Herringbone 360° Segmented Pen Blanks

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In another tutorial, I wrote about making a simple herringbone pen blank. While the blank was nice it was herringbone only on two opposite sides. The other two sides were not herringbone but just curved segments or layers. I mentioned that I am not one who makes segmented pan blanks or turnings but the herringbone pattern has always intrigued me.

This is a previous herringbone blank I made.

Thinking about the previous herringbone pen blank, I realized I needed to follow up with what is called the herringbone 360 pen blank. The name comes from the fact that the herringbone is visible all the way around the turned blank…360°. A good analogy would be to print the herringbone on a piece of paper and wrap it into a cylinder. The pattern would repeat it self over and over.

The way this blank is constructed the herringbone pattern repeats six times. More on this later as the blank is built.

The herringbone 360° pen blank showing “3 sides”.

Ten years ago or longer some one posted a picture of a herringbone 360° pen on the IAP site or maybe the Yahoo! Penturners site. No instructions were offered and, although several asked, still no instructions.

Then in 2011 Darrin McArthur wrote an article and posted it in the IAP library. I read it but thought I will never do this and sort of put it away. But after my other herringbone article I knew I needed to follow it with the herringbone 360° topic, if I could master it enough to understand the process.

So, I referred to Darrin’s article and once again the complexity, or so I thought, boggled my mind. But I persisted; reread the article, used some of the tiles from my other herringbone article and the process seemed to fall into place. Understanding is the key. The more I played with the process the better I understood it.

The blank I made in my simpler herringbone blank tutorial took just 20 tiles or so. For the herringbone 360° the number of tiles would be 3 or 4 times that many. I certainly did not want to make that many cuts on one piece of wood. Someone posted a herringbone pen where the blank was made with Scrabble™ tiles. Perfect. Premade tiles. I found some blank tiles at Hobby Lobby and purchased a couple of bags. I made my first herringbone 360° blank from these tiles. See below.

My first herringbone 360° blank.

I posted this first attempt on the FaceBook Pen Turning group and received some helpful comments. Notice the gaps between the tiles of each layer? I realized after using the purchased tiles that cutting my own would be the best choice.

The purchased tiles had a few problems: (1) they were not square but rectangular, (2) the thickness was not uniform and (3) the clear finish did not play well with the glue used. I used carpenter's glue and CA. I think the gaps between the tiles were directly related to the tile's shape and varying thicknesses.

I spent lots of time culling tiles on the next attempts before deciding to cut my own tiles to control the shape and thickness.

The second blank above is actually my second attempt and the fit is better after culling and watching the orientation of the tiles while gluing them together.

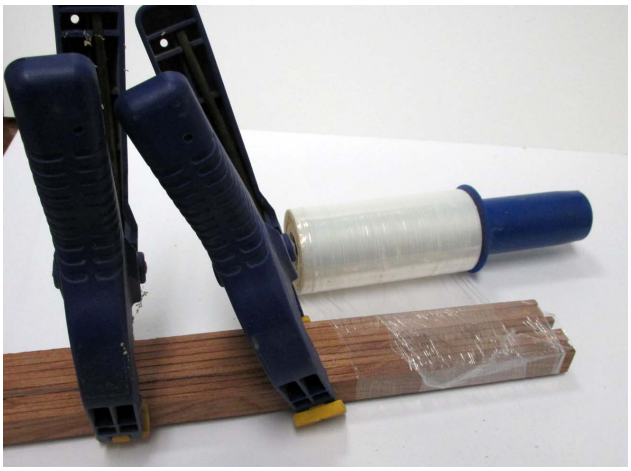
Michael Hardin offered some advice and tips as I progressed with the second attempt. He suggested a process for cutting tiles in a more efficient way than I did for my previous herringbone article. No more one cut yielding one tile. Thanks Michael!

To cut tiles for my third attempt that I used for this article I started by cutting a mesquite board into strips on the table saw. I picked a thickness that looked pleasing to me. The thickness turned out to be .215 inches. The board's thickness was .76 inches so I made tiles that were .76" square and .215" thick. All were uniform in shape and size.

The mesquite strips cut from a board on the table saw.

The next step in cutting the tiles was to tightly clamp them together and wrap them tightly with plastic wrap.

I clamped and wrapped. Moved over a little and clamped and wrapped and continued until the entire stack was securely and tightly bound back together with the plastic wrap.



Clamping and wrapping the slats.

The slats are wrapped and readyfor cutting into tiles.

Cutting the tiles was done on my power miter saw. I clamped a stop to the bed so the cut would make square tiles. Nine tiles on each cut instead of one the way I cut them last month. I had 9 slats wrapped together: 216 total inches of mesquite slats. Each cut produced 9 tiles .76 inches square. When the cutting was done I had 284 tiles. Ripping, wrapping and cutting them took just over 15 minutes. Thanks Michael Hardin!

