Description:

This is a revised drilling jig to make the firing-pin channel for the FGC-9. Unlike the original jig which only had the user drill pilot holes in the steel bar, this jig is intended to be used during the drilling process, and it is intended to prevent any canting of the drill bit when using a handheld drill.

Materials and Tools: (What I used, in particular…)

- **HEARING + EYE-PROTECTION**
    - **Your senses of hearing and vision are the only tools you have that cannot be replaced!**
- 3D Printer + any kind of filament you can print well
    - I just used Prusament PLA
- Appropriately Cut Piece of 4140 Alloy Steel Bar
    - McMaster-Carr part 5836T275
- 3.5mm cobalt steel drill bit
    - McMaster-Carr part 29355A57
- Power Drill
- Bench-Vice
- Hacksaw
- Cutting Oil

*** If you are smart enough to build an FGC-9, you should know what will or will not work as a substitute.

Directions for use:

Start by identifying which length of jig you need. With the drill bit I mentioned in the materials, I found that the 5cm version is appropriate. The goal is to have as much of the bit as possible inside the jig when you are drilling. Preferably, that includes a little past the non-threaded part of the drill bit. This is to prevent the bit from canting inside the jig during the early stage of drilling.

I printed this jig at 100% infill, one piece with holes and one without. I would advise against any infill less than 100%, as this jig should be clamped down real hard inside the bench-vice. Once it has finished printing, place the piece of steel bar inside the jig and place the other part of the jig on top. Then, sandwich the jig assembly inside a bench-vice. Try to make the jig as level as possible and entirely encased by the bench-vice, and then clamp it down as hard as you can.

