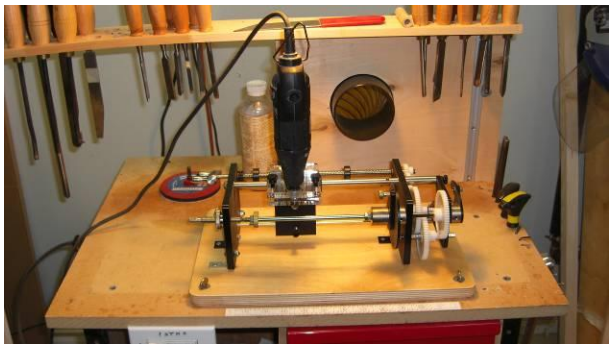
Pen Wizard Startup tips

A Tutorial by:

Bob Hewson
A.K.A “Bob Hewson”

Pen Wizard start-up

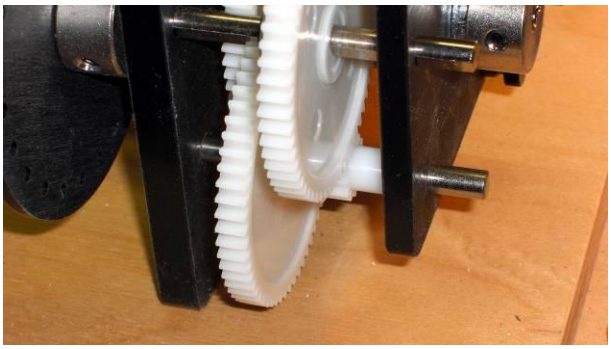
To start I chose a spiral cut. To do this required several steps and alterations to the PW and followed Beall's video. I chose to mount my PW with the in front, towards me, not in reverse as Beall does in his video. I then crank with my left hand (I'm a lefty too) and can see the cut as it progresses...

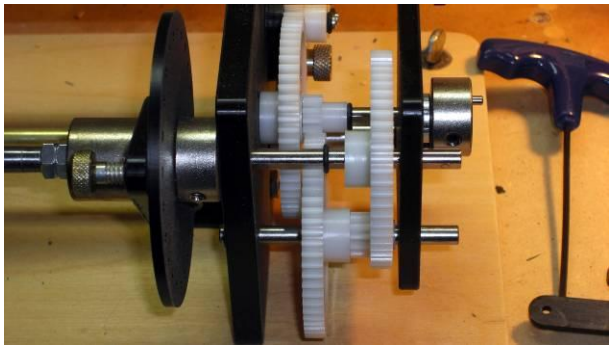


Spiral cut

1) Remove the guilloche (wave) mechanism. It is done by loosening one screw on a drive wheel and a simple pull does the job (Beall's video indicated you need to remove the other wheel that interacts with the mechanism, but there does not seem to be a need to do that step.

2) Move the 60 tooth drive gear to engage the gear train

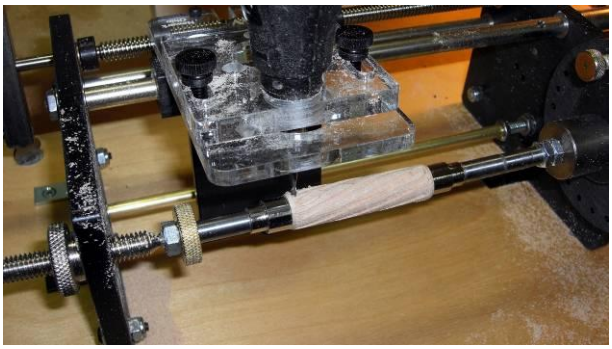


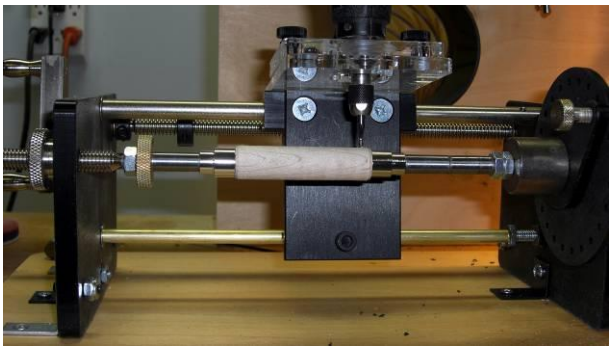


3) By turning the hand crank the blank describes a spiral. Using the 60:12 gearing as supplied you get 0.12 rev per inch of travel. For my test blank that is ~ ¼ rev.
4) My Dremel is set to cut a depth just slightly less than the OD of the bushing. I chose a 3/32" square end cutter (Beall cutter).