The slats against the stop are ready to be cut.

Nine tiles in one cut!!

The tiles cut and ready to start gluing them together.

The miter saw did leave some small tear out on the cut edges of some of the tiles.

Some cleaning had to be done. I removed the tear out as needed during the gluing process.

Michael Hardin suggested using a table saw sled to get a cleaner cut with little tear out. I suppose a table saw sled in on my to do list. Yes, the can see more of these in my future. They are addictive and intriguing.

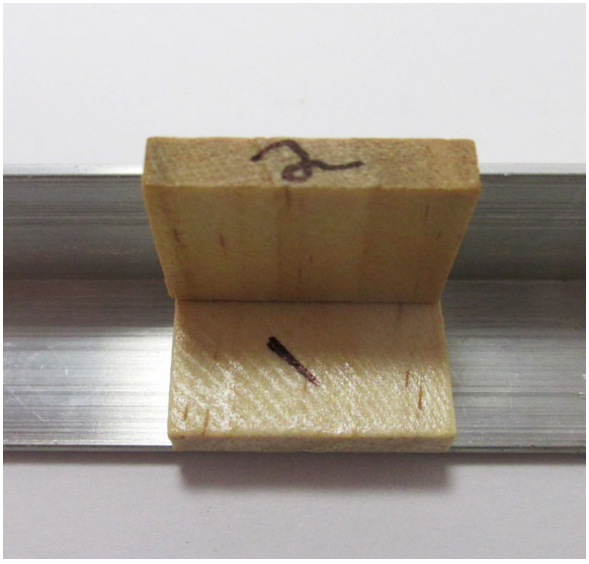
Look at the top image on page 1. The blank is made with layers of 6 tiles glued together. The top image blank on page 2 has 10 layers so 60 tiles were used: 6 per layer and 10 layers. Explaining how to make the blank will be difficult but I hope I can get the information delivered.

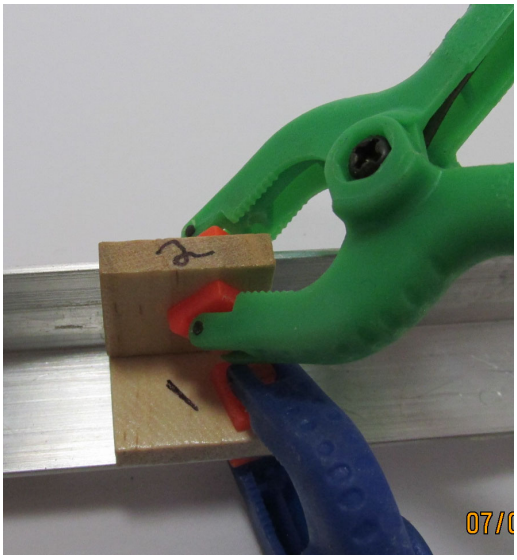
The first step is to glue up L's as I did for the blank from my previous herringbone article. I also discovered that getting these first two tiles perpendicular to each other is the most important step. If these first two are off then the next tiles will be off. And the layer made with them will have gaps.

I used the piece of aluminum angle as a jig for gluing the L's. Place #1 down first and then glue #2 on top against the aluminum angle. For gluing the L's I used TightBond II and micro-brush applicators. I applied glue to one edge of the #2 tile and placed it on top of the #1 tile.

Making the L's for the first part of each layer. The micro-brush applicators used to apply the TightBond glue. Applying glue to tile #2.

For a 10 layer blank 20 of these L's will be needed. The L's were made the same way they were in my previous herringbone article. I glued 14 L's at one time all clipped to the aluminum angle.



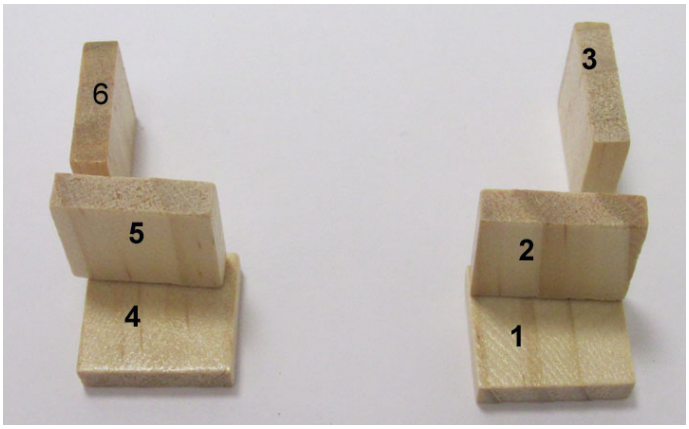


One of the L's clamped to the aluminum angle.

