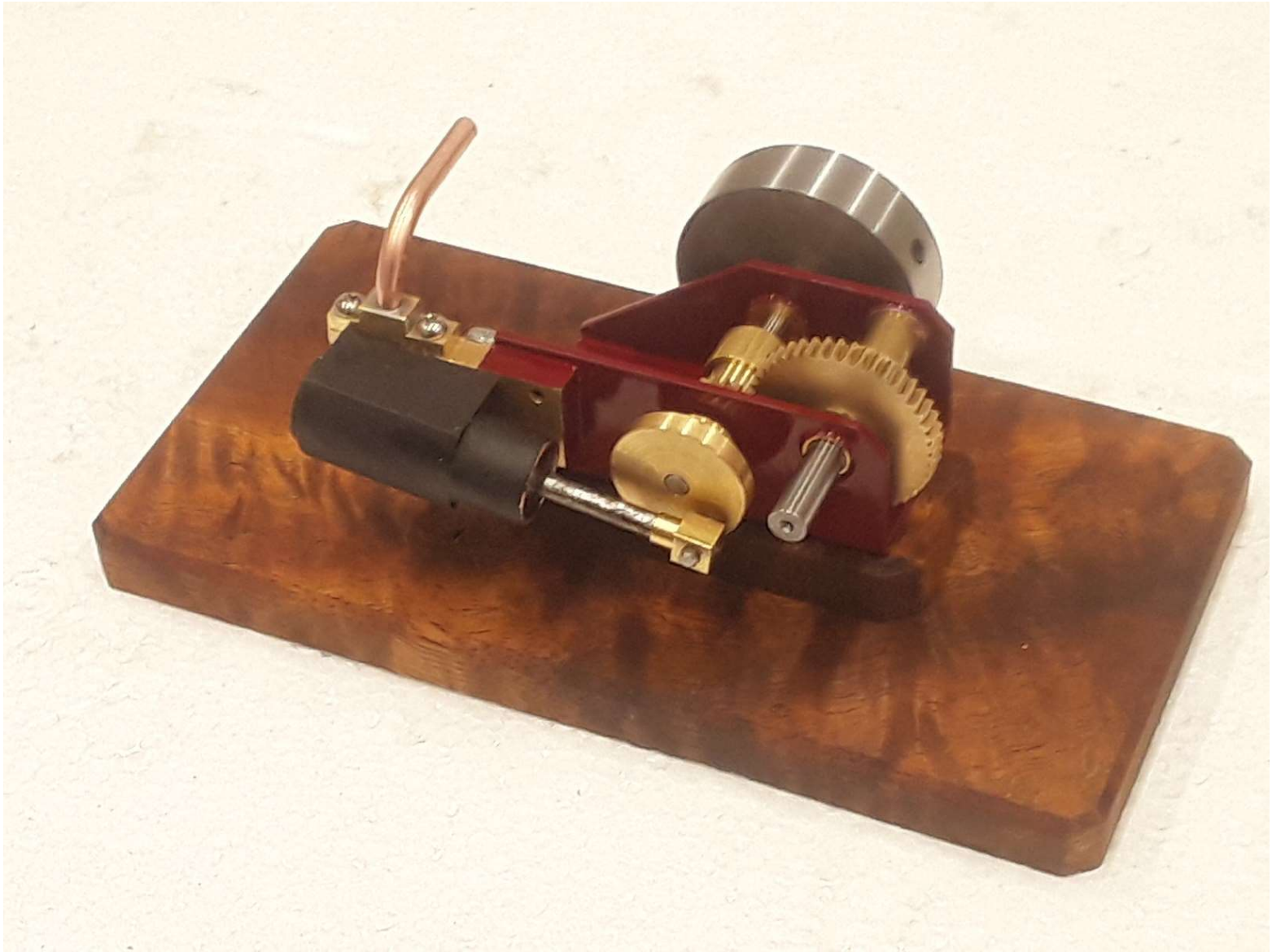
Steam in the Garden, the lost articles

Part One, Stationary Engine Build

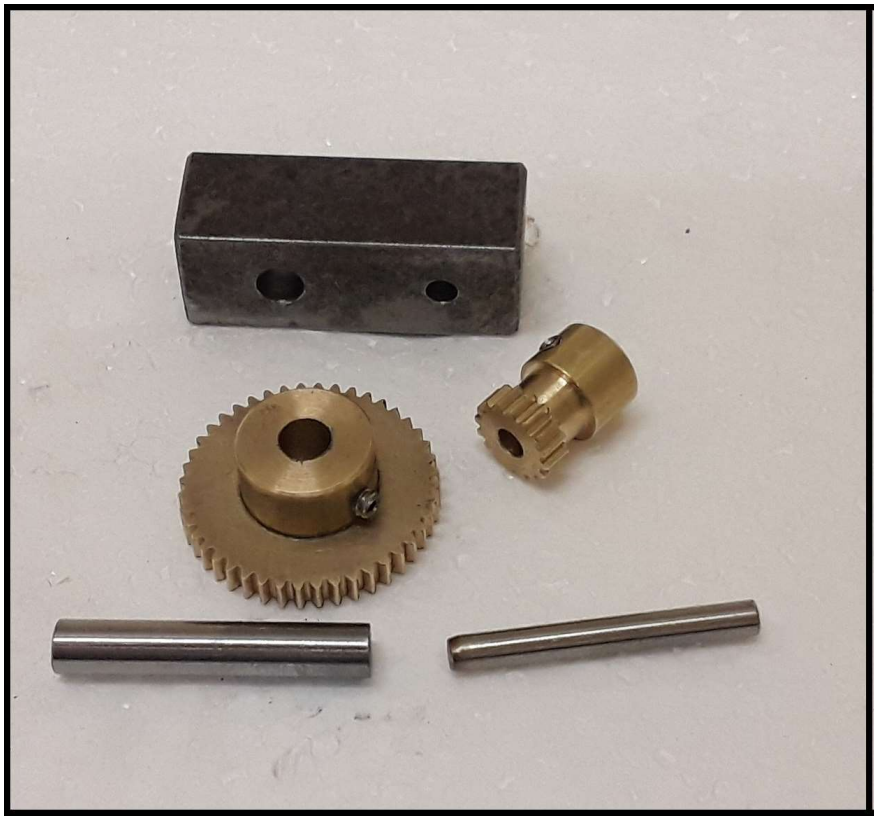


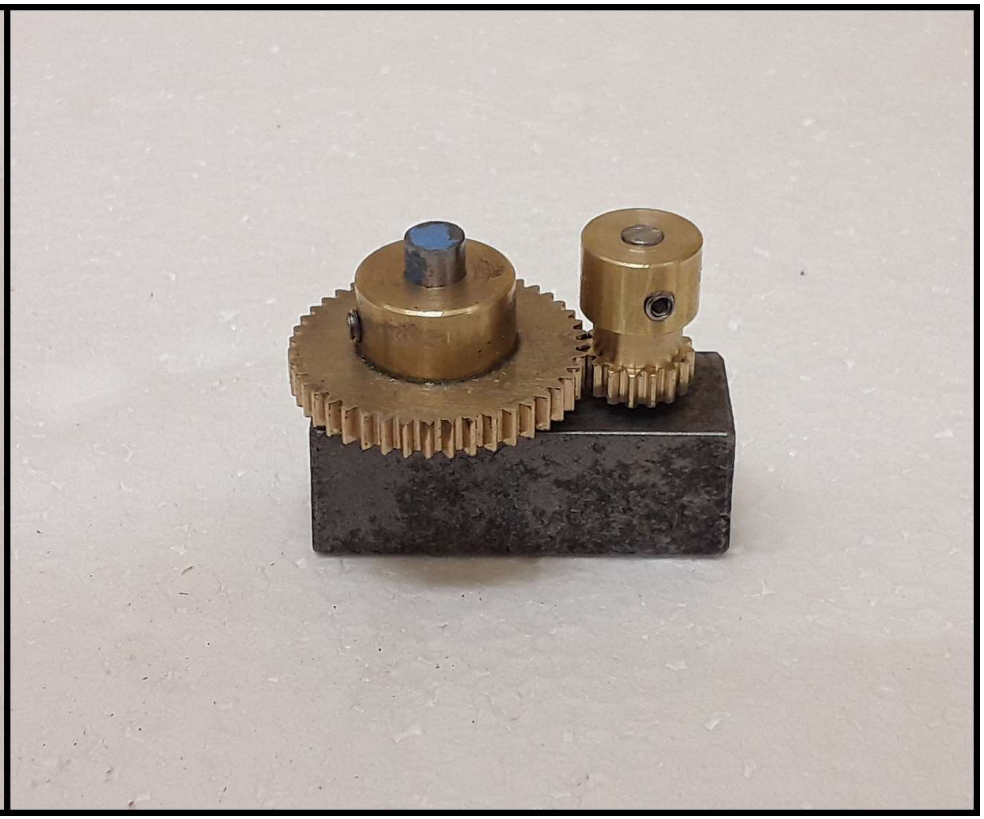
Background

"Denver" locomotive, designed by Jim Reyer, Ken Orme, Bruce Holmes, and Marc Horowitz

Two motor options. Both are 0.375" bore with one option 0.500" stroke and the other 0.875".

