

Christmas Train

By JoeSnuffie

<http://www.thingiverse.com/thing:1902374>

Instructions



Important Notes

This was designed with Corel Draw X7 and it doesn't seem to export some file types properly. This is the only application I have so you'll have to do your best with what I have provided.

I am using a non branded 40W Chinese laser engraver that's been modified to be a good cutter. However, it is very simple in its controls and because of this I have placed things intended as a light cut on a separate layer than the normal cut. The light cut layer is intended to be like an engraving but because it's all vector, it's much faster to cut it at low power and high speed than to engrave.

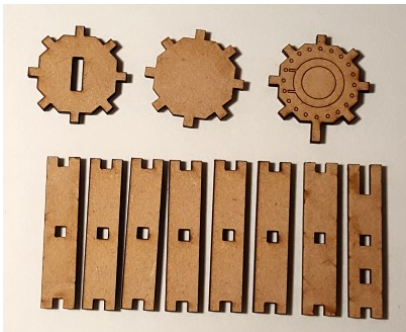
For those interested, I light cut at 2.5ma and 25mm per second speed. I don't know how this translates to the more sophisticated laser cutters but for mine, 2.5ma is about as low power as can be used and still produce a laser.

Because every laser cutter is different, you may have to tweak the dimensions for a proper fit on some pieces. I've had to do this for most files I've downloaded and it's to be expected.

The Steam Engine

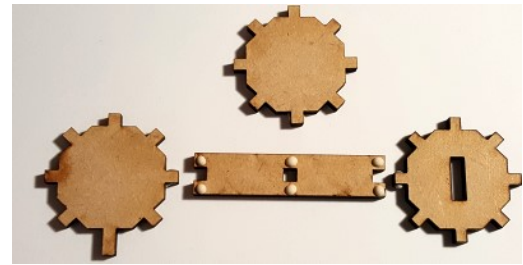


The Boiler

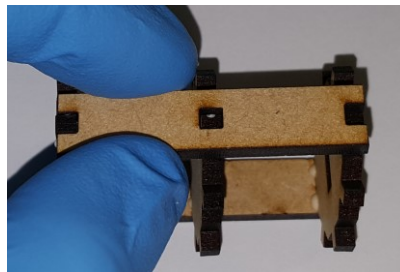
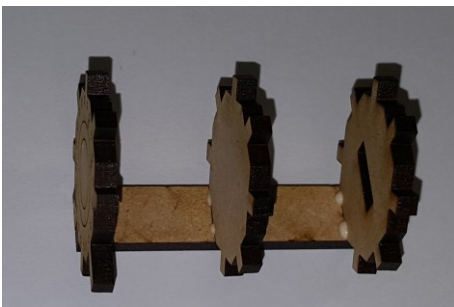


Start by gluing a side piece onto the 3 inner supports. The back piece has the vertical notch, the front piece has a longer nub and the middle piece is plain.

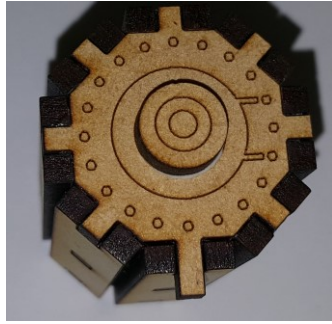
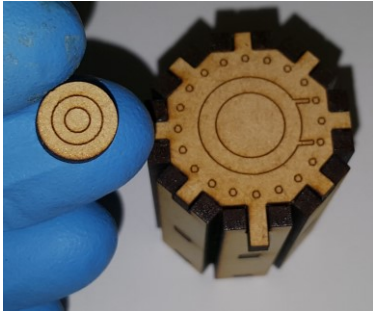
Place glue as shown and attach the inner pieces. Make sure the front inner piece has the designs facing outward.



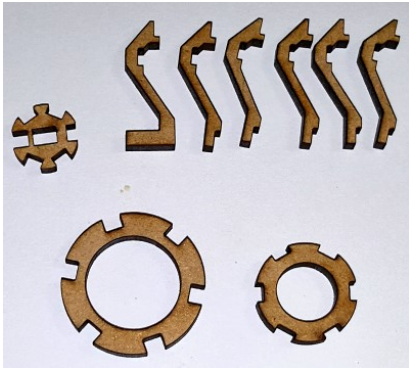
Add the piece from the opposite side and then add the rest. Make sure to place the piece with the extra notches on top. The top is the side opposite the longer nub.



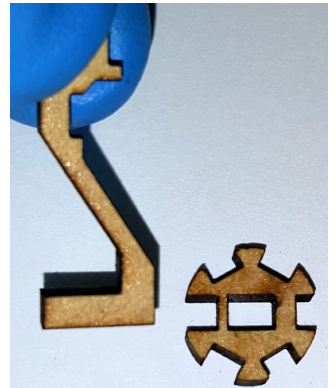
Place this accent piece in the center of the front of the boiler.



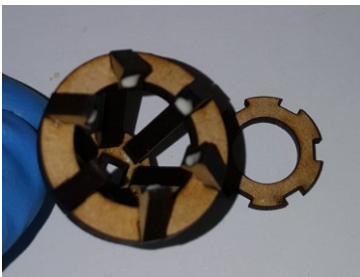
The Smoke Stack



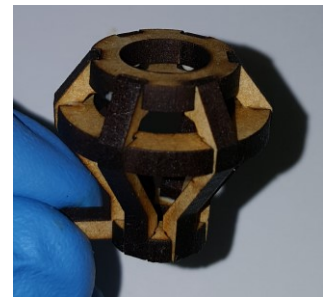
When assembling the smoke stack, note that the piece with the extended bottom faces the front. It also fits into a deeper cut in the bottom support piece.

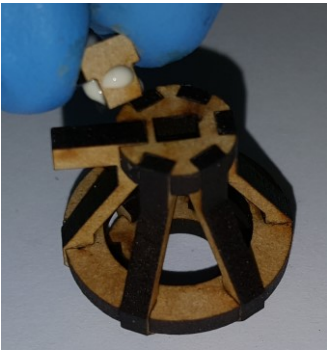


Start by placing glue on the bottom and middle support pieces and place these onto the front piece with the extended bottom. Continue gluing the pieces around the middle and bottom supports.