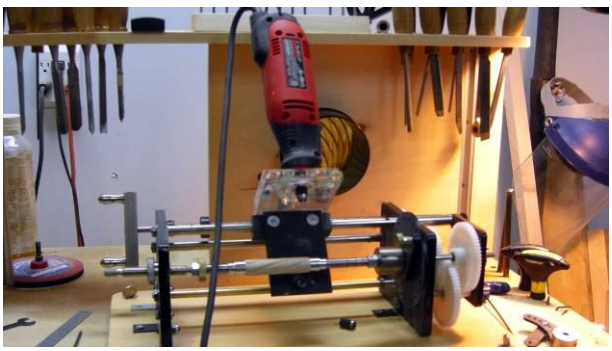
5) I set the travel stops on the drive screw to the limits I wanted on my blank.
6) I have a start switch wired to my Dremel to turn it on/off. The speed is set to full.

7) I start the Dremel with it above the blank and lower it into place.
8) The cutter must be at its left hand limit and the crank is turned counter-clockwise and the cutter moves to the right until it reaches the right limiter. The Dremel is then lifted off the blank and turned off. The Dremel jig is disengaged and the drive mechanism returned to the left-hand limit.





9) This is a 6 spiral cut, so the 24 position index wheel is advance 4 positions per cut.
10) The 2nd cut is completed as well as the remainder. Care must be taken to ensure and accurate progression on the index wheel. I goofed once, so will add a dab of color to the wheel to simplify the counting.
11) OOPS, I had a problem; my old Dremel's shaft snapped in mid-cut, I guess it couldn't take the fast start from zero to full speed. Fortunately I have a B&D RTX and made the swap (this time I used my variable control foot pedal to increase the start-up time from zero to full speed and hopefully won't destroy my RTX). I was able to get pretty close to the



same registration of the cutter, but not 100%. Next time I would just scrap the blank. This blank was finished and while not perfect wasn't too bad for the initial try.

Checkerboard/diamond pattern

12) My 2nd blank was another 6 spiral blank, and then by using the reversing mechanism adding 6 more spirals in the opposite direction for a checkerboard pattern.

13) The reversing was done by a simple adjustment of the drive gears to reverse their direction. The finished blank was pretty decent, but I will need to work on registration so both spirals (Left and Right) start at the exact same place.

Flat octagon with a twist

14) Next thing to try was a lazy twist octagon shape. I used a Dremel #115 cutter but it was apparently dull because my cuts were ragged. In the midst of this one of the gear retaining "O" rings popped off disengaging the gears. Looks like I may need a large supply of "O" rings if this is prevalent. A straight octagon shape is made by disengaging the rotation feature so the cutter tool runs straight down the blank within the limiters range, then indexing every 3 spaces

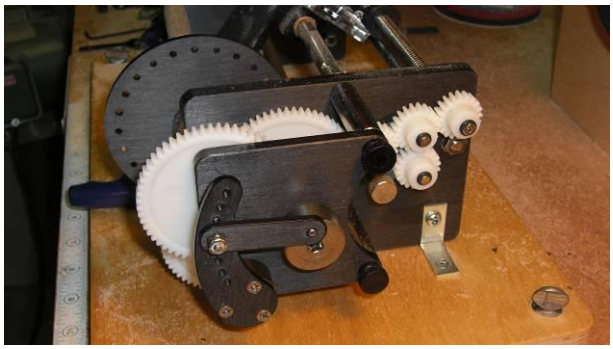
Wave patterns

My next step is the guilloche action, but first I need to replace the guilloche mechanism and disengage the 60 tooth drive gear. Both simple to do and took only a minute.

Fast frequency

1) Using set-up as received a sample wave pattern was made using 3 repeats and a fast frequency. I used the 1/16" square cutter at approx 1/16" depth
2) Pattern is very busy and had a slight variation in line spacing.

Lazy/slow frequency



3) Rest the guilloche attachment for a lazy wave. This was somewhat unclear in the instructions but eventually I had it set correctly. The pattern was more to my liking. The wave amplitude was as received, next will be an attempt to change amplitude.
   I still found a slight error in repeat spacing. Checking with other users on the net suggested that my blank may not be tight enough and was moving slightly causing the registration problem. I will keep a close watch on this in future work.
4) Tried to reverse the guilloche by changing the gear train but it had no effect on the pattern (I thought that perhaps I could create a pair of hourglass shaped cuts)

Change of amplitude

5) To change the wave amplitude requires an adjustment to the guilloche arm (see photo).
6) To change the frequency requires a gear change.