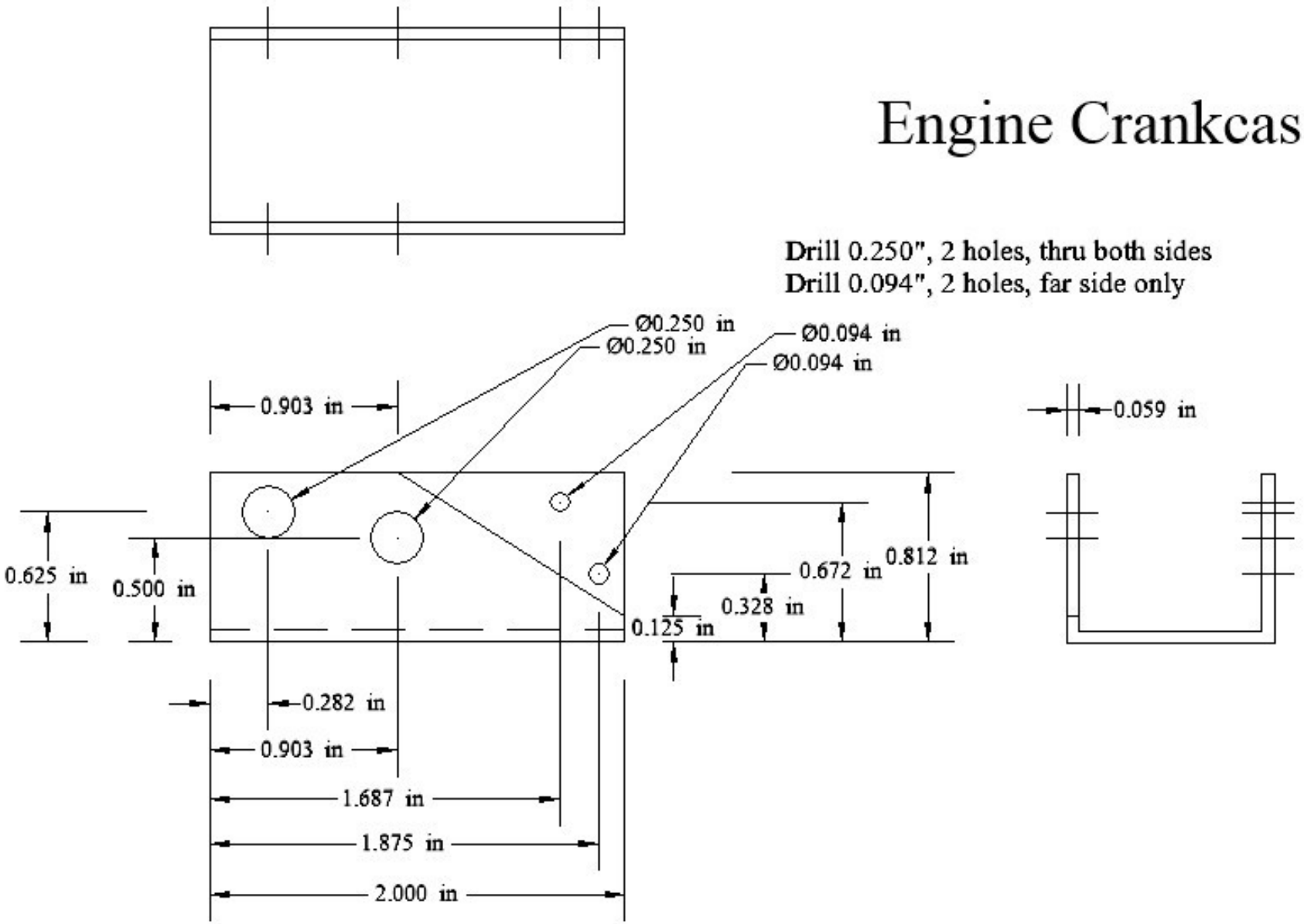
Gear Train



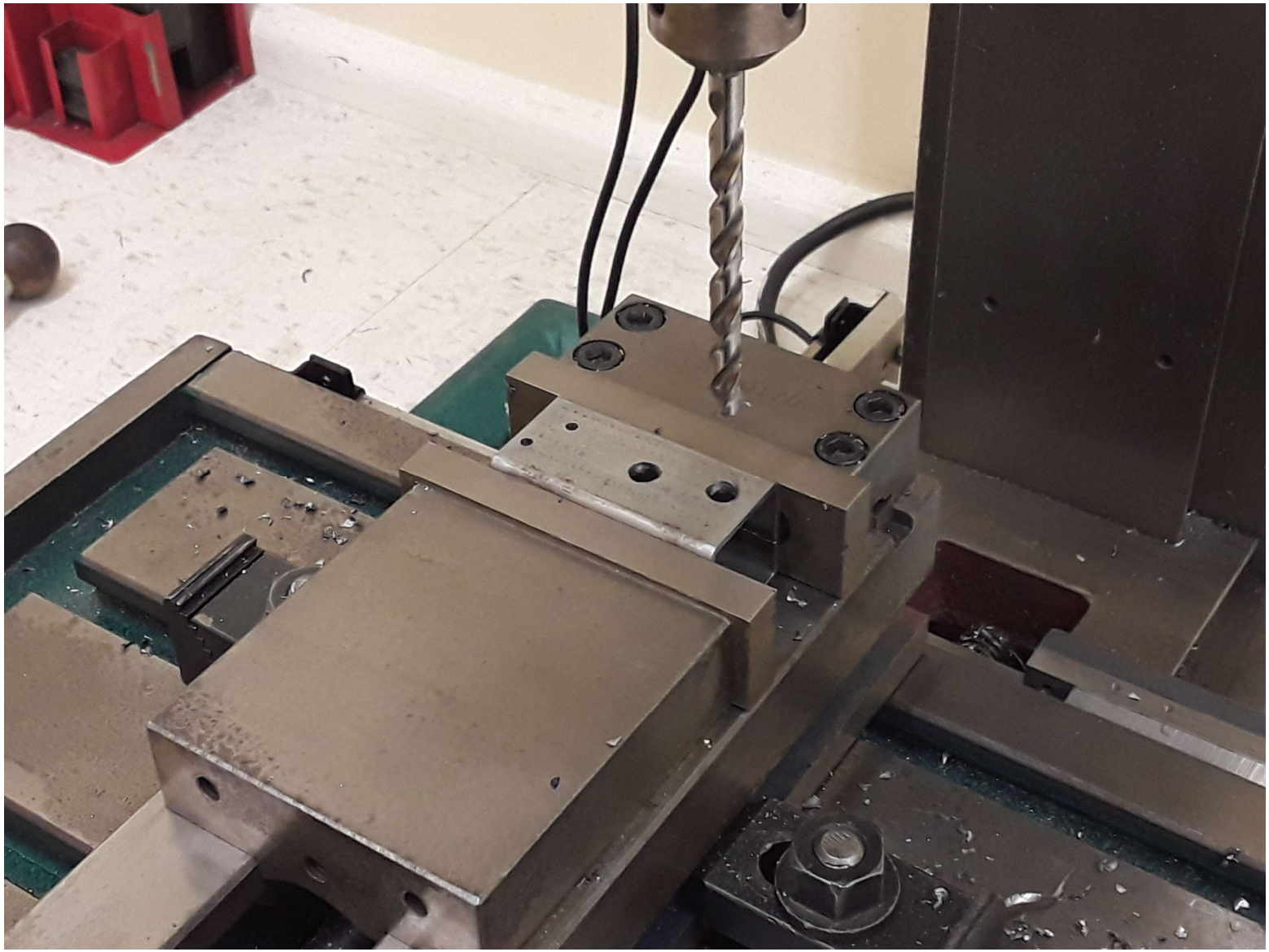


- Use 48 Diametral Pitch gears (0.5mm Module)
- 16 tooth pinion
- 44 tooth gear

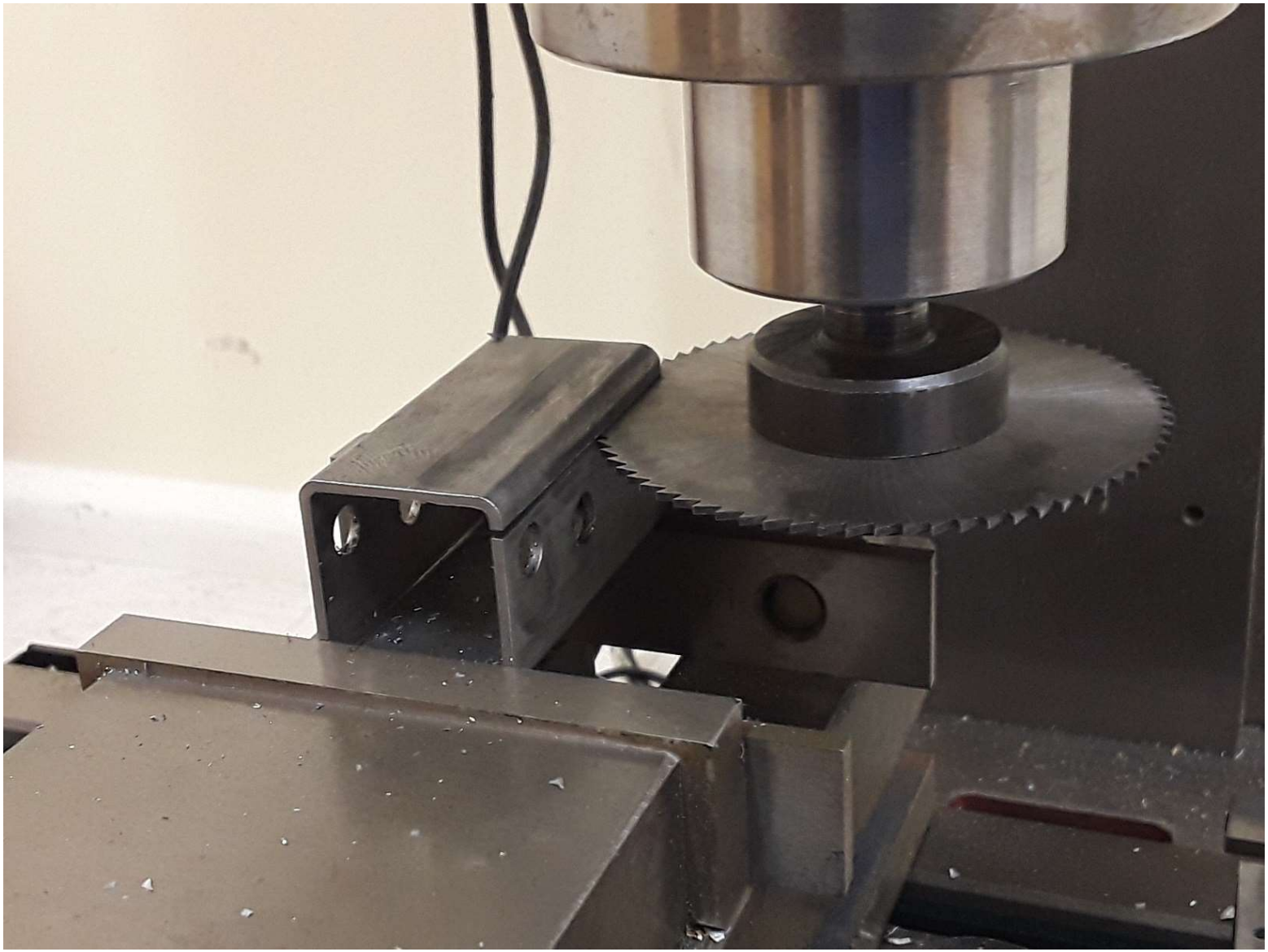
Crankcase


Engine Crankcase
Drill 0.250", 2 holes, thru both sides
Drill 0.094", 2 holes, far side only
Ø0.250 in
Ø0.250 in
Ø0.094 in
Ø0.094 in
0.903 in
0.059 in
0.625 in
0.500 in
0.672 in
0.812 in
0.328 in
0.125 in
0.282 in
0.903 in
1.687 in
1.875 in
2.000 in