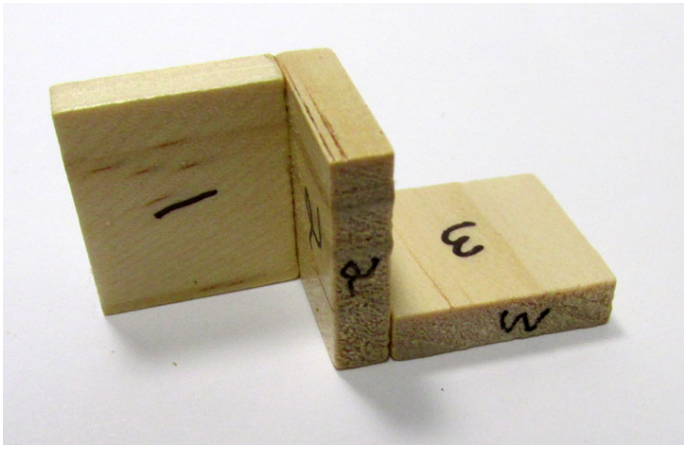
Several L's with the glue drying.

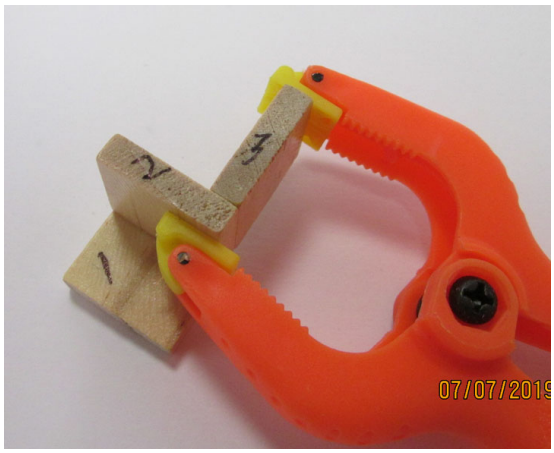
10 pairs of these mirror imaged threesomes will be needed for the blank I plan to make.

Once the #1 and #2 tiles are glued into the L shape the #3 tile is ready to be glued in place. There are several ways to get the #3 tile glued in place.



Notice the location of tile #3 and #6 . Some of the ways I read about used jigs and other props. I noodled around with tiles and clamps and clips and found a way that worked really well for me. I used the larger clips from the ones I purchased for my other herringbone blank article to hold the #3 and #6 piece in place. Once it was positioned I added one drop of thin CA on the inside corner of #2 and #3 tile then a quick spray of accelerator.

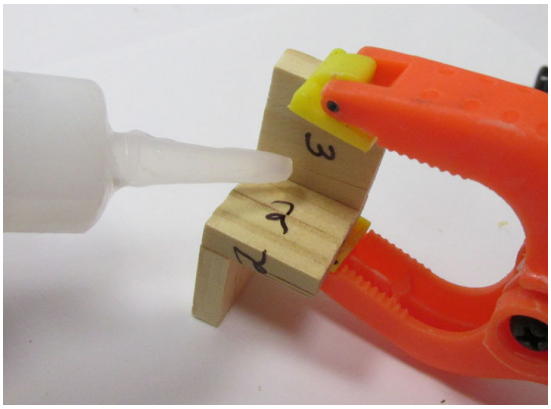


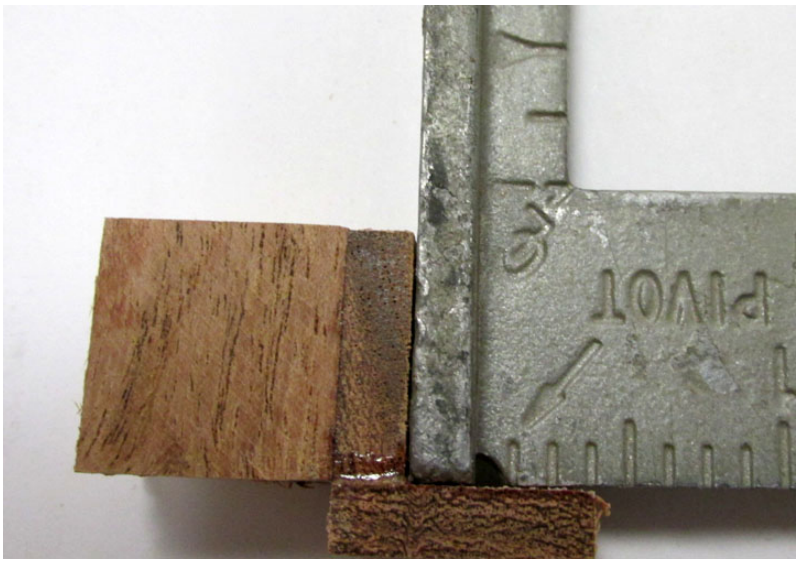


The L with #1 and #2 tiles is flipped 90 degrees (to the right). Grab the threesome holding #3 tile to #2 tile.