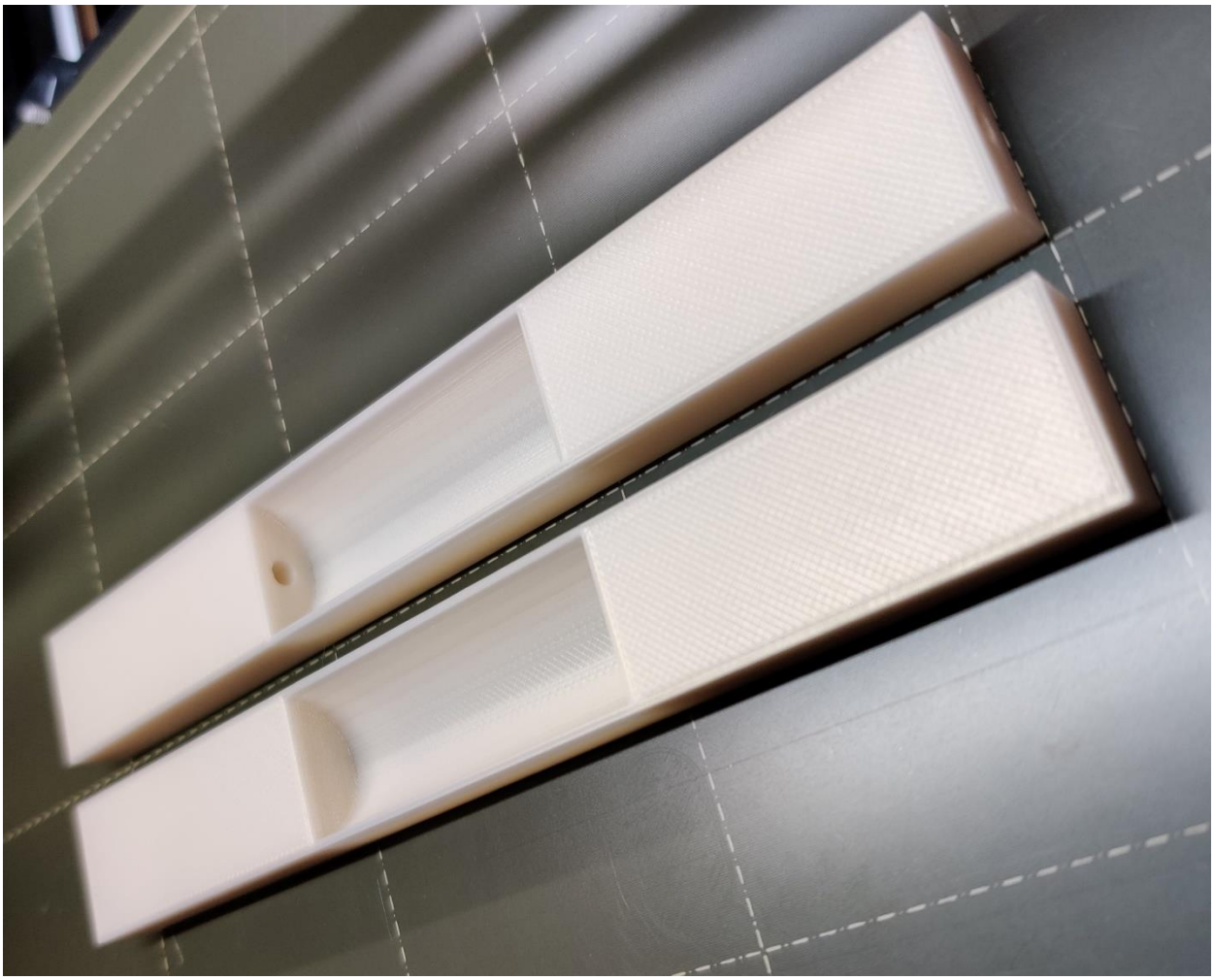

Figure 1: Print Orientation

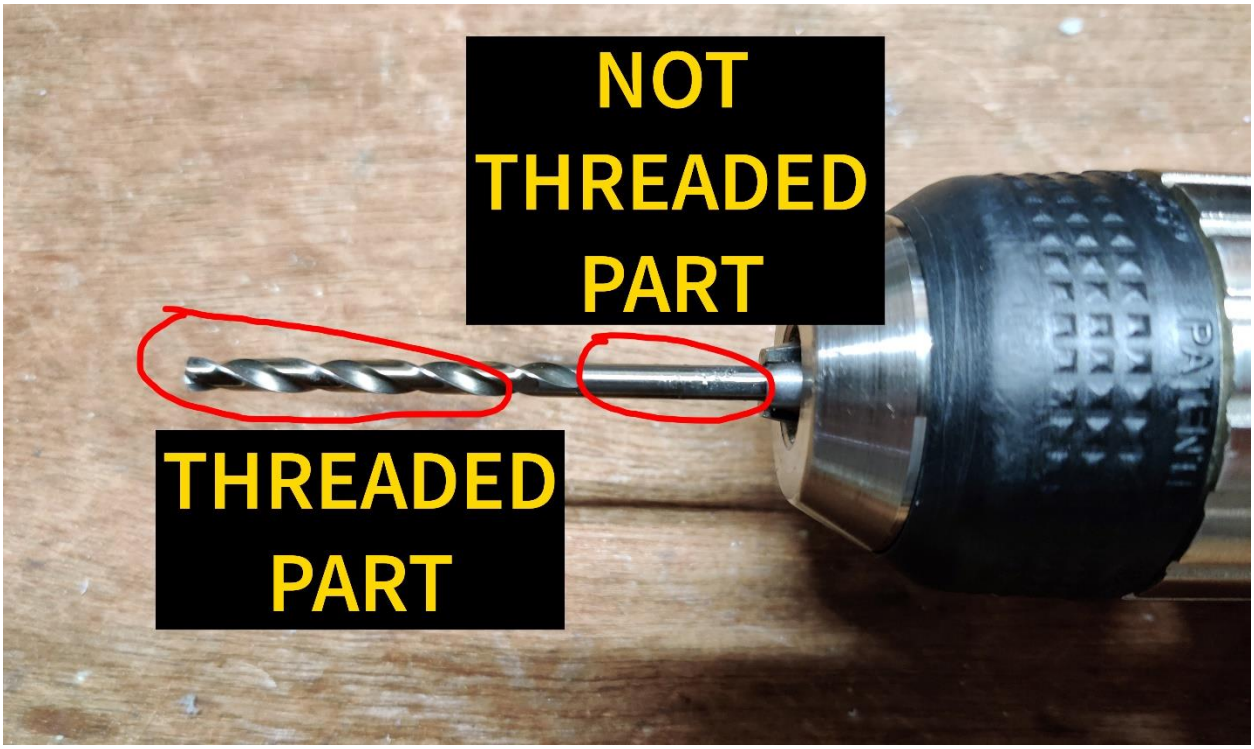

Figure 2: Drill Bit Anatomy

Before drilling the steel bar, the holes on the jig will need to be reamed out. Apply cutting oil to your drill bit. Try to manually shove the drill bit (which should be mounted to a power drill) inside one of the holes. If it is stuck, spin the drill as slowly as possible for the shortest amount of time possible. Remember, if you cant the hole inside the jig, the jig becomes worthless.

