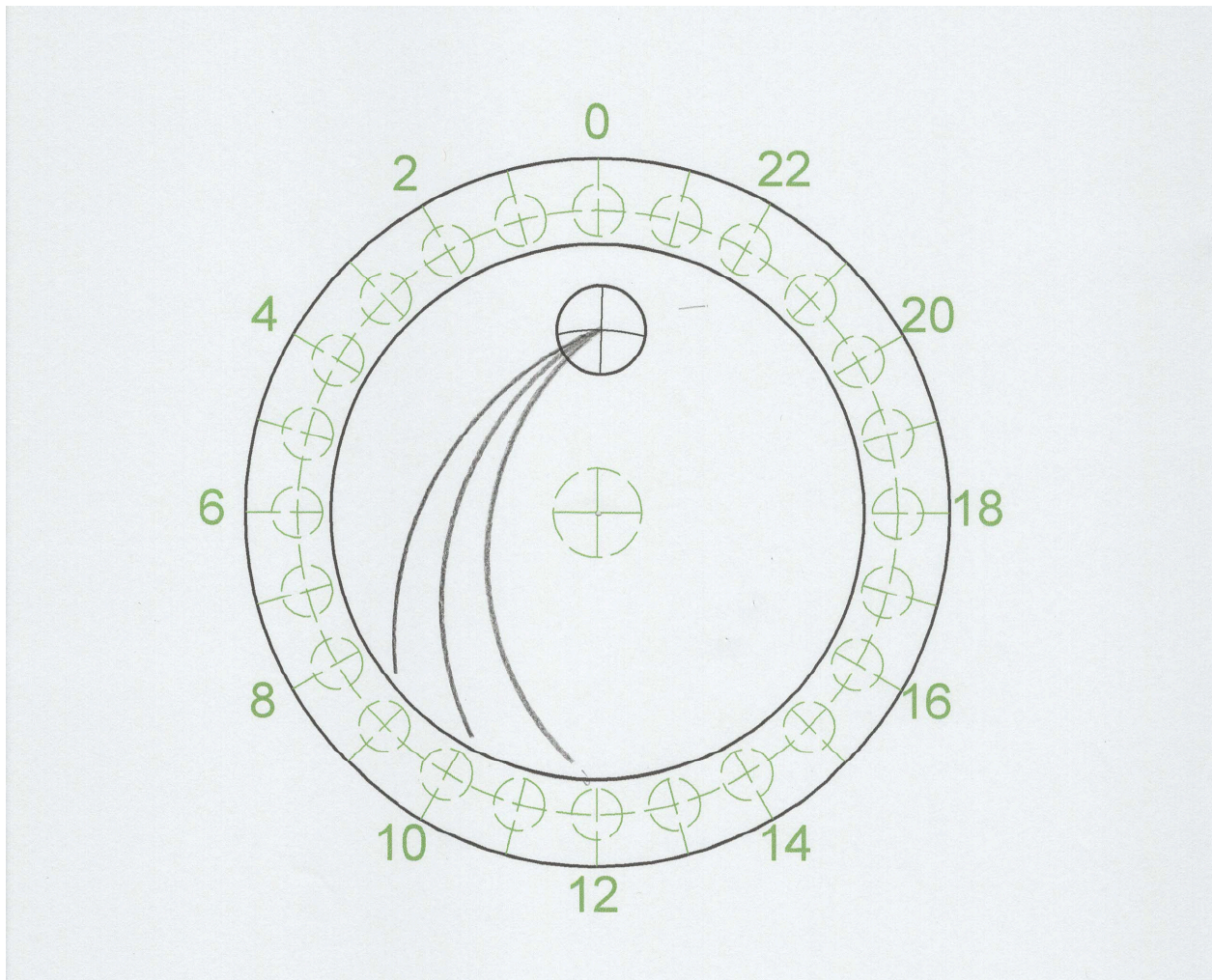


# Joyner Off-Set Jig Pattern Design

By Dan Douthart



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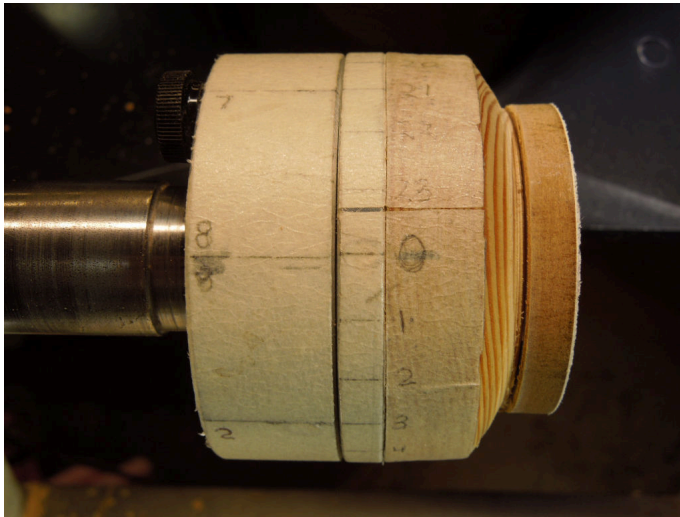
## Joyner Off Center Jig Pattern Design

Bill Kloeping has an Excel spreadsheet tool that can be used to design cutting patterns for use with the Joyner Off Center Jig. He has two spreadsheets, one for the original 8-Hole jig and one for the newer 10-Hole jig. These spreadsheets and instruction paper are available on his club's web site at [www.huntcountywoodturners.org](http://www.huntcountywoodturners.org). I have used both spreadsheets with success.

This paper will cover an alternative process that I believe makes it easier to produce the pattern that you have envisioned. One of the main differences between my process and Bill's spreadsheet is the reference point that is used for the index plate position. Bill's spreadsheet uses the "0" mark on