



Multiaxis Skill Builder

“TWISTED” NAPKIN RING/ TEA LIGHT SET

Andrew Kuby

Here’s a quick project that is sure to elicit the “You turned that?” response. Create a coordinated table setting with napkin rings and tea light holders made from the same timber. These two spindle-turned projects feature a “twisted,” or spiral, look, achieved by mounting the work on three intersecting axes. Information from multiaxis turner Barbara Dill was my main inspiration.

Start with a wood spindle block 2½" (6cm) in diameter and about 6" (15cm) long. Each 6"-long spindle will provide enough wood for three or four napkin rings or tea light holders, so you will need to turn a few blanks, depending on the number of rings and holders you want to make.

Cherry or walