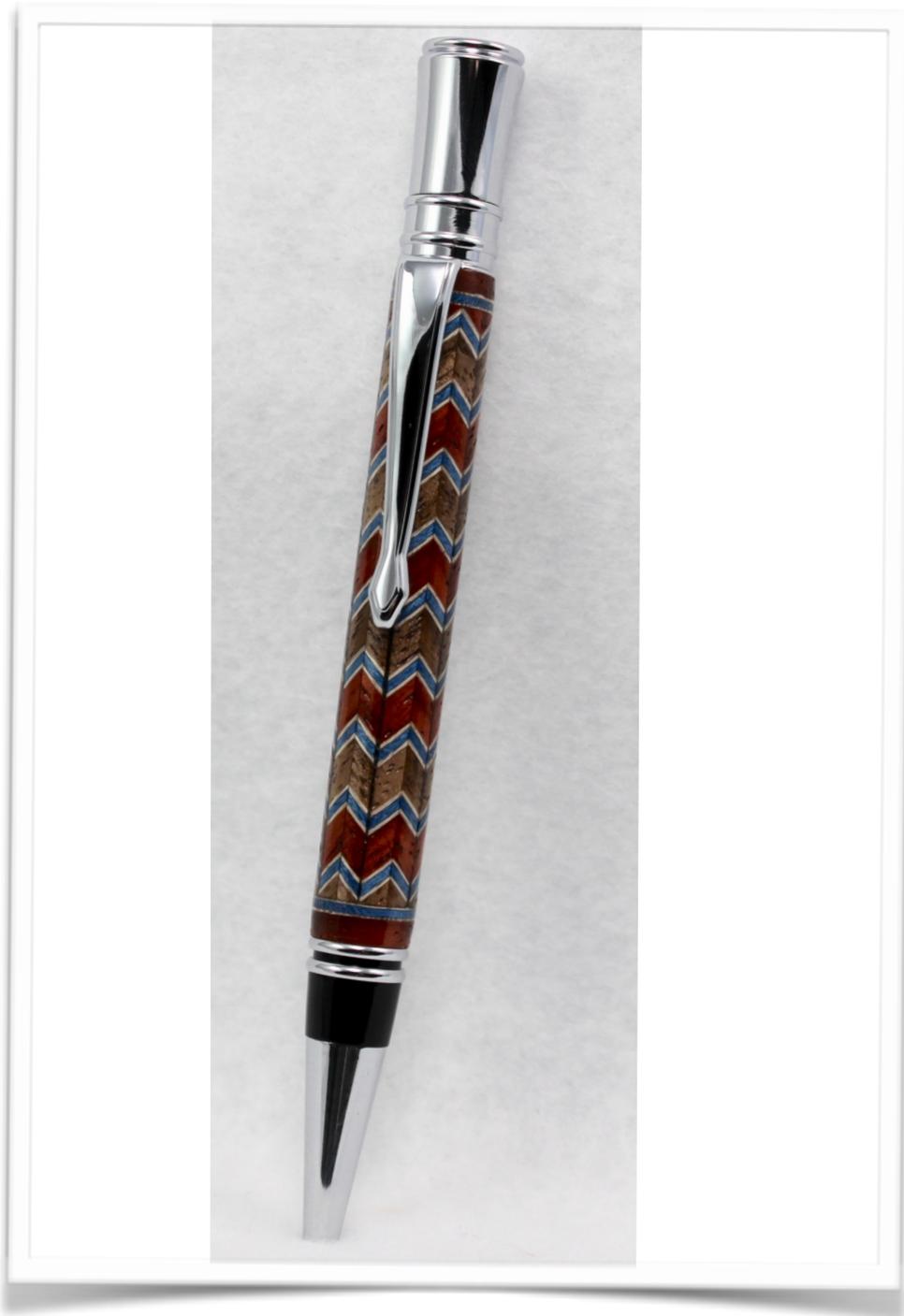




International Association of Penturners

Studies in Segmenting VII: 360 Degree Chevron Wave Blank

Author: Mark James August 2019
Downloaded from www.penturners.org



This tutorial builds on previous IAP Library Articles: **Studies in Segmenting**. Please review these first as some information/definitions are not repeated here.

