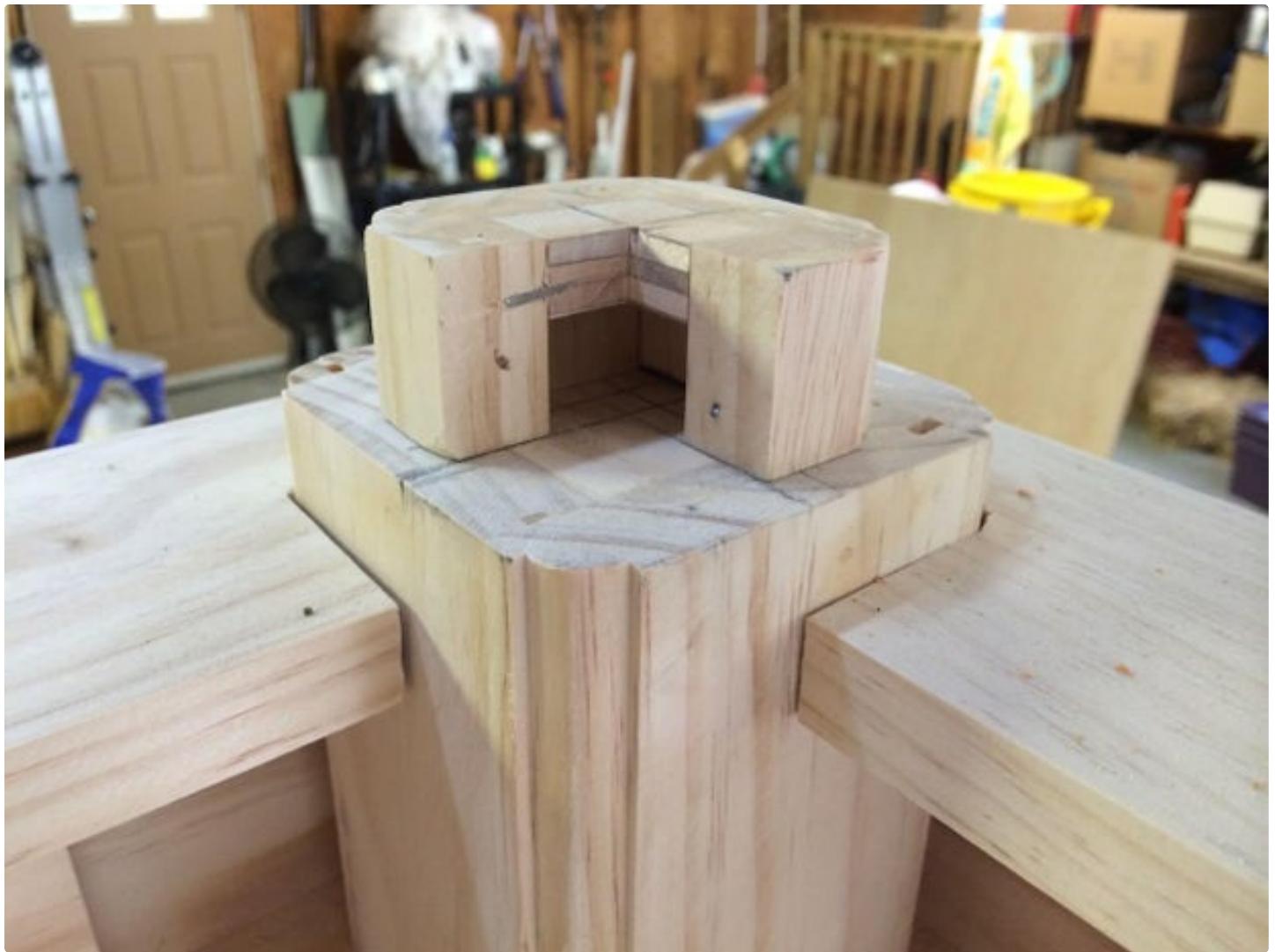


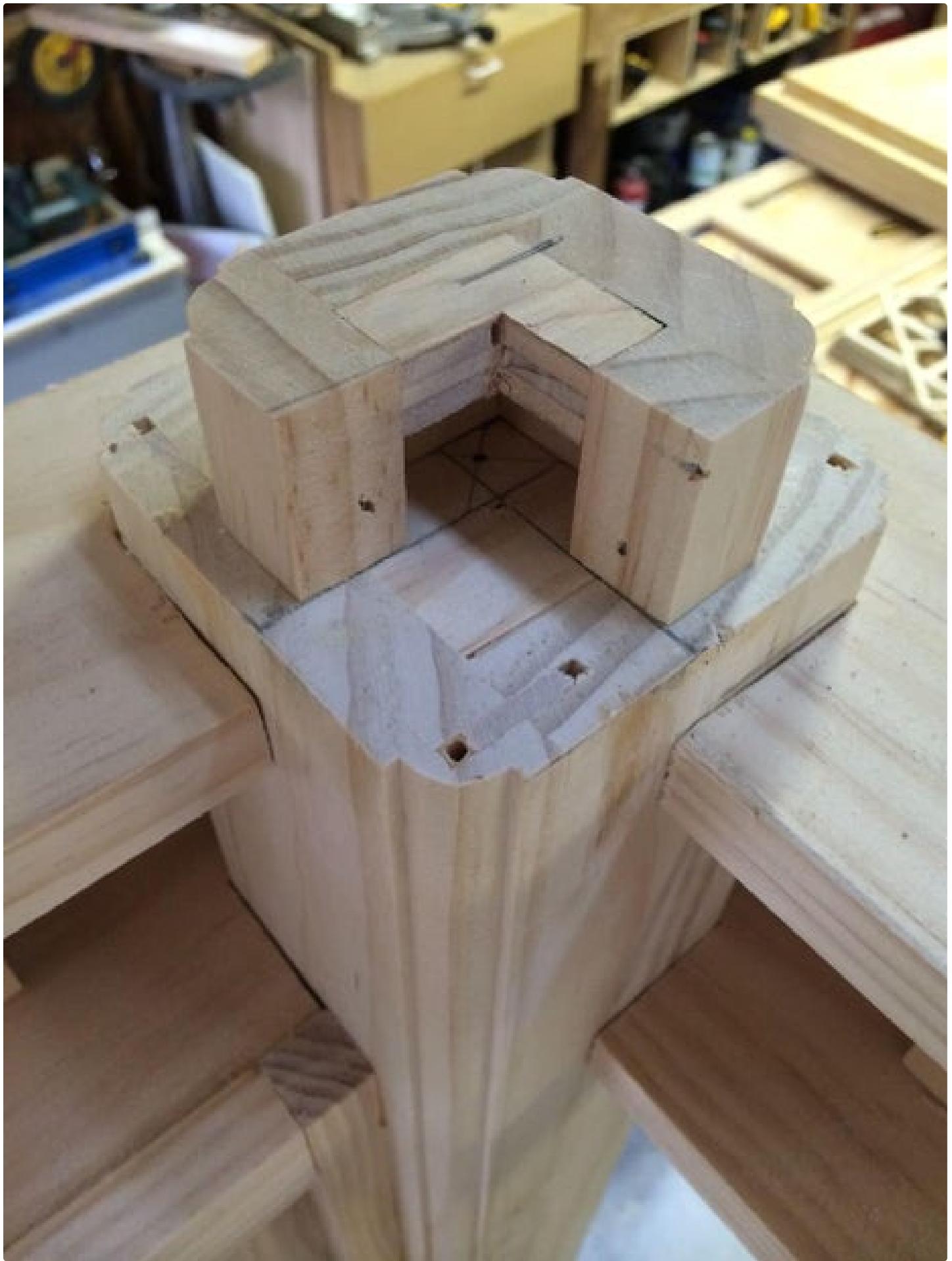












Your Own TARDIS: Page 38



Your Own TARDIS: Page 39

Step 4: Roof & Light

The roof ended up being one of the more difficult structures for me. I know this isn't structurally sound for an actual room, but it works for this. It's also held together with epoxy and putty.....so....it's the best I could do at the time :-)

Roof

The roof is relatively simple. It is just 4 1/4" plywood panels, cut into triangles. Getting the slope right and getting all of the pieces to come together with no gaps was a bit of a challenge. Lots of small changes until it started to come together.