One drop of thin CA on the inside corner where #3 meets #2.

Now 10 or 12 of these "right side threesomes" need to be made. Then reverse the process and make the same number of "mirror image threesomes". Look above 2 pictures. The threesome with tiles #1, #2, and #3 make the "right side threesomes". The threesome with tile #4, #5, and #6 will make the left side or "mirror image threesomes". Make the same number of the "left side threesomes".



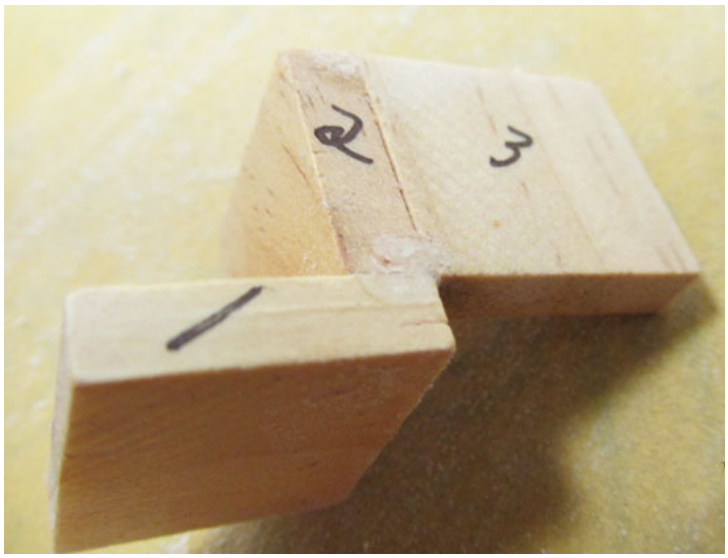


Check the fit of the three tiles to guarantee they are square with each other: #1 with #2 and also #2 with #3.

Reject anythat are not square. This is very important in the final fitting of the layers to make the blank.

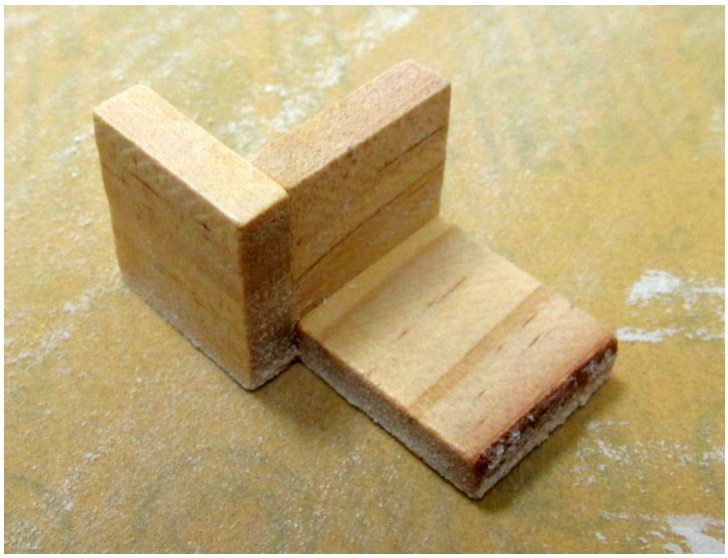
We want the joints as tight as possible.

Once all 20 or so threesomes are made then they will be glued together to make a layer of 6 tiles. We will have 10 or 12 of these 6 tile layers. But first, we need to do a little sanding on these threesomes. First, locate the side where edges of all three tiles are aligned on the same plane. There is only one of these places.

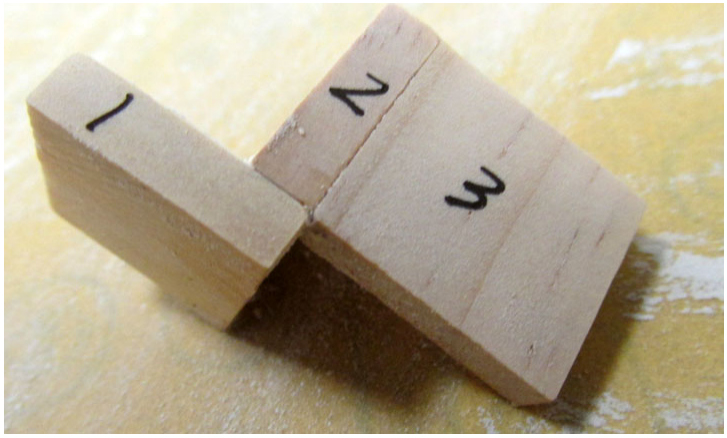


The place where edges of all three tiles are in the sameplane.

