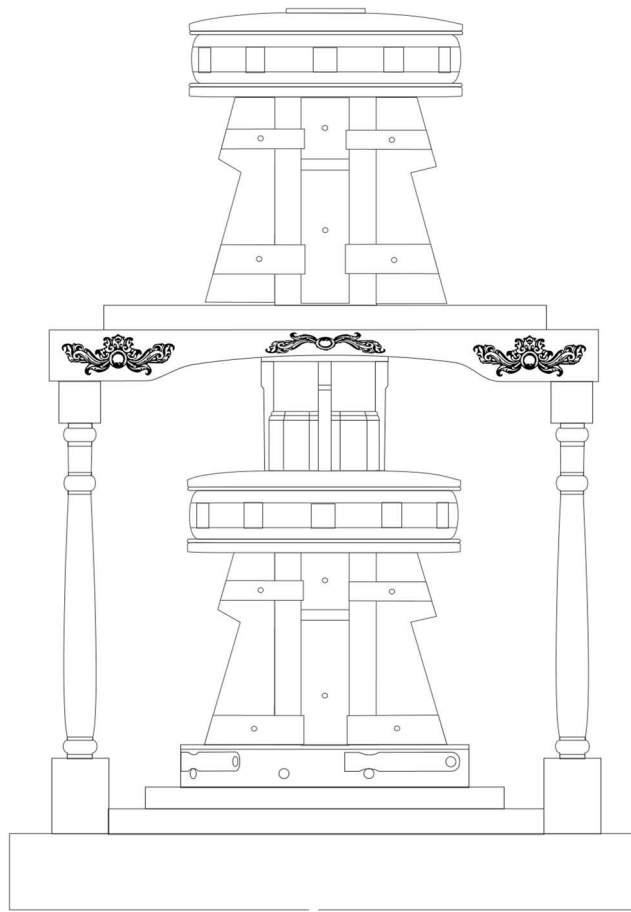




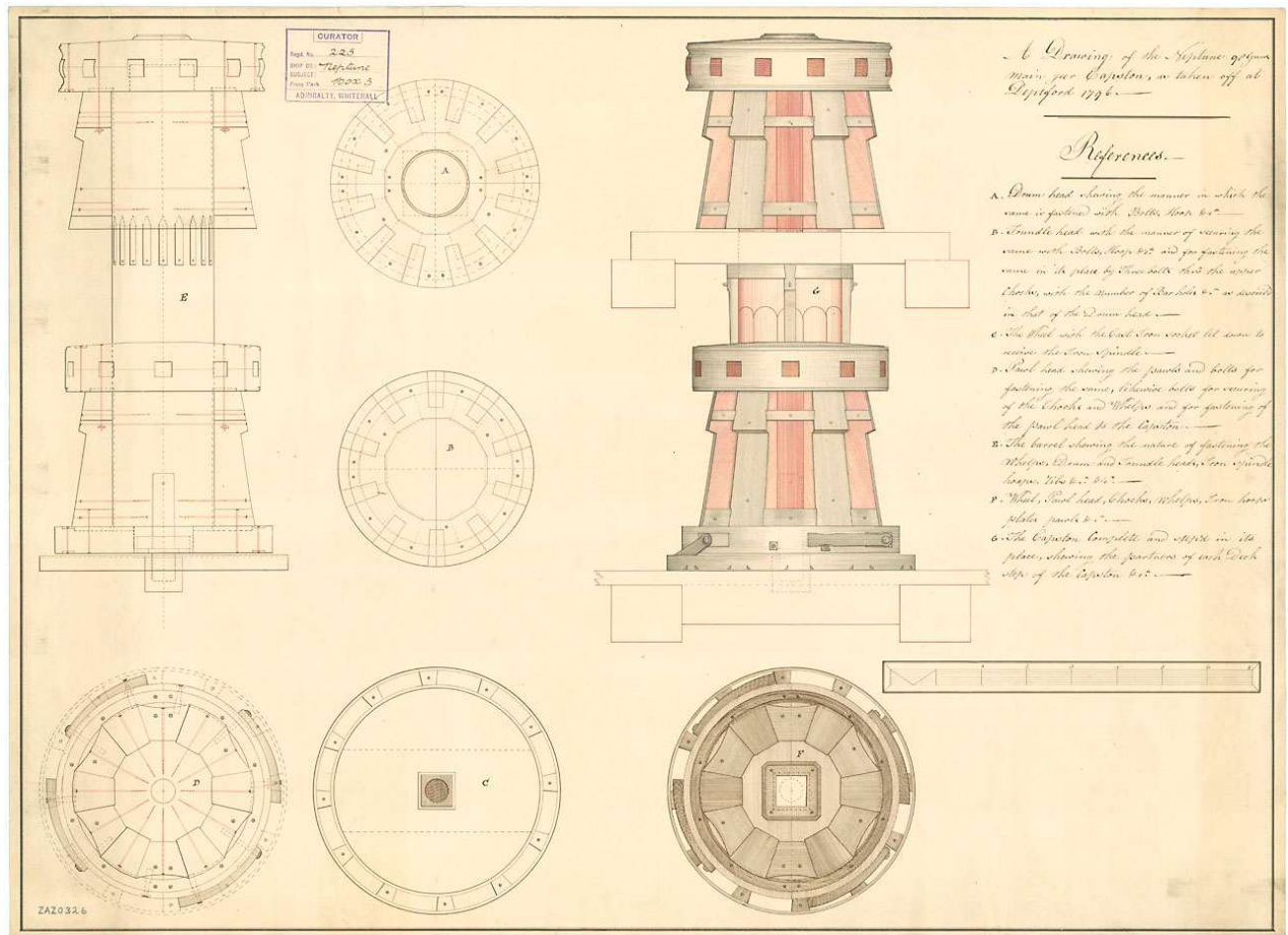
**18th Century Double
Capstan circa 1796
His Majesty's Ship Neptune at Deptford**