The roof doesn't come to a point, rather it has a square "hole" in it that is the base for the light. Read the light section to make the light base that will support the roof. I started by building a center "support" that would hold the top ends of the roof pieces while I measured and cut the individual triangles that make up the roof. Once I had the general layout correct, I built the the "base" for the light (see below). This base was then used as the final piece in the roof structure to hold the top of the 4 roof panels.

Now comes my shame. Wood putty is sometimes called "a bad woodworkers best friend". I'm not sure I would go that far, but it can be used to "fill in" poorly fitting joints. For the roof, I used epoxy inside the roof to secure the panels to each other. I then used a lot of wood putty to fill in the seams on the outside/top of the roof. Putty, sand....repeat.

This roof structure will be attached to the frame from the previous step, creating the full removable roof structure.

Light

The light was one of the more fun parts of the build. I looked at a lot of reference material, but in the end, I didn't try to replicate any specific look. I simply kept looking around for a glass jar that looked interesting. I'm pretty sure I just found something on Amazon.

The base for the light (that was the center of the roof from previous step) is made out of 1x4 poplar, miter cut and glued together. The outer dimension of this box/base was about 5". The actual dimensions will be driven by the light glass that you use.

With the jigsaw, cut two discs out of poplar, each of these a little larger than the glass jar. In one of the discs, cut out the center so that it fits over the threaded part of the jar.

To add some design style to the light, cut 4 pieces of hollow copper tubing and use 4 long bolts to connect the two end caps with the glass in the middle.

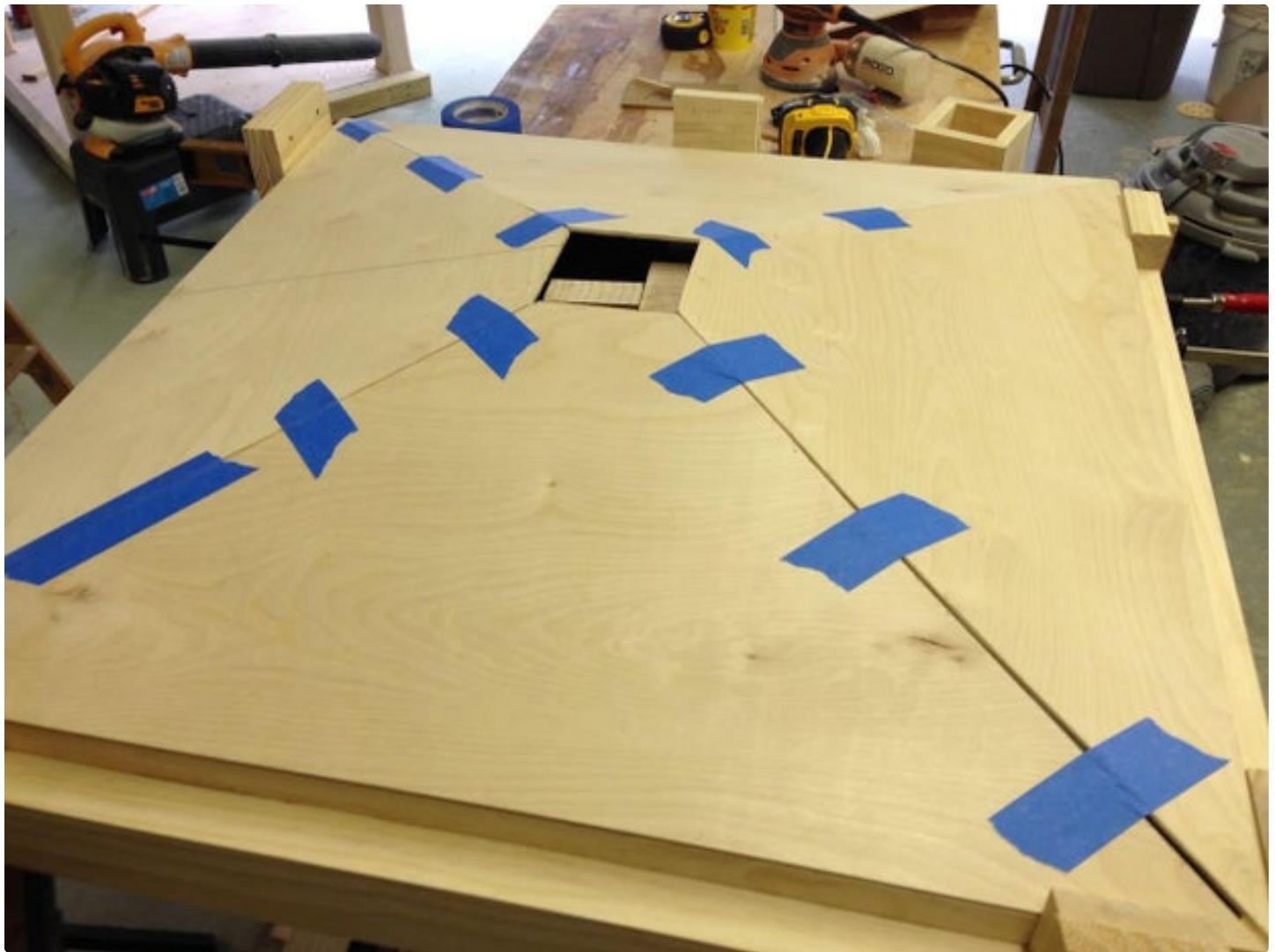
Yes, I also wired this to have a working light in it.