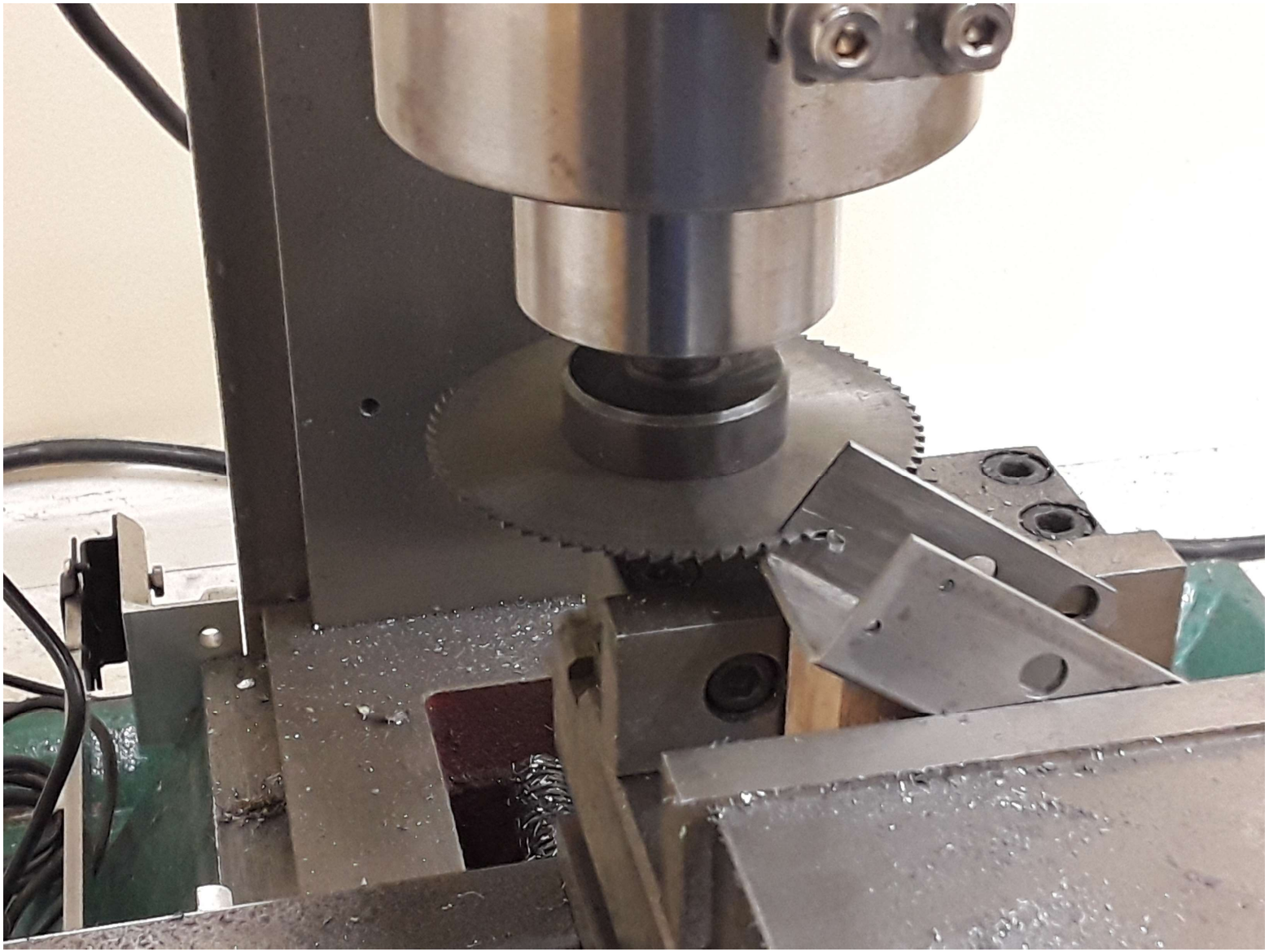
Crankcase



Crankcase



Crankcase

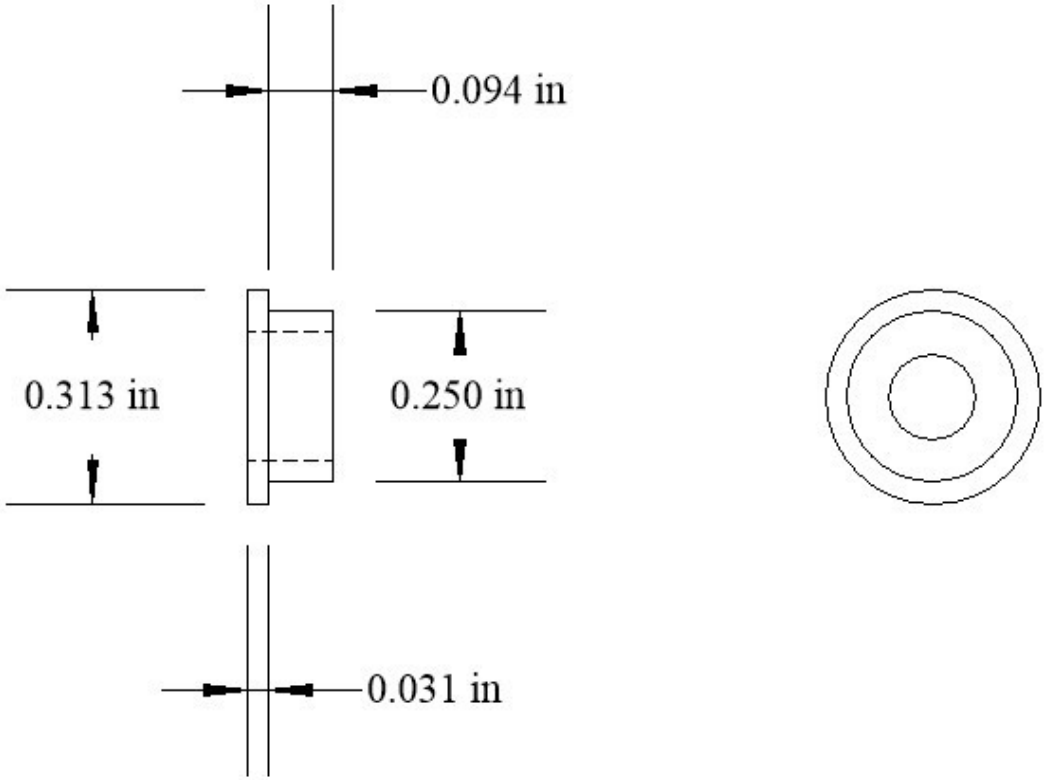


Crankcase

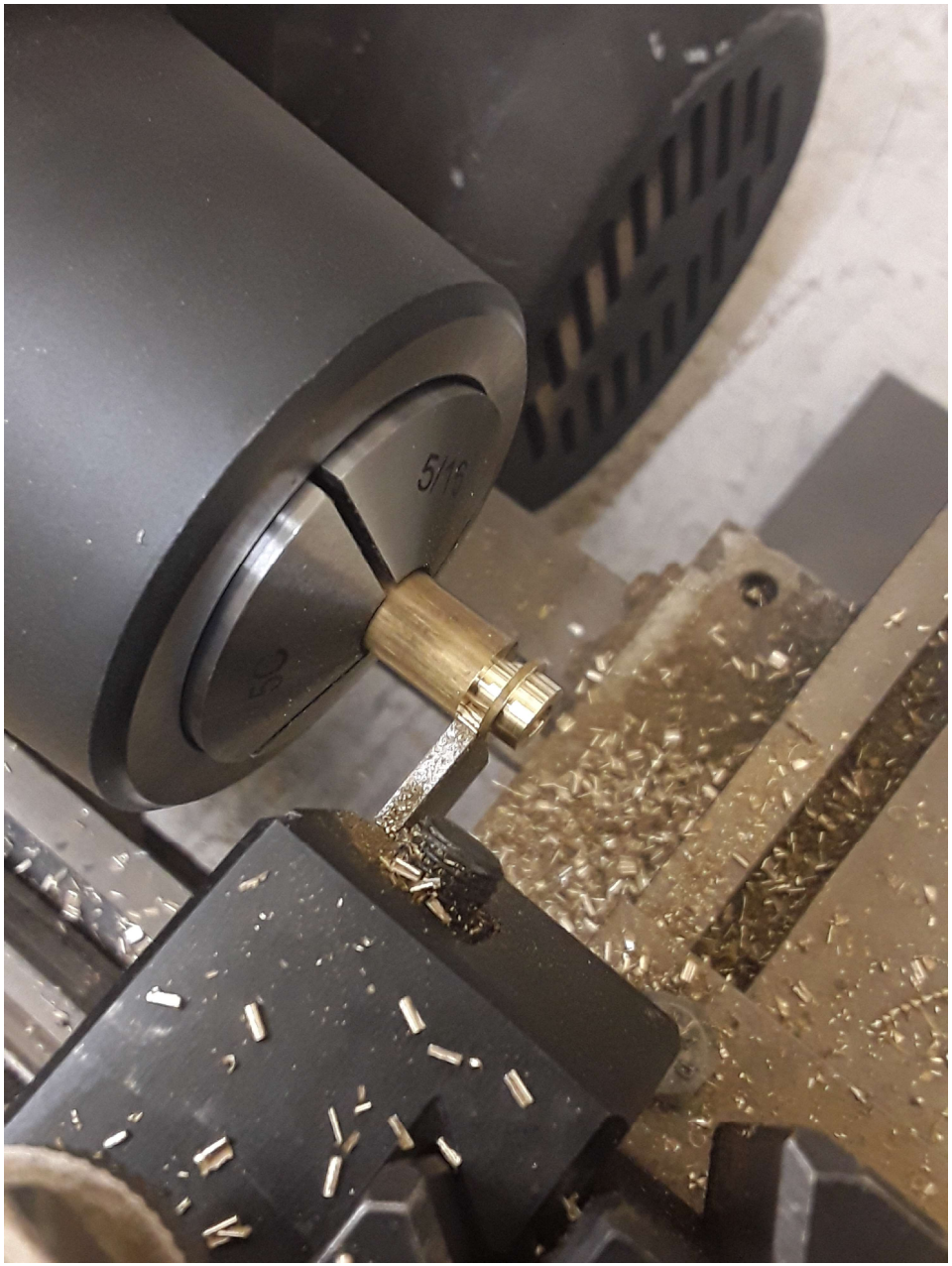
Main Bearings

Bearings, 4 total

2 bearings drill 3.2mm
2 bearings drill #12



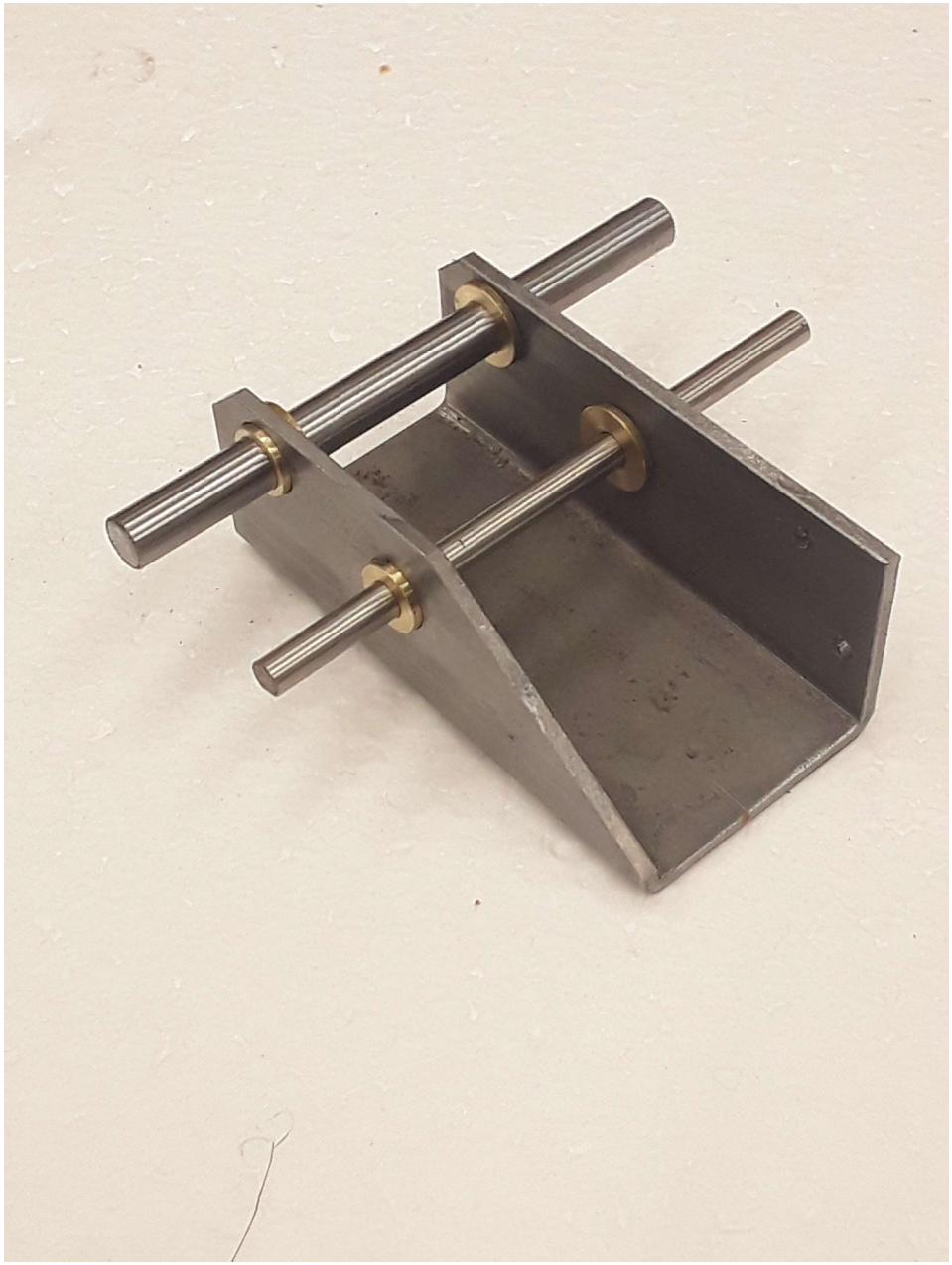
Main Bearings



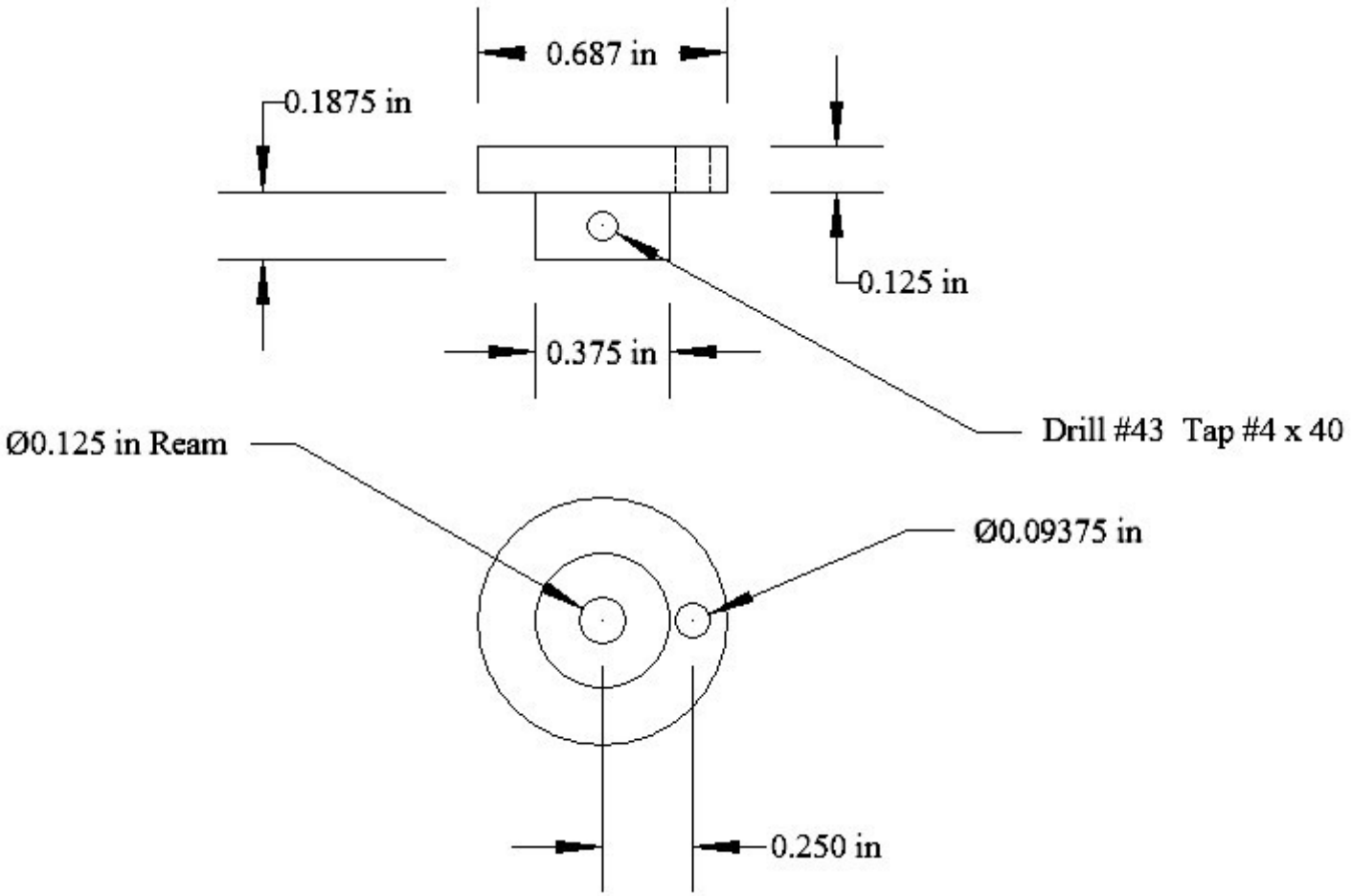
Main Bearings

Shaft Material:

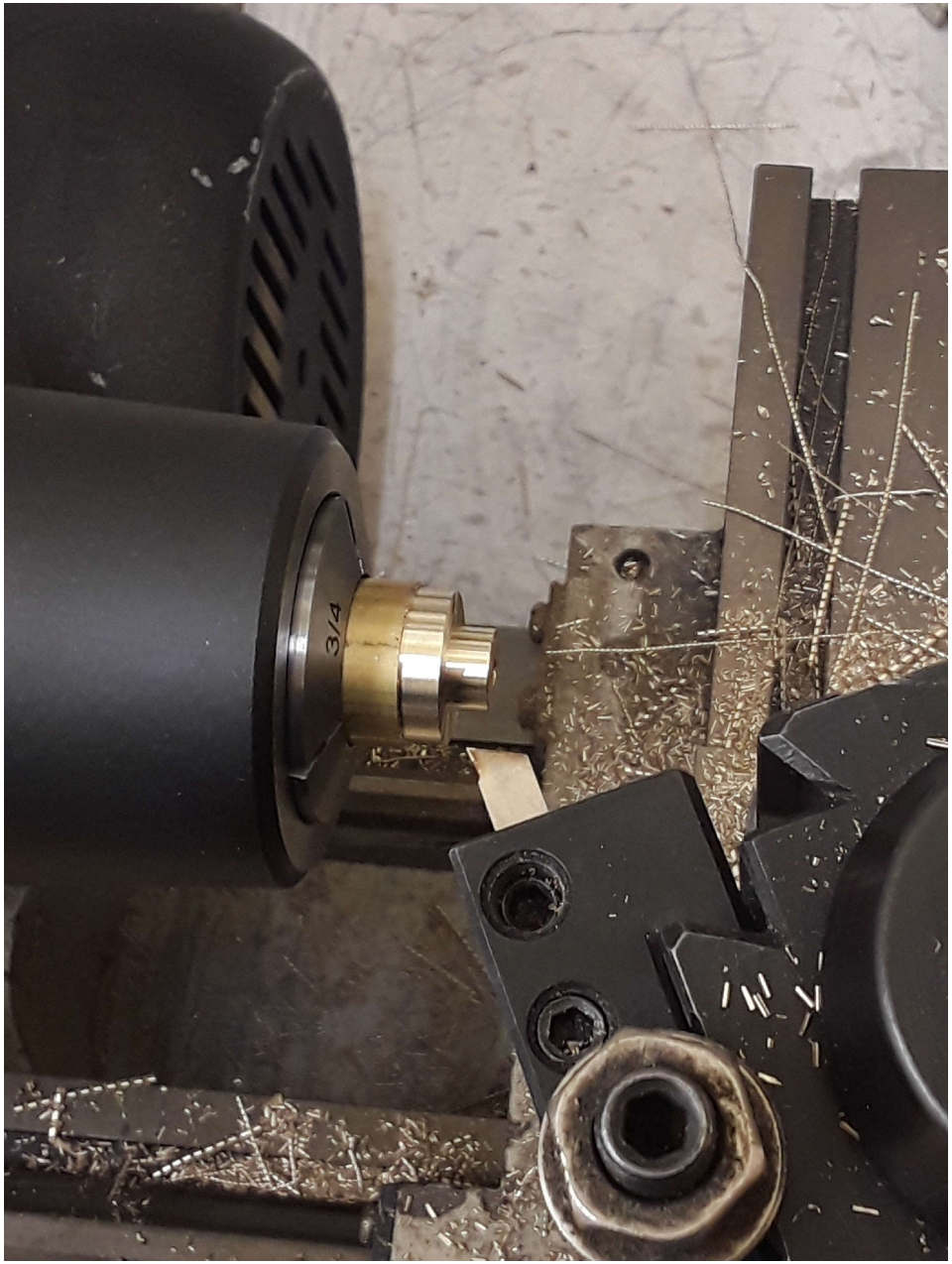
- 12L14 or 303
- 2” lengths
- 1/8” & 5/32”



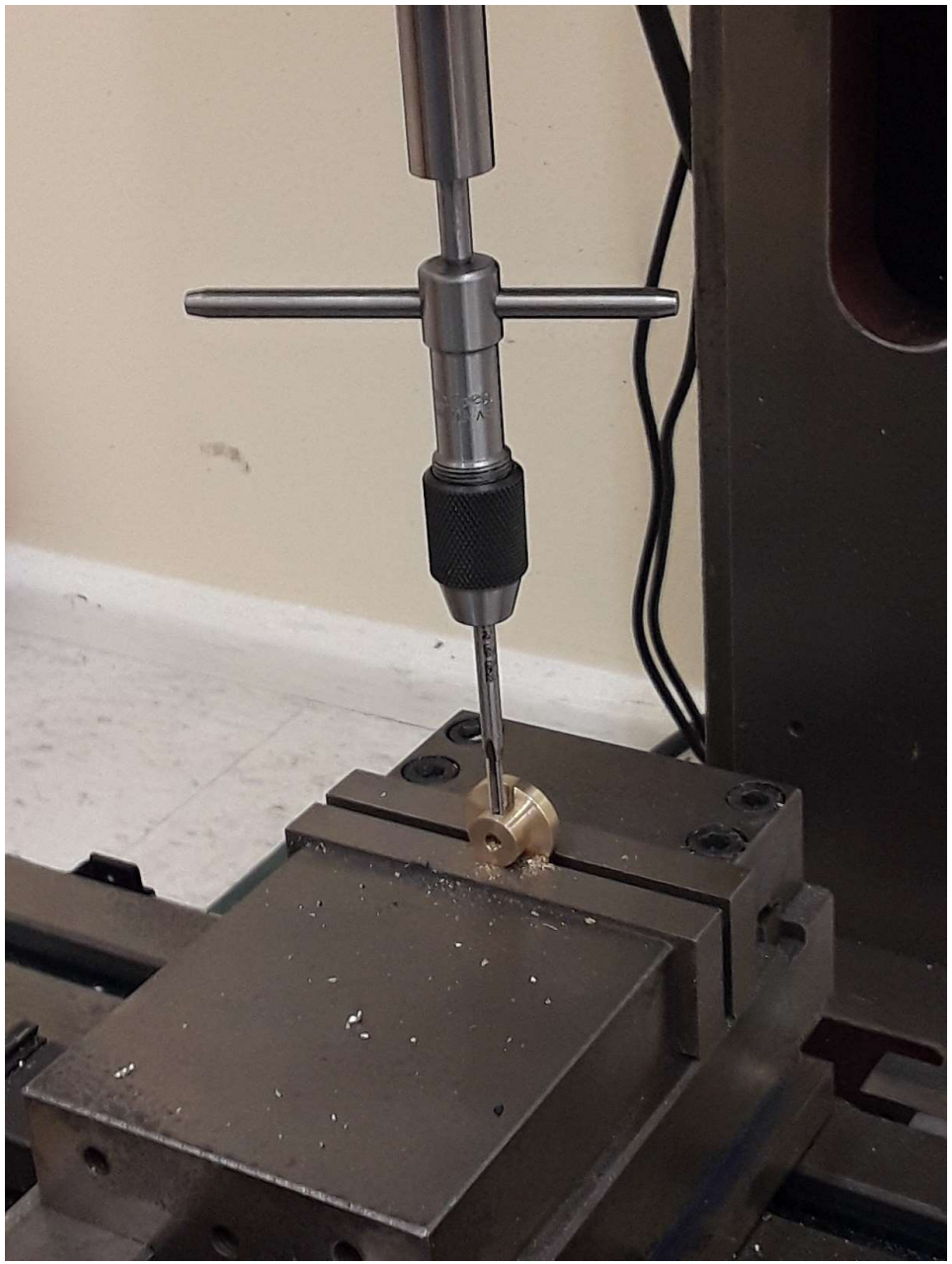
Crank Disk


Crank
0.687 in
0.1875 in
0.125 in
0.375 in
Drill #43 Tap #4 x 40
Ø0.125 in Ream
Ø0.09375 in
0.250 in

