Woodturning Projects

Module 21

Inside / Outside Turning

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Equipment

- Steb Drive Center
- Cup Point Live Center
- Scroll Chuck (Optional, but useful)
- Nylon reinforced Strapping Tape
- Roughing Gouge
- Spindle Gouge
- Paring Tool
- Skew Chisel
- Alternate turning tools, dependent upon design

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Materials

- 4 hardwood spindle blanks squared to a dimension ½ of the final outside diameter of the project, and a minimum of 2 inches longer than the final project length.
- Matching grain patterns is desirable, and stock with minimal grain pattern gives more attention to the design rather than the wood figure.

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Preliminary Stock Prep

It is critical that the blanks be perfectly squared and of exactly equal sizes, both in width and in length.

If unsure of your basic stock then run the pieces across a jointer and then a planer.

Match the grain at the ends, such that the growth rings open to the outside when grouped at the start so that the final assembly will show a circular grain pattern.

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Stock Marking

Using some consistent convention, mark the center intersections of all four pieces and number them in a clockwise rotation.

I use a large square going across all four with the numbers 1-4 inside the square.

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Stock Marking

Then rotate the blocks such that the square markings are towards the outside,
and then I draw a circle at the intersection and again number them 1 through 4 corresponding to the same number at the other corner.

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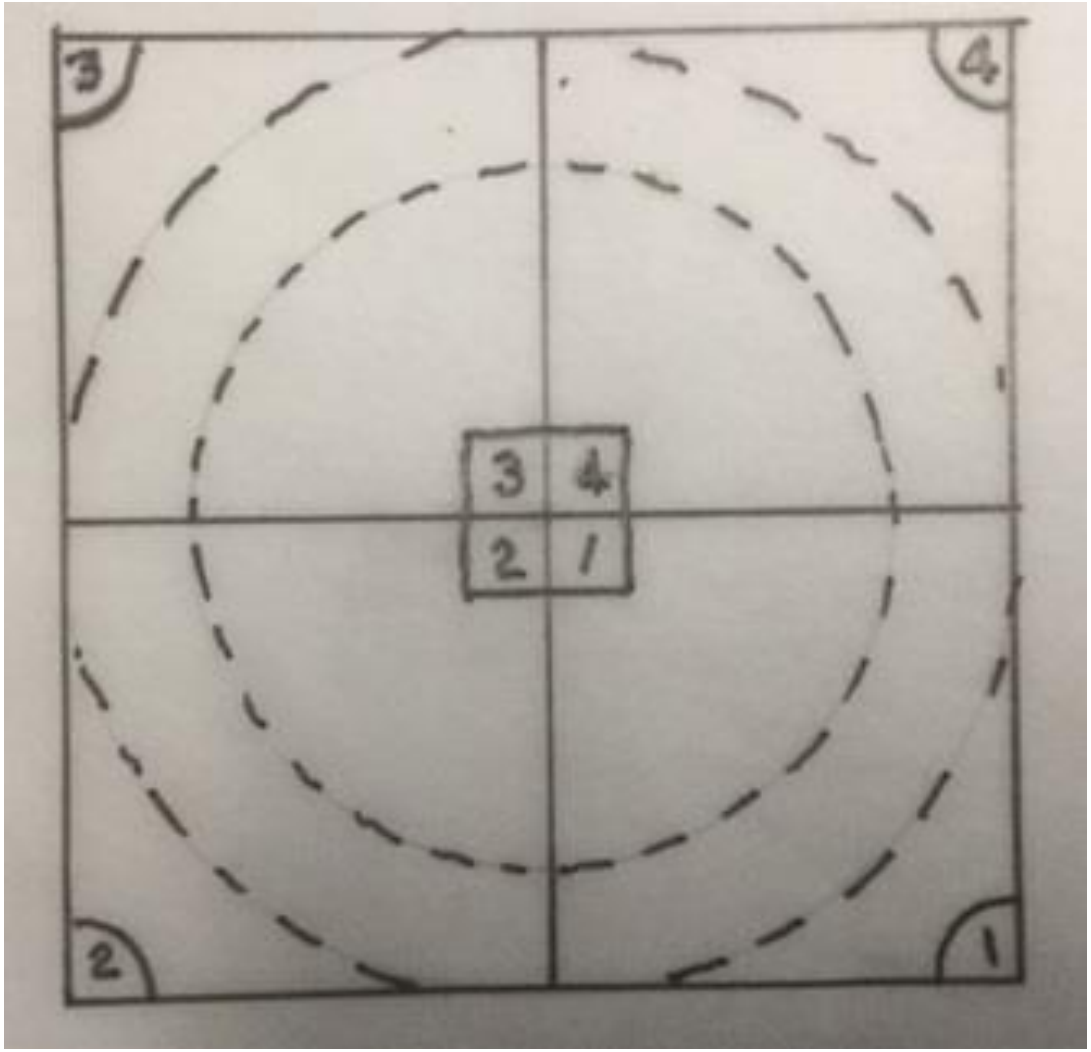

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Align for first turning

- Rotate the blocks back to the original orientation so that the square is aligned perfectly and the bundle is squared and even in the lengths.

