Cascading Garden Fountain, Designed and Constructed by Mark Langlois

About the man behind the design of the Cascading Garden/Patio Fountain and its construction.

Name: Mark Bradford Langlois

Status: Married with Children, Grandchildren

Education: B.S. Liberal Arts, Central Michigan University Sociology, Industrial Technology, Computer Science

Career: Design, Engineering, Product Life Cycle Management, IT Consultant, Software Development

Music: J.J. Cale, Jackson Brown, Mark Knopfler, Snowy White, Buddy Miller, Jazz, Classical

Favorite Book: Catcher in the Rye, by J.D. Salinger

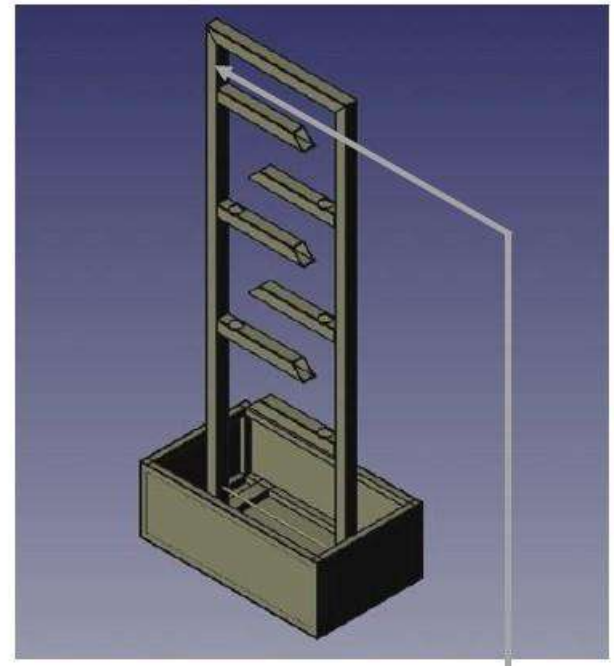
Drink: Oban Single Malt Scotch, Jack Daniels or whatever you have

Cigar: Rocky Patel Vintage 1990, 1992, Undercrown Maduro Robosto

Hobbies: Travel, Photography, Music, Art, Creative Design Engineering and Metalworking

Author: Mark Langlois
Photography: Mark Langlois
Book Completion Date: June 7, 2025

Certification of Authentication and Registration Of Ownership



Cascading Garden Water Fountain For Patio

Cascading Garden Water Fountain For Patio: From the Mark Langlois Catalog of Designs, Iteration Number 121775-10A, 00001.
Construction: .120" Steel Plate, 1" Steel Tube, 2" Steel Tube, 1/2 " Galvanized Pipe & Fittings, 1800 GPH Magnetic Drive Water Pump, Welded Construction.

Original Design By Mark Langlois, Created By Mark Langlois
Design Creation Date, March, 2025.

Purchased By *Gifted To Mark & Marianne Langlois*

Date *May 9th, 2025*

Color *Prismatic Color: Illusion Fractured Cherry, PVB-10293, Clear Vision, PPS-2974*

Design Iteration Number: **121775-10A**

Registration Number: **ML-ISC-10A-** 0 0 0 0 1

Signature Plate Located
On Inside Left Vertical Rail

Introduction:

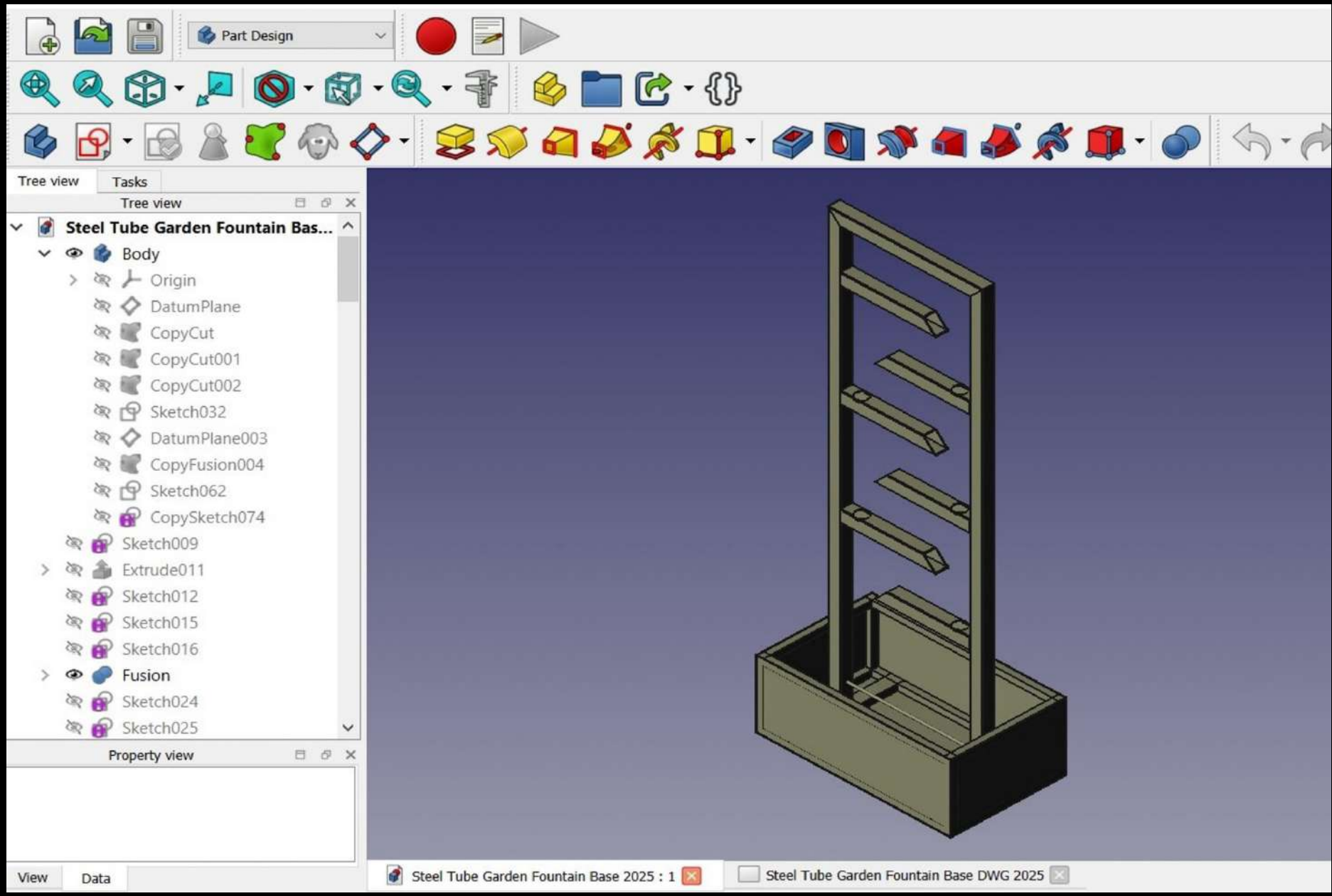
The creation of the Cascading Garden Fountain was born out of the necessity to replace our existing garden fountain that was constructed out of fiberglass and after 5 years of use, was no longer functional.

I began searching for garden fountains of various configurations for this spot in our garden. I decided I wanted the fountain to be made out of steel and powder coated so that it can be stored outside, in place, during the winter, with just a cover.

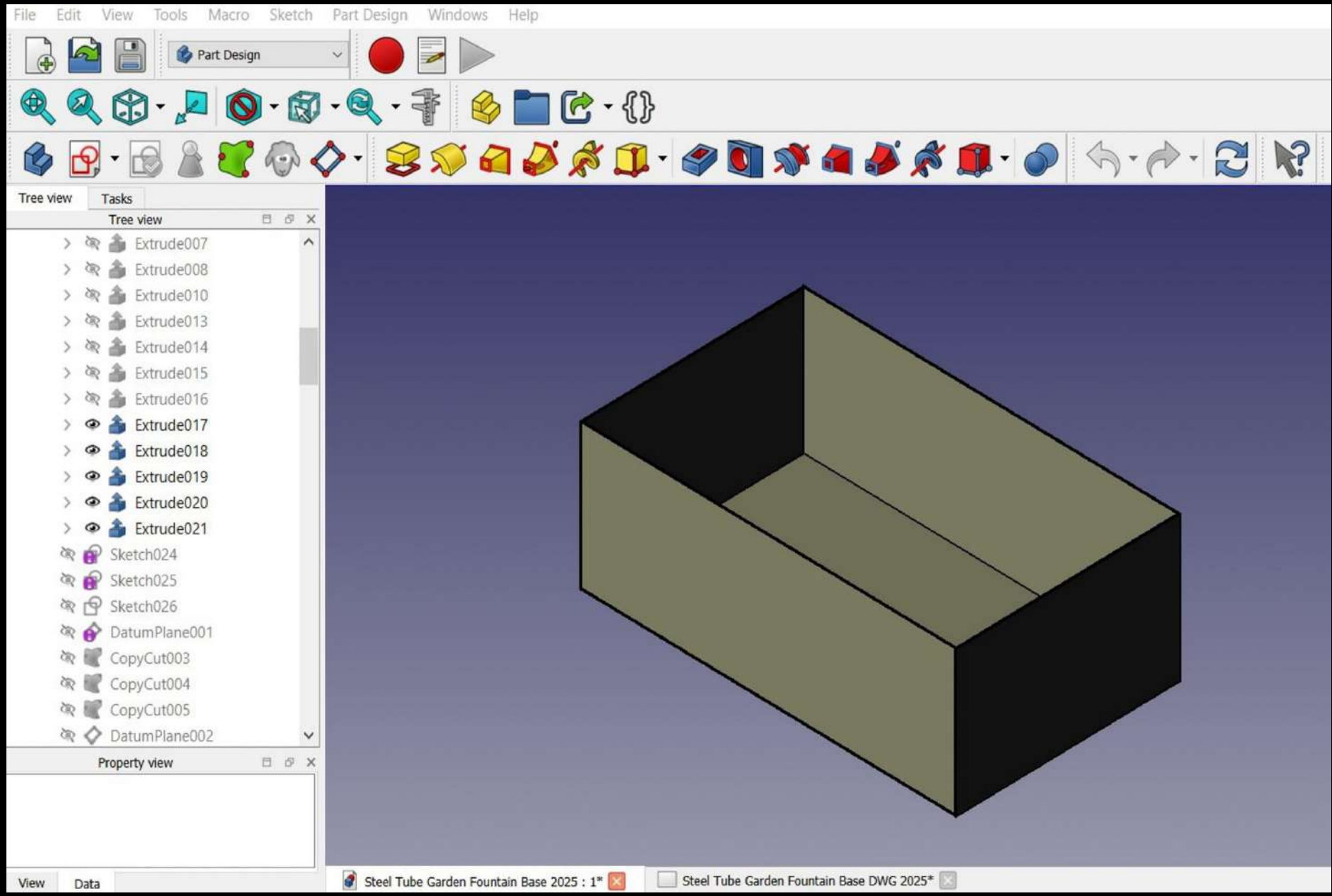
In my search, I discovered a couple of possible designs that I liked, and I ordered a print of one of them online. The print was the only option; they didn't offer a completed fountain for sale. After reviewing the drawings and information that was provided, it became clear to me that I would need to construct this fountain in my own CAD system in order to build it.

In this design, there are 5 major components: 1) The steel tank, composed of .120 thick steel plate. 2) The steel tank frame, made from 1" steel tube. 3) The fountain structure, made from 2" steel tube. 4) The plumbing assembly, made from ½" galvanized pipe components. 5) The water pump, 1800 GPM, magnetic drive submersible pump.

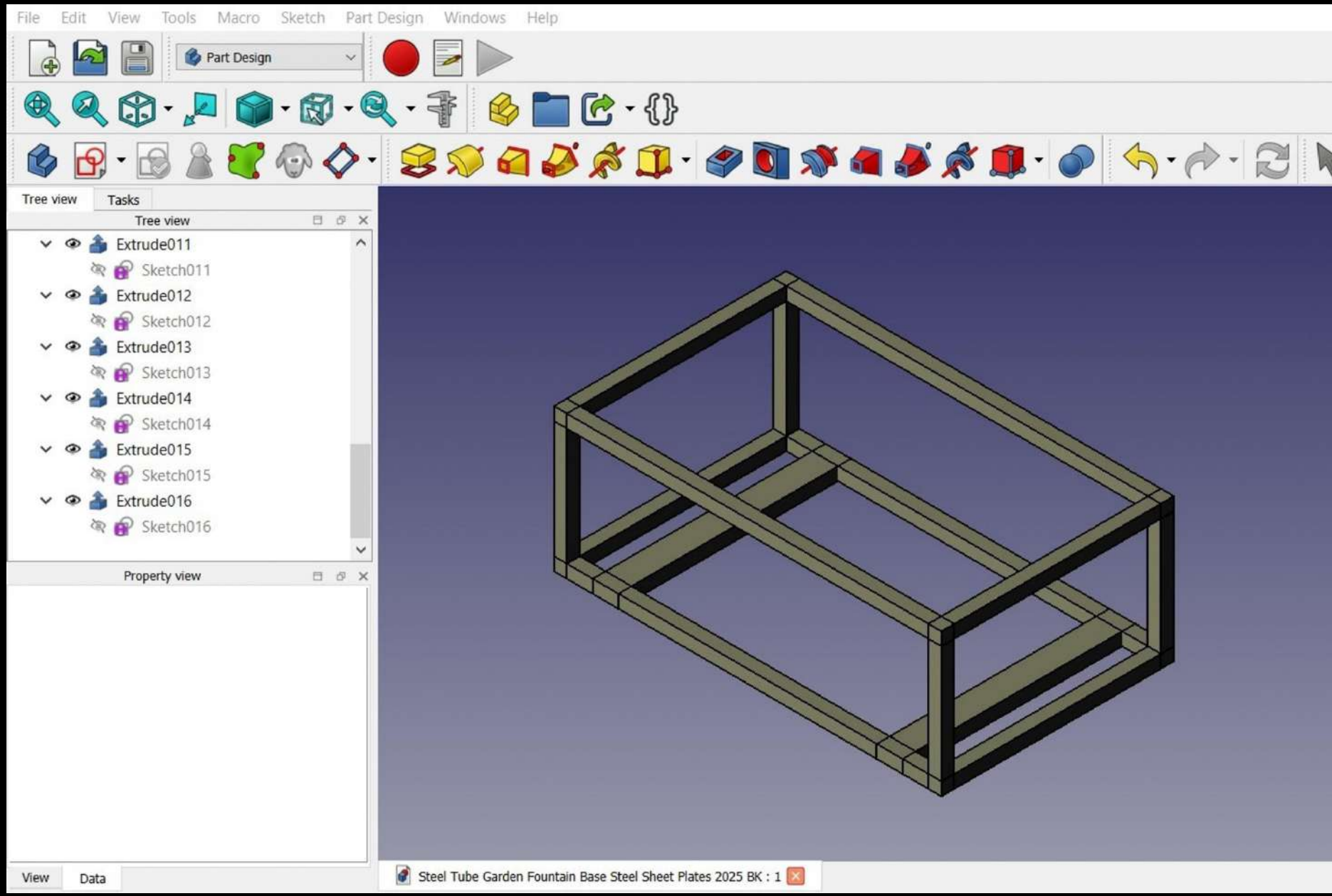
The Cascading Garden/Patio Fountain is a part of a catalog of my other designs. The Cascading Garden/Patio Fountain is design iteration number ML-ISC-121775-10A-00001.