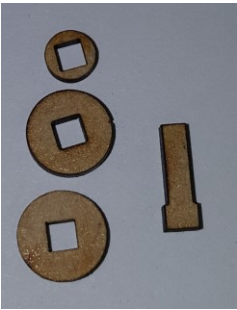
Once all the outer pieces are assembled, the top piece needs to be added. Place the glue on the top of all side pieces then add the top piece. You'll need to work it into place. I sometimes have to pull the side pieces back a little to make it fit.





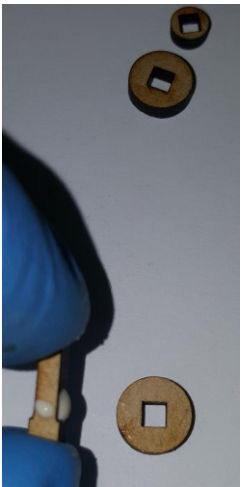
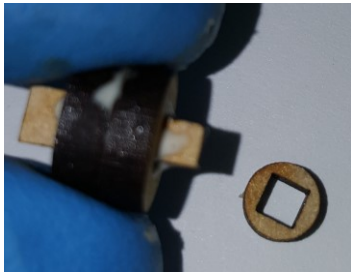
The last piece for the smoke stack for now is the key in the bottom. This will make sure it's held secure to the boiler.

The Dome



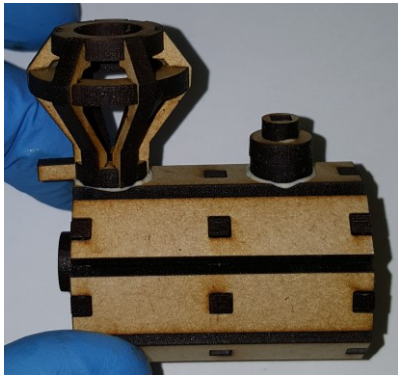
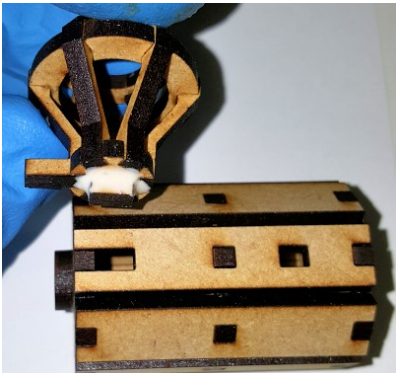
The dome is only 4 pieces. A long key and three circles. The smallest circle is plane, with no designs on it. Pay close attention to the two smallest circles. One has a circle design placed right on top of the square cut out and this is part of the light.

Begin by placing glue on the key just above the larger section. Place one of the larger circles onto the key then repeat. The small circle goes on top.

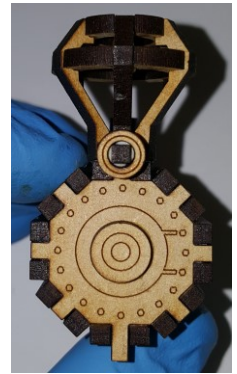
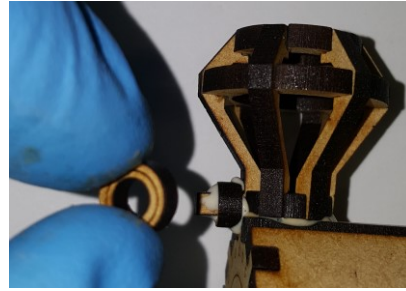
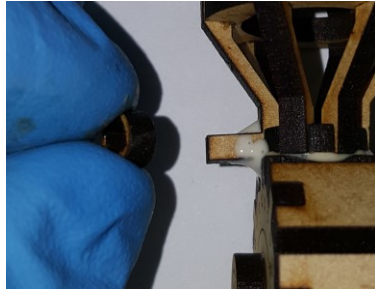
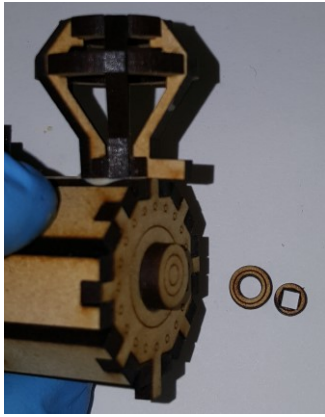


Finish Assembling the Boiler

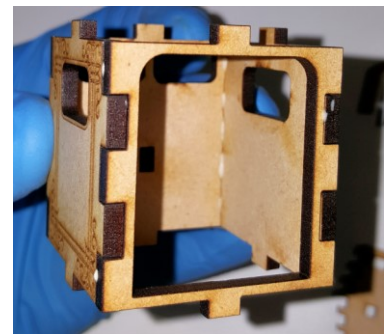
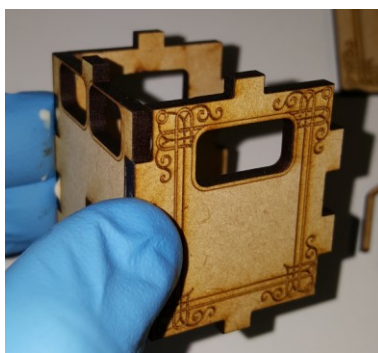
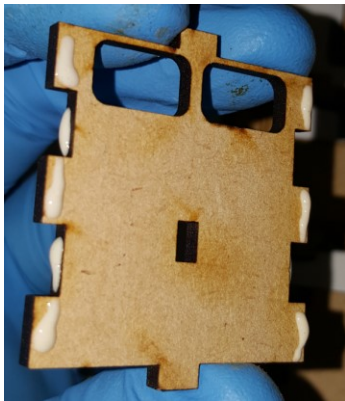
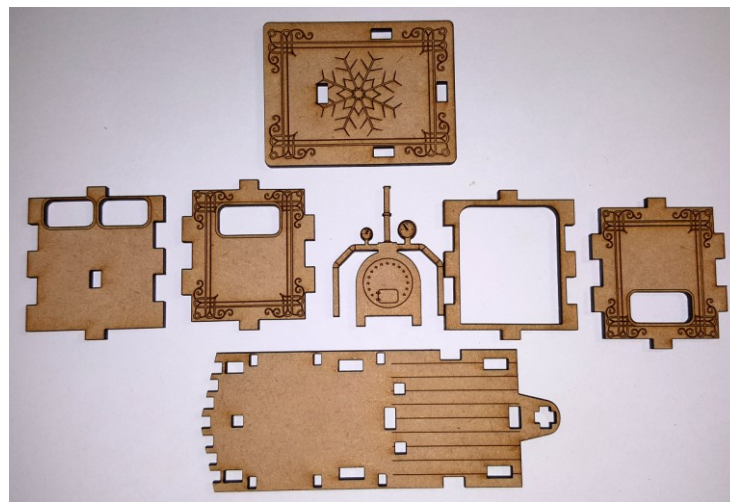
Now it's time to attach the smoke stack, the boiler and the light to the boiler.



