Turning Thin Stock on a Lathe, Version 1.0

By R. G. Sparber

The following is a common technique used by clockmakers. I think I learned about it from one of Guy Lautard's Bedside Readers but I could not find the article.

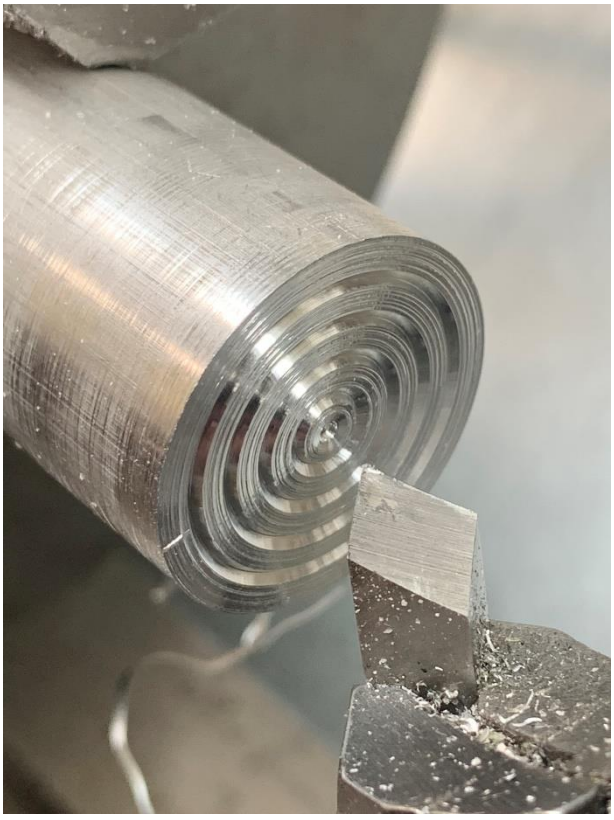
I made both of these washers from 15 thou thick shim stock. The one on the left was cut with sheers, rounded on a small belt sander, and then I punched a series of ¼ inch holes to form the rough inside diameter. Yeah, it looks like crap. The washer on the right was precision turned on my lathe.

Both get the job done. Only the one on the right will make me proud.

First, I will explain how I made the professional-looking washer and then discuss why this technique works.

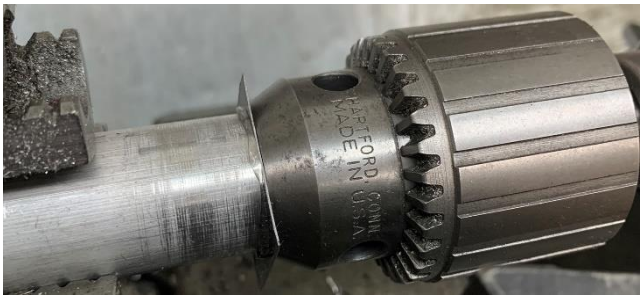
I started with a sheet of 15 thou shim stock. After cutting a 1-inch square, I used my ball peen hammer to roughly flatten it on my anvil.

The washer will be a little under 1 inch in diameter, so I chucked up some 6061-T6 aluminum and faced the end square.



Now for the cool bit – I cut a series of grooves in the face. Since I planned to publish this trick, I made it pretty. The groves were spaced 0.1 inches apart on radius and 20 thou deep. It doesn't have to be this precise. The goal is to have grooves flanking raised, flat areas. I then used alcohol to degrease the face plus the surface of the shim stock square.

Next, I generously applied cyanoacrylate glue to the surface.



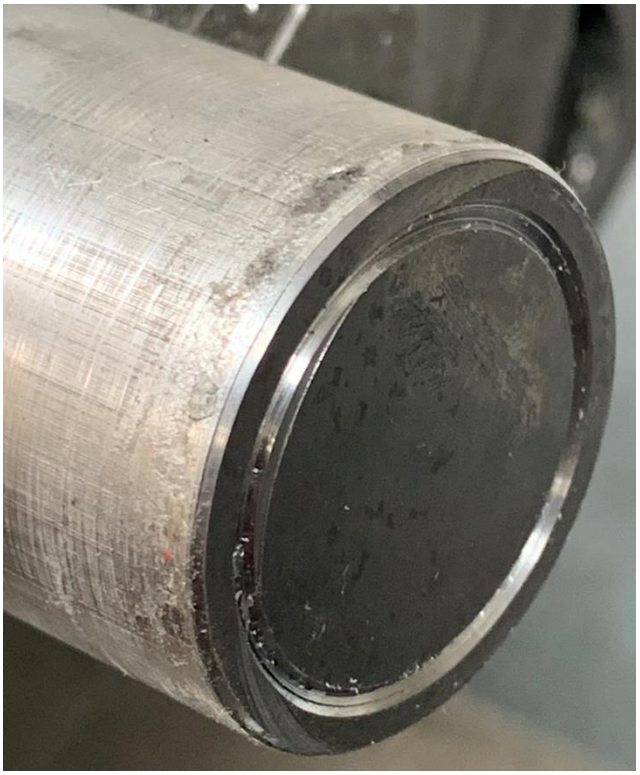
I placed the shim over the grooved surface and applied pressure with my tailstock-mounted drill chuck.

Then comes the hardest part – wait about 30 minutes for the glue to cure enough to hold.

I strongly suggest that you never align yourself with the shim stock. If it breaks free, it could slice through you in an instant.

I used my cutter to form the OD of the washer. It is wise to take a light touch in case the glue is not strong enough yet.

You can see that the excess metal has slid back from the face and is easy to slide off once the lathe has stopped.



I fed in 0.1 inches and plunged the cutter in again to form the inside diameter.

Not wanting to waste material, I cut a few smaller washers.

This next step is essential, take the aluminum bar with the shim attached ***OUTSIDE***. The fumes released from heating cyanoacrylate glue can be dangerous.

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Using my MAPP torch, I heated the shim stock and then bumped the aluminum bar. The disk fell off.

I could see daylight through my circular cuts, with a few tiny bits of swarf keeping them together. After sliding the disk over the surface of a fine file a few times, they all fell away.

Why does this work?

If you don't cut the grooves, you will find that the glue sets up at the perimeter of the aluminum bar as a thin line. This prevents air from reaching the rest of the glue, so it will remain uncured.

The grooves hold enough air to enable some, if not all, of the glue on those flat lands to set up.

If you think about those thin brass gears in clocks, you can understand why clockmakers use this technique.

I welcome your comments and questions.

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