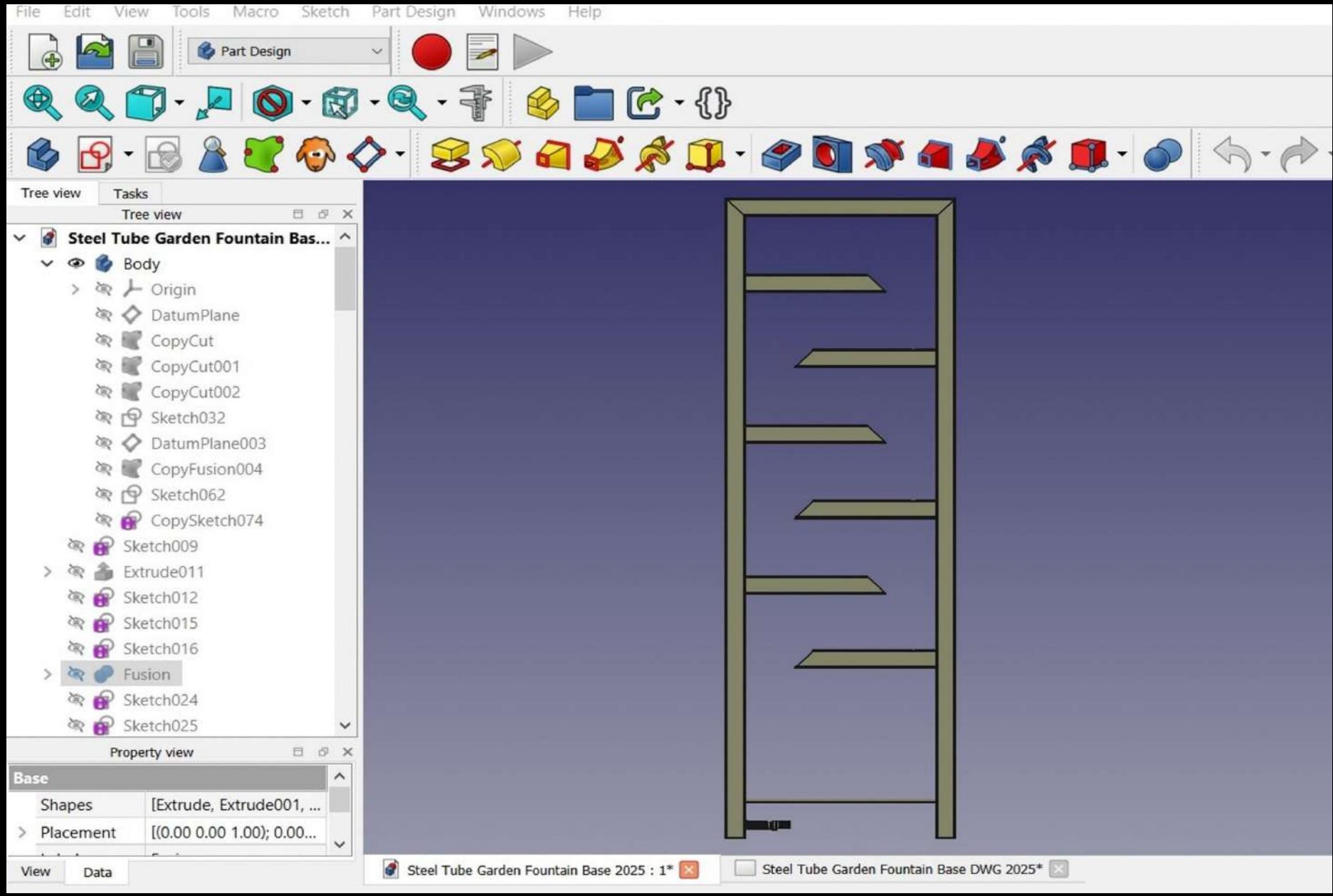
Parametric Solid Model of Cascading Garden/Patio Fountain In FreeCAD.



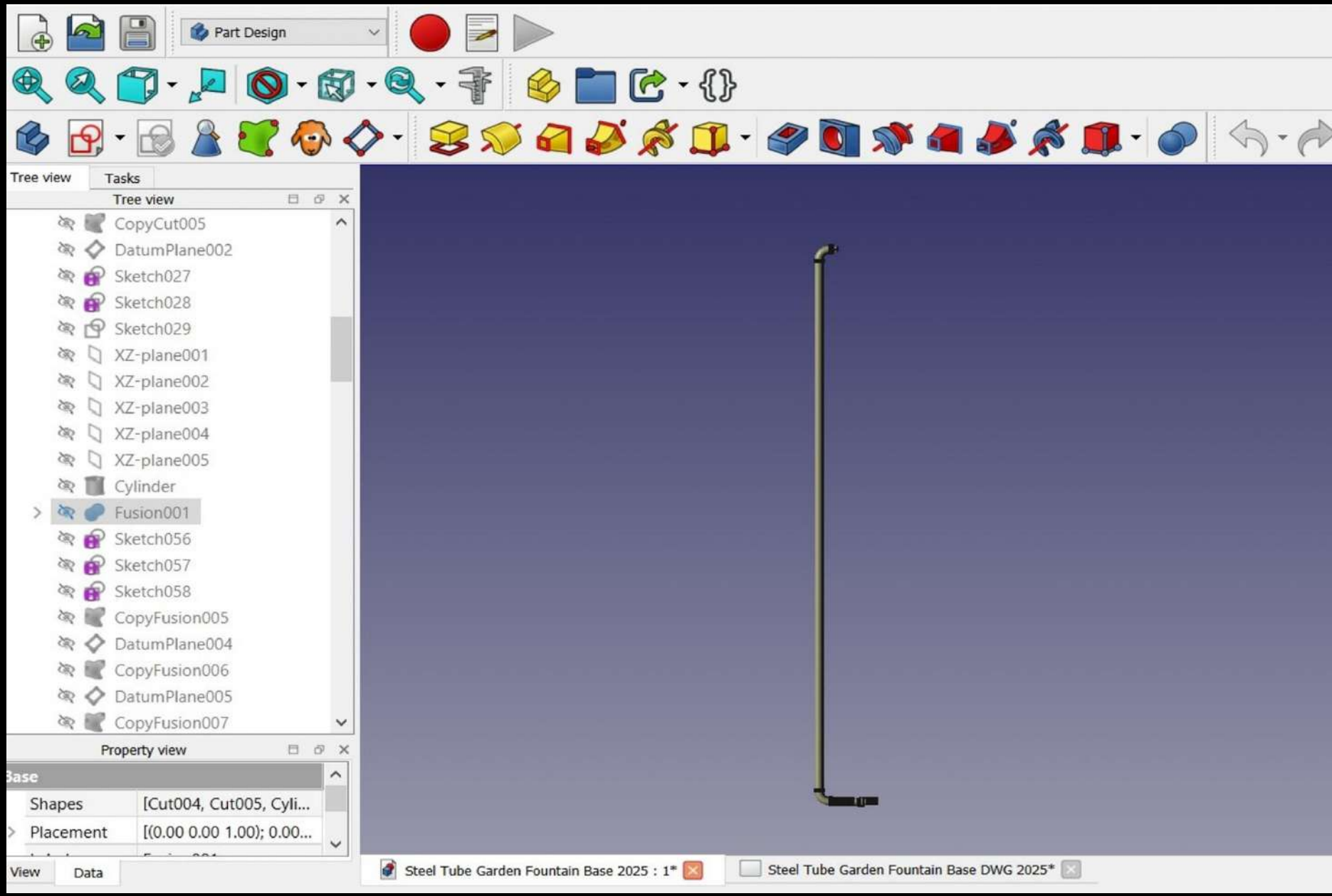
Solid Model of Cascading Garden/Patio Fountain Tank in FreeCAD.



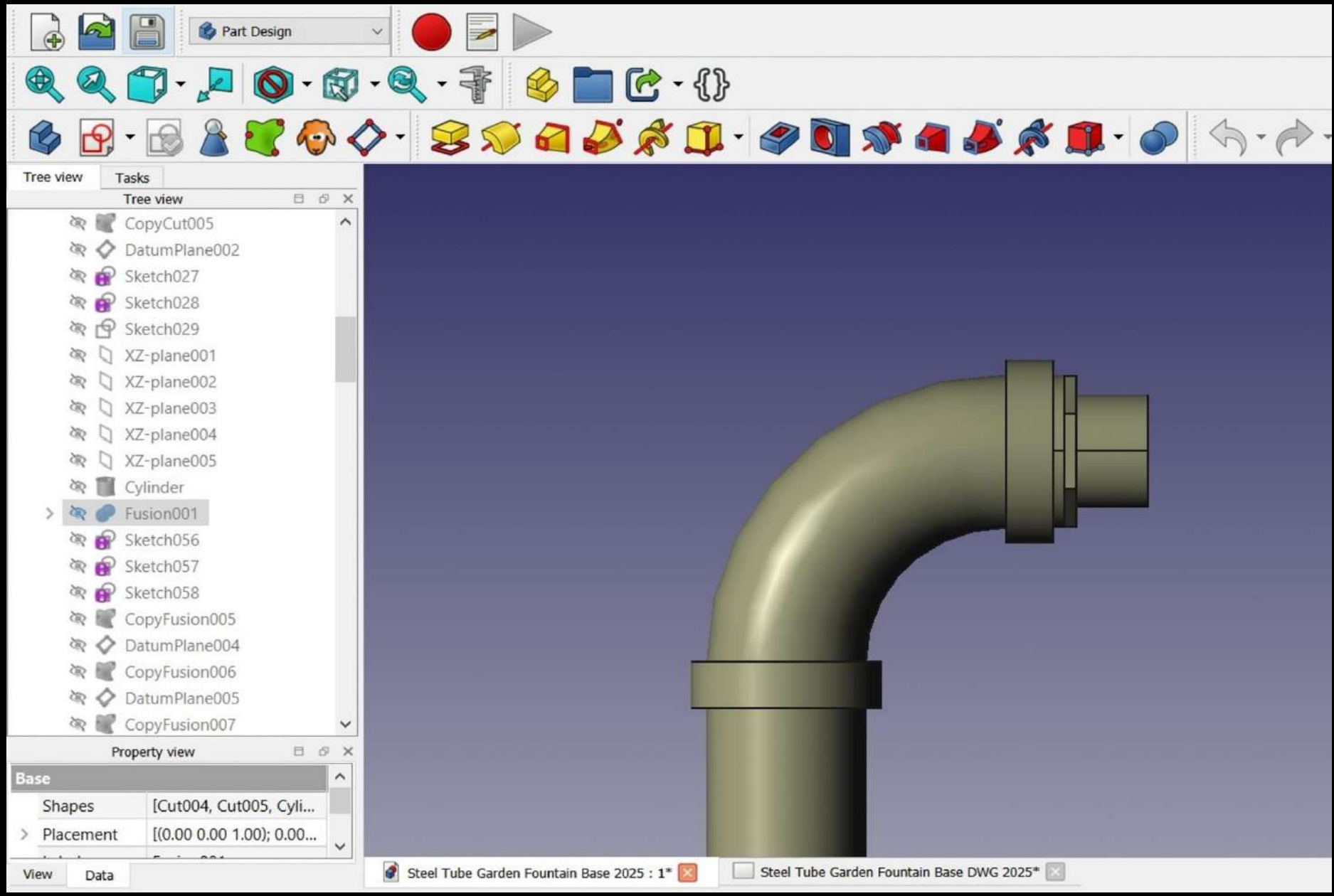
Solid Model of Cascading Garden/Patio Fountain Tank Frame in FreeCAD.



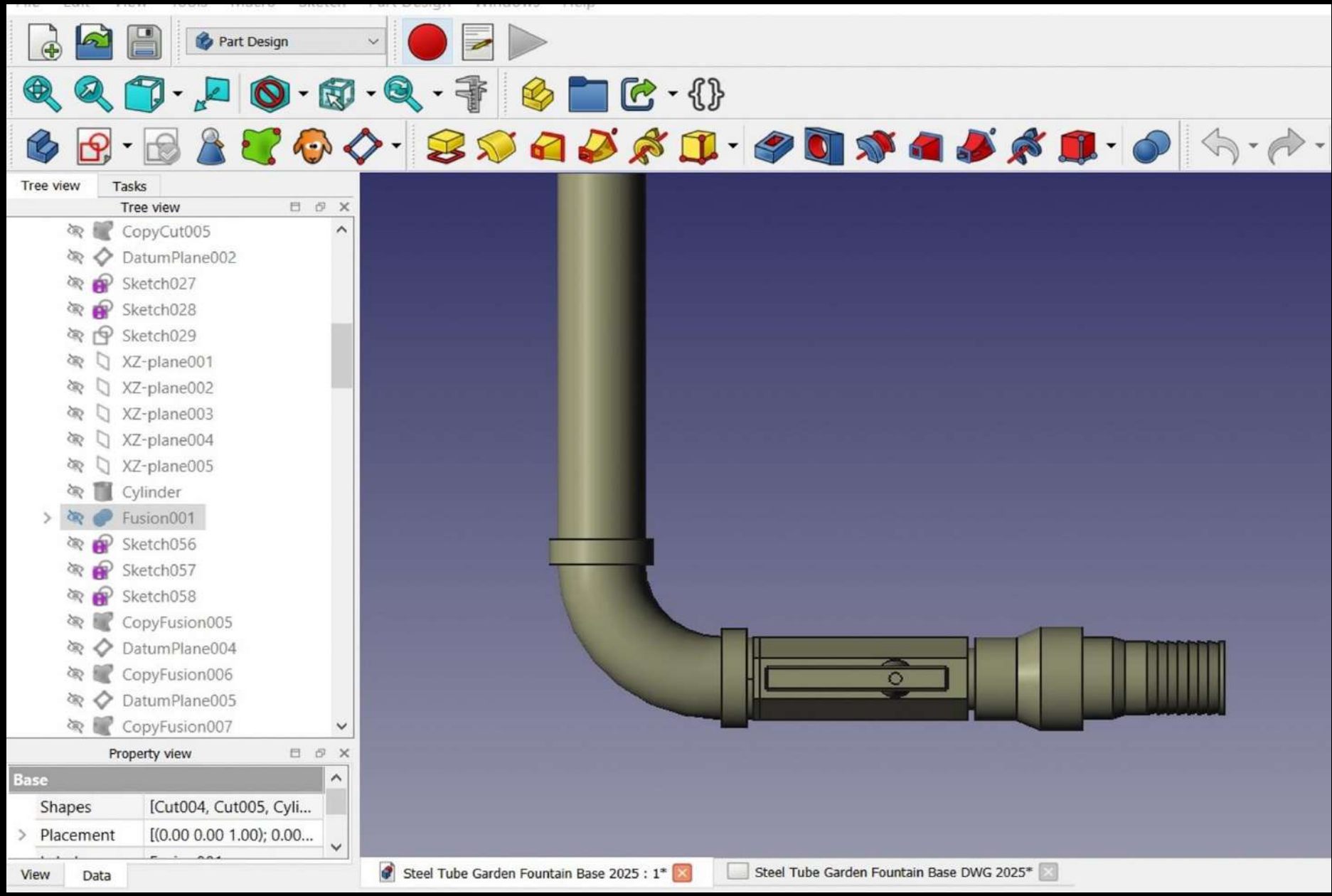
Solid Model of Cascading Garden/Patio Fountain Structure in FreeCAD.