Glue the smaller light piece on first. Next, glue the larger light piece on.



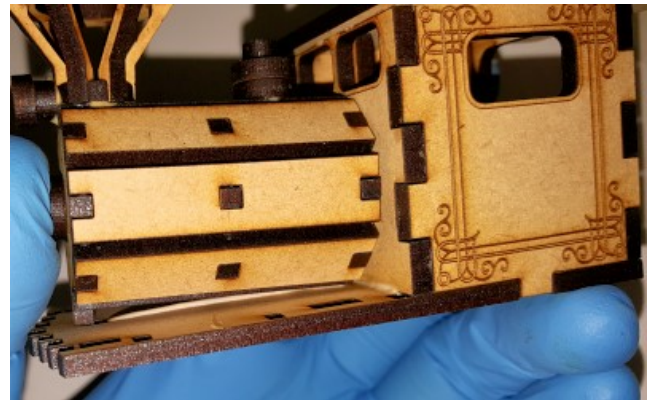
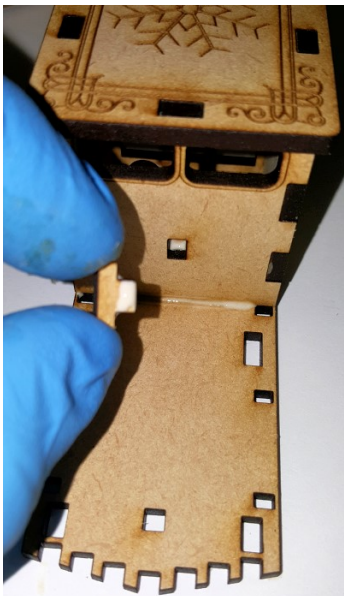
The Cab





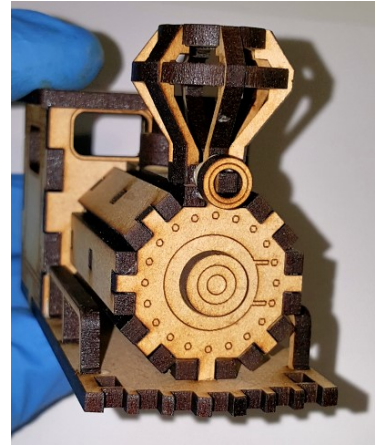
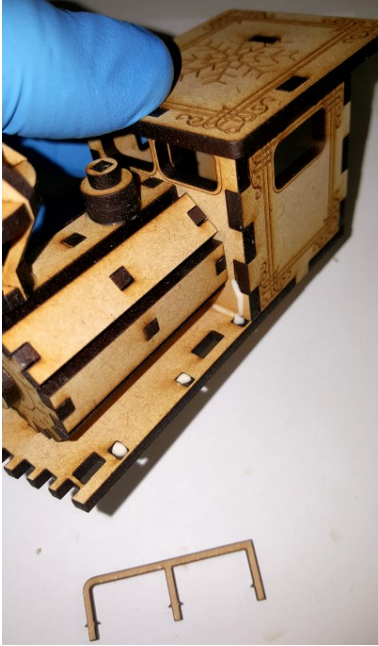
Assembling the rest of the Steam Engine

The vertical slot on the back of the boiler fits over this key.

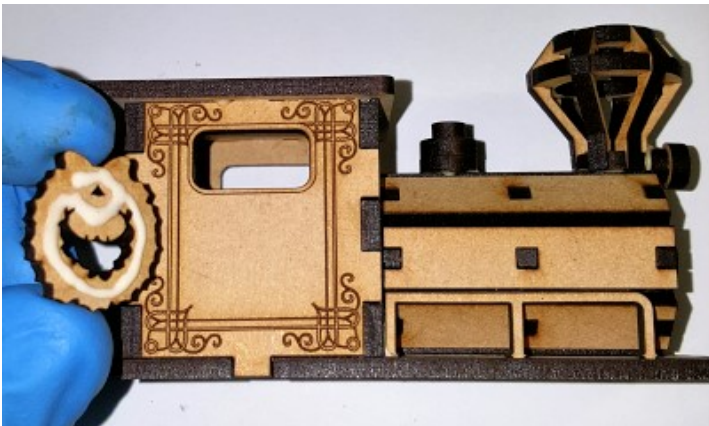


Place the boiler over the key first then force the nub in the front into the hole below it. The bottom frame piece will flex and allow it to snap into place

There's a guard rail on each side of the boiler. Place glue in each of the 3 small holes and along the front edge of the cab where it will connect.

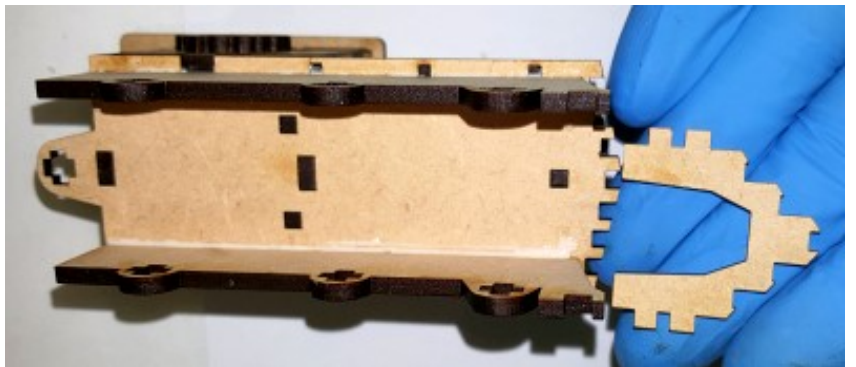


Glue on the wreath.