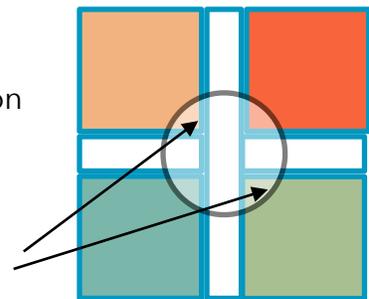
This design was spurred from suggestions from the IAP membership, and resulted in a totally different blank construction (at least for me).

Requests:

1. A continuous 360 degree Chevron "Wave Pattern" around the blank.
2. No separation between the Chevrons; I needed to eliminate any material between the Chevrons as in previous designs.

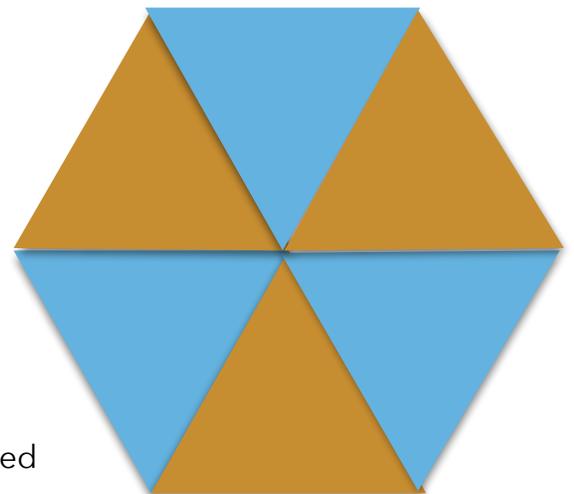
As we know from the previous tutorials, this 4 sided Chevron blank will have 4 corner pieces between the Chevrons. These corners I needed to eliminate.

Corners

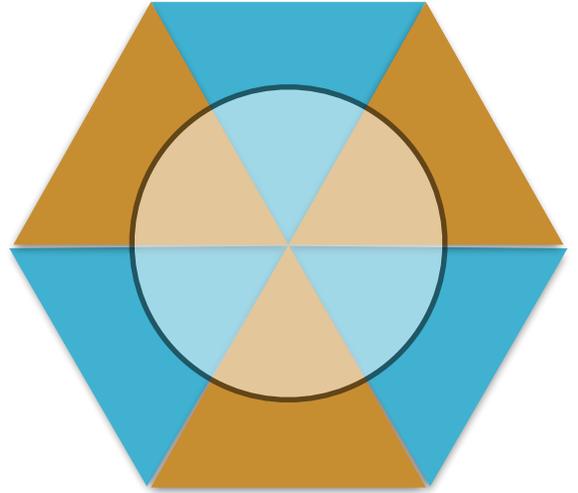


I still needed the Chevron design to extend through the blank, so that it would retain its dimensions as it was turned down.

After playing with several combinations, this was what I thought would work, a six sided blank. Each Triangle needed to be a completed Chevron inlay (2 slices glued together) so 12 slices were needed.