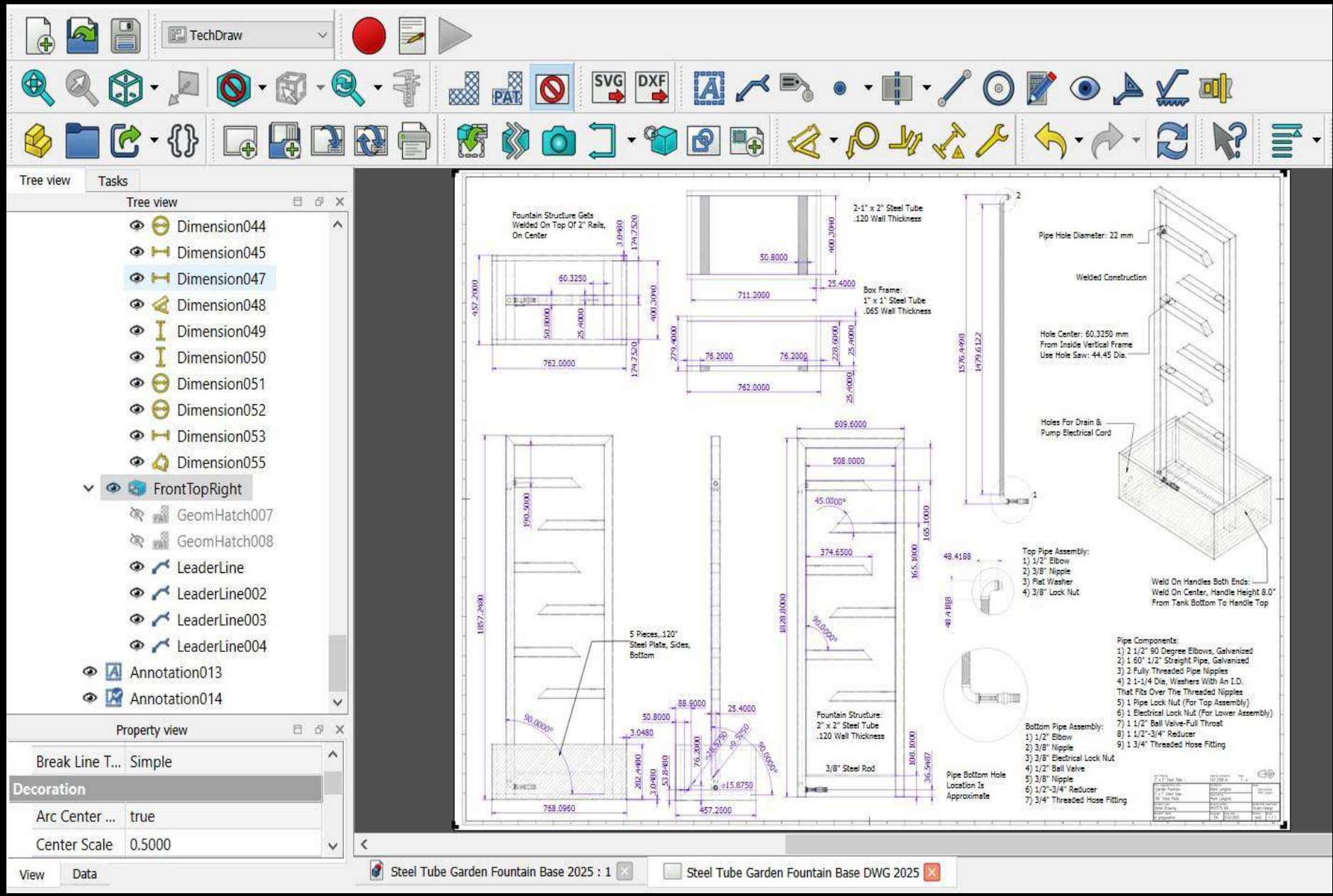
Solid Model of Cascading Garden/Patio Fountain Pipe Assembly in FreeCAD.



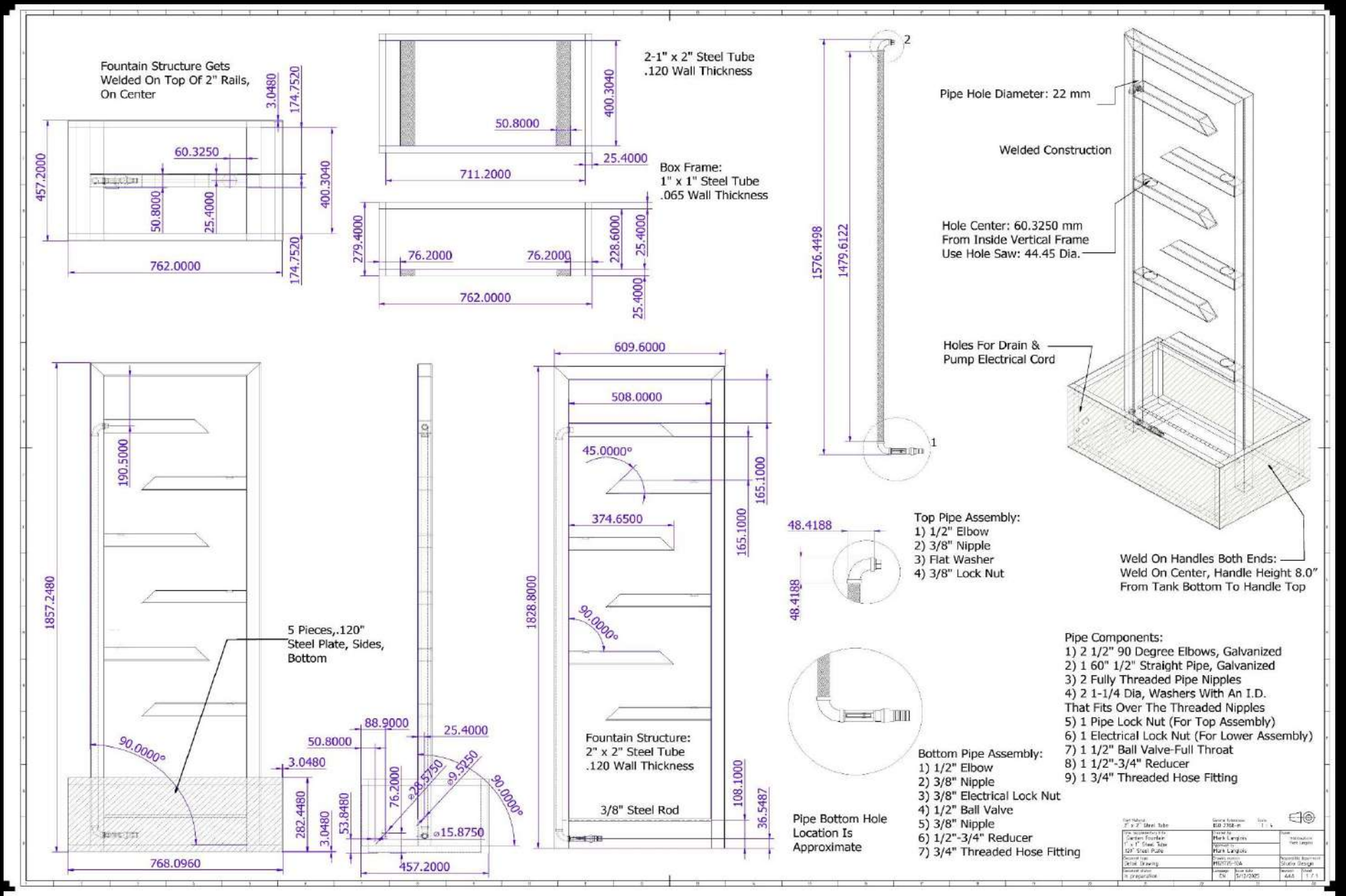
Solid Model of Cascading Garden/Patio Fountain Pipe Upper Assembly in FreeCAD.



Solid Model of Cascading Garden/Patio Fountain Pipe Lower Assembly in FreeCAD.

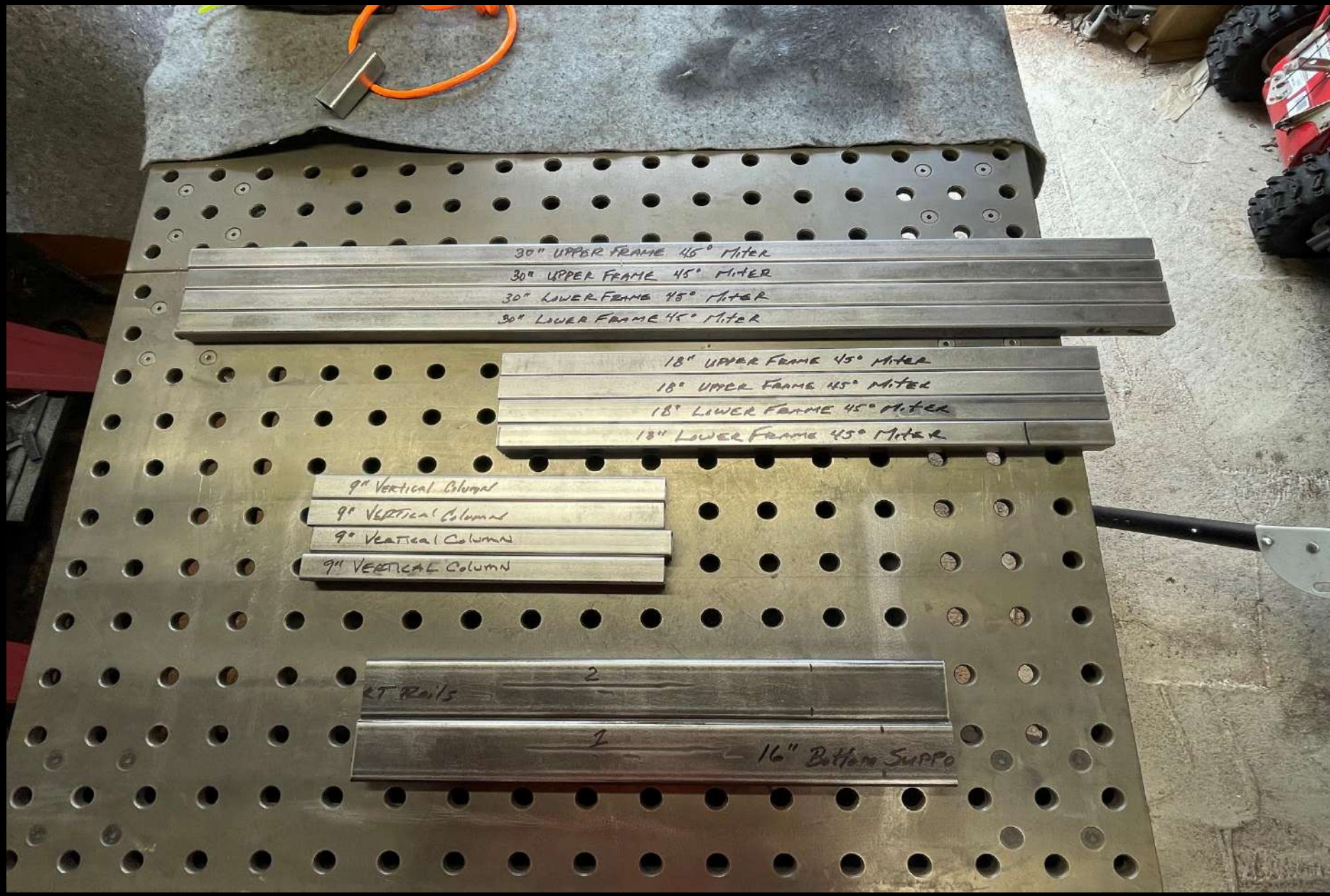


Drawing of Cascading Garden/Patio Fountain In FreeCAD.



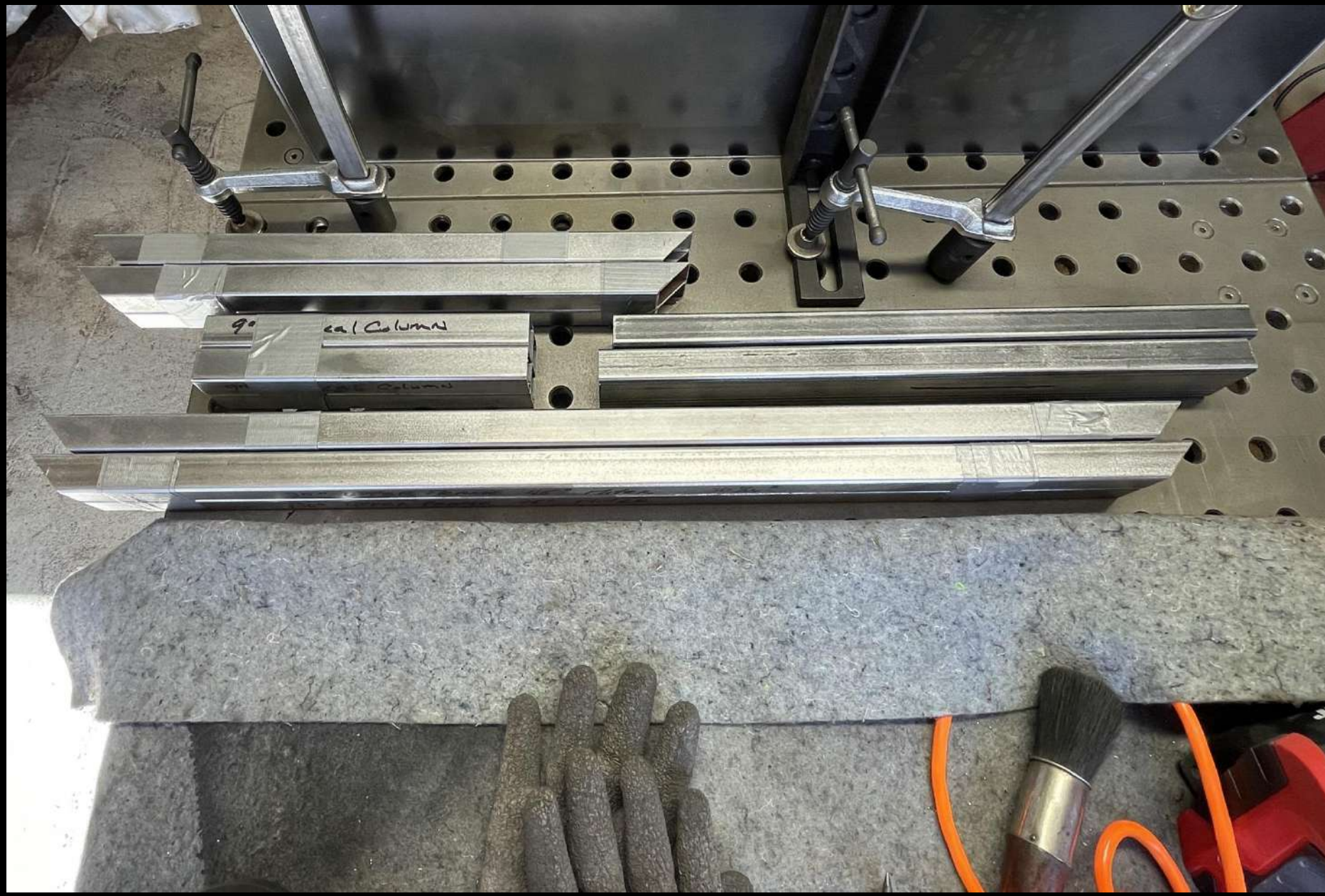
Drawing of Cascading Garden/Patio Fountain Output.