Crank Disk



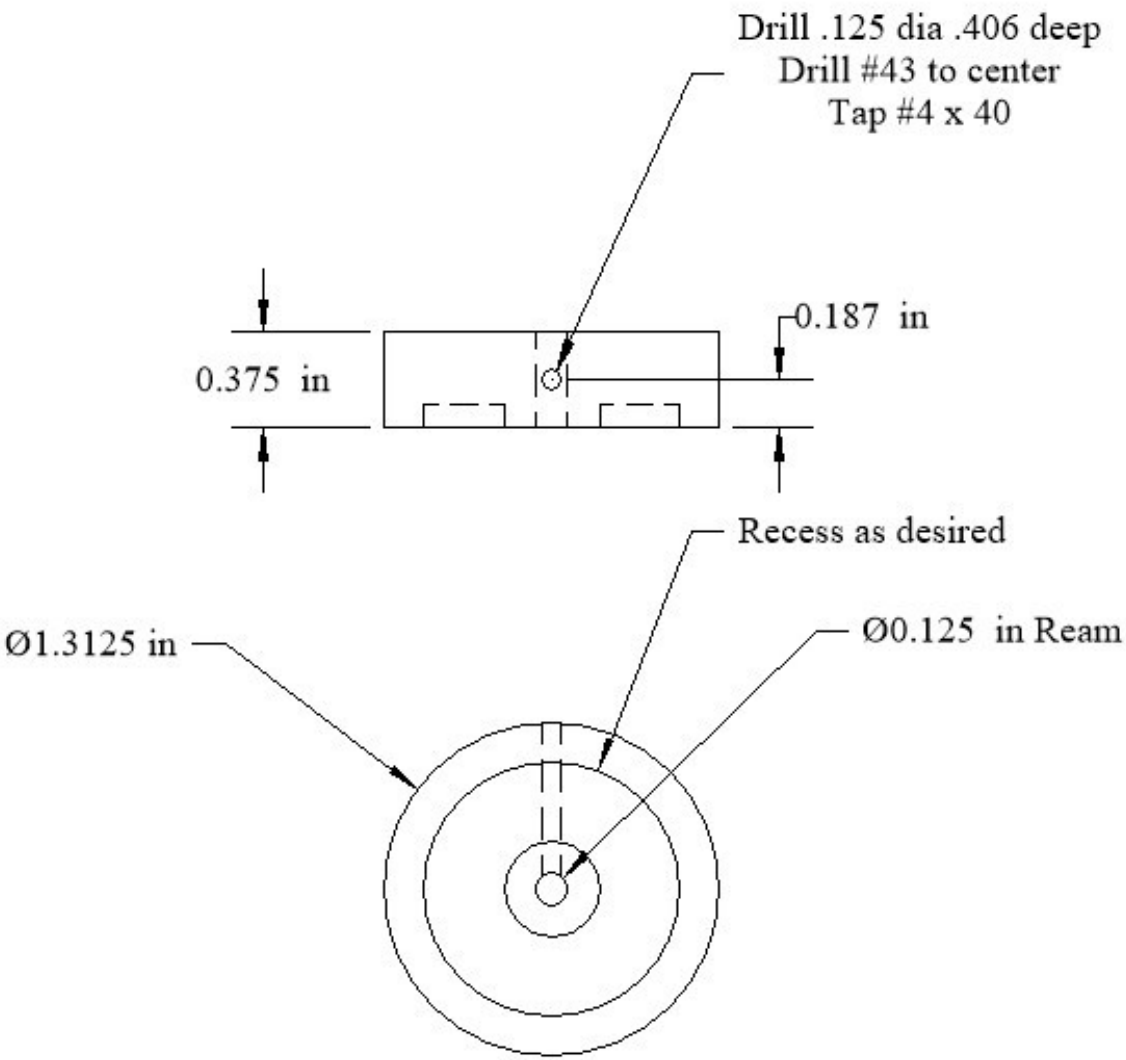
Crank Disk



Crank Disk

Flywheel

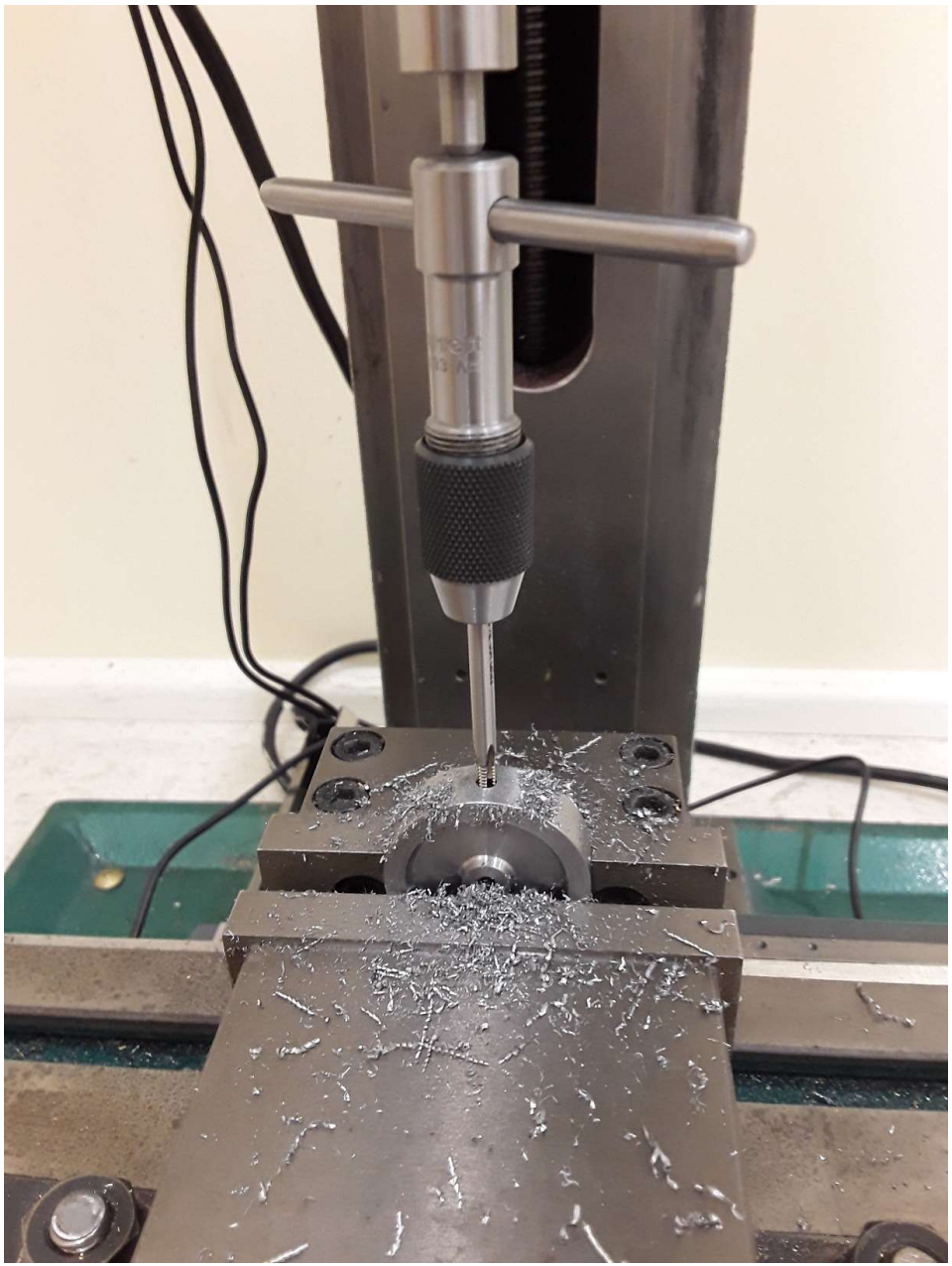
Flywheel



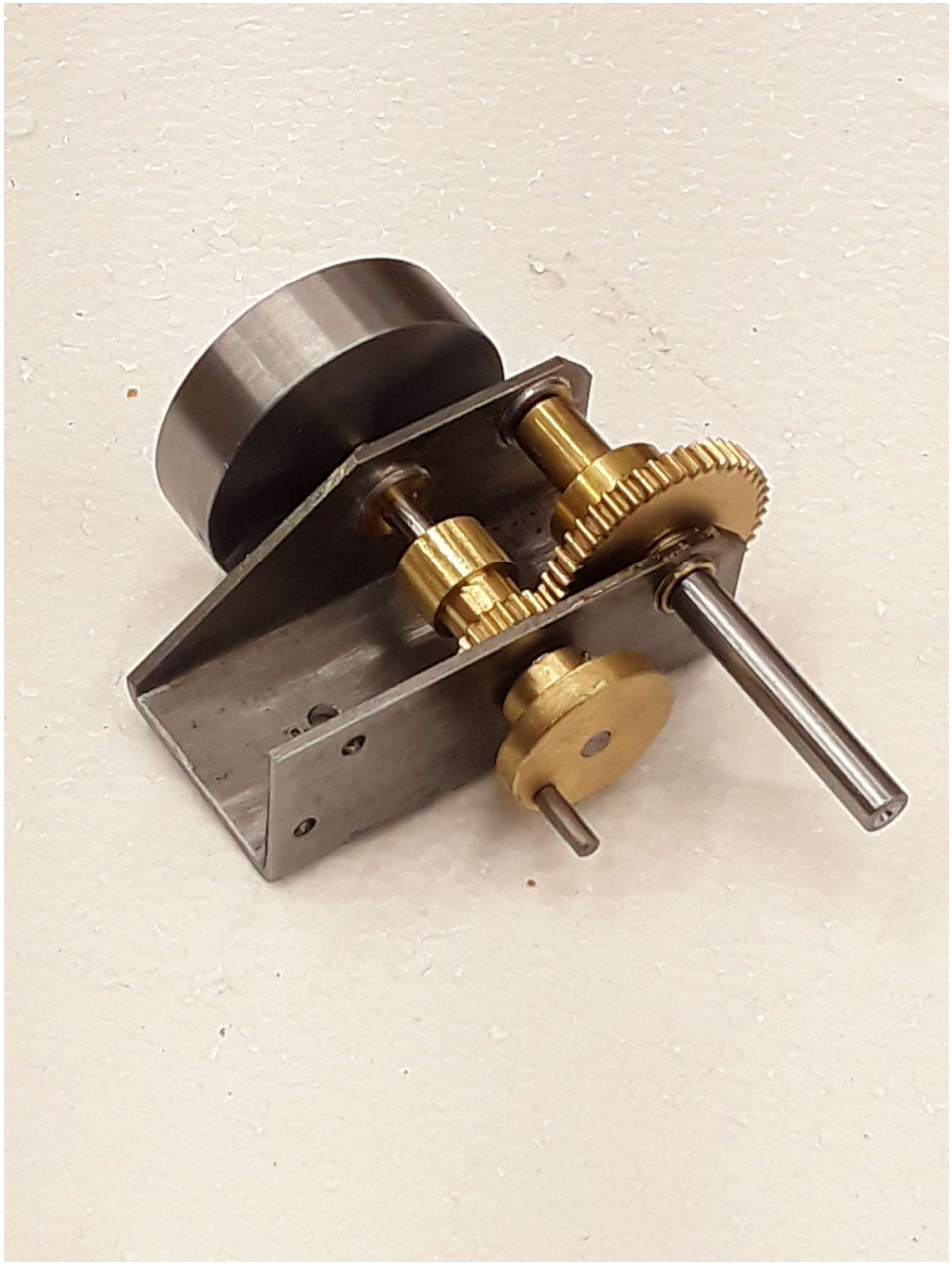
Flywheel

Flywheel

Flywheel

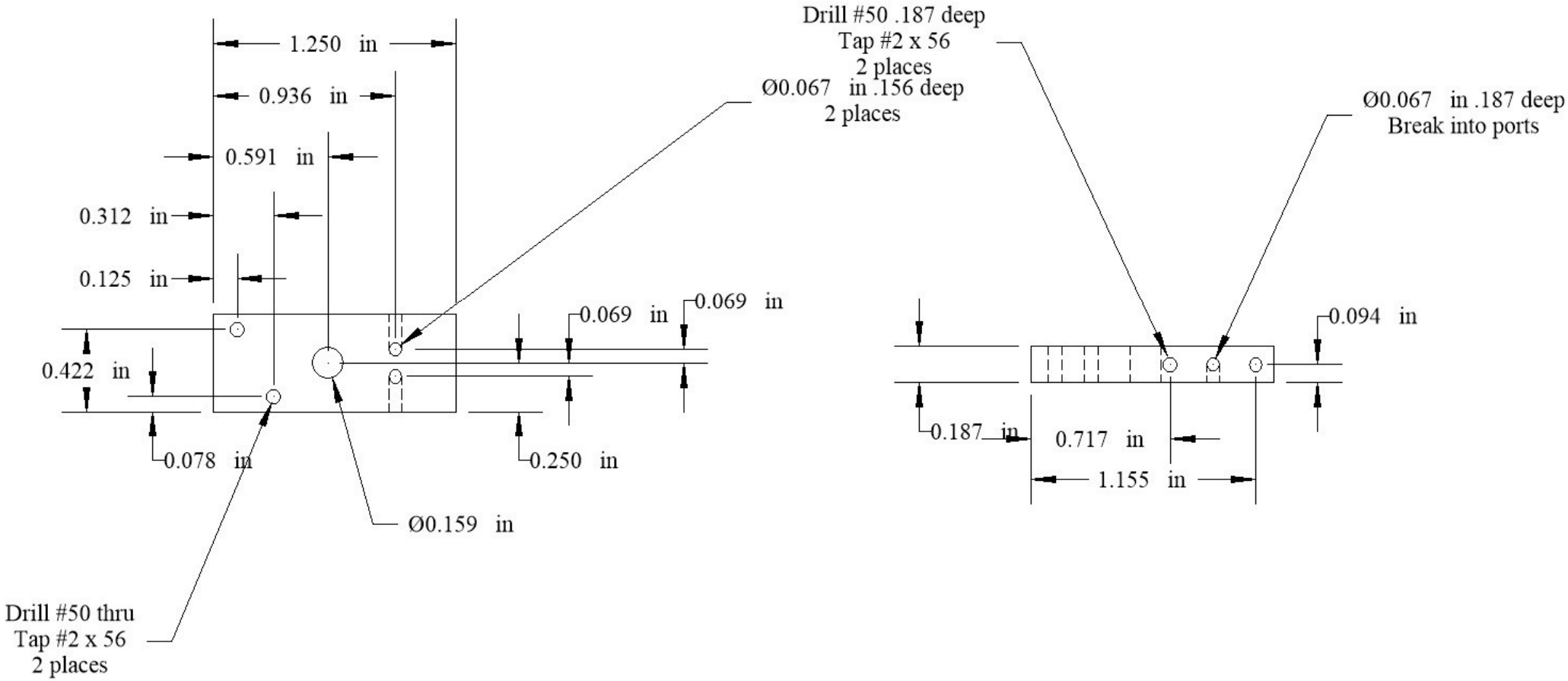


Rotating Assembly

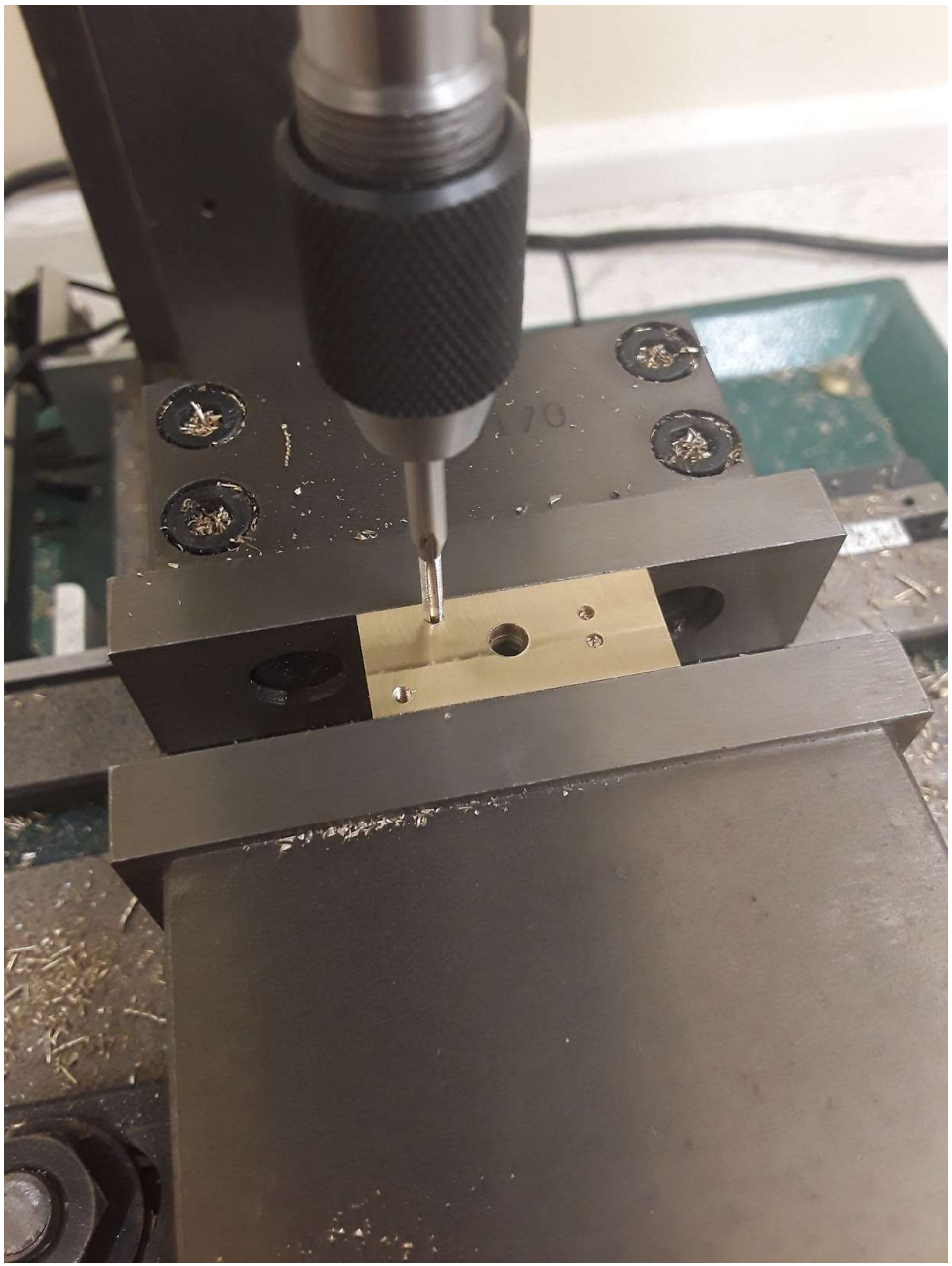


Rotating Assembly

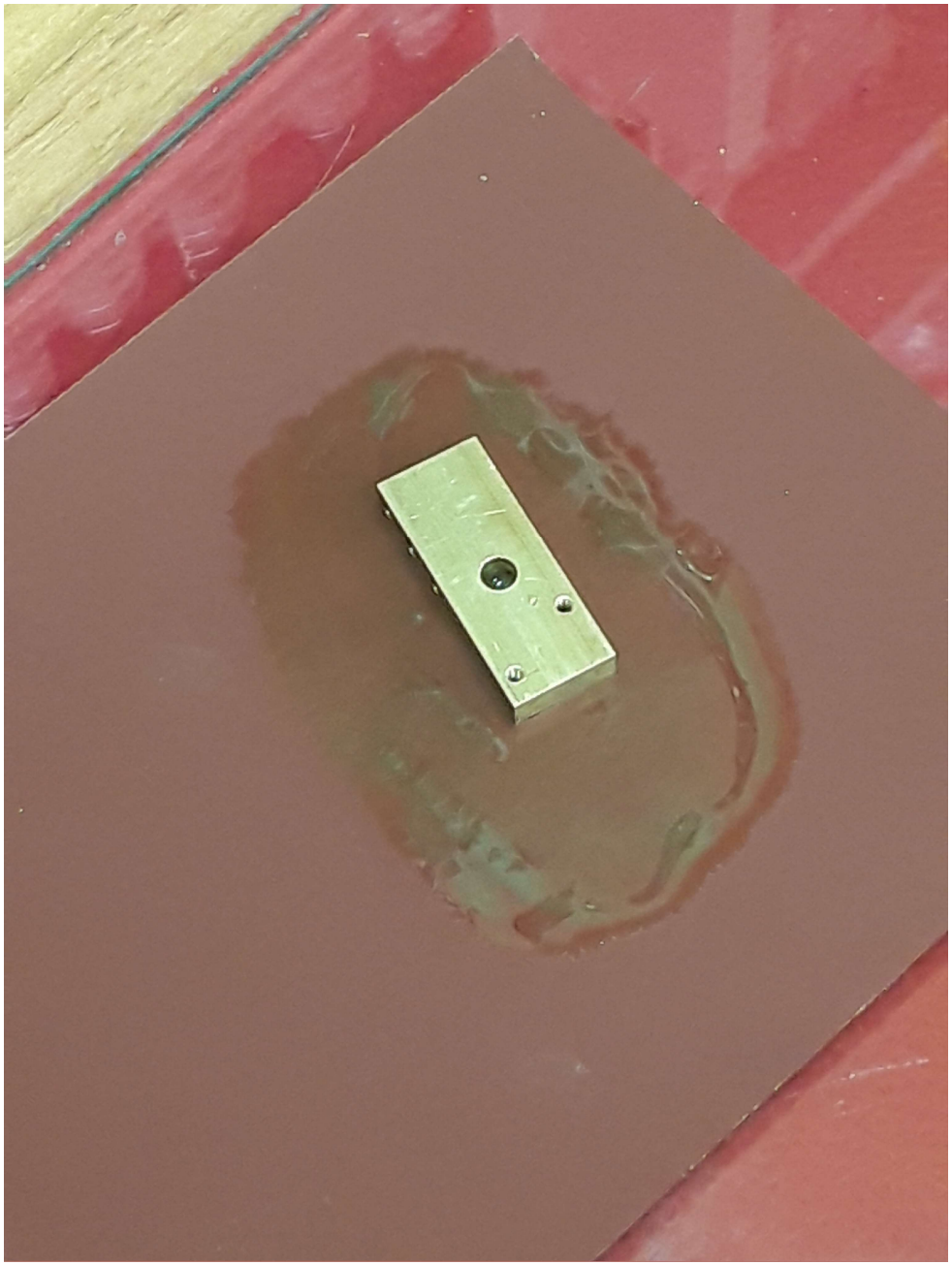
Portface


1.250 in
0.936 in
0.591 in
0.312 in
0.125 in
0.422 in
0.078 in