Glue on the base.

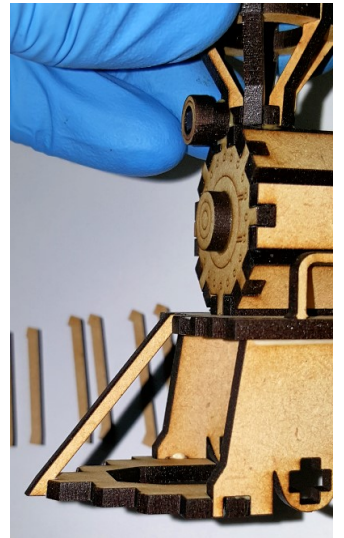
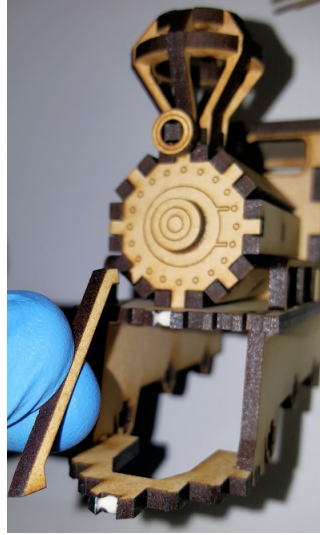
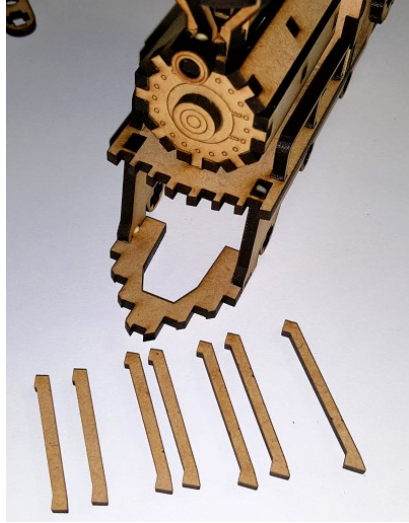
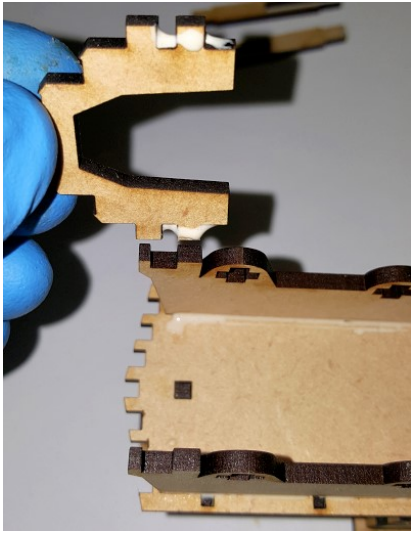
These pieces hold the axles and front bumper parts.



Install the bumper.

This piece is the bottom support for the vertical pieces.

Arrange the vertical pieces from smallest to largest. This helps in assembly. The pieces are in pairs, except for the largest center piece. Place the center piece on first.



Assemble the rest, largest to the center, smallest at the outside.



The Steam Engine has 3 axles and each is made of these two pieces. Be careful not to confuse the steam engine axles with the axles for the cars because they are different. The axles for the steam engine are longer.



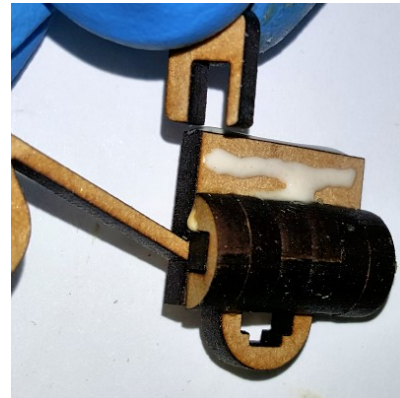
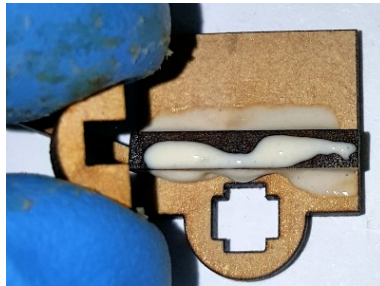
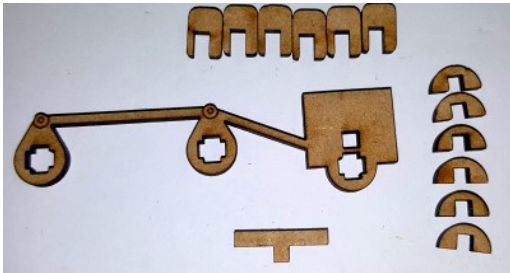
Please the axles into the holes in the base. The step down area at the end should be flush with the sides of the base. Glue the axles into place. The wheels will spin around the step down area.



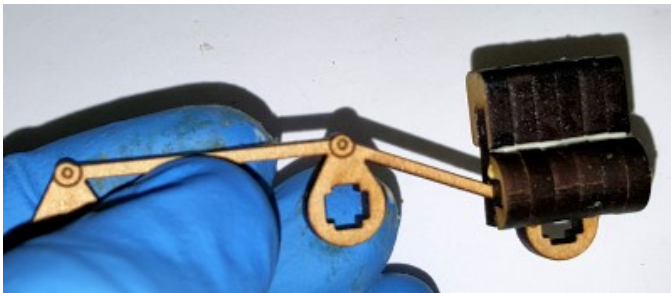
Assemble the steam pistons.

There are two that are mirror images of each other. One for each side.