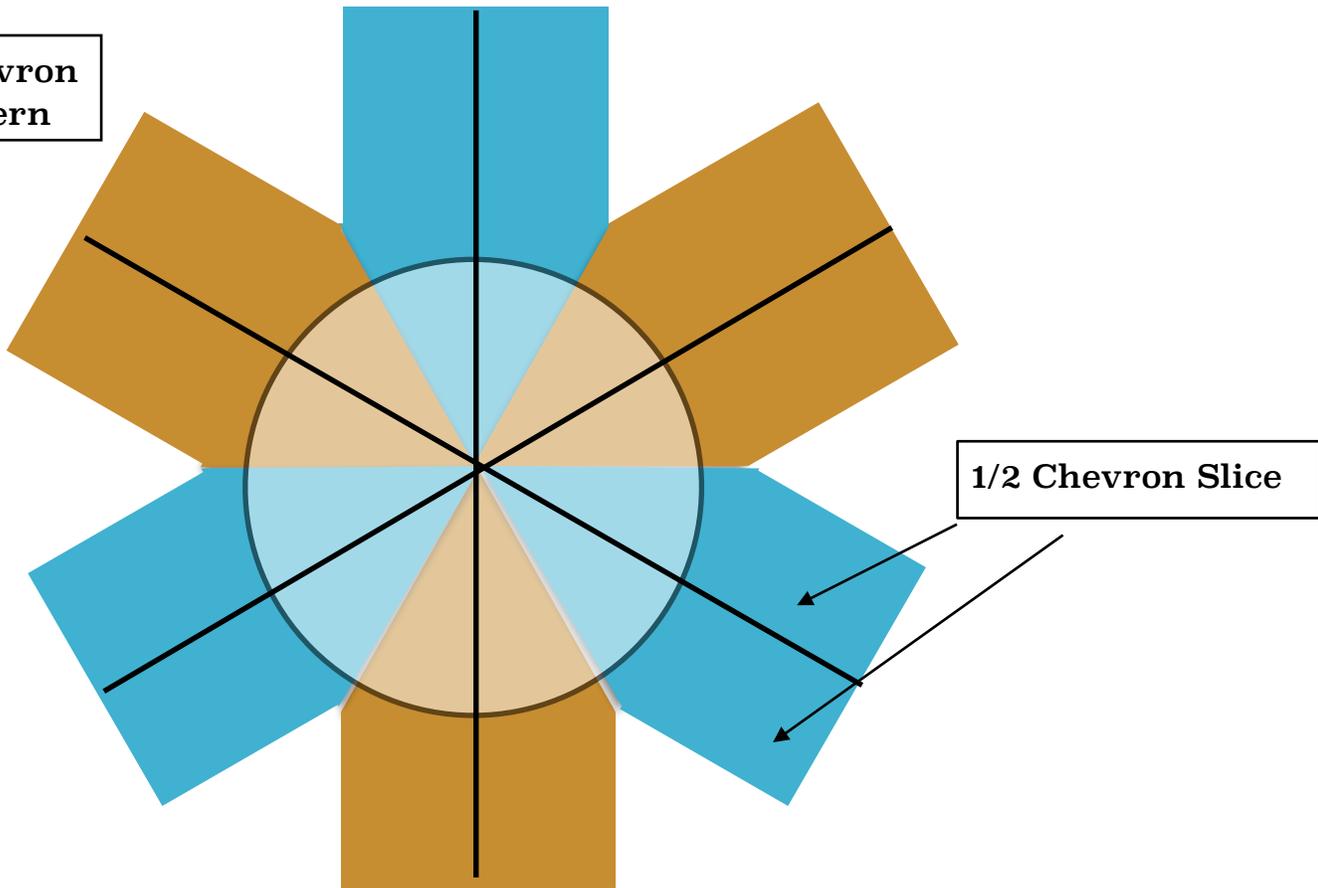


The outer diameter of the pen with the pattern (colored design) extending to the center. But as noted in Studies in Segmenting I (Design Considerations), the pattern would be reduced as turned to final OD, so some calculations needed to be done first.

