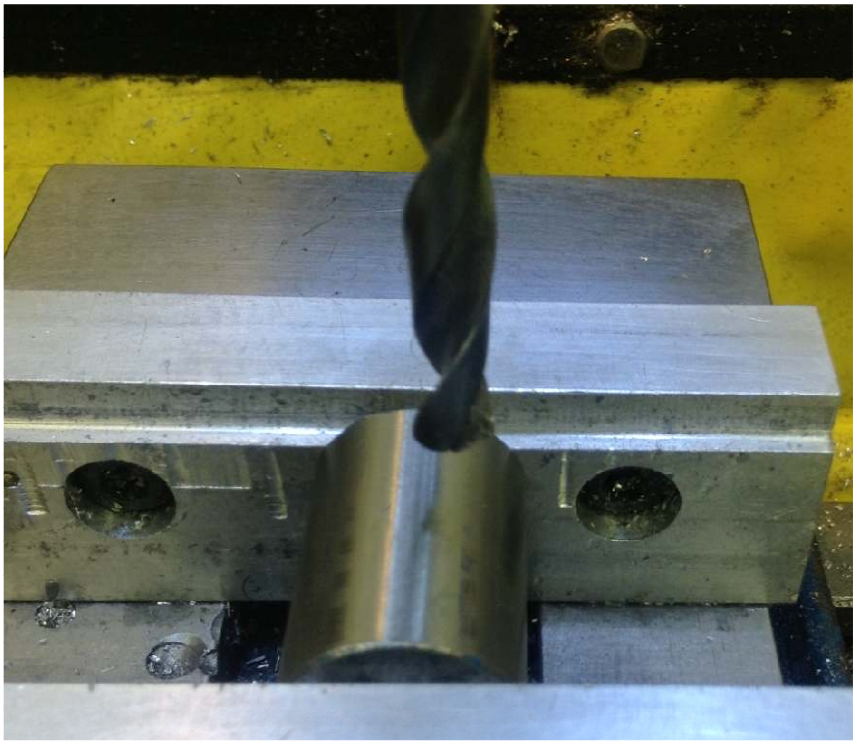
Yet Another Center Finding Tool, version 1.1

By R. G. Sparber



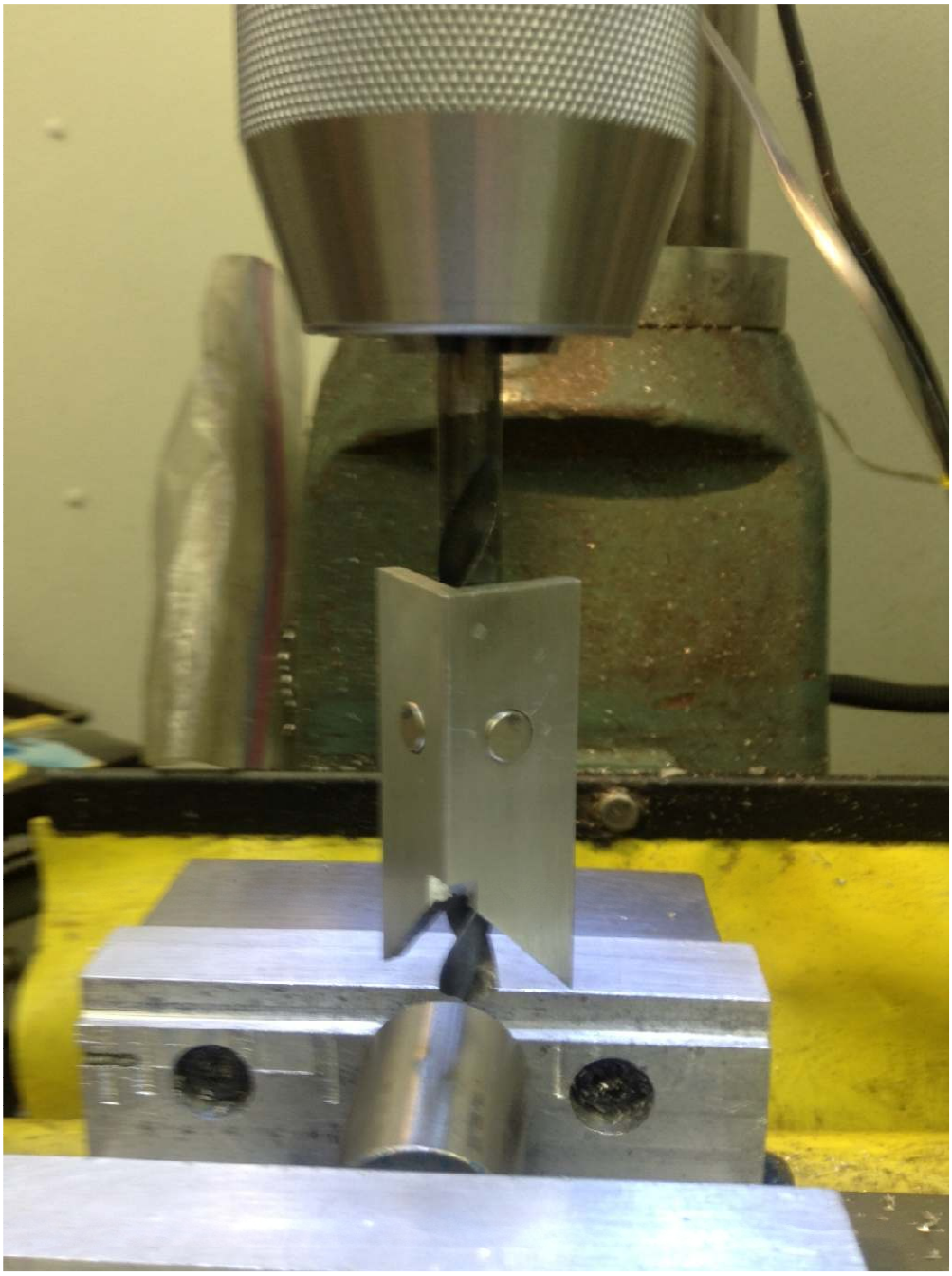
There are no lack of center finding tools in this world. But that never stopped me before.