The first step in the construction of the Garden Fountain, besides ordering the necessary steel, is to sand and clean all of the steel plates and steel tube for welding.

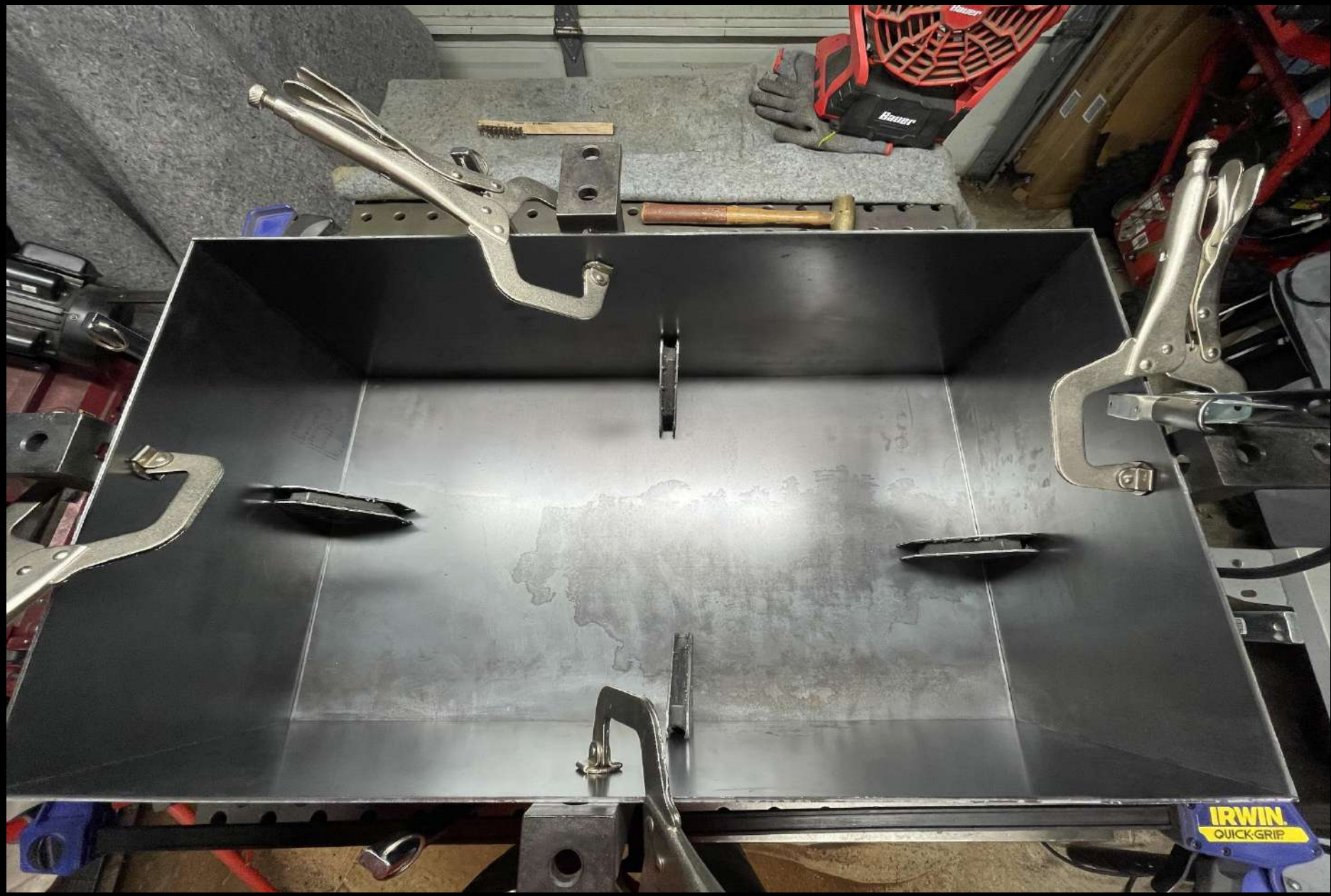


I organized and labeled the 1” steel tube components for the tank box frame. This is a must for understanding component drops and what kind of cuts to make.

I am fabricating the steel tank for the fountain first. I used the steel chop saw to make the cuts to length and miter cuts on the 1” steel tube for the tank box frame.



I tightly taped common components together when making my cuts on the chop saw so that I can cut multiple pieces and ensure the cuts on both parts are the same.



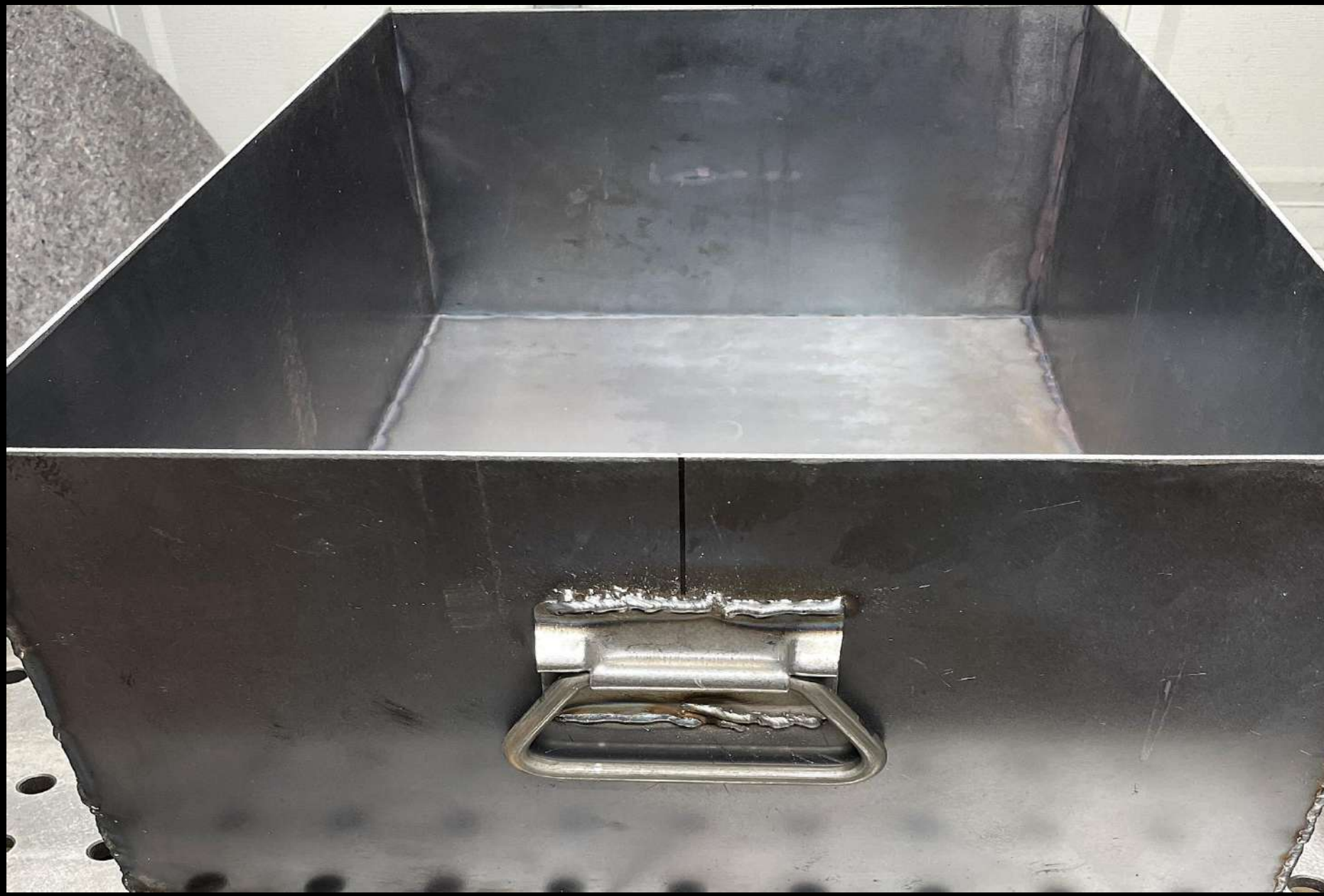
I am fabricating the steel tank first out of the .120” steel sheet. I am using 90-degree angle plates, bar clamps and magnetic squares to keep the steel sheets square.

I tack welded each of the corners to keep the sheets in position before welding the seams on the sides and bottom.

I welded each of the corners on the tank first.

Next, I completed welding the seams on the bottom of the tank.

I purchased two handles for each end of the tank and welded them on next. This tank is heavy, and the handles make it much easier to handle moving it around.

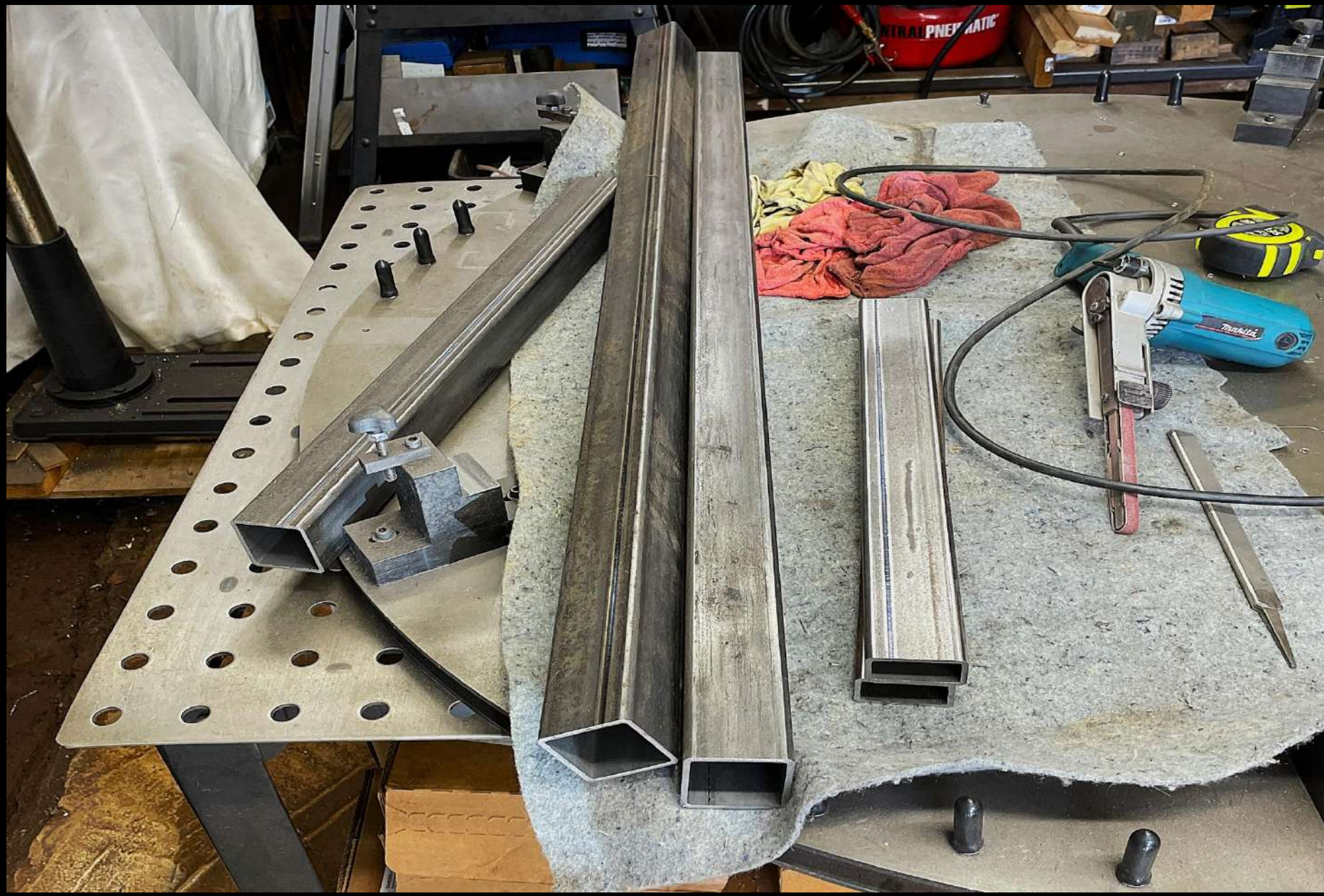


I did not weld the seams on the inside of the tank because I chose to fit the tank box frame to the steel sheet.

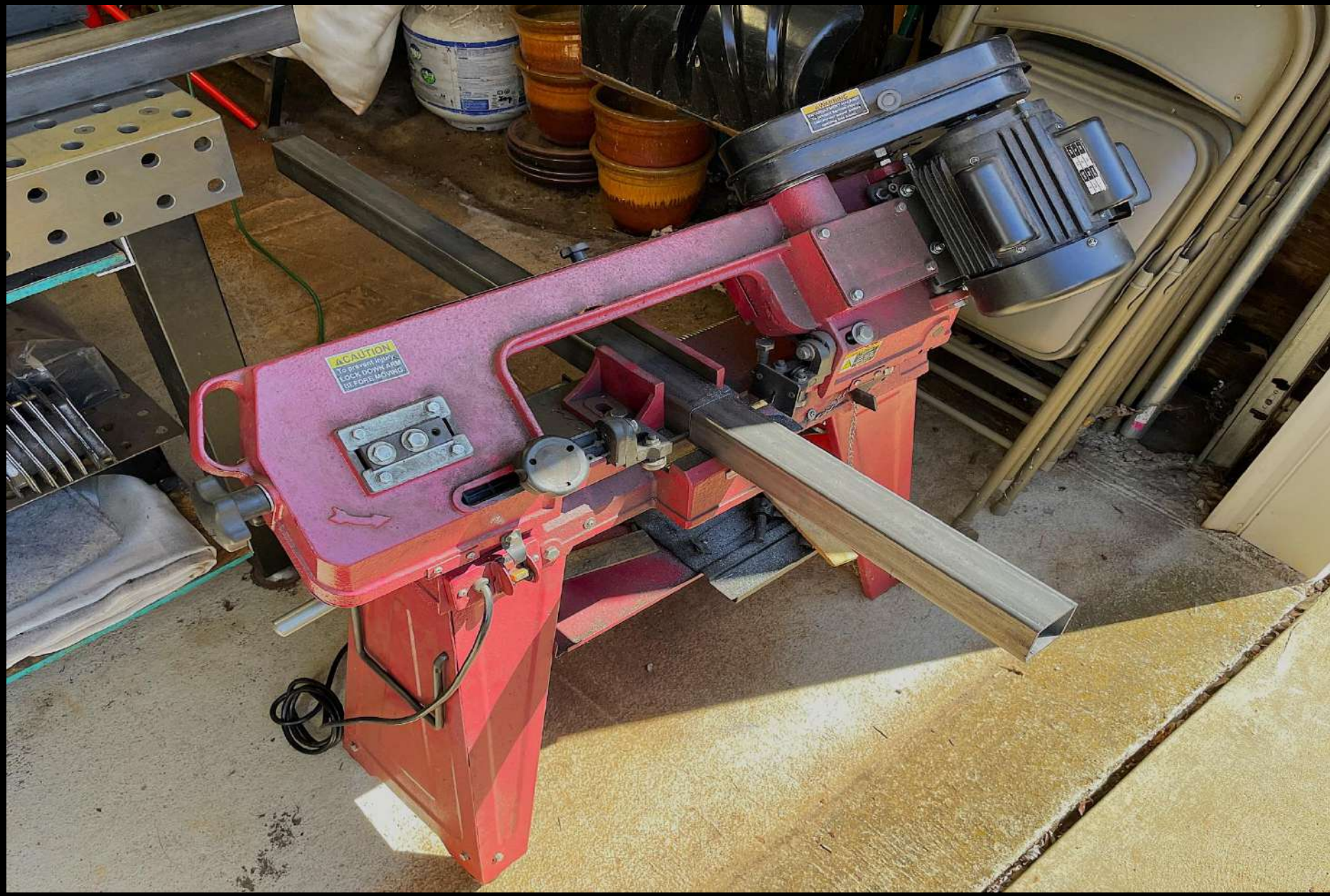
Here is the tank box frame fitted inside the steel tank. The frame fits in nicely with a few minor adjustments.

