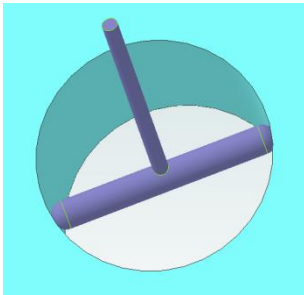


An Inside Diameter Gage, version 2.1

By **R. G. Sparber**

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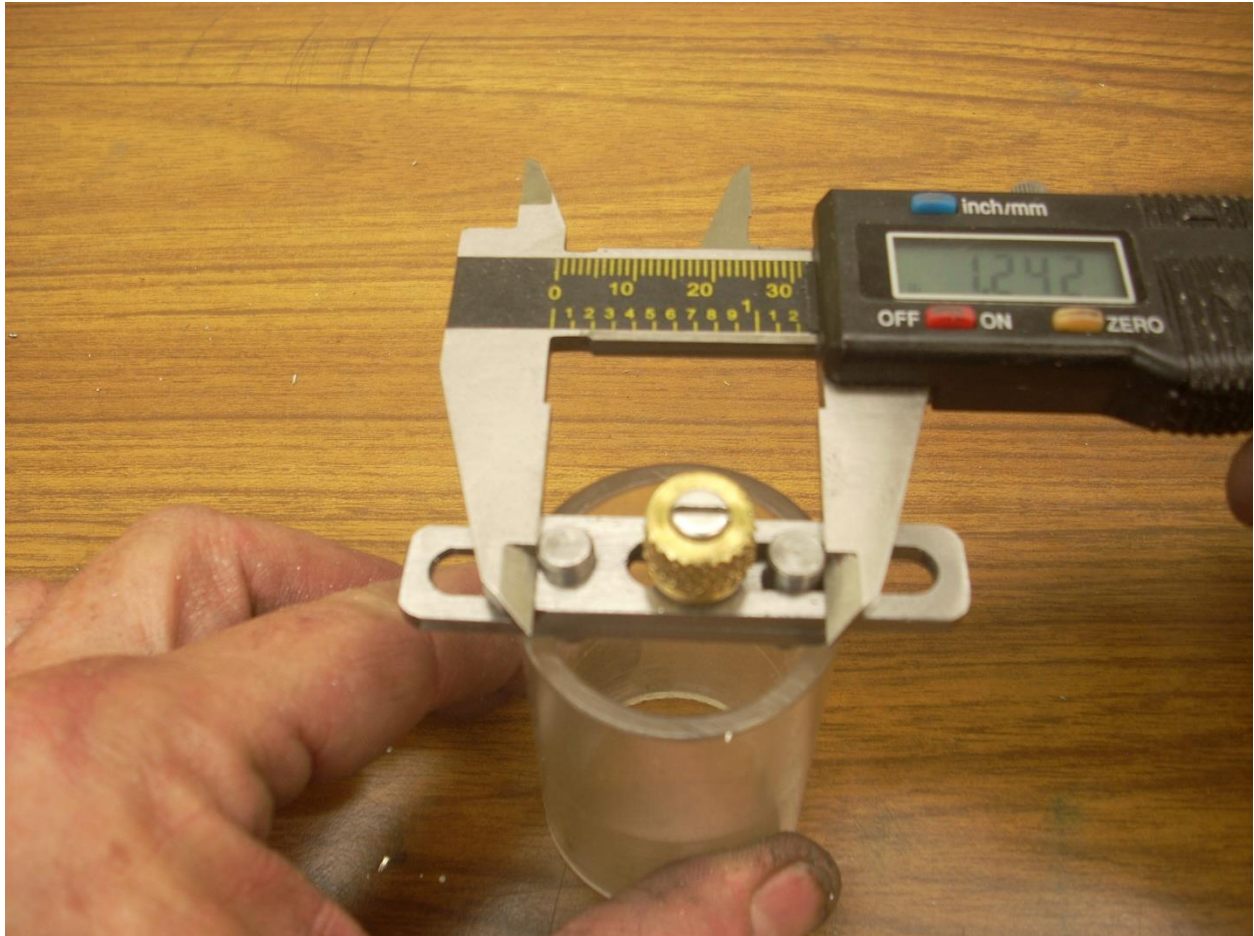


Recently I wrote a small article on how to use a telescoping Inside Diameter gage based on some wisdom from “doc” of the metal_shapers group. Members of a few other Yahoo BBS then had a discussion about the best way to use this tool. After listening to all of them, I came to the conclusion that I really did not like this gage. It was just too easy to get the wrong answer. This started me down the path to finding a better design. The result is shown here.