the offset plate as the reference point for index plate position. My process uses the currently active offset hole as the reference point for the index plate position.

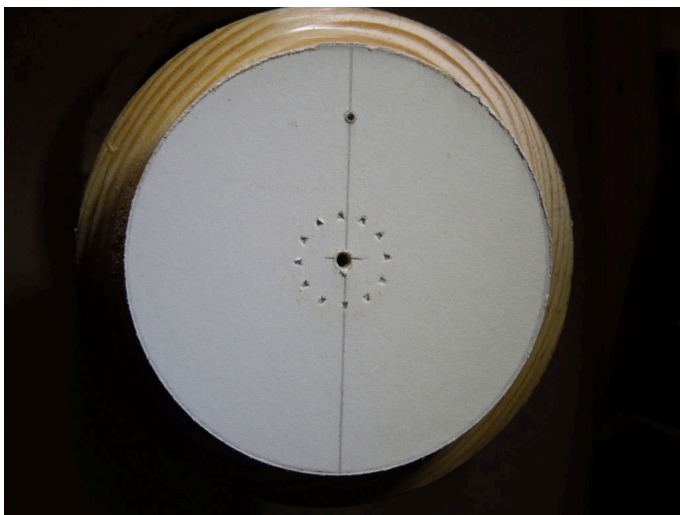
I have used a CAD program to produce accurate drawings to the jig's offset plates and index plates for both the original silver 8-Hole jig and the newer red 10-Hole jig. If you are not familiar with this terminology, please refer to the paper titled "Joyner Off-Set Jig Intro". That paper is available at [www.nilesbottlestoppers.com](http://www.nilesbottlestoppers.com). These drawing are twice the size of the actual jig, making them easier to use. Printable copies of these drawings are attached to the end of this paper.

The process could also be used at the lathe directly on the jig.



I have a piece of 1/4" MDF attached to the waste block with pieces of double sided tape. White printer paper has been glued to the surface of the MDF.