I used weld clamps and magnetic squares to keep the tank box frame square, flush with the steel tank while I welded it in place.

The major components that make up the steel tank for the Garden Fountain are now complete except for the cross rails. The steel fountain structure is next.

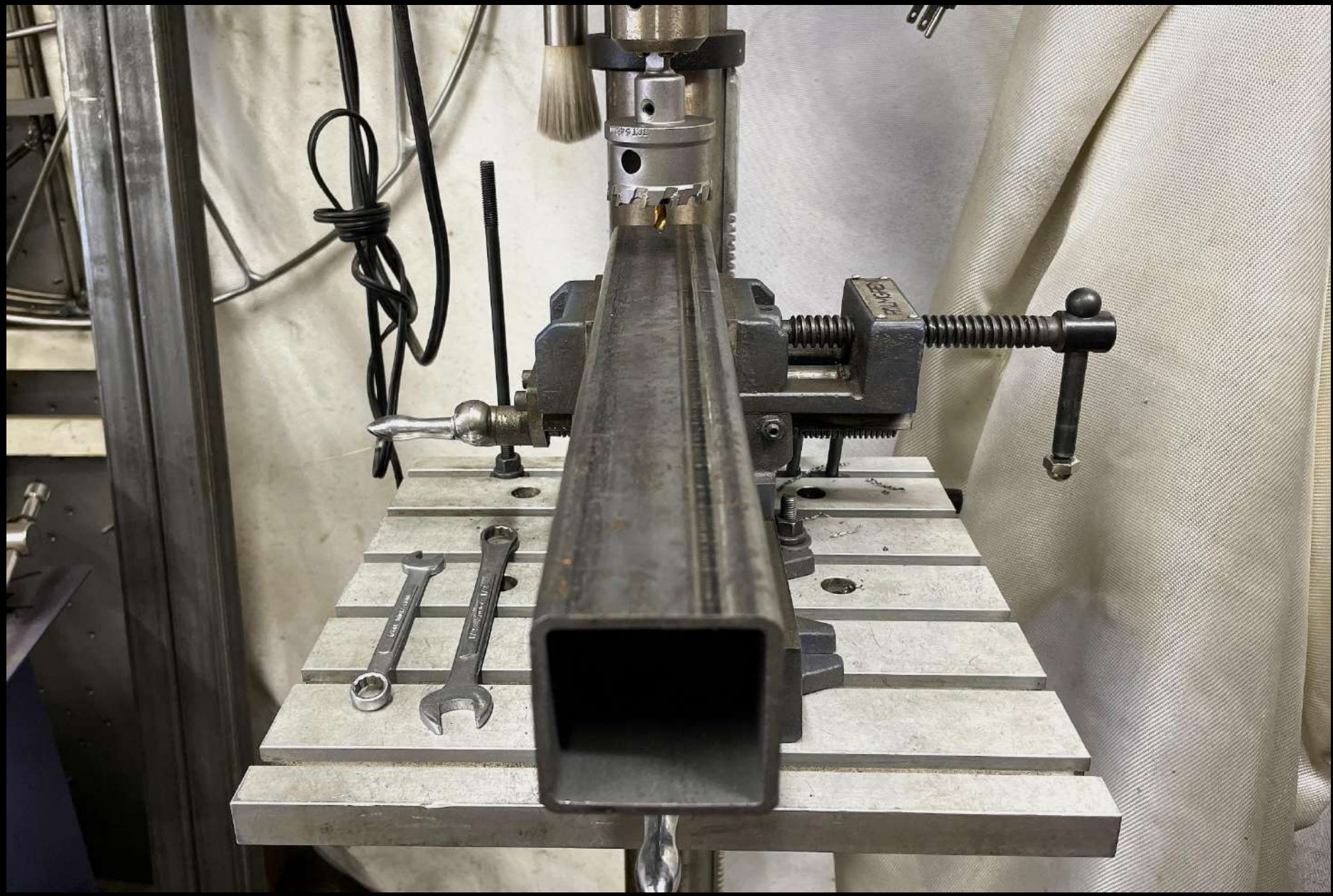


My first job associated with the construction of the fountain structure is to create the six flutes that will pass the water back and forth. I must cut these to a length of 14.75 “



I used my band saw to cut the six flutes that I need to the correct length. The fountain structure is made from 2” steel tube.

I have the six flutes cut to size. The top bar of the fountain structure is 24” and came as a stock size



Five of the flutes in the fountain structure get a 1-3/4 diameter hole, 2-3/8” from the vertical column or end of the flute. I am using a 1-3/4” hole saw to get this done.

The five fountain flutes that get holes for water flow are cleaned up and deburred. The top flute does not get a hole. This is where the water flow originates from the pipe.

I need to weld the fountain mounting rails for the fountain structure in the bottom of the tank next.

I used the 24” top cross rail as a gauge to position the 1” x 2” rails so they are centered in the tank.

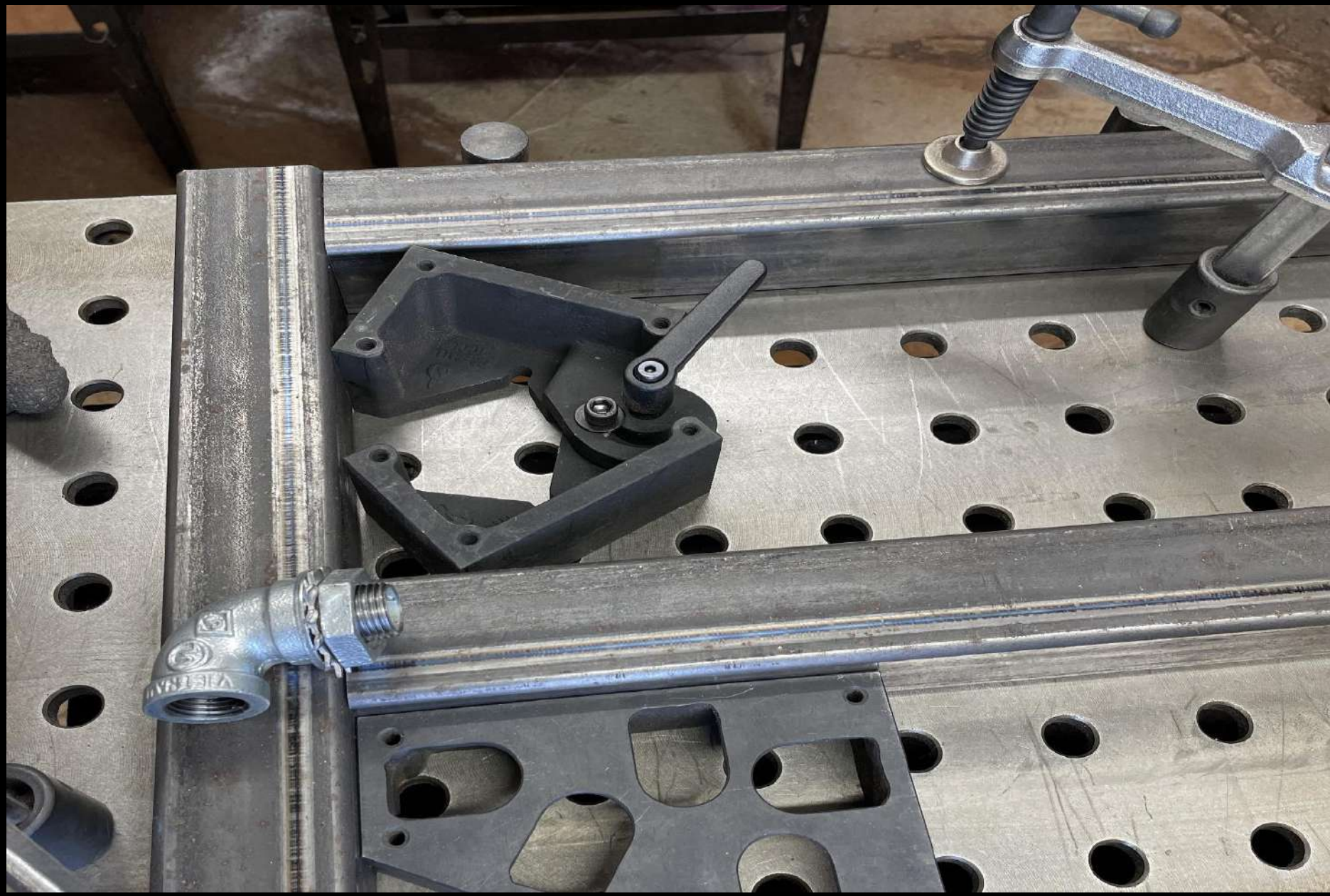
They are now in the correct location to weld to the tank frame. These support rails are important structural components securing the entire fountain structure.

The water supply for the fountain is located inside one of the fountain structure's vertical legs. Two holes for the water supply must be located and cut in this vertical leg.

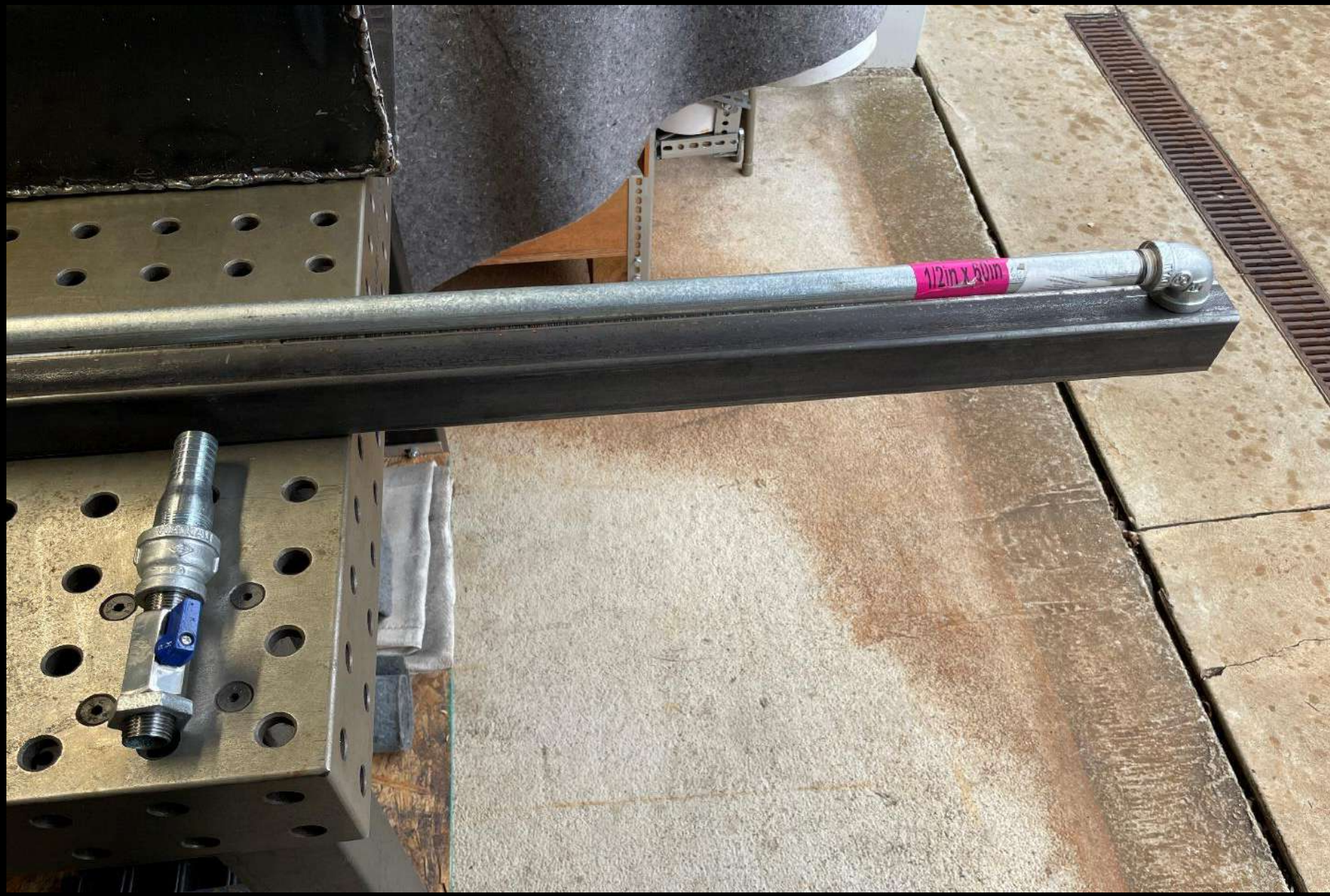
The upper water supply assembly gets a 1/2“ elbow, a 3/8” nipple, a washer, a lock washer, and a lock nut. The nipple goes through the hole in the vertical leg and bolted.

The lower plumbing assembly consists of a 1/2” elbow, a nipple, a washer, a lock nut, a 1/2” ball valve, a 1/2”- 3/4” reducer, and a 3/4” threaded hose connector

The top hole for the water supply is centered in the location where the top fountain flute is welded. This is where the water supply will initially start flowing for the fountain.



The location of the top hole in the vertical tube needs to be on center with the location of the top fountain flute. The top flute will be welded over this plumbing assembly.



The bottom hole location depends on the location of the top hole, length of the pipe and thread engagement. The bottom plumbing is connected to the pump inside the tank.

The top and bottom holes in the vertical leg were cut with a 7/8” diameter hole saw.

