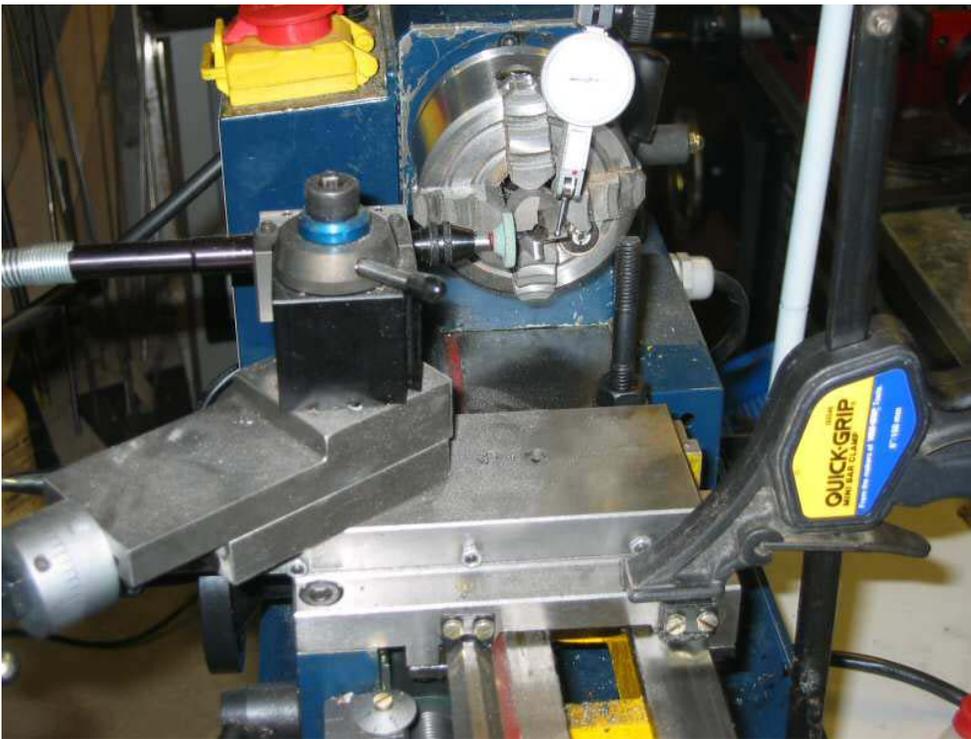


Sharpening a Pen Mill

Using a metal lathe and Dremel

Some people sharpen pen mills using a variety of hand tools like hones, diamond files etc, but I have always found it challenging to sharpen a pen mill with hand tools. A recent question in the group by Tom Munroe triggered some ideas, we kicked it back and forth a little, and he tried it... and it worked wonderfully! Tom has a Taig metal lathe, I have a Chinese 7x12 lathe. This method is obviously not for everyone, since it involves a metal lathe and a Dremel tool. But for those that have such equipment, it's sure a sweet little project.

I will describe what I did after Tom's success. I should say the second cutter I did was done in less than ½ hour, the first took considerably longer as I developed the technique.



Here is the setup. The cutter is set in a 4-jaw chuck and centered using a dial test indicator (DTI). I also used the DTI to check the cutting faces in case they are not even. The pen mill such that the cutting faces more or less line up with the jaws.

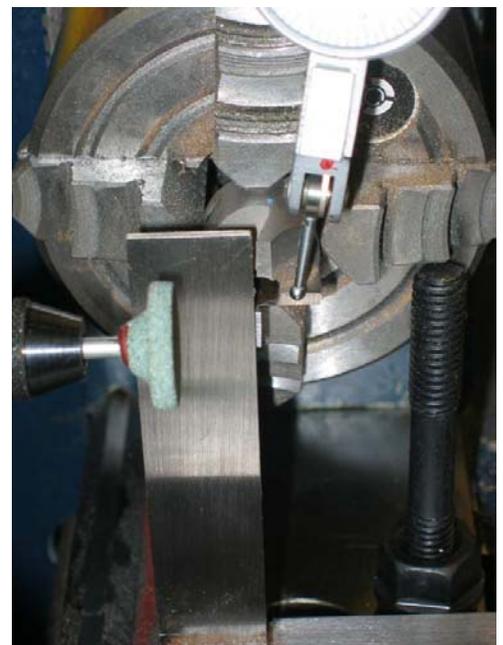
The Dremel is hooked up to a flexible shaft which is held in the tool post. It is raised slightly in the tool post (its axis is higher than the axis of the lathe) such that it grinds a small relieve behind the cutting edge. The compound is rotated so that advancing it moves the grinder only a smaller amount closer to the

pen mill. The carriage is locked to prevent movement. I don't have a lock (yet) so I used a clamp.

I set up a bolt with 2 nuts as a jack. By moving it under one of the jaws I have a repeatable position to come back to, in 4 positions exactly 90 degrees apart. It can be seen in the photo below.

I used a small square to line up the 2 vertical cutting edges, and adjusted the jack that it supported the jaw in that position.

I found the lowest cutting edge (the one that needed the least removal) and set it up for the first cut. I advanced the compound until I started seeing some sparks and moved across the face using the cross slide, making sure I did stopped before I hit the next face. Slowly advancing the compound .002" at a time (which, because it is set at an angle, is considerably less) I kept making passes until the face had a hollow grind all the way up to





the edge. I noted the compound position. Then I went to the next face, advancing to the same compound setting in steps and so on. In the end I checked all 4 edges with the DTI and found that I was not quite even, so I made a few more passes on the high edges until they were within .001" of each other.

Made a new handle out of a bush branch from my yard that's been drying for a year or 2 (smoke bush) and now have a pen mill that cuts better than new!

Below are 2 pictures of the setup Tom used. He has a milling attachment on his Taig which he used to hold the Dremel handpiece. He did not use a jack to arrest the rotation of the chuck, and had no problem. Tom did not use the compound, but rather the vertical feed to advance the

grinding wheel into the pen mill incrementally, and the cross slide to cut each face.



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