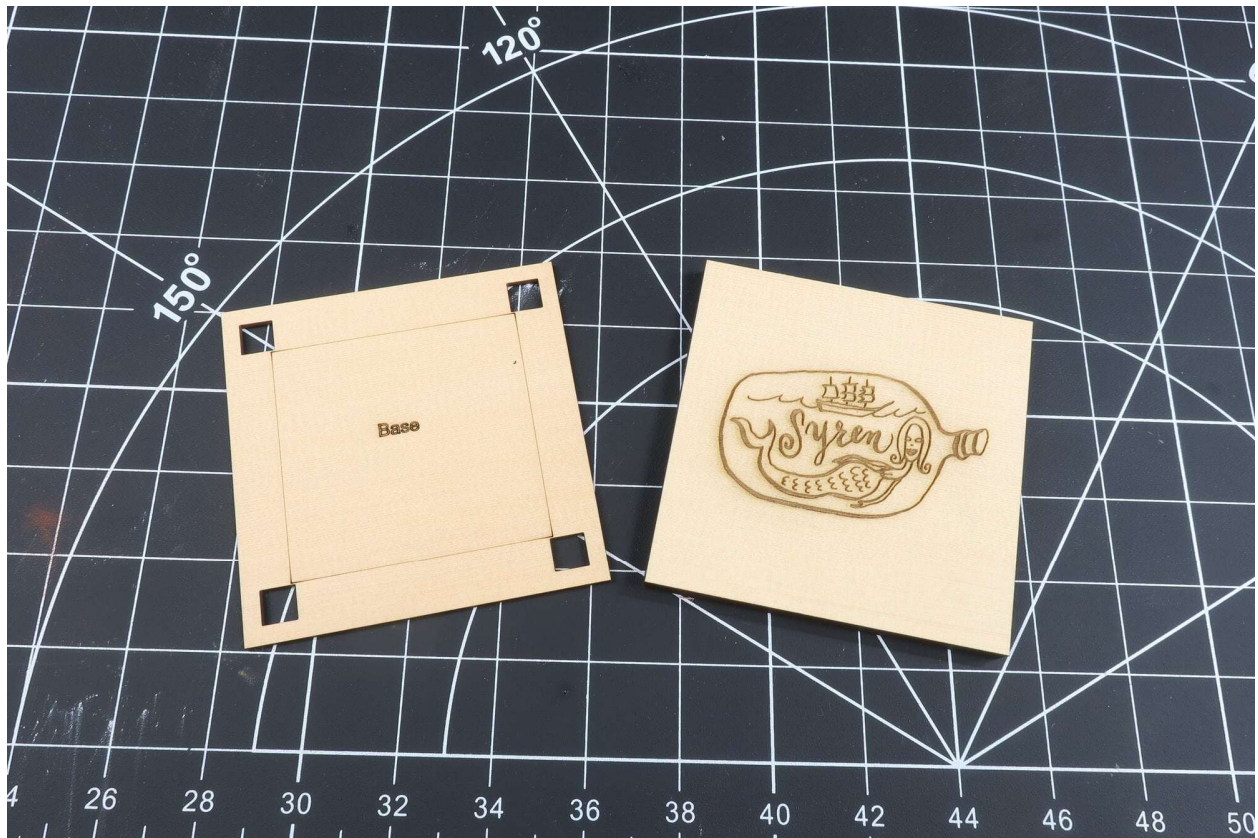
Designed by Chuck Passaro

Copyright 2025

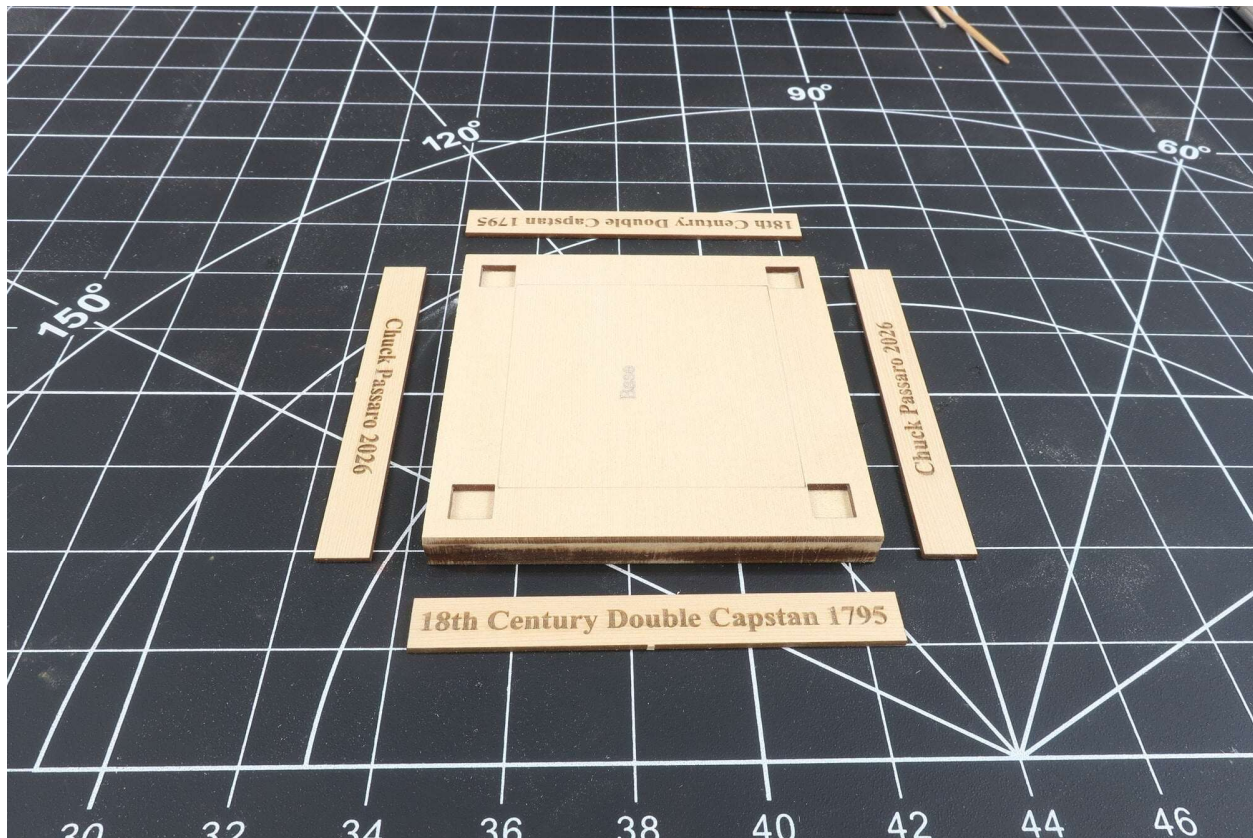
1/2" Scale

The original draft for our capstan project is below. This is what the project is based upon. More or less as additional research and documentation was also used.





Whether you bought the kit or produced your own parts from files provided, these are the step-by-step instructions for building your model of the capstan. To begin, take the two parts for the base shown above. These are the two initial layers. The Syren Logo goes on the bottom of base. The thinner layer is simply glued on top with the laser cut reference square face-up. When gluing them up you don't want the base to warp. To prevent this from happening, I only used a small amount of CA placed around the perimeter of the top thin layer along with a little bit in the center. If you use PVA like Titebond and place a large amount on the entire surface you will certainly get warpage. So don't use a whole lot of it. There really is no need. Do a little sanding around the edges to make them neat before the next step.



Take the laser cut Cedar strips with the text etched onto them as shown above. Sand the outside faces to remove any laser dust and char from around the letters. But don't worry about the edges yet. These were laser cut just a bit longer than needed so when you glue them onto the sides of the base they will hang over at the corners. For this reason, you should add the strips on the two opposite sides of each other first. Remember to add them in the correct order so as you turn the finished model you can read it as a complete sentence that makes sense. Your strips will have a slightly different text etched into it as my prototype. But you get the idea.

Sand the corners flush and apply the remaining strips. Then sand these flush at the corners as well. The top edge of these four strips should be flush along the top of the base. So, as you glue them on you might want to do so with a slight overhang along the top edge. Not too much at all but just a hair. This way you can sand the

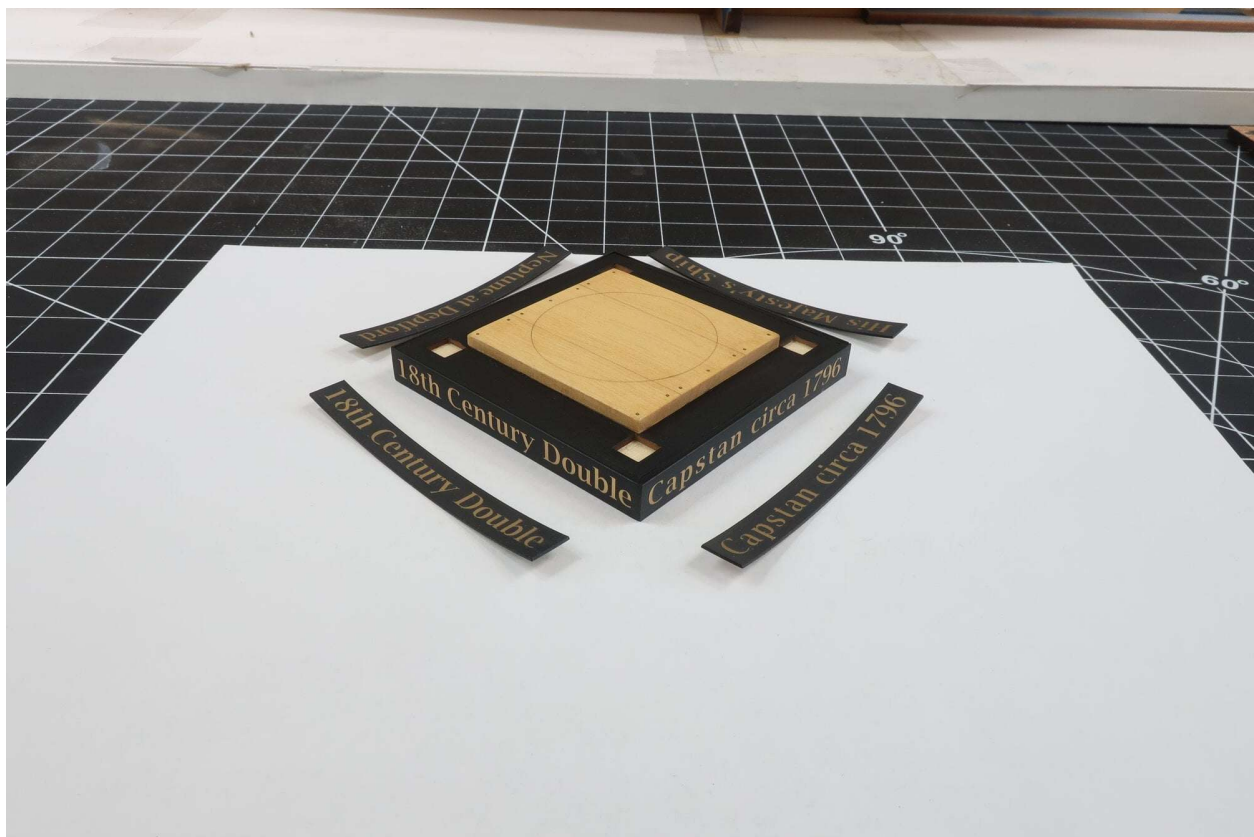
entire top of the base smooth without risking possibly gluing a strip too low. This way the top surface of the base is completely smooth. You can see that below.



In the photo above you can see that the capstan partners which simulate the actual partners on the ship. The timbers used have laser etched lines along with laser etched bolts along their ends. Now you can choose to just sand the laser char off the four edges and give the top a quick sand...apply some wipe on poly and you are done. But you can also drill those etched bolts and insert some 40 lb. black fishing line into each hole. Cut off the excess so they stand ever-so-slightly proud of the top surface.

Depending on what your color scheme will be I also recommend that that you paint your base before you glue the partners on top. In my case I decided to paint the base black. I used acrylic paint for this and then applied some matte fixative. But if you decide to go with the natural look along with keeping the natural wood sides with etched lettering, you can go ahead and glue the partners into position. Use the laser etched square on top of the base to position it.

Because I decided to paint the base black, I have also provided some black etched letter strips with gold letters. These are self-stick strips. Just peel off the paper backing and stick them in position over the natural wood versions. I also recommend that you clean them first. Simply use a damp cloth with some water and rub the outer surface to remove any laser dust. This will also make the gold lettering brighter. These were laser cut a bit longer at the corners as well. So, use the same method for sticking them on the sides. Do opposite sides first and trim back the strips at the corners. The finish it up by repeating this with the two remaining strips. See below. The capstan partners are also glued into position using the etched square as reference for placement.



Depending on whether or not you bought a kit from Portland Scale Ship Model Company or you 3D print your own parts, you will need to finish your parts or paint them. In my case I decided to make them black. You could simply sand off any little nibs from the 3D printing supports, prime and paint them. I decided to dye them black. I always use Fiebing's dyes for this purpose. In this case Pro Dye Black. Just go with a 50/50 mixture in a small tub. Use 90% Isopropyl Alcohol to mix with the dye in those ratios to start. I just drop the parts in the tub of dye for 15 or 20 minutes.

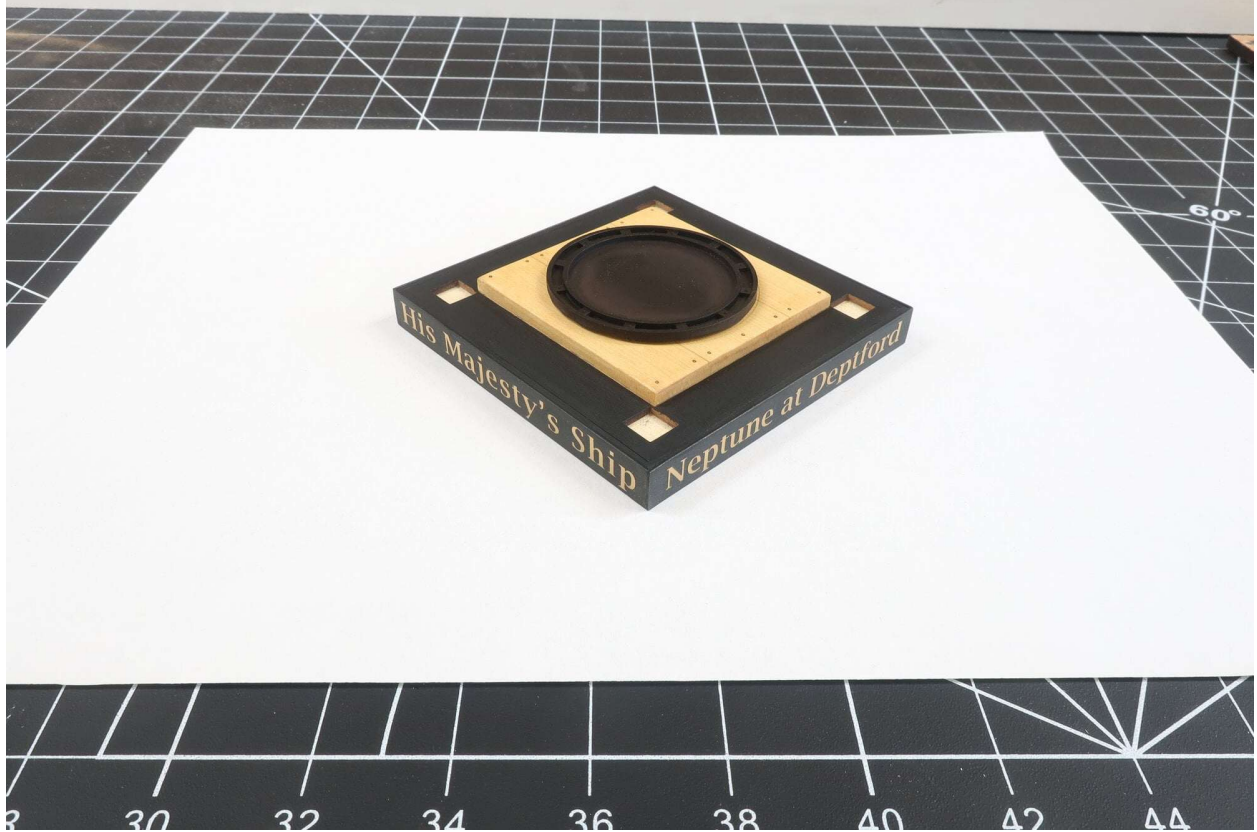
Remove them and pat them dry. Repeat if you want to go darker. To finish them up, spray with a matte fixative or apply wipe on poly.