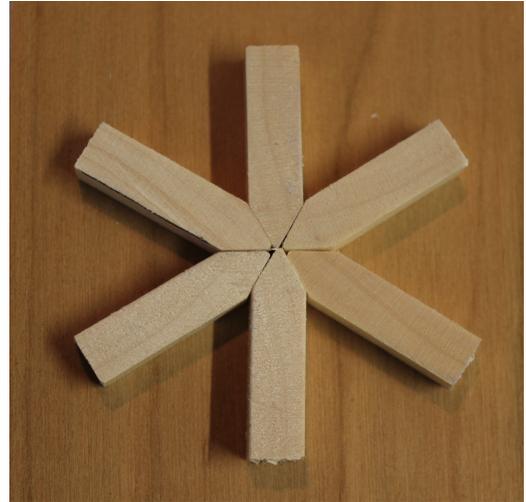


Here is how the blank needed to be constructed.

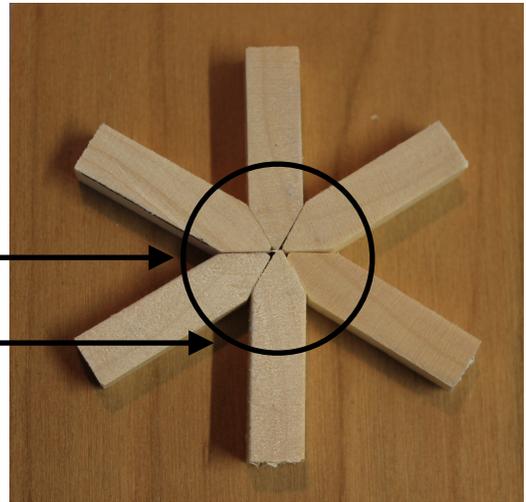
6 sided Chevron Wave Pattern



Here is my first "proof of concept".

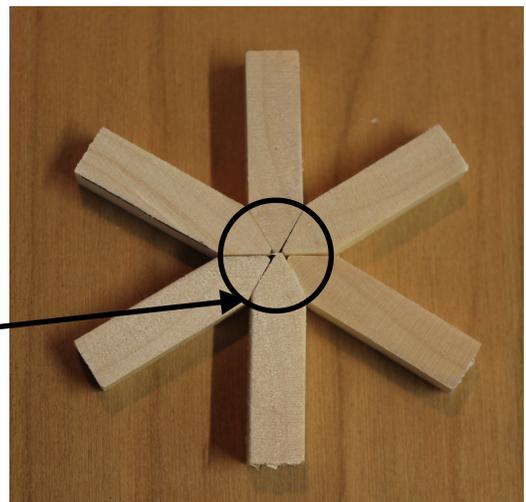


Segments too thin, or the OD is too large - gaps at the corners.



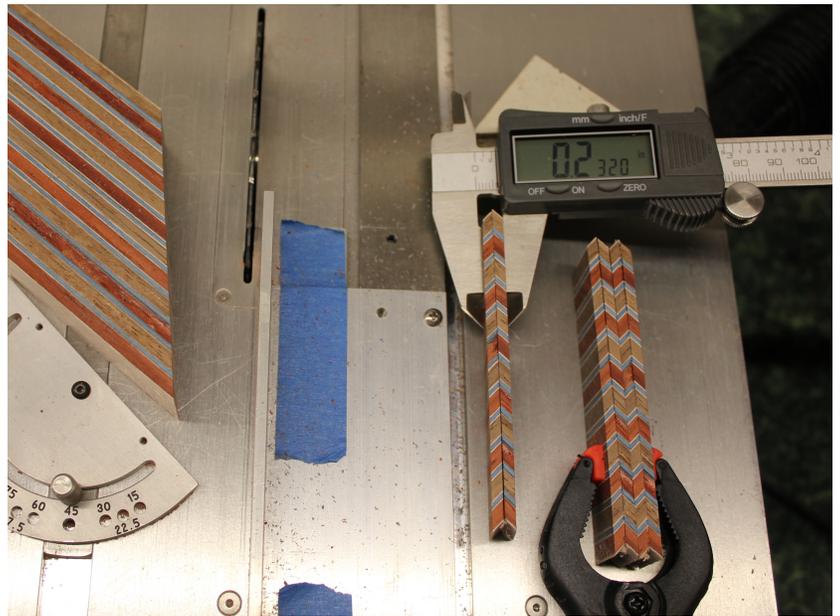
The final OD of the pen needed to be just inside of where the pieces would meet.