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Secure for first turning

Apply strapping tape across the ends of the four pieces as grouped together, in both 90^0 directions and at each end to hold the pieces into alignment. Wrap a length of strapping tape around the ends with two complete layers each. (this is an alternative to a paper glue joint)

Be very aware that this tape is the only thing that shall be holding this bundle together for the first stage.

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Mount to the Lathe

Locate the assembled billet between a Steb center and a cup live center making certain that the center points are exactly at the intersection of the four corners.

Using a Steb center drive will keep the assembly from spreading, as will the use of a cup enter at the tailstock end, as pressure is applied by the tail stock.

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Planning the shape

Mark out the planned overall location of the final shape, allowing an inch at both ends for chucking and for alignment. Locate the area where the shaped cut out will be for the window. I use a cardboard half pattern cut with the positive half shape and wings at each end cut right on the centerline of the pattern.

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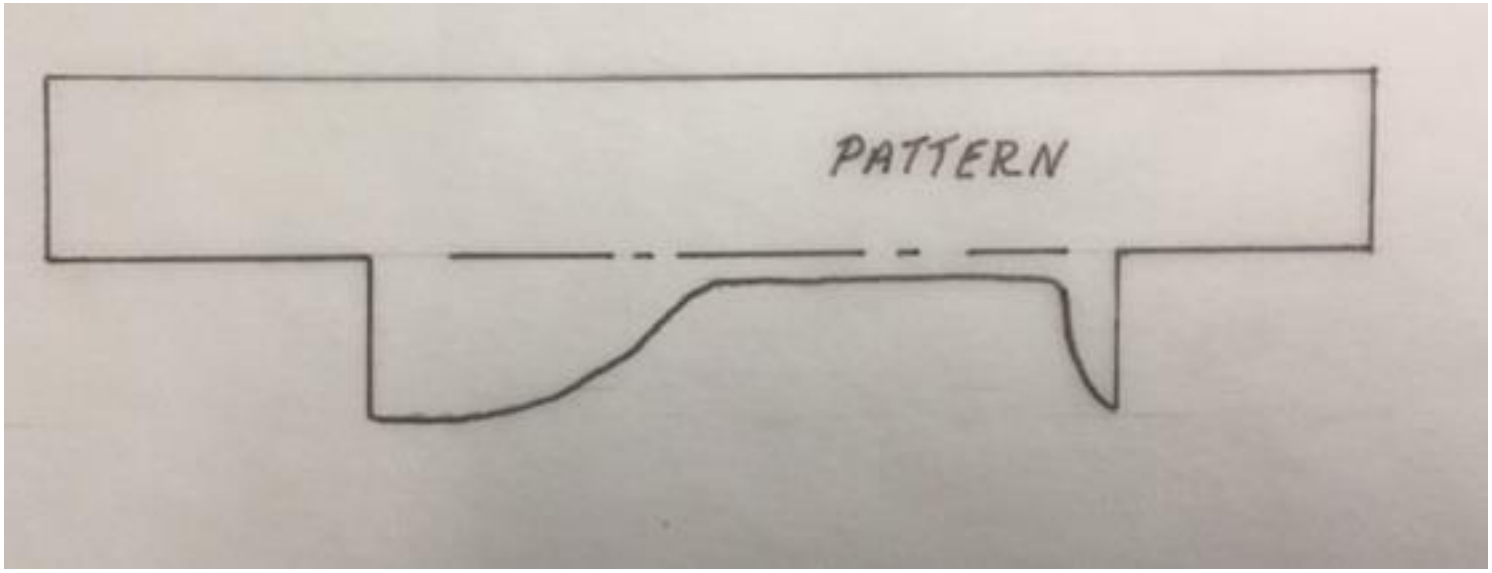
Positive Half Pattern



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Inside Turning

Turn away the window area, checking the relief with the half pattern located at the flat of the assembled block. Make the entry and exit transitions clean and as sharp as possible. Straight in cuts, that would leave flat bottomed windows need to be square to the axis and are more difficult to align during the next step.

Sand and apply any desired coloring or finish to this inside profile at this time.

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Disassembly

Taking the block out of the lathe, you can cut away the strapping tape and separate into four individual blocks once again. Arrange the blocks so that the circles are now at the center and the numbers increase clockwise.

Depending upon the depth of the inside cut you should be able to see the inside cut profile.