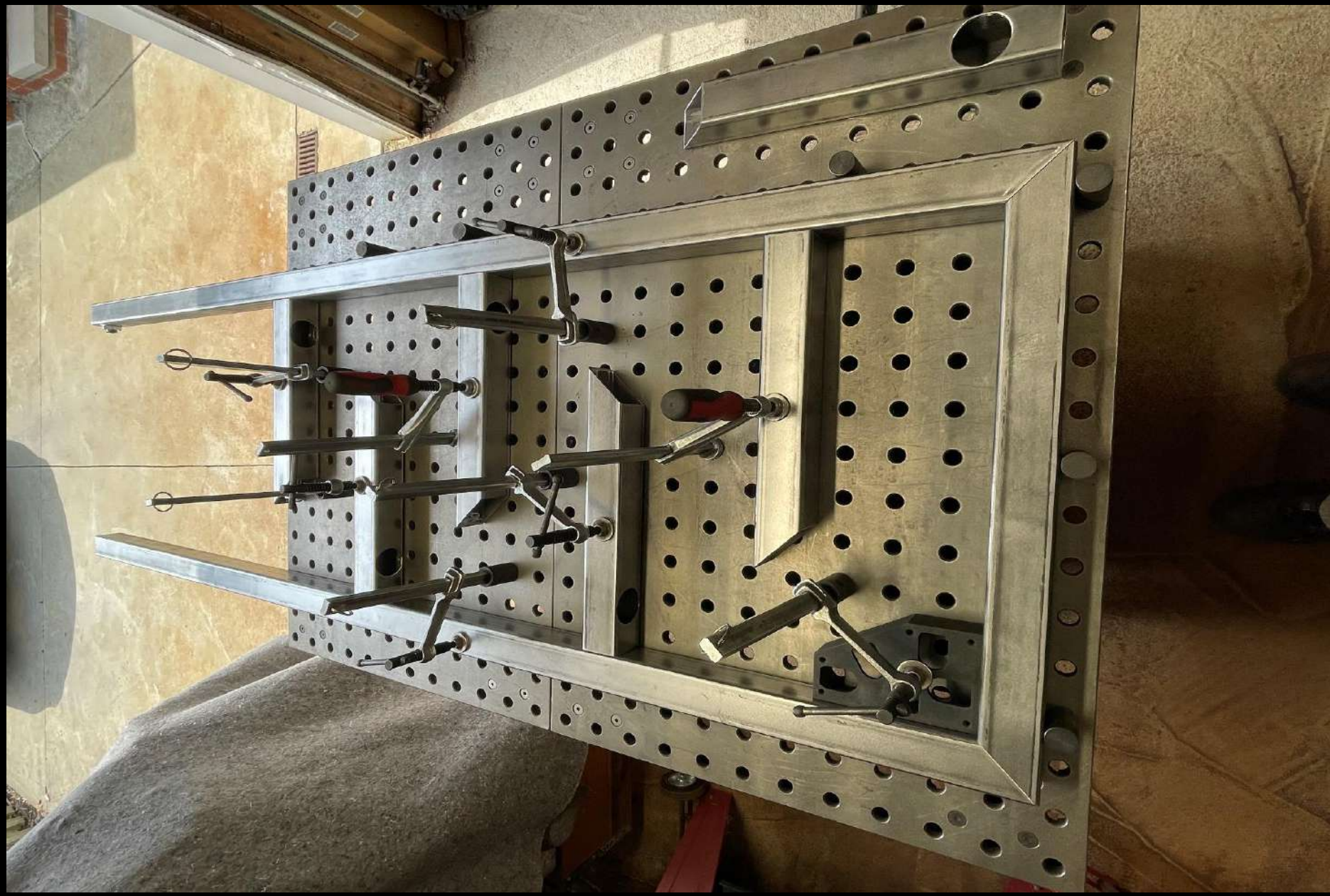
The top plumbing assembly is in place and secured. The bottom hole location shows the pipe running inside of the vertical leg with part of the bottom assembly in place.

The plumbing for the water supply in the fountain structure is complete. I can now start making all the miter cuts required for the fountain structure components.

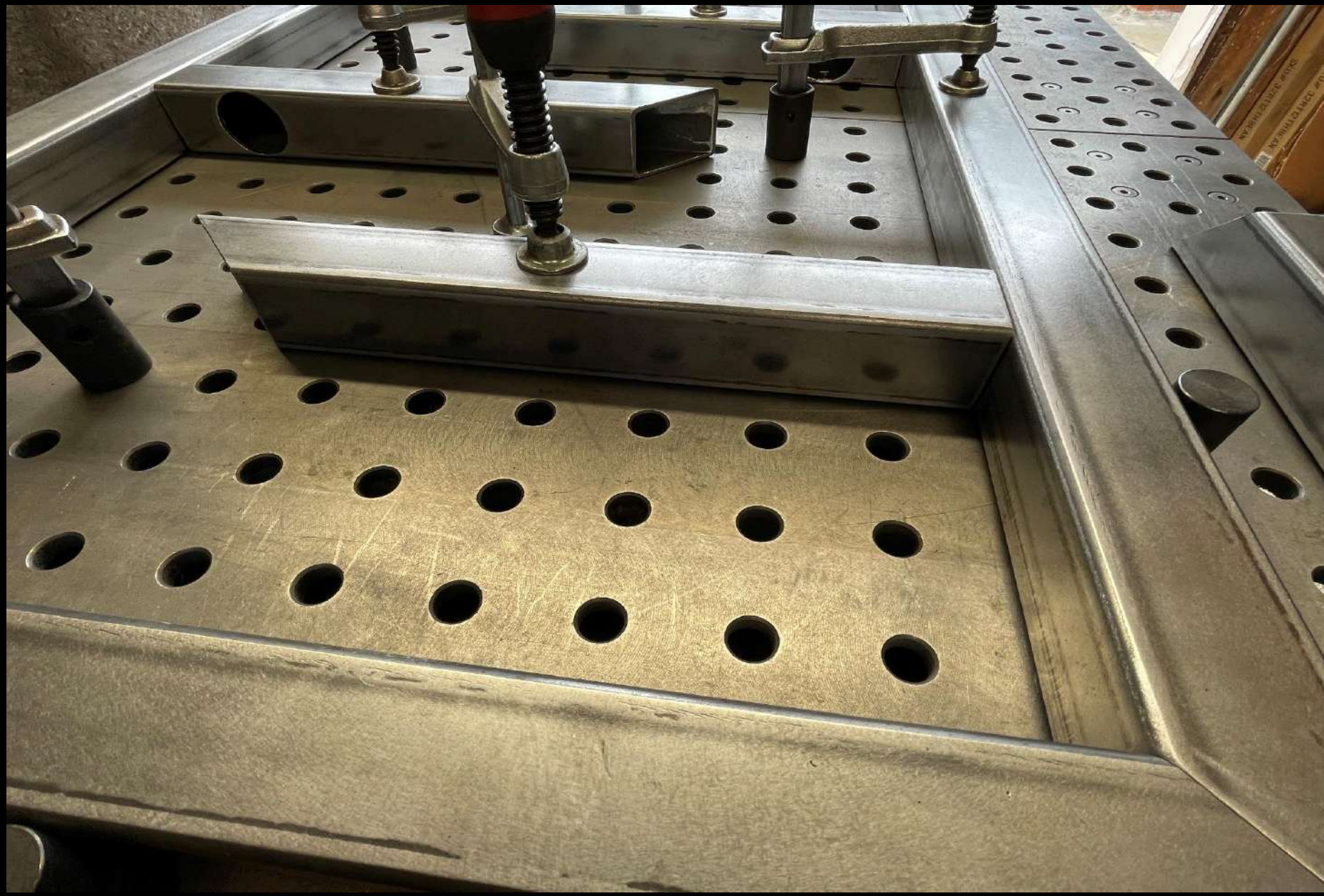
The steel chop saw is set up to make the 45-degree angle miter cuts for the fountain flutes, the fountain vertical legs and on the top cross rail.

All of the miter cuts have been completed for the fountain structure; the six flutes, the top cross rail and the vertical legs, 10 miter cuts in all.

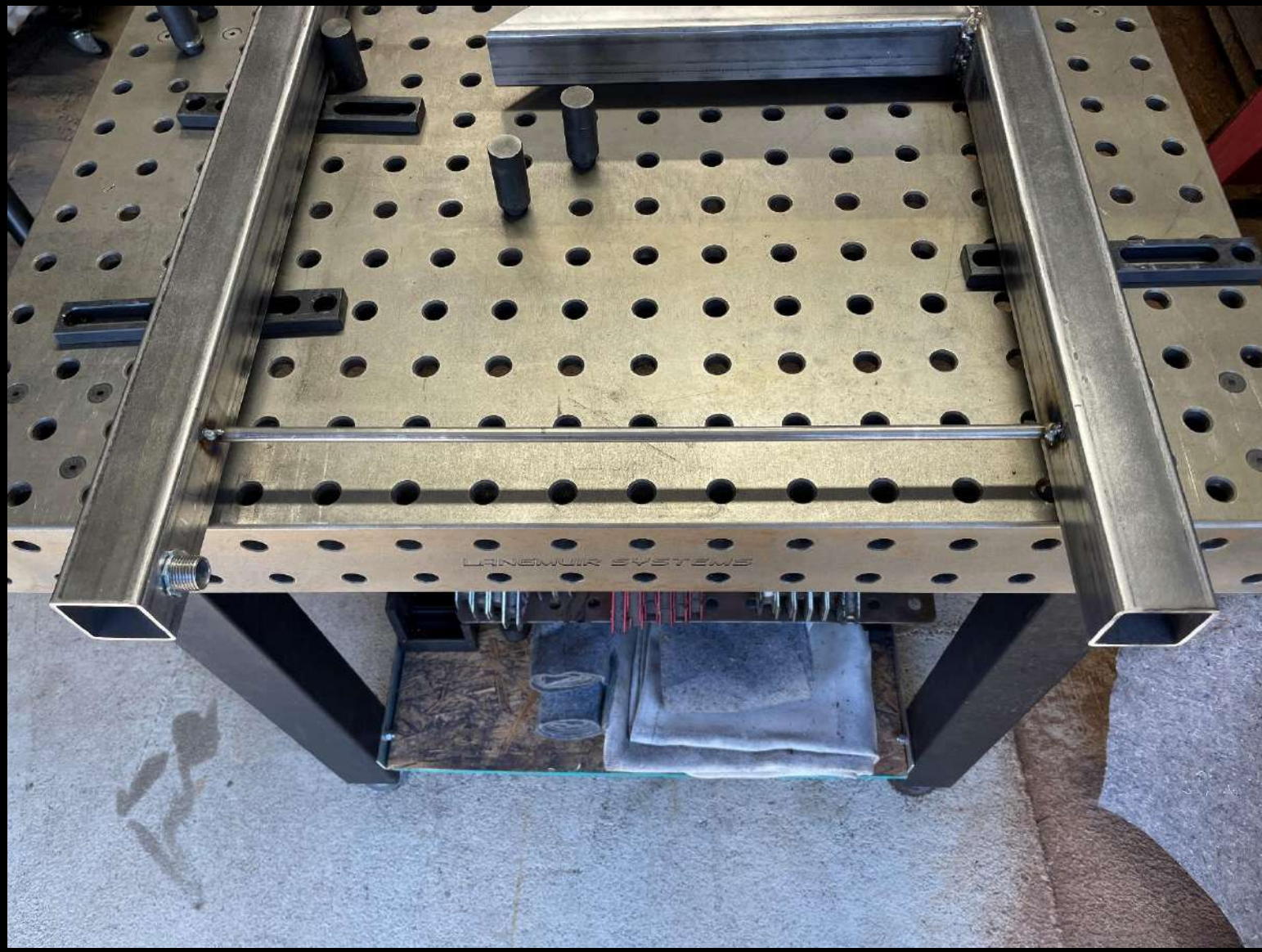
I sanded all the components in the fountain structure prior to welding them together. This will help with the welding process and later for powder coating.



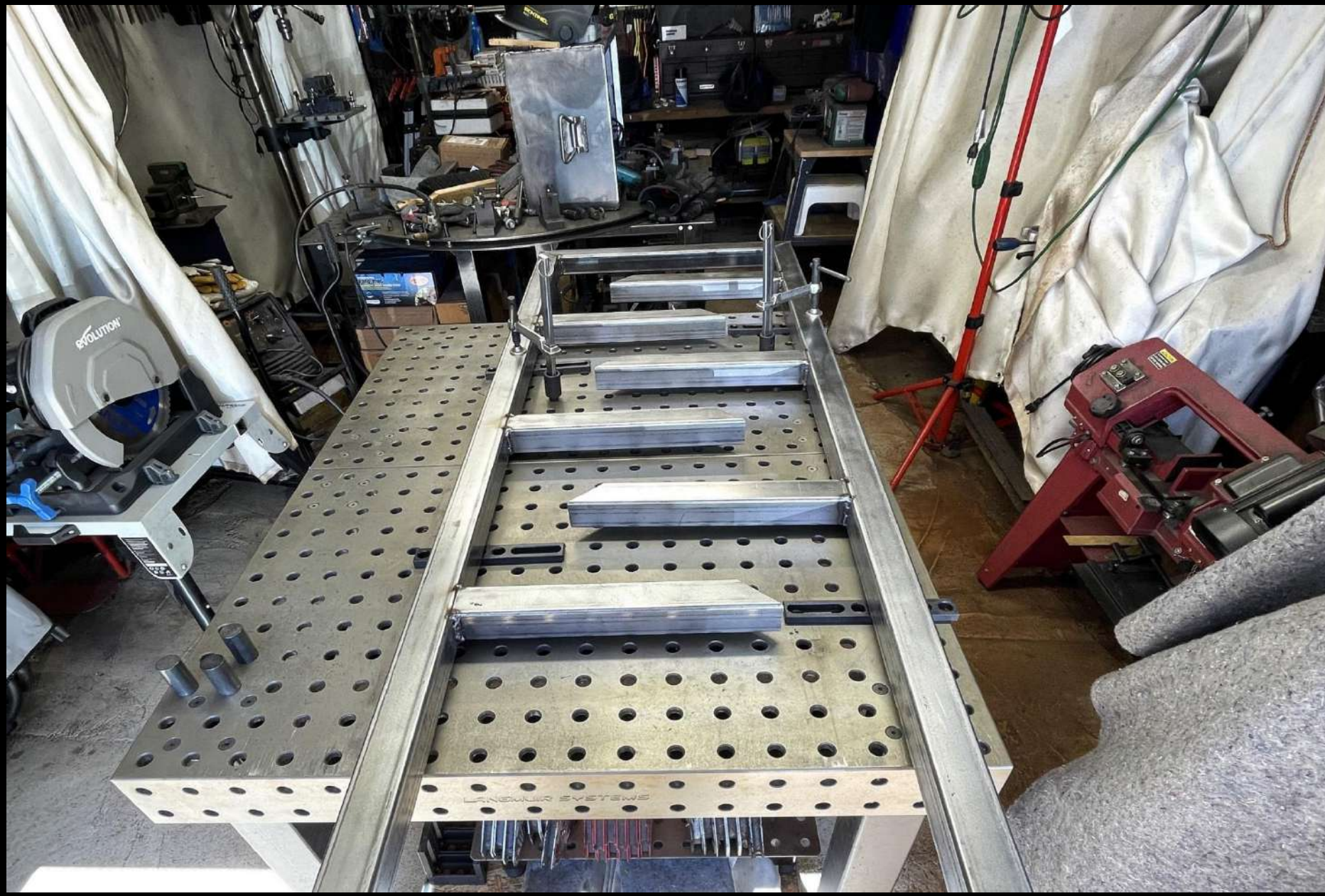
This is the “A” side setup for the fountain structure. I don’t have enough table length to weld the six flutes at the same time. I will move the structure up to weld the last one.