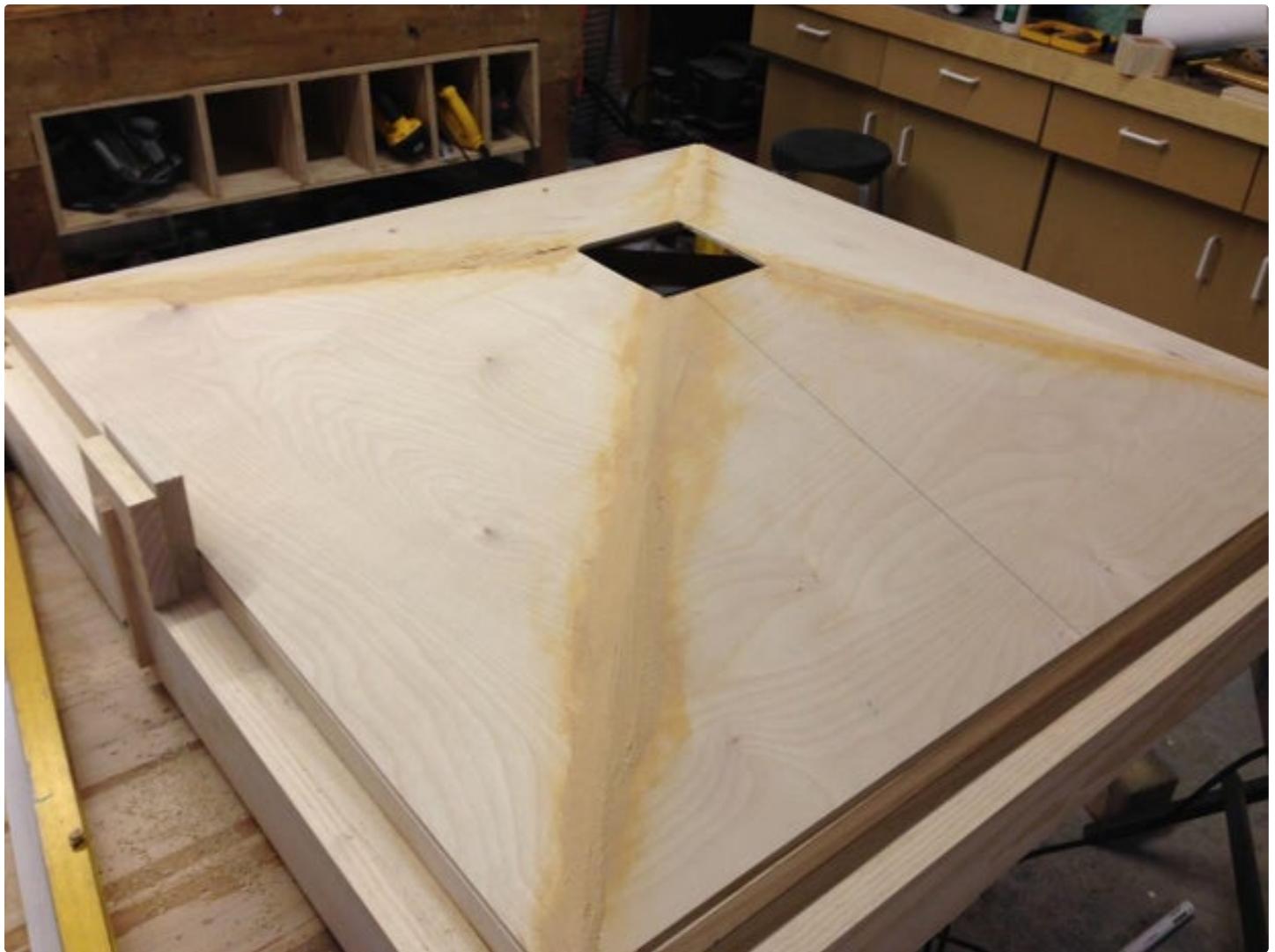


























Your Own TARDIS: Page 54

Step 5: Wall Panels & Door

Now that the outer frame of the box is done we can move onto the side panels and door. The side panels are not structural, in that they aren't holding up any weight, the corner posts do that. Since they aren't structural, they are pretty simple construction.

Walls

The walls are made of 1/4" plywood with face frame attached to create the divided "panels". If you are familiar with real cabinet construction, these are not true paneled doors, it's a fake for simplicity.

Wall dimensions: 37.25" x 67.75" for full panel. (the rt. and left sides are each approx. 18.5" wide with 1/4" between sections).

Place the plywood inside the TARDIS and trace the exact dimensions of each panel. Cut the panels to size. Once you have are panels, plan the layout for the raised panels. Use pencil marks, or blue tape to determine the exact location of the rails and stiles. Make sure all of the individual panels are the same sizes. Based on the dimensions of your plywood panels, your individual rails and stiles may be different lengths than specified here.

Rip a bunch of 1x4 poplar into 3" strips for the rails and stiles for all 3 sides and the doors. With the plywood panels cut to size and the basic rails and stiles cut, start laying out to get the exact dimensions of everything.

Each of the raised "panels" on the sides and doors are 13" wide and approx. 13 3/4" tall. With the poplar ripped into 3" widths, you can begin cutting to length. There are 32 stiles (vertical pieces), each about 57" tall. These should exactly match the height of the plywood panels. Same process for the rails (horizontal pieces). There's something like 40 rails, each about 13" long.

For added detail, you can add a 45 degree bevel on the rails and stiles. If you do this, it complicates the final installation because you need to account for this bevel on the end of the rails so that they fit nicely against the beveled stiles. See photos for details.

I used pocket screws to attach all of the rails and stiles together. Once the face frame is done, it can then be glued the plywood panels. Wash, rinse, repeat 4 times. Windows will be addressed in the next step.

Doors

The door is actually made from the 4th panel. I just cut it down the center and use each side as a door. OK, now for one of the main things I wish I had done differently. In order to be authentic and match the show, I made the doors swing inward, not outward. It does lend some credibility to the design, but it's terrible from a functional stand point. Since this TARDIS is **not** bigger on the inside, when the door swings in, you have no room inside for anything else. It's very awkward to get in and out, etc. In hindsight, I should have made the doors swing outward.

Aside from that, the doors are just installed with some hinges, nothing fancy.