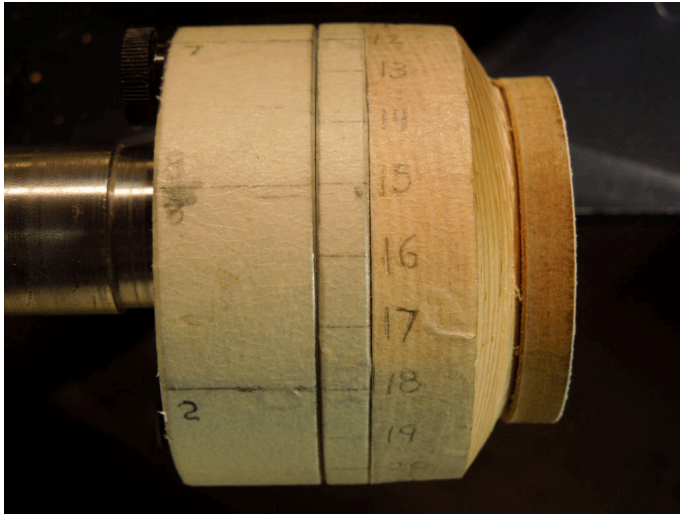
The Index plate hole 0 is aligned with the offset plate hole 8



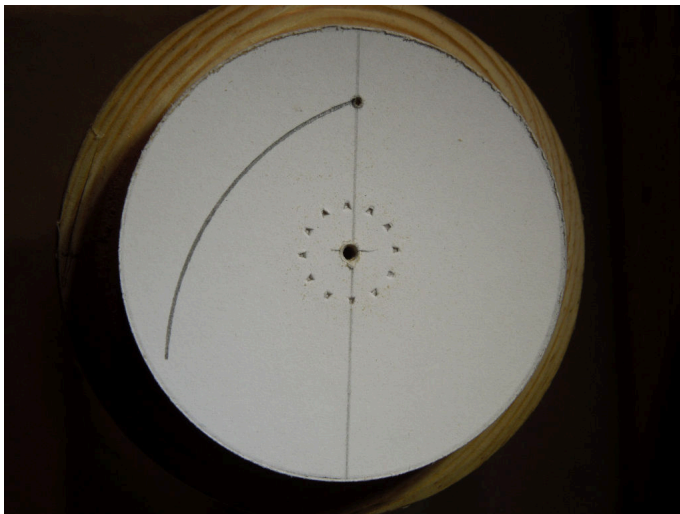
The offset plate has been moved to offset hole 8 and the center of rotation is marked.

This will be the center of the pendant hanger hole.

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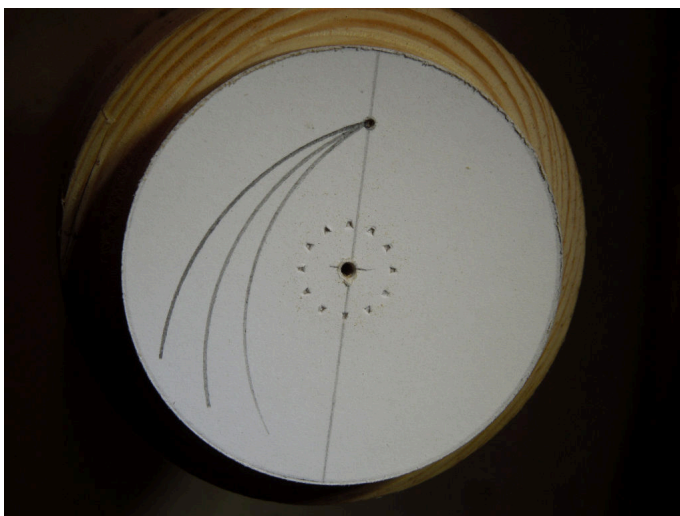
The index plate has been rotated to align index hole 15 with offset hole 8.



The pencil point was placed in the of the hanger hole and the lathe spindle was manually rotated to produce the first element of the pattern.

There is no need to determine the exact radius as with the spreadsheet tool.

I simply place the pencil point or cutting tool point in the center of the hanger hole.



The steps are repeated with index holes 16 & 17 to finish my comet trail design.