The top flute has no hole and gets welded over the water supply that is bolted in place. Each of the flutes needs to be welded 90 degrees to the vertical legs on both sides.



The bottom fountain structure is welded on two steel rails inside of the fountain tank. I used a piece of 3/8” steel rod to maintain the 20” spacing between the inside rails.



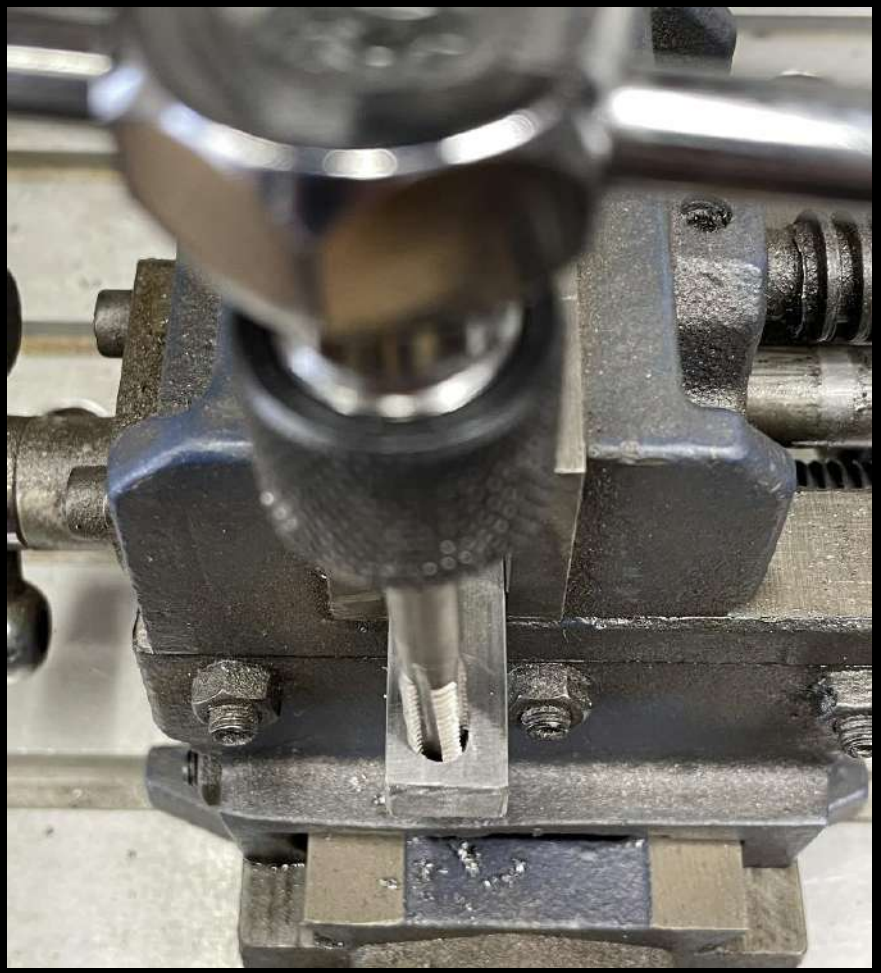
The fountain structure is flipped and located on steel parallels to weld the “B” side. The parallels keep the structure flat and off the table to clear the “A” side welds.

I clamped fountain structure on its side, using right angle fixture plates, to weld the inside corners of the flutes. The fountain structure is flipped to weld the opposite side.

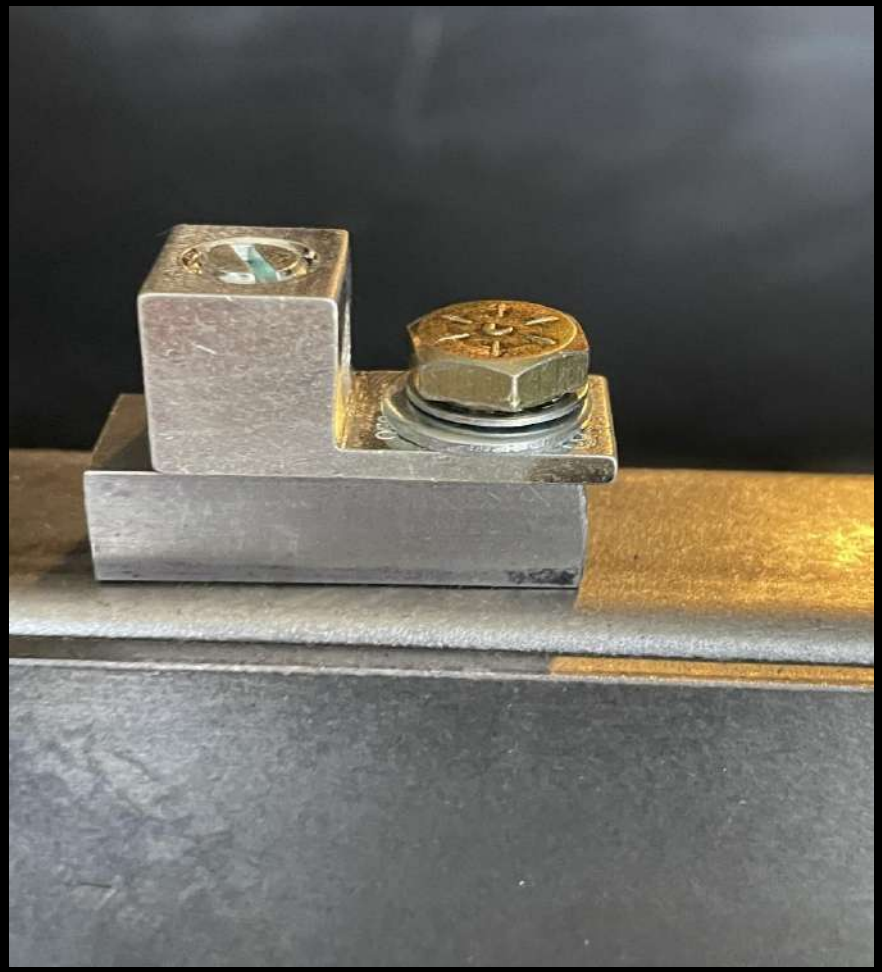
The fountain structure is now complete and ready to be welded on the rails inside the tank. I have a few more components that go into the tank before I can weld this in.

In the tank, I have located where the fountain structure will be welded on the 2” rails. I need to put two holes in the end of the tank for a drain & electrical cord.

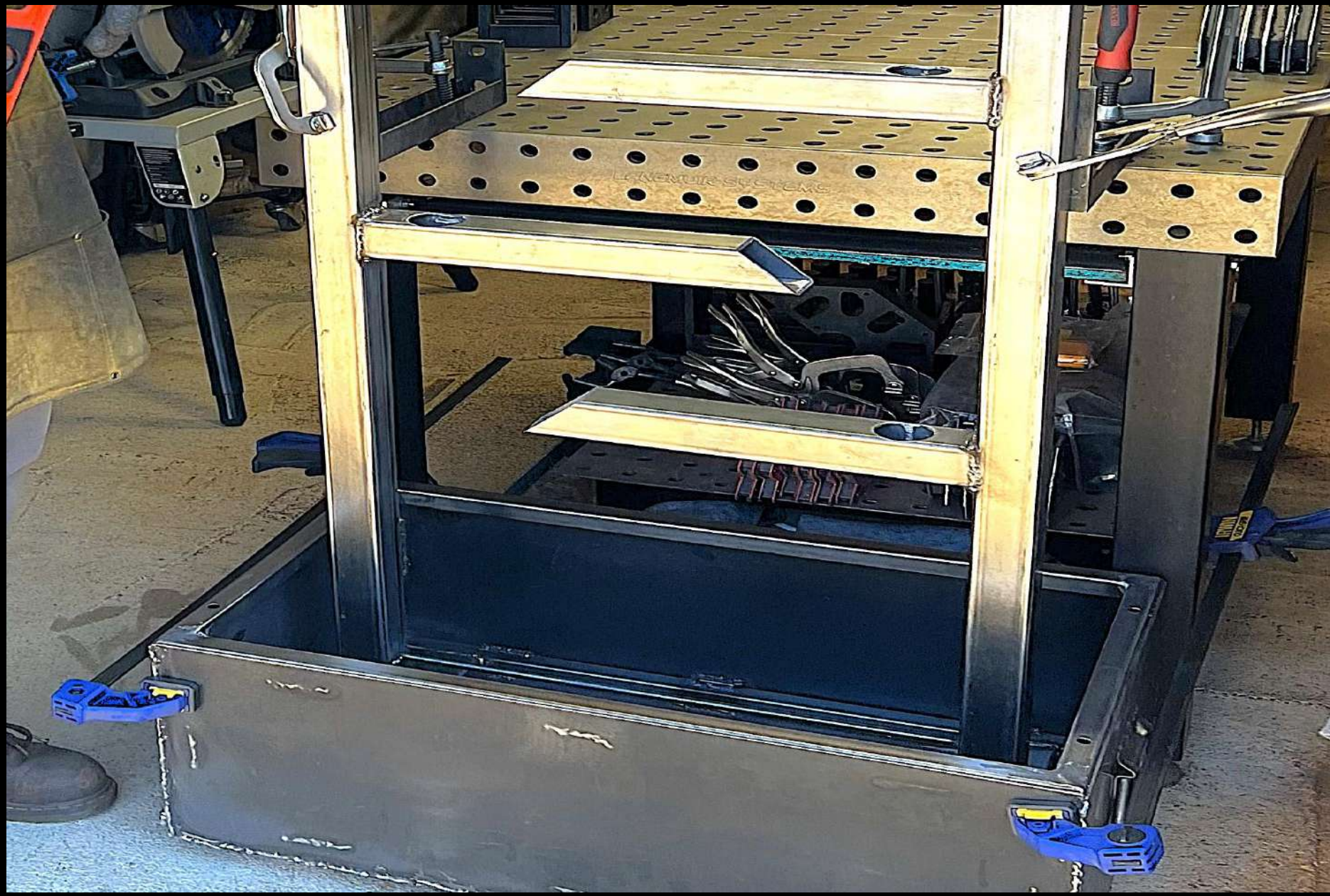
I drilled two holes in the end plate, near the bottom. One for a drain fitting and one for an electrical cord grommet. The drain hole is 7/8” and the grommet hole is 5/8”.



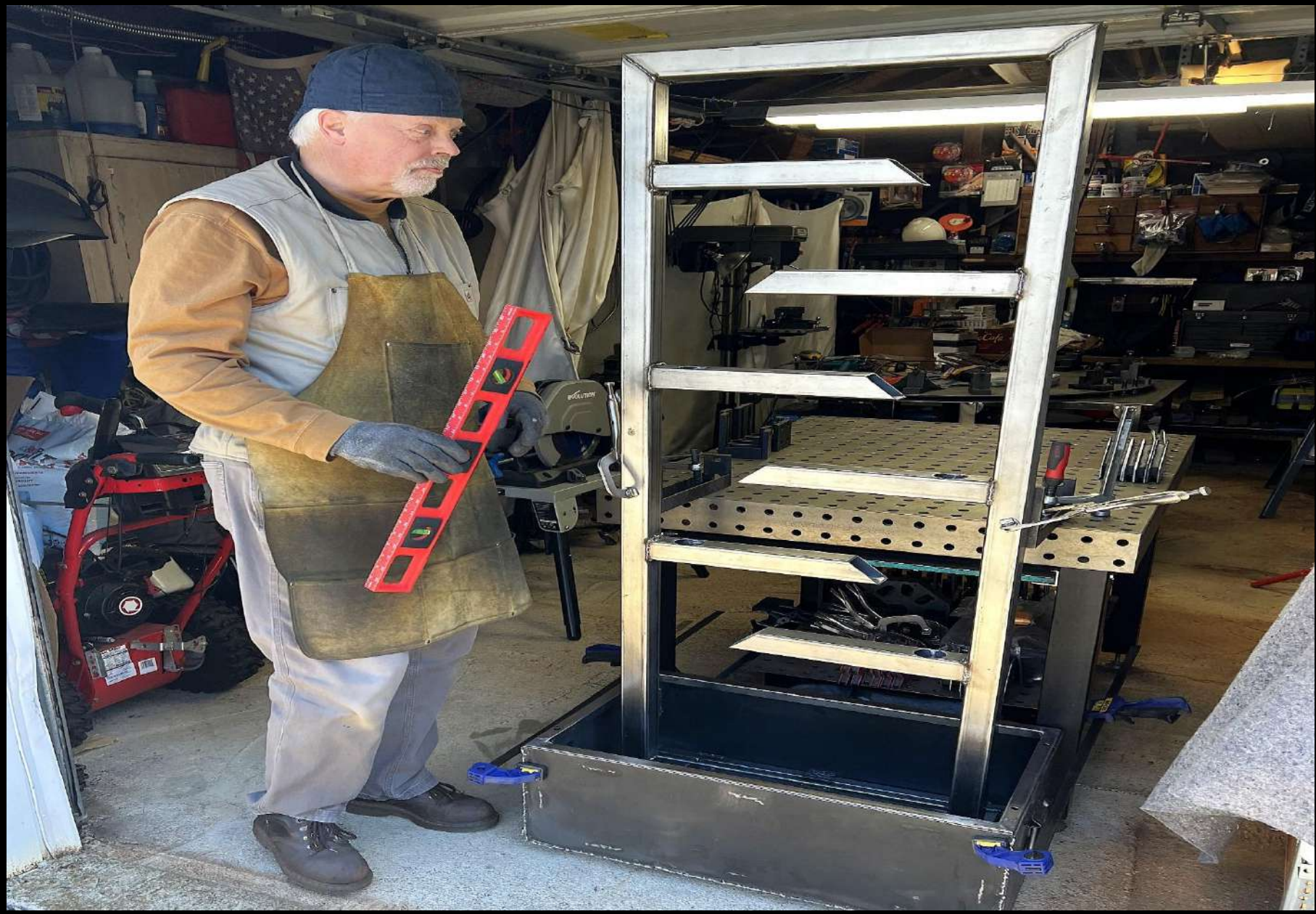
I created a grounding stud from a piece of 1/2” solid square stock. I drilled and tapped a hole for ¼”-20 screw.