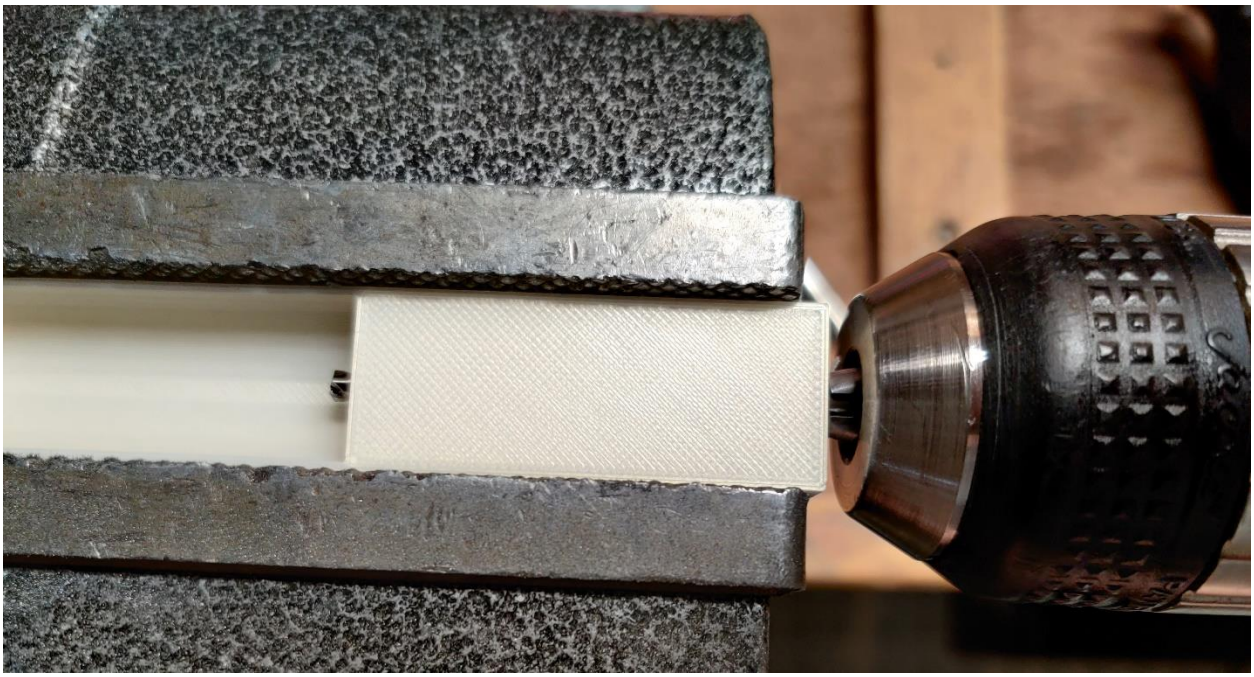

Figure 3: Reaming the Jig

Place the piece of steel bar inside the jig. If it was cut right, it should fit snuggly. Then, close the jig and clamp it as hard as you can inside of a bench-vice, as pictured below.