This confluence of the three tiles needs to be flat so sanding will help get the three surfaces in the same plane and nice and flat. Lay a piece of sandpaper on a flat surface such as a desktop. I secured the sand paper with tape.

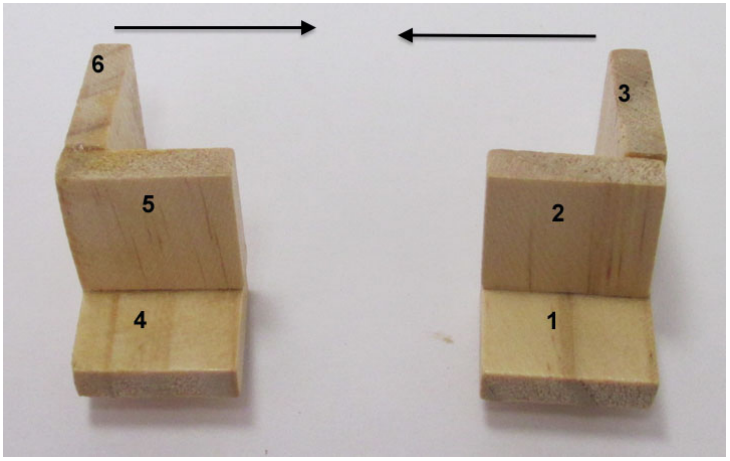


Orient the threesome so the three surfaces are on the sand paper and move the threesome over the sand paper flattening the three surfaces into one. Sanding the three surfaces flat.



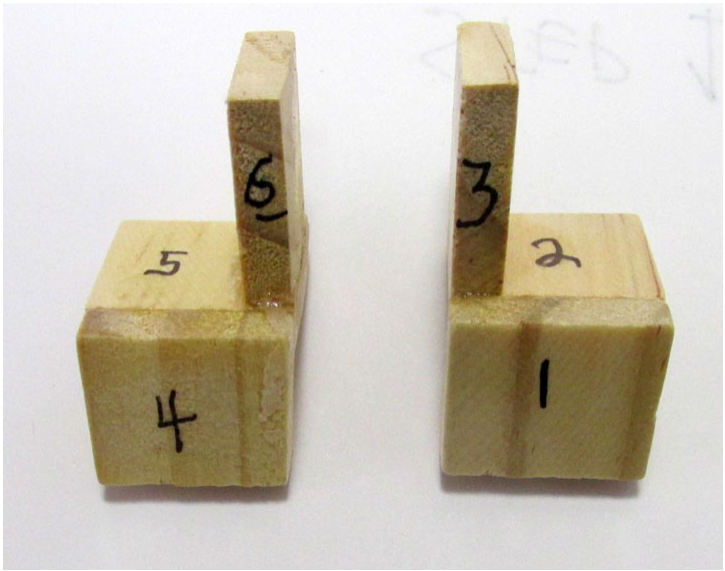
The intersection of the three surfaces sanded nice and smooth and flat. (Yes, I had to renumber them.)

If all has gone as planned there should be 20 or more of these threesomes: 10 or 12 pairs of mirror image threesomes like those on the left. The pairs are ready to be glued together to make 10 or 12 layers of two threesomes or 6 tiles. To do this we will use pairs of mirror images.



Step 1: Start with a pair of mirror image threesomes.

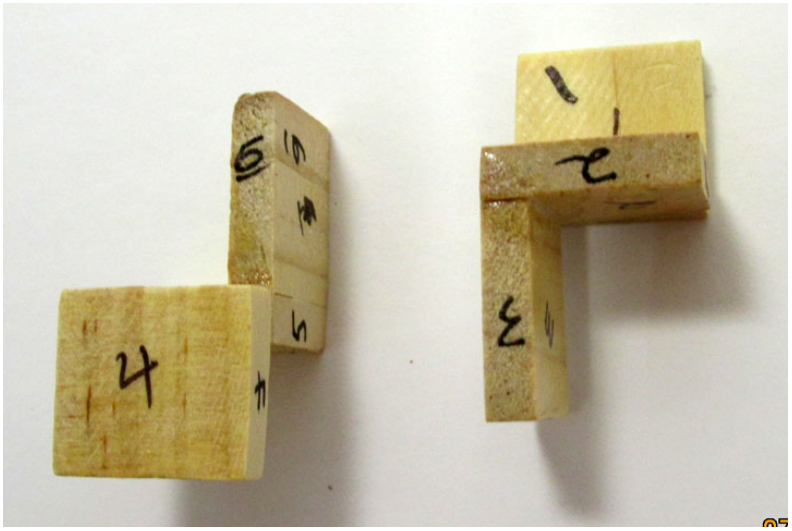
These two threesomes are now rotated 180°. The right threesome is rotated to the left and the left threesome is rotated to the right. The surfaces sanded earlier should now be facing each other.