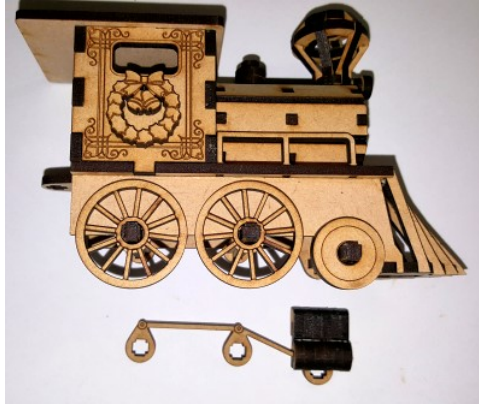
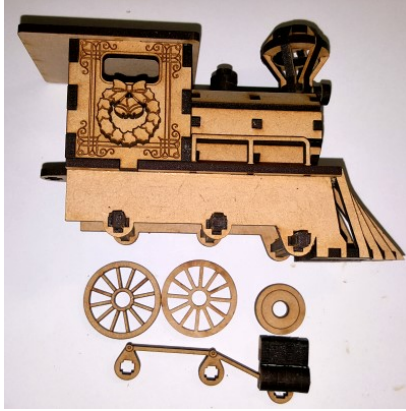
The “T” is glued horizontally into the small square hole. Once in place, glue 6 of the half circle pieces onto it. Finally, glue 6 “U” shaped pieces above the half circles. Make sure the thinner side of the “U” is on the same side as the half circles.



When complete, it looks like this.



Attach the wheels and glue the steam piston over them. Do this for each side. The steam piston piece should be flush with the axle and not pressing against the wheels. Make sure there is enough room for the wheels to spin freely.



Install the hook adapter. This adapter lowers the height of the hook assembly to account for the smaller wheels and lower height of the cars.



Glue these two pieces together. Glue one end into the **BOTTOM** of the steam engine.

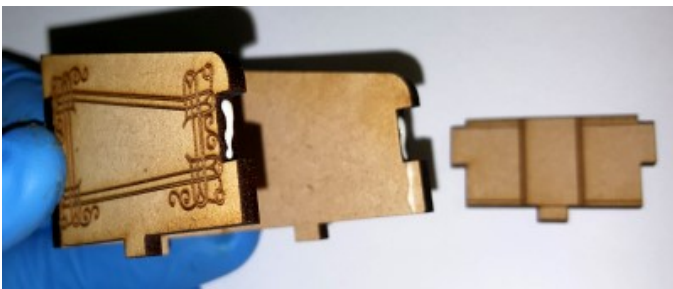
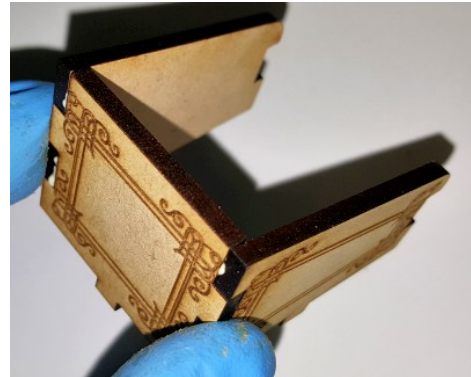
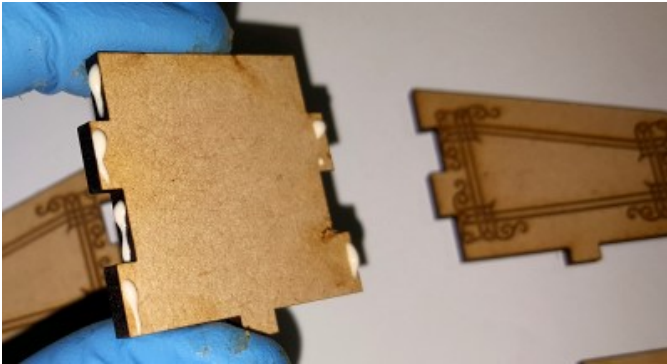
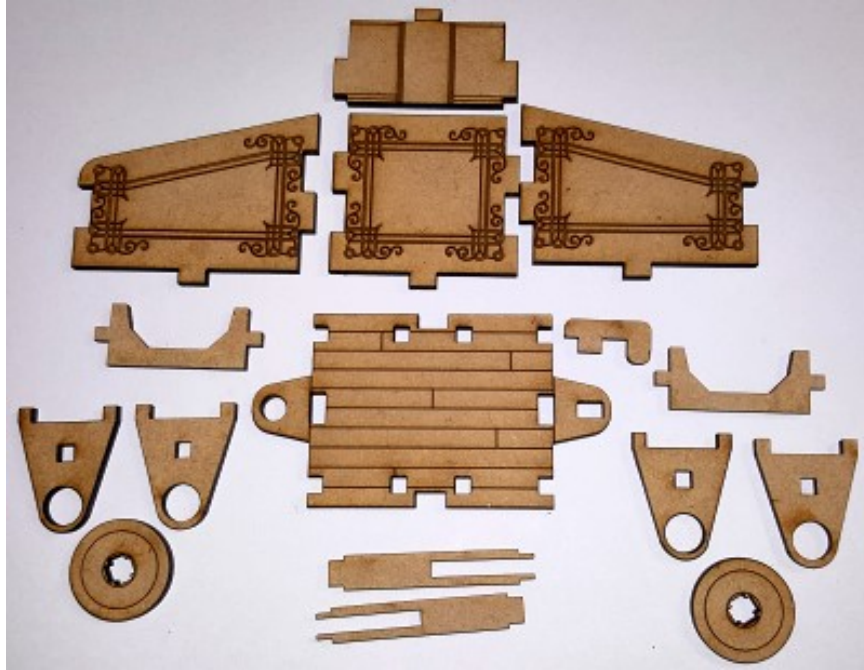


Glue the adapter onto the other end.

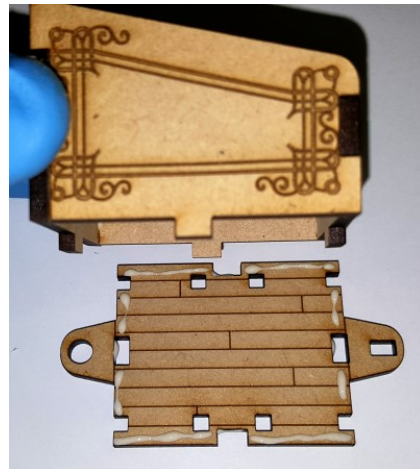


The Coal Car

The coal car is the smallest car. This first picture is missing 2 axle pieces and 2 wheels.