0.069 in
0.069 in
0.250 in
Ø0.159 in
Drill #50 thru
Tap #2 x 56
2 places
Ø0.067 in .156 deep
2 places
Drill #50 .187 deep
Tap #2 x 56
2 places
Ø0.067 in .187 deep
Break into ports
0.094 in
0.187 in
0.717 in
1.155 in

Portface

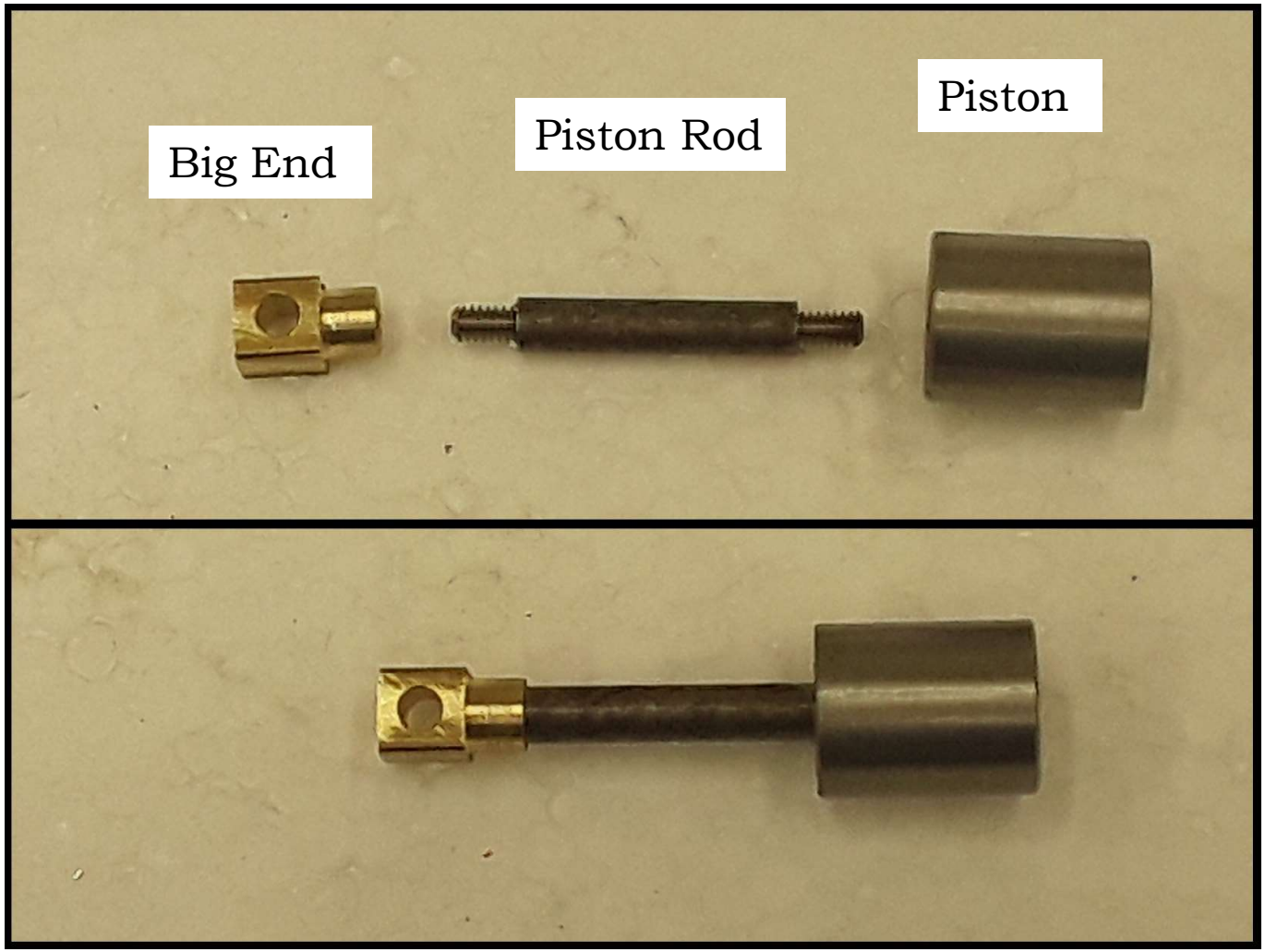


Portface



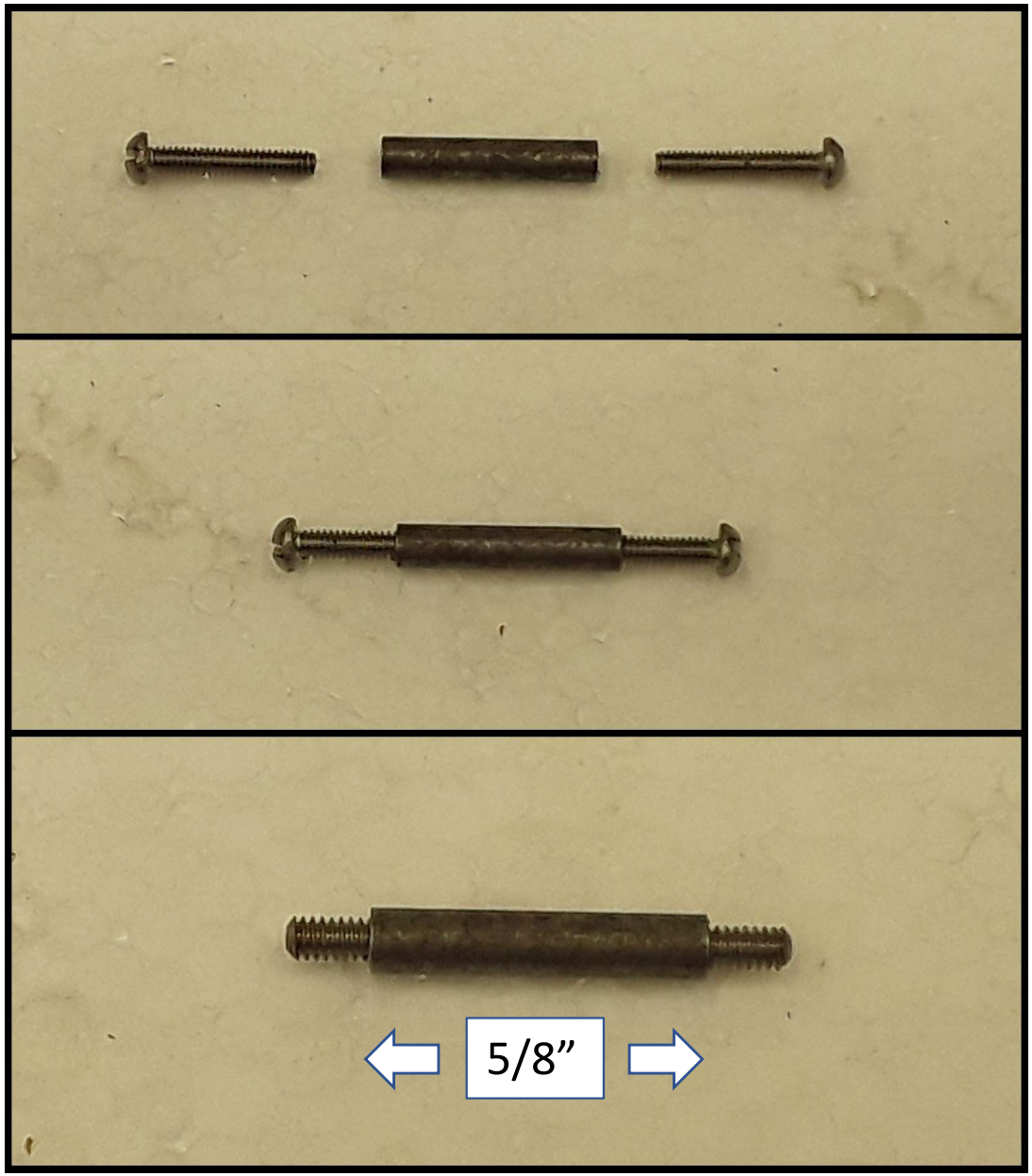
Piston

Piston material is alloy 303 “Ground and Polished” stainless steel. Length is 0.469” (15/32”). Tap one end with #2 x 56