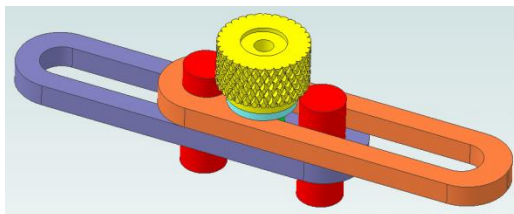
The gage is dropped into a hole, and the pins moved apart until they contact the walls. A little wiggling of the gage will guarantee that the pins stay on a diameter of the hole. Then the knob is turned to prevent further motion.

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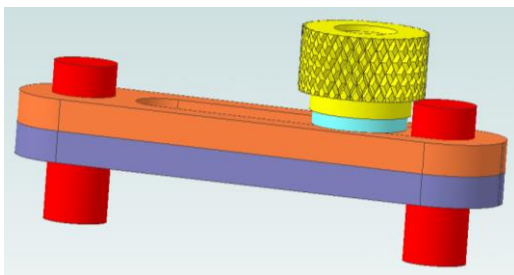


Then use a micrometer or caliper to measure between the pins as shown here.

The gage is far from perfect. If the hole being measured is not uniform, you will not get a true reading by just measuring the top $\frac{1}{4}$ ".

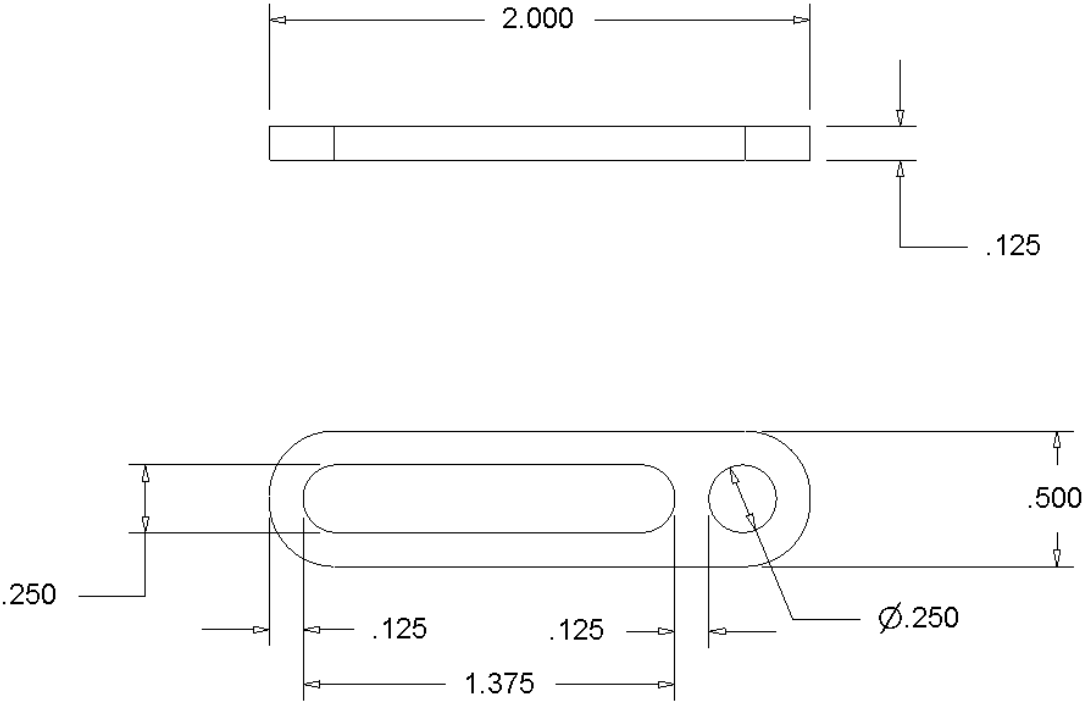


The design presented here can measure IDs from 1" up to 1 $\frac{3}{4}$ " but it would be easy to extend this range by making the gage longer.