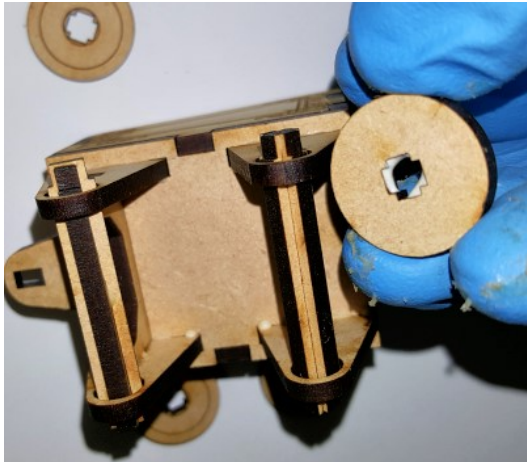
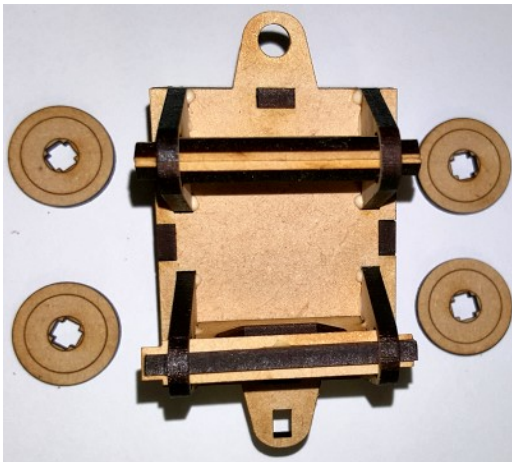
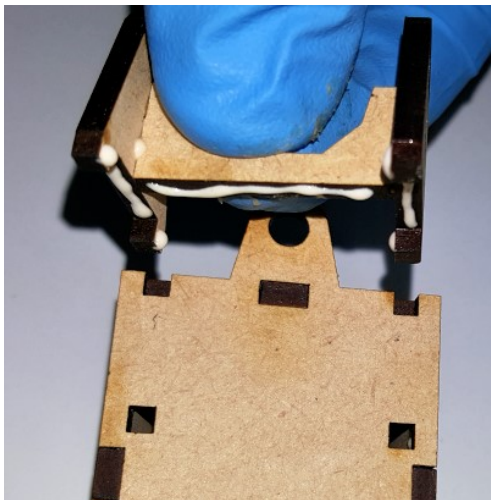
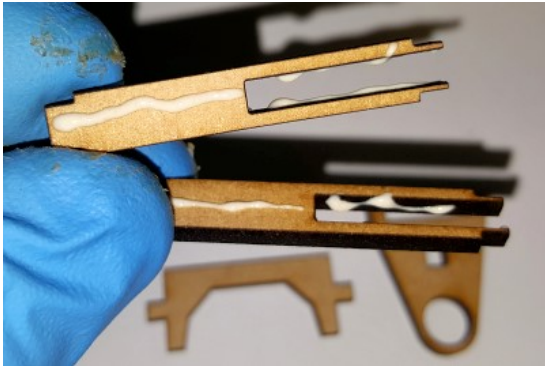


Glue the shorter end on the side with the rectangle notch.



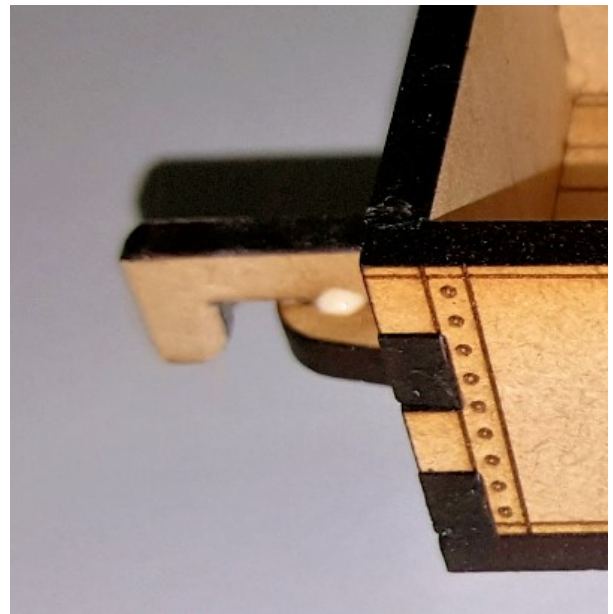
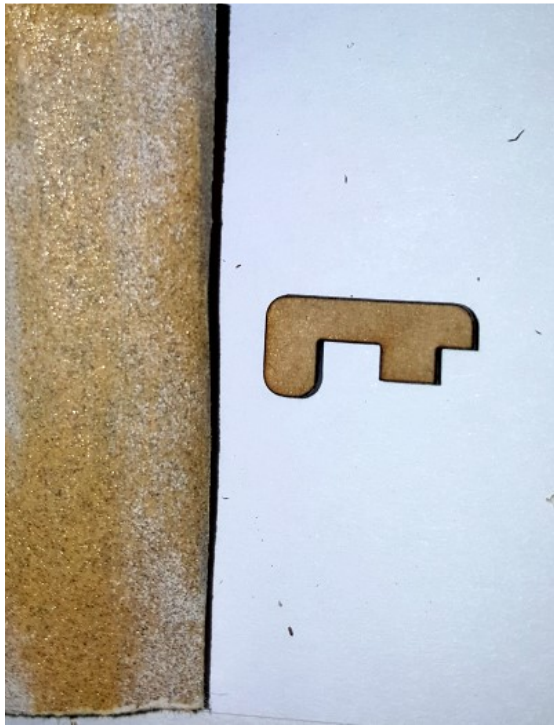
Assemble the axles and axle supports.

You'll use these instructions for the axles, axle supports and wheels for the rest of the cars.