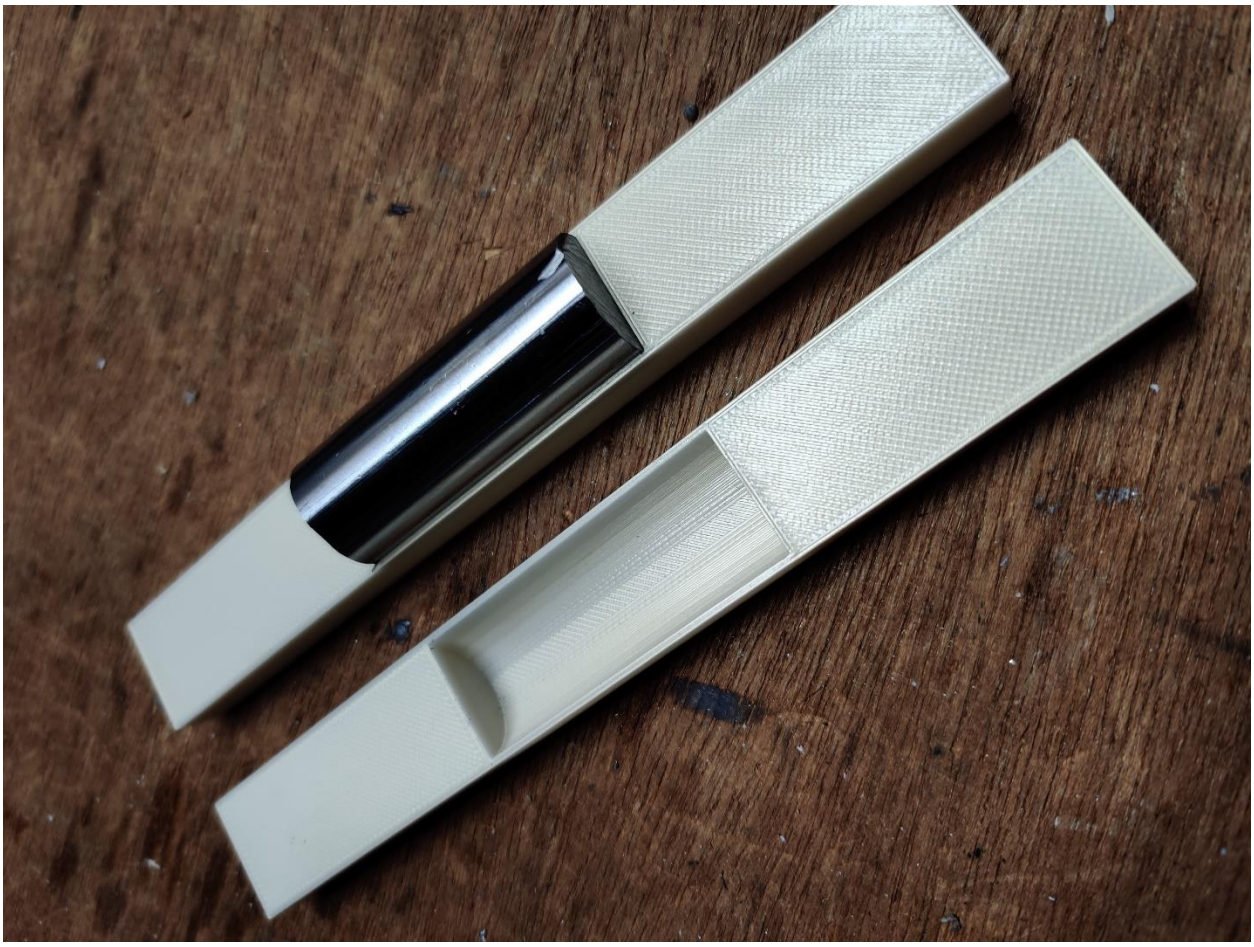

Figure 4: Placement of the Steel Bar Inside of the Jig

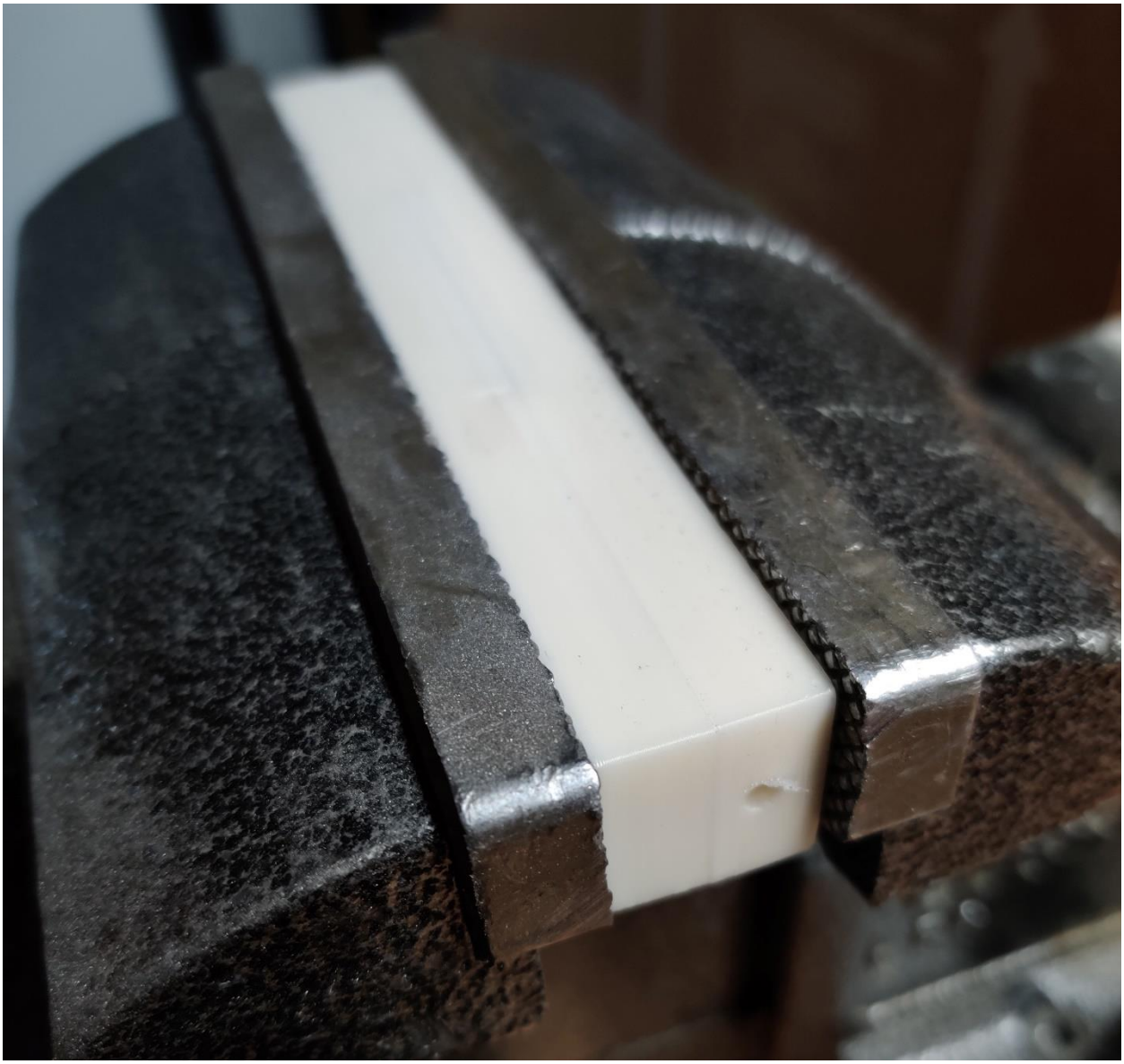

Figure 5: Placement of the Jig Inside the Bench-Vice

Once you hit the steel bar, drill away! Make sure you support the drill and guide it into the hole. Stop drilling before the clamp attaching to your drill bit contacts the jig. At this point, try to yank the drill bit out of the jig. Only if it is absolutely stuck should you reverse the direction of the drill to guide it out. Doing that too much may cause the inside of the plastic hole to conform to the shape of the drill bit, making it difficult or impossible for the bit to spin again without reaming. Half-molten PLA and metal shavings will slowly ooze from the end of the hole. I will advise against touching it with your bare hands because not only is it hot, but it is also ridden with potential metal splinters which really f###ing hurt. While the bit is still toasty, try to pick the by-product out of the threads with a loose nail or something pointy, and use a vacuum to clean up other by-product. (Putting cutting oil on the drill bit keeps the melted plastic to a minimum!)

Repeat the process on the other side, repositioning the jig inside the clamp if necessary.