Don't dye the three center shafts for the capstan. All of the parts can be dyed black or whatever your preference is. But leave those three capstan shafts a natural resin color for now.





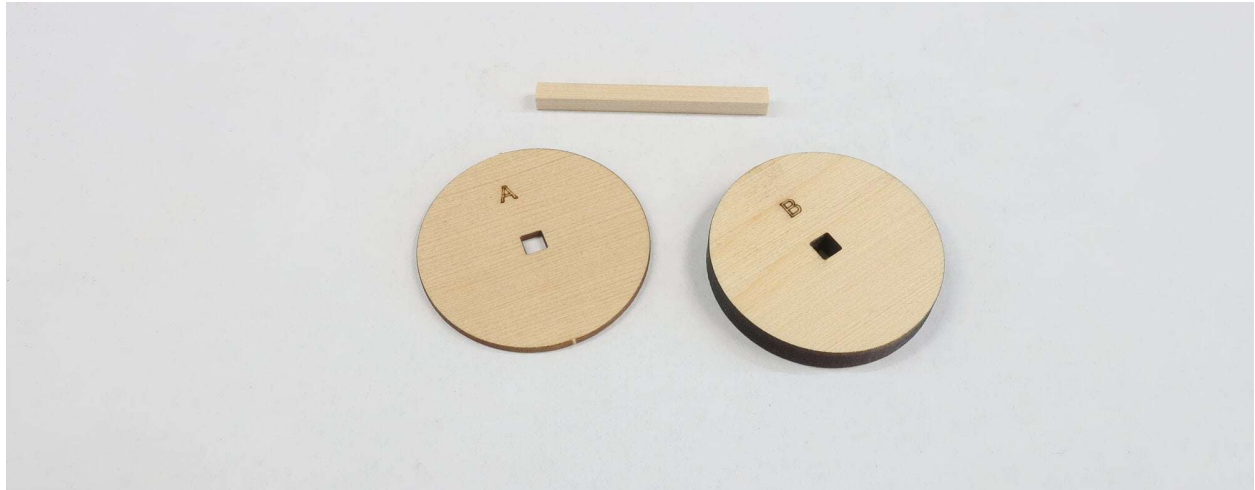
Depending on your preferences you can also weather your black dyed metal parts. For the capstan pawl base, I weathered it with some Rust powder. Not much but enough to make it look like I wanted. It's too easy to overdo the weathering. This particular part has now been updated. I changed it so it would be easier to 3D print. So, yours will probably have a circular opening in it rather have a solid center flat base. It doesn't matter on the final model. Now you can glue this in position now if you want but I held off while I finished the other lower capstan parts.



Below I was just test fitting the columns and lower pawl ring with the whole pawl ring completed.



Let's start making that lower pawl ring of parts. You want to take parts A and B and the stick provided on the kit. The stick is 1/8" x 1/8" cedar. You only need a small length for this.



Place both parts on the stick. I must caution you not to force them on the stick. Some of these layers are very thin and fragile. If you try to force them onto the stick they may split along the wood grain. So best to stop!!! and reduce the size of your stick until the pieces slide on with some resistance, but not a lot. You need a press fit. The two layers should be glued together on the stick with the laser etched letters facing each other. **DON'T GLUE IT TO THE STICK.** You will need to remove these as you build it and that will be the concept moving forward on this project.

The thinner disk A is larger than B. This is by design.



Place the stick in a hand drill as shown below. Tighten it in the chock. Then with the drill running, use a sanding stick to remove the char from the edge of disc A. Only remove the char. Don't reduce its size too much. It is supposed to be larger than the thicker disc. Do not remove or sand the thicker disc at all, except to maybe remove the sprue that attached it to the laser cut sheet.



Now you need to slide the two pieces into the pawl ring. It should be a press fit and not too loose if you left the thicker disc as is. You will also need to have disc C ready as you can see in the photo below.



In the photo below, you can see how the pawl assembly looks with the first two layers inserted into the ring. That thinner layer A producing a lip that the ring sits against. Note Disc C face up ready to be added next.



Below you can see disc C in position. This is the bottom. The stick is pushed down and flush with the bottom. Glue the disc C to the thicker disc B and keep the stick in the entire assembly.



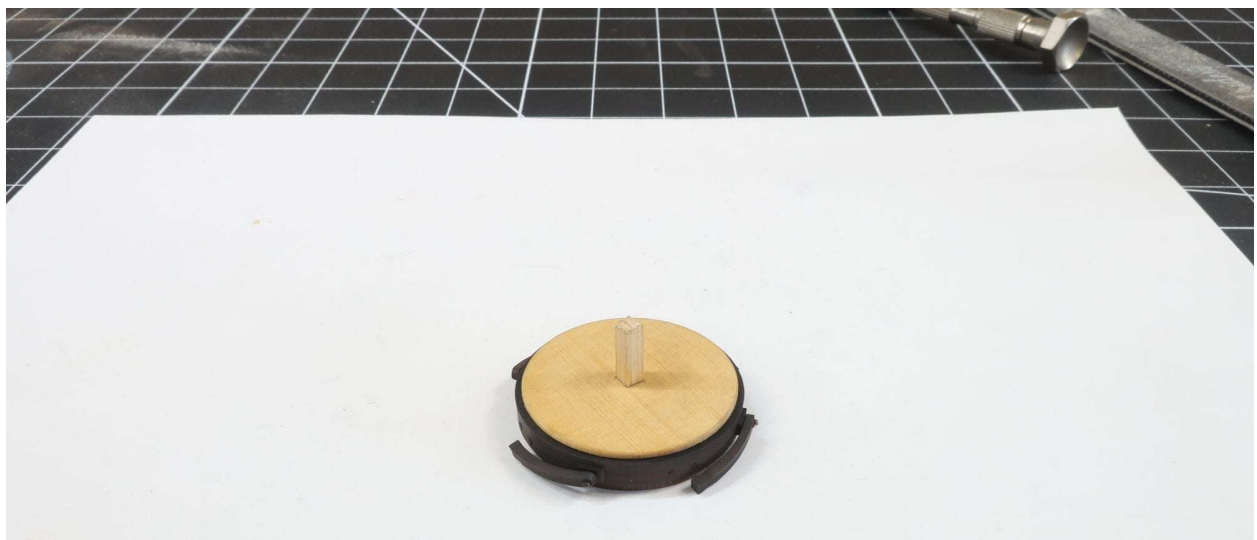
The stick can actually be glued into this assembly at this point. Then snip it shorter as shown below. You only need about a $\frac{1}{4}$ " of the stick. Grab those four pawls which have been dyed black. You will need to cut small lengths of brass $\frac{3}{64}$ " rod. Glue these into the pawls but have them stand proud on the outside of the holes just a little bit. The other side is about $\frac{3}{16}$ " long. The longer side of these brass

rods will be inserted into holes along the 3D printed pawl ring. You need to of course drill them deeper to accept the full lengths of the pins.

The pawls with their pins will not be glued into the holes. These need to be moveable in order to keep the capstan model as a working CAPSTAN.



Here is the pawl ring with the pawls inserted (No Glue) into those four holes around it.



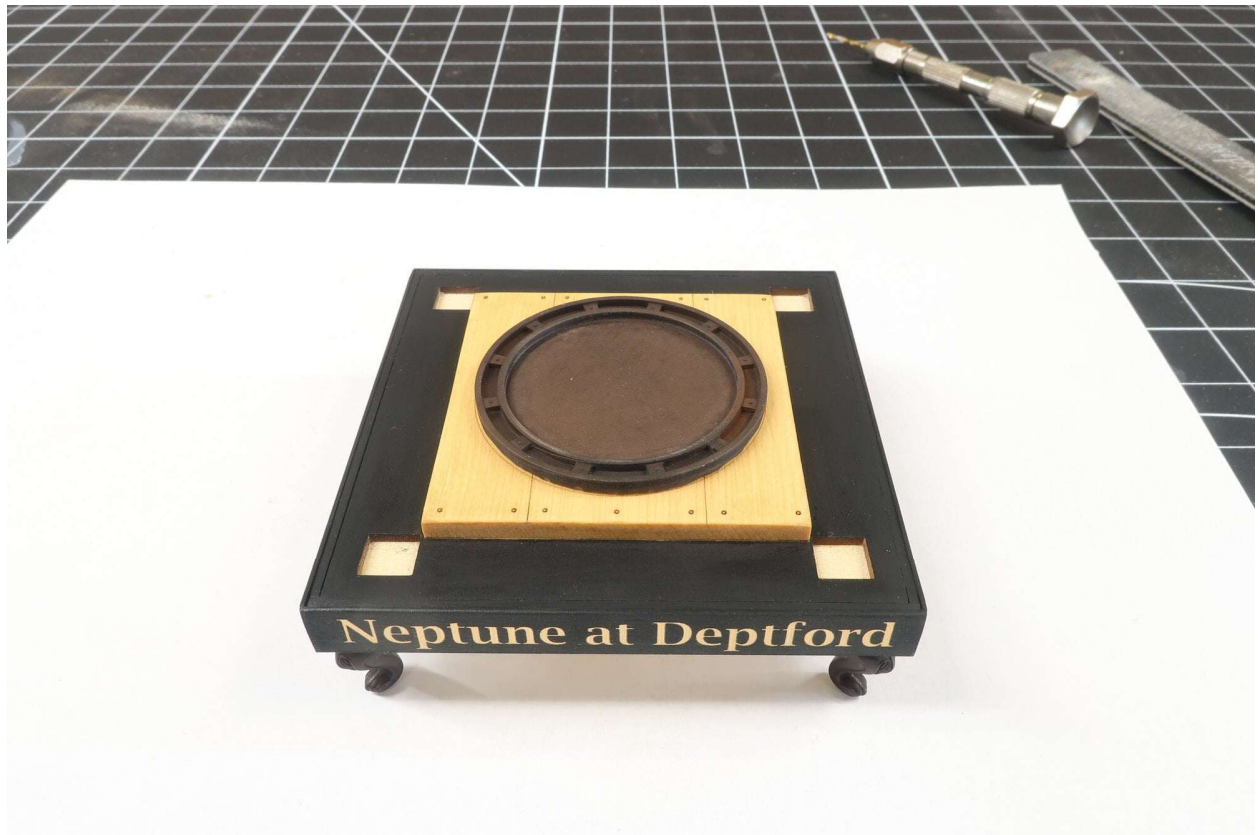
The Pawl ring is now RESTED in the Pawl Base. It needs to be able to turn in the pawl base so the pawls will actually engage the rings stops. This is true for either direction of turning. The pawls would have just been flipped over to turn the capstan in the opposite direction.