No gaps at the corners.



Ok, let's have some fun! (Read Studies in Segmenting III - Variable Brick Chevron Blank for how to construct this brick).

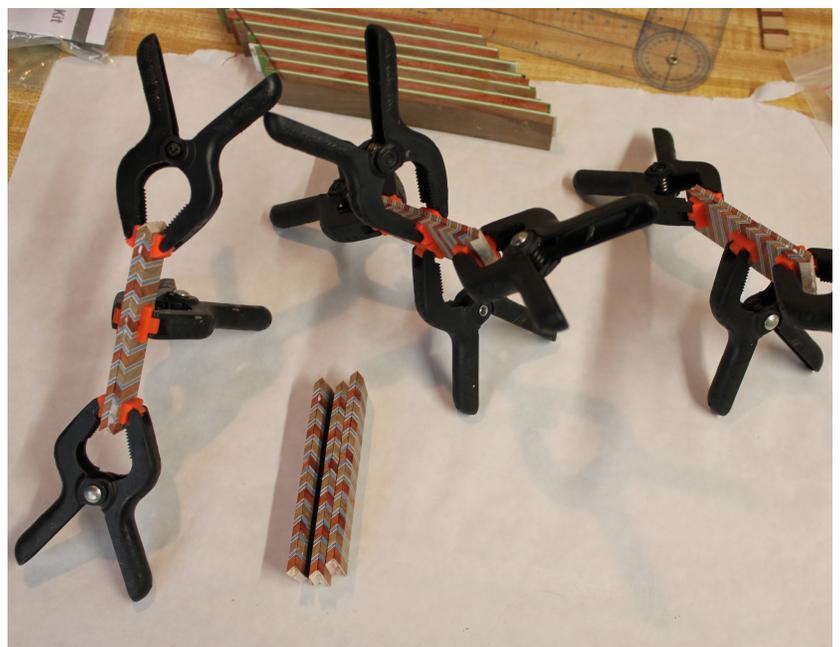
I'll give the math at the end, but I determined that my slices needed to be about .118" thick, for a completed chevron inlay about .236".



Check to insure that the pattern matches.

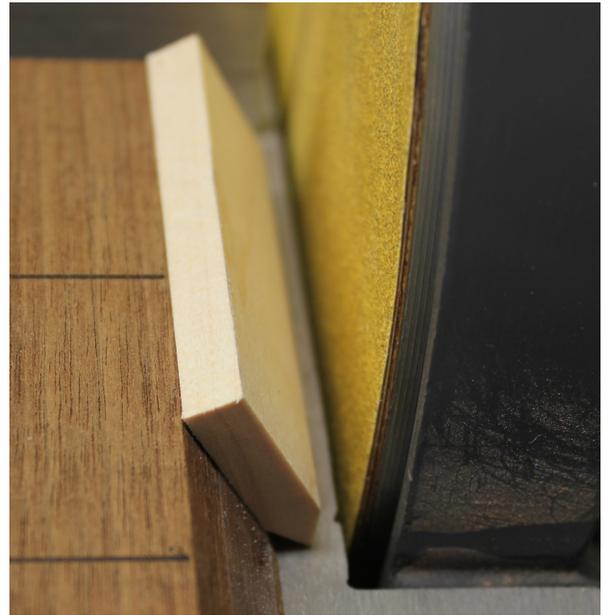


Glue your chevrons together.