Step 2: The position of the two threesomes after rotating as instructed in the previous paragraph.

The right hand threesome is ready to be rotated in the opposite direction 180°. Tile #1 and #3 swap places so to say. Study picture on the left to see how the right threesome is rotated. Maybe sacrificing a pair of threesomes (mirror images) and number them like I have the tiles numbered.

Now, just continue to match your tiles with mine to help understand how they are rotated. This is the part I had the most difficult time understanding. I hope numbering the tiles is helping. Once I got a grasp on what is happening then the confusion went away as understanding prevailed.



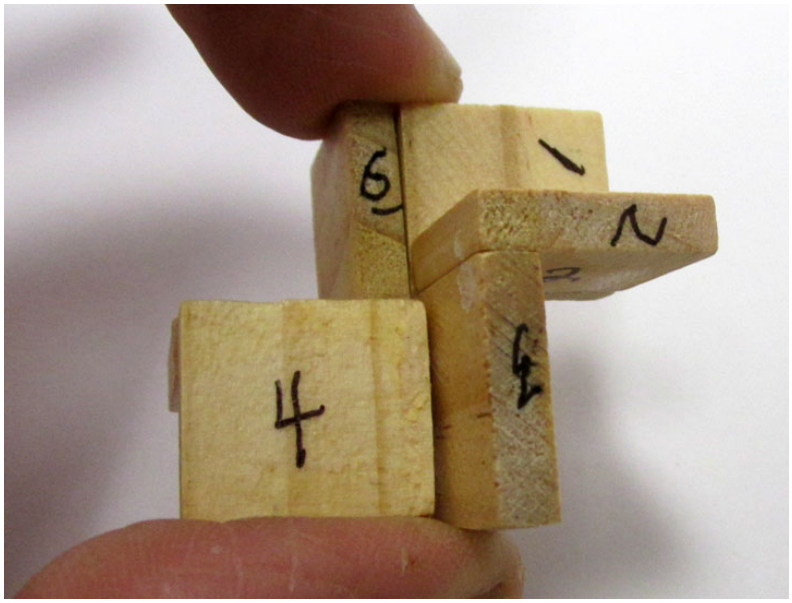
Step 3: The right hand threesome after its rotation.

Remember, only the right threesome is rotated.

These two pieces are ready to be glued together to make the layer of 6 tiles.

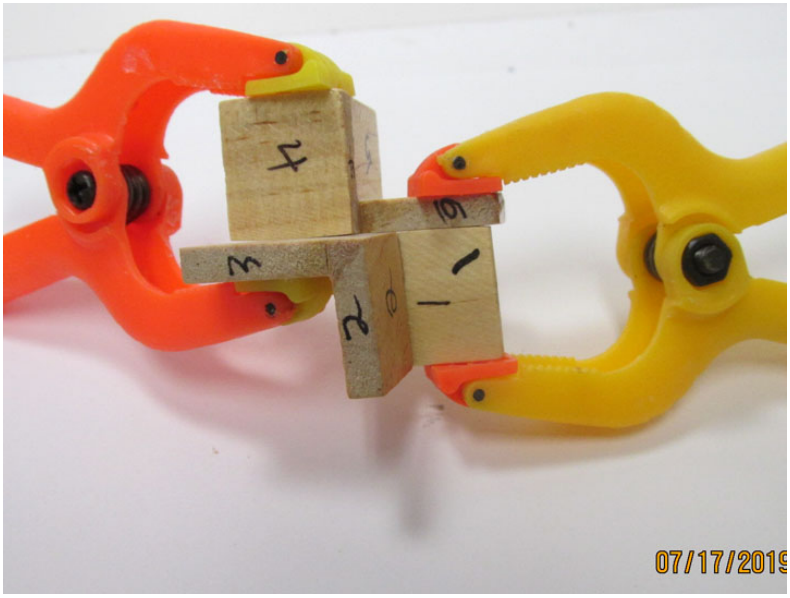
The right threesome moves upward so tile #1 is at the top of tile #6 but NOT sitting on top of it.

The bottom edge of tile #3 should align with the edge of tile #4. There are two ways to fit these two threesomes together but only one of them is what we want. Study the next picture.