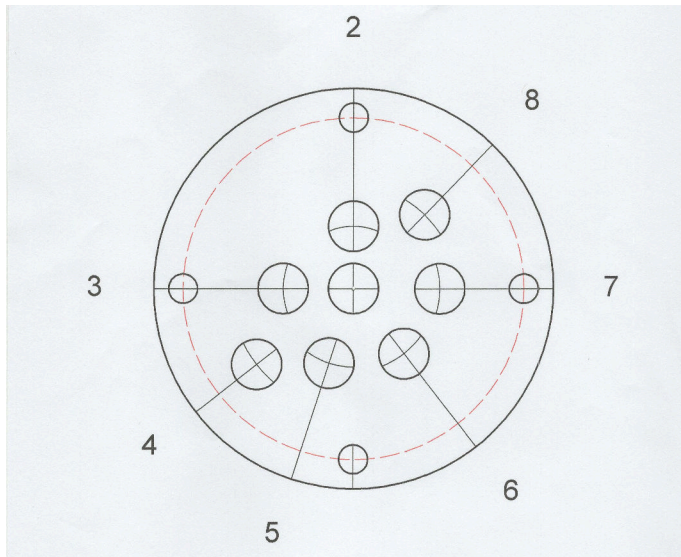
I have seen other comet trail designs, but I prefer to have the pattern emanating from the hanger hole.



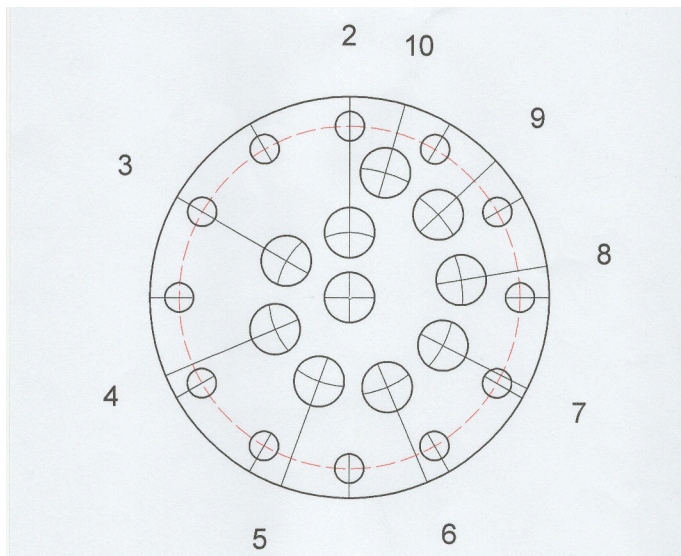
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This process was completed while standing at the lathe. Emphasizing **STANDING**. The process also involved screwing and unscrewing the jig from the mandrel four times and screwing and unscrewing the thumb screws holding the index plate four times.

I will now show you how this can all be accomplished while sitting in your comfy chair at your desk and rotating a couple pieces of paper and using a compass to scribe the pattern lines. The numbering on these drawings are as seen from the lathe tail stock.

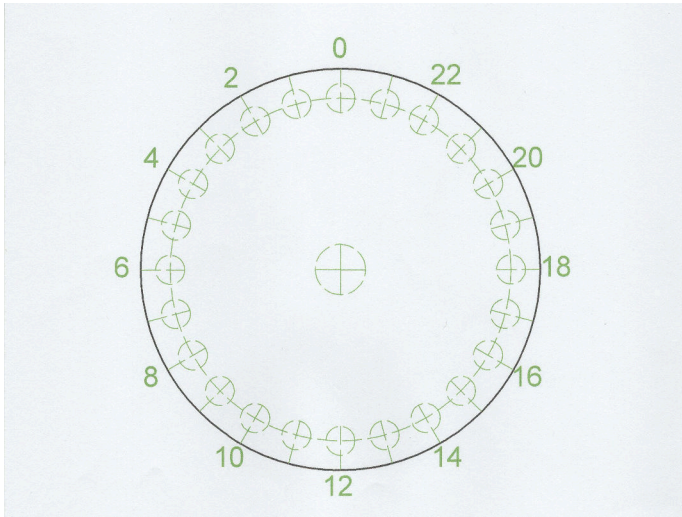


This is the drawing for the original silver 8-Hole offset plate.