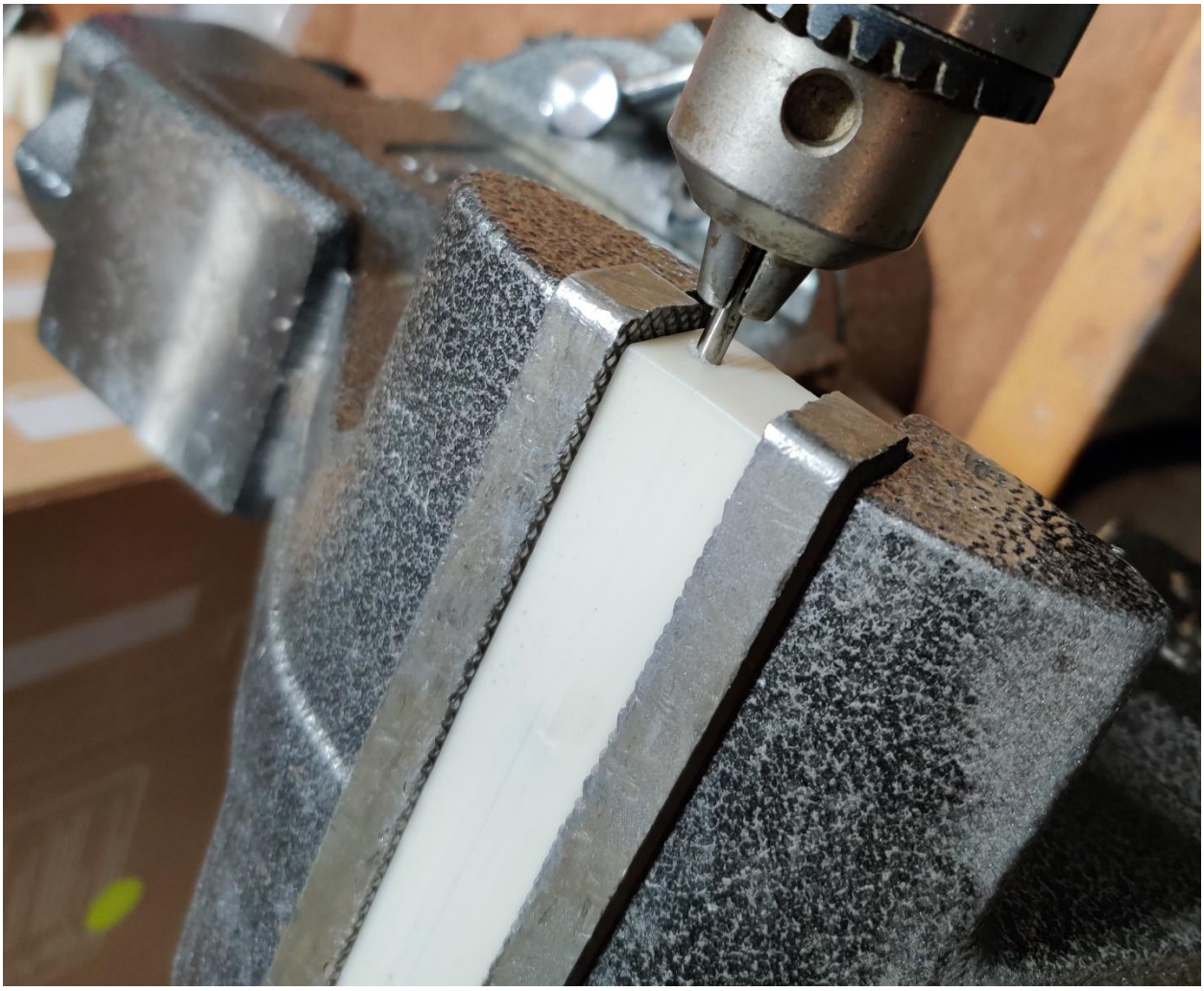

Figure 6: Starting to Drill

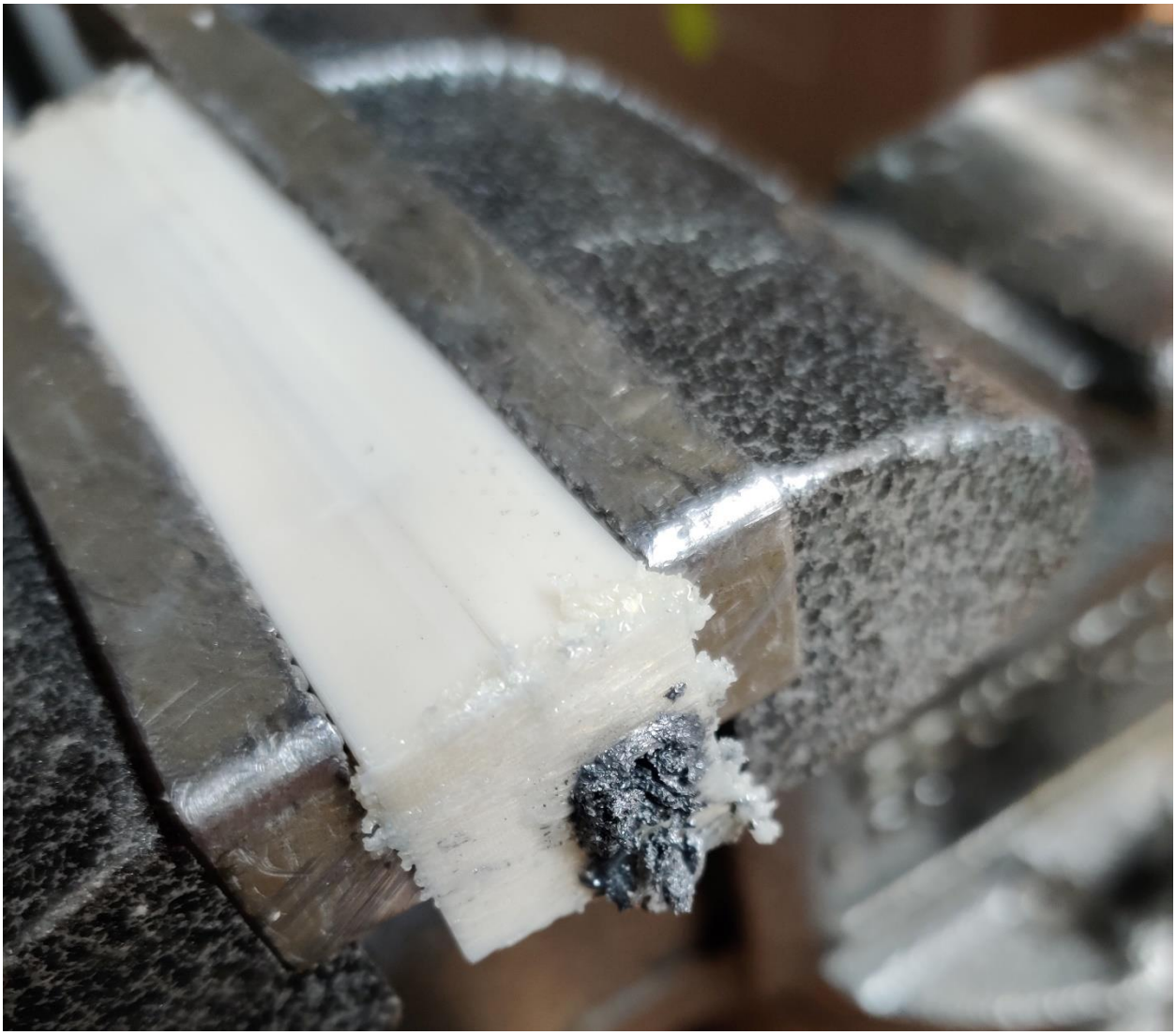

Figure 7: Splintery By-Product

Position the jig in the bench-vice so about a centimeter is jutting out. Take a hacksaw and apply a drop of cutting oil to the blade. (Trust me when I say it makes cutting through PLA a lot easier.) Cut off the bit of the jig that is sticking out from the bench-vice. Even with cutting oil applied to the hacksaw, odds are the plastic around the hole will melt and obstruct the hole on the outer surface, so you will need to drill for it again. Spin the drill bit as minimally as possible to return it to its position inside the jig.

Repeat these processes until you have finished drilling. When finished, odds are all the heat from the steel bar and drill bit will cause the two parts of the jig to fuse together. I used a hacksaw and slotted screwdriver to pry it open. Though you should be using eye-protection this entire time, the plastic will probably shatter, so be extra careful.