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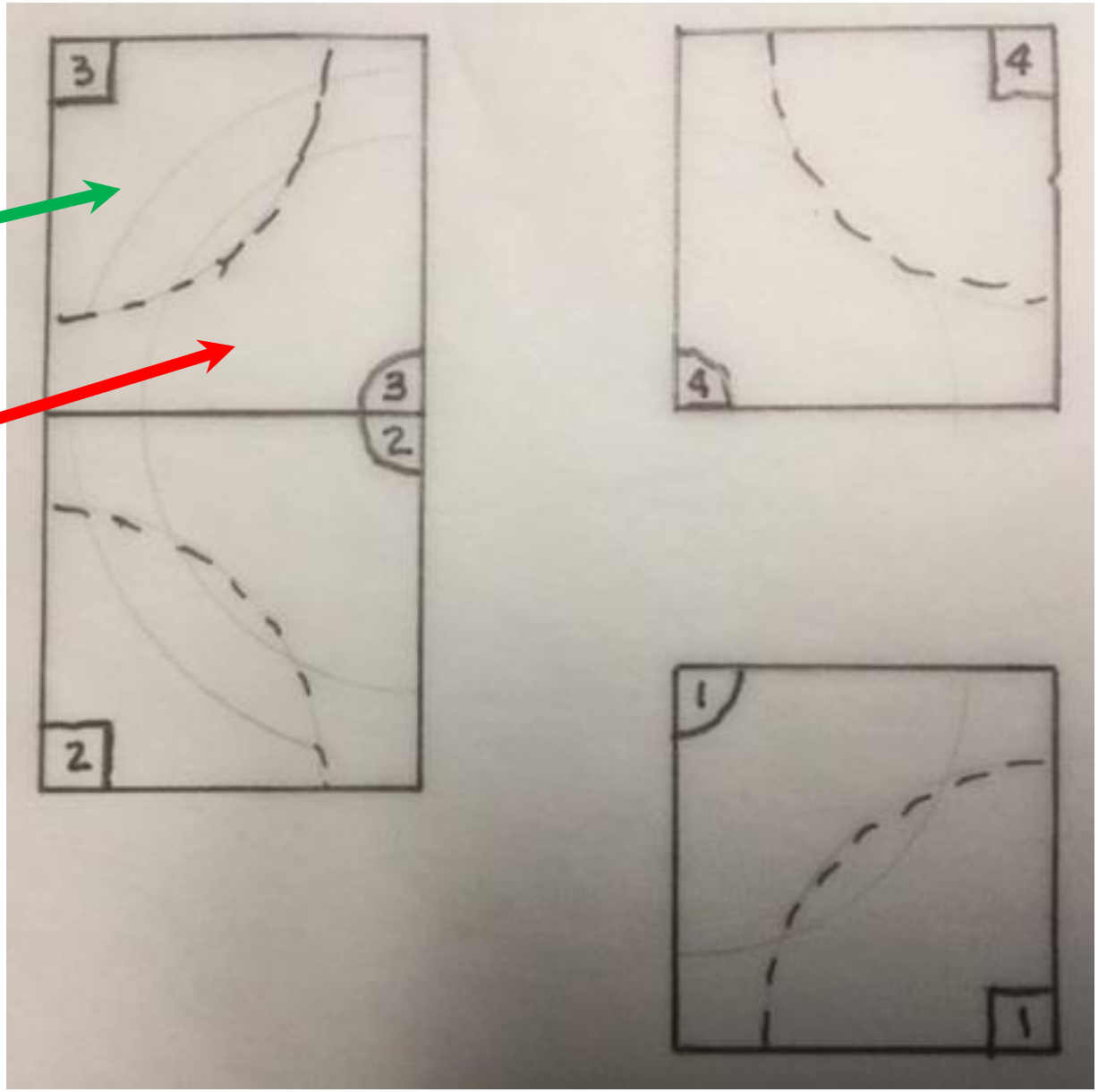
Solid

Inside Profile



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Glue up

Take two adjoining numbers and apply glue to both inside faces along the mating surfaces, being careful to align the end points of the inside profiles at top and bottom.

If they do not align exactly, favor the edges with the flattest cut, as it is easier to fake in the curved edges later if needed.