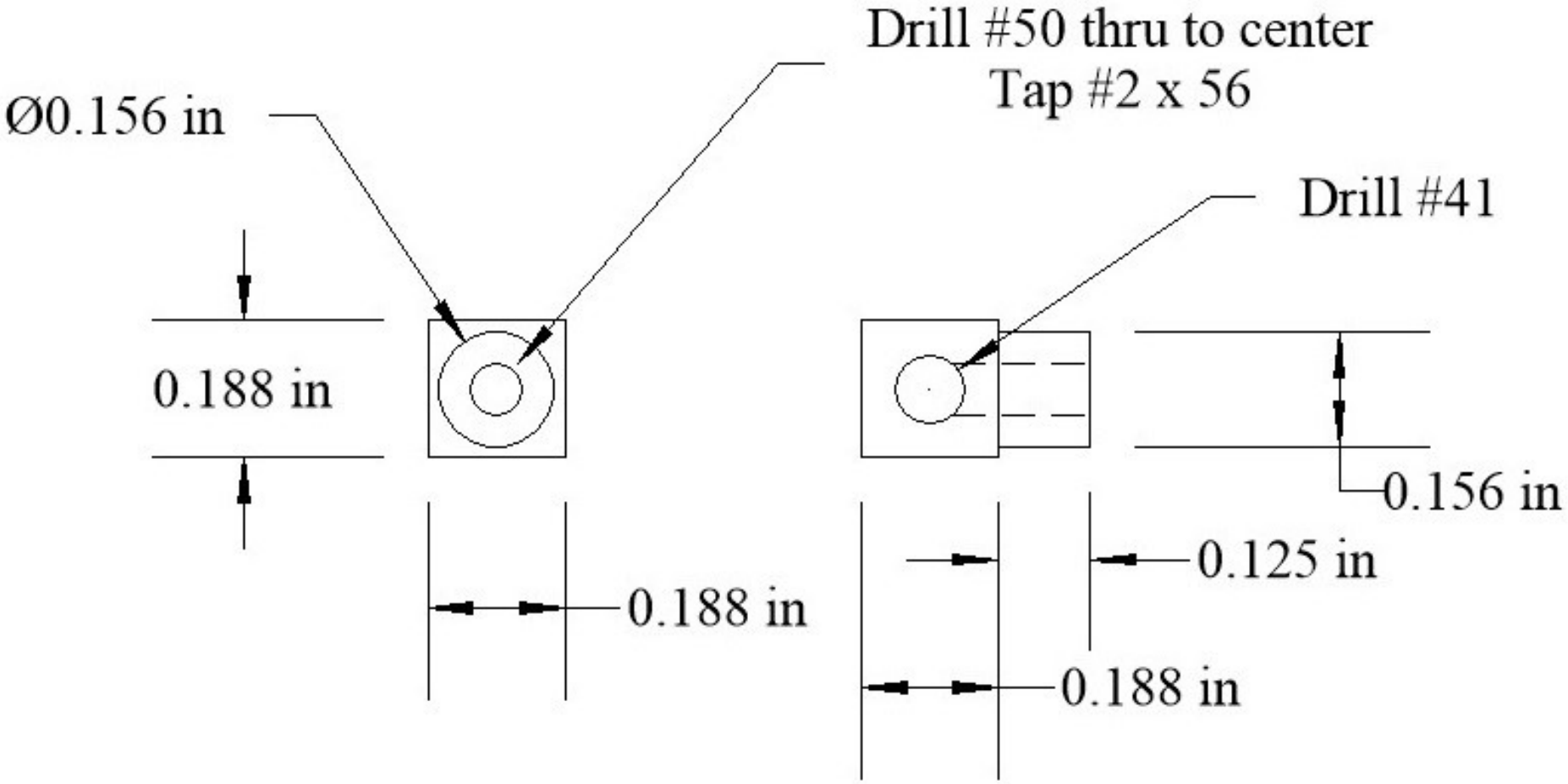


Piston

Piston Rod is
1/8” diameter
Brass or Steel.
Drill and tap
with #2 x 56



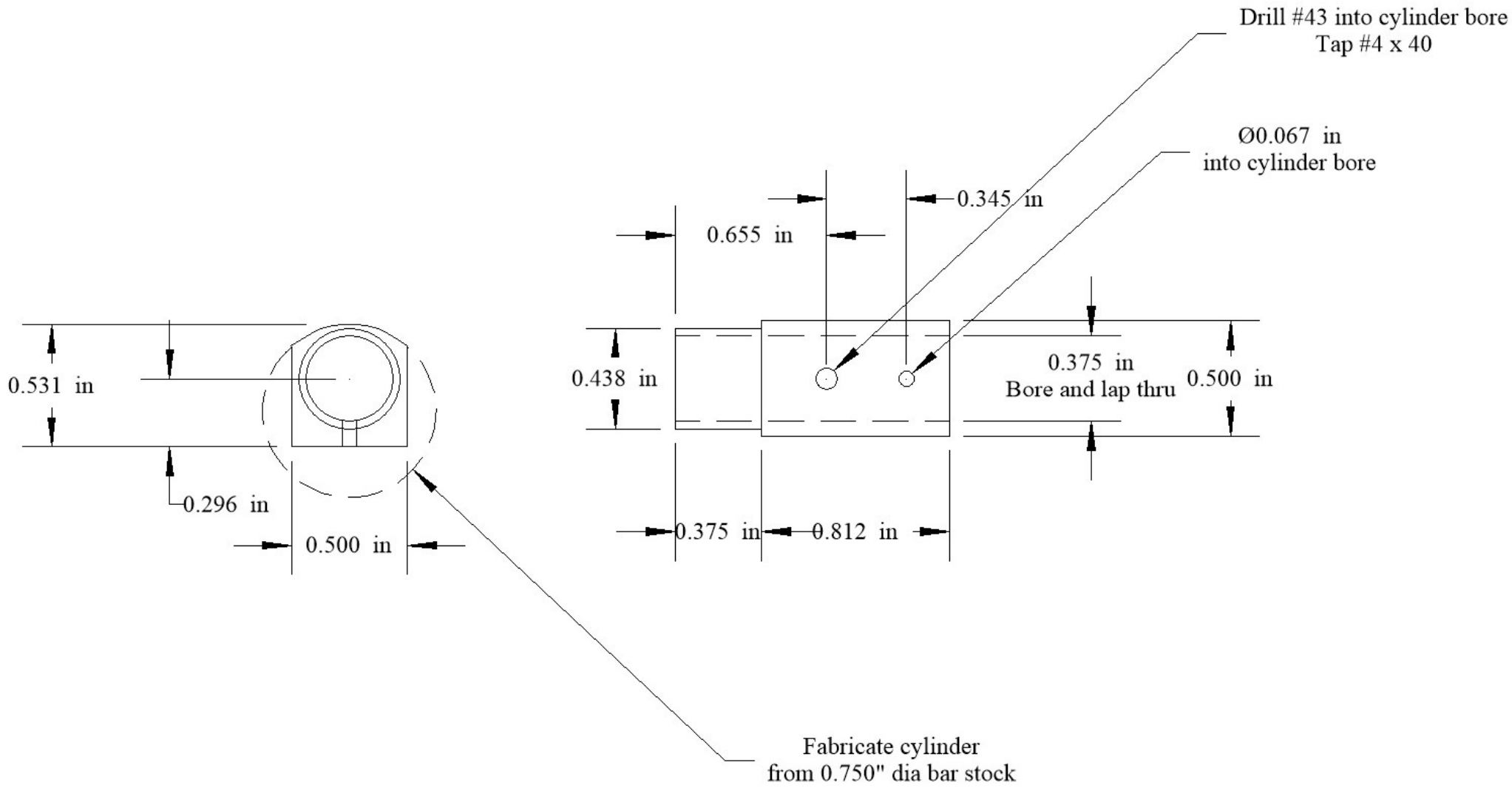
Piston


Drill #50 thru to center
Tap #2 x 56
Ø0.156 in
Drill #41
0.188 in
0.156 in
0.125 in
0.188 in
0.188 in

Piston

Piston

Cylinder

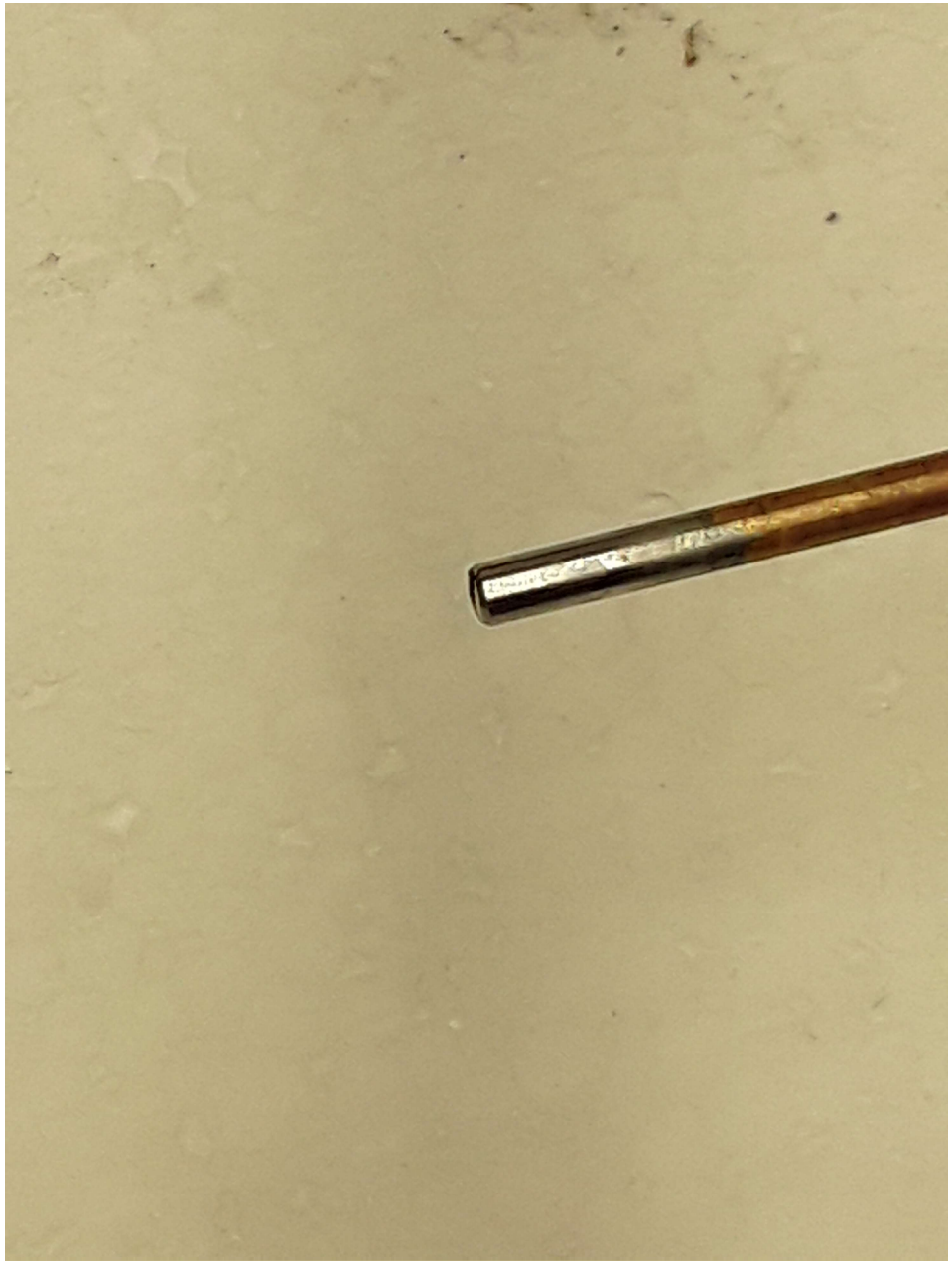

Drill #43 into cylinder bore
Tap #4 x 40
Ø0.067 in
into cylinder bore
0.345 in
0.655 in
0.531 in
0.438 in
0.375 in
Bore and lap thru
0.500 in
0.296 in
0.500 in
0.375 in
0.812 in
Fabricate cylinder
from 0.750" dia bar stock

Cylinder

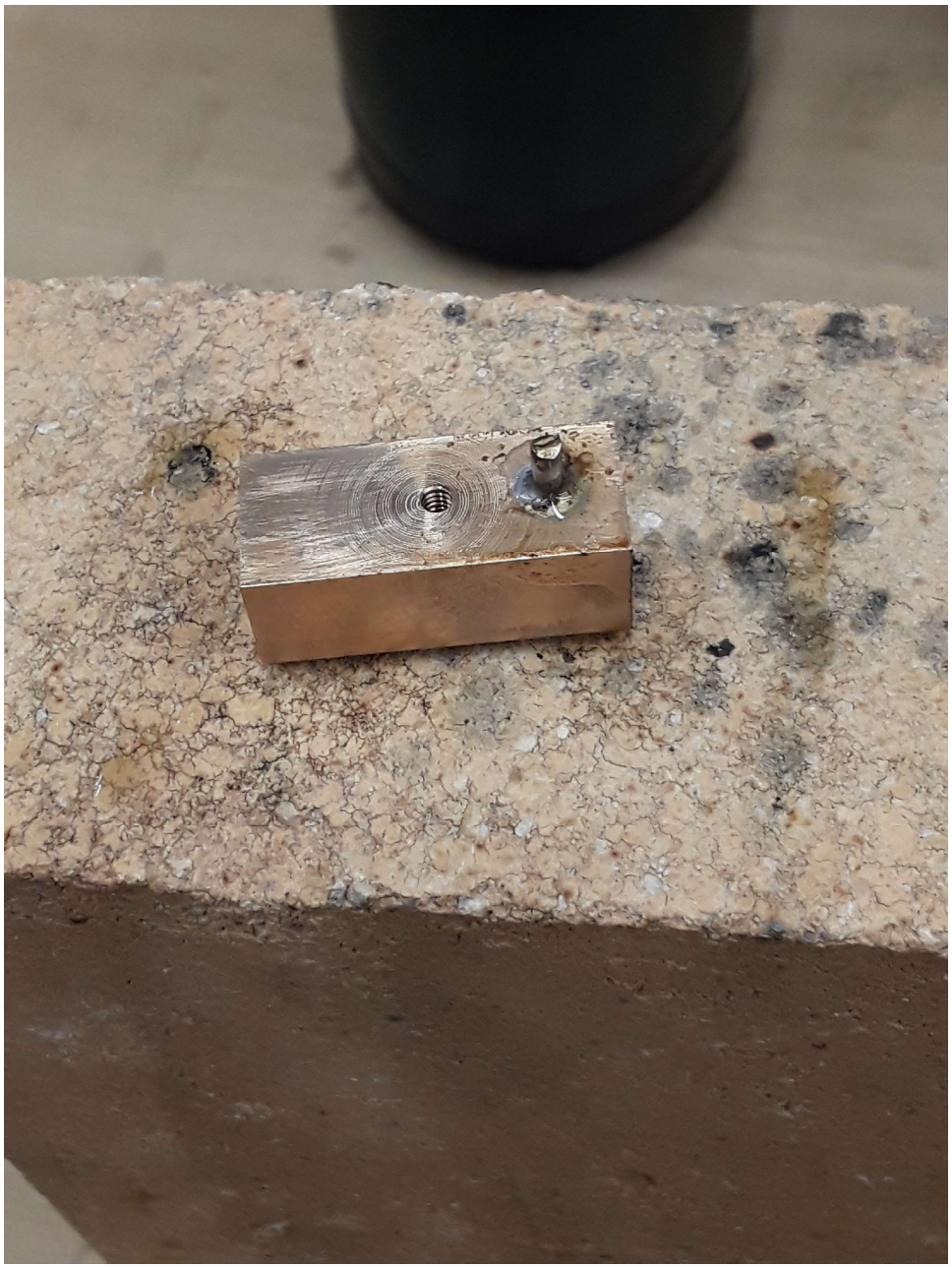
Cylinder

Opps!!
Boo boo
big time.