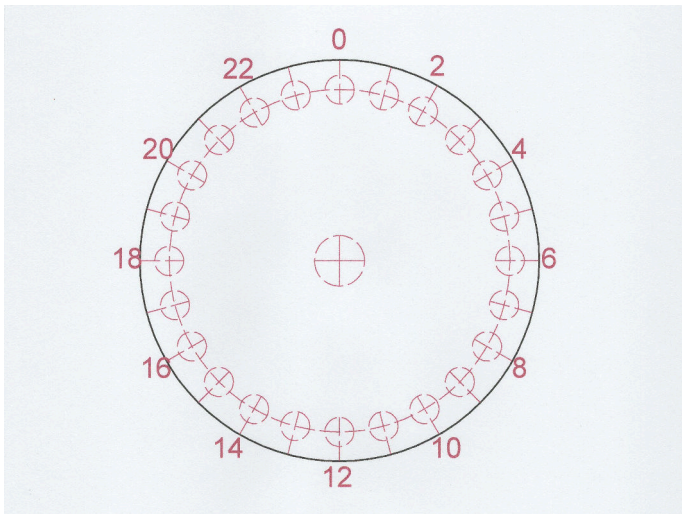
This is the drawing for the newer red 10-Hole offset plate.

# Joyner Off Center Jig Pattern Design



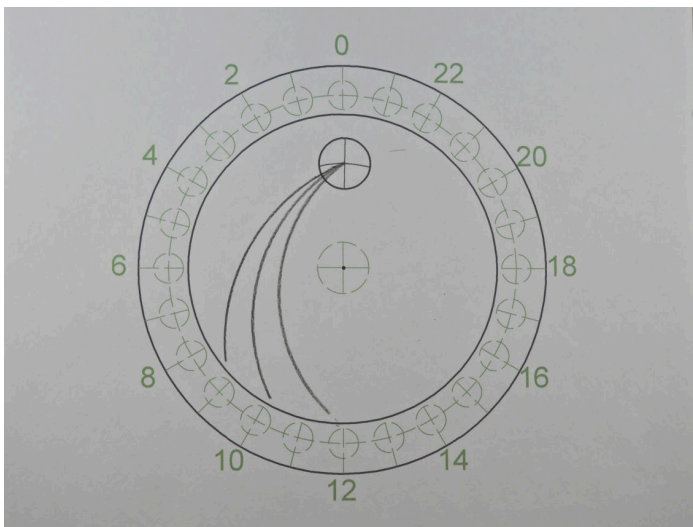
This is the drawing for the original silver index plate

Note: The index holes are numbered counter clockwise.



This is the drawing for the newer red index plate.

Note: The index holes are numbered clockwise.



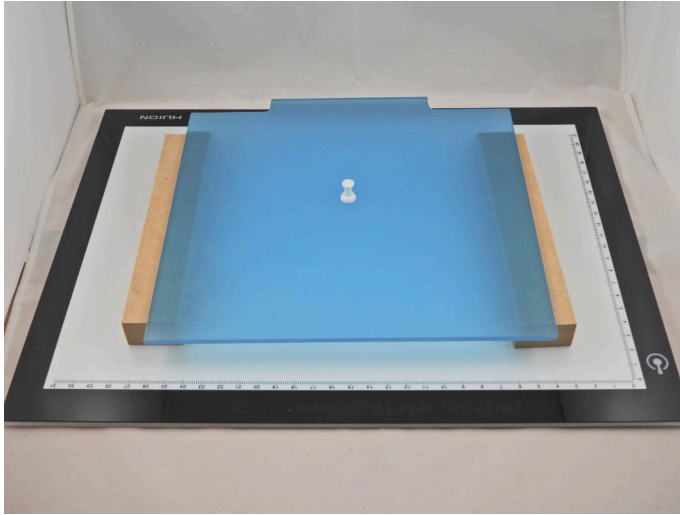
This design is commonly referred to as a comet trail. I have seen other versions, but I prefer to have the pattern emanate from the center of the hanger hole.