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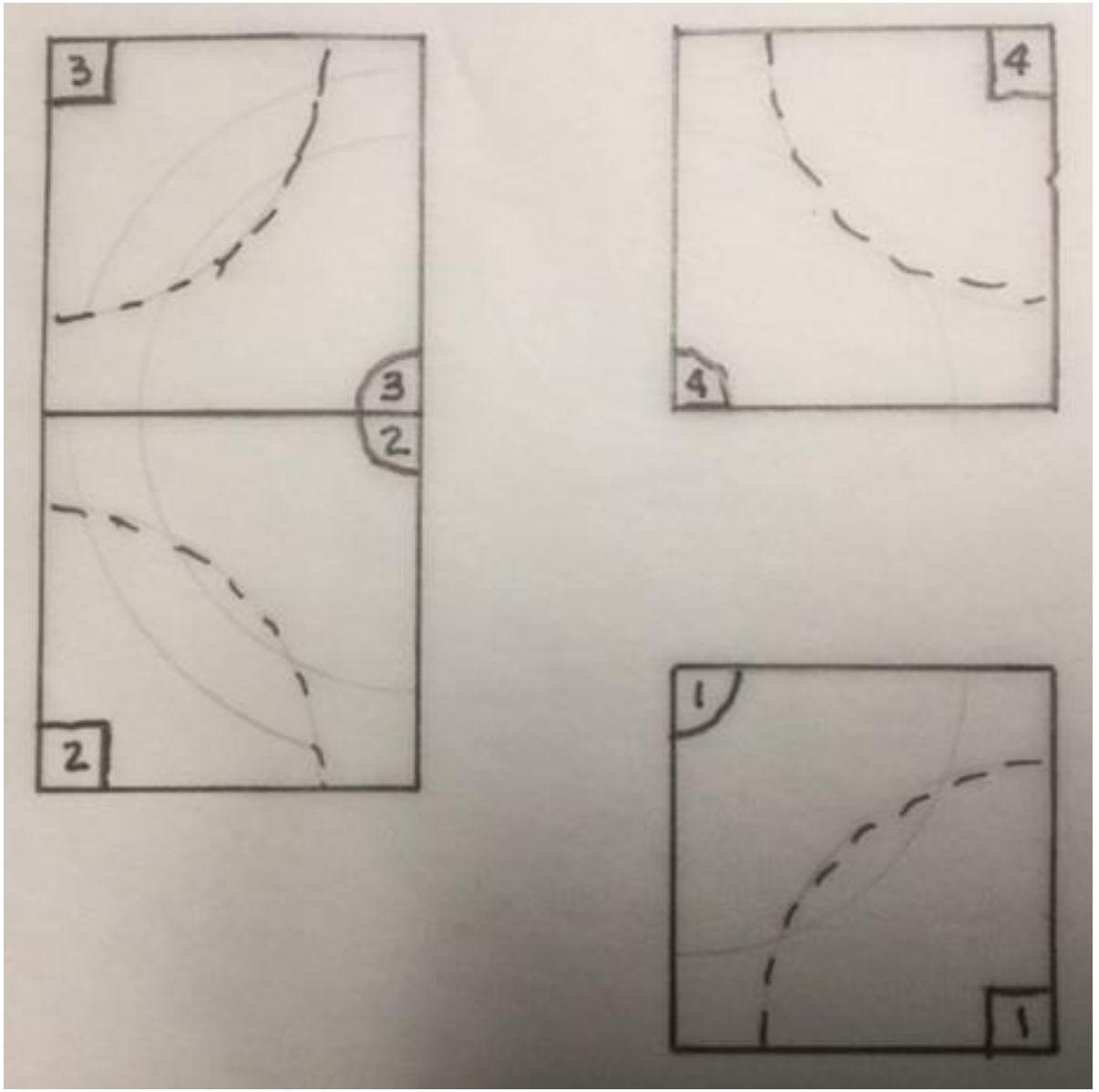

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Glue up

Repeat the process with the other two pieces so that you now have two joined halves rather than four quarters. If the inside profile is not visible from the outside, make witness marks across the inside transitions and follow those to the outside faces so that when you glue the two halves together you are sure that all transition points are in line.

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Glue up

If the ends of the glued assembly are not exactly aligned and square you can trim off a thin section to square them up.

For safety sake, even after the glue has dried, I again wrap a double wind of strapping tape around both ends.

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Mount to Lathe

Secure the glued billet between centers. If you chose to use a scroll chuck for the final turning then first turn a tenon onto each end. This will help in the finishing of the ends for finish sanding and finishing.

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Outside Turning

Turn your final shape, being careful once you start getting an interrupted cut. Lighter cuts and higher speeds will give a better finish and less bounce across the interrupted surface.

Keep in mind that the following edge of the opening is unsupported grain and fragile.