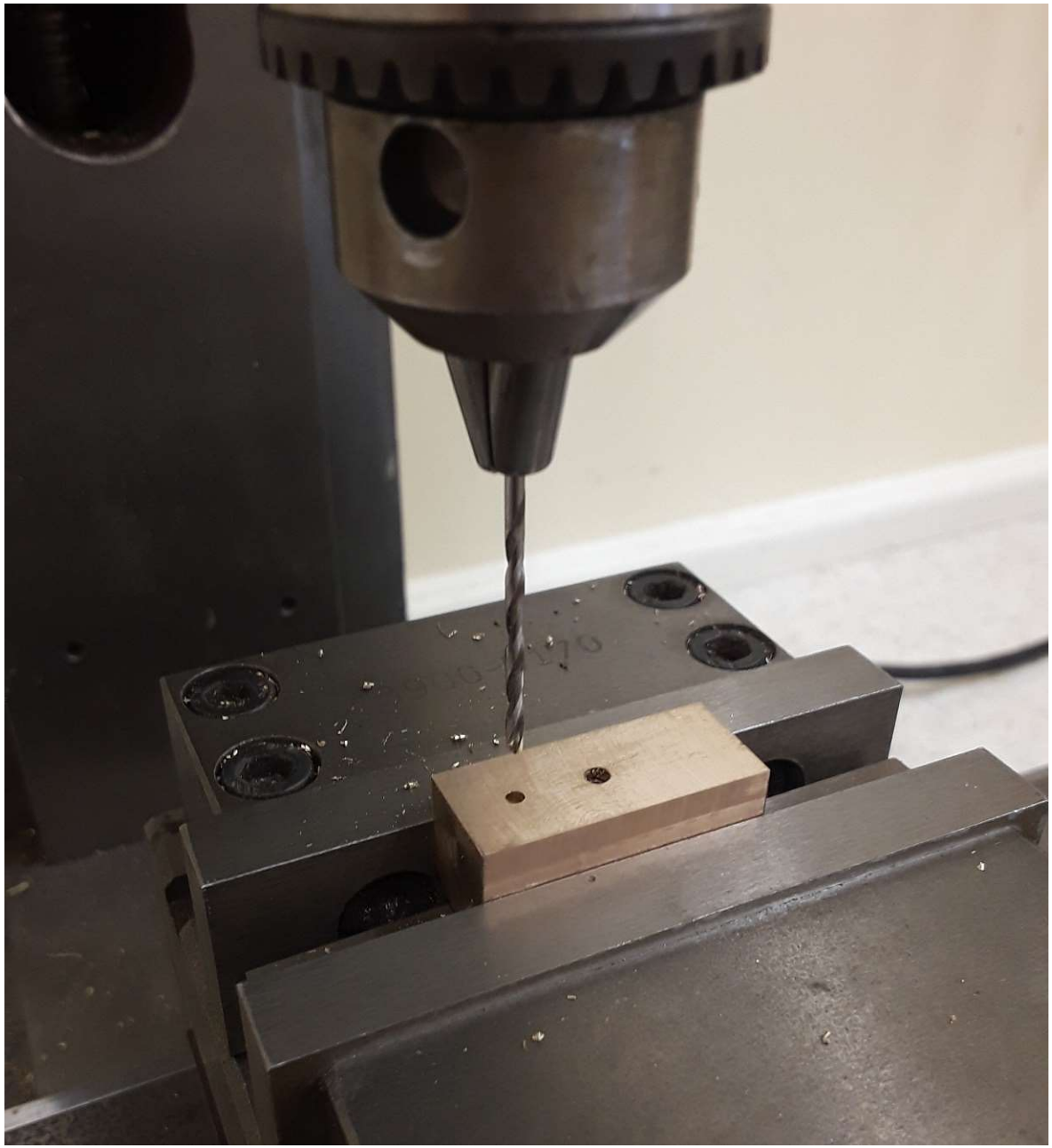
Cylinder



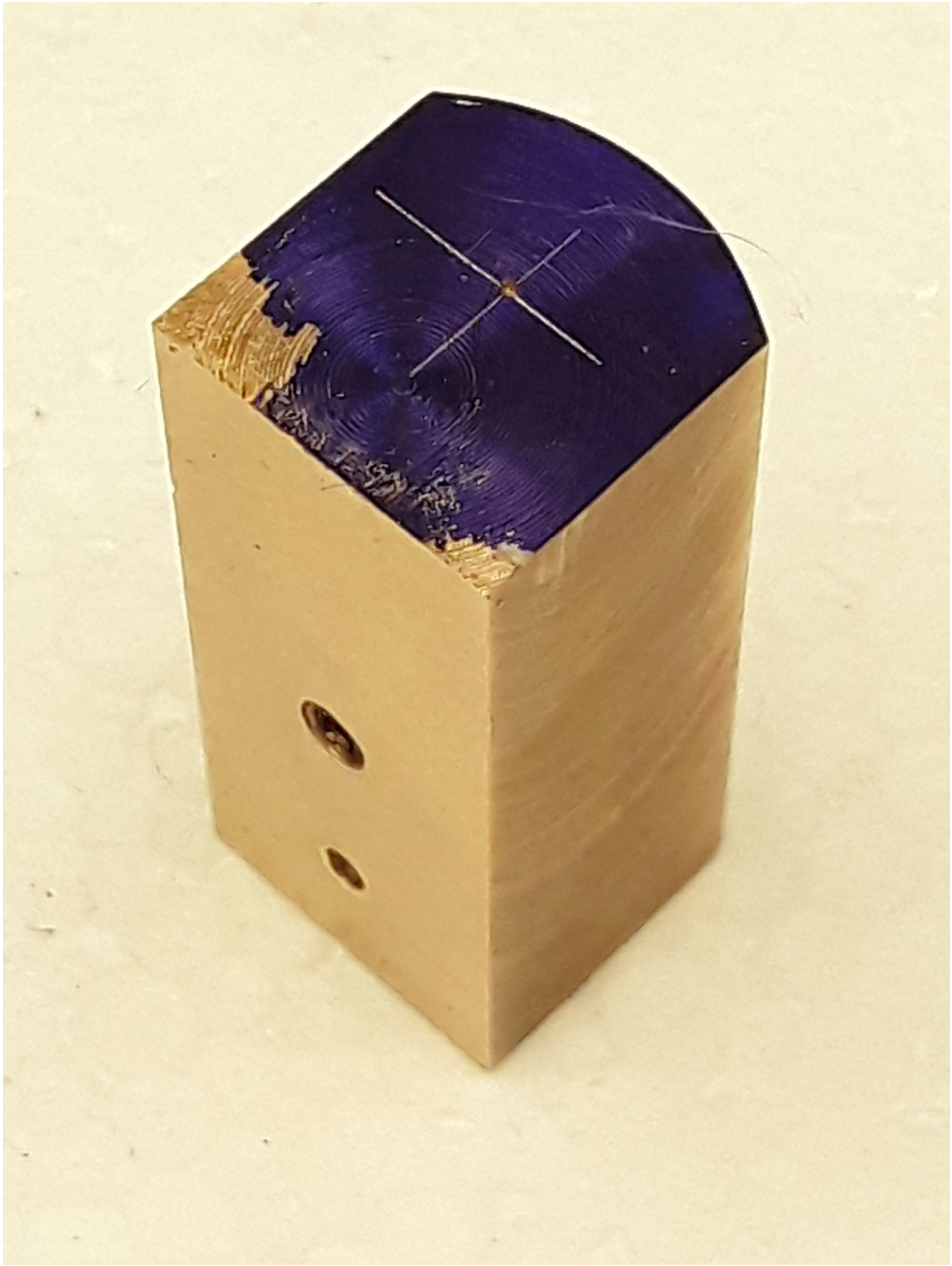
Cylinder



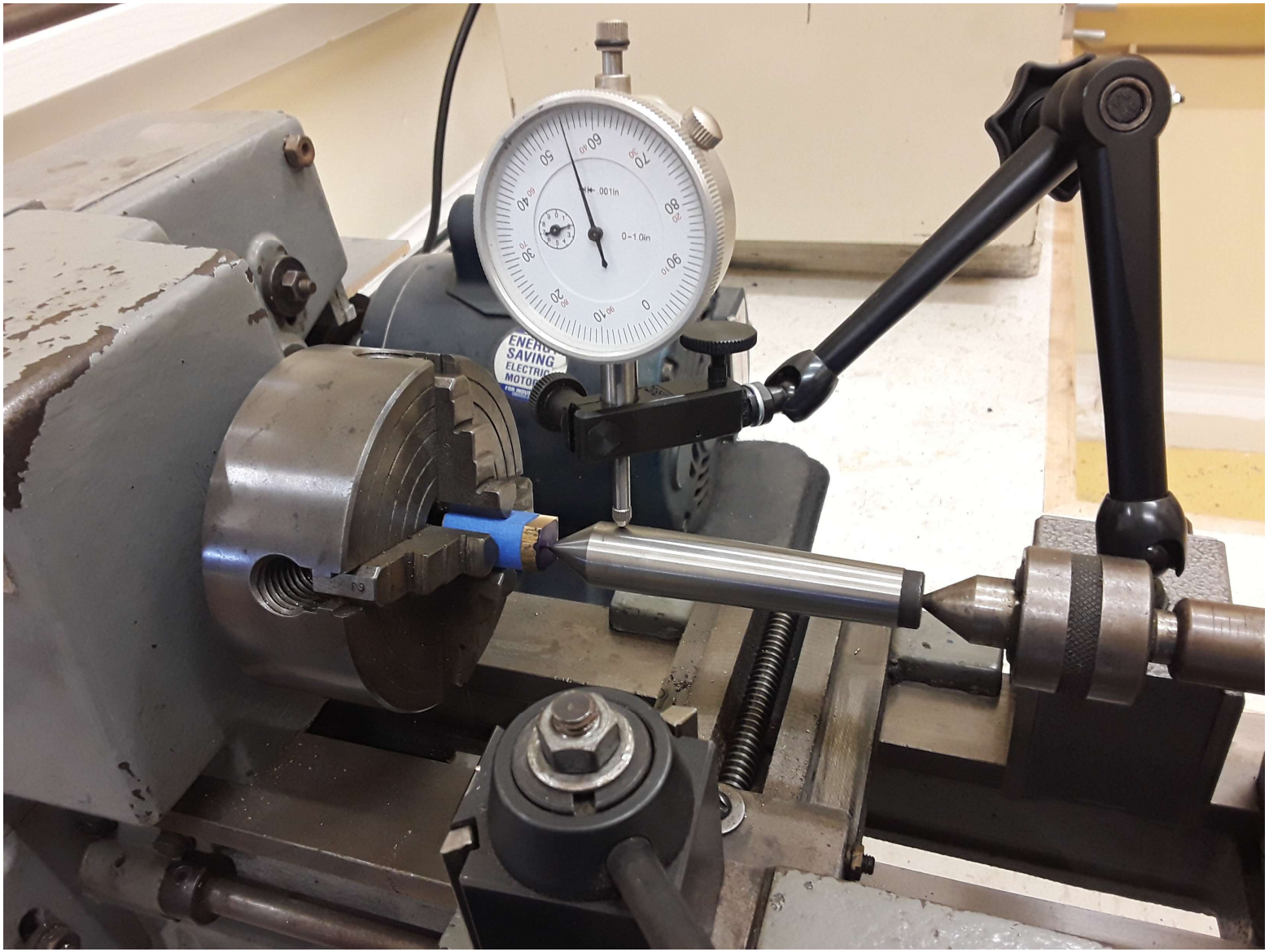
Cylinder



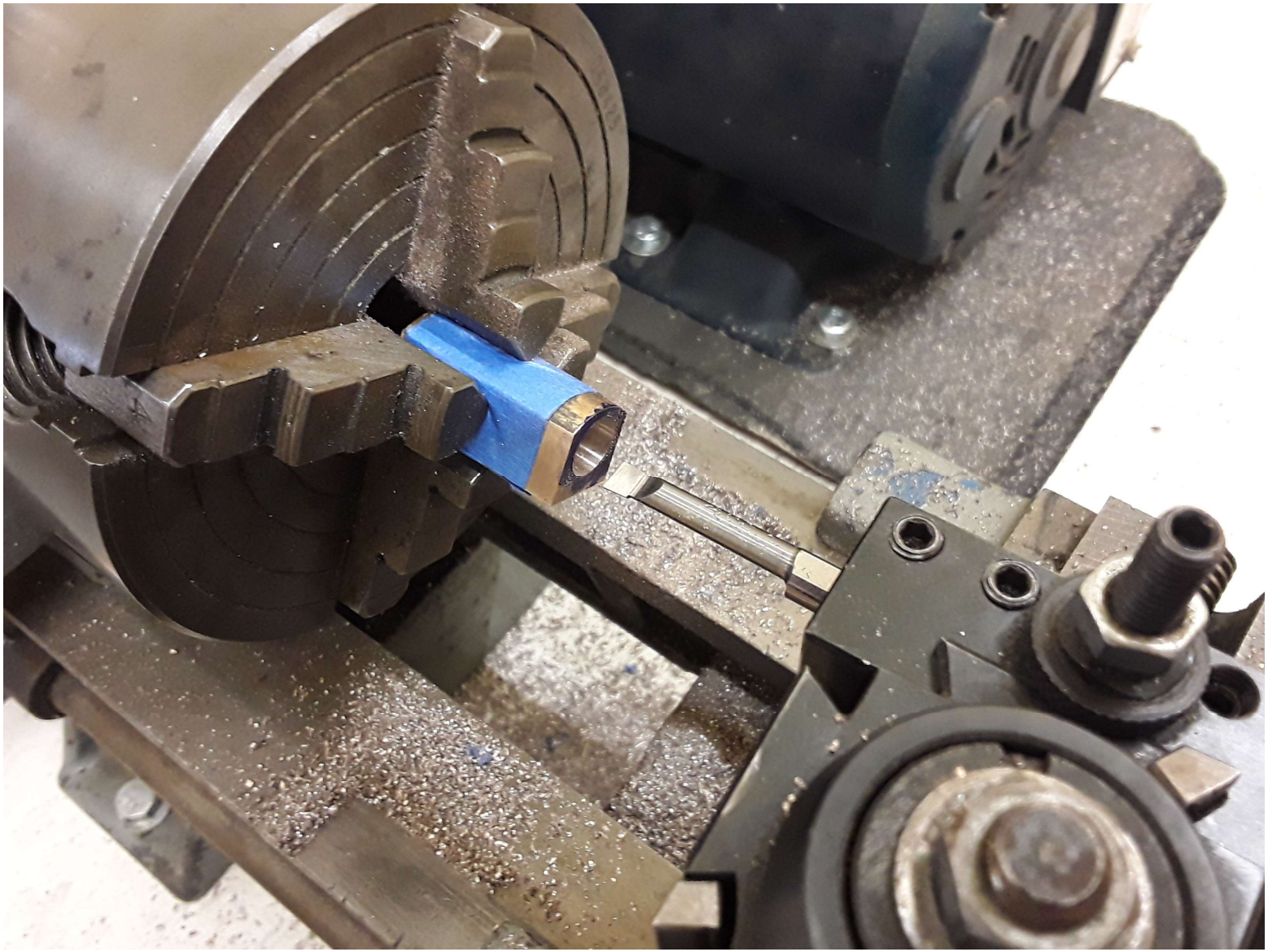
Cylinder



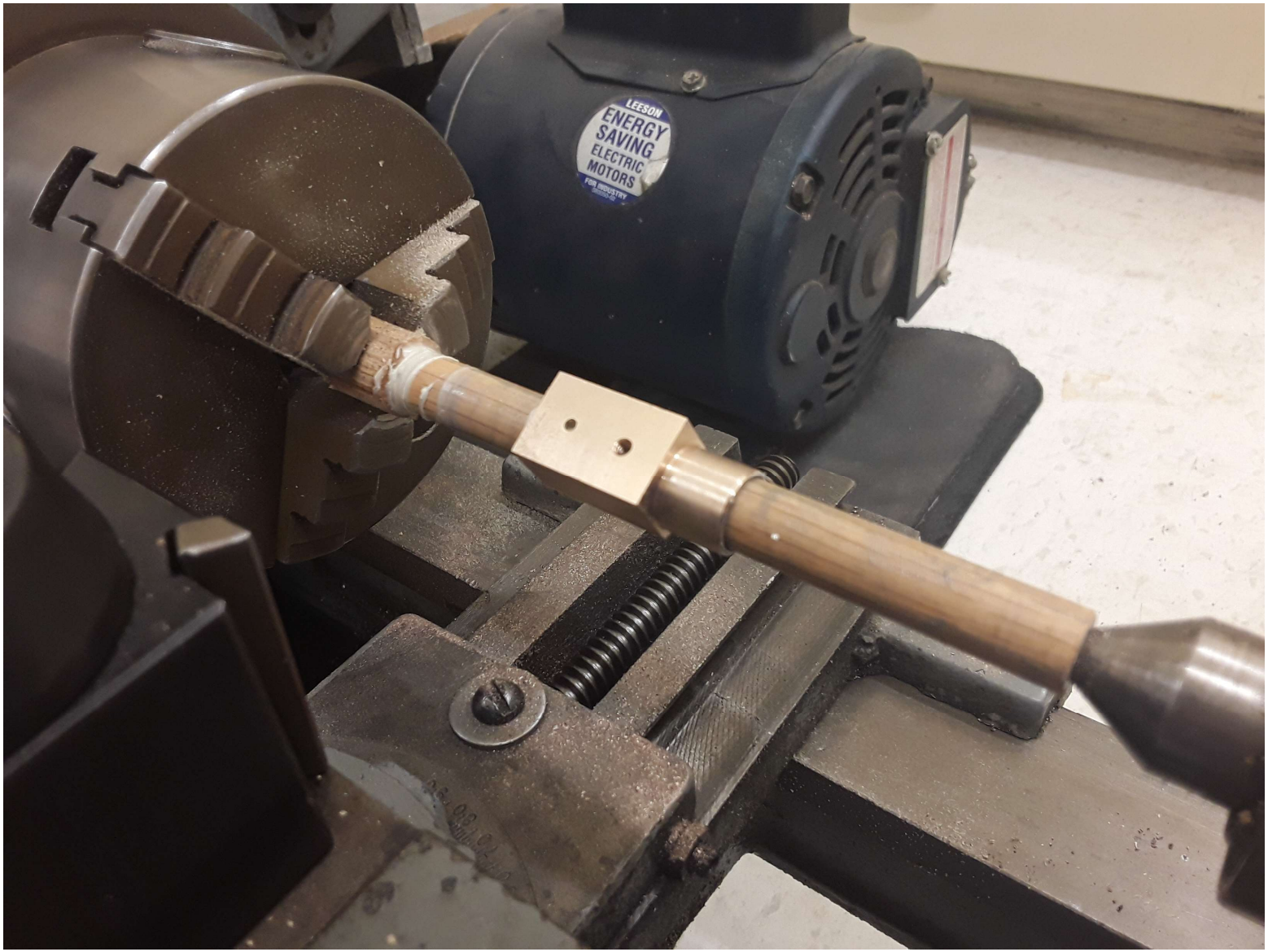
Cylinder



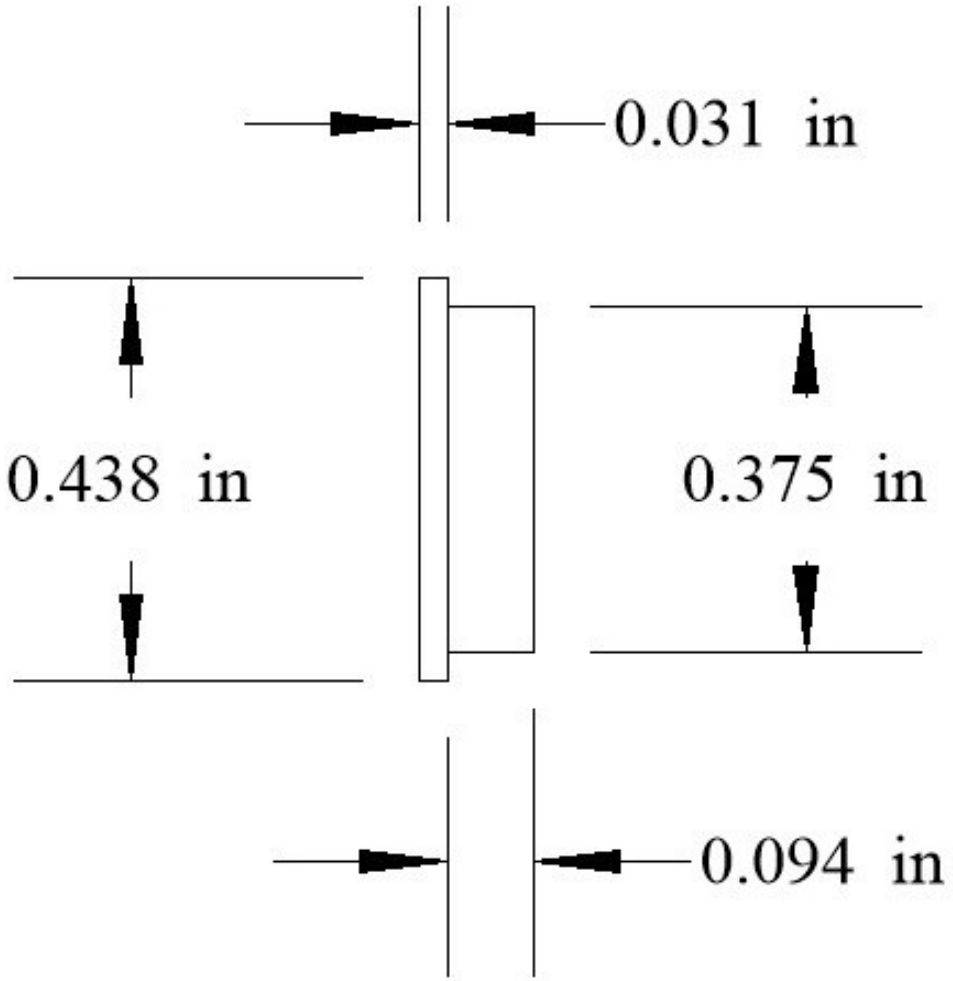
Cylinder



Cylinder