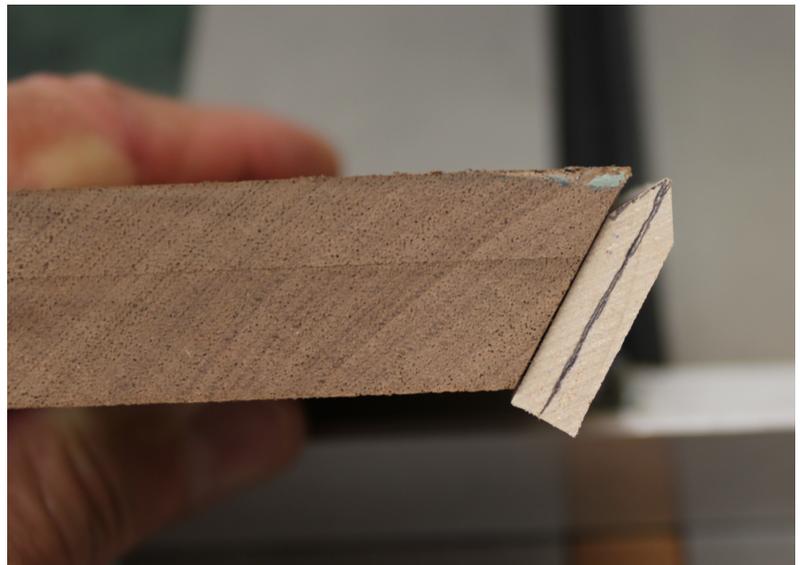


Make a sanding block with a 60 degree angle, this will then result in a 60 degree tip after you sand both sides of the chevron pieces. Six 60 degree triangles will complete your 360 degree pattern.

(If you wanted an eight sided pattern you would then need 45 degree triangle tips, and a sanding block with a 67.5 degree angle; 60 degrees seemed easier).

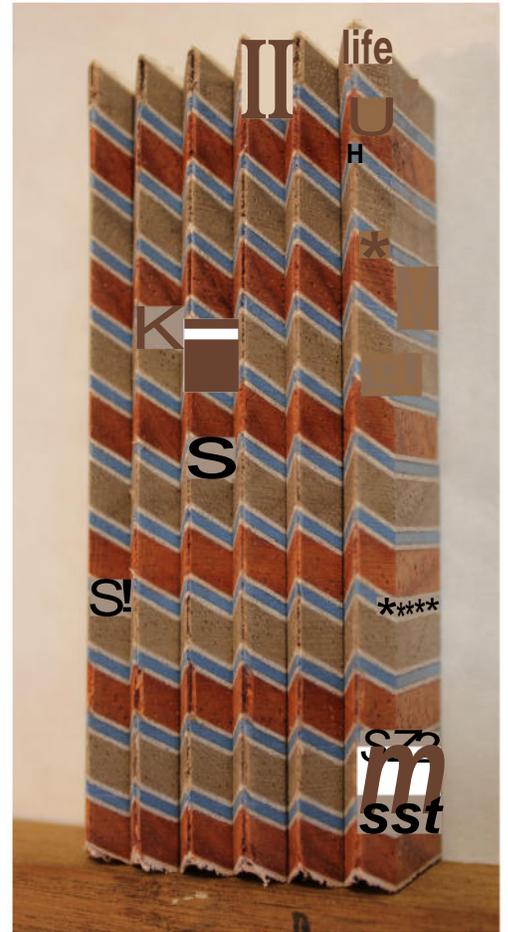
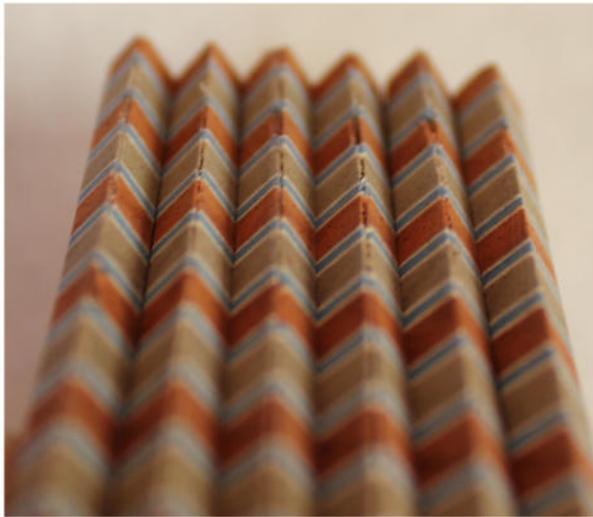