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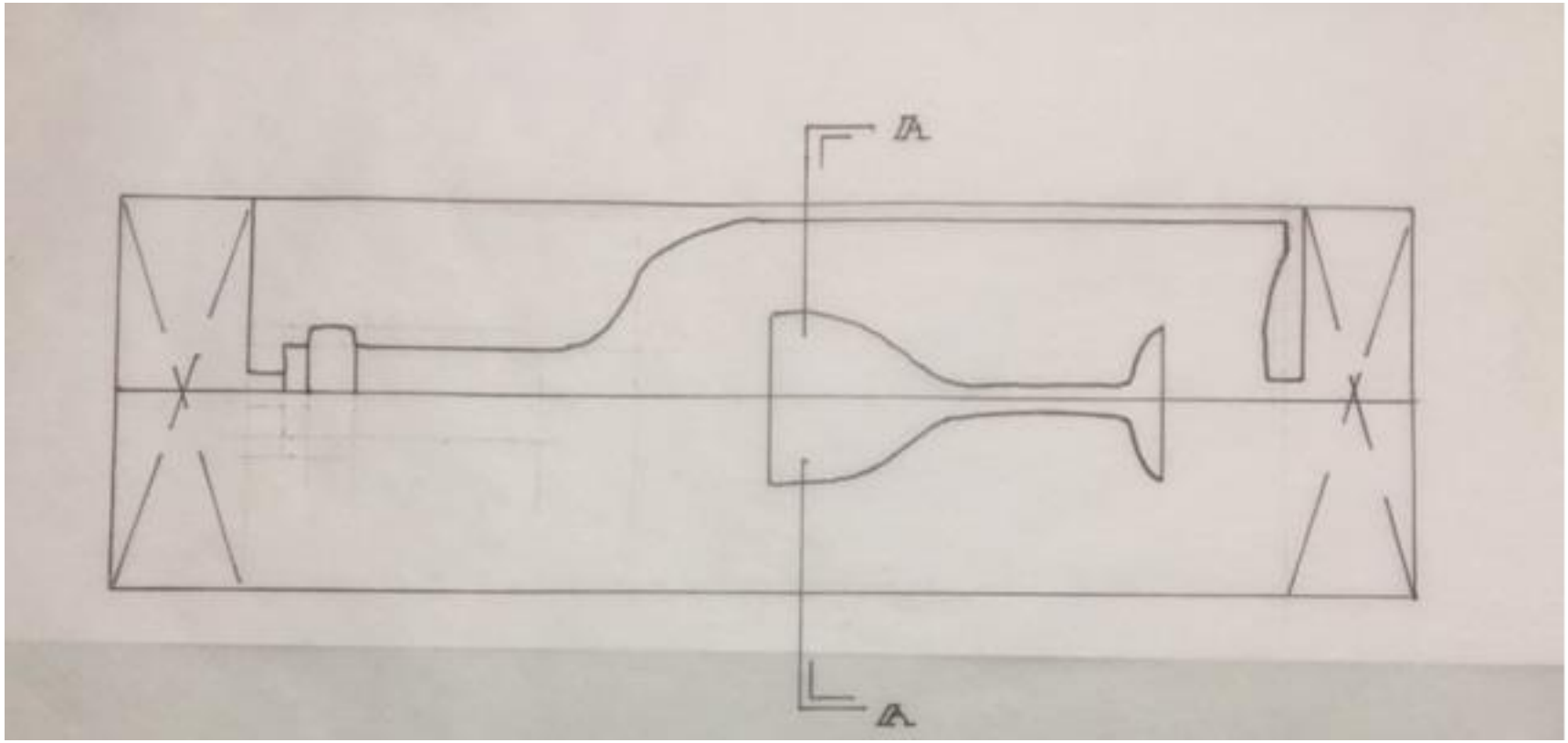
Turning Outside Shape



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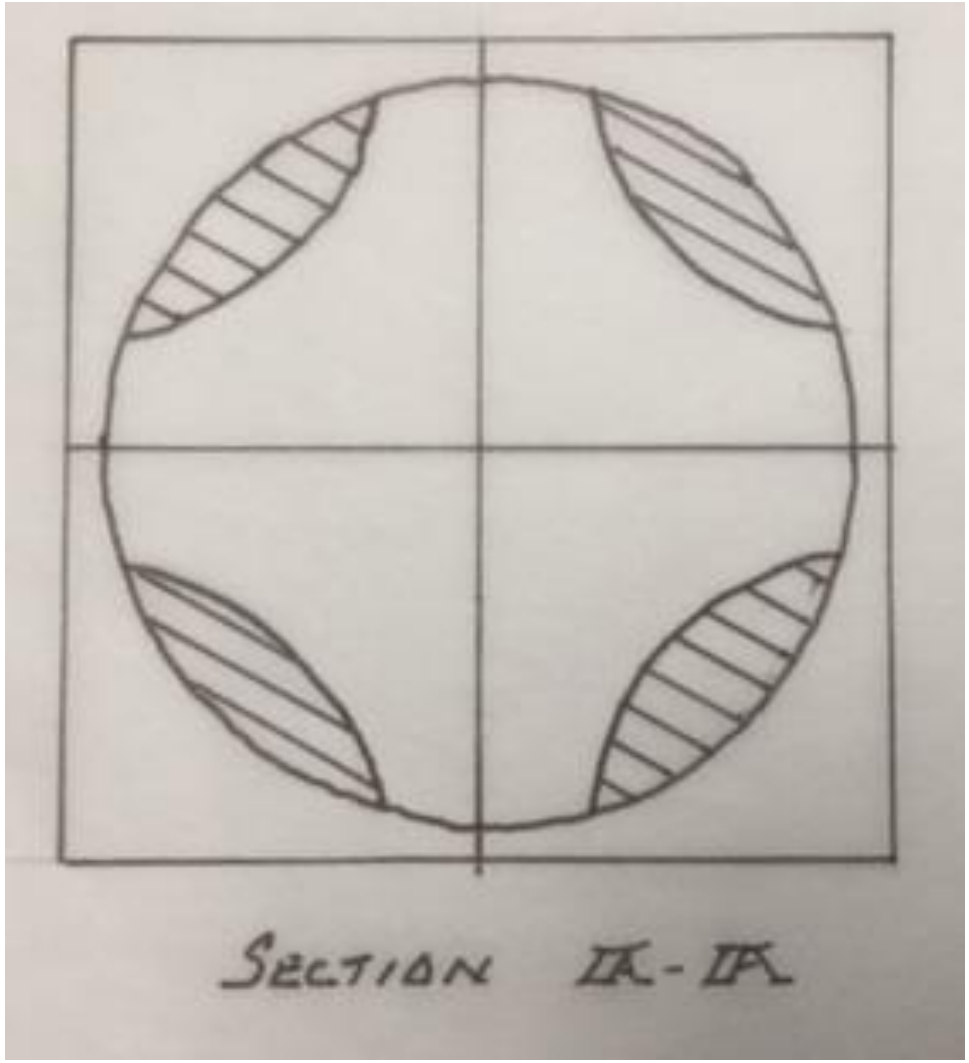
Web Thickness