I can visualize that the center point of each of these three arcs will need to be somewhere in the lower right quadrant of the index plate.

I will use index holes 15, 16 & 17.

Details to follow.

## Joyner Off Center Jig Pattern Design

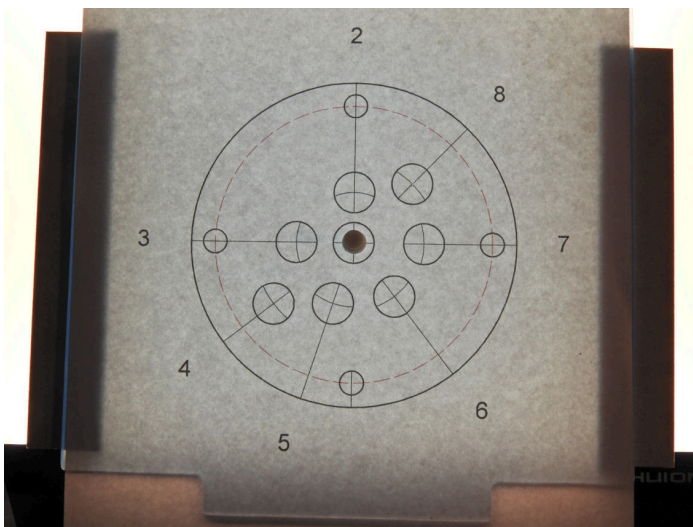


I use a light table to make the offset plate drawing visible through the index plate drawing.

I use a piece of plexiglass as a work surface over the light table.

A hole was drilled in the center of the plexiglass to fit a push pin. Two blocks of MDF provide clearance for the push pin so that the light table damaged.

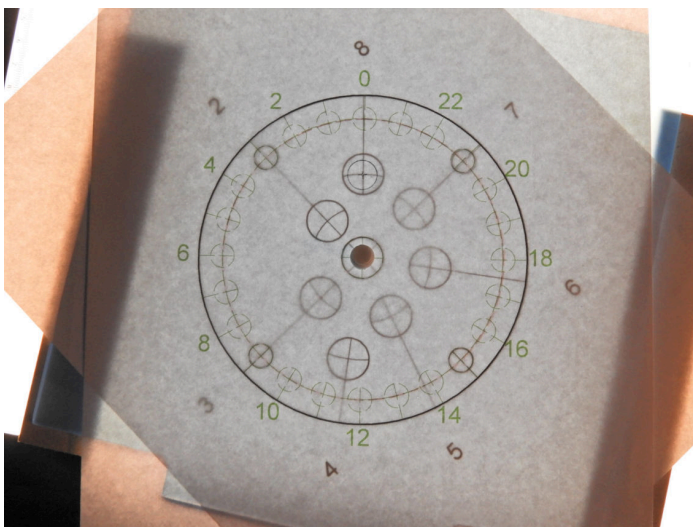
The push pin is used to keep the drawings in aligned on the central axis..



The offset plate drawing is placed on the light table with the push pin holding it at the center of drawing (hole #1).

I will be using hole #8 and index hole #0 for the hanger hole. This gives about 1/8" of material between a 5/16" hanger hole and the edge of a 1 15/16" diameter pendant.

I would use hole #7 on the 10-hole jig to give about the same spacing.



The offset plate drawing is rotated so the hole #8 is at the top.