I like the center finding tool with the right angle fork that pivots. Move this fork over the outside diameter (OD) of the round workpiece until the needle points vertically. You are then very close to the center.

But it got me thinking. Can I do the task without any moving parts? So that was my starting point.

My answer is yes, but how close you get to center depends on a little practice. I have been able to repeatedly get within a few thou as compared to my Digital Read Out which was set to the centerline. This DRO has a repeatability and resolution of +/- 0.0005". Getting within +/- 0.005" is easy.

[1] You are free to copy and distribute this document but not change it.

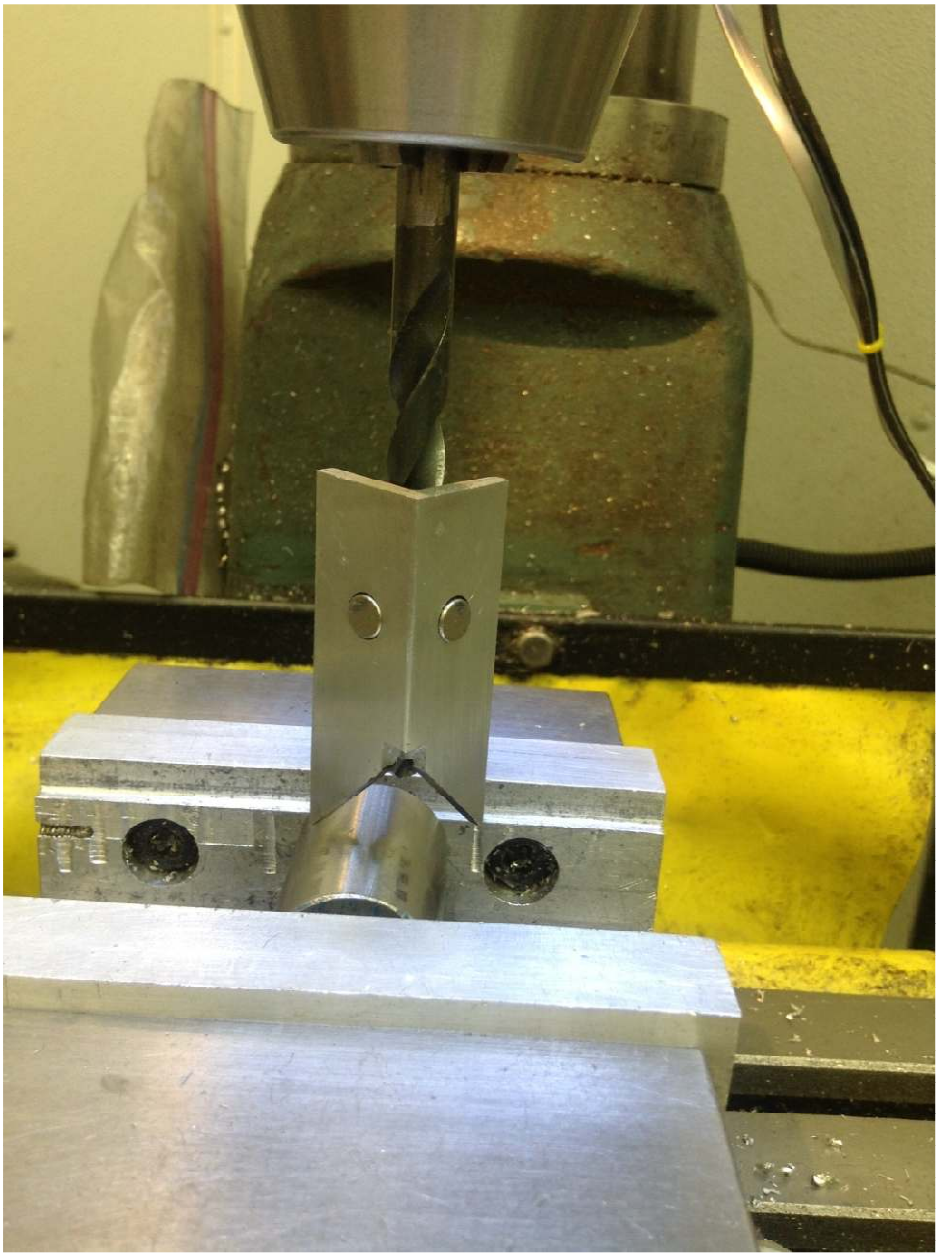


The tool consists of a piece of scrap aluminum with one end cut with a 90° V. Two round magnets are sunk into the faces of the stock so the tool will stick to the drill bit.

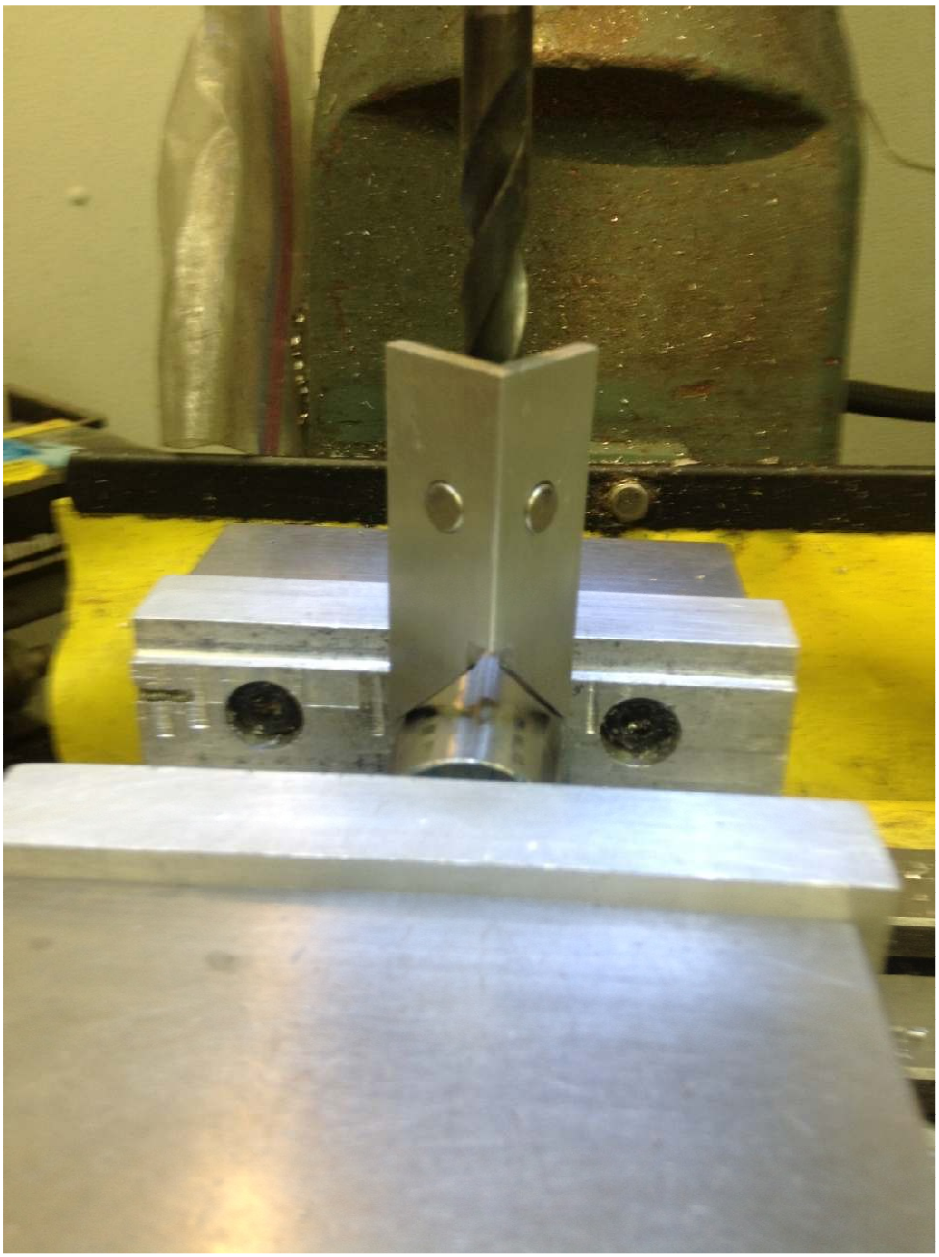
Although the tool will work on a fluted surface, I prefer to chuck up a piece of drill rod which is smooth.