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Finishing

Sand the finished shape, keeping fingers well away from the window openings, and apply the desired finish. If using a chuck you can then part one end and finish that end, before parting off the other tenon.

If you are still turning between centers, then part to a conservative depth and finish parting with a fine tooth pull saw.

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Finishing

Once the piece is parted off, chisel off the nub at the base and sand smooth to a concave surface.

To finish off the top, use a rotary detail tool to carve off the nub and to carve a recess into the end and cut dimples into it to emulate the end of a recessed cork.

Apply gold paint or red wax over the end to represent a seal.

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Finished Project

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Finished Project

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Design Options

The shapes and sizes of the internal window are limited only by the imagination of the turner.

Using a paper layout of the ends of each spindle and using a compass to show the cuts will give a good prediction of the size of the inside cut relative to the amount of wood left for your finished shape.

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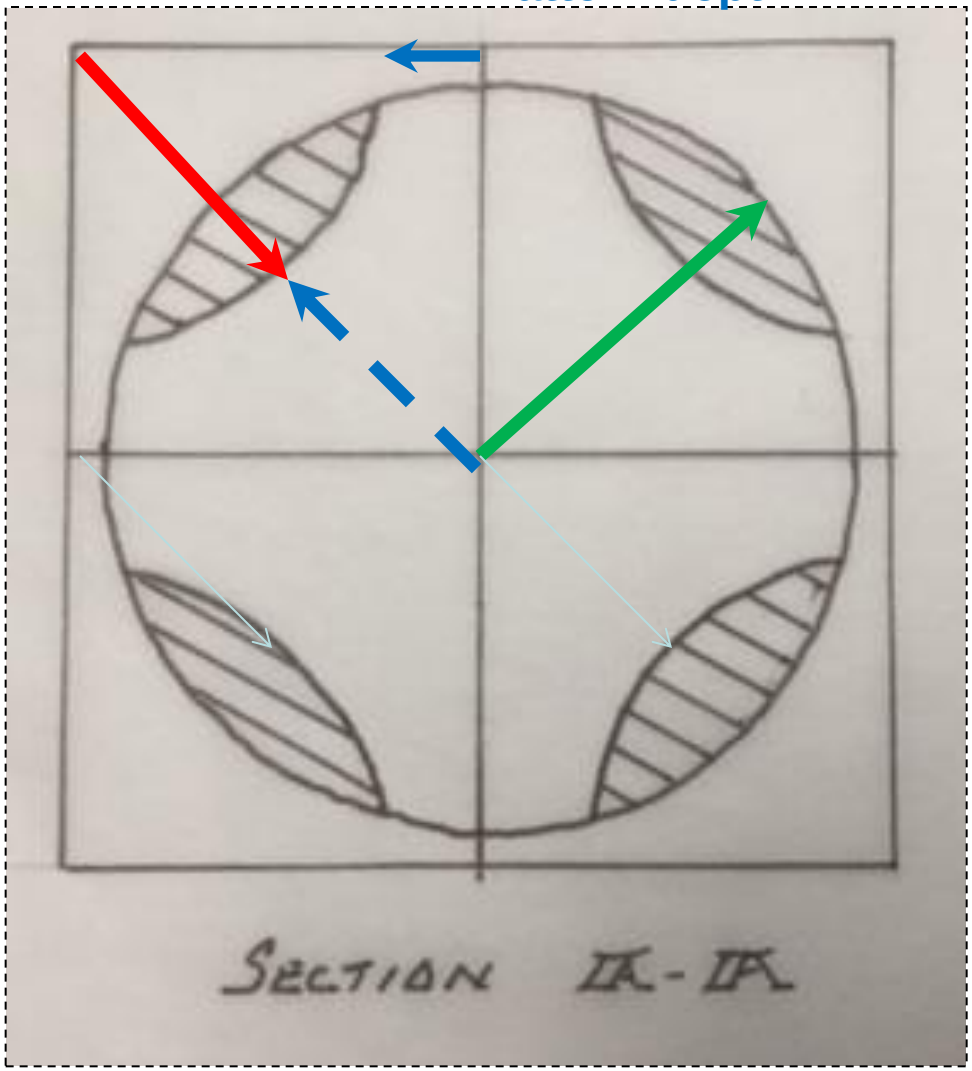
Predicting Web Thickness

Pattern depth

Inside cut (first)



Outside cut

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Design Options

The more dense the wood and the straighter the grain will allow for thinner walls.