Testing in the pawl base.... below NO GLUE....it just sits in there.



If you haven't already done so.... now you can glue the pawl base into position like shown below.



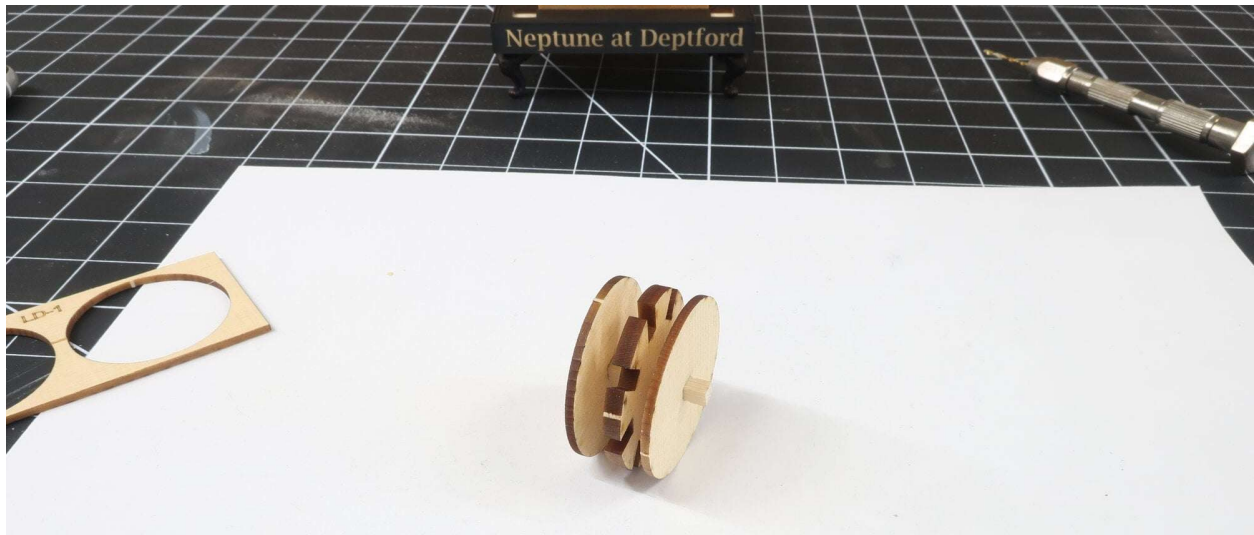
Once again testing the columns...not gluing them in...and the pawl ring base sitting in position. I have also glued the four 3D printed legs onto the base as well. These were dyed black. Just glue them into the corners.



Let's start building the lower Capstan. We will start by constructing the lower capstan drum.

You will use the same building technique using a hand drill for these. Grab another small length of that 1/8" stick. Slide the 3 layers onto the stick that make up the center of the lower capstan drum. These would be parts LD 1 and LD 2 "LD" standing for LOWER DRUM. Sandwich the thicker gear-like piece between the two thinner LD1 layers. Glue them together on the stick.... **BUT NOT TO THE STICK, LOL.**

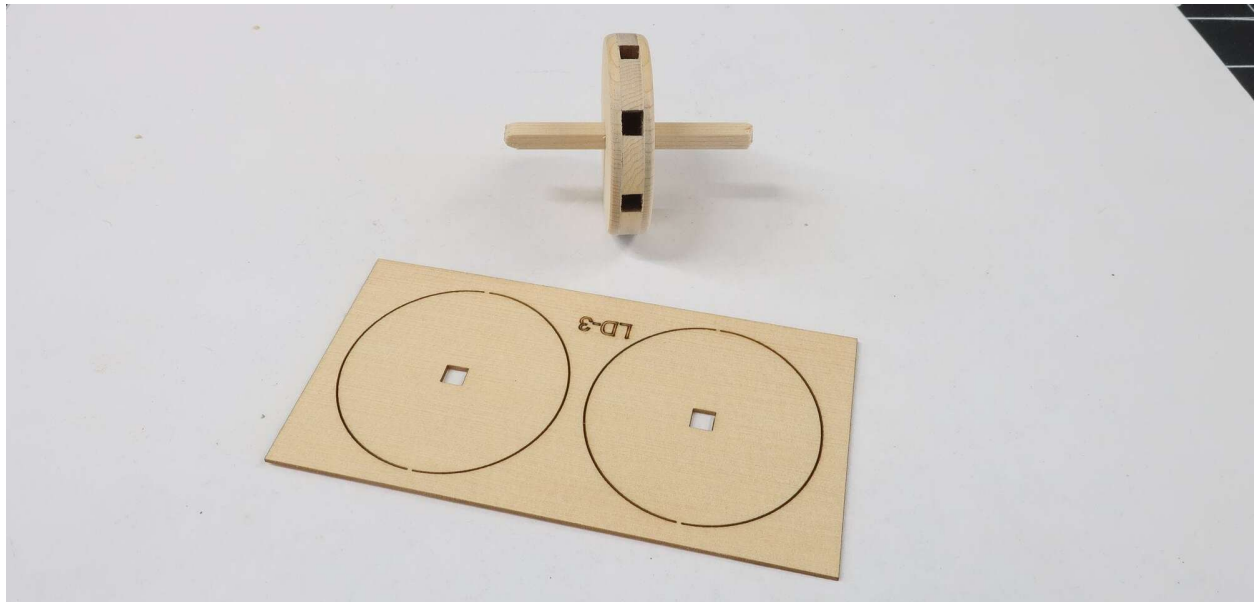
Chock it in the drill and sand the edge free of char while shaping it correctly as well. The outside profile is rounded off. Examine the plans for the correct shape and take a look at the next photo. See how rounded the outside edge is. This gives the fancy elegant shape to the drum parts and we will be adding more drum layer sequentially and rounding those off those edges as well. You will be pleasantly surprised with the results.



Below you can see those three initial layers glued up and shaped on the drill. There is no laser char and the bottom and top edges have been rounded off. Grab the next two layers.... LD-3.

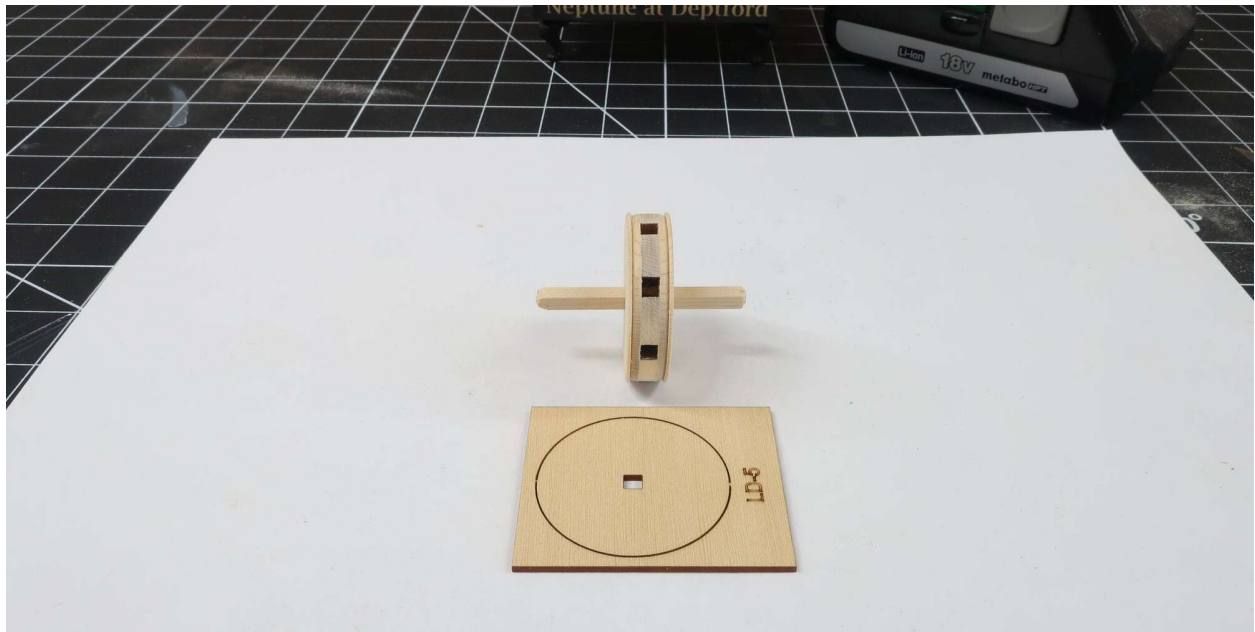
Slide them on both sides and glue them in position. Once again, I issue a warning. These layers are thin. Don't force them on the stick. Reduce the size of the stick so they slide on easily or they will split along the grain. These next layers are ever-so-slightly larger than the last. This is by design which will give you the proper profile edge when we have sanded all of the layers on the hand drill. Remove the char and

round off these two thinner layers. Be careful to NOT reduce their diameter that much. Just remove the char and shape them.