Here is a video of the center finder in use:

http://www.youtube.com/watch?v=YAFo-K7FAaE



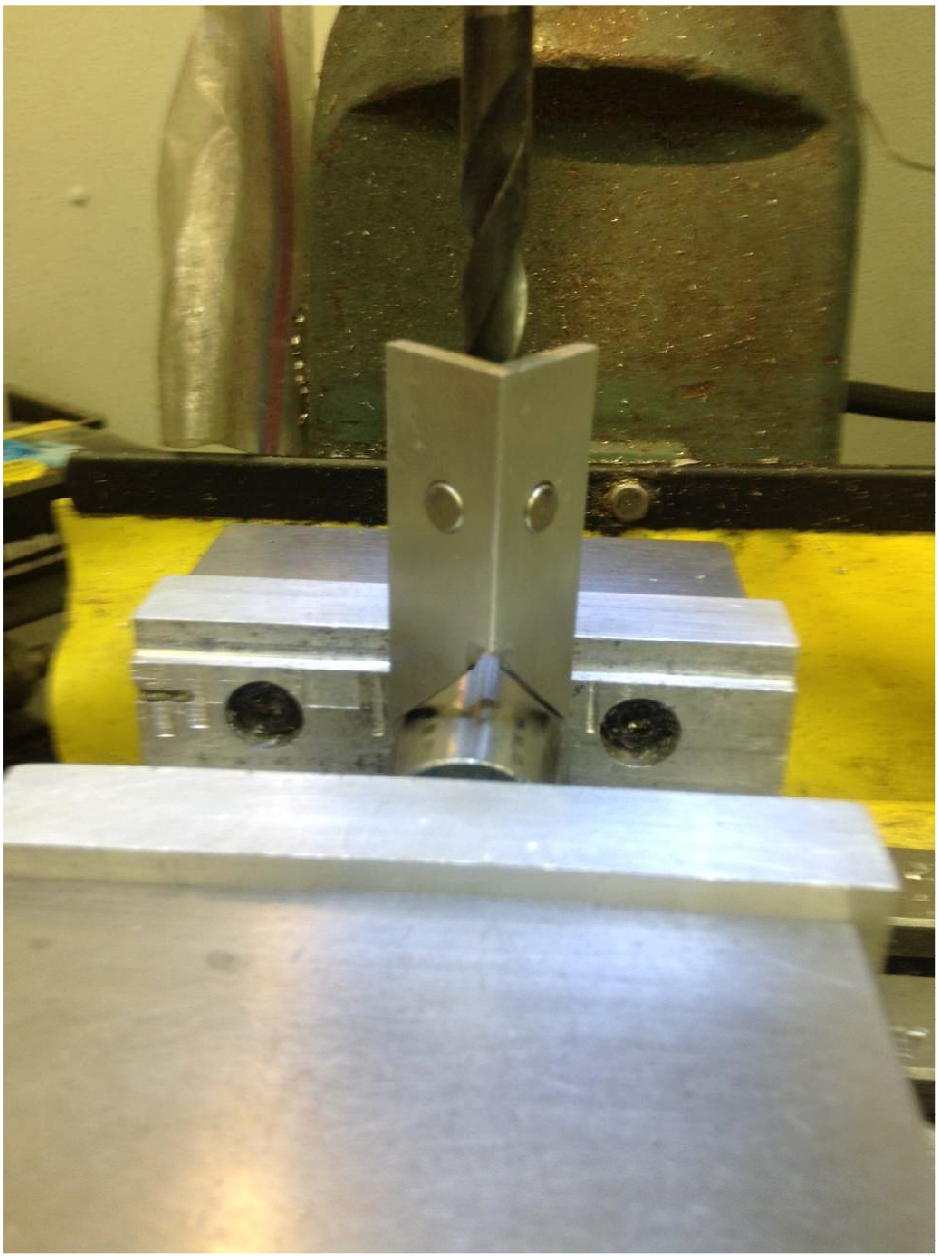
To center the drill, I point the corner of the tool towards me. Alignment is not critical although the closer to straight, the better.



