

OT

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American Association of Woodturners

# Phasing Fundamentals

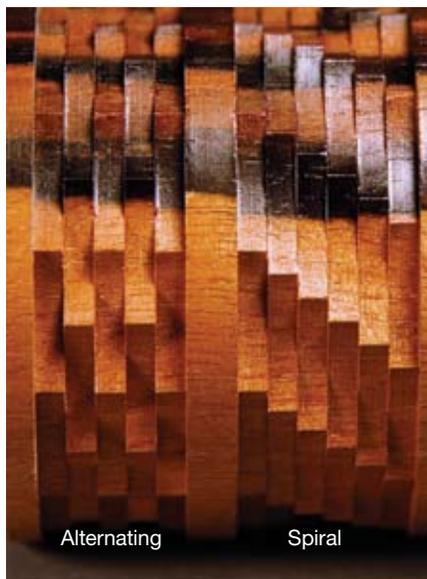
By Jon Magill

Those new to ornamental turning and rose engines will be fascinated with the magic of just a single cut made by a rose engine and seeing the patterns each rosette can make. The real reward of OT comes with mastering the manipulation of the lathe to create the interplay between multiple cuts.

## It's just a phase

To expand your repertoire of techniques beyond single cuts, you need to learn how to combine multiple cuts and their relationship with each other. Moving to the next step means becoming proficient with phasing. A fundamental feature of all rose engines is the incorporation of some facility for doing phasing. This means the ability to adjust the position of the rosette relative to its geometry and to make additional cuts that have a prescribed relationship to prior cuts. Although the way that phasing is implemented varies from lathe to lathe, every rose-engine lathe includes some phasing provision.

Most common on antique lathes was a notched plate, sometimes called a click plate, with detents around its periphery. This plate was



typically connected to a barrel of rosettes by a pawl. Releasing the pawl, rotating the rosette barrel to a new position, and reengaging the pawl in a detent phased the rosette. After each cut, the pawl could be released, repositioned to a new notch, and the next cut made. This quick-and-easy adjustment was the key to making complex patterns in an accurate but easily repeatable fashion.

In the heyday of OT there was a fascination with multiples of 12. Hence rosettes with 12, 24, 48, and 96 lobes were commonplace. The notch plates had groups of notches that represented fractions of a circle. They



*Above:* To produce the moiré pattern, the notch plates or phasing holes are moved forward a few, then back a few. This moiré example is turned with a fixed cutter on African blackwood end grain.

*Left:* The first two phasing patterns to master are alternating, *far left*, and spiral, *near left*. This pattern is made with a square-tipped cutter on side grain.

were labeled, according to the count, as if the notches encircled the entire plate. But because only a small section of notches is required for any rosette geometry, the notches seldom include more than a few in each group. Given that 12s were popular, most antique notch plates will have groups of notches intended to easily facilitate the division of a circle into numbers that are multiples of 12.



A typical notch plate on an antique rose-engine lathe shows the predominant multiples of 12, and the small number of notches actually required for each group.

Most antique rose engines also have a worm wheel attached to the notch plate, which allows for very fine positioning adjustment. The worm can be used to set the initial position to align a pattern. It can also be used to subdivide the equivalent of the notch spacings, facilitating fine adjustments. The specific use of the worm is a more advanced topic for another article.

Other techniques for phasing include carrying the rosette-specific spacing on the rosettes themselves.

The advantage of this is that rosette counts that are nontraditional (e.g., prime numbers) can easily be phased even though their multiples might never have appeared on a notch plate's detents.

You can make an unlimited number of patterns using phasing as long as the phasing provision on your lathe allows you to align a pin or notch with a "peak" on the rosette, a "valley" on the rosette, and one or more intermediate subdivisions between those.

### Creating patterns

If you want to create an alternating pattern with a 24-lobe rosette, a plate with 48 notches is a good starting point, as shown *left top*. Alternatively, a rosette with phasing holes in it would have holes aligned with the peaks, the valleys, and one or more holes between those, as shown *left center* and *bottom*.

To create an alternating pattern using the notch plate, you would engage the pawl in any detent on the 48-count group. With phasing holes, put the pin in a hole aligned with a peak of the rosette. Make your first cut. Now reposition the cutter for the next cut, but before cutting, move the pawl to the next detent in the notch-plate group (or the pin to a hole aligned with a valley of the rosette). Make your next cut. Now go back to the original notch or hole and prepare for your subsequent cut. Any notch grouping with twice as many notches as features on a given rosette will enable an alternating pattern.

The next pattern to master after alternating is a spiral pattern. The process is the same except that instead of returning to the prior notch or hole, you continue to step through the available notches or



Phased work as done in metal on traditional enamel work.

holes. Notch plates and rosettes with phasing holes are designed so that beginning in the first notch or hole, when you work through all the notches or holes, returning to the first again will continue the pattern.

You can create a moiré pattern, or reversing spiral, by moving forward a number of notches or holes, and then reversing through the same notches or holes while continuing to move the cutter in the same direction (toward the center with each subsequent cut is one example).

These three simple techniques should open the door to experimenting with thousands of complex and beautiful patterns.

*Ornamental Turners International (OTI), an AAW chapter, will host a symposium Sept. 26–28 in St. Louis. You must be an OTI member to attend. For details, see [ornamentaltturners.org](http://ornamentaltturners.org).*

Send feedback, questions, and topic suggestions to [jon@magill.com](mailto:jon@magill.com).



**Top:** Insert a pin through the phasing hole on a rosette. Note that the pin will be aligned with a peak of the 24-lobe rosette.

**Center:** On a four-lobe rosette note how holes are aligned with each corner, or "peak," a hole is centered between the peaks, and then that space is subdivided into fourths.

**Bottom:** On a 24-lobe rosette the holes align with the peaks, the valleys, and half-way in between each.