Inside / Outside turning can be done with just two starting pieces, or as many even numbered pieces as you care to try to align and control.

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Similar Designs

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Caveats

- Be certain that adjoining faces are square and flat before glue up, or gaps shall show up.
- Be aware that the back sides of window openings shall splinter out as there is no support for this edge. You may need to sand these edges and repair the inside finish.

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Caveats

- If your window shape is tapered towards the outside the visible opening may be smaller than expected once the final outside form is cut.
- Open grained woods, such as Oak, Ash, or Palm, do not work as well since there is less strength in the web section

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Caveats

- Fine detail in an inside shape make it more difficult to align the profiles during the glue ups.
- Undercut shapes are more difficult to control, such as hearts or shamrocks.

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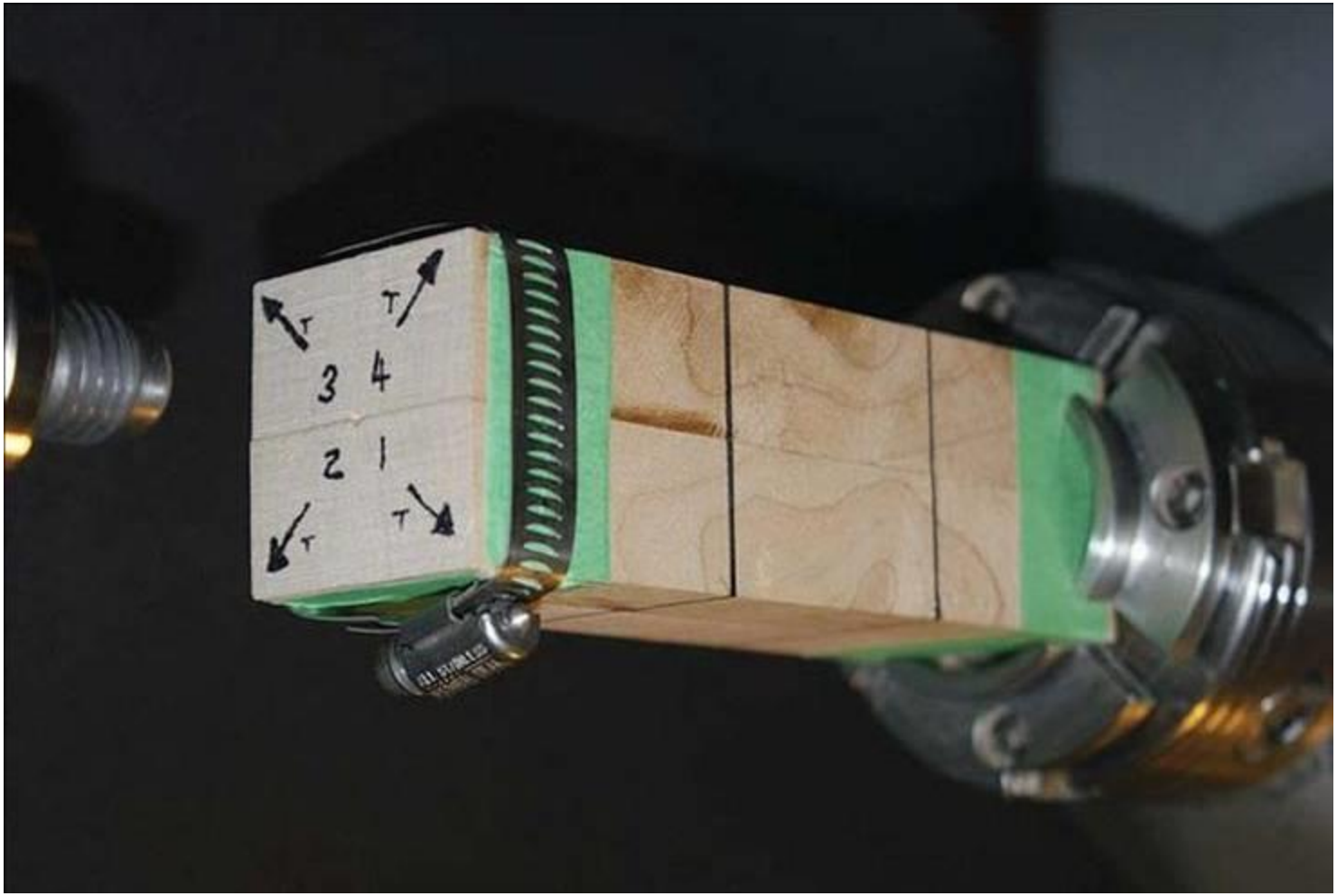
Examples of the infinite options