Then the drill or tool is lowered down so it is near the workpiece. The diameter of the workpiece must be small enough to permit the bottom edges of the tool to contact the OD.

This tool was cut from ¾" x ¾" x 1/8" angle but the idea can be scaled up to fit any OD.

Sight between the OD and the bottom edges of the tool to rough align the drill. This might be good enough in your application.

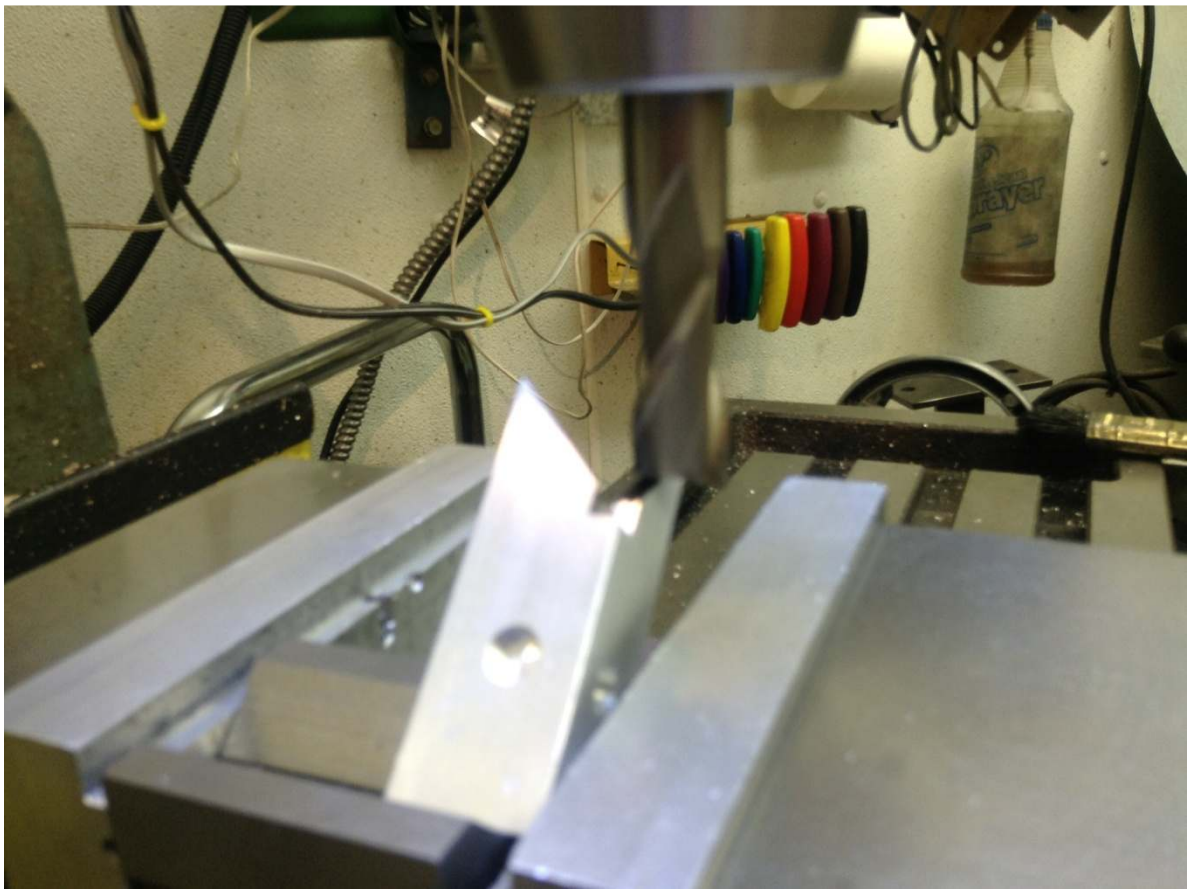


For maximum accuracy, move the workpiece side to side until the tool rests on the drill bit and the bottom edges rest on the OD with no rocking. You are then centered to the best ability of the tool.

The accuracy of the tool depends on having the bottom V aligned with the center line of the angle stock.

Since this was a proof of concept, I used aluminum. Steel angle would be more durability but would tend to spread the magnetic field so stronger magnets would be needed.

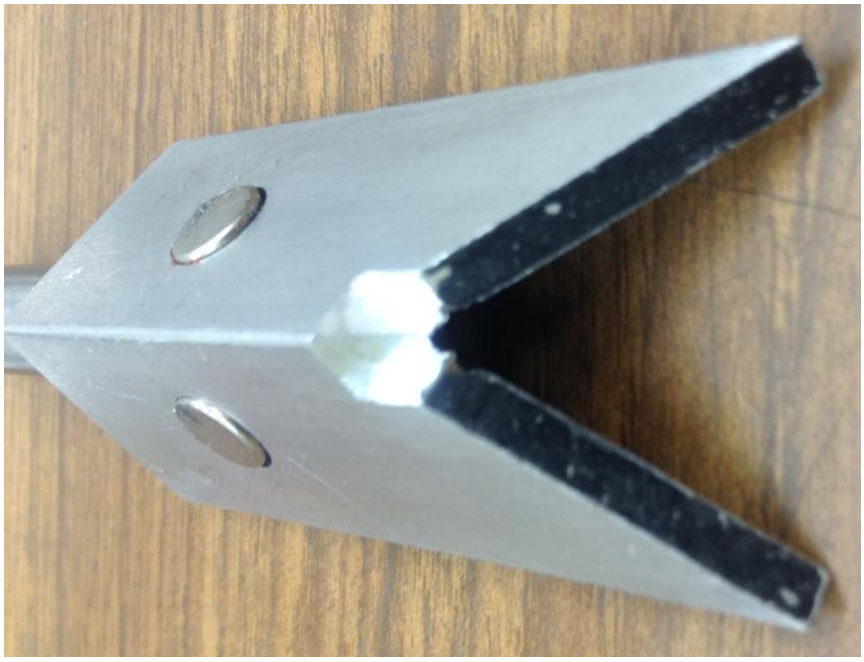
The first step is to square off one end of the piece of angle so it is perpendicular to the flank of the stock. I then rough sawed the V.



Then I put a V block in my mill vise and placed the stock down on it as shown here. Next I ran my end mill across the surface taking a light cut. Without disturbing the end mill's height, I flip over the workpiece and mill the other surface.

I milled in pockets for the magnets using a 6.5 mm (.256") end mill going in .1". These magnets are .250 +/- .004" in diameter and .125" tall. I wanted to insure no binding of the magnets in their holes plus didn't want them falling through. The added diameter also lets me live with the bottom of the hole fillet caused by the

end mill's flutes not being perfectly square. An alternative would be to drill the hole with an F drill and leave a small lip at the bottom.



I painted the bottom faces black to minimize glare.

One improvement I investigated was to insulate these bottom faces and connect them to two LEDs. When both LEDs turned on, I would know I was centered. It seemed to be too much added complexity so I put that effort on hold for now.

I welcome your comments and questions.

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