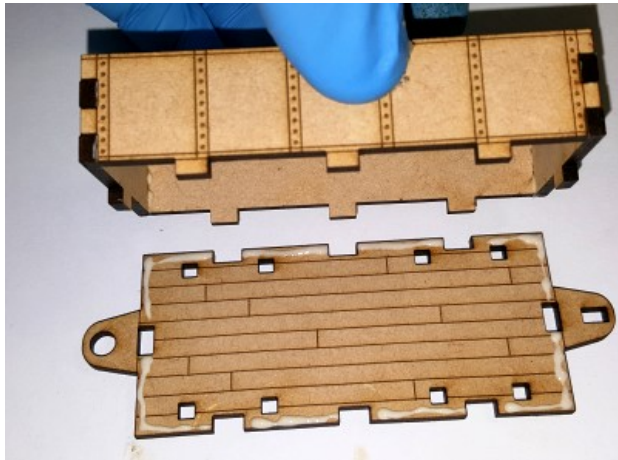
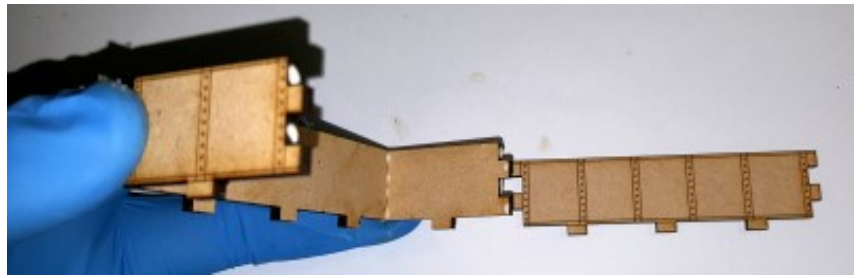
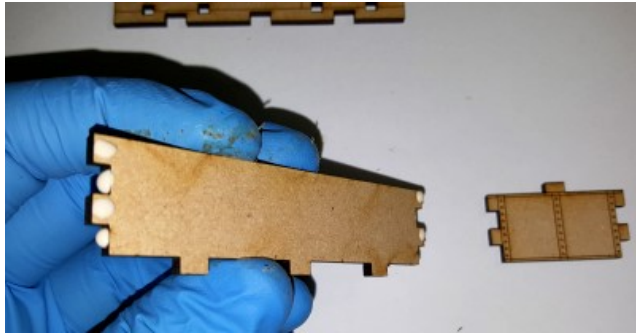


Attach the hook.

The rounded end of the hook needs to be sanded. This will allow the hook to move more freely in the hole in the car in front of it. The hook on the bottom of the second picture shows how much sanding I am doing for a good fit.

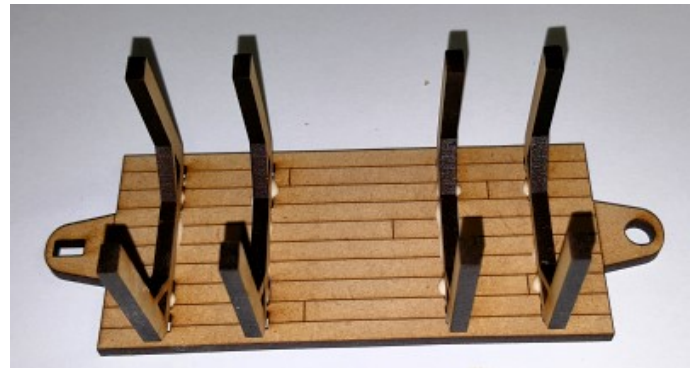
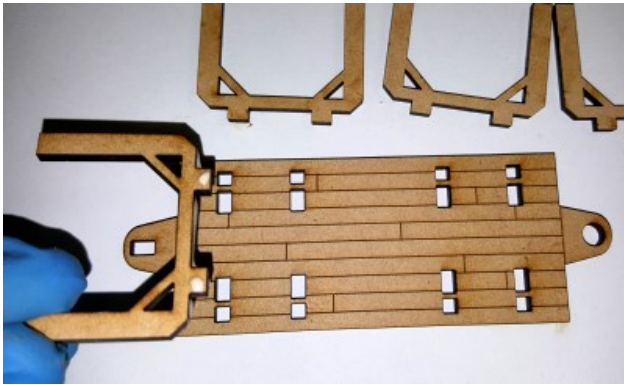