Practice sanding just to the tip - this will be the joint in your chevron. As in the previous tutorial (V), I am using double-sided tape with proper safety precautions.



Now you sand the six chevron pieces (I recommend you actually make a few extra just in case something goes awry - because some will).





Make sure the middle of the chevron sections are in alignment when you glue them together.

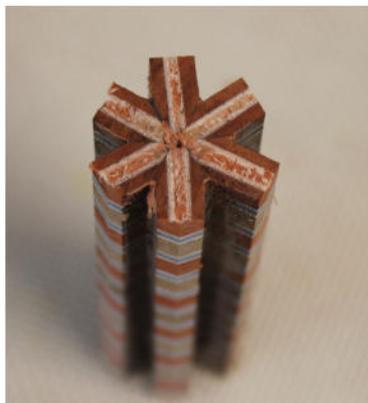




This is the blank so far... This will be fun to turn!

So far so good. Now things will get a bit "challenging." You can sand the blank to reduce the amount of the six sections sticking out, but ultimately you will need to true up the ends, mark the centers very accurately, and turn it round to a diameter to fit into a collet chuck to drill the tube hole. With 450 (+/-) glue joints I recommend using a collet to have as much side support. Also - drill slowly and keep the bit cool. If you create too much heat, drilling in the middle of the six sections will result in the blank opening up like a flower bud (trust me...). Alternately, if you are a caster, you could do a clear cast and have a solid blank; alas, I don't cast anymore.

But, I got it drilled (Whew).



As with some of my previous designs, I centered the design on the tube and added some end veneers and trim rings. At this point it is simply another pen blank and the rest goes smoothly.



The finished pen does have some flaws in alignment, but in general I was happy with how it came out.

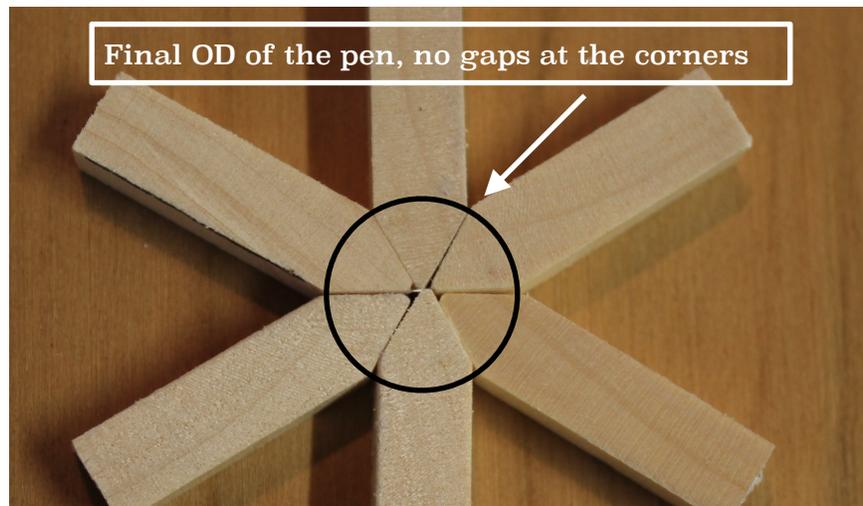
Some additional information for those interested.