Circular cut around the circumference

This proved an easy adjustment; you simply lock out the index and rotate the mandrel manually. Be sure to keep the cutter to either the left or right of the "drive slot" to keep it free from "slop".
I carried on with a further 6 lazy wave to complete this shape.
In future, for a circular cut I will simply use the lathe and a chisel rather than the PW.

Improvements/changes I'd like to see for the PW

- ✓ A parts drawing indentifying and naming all parts
- ✓ More detail on the adjustments of the gear train, speed gearing, etc.
- ✓ Markings on the index wheel to make indexing less prone to error. Not that we can't count, but the positioning and adjustment are awkward at best. Perhaps a pressure sensitive label with numbering or color coding would help (see my mod for this).
- ✓ While the video is very detailed the adjustments are not clearly shown. After you figure them out it's easy to do, but shortening the learning curve would be nice. (I have searched the video a number of times looking for some detail I know JR mentioned...)
- ✓ There is a lot more plastic in this machine than I expected, is it all that robust? I feel I must be very more careful with it than most tools and machines in my shop.
- ✓ To have had the unit pre-mounted to a board or sheet of plywood would have been a nice touch.
- ✓ The Foredom adapter didn't fit my large Dremel handpiece, no big deal, a small job on the lathe.
- ✓ Despite the comments, the unit does do what it says it would. I can see a few mods that would add versatility and further capabilities, but, that is for another day and some playing around.

Mods I made to my PW

- ✓ -Fastened the PW to a baseboard and added extra "L" brackets.

- ✓ -Adhered a color coded index to the index wheel (thanks to http://www.smithart.us/download.htm that has series of index wheel templates that can be scaled). After sizing I painted the 2, 3, and 4 segment locations for ease of indexing. The sheet was glued to the back of the index wheel with spray adhesive and then over-sprayed with sanding sealer to keep it clean.

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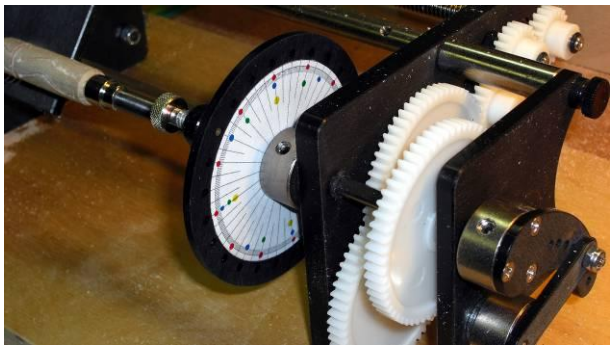


- ✓ -Enlarged the Foredom adapter to accommodate my large Dremel handpiece.

- ✓ -Use soft start switching for my rotary tool rather than a simple on/off to prevent another breakdown of same. My large Dremel has a foot speed control; this is used with the small rotary tool. Simply set it to the speed desired and then use the foot pedal to increase the speed (a soft start).

Filling the grooves with an infill material is the next step in my Pen embellishment project started with the Pen Wizard

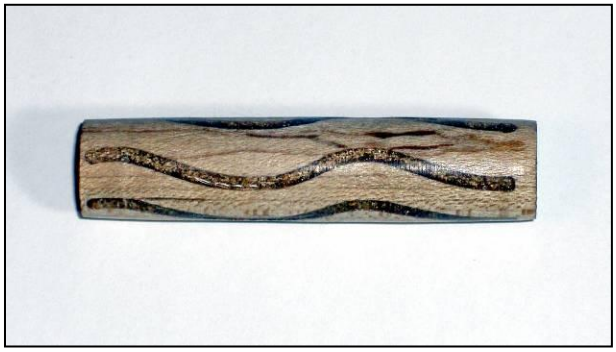
-Several glitters, embossing powders and pigments were bought at the local stamp art store
-A small applicator was made based on one used by Ed (from YoYoSpin.com). I tried a length of aluminum tube obtained from a hobby shop (aluminum is quite soft, I should have bought brass). I retooled with brass.
-Thin CA (HotStuff)
-Paper towels
I used my lathe to hold the blank. It was somewhat awkward so I will make a small jig/stand to hold the blank at a convenient height (see photo)
My first attempts were pretty poor and messy. An appeal on the net brought help from Ed (YoYoSpin.com) in the form of a good video tutorial.
Solutions were to go slower, use the applicator tool noted above, and apply the glitter into the groove, not all around it and to apply the CA to the edge of the filled groove and allow capillary action to take the CA into the glitter filled groove. Once cured the blank is cleaned up using a sharp gouge, scraper or bedan. Examine the fill to be sure it is complete and if not add more glitter and CA (this is a time consuming extra step, so take particular care to fill the grooves completely the first time).

