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The Twisted Triangle Box - Layout Steps

1. Your blank should have smooth, square ends. It works equally well to start with a square blank, or a rough one that you turn round first.
2. Find the center of the piece of wood on both sides. Rough down to round if desired.
3. Make a reference line that joins the top and bottom layouts. This can either be one corner of the square blank, or a line drawn using the toolrest as a guide.
4. Draw a diameter line from the reference line through center on both sides of the blank.
5. Use a good quality compass with a pencil lead type point. Sharpen the lead with a piece of sandpaper laid flat on the table.
6. Use a ruler with engraved lines for increased accuracy.
7. Pick up your layout marks accurately with an awl mark, being careful not to let the woodgrain push the awl off the layout mark.
8. Pay attention to having the 3 centers
9. Use live and drive centers with sharp points for the turning.
10. Use smaller diameter live and drive centers for the turning. 1/2" diameter is a good choice.
11. Wear sufficient PPE to feel safe!
12. Be sure the blank is held tightly between centers.
13. Use a safe spindle speed for the turning.

This type of layout can be done in a huge range of sizes.
Here's how I determined the relationships in the layout
(this formula works in this size range, and may (or may not) work the same way in much larger layouts):

Starting with the largest diameter available in my blank:

1. Multiply the major (Blue) diameter by .77 to get solid (Red) diameter
2. Subtract ½ " from the Red diameter to get the centerpoints (Green) diameter

Starting with the desired small Red diameter:

1. Multiply the Red diameter by 1.3 (or divide by .77) to get the Blue diameter
2. Subtract ½" from the Red diameter to get the Green diameter

Other things I have discovered:

1. The larger the radius of the outer arcs, the more "triangular" the box appears.
2. The smaller the radius, the more like a circle it looks
3. If the design of the box doesn't fit within the Red cylinder, the hollowing will cut through the sides. This could be either a good thing or a bad thing!
4. Other numbers of centerpoints are also possible using the exact same ideas. 6, 4, and 8 are easy to figure out.
5. The more "sides" to the geometric shape, the more it starts to look round.
6. Don't feel limited by symmetrical points! Any variation of asymmetrical polygons is possible!
7. If the centerpoints 1, 2, & 3 (or however many) are shifted in relation to each other, you will get a "twisted" triangle (or whatever). This looks cool but is harder to sand.
8. Try a tapered 3 (or 4, 6, 8, etc)-sided turning. Make the layout smaller on one end of the block.
9. This same idea works well by only shifting the centerpoints on one end of the block, also.