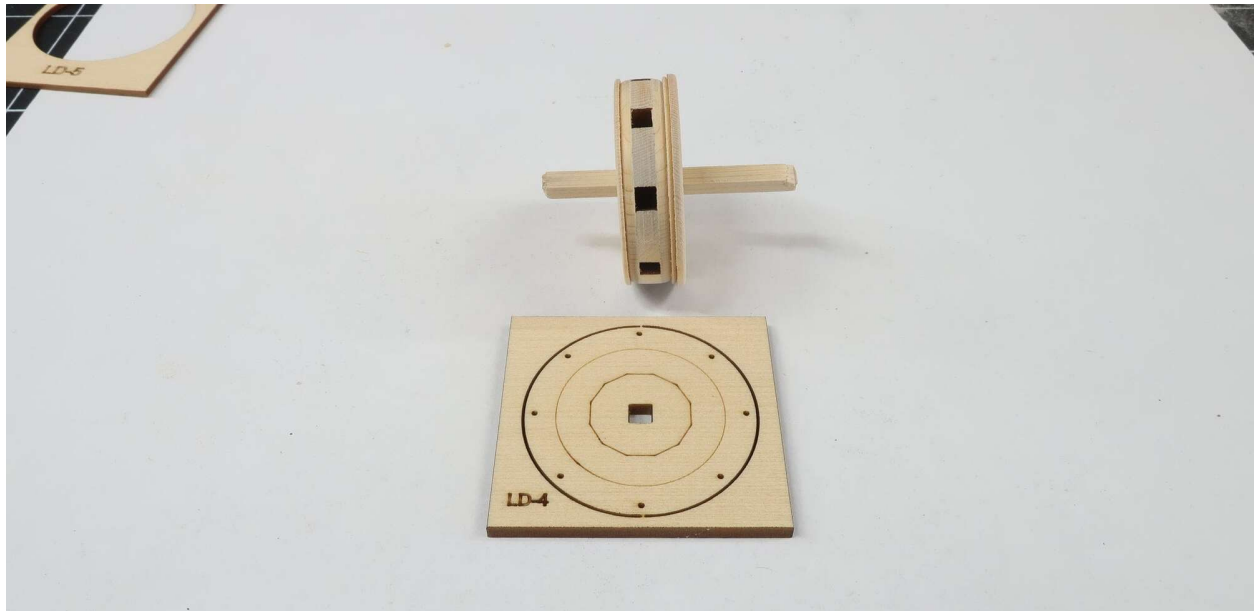


See below how the drum looks at this point...with all of its shaped layers free of char.

Next up is the bottom layer (LD-5). Slide it on and glue it...sand it down and shape using the plans as a guide for that shape. You are getting the hang of this by now I suspect.



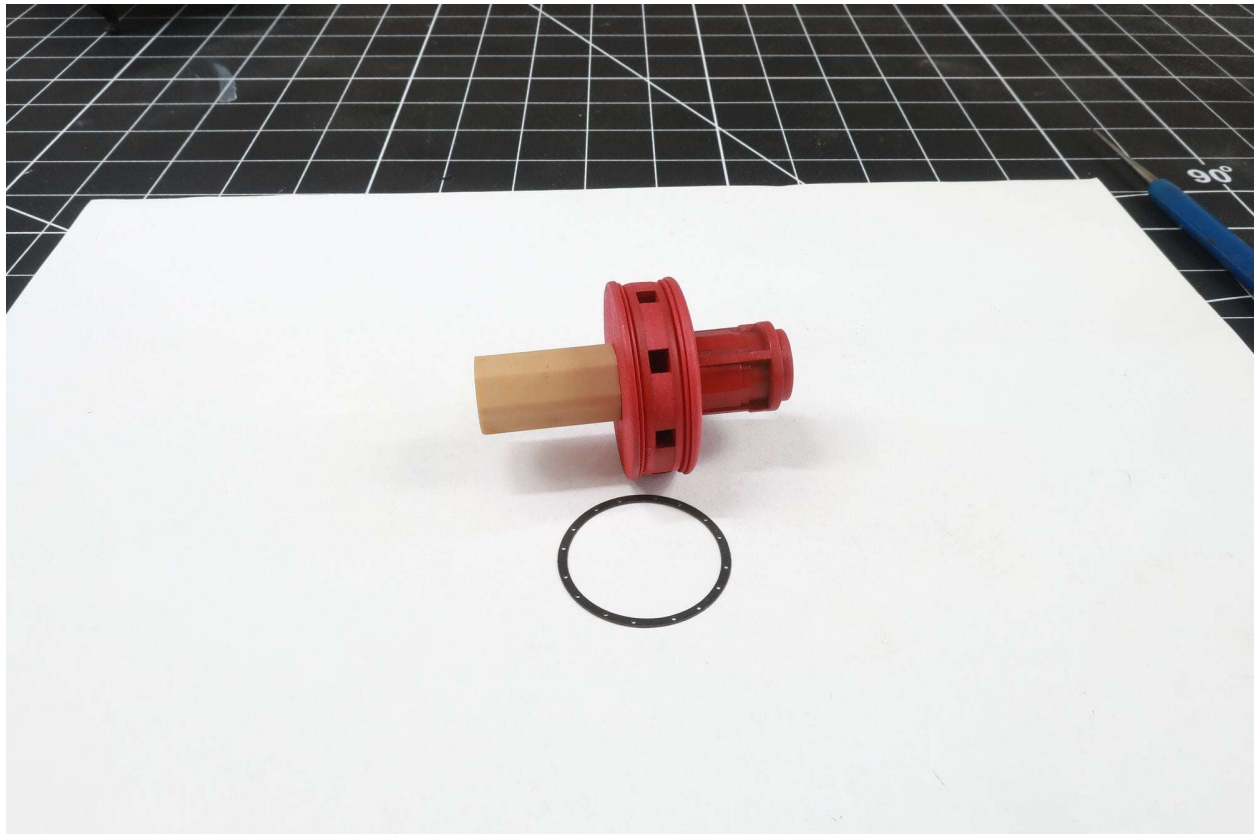
Examine the progress below. You should still be able to remove the drum from the stick, right? Tell me you guys didn't glue the drum to the stick? Ok, next up is the top of the drum (LD-4) I purposely did these out of order because it really doesn't matter.... for layers 4 and 5. Once again these are slightly larger in diameter. But not much. **NOTE....line up the small holes on the top of this layer with the notches for the capstan bars in the center layer. Place it on the stick oriented properly to achieve this. You have a 50/50 shot of getting this right!!!**



The initial drum for the lower capstan is finished. I applied some wipe on poly and painted it red. You don't have to paint it red... you can leave it natural or use another color. It's up to you. Grab the small 3D printed center column/shaft for the capstan. This one is slid on the top side of the stick and glued to the top of the drum.



Below you can see I also painted the top column red....and I added the longer 3D printed shaft on the bottom. I slid it onto the stick. The stick doesn't have to be too long either. Only a small portion needs to be slid into the square in each column. Make sure you use the correct column.... there are two left and this one is the shorter of the two.



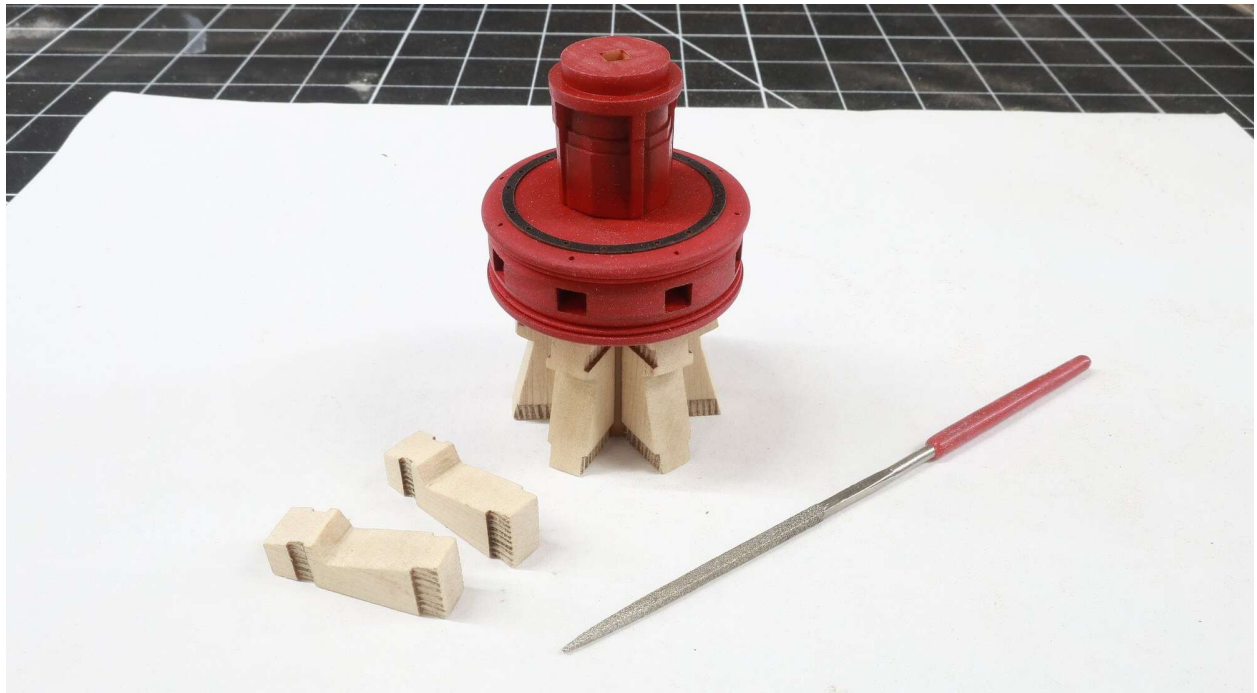
You can see the laser cut iron ring. This is cut from black laserboard. This can be glued on the top of the drum at this time.

The Whelps and Chocks...

The whelps will be glued into position first. But before you do, they will need to be cleaned up. Even before I removed them from the laser cut sheet, I sanded both sides with some fine 320 grit sandpaper. Then I removed them from the sheet and carefully sanded the char off the outside edges. Don't remove too much. Just remove the char and try not to round of the corners of the edges in the process.

There are two sizes of whelps. Use the shorter ones for the lower capstan.

In addition, the notches that will accept the chocks were filed out just a little. The etching process leaves a jagged surface which will make it tougher for the chocks to slide into position easily. Be careful here. Don't make the slots wider...because you will have gaps. Gaps don't look pretty. You want to have nice tight clean joints. You can glue these to the flats of the center column. just try and space them evenly all around. You don't have to be exact but get close. Try and glue them in position vertically without being crooked. They should be perfectly vertical. Get a nice tight joint under the capstan drum without any gaps...because we know gaps just look ugly.



The chocks are the same for both the upper and lower capstan. BUT the two types on each capstan are different. The lower chocks are thicker than the upper ones. The lower chocks are concave on the outside edge and the upper ones are convex.

Now you guys can add these anyway you like. But I did them one at a time use a three-step process. Don't rush these as sloppy chocks lead to sloppy gaps!!!