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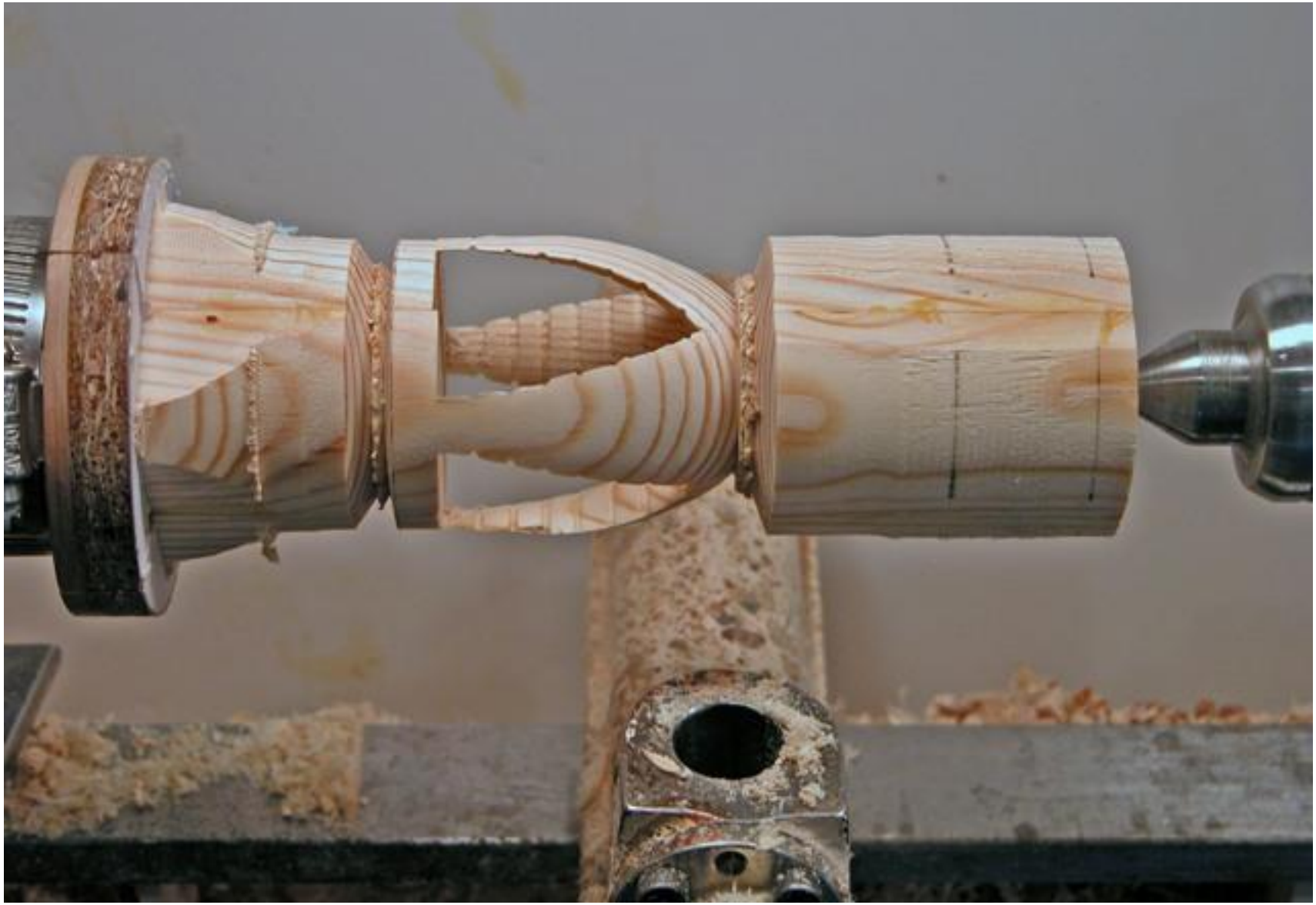

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Questions ?

- Thank you for your interest and attention.

- Are there any questions about the covered material or the topic in general ?

Contact info - rrumery@aol.com

Resources

- https://**www.youtube.com**/watch?v=sQnMFQKeWas
  Video example of an ornament being turned

https://more**woodturning**magazine.com/articles/**Inside**-**Out**-**Turning**.pdf
John Lucas description of how to Inside Out turn

- http://tidewaterturners.net/wp-content/uploads/2015/09/Inside-Out-Profiled-Turned-Trees.pdf
  Roger Zimmerman's two piece tree ornament

- http://thiswoodwork.com/inside-out-woodturning-christmas-tree-ornament/
  Alex Harris' ornament with contrasting woods

http://www.davidreedsmith.com/Articles/InsideOutsideAngelOrnament/InsideOutsideAngelOrnament.htm
David Reed Smith making an angel ornament

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