I also tried 5 minute epoxy and a slower cure epoxy (the one used to simulate 50 coats of varnish). The 5 minute epoxy worked OK and once I incorporated Ed's discipline I was able to do an OK job too.

The following are several of my trials (and tribulations). The blanks are all maple with a ¼" hole to fit the mandrel, they were not for use in a pen but rather low cost trial pieces.

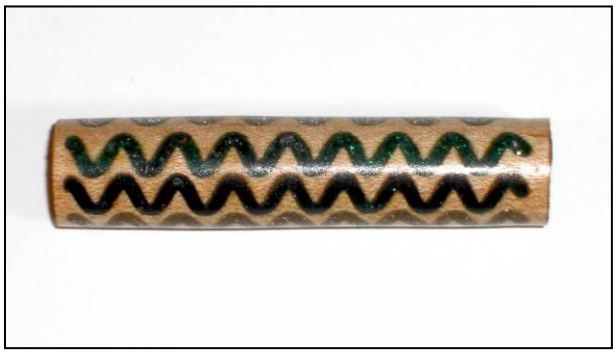
1) This is one of my later samples. The lazy wave all register properly and the green glitter/CA are decent. Sanding to 1000. The finish is Turners polish then buffed.

2) This sample was not cut deep enough so when filled with embossing powder and 5 minute epoxy it looked OK, but when turned down there was insufficient depth of material. The epoxy embossing powder worked well. Finish was light buffing only.

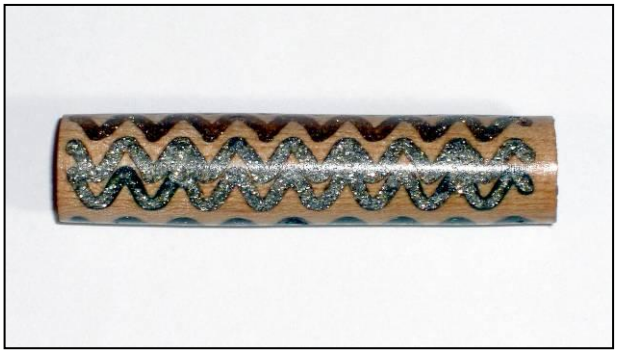


3) This sample was a fast wave, somewhat too busy for my liking. This is gold glitter and CA refilled a couple of times. Note how the middle line is thicker in places. I think this was some slop in the setup.

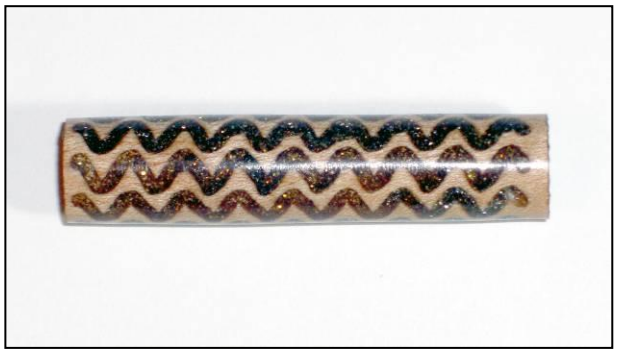
4) Green glitter as well as black embossing both with CA and some re-filling.



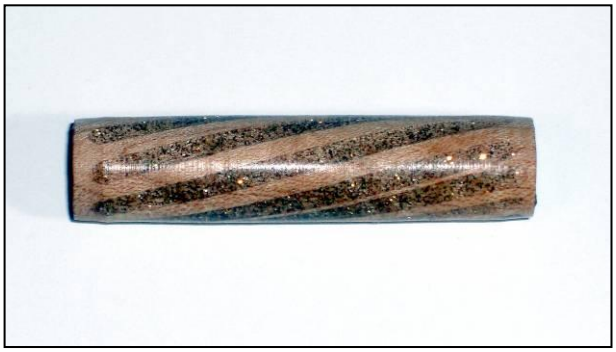
5) This sample shows the final cut out of register and close together. Suggestions from the pen group suggest that my blank was not held tightly enough allowing it to move slightly during the cutting operation.
The two predominant lines are filled with silver glitter with a bit of black from an adjacent line. This would be a reject if for real.



6) This was gold glitter in epoxy (long cure). Most of the resin dripped out but the residue coated the inside of the cuts making a different effect.



7) This was gold glitter/epoxy but the cuts were too shallow. Also show is what happens if you lose count on the index wheel.



My experimenting is over, now to cut some decent wood and make some blanks with brass tubes to embellish for several Sierra pens.

My thanks to those who answered my call for help and gave me several tips along the way

Bob Hewson
1/29/9