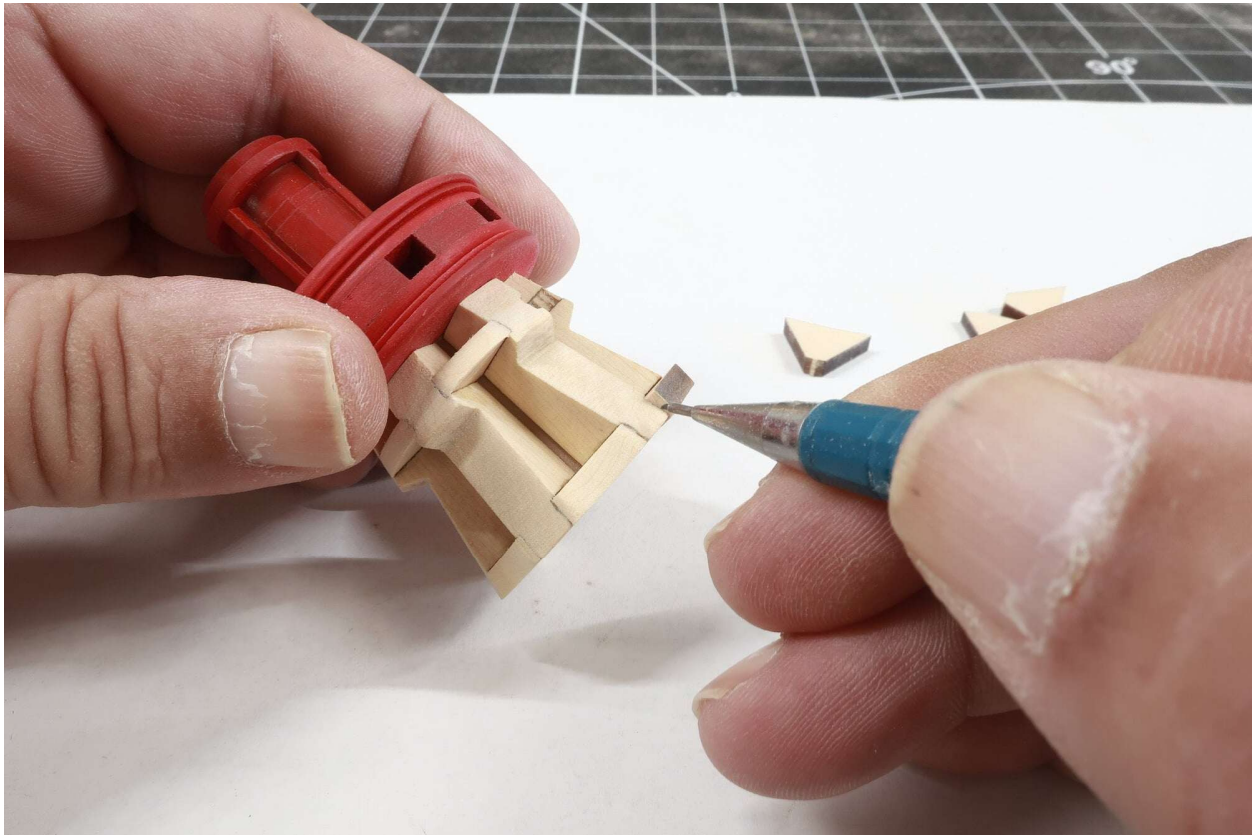
Step 1 - Test a chock in position...I added the top and bottom chocks between a few sets of whelps just to show you folks how they will look below. You can see the one lower chock slid into position and sticking out because it was laser cut extra-long and extra wide. This is good practice...

Reduce the sides of a chock until you can slide it all the way into the slots. The point of these pie shaped pieces should contact the central column. In addition, you should have a tight fit on both sides with no gaps. These will show even after painting. Once it fits nicely, see next photo...



Step two- Mark the sides of the chock with a sharp pencil against the whelps. Then remove it. It is much easier to sand the chock to its "almost finished" shape while its off the capstan. It's far too easy to sand parts you don't want to or make grooves and nicks on the capstan if you did this while it was in position. So, I sanded off the excess almost up to my pencil lines on both sides of the chock. I also tried to establish the finish concave or convex shape to the outside edge. I tested it in the slots a couple of times and kept tweaking it until I was happy with it. Then I glued it in position.

Step three- Give the chock some final sanding to really shape it properly. But do it carefully. I used 320 grit or even 400 grit sandpaper. Try not to mar the drum or the whelps or other parts of the model. THEN, move onto the next chock. Repeat...until finished.

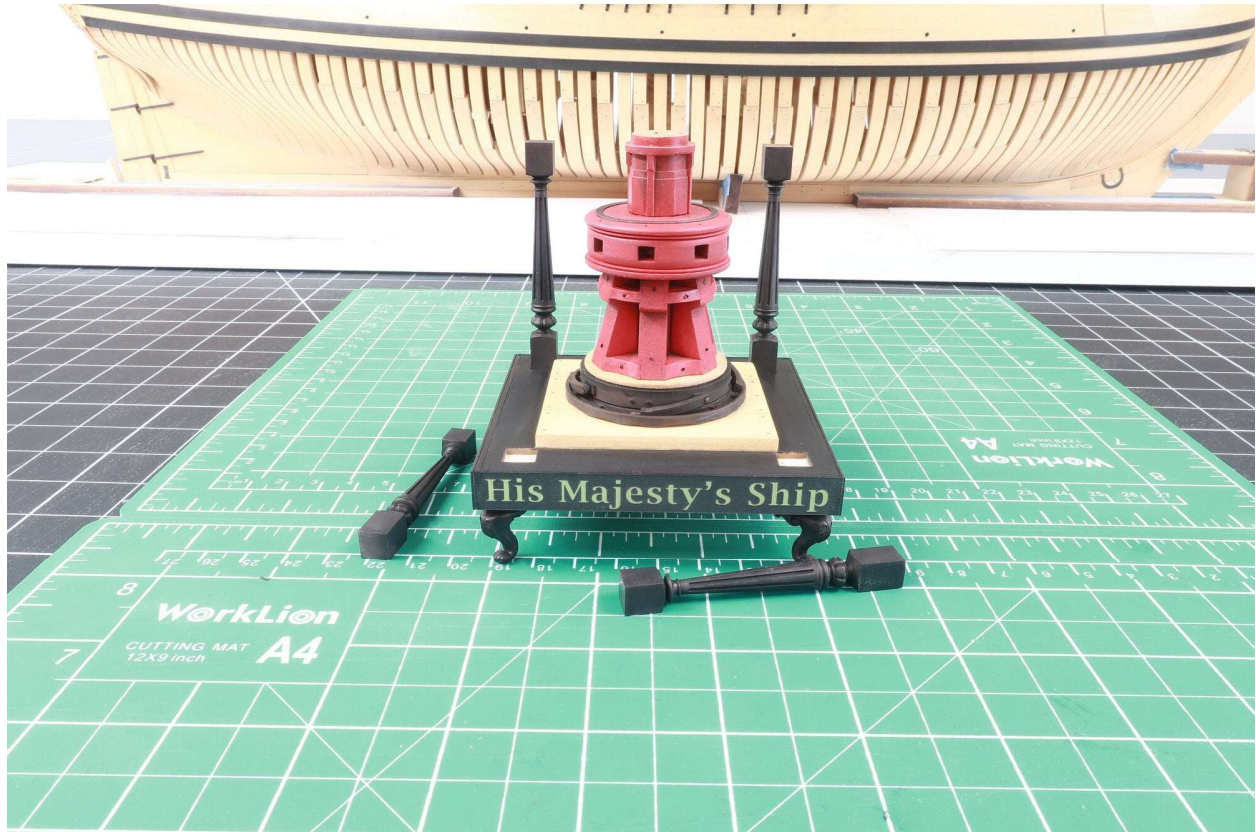


If you remember, we left a little nub of the strip sticking out on the pawl ring base. You can paint the capstan red if that is what you decided on, and slide the painted capstan onto that stick. See below. You will also notice that I added the bolts on the whelps and the chocks. I drilled some small holes and inserted some 40lb black fishing line. I did have to touch up that paint around the bolts. When I sliced off the excess line, I left each simulated bolt standing proud of the surface just a wee little bit.

You can actually glue the lower capstan onto the lower capstan base at this point. But I decided to hold off on that just in case things needed tweaking as I start the next steps. Also, the fancy columns were tested just to see how they would look with the capstan placed on the model.

Your capstan should actually rotate...give it a try. You can see how the pawls will engage etc. This is how these things actually worked. Flip the pawls to rotate the capstan the other way!!!

Ok enough playing...onto to the next step!



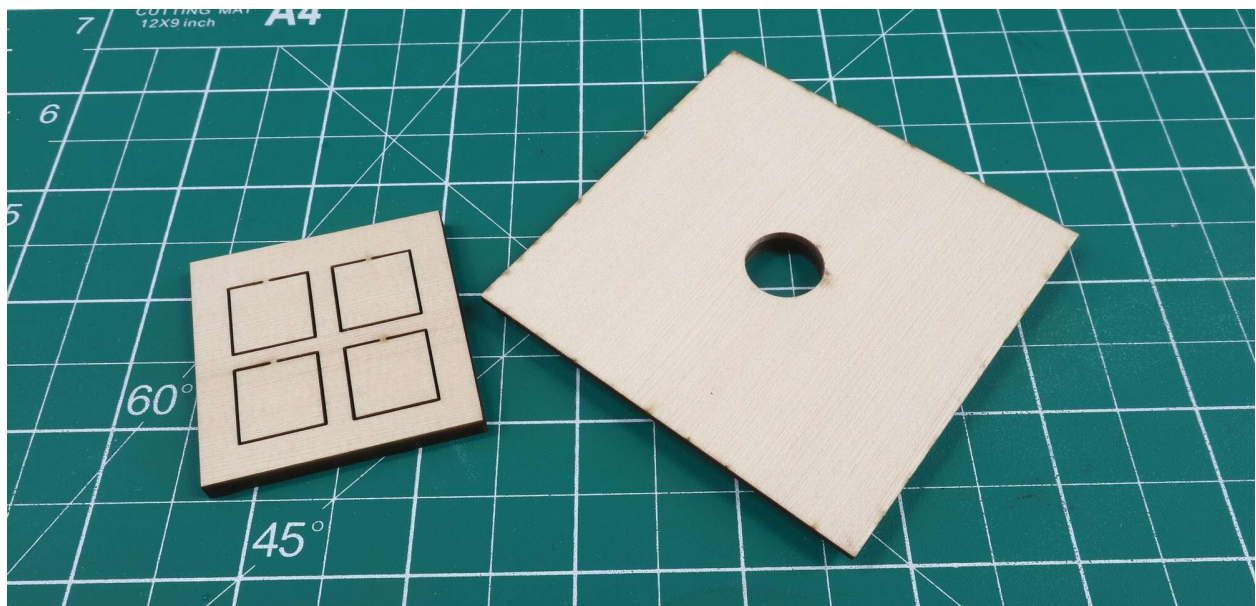
Time for the upper base...

Take the two pieces for the upper base.... prepare the partners. The partners can be sanded free of char etc... finished with wipe on poly.... add bolts if that is something you chose to do. It's a repeat of the work you did on the lower base parts.