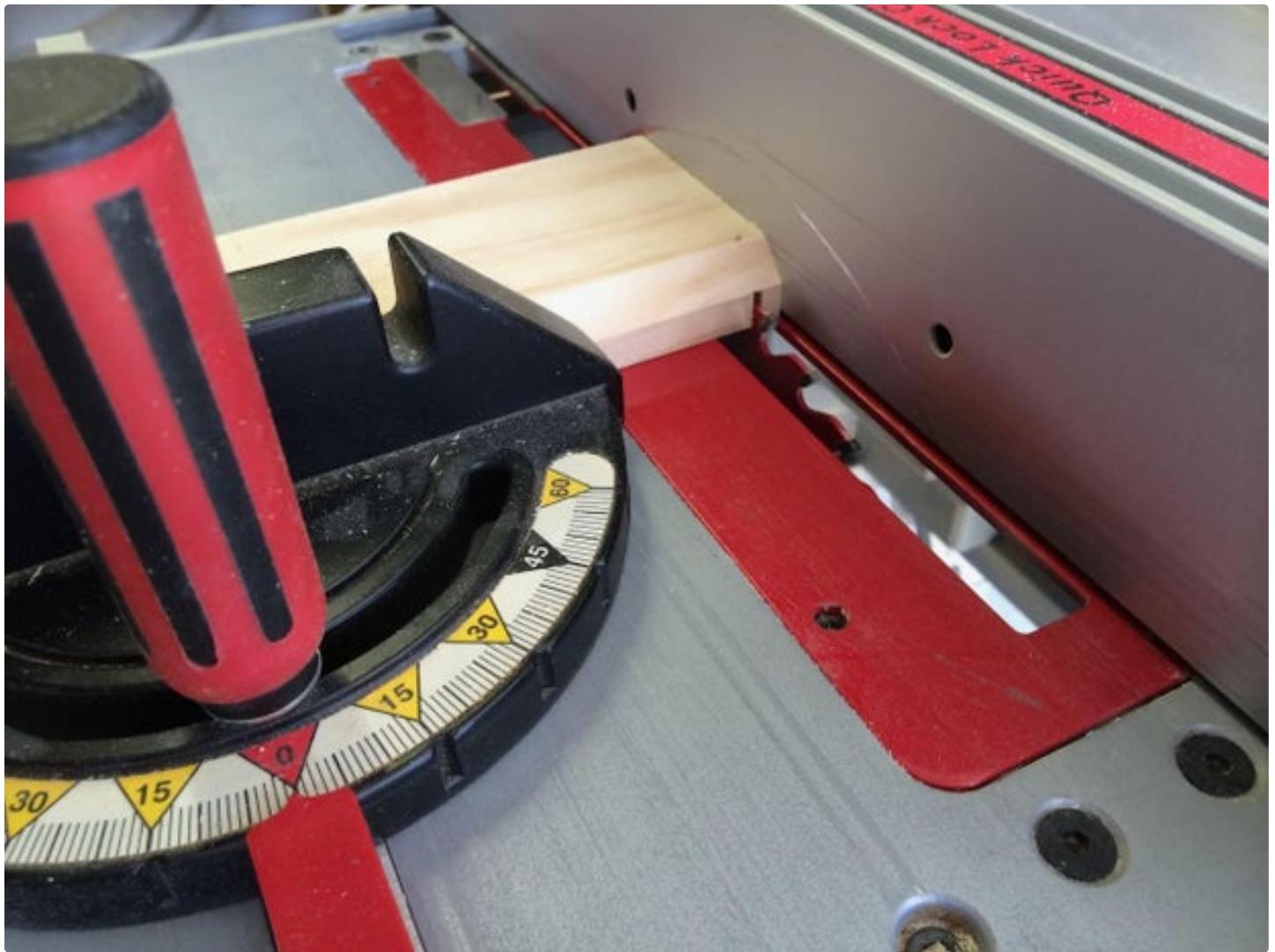
Your Own TARDIS: Page 56







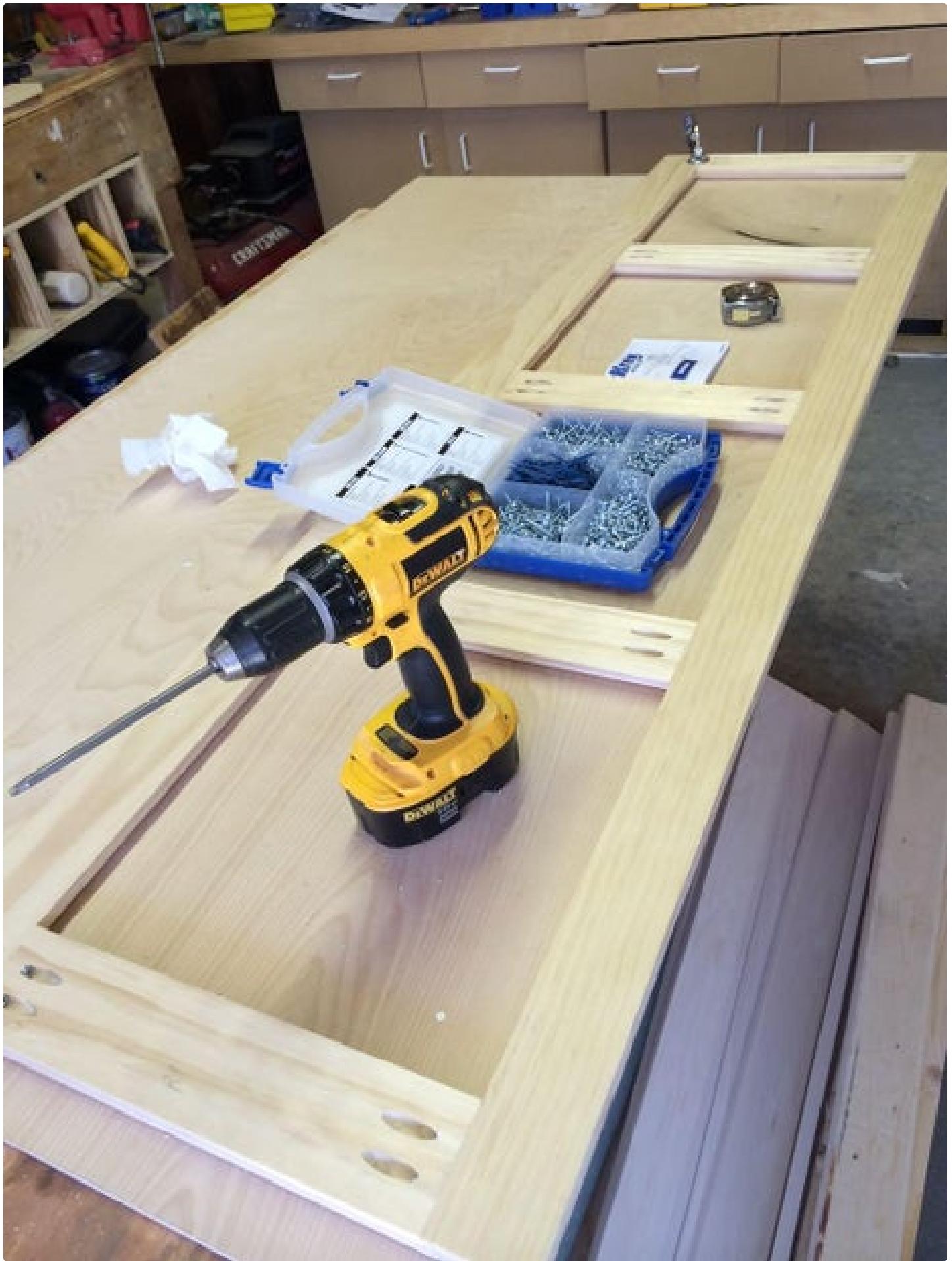


















Step 6: Windows

Now we're getting into some pieces that have more fiddly details. Lots of smaller, more intricate work for the window frames. Not terribly hard, but go slow and make sure you have all of your measurements figured out up front. The windows are made up of the grills (wood frame that divides the "glass") and the glass material.

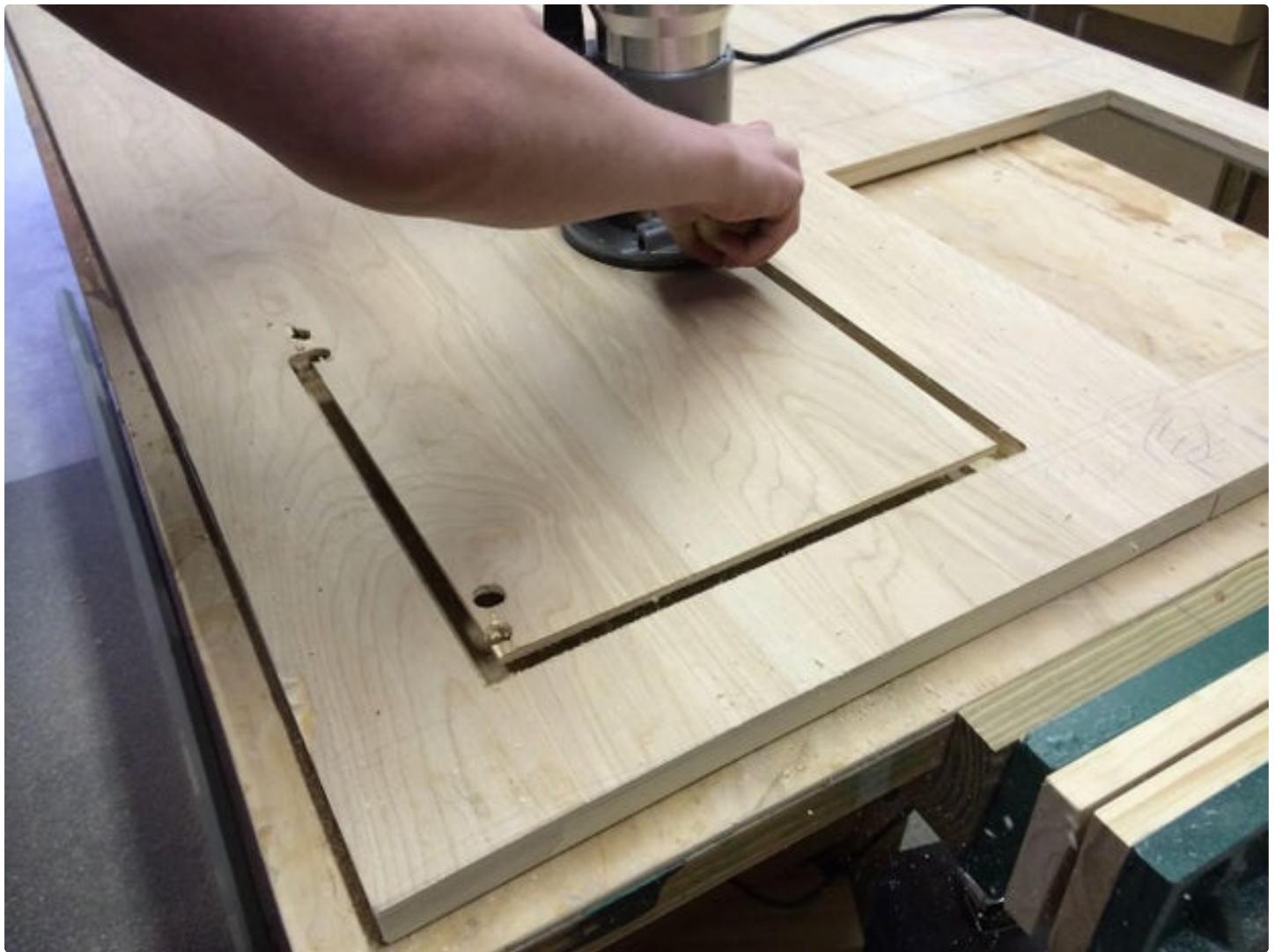
Grills

The grills create the illusion of 6 (two rows of 3) pieces of "glass" in each window. Before making the grills, use a router with a flush trim bit to remove the 2 top panels at the top of each panel. If you don't have a router, you can use a jigsaw or circular saw. Just be careful not to cut into the rails or stiles.