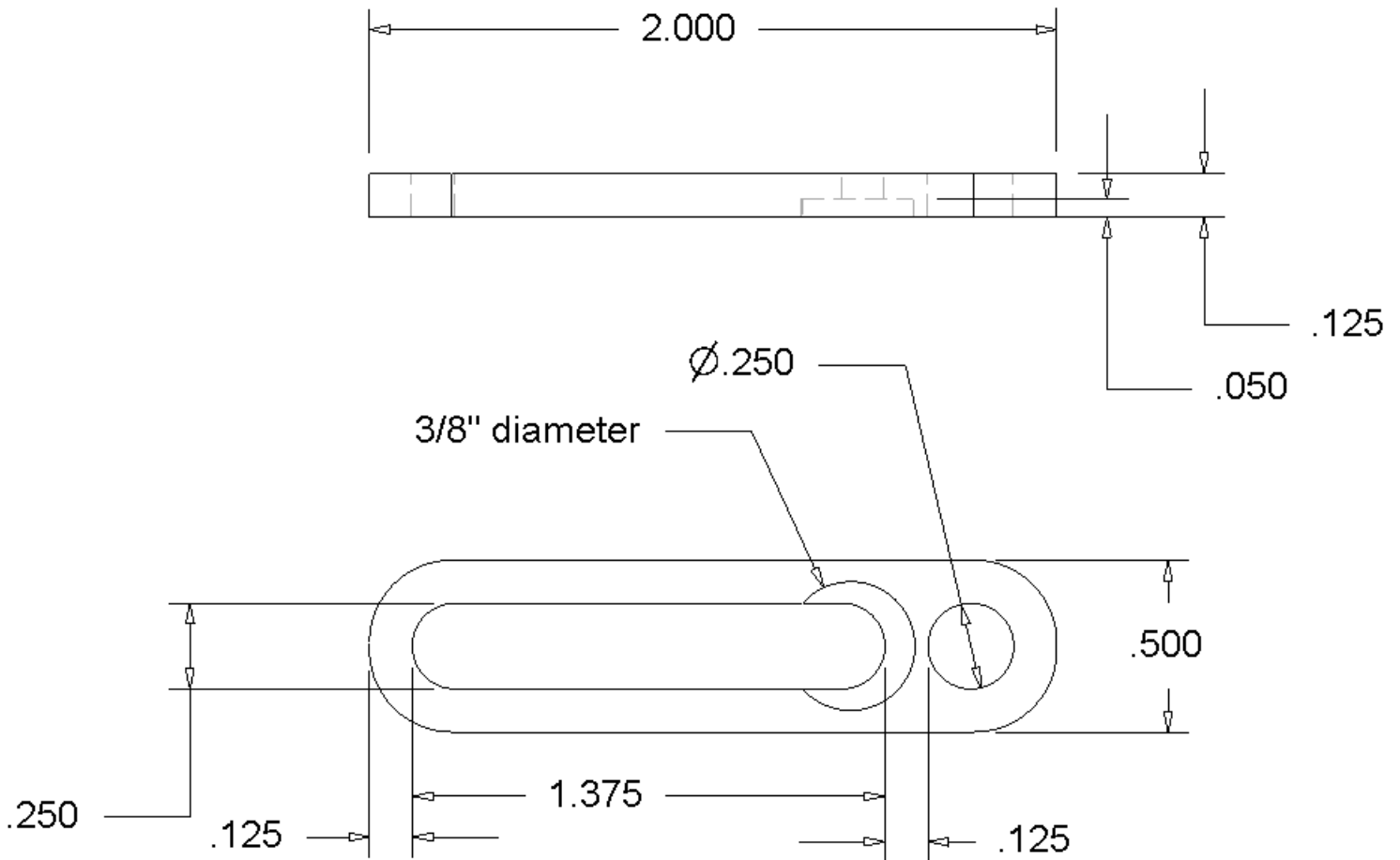
Shop Drawings

Upper Blade material: steel



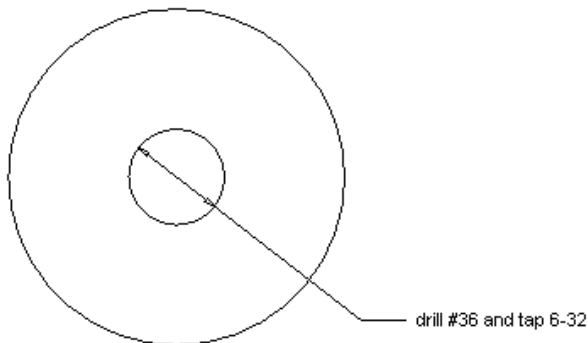
I cut the slot by first chain drilling with a “C” drill and then ran a 2 flute 1/4” diameter end mill as my finish cut. The 1/4” pins should be a sliding fit to the slot so some filing may be needed to smooth the sides. The 0.250” hole was first drilled with the “C” drill and then reamed with a 1/4” reamer. It should be a snug fit to the pin which will be secured with Loctite® Red.