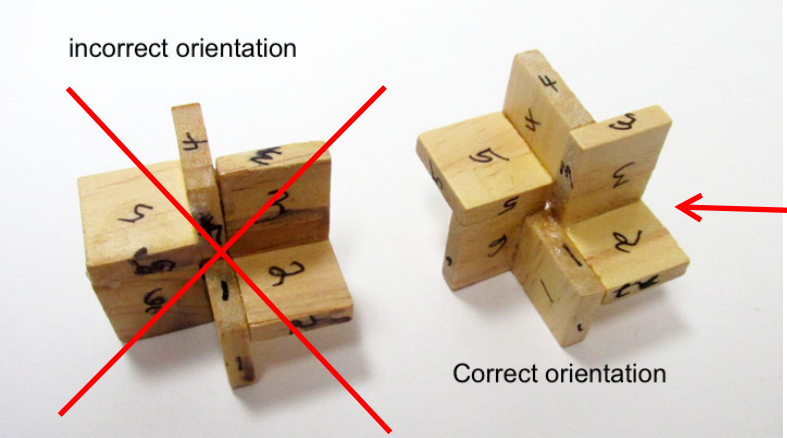


Step 4: Get the threesomes aligned, clamp and glue.

Clamp using two clamps to grab the two threesomes with one clamp on tiles #1 & #6 and the other on tiles #4 & #3. Place a drop of thin CA at the inside corner formed by these pairs of tiles. A short spray of accelerator will quickly cure the glue.



Two threesomes clamped together ready for the thin CA glue. The next picture below shows the two ways to glue the threesomes together. Study this picture below also to insure understanding of how the two threesomes are oriented.

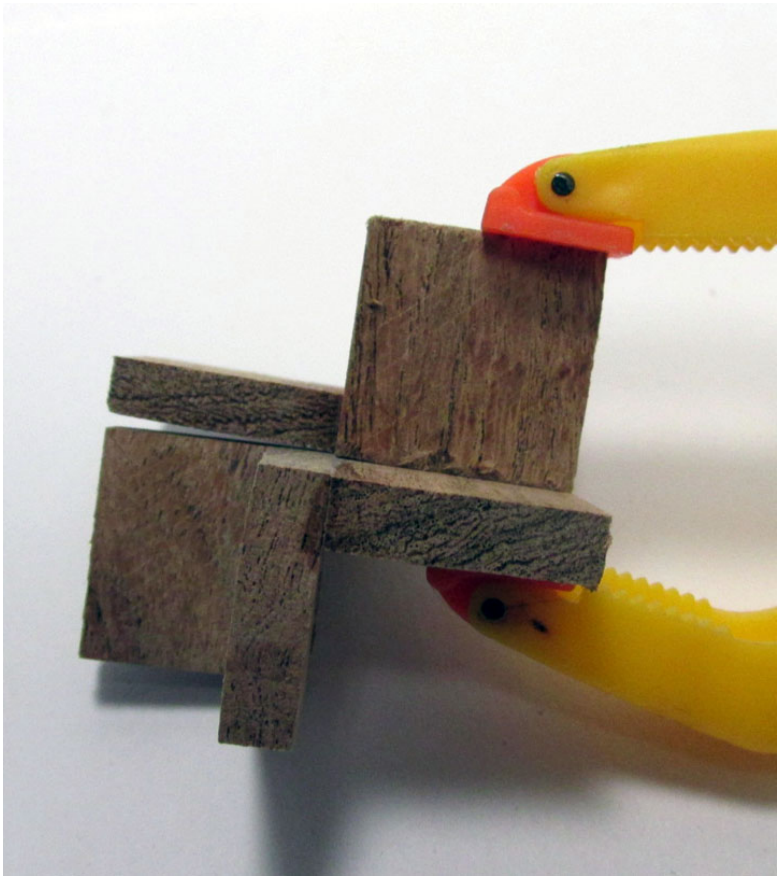


The two ways to glue the threesomes together.

In picture on the right, notice the correct positions of tiles #4 and #1 relative to each other. For the incorrect orientation they are “inline” opposite each other. The same is true for tiles #3 and #6.

In the correct orientation these pairs of tiles (#4 & #1 and #3 & #6) are offset but still opposite each other. They are not in the same plane in the correct orientation. Keep looking. This was the most difficult for me to finally see. Once I understood these things went much smoother. Understanding always wins.

IMPORTANT NOTE: While the threesomes are clamped together and prior to gluing, check for any gaps between pieces that are touching. Sometimes the clamps will close the gap but sometimes not. If the gap cannot be closed, cull that pair or try to loosen the glue joint and glue again. This is why I make more than I need.