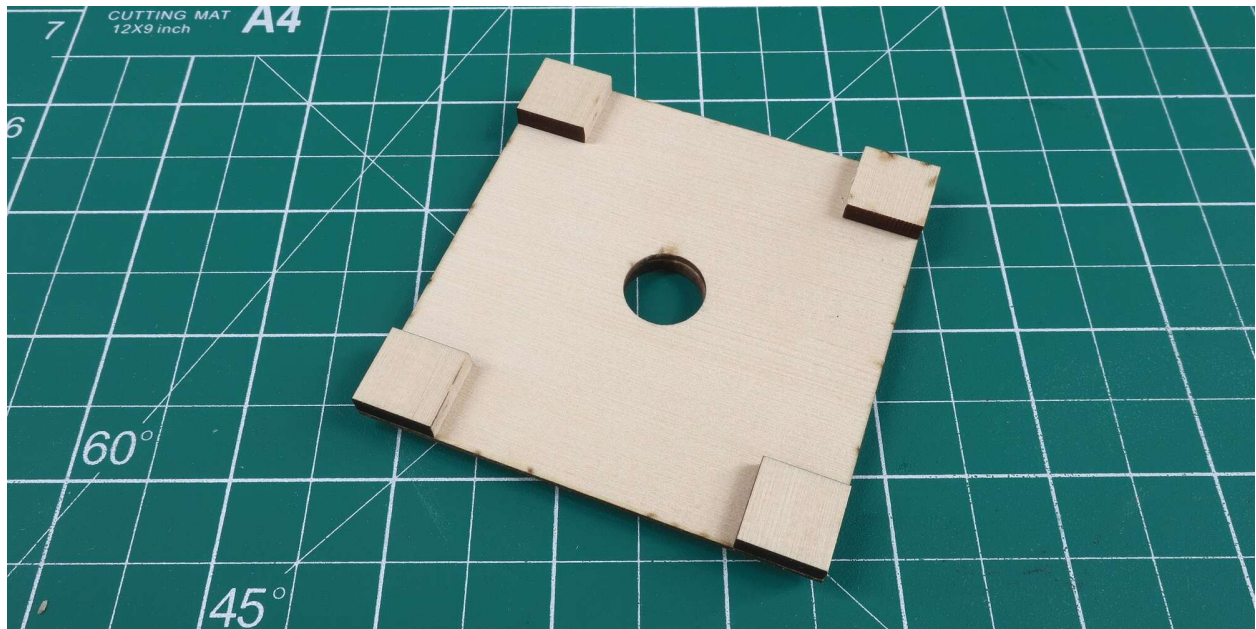
Similarly, the base can be painted black before you glue the partners onto it using the etched square for placement.



Then flip it over and glue the small squares in the corners on the bottom side.



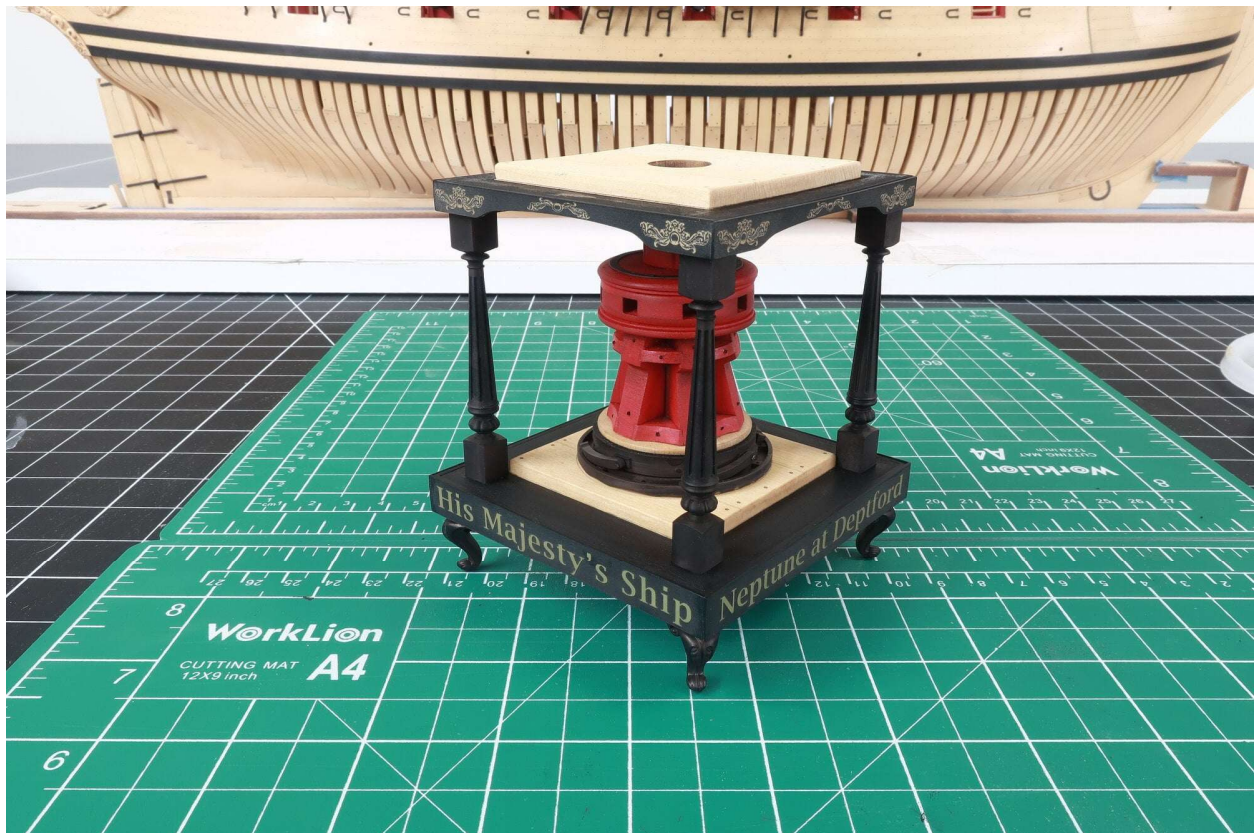
This is how it should look...



My base was painted black and then I added the fancy side panels which are laser cut for you. Don't forget to wipe them clean first. Peel and stick. They are laser cut longer than needed again so the trim them back on the corners again. You have done this before so just repeat.

Now the fun part. Test the top in position with the four columns in position. I would not glue the columns in yet for this dry fit. Depending on how you sanded the parts for the lower capstan, the four columns may need to be sanded shorter.... or you can use the small round laser cut spacers on the center column if the upper base need to be raised. This upper base should sit on top of those columns and at the same time the center shaft should enter the hole in the base. It shouldn't sit flush with the top of the hole, but should at least fill it up to the half way point. We need the other half of the hole depth to slide the upper capstan into. The lower capstan should have a little nub of the 1/8" stick sticking up at this point so you can slide the upper capstan down onto it once its finished. Or just stick into the bottom of the upper capstan when you finish it. It doesn't matter, but that is how the two will be connected.

So, as you determine the proper height for this upper base keep all of that in mind. Use the spacers on the center shaft of the lower capstan or literally sand the four fancy columns shorter to find the proper height for the base. Glue the base and columns in position permanently when you are satisfied. It will look like the photo below.



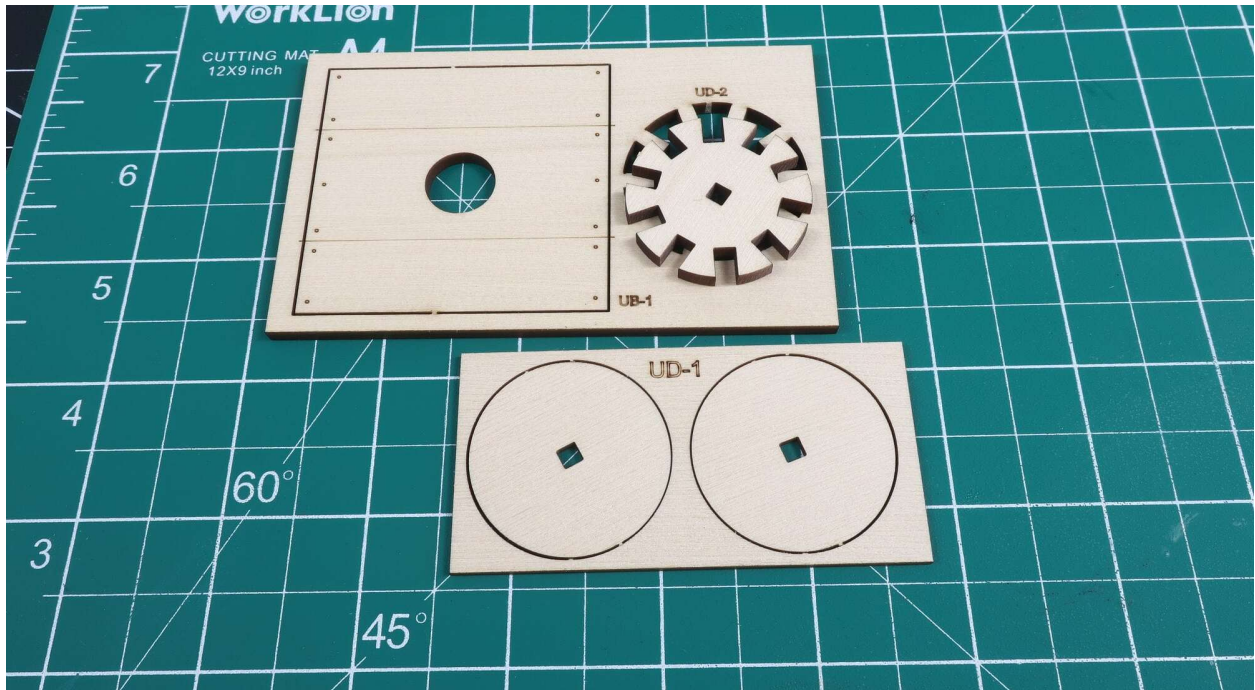
Almost there!!!