I

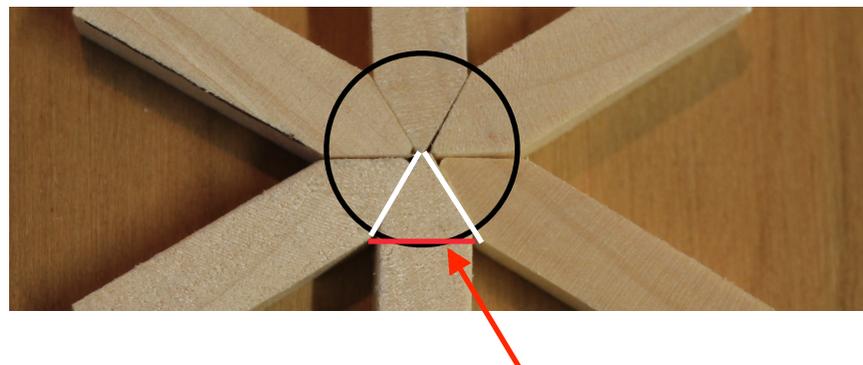


As mentioned earlier the thicknesses of the chevron slices were important to eliminate the material between the Chevrons but extending to the OD of the finished pen. I did experiment with several methods, but ultimately decided on the "star" shaped hexagonal design.

So how did I determine that my slices needed to be about .118" thick, for a completed chevron inlay about .236"? As seen below, I needed to aim for the dimensions of the black circle.

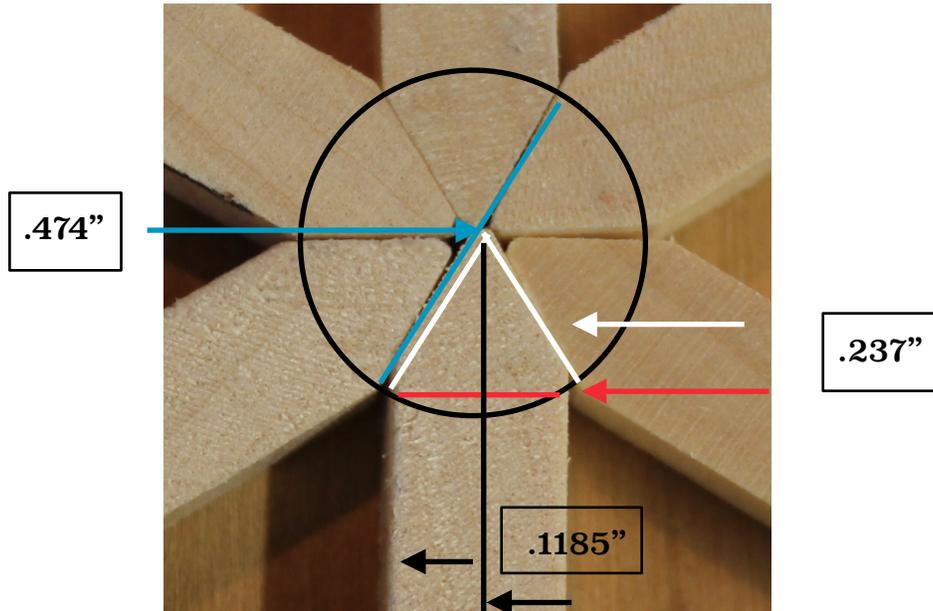


I needed to relearn some more Geometry... (And no I did not remember any of this before this project).



**This side needed to be determined first.
This dimension would determine the
width of the Chevron (2 slices)**

I got lucky without being aware of it. Since I had decided on a six sided pattern, this resulted in using an "Equilateral Isosceles Triangle" (all sides/angles are the same).



For my dimensions, the red and white sides are the same (as all interior angles are 60 degrees), and these sides are all 1/2 of the blue line, which is the OD of my finished pen.

My OD of the finished pen was .474", so all sides of the triangle needed to be close to .237". And, if the full Chevron is .237," then the two slices each needed to be about .1185" thick off of the table saw.

This is what I was aiming for.