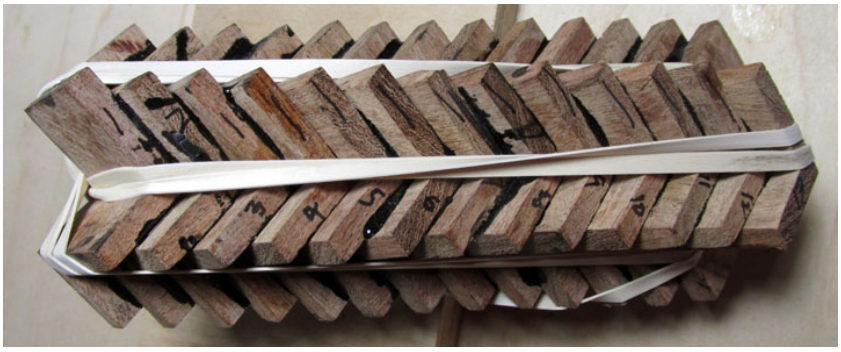
Correct the gap or cull the piece.

Once all of the pairs of threesomes are glued together into the 6 tile layers then we are ready to start stacking them together. I found it easier to stack and glue two layers together. They will either nicely stack together ornot. If the fit is not good then rotate one or both layers and try again.

The two layers will only fit together one way. You will know when you find the correct fit. Once double layers are glued together then stack and glue two of these double layers into 4 layer stacks. I make 12 layers so now I stack and glue the three 4-layer stack together to make one long 12-layer stack. This is not the only way to make the final stack.

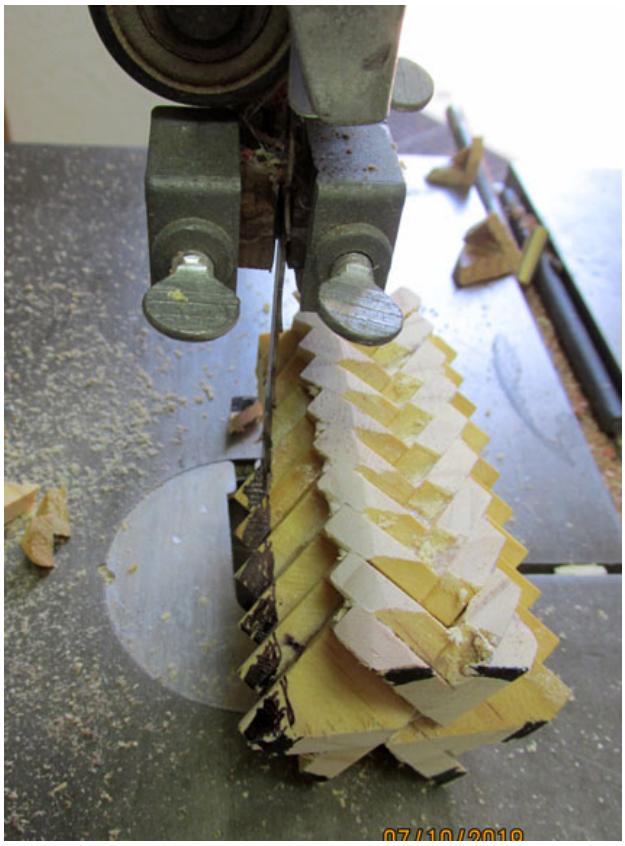
I found large rubber bands worked well to hold the layers together. Stretch and wrap the rubber band around the layers then drench with thin CA that will wick in between the tiles. This worked quite satisfactorily for me but I suppose two-part epoxy would work well also.

Pairs of 6 tile layers glued and banded together.



The completed 12-layer stack glued and banded together.

The blank above is not made from purchased tiles but from mesquite tiles that I cut myself to control quality. Notice the black between these mesquite tiles. I glued these together with two-part 30-minute epoxy. I used a little black pigment I had to color the epoxy. I am hoping the black epoxy will fill any gaps and make the tiles appear to be gap free. We shall see.



The blank is now ready to make a pen.

Cut the corners of the tiles to remove them. I used my band saw.

Then I took the blank to the disk sander and rounded the blank where the corners were removed. I made it as close to round hoping the initial turning would not be too rough on this segmented blank.

Cutting the corners of the tiles, then to the disk sander for more shaping.

Drilling the hole for the brass tube.

I next cut the blank to length and drilled for the brass tube. The brass tube was glued in place and the blank was turned. Turning proved to be uneventful and went well. The blank on the left is the result of the second one of these for me. The mesquite blank shown earlier was number 3 and I do see more of these for me. I hope I can refine the process to get the layers to fit together even better.

A sierra vista with the mesquite blank from this article.