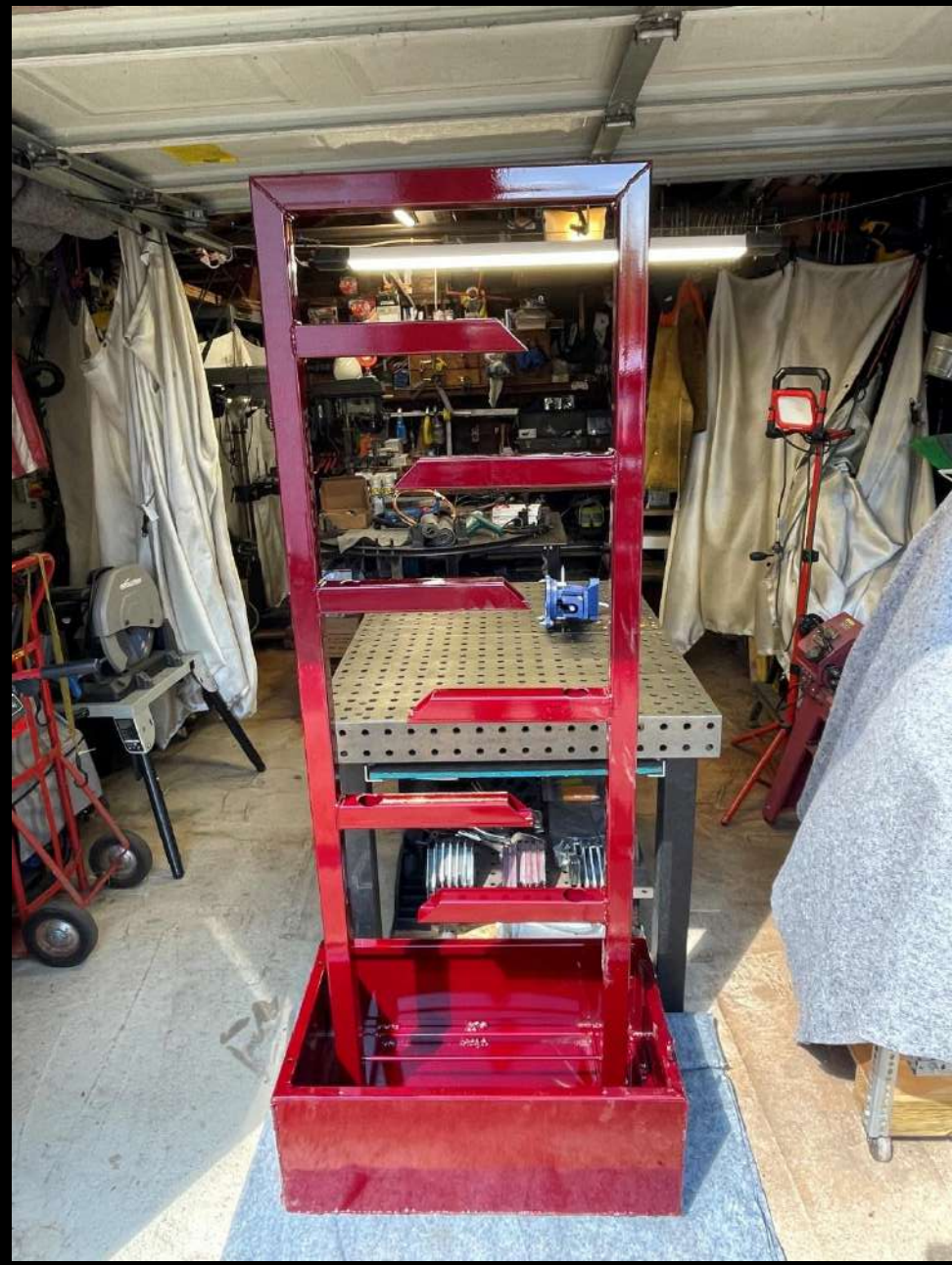
The steel stud gets welded on the outside of the end plate, near the bottom. The electrical wire lug gets screwed on top of this stud for a copper grounding wire.



With the tank fittings in place, I am ready to weld the fountain structure onto the steel base rails inside of the tank.



The fountain structure must be square and level, with the flutes at 90 degrees to the vertical legs when I weld it. The fountain will go to powder coating after welding.

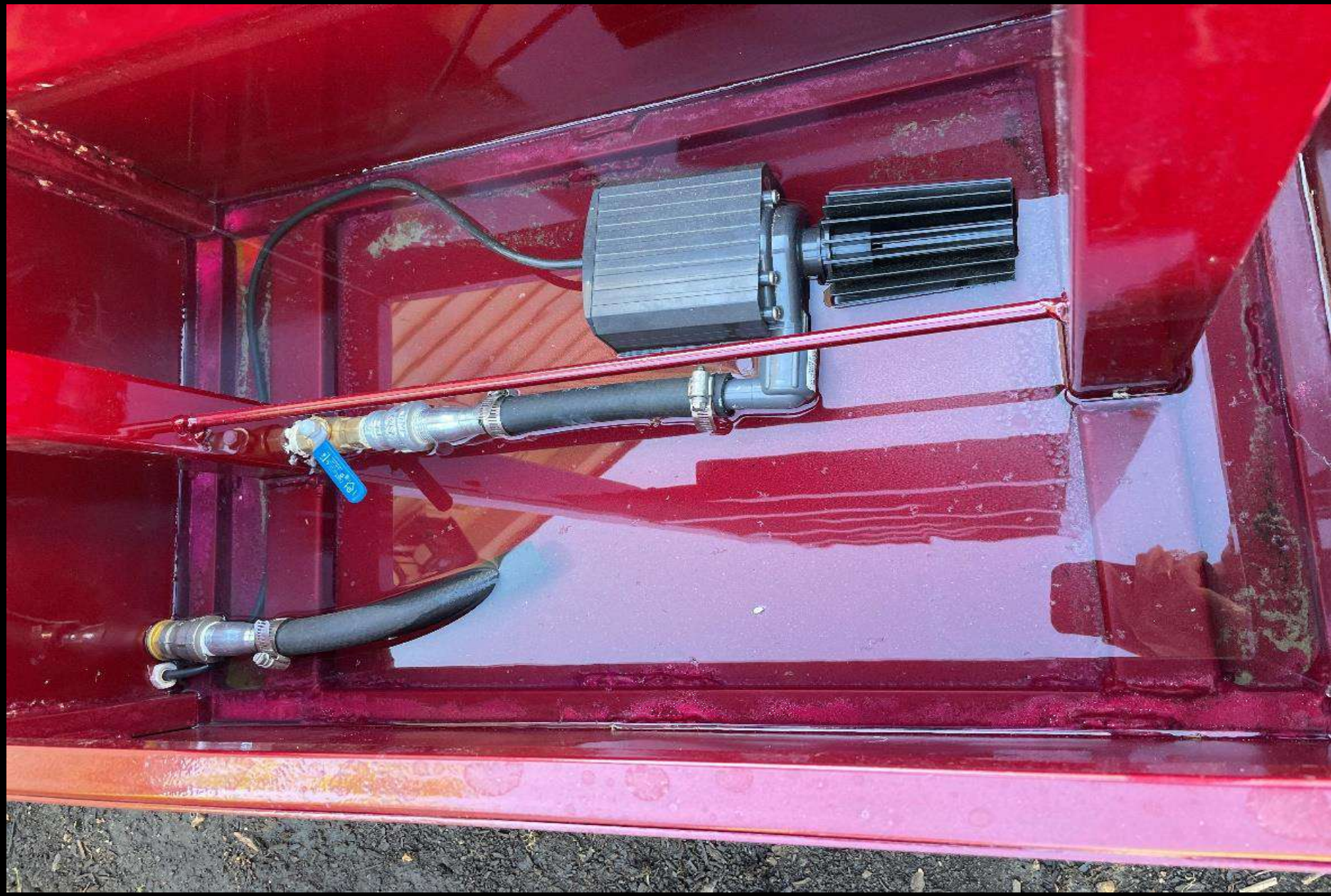


I have the fountain back from power coating. Now, I need to install the balance of the plumbing components, the water pump and position it in the garden.

The drain assembly and the chord grommet are installed in the holes in the end plate. The wire lug is also attached to the grounding block that was welded to the tank.

The fountain needs to be level and square. This takes a bit back and forth to get the tank settled into place. The fountain filled with water is very heavy and will not move.

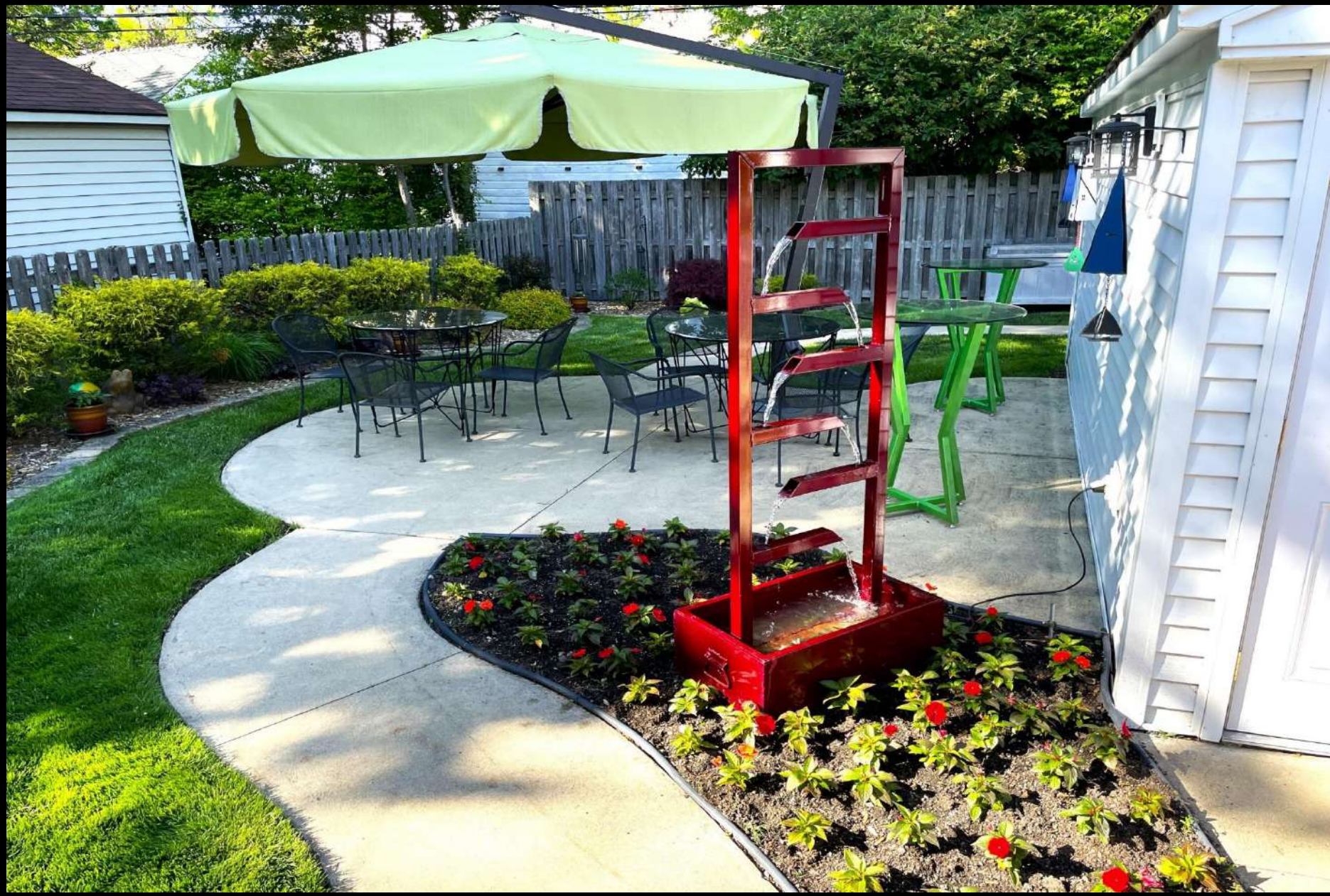
The pump is a submersible, magnetic drive pump. The pump moves 1800 GPH. I included a ball valve in the pump assembly to regulate the water volume.



The pump intake has a large filter to keep out debris that may fall into the tank. The pump outlet is connected to a 90-degree hose fitting to the fountain water supply.

The entire steel assembly is connected to a ground rod with a heavy copper ground wire to ensure all reasonable safety with the running water. The electrical outlet is a GFI.

Including the ball valve in the water supply assembly provided me with a simple way to regulate water volume in the system and maximize water flow from hole to hole.



Cascading Garden/Patio Fountain Installed and Running.

Cascading Garden Fountain-Steel Tube 121775-10A	
Design Iteration Number	ML-ISC-121775-10A
Major Components:	Steel Tank, Fountain Structure, Plumbing, Pump
Steel Tank Measurements:	Length: 30", Width: 18" Height: 11"
Steel Tank Components:	
.120 Steel Plate	5 pieces: 2 Sides, 2 Ends, 1 Bottom
1" x 1" Steel Tube, Tank Box Frame	12 Pieces: 4 Sides, 4 Ends, 4 Corners
1" x 2" Steel Tube, Weld Base For Fountain	2 Pieces: Tank Bottom, 2 Places
Weld On Steel Handles	2 Pieces: Tank Ends, 2 Places
Fountain Structure Components:	
2" x 2" Steel Tube, Fountain Base	3 Pieces: Right Leg, Left Leg, Top
3/8" Steel Rod, Fountain Base Cross Bar	1 Piece: Lower End Cross Bar
2" x 2" Steel Tube, Fountain Flutes	6 Pieces: 3 Right Leg, 3 Left Leg, Alternating
Fountain Plumbing Components:	
1/2" 90 Degree Elbows, Galvanized	2 Pieces
60" 1/2" Threaded Straight Pipe, Galvanized	2 Pieces
2 Fully Threaded Pipe Nipples	2 Pieces
1-1/4 Dia, Washer, I.D. Must fit Over Threaded Nipples	1 Piece
3/8" Pipe Lock Nut (For Top Assembly)	1 Piece
3/8" Electrical Lock Nut (For Lower Assembly)	1 Piece
1/2" Ball Valve-Full Throat	1 Piece
1/2" x 3/4" Galvinized Pipe Reducer	1 Piece
3/4" Threaded Hose Fitting (Lower Assembly)	1 Piece
Pipe Tape, Pipe Dope	1 Piece
3/4" 90 Degree Threaded Plastic Hose Fitting For Pump	1 Piece
1/2" Rain Barrel Faucet For Tank	1 Piece
1/2" x 3/4" Galvinized Pipe Reducer For Tank	1 Piece
3/4" Threaded Hose Fitting For Tank	1 Piece
1/4" Waterproof Electrical NTP Fitting For Tank	1 Piece
Fountain Pump:	
1800 GPM, Magnetic Drive Water Pump	1 Piece
Tools Required:	
1-7/8" Hole Saw To Cut Steel (Water Holes In Flutes)	1 Piece, 6 Places
7/8" Hole Saw To Cut Steel (Fountain Structure)	1 Piece, 3 Places
1-1/8" Hole Saw To Cut Steel (Tank)	1 Piece, 1 Place
5/8" Diameter Drill To Cut Steel (Tank)	1 Piece, 1 Place
Flex Seal, Clear Liquid Spray, 2 Cans (Tank)	Tank
Hose, 1.5 ft, 3/4" I.D. for Tank & Pump	1 Piece, 2 Places
Copper Ground Wire: Length As Required	1 Piece, 1 Place
Ground Lug For Copper Wire (For Tank)	1 Piece, 1 Place
Material Costs:	
Steel: Steel Tube, Steel Plate, Steel Bar, Steel Handels	$466.00
Plumbing Components:	$115.00
Powder Coating:	$350.00
Fountain Pump:	$212.00
Required Tools:	$114.00
Total Material Costs:	$1,257.00
Man Hours To Construct:	
Fabracation: Tank, Structure, Plumbing, Welding, Coating	70 Hours, 1.75 Weeks
Tank Capacity:	
Tank Size: 30" x 18" x 11" (3.4125 Cubic Feet)	25.5 Gallons
Fountain Weight Approxiamate:	
Stee: Tank, Structure, Plumbing	145 lbs.
Water In Tank 25.5 Gallons	213 lbs
Total Fountain Weight:	357 lbs.

Cascading Garden/Patio Fountain Construction Data