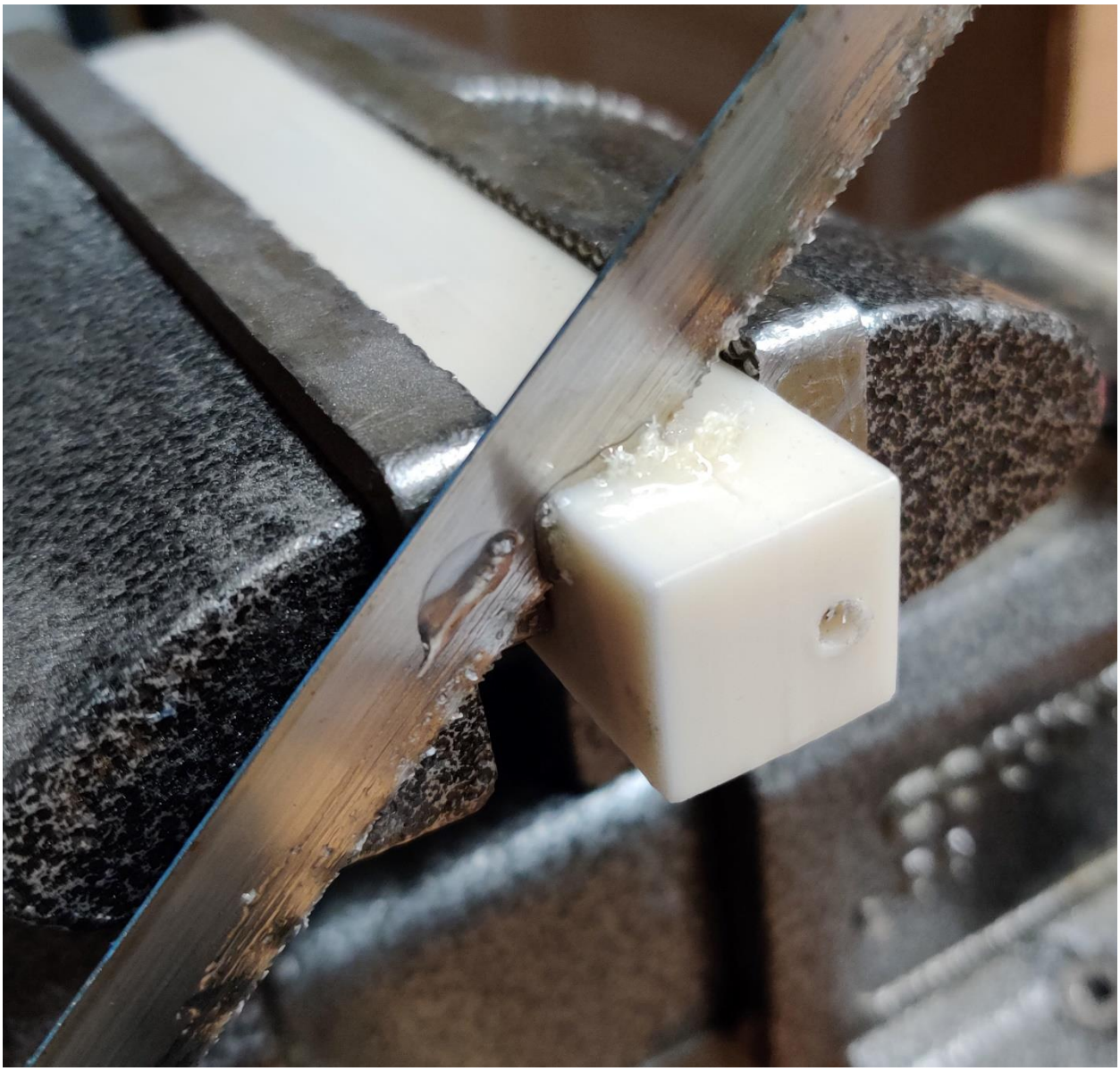

Figure 8: Cutting the Jig

Figure 9: Obstructed Hole

Figure 10: Removing the Obstruction

Final Remarks:

Congratulations! You are now one step closer to being the proud owner of an FGC-9. Special thanks to jstark1809, ivanthetroll, and everyone else for the hard work they put into developing this masterpiece. If you want to thank me for this jig, feel free to send me a few lumens on Keybase.

ΜΟΛΩΝ ΛΑΒΕ!