The grills are made of polar, ripped and cut into numerous lengths. They are 1/2" wide and 1/4" thick. They are cut just like smaller versions of the rails/stiles we did for the wall panels and doors. Once everything is ripped and cut to length, you should dry fit them to get the right layout/distances. I grouped all of the pieces for each window and taped them to the appropriate window. This is just to keep things organized. There are a lot of these pieces floating around.

Getting these rails/stiles to "cross over" each other can be a bit tricky. There are dados (grooves) cut into each of the grid pieces at each interaction point. The grooves are 1/2 the depth of the piece you are putting the groove into. This will allow each piece of the grill to "fit inside" the other creating a flush surface. Lots more glue and clamps layer and viola, grills for the windows.

The "glass" is a piece of frosted acrylic, available at local hardware store. This is 1/4" thick, or possibly less. Acrylic can be cut with normal tools. Drill holes into each corner so they can be attached to the side panels from the inside. Drilling acrylic can be a little tricky as it can crack easily. Used a step bit which really helps with the cracking. If you don't have a step bit, just start with a small bit and slowly move to larger sizes until you get the desired hole.



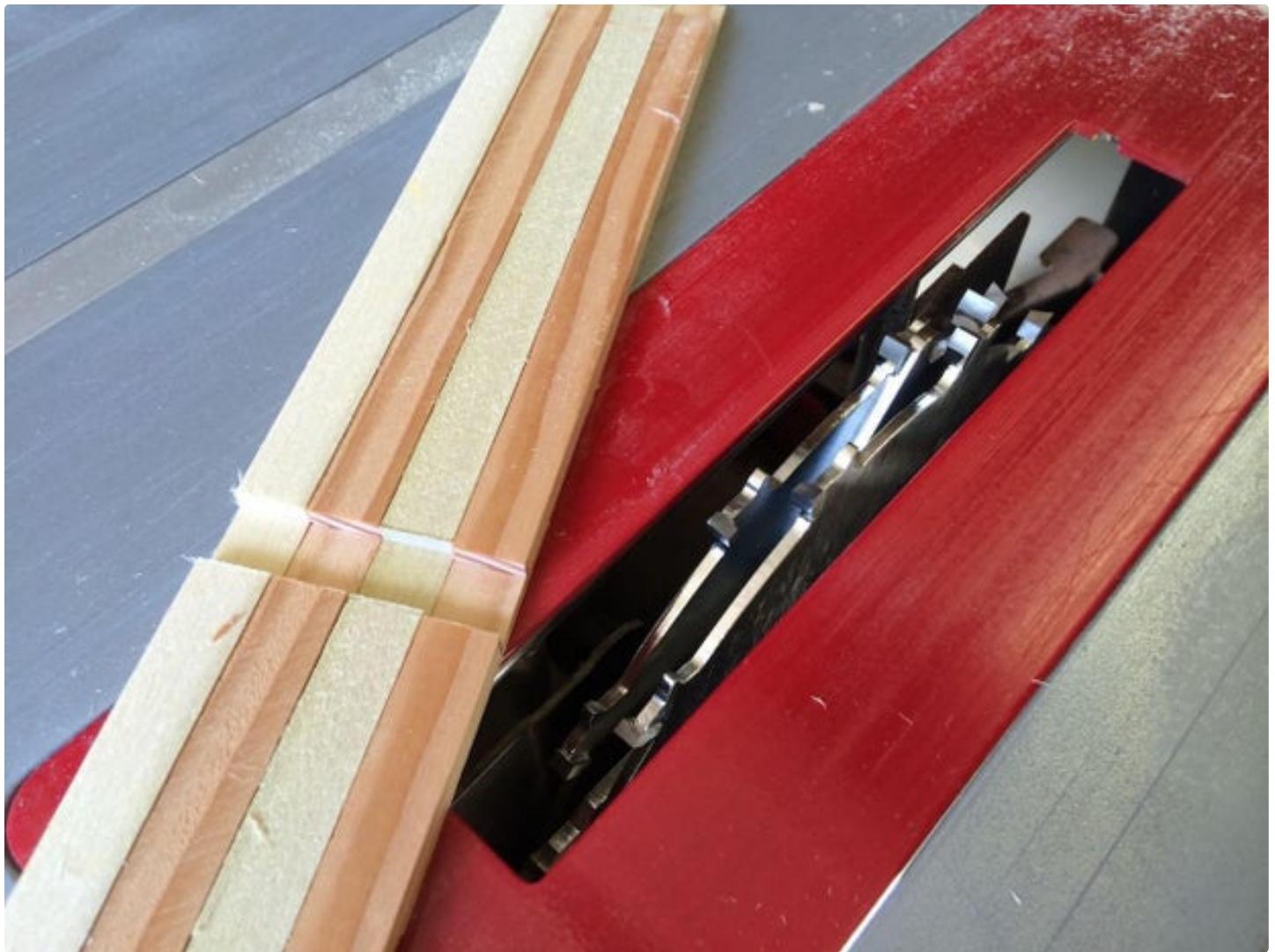


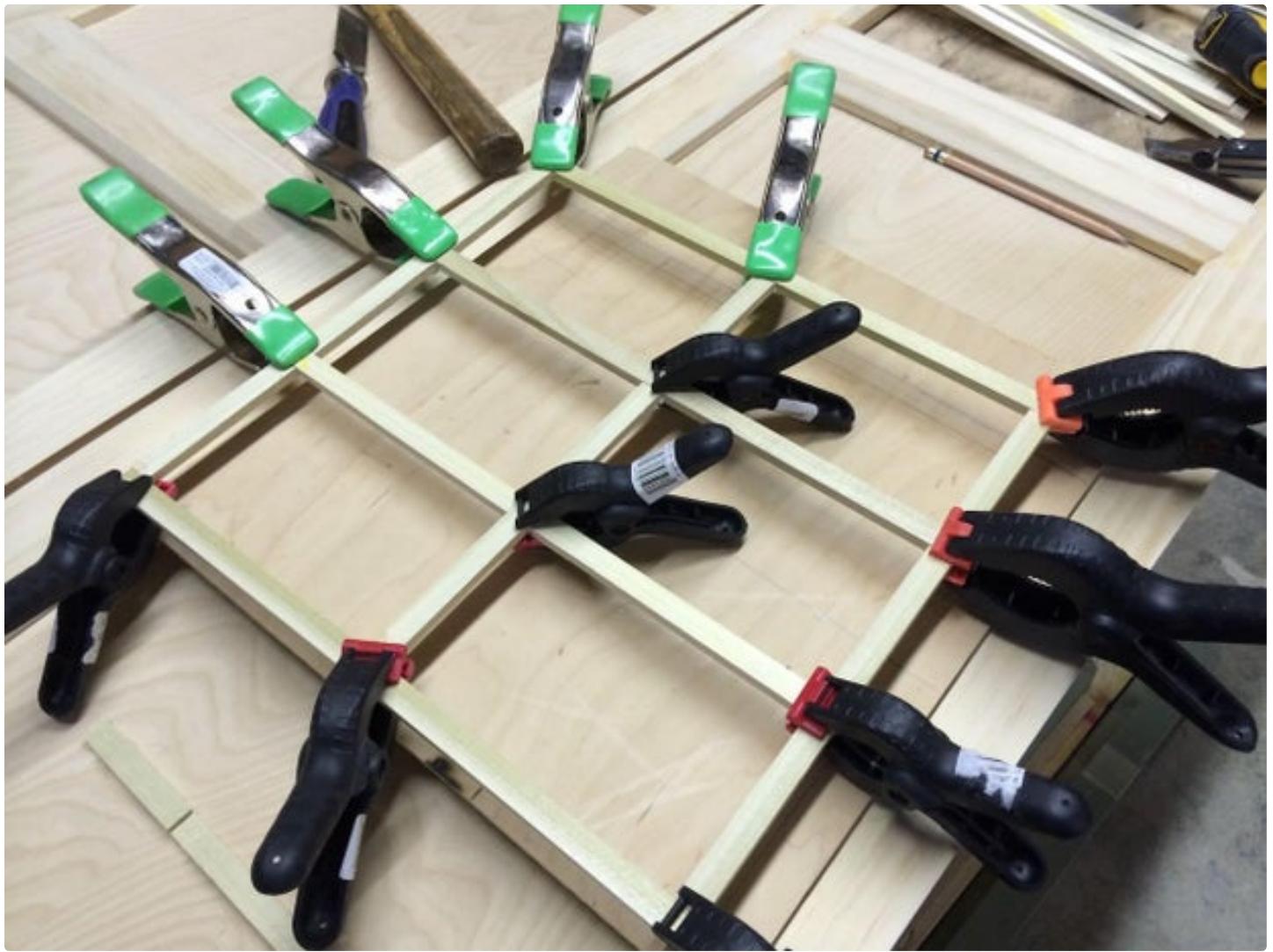




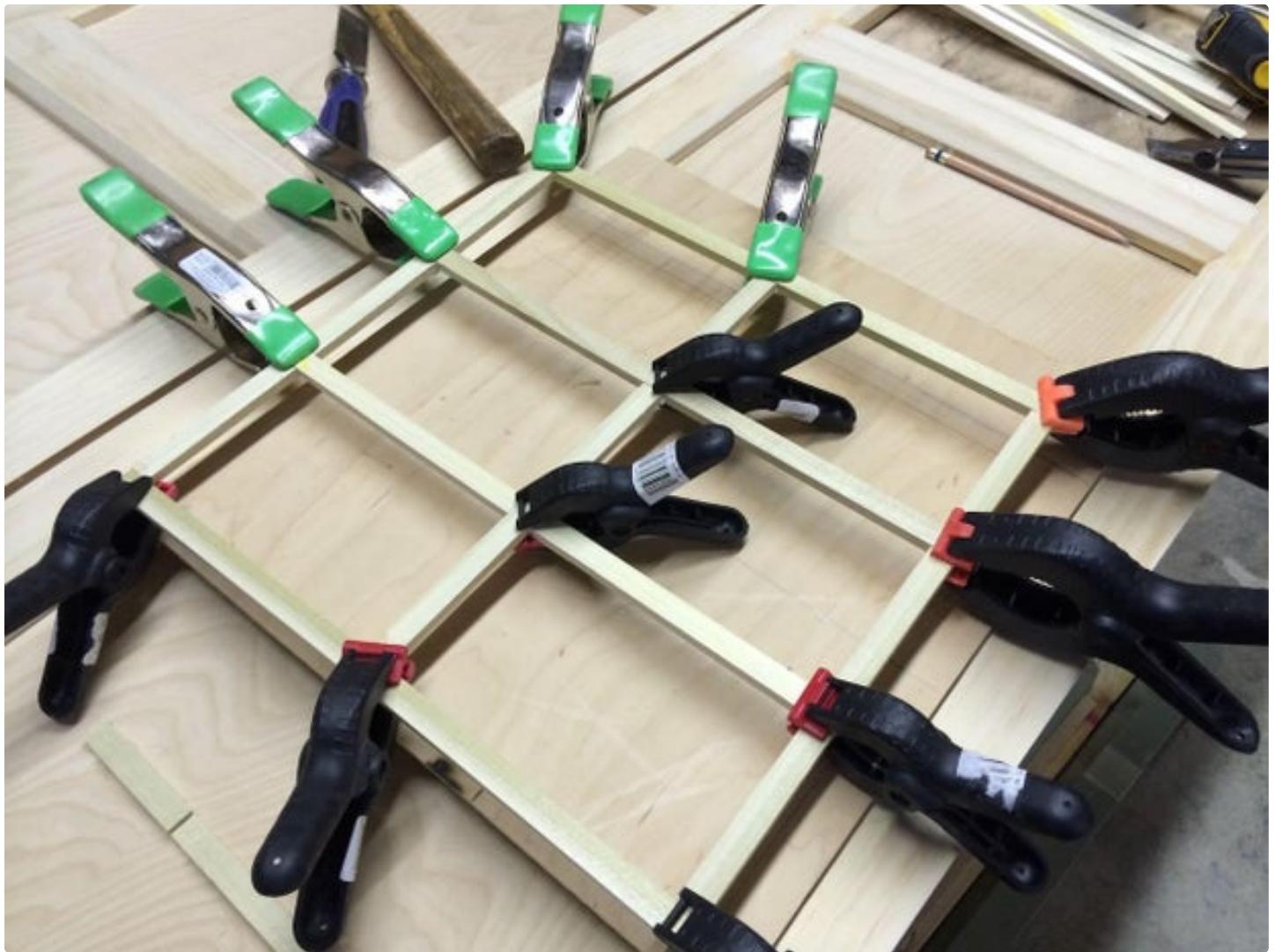












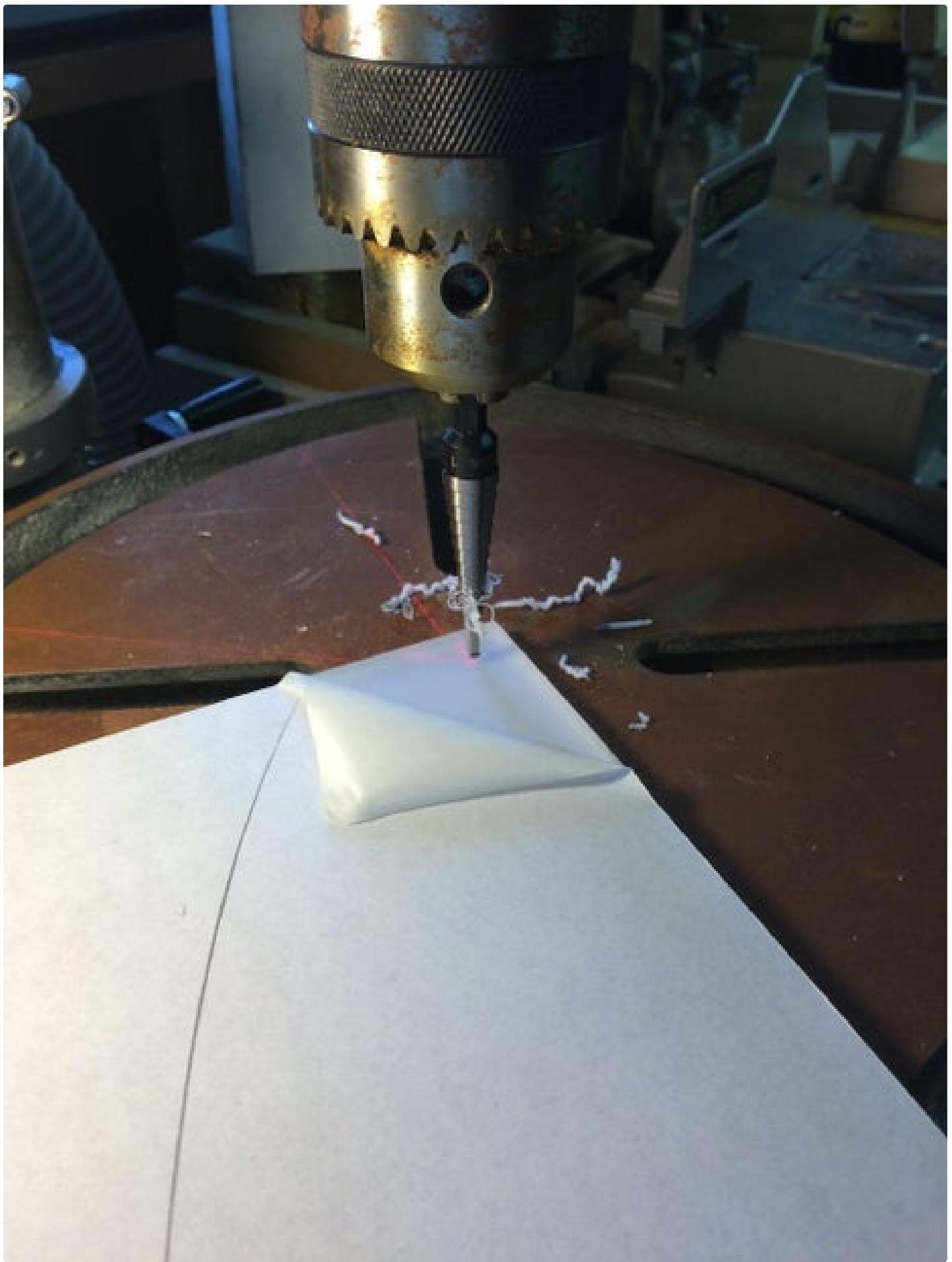


Your Own TARDIS: Page 80





Your Own TARDIS: Page 82



Step 7: Phone Access Panel

Way back when, the TARDIS disguised itself as a police box to keep from getting detected. While it was in hiding, its chameleon circuit broke, which left it stuck into that form. In real police boxes, there is a panel on the front that opens to reveal a telephone. The phone could be used by the public to contact the police. I'm not aware of any Who cannon that shows this door and phone being used, but of course, I had to make a door that could be opened. There's no phone behind it though.