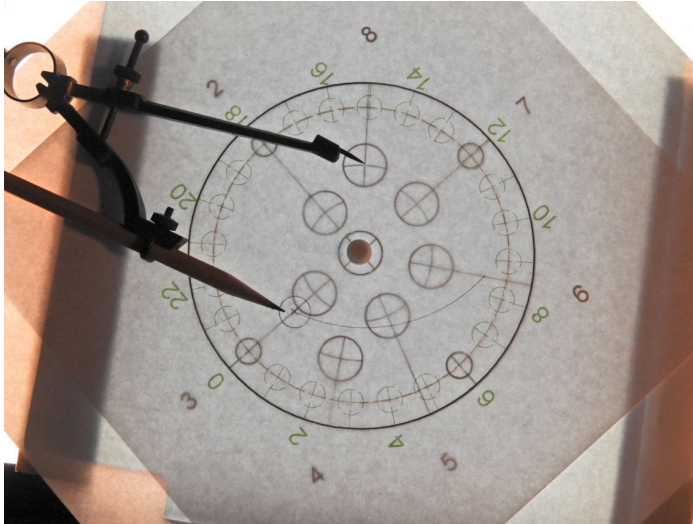
The index plate is overlaid with index hole #0 in alignment near hole #8. Hole #8 is not in direct alignment with an index hole. Align the index holes around the perimeter of the two drawings.

The push pin is used to keep the plate drawings centrally aligned.

The center of hole #8 is marked and the hanger hole is scribed at 5/16" radius.



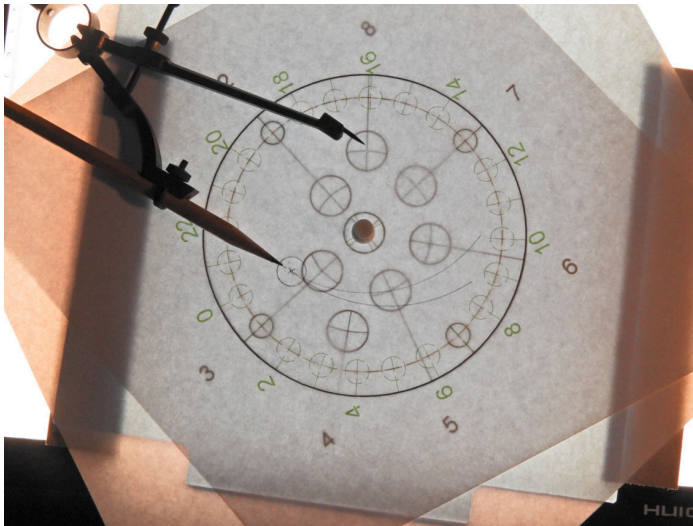
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The index plate drawing is rotated so that index hole #15 is in near alignment with offset hole #8.

The compass point is place on hole #8 center point and the pencil point is set to the center of the hanger hole.

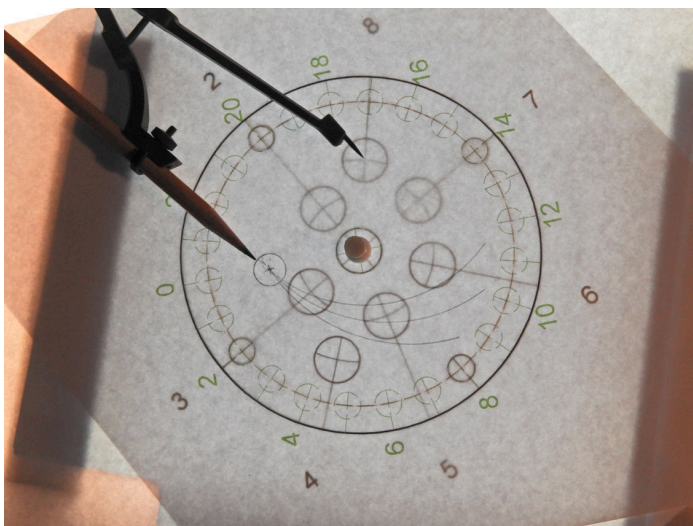
The first element of the comet trail pattern is scribed.



The index plate drawing is rotated so that index hole #16 is in near alignment with offset hole #8.

The compass point is place on hole #8 center point and the pencil point is set to the center of the hanger hole.

The second element of the comet trail pattern is scribed.