Time to start building the upper capstan. By now you probably realize that building the upper capstan is EXACTLY the same as building the lower. There are a few differences and they are minor. For example, on the Neptune at this time, the double capstans only had pawls on the lower capstan. So, they won't be needed. This project was made using the plans from NMM which are incredibly detailed. If any of you would like to take a look at that...here is the link

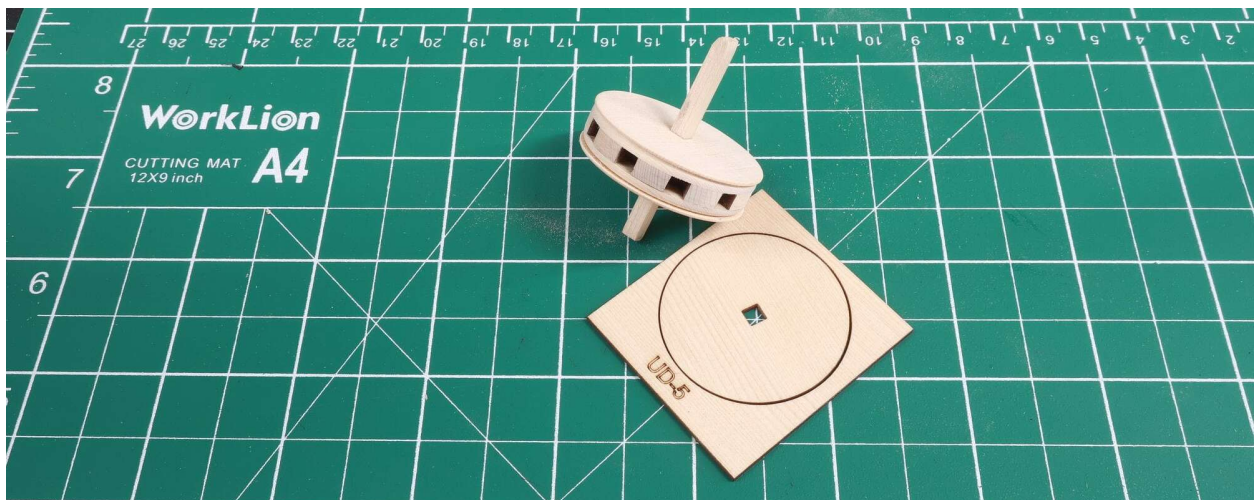
<https://www.rmg.co.uk/collections/objects/rmgc-object-80117>

So, the instructions will be abbreviated for the upper capstan because it's identical.

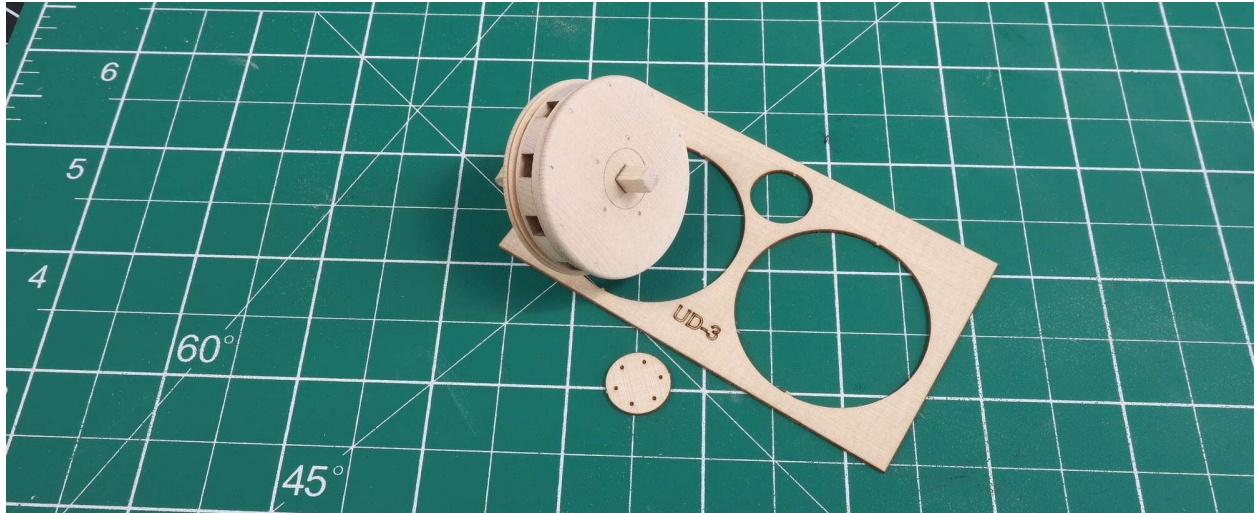
Parts UD-1 and UD-2 (UD stands for Upper drum). Sandwich them together on the stick and sand away.



Below you can see the addition layers added and sanded to shape like we did on the lower capstan drum. First layer parts UD-3. Then I got layer 5 ready below which is the bottom of the drum. Again, out of order but it didn't matter.



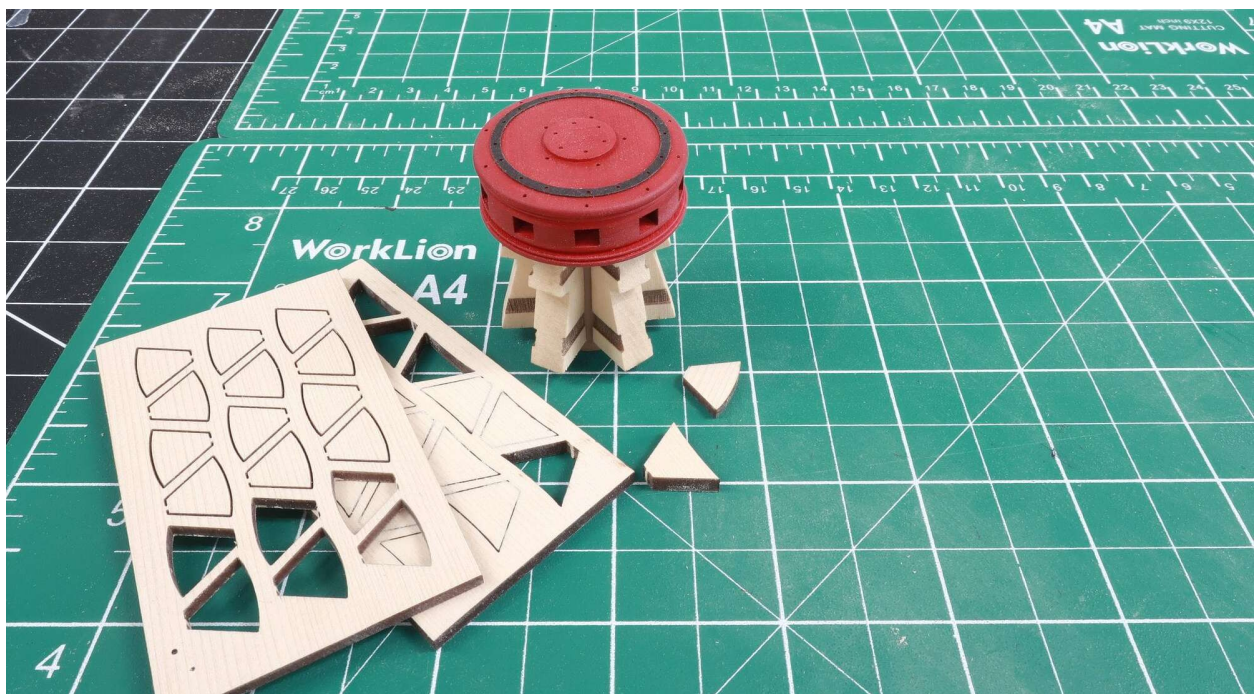
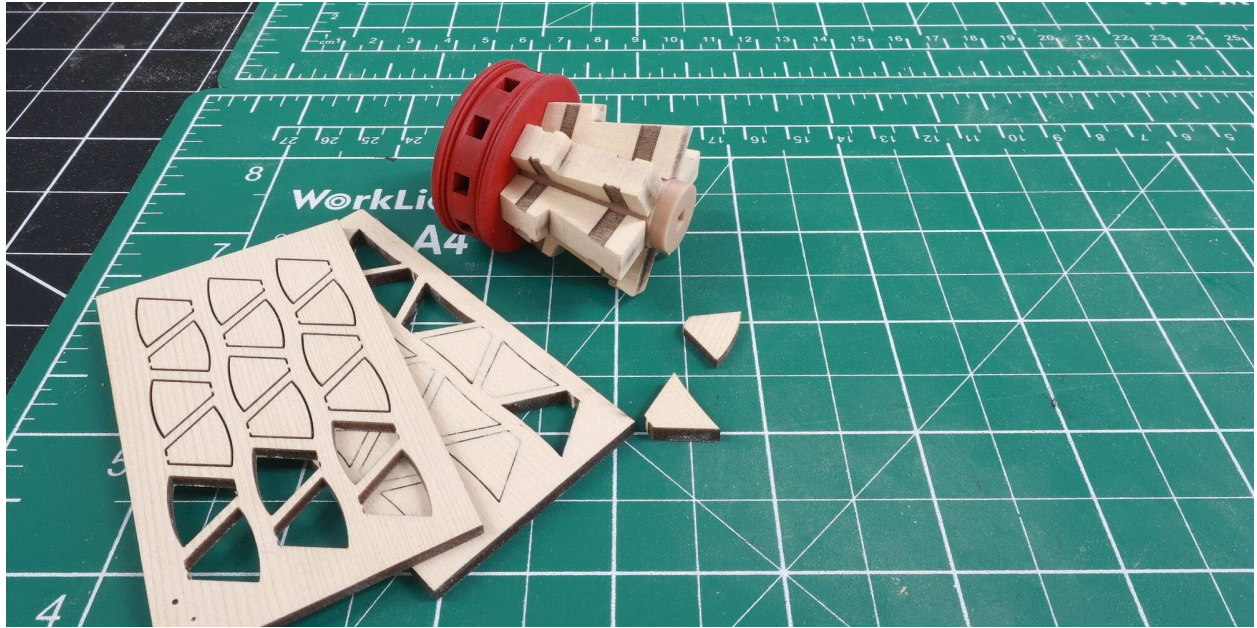
And of course, the top layer...UD-4 was added and shaped. But then we have a different layer not part of the lower capstan. A small disc with some tiny bolts on it. This must be glued on top and centered. There is no hole to help you center it so do this carefully. You can push the stick down so it sits just below the hole surface so it doesn't affect this center disc when you glue it in position. This will actually cover the hole and finish it off.



It will look like this.



Use the stick as a handle on the bottom of the drum so you can neatly paint it red if you chose to. Add the laser cut iron ring on the top. slip the remain 3D printed capstan column in position under the drum. Just cut the stick shorter and glue it in position. Then proceed to clean up and add the whelps (the longer ones this time). Then add the chocks the same way as you did for the lower capstan. yada yada yada...it's literally exactly the same as the lower.



Ok, the upper capstan has been completed now.... it's all painted with the whelps and chocks having some bolts added. Use 40lb black fishing line like before.

The only things left to do at this point is glue the upper capstan in position...BUT don't glue it in position so it won't turn in the shaft hole. You can insert a small length of stick into the bottom of the upper capstan and cut it short. Then you can insert the other end of the stick into the hole of the column on the lower capstan. Do a test fit first before gluing bot capstans to the center 1/8" stick. You want to make sure that the upper capstan is not actually touching the top of the capstan partners. It should be raised up a little off the surface. Just a tad. See the photos below. Once you have that gap established you can glue it all together. The capstan should still turn freely. It is after all a working capstan model.

Lastly, to finish of the model, just add the four finials to each corner of the upper base which adds a nice fancy touch to the display. Align them with the fancy columns below them so they look like an extension of those columns. Then do whatever cleanup you need to do because you just finished the model!!! I hope you enjoyed this little project.

My completed prototype is shown below and it makes a handsome display on my fireplace mantle.