Cylinder

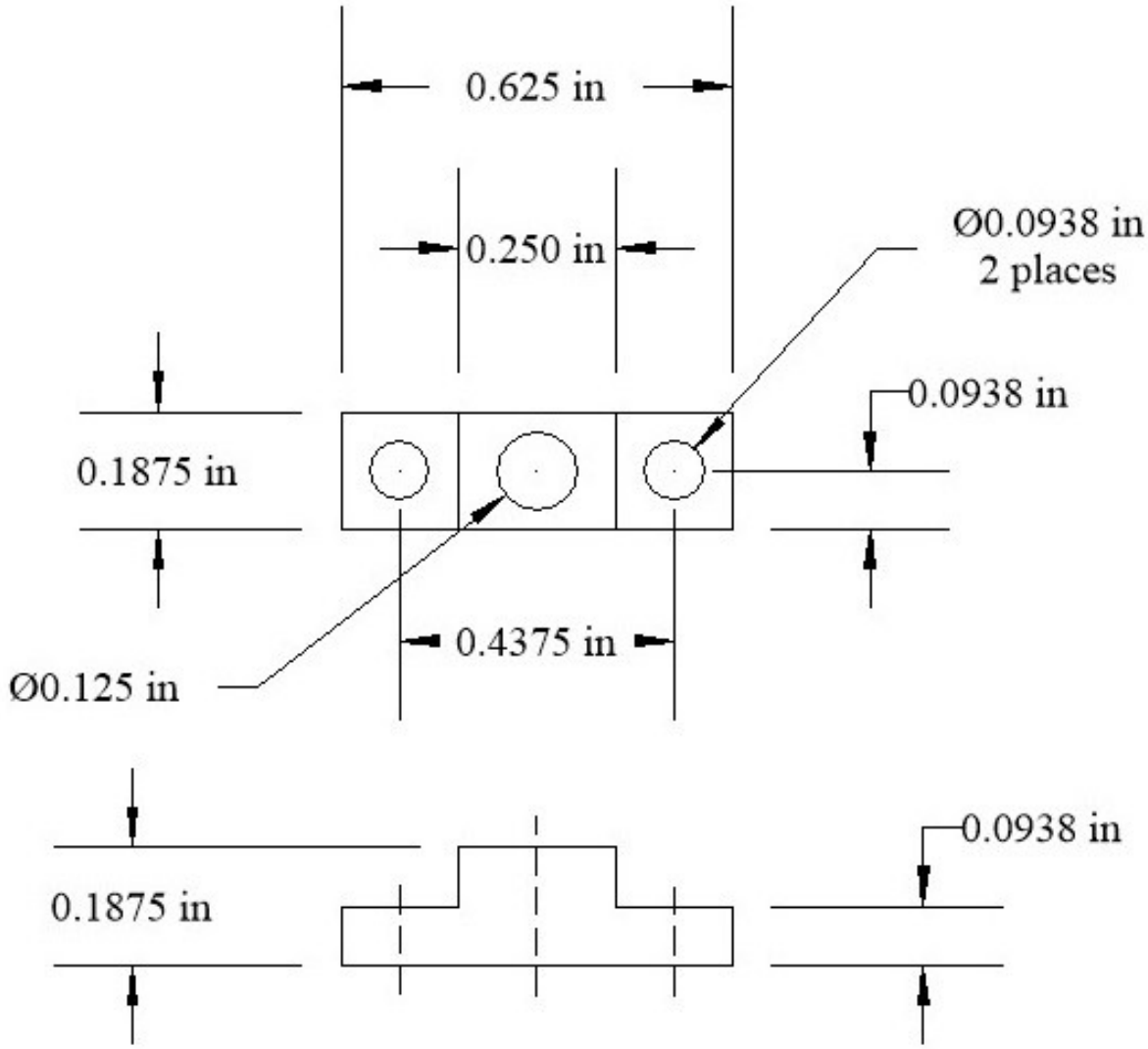


Cylinder

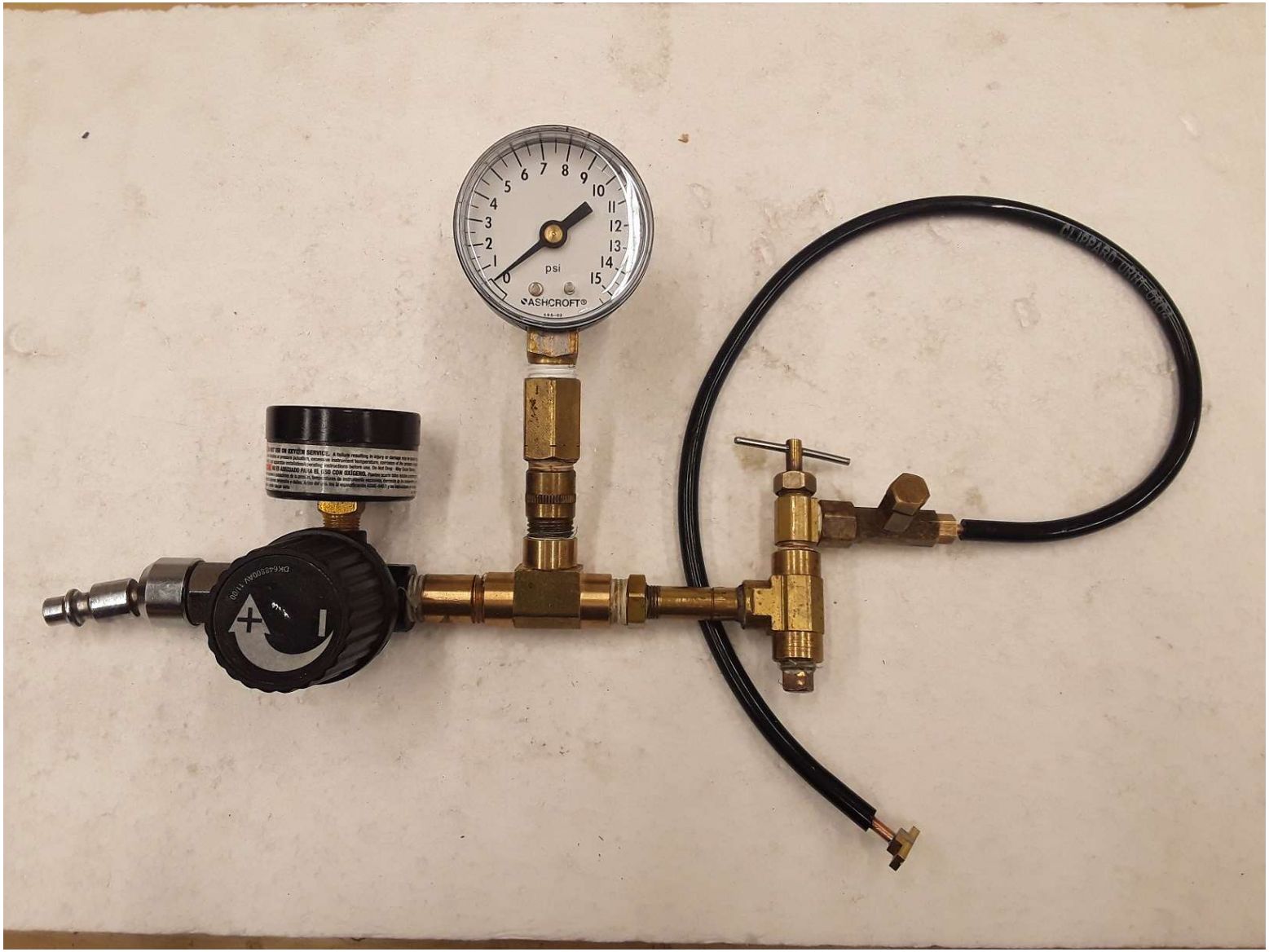
Cylinder Pivot Pin:

- 5/32” diameter
- Tapped #4 x 40 both ends
- Body length is 0.340”
- Use McMaster Carr spring part # 1986K333

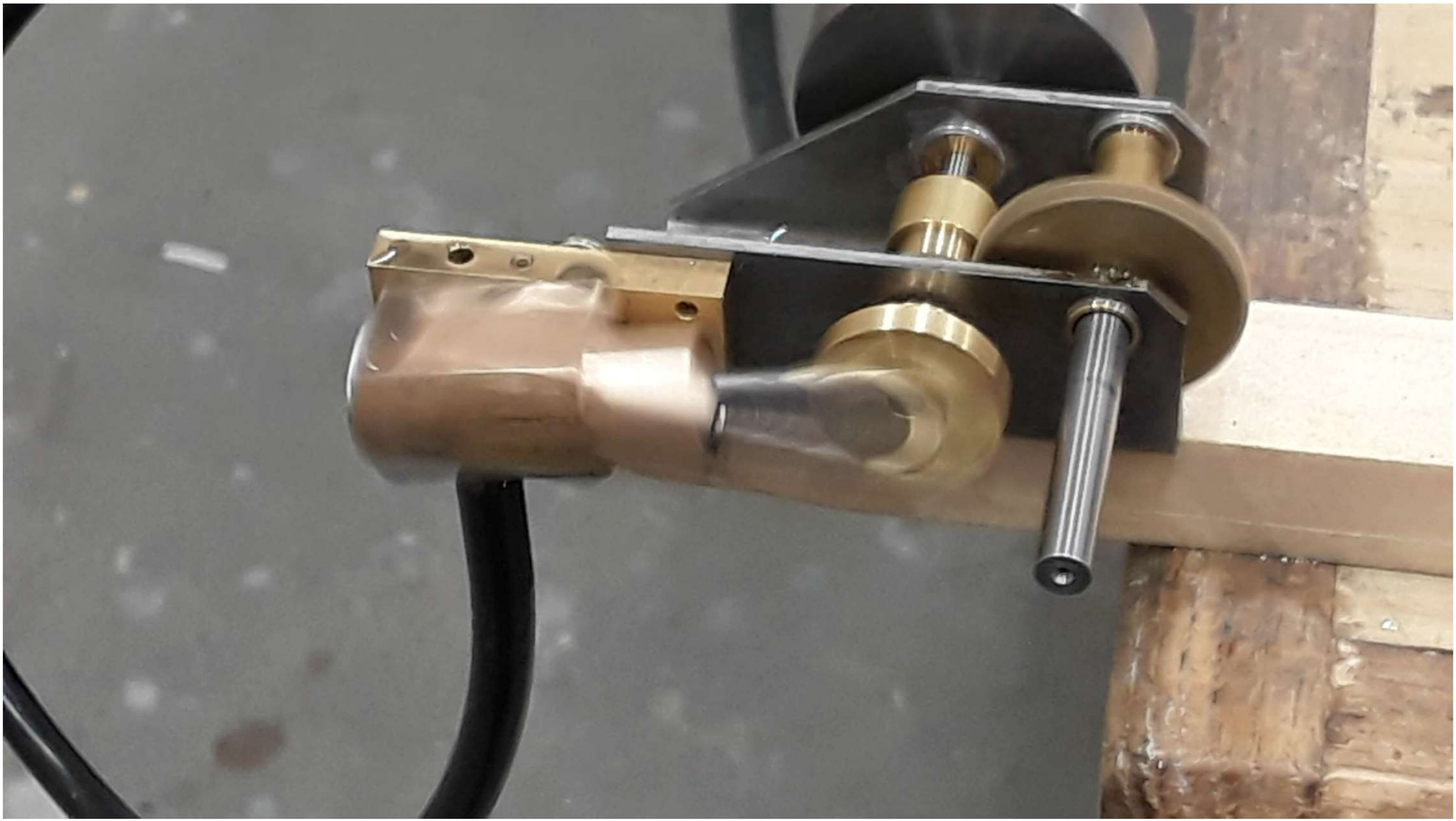
Steam/Exhaust Flange



Air Test



Air Test



Questions?