Phone Access Panel

The panel is a piece of 1/4" plywood with a poplar frame that is set proud of the back panel to allow for the sign to be inserted. Once the panel is assembled, cut the panel out of the door just as you did for the windows. Then attach the phone door with some small hinges.

Sign

there's a lot of images to see what's printed on the sign. I was unable to find out what FONT was used, so it's not an exact duplicate, but close. I attached a PDF of my sign below. I used a thin piece of acrylic to protect the paper sign as well.









Download

<https://www.instructables.com/F9B/PCGR/LQ2CSYMV/F9BPCGRLQ2CSYMV.pdf>

Step 8: The Main Sign

As I was building the TARDIS, I kept thinking about the "Police Box" sign at the top....I had no idea how I was going to accomplish that. I downloaded a ton of reference images to capture the sign in different situations so I could get a good references for it.

I knew I could replicate the sign, or at least something very close on the computer. Using the reference images, I recreated the sign in a vector image program. I used Adobe Illustrator, but anything would work. I have attached the AI file as well as a PDF version. The advantage of using a vector file is that professional printers can use that file directly and get a perfect replica, even if they scale it up. If I remember correctly, I think this is white acrylic with black printing.

Driving home one day, I passed a local Fastsigns business (<https://www.fastsigns.com/>). I stopped in to see if they could print my sign onto pieces of acrylic. I showed them reference images from the show, as well as my vector file. He wasn't a Doctor Who fan, but was very intrigued in the project, He agreed to do a quick test run to see if I liked the product. I did and he printed me 4 separate signs, sized exactly as I needed. The final result was truly brilliant, I couldn't of asked for something nicer and it really tops of the build. I love them.

POLICE PUBLIC CALL BOX