The Open Top Car



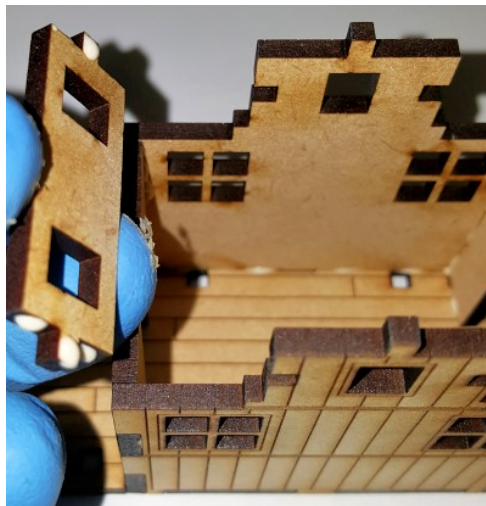
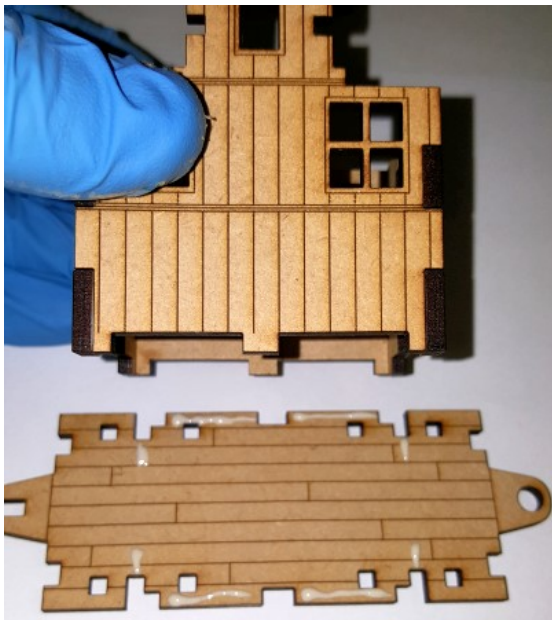
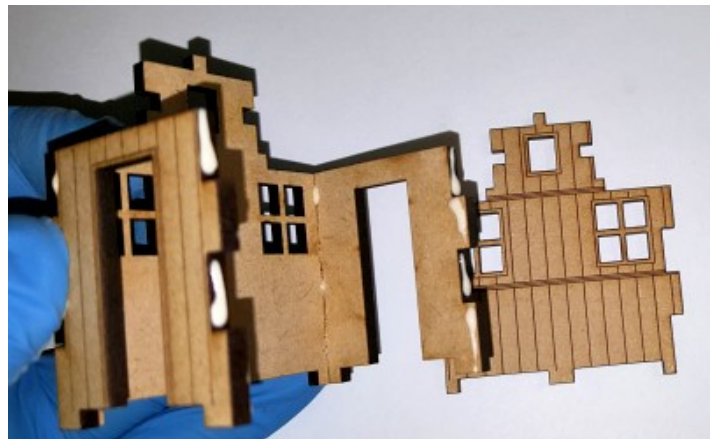
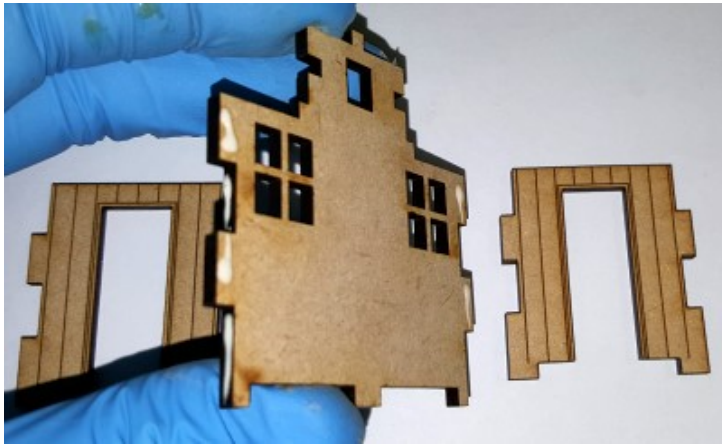
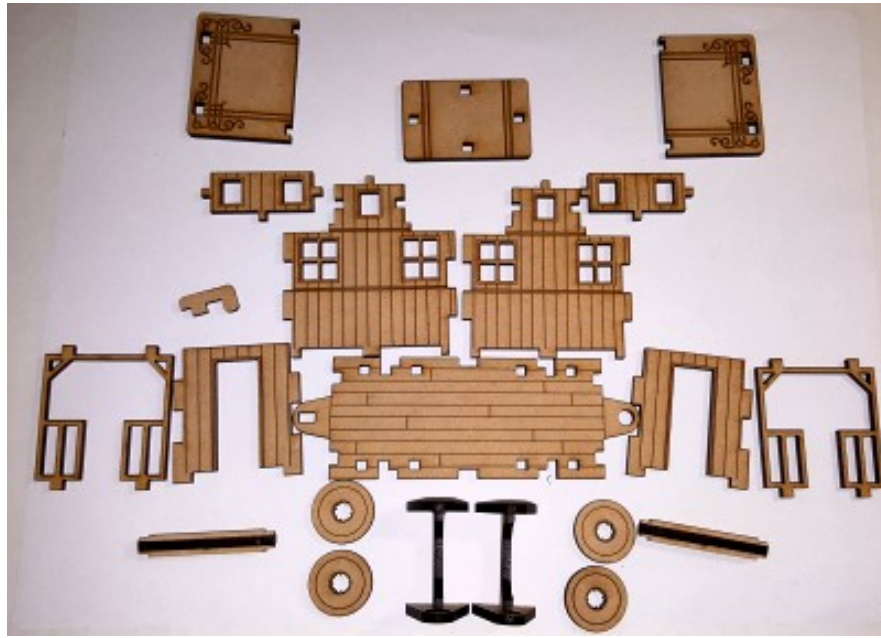
Add the axles, axle supports and hook as seen in the Coal Car.

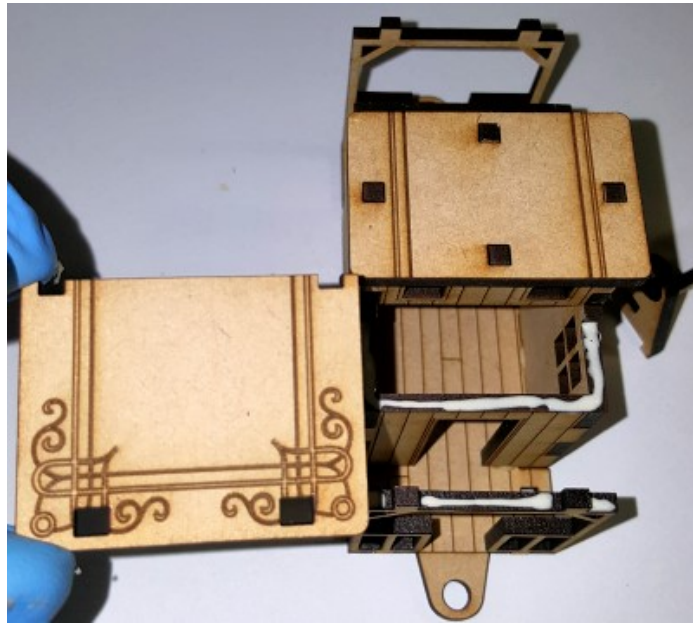
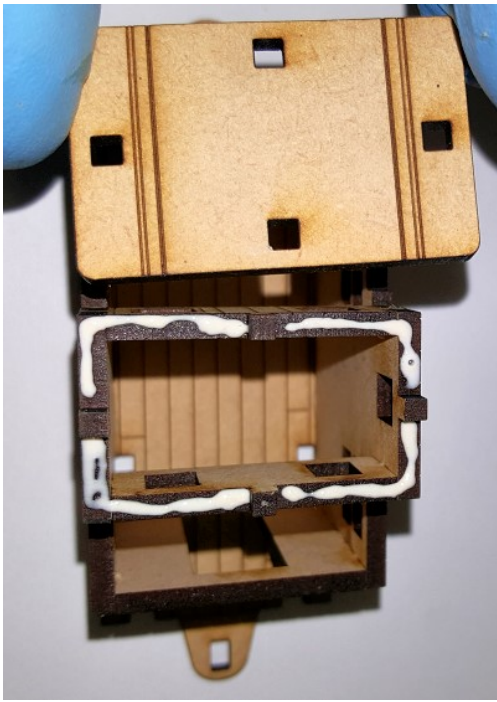
The Log Carrying Car



Add the axles, axle supports and hook as seen in the Coal Car.

The Caboose





Add the axles, axle supports and hook as seen in the Coal Car.