Bottom Blade material: steel

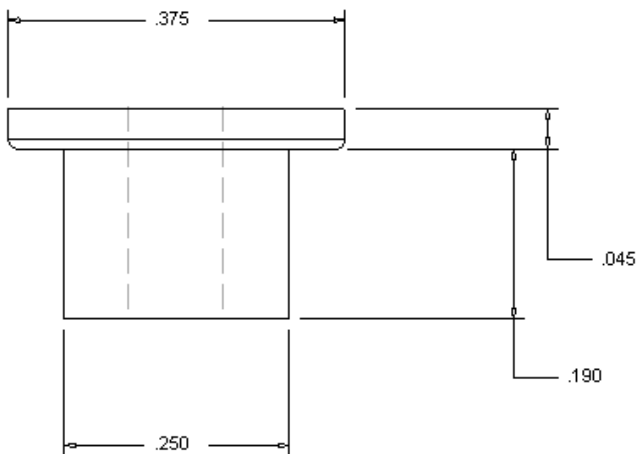


This part is identical to the Top Blade except for a 3/8" diameter recess at one end of the slot that is 0.05" deep.

Lower Lock
material: steel



Note the small bevel on the underside of the flange. It is necessary in order to avoid hitting the slight rounded bottom edge in the 0.375" recess cut into the Bottom Blade. Use Loctite Red on the underside of the flange to secure it.



Other Parts

- (2) 5/8" long pins 1/4" in diameter cut from drill rod. Bevel ends.
- A #6 washer that goes between the Top Blade and the bottom of the knob
- A knob with a 6-32 threaded section out the bottom.

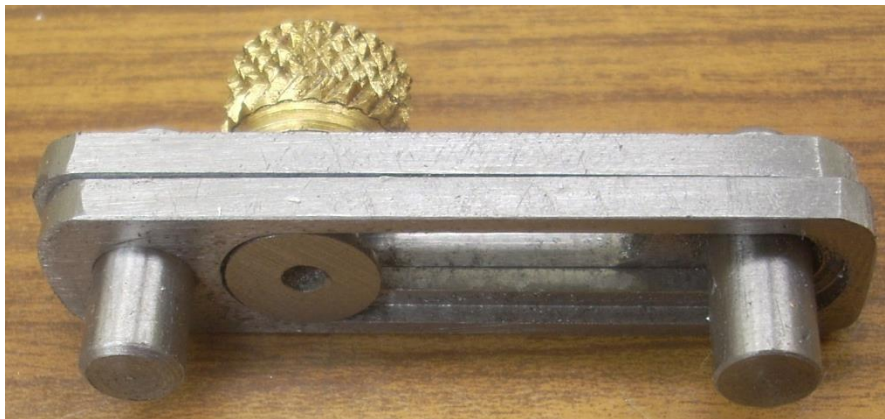
One possible design enhancement came from EdwinB of mill_drill. He suggested turning down the pin diameter below the blades except for the last 0.1". In this way the gauge would avoid any anomalies in the top 0.15".

Assembly



The pins should be a snug fit in the reamed holes. Use your mill or drill press to hold the Loctite coated pins and drive them squarely into the blades. The pin pressed into the Top Blade should extend $1/8$ " above the top surface. The pin pressed into the Bottom Blade should extend $1/4$ " above the top surface. Wipe any excess Loctite from the pins before letting them set up for 2 hours.

After I cut the Bottom Blade recess the full length of the slot I realized it could be just a hole.



Dale Austin came up with this elegant variation. The photography is also outstanding.



Acknowledgments

I wish to thank Ed C., a very good friend of mine, who gave me a key piece of this design. Thanks to EdwinB of mill_drill for his suggestion related to the pins. Thanks to Dale Austin for sharing his design.

I welcome your comments and questions.

Rick Sparber
Rgsparber@aol.com
Rick.Sparber.org