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<https://www.instructables.com/FBH/WI7W/LQ2CTBN9/FBHWI7WLQ2CTBN9.pdf>

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Step 9: Paint

My least favorite thing to do in woodworking is finishing. Either stain or paint, I just don't really enjoy it. I admit it really makes your projects come to life, but it's tedious work. As much as I love the raw wood look of the TARDIS, painting is required to turn it into a "real" TARDIS.

You can't talk about painting without first talking about the prep work. This involves numerous rounds of caulk/putty and sanding. More caulk/putty more sanding. Now just 2 or 3 more caulk/putty/sanding passes. Sanding individual pieces before assembling them into the final build helps a lot, but you will still need to stand after it's all put together. There will also likely be a lot of cracks/joints that you should putty/caulk before painting. This goes along way to creating a much more professional looking product.

Use primer first, as this raw wood will really absorb the paint. It's an extra paint/sand cycle, but it makes the final paint coat adhere and look much better. New paints come with primer built in. Those are probably fine and they will certainly save a lot of work.

Once the prep work is done, you need to find the right color of blue. Each Doctors' box is a different shade of blue and there's not a lot of concrete information specifying the exact color. It's kind of kept as a bit of a secret. I did find a Pantone color reference, which I did use. Sadly, looking back over my notes, I can't seem to find out what it was. If anyone has any info about this, please let me know.

If you have a Pantone color #, most paint shops will match that color. I used an HVLP sprayer for most of this. Being able to spray makes the process go much faster and produces great results. Rolling/brushing would be fine and would probably produce a slightly more realistic look giving it a warmer/less polished feel.

Multiple coats of the blue. I left the final coat a little bit uneven as I thought it gave it a better look.