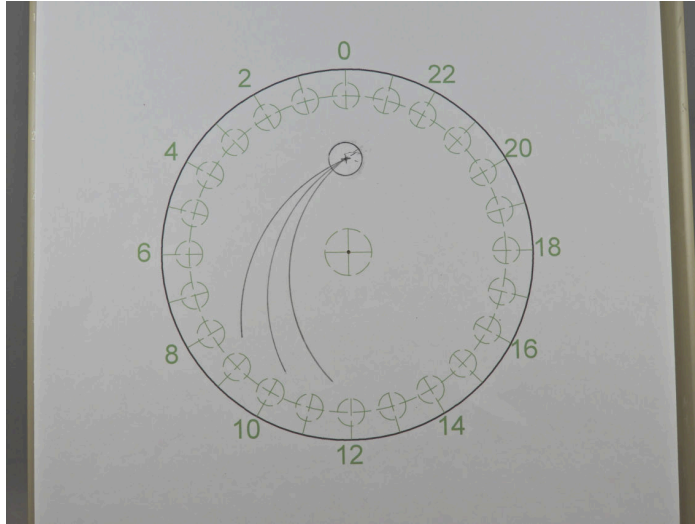


The index plate drawing is rotated so that index hole #17 is in near alignment with offset hole #8.

The compass point is place on hole #8 center point and the pencil point is set to the center of the hanger hole.

The third element of the comet trail pattern is scribed.

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Here is the finished pattern.



In lieu of a light table you could use a low profile LED light such as this.

This particular one came from Harbor Freight. I have seen a number other ones at places like Ace Hardware and Home Depot and I expect that a variety are available on Amazon.

The following chart shows the relationship of each offset hole.

The 2<sup>nd</sup> column shows the distance in inches from the center of the each offset hole to the center of jig (hole #1).

The 3<sup>rd</sup> column degrees in rotation (counter clockwise) from offset hole #2. Offset hole #2 on both jigs is in alignment with an index hole.

The 4<sup>th</sup> and 5<sup>th</sup> columns show the number of degrees each offset hole is offset from an index hole.

The 8-hole jigs has holes #2, #3 & #7 in alignment with an index hole. The 10-hole jig has holes #2 & #3 in alignment with an index hole.

With patterns that only use a single offset hole, it really does not matter about the offset hole's alignment with an index hole. However, with patterns that utilize more then one offset hole, the



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arcs could be out of phase with each other. This is more significant with symmetrical patterns.

The 6<sup>th</sup> and 7<sup>th</sup> columns shows the degree offset of each index hole from index hole #0.

offset hole	radial offset from hole 1 (radius) (inches)	degrees from hole #2	degree offset from previous index hole	degree offset from next index hole	index hole	degrees from index hole 0
1	0				0	0
2	0.400	0	0	0	1	15
3	0.450	60	0	0	2	30
4	0.500	113	8	7	3	45
5	0.550	160	10	5	4	60
6	0.600	203	8	7	5	75
7	0.650	243	3	12	6	90
8	0.700	279	9	6	7	105
9	0.750	313	13	2	8	120
10	0.800	344	14	1	9	135
					10	150
					11	165
1	0				12	180
2	0.385	0	0	0	13	195
3	0.435	90	0	0	14	210
4	0.760	128	8	7	15	225
5	0.485	162	12	3	16	240
6	0.510	218	8	7	17	255
7	0.535	270	0	0	18	270
8	0.635	316	1	14	19	285
					20	300
					21	315
					22	330
					23	345

One benefit that I see of using the offset hole as the reference point for the index plate position is that I can select an offset hole for the hanger hole based on the desired pendant diameter. Then use the same index holes 15, 16 & 17 to produce the same comet trail pattern. The offset hole's relationship with the nearest index hole would alter the position of the pattern slightly. If the offset holes have the same relationship to an index hole then the patterns would be in phase. For example holes #4 and #6 on the 8-hole jig and holes #4 and #6 on the 10-hole jig are all 8° from the previous index hole. These four holes could be used interchangeably producing arcs that are all in phase.