Your Own TARDIS: Page 97



Your Own TARDIS: Page 98







Your Own TARDIS: Page 101



Your Own TARDIS: Page 102





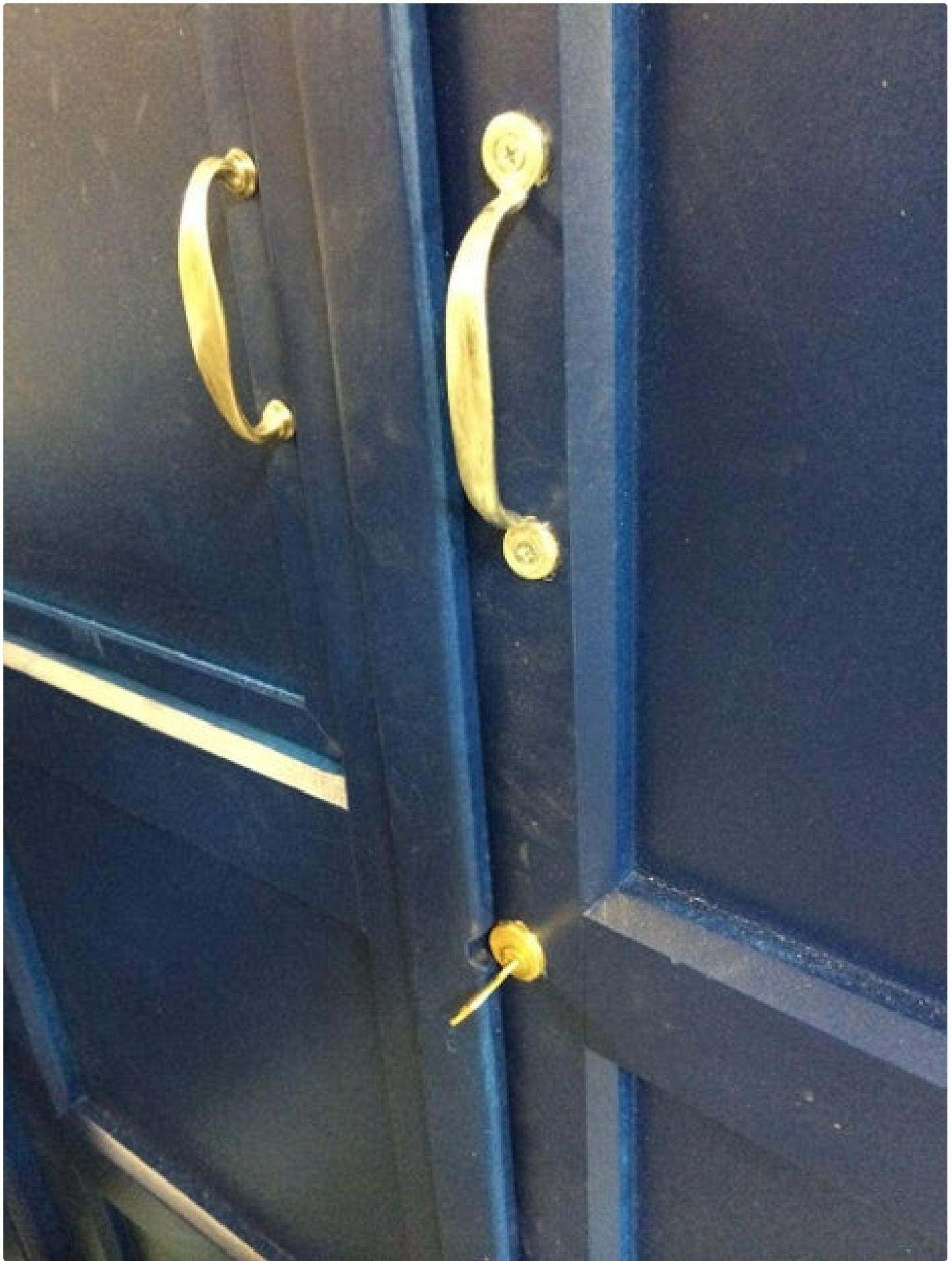
Step 10: Hardware / Finishing Touches

With the main box done, need to add some of the details. Most of this is by the way of hardware, handles, power, etc. I added an electric receptacle into the back panel so that you can plug an extension cord into as show in one of the image above. On the inside, I could then power lights, photo booth equipment, etc.

A very deep cut of Doctor Who trivia. Does anyone remember the "spare key" and the fact that its location is right above the front door in a little key-shaped cutout ??? I had to recreate that :-)

For a while, I added an iPad and bench so the TARDIS could be used as a photo booth. Hat, scarf and sonic available as props!

Although mine isn't technically bigger on the inside, I did find a wall hanging of the inside of a TARDIS and put this on the wall opposite the iPad, so the photos had that in the background :-)

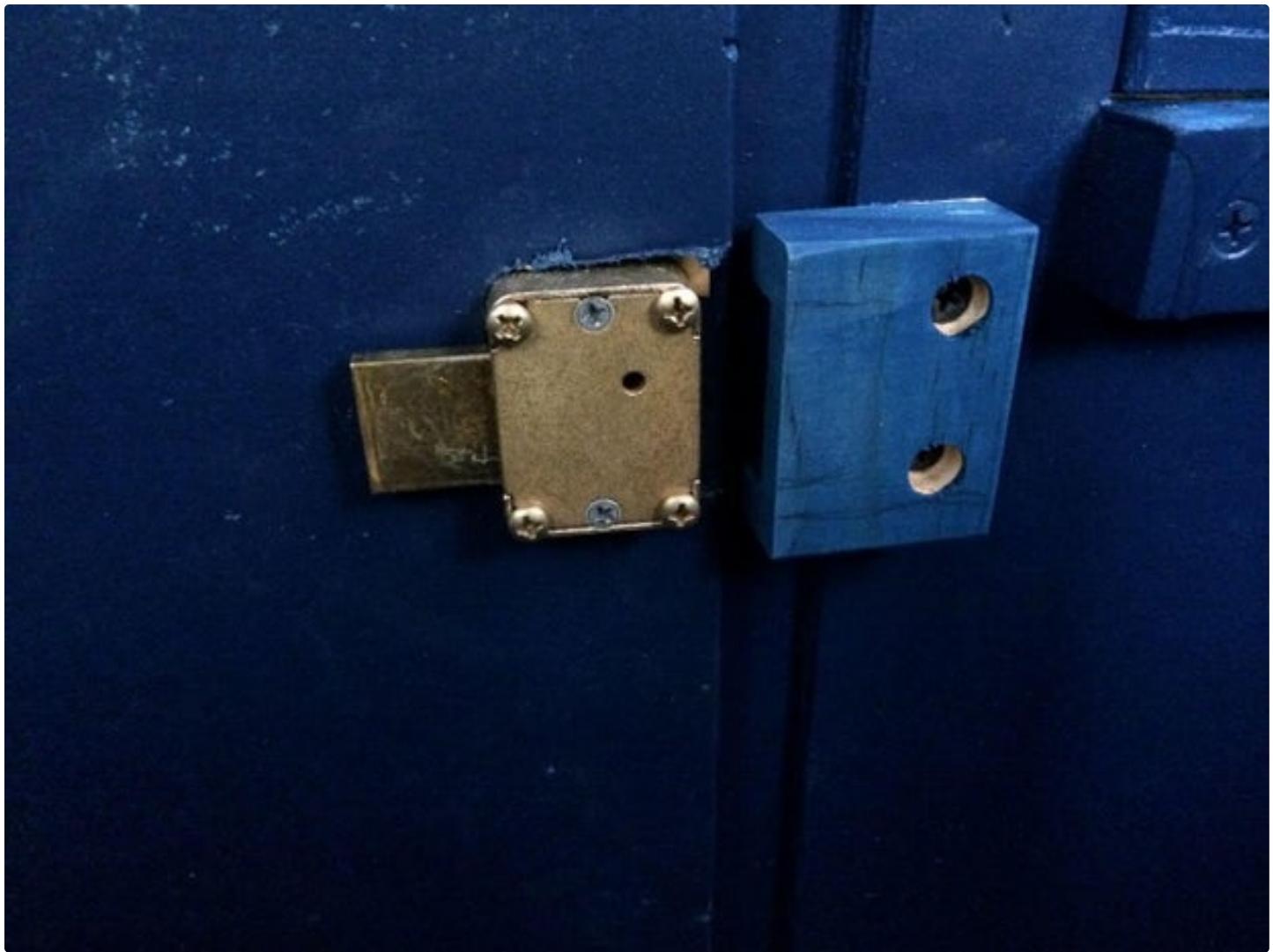




Your Own TARDIS: Page 107













Your Own TARDIS: Page 113

Step 11: Future Additions

On my original roadmap was a full audio and lighting control system so that the TARDIS would play the whooshing sound and flash the top and side lights. It was all going to be controlled via a mobile app talking to a raspberry Pi in the TARDIS. I started working on that, but some life issues got in the way and the TARDIS took a back seat for a long time.

I think it might be time to fire up that project and put the finishing touches on the build. Any suggestions?

Step 12: Thank You!

This was purely a labor of love for me. Both a love for Doctor Who and the love of creating things that start out as just visions in my head. This TARDIS has been to many parties and brought people a ton of joy, which makes me very happy. It's even made a trip to Capital Hill to appear at a holiday party at the Library of Congress!

Thanks for following along, please let me know if you have any questions or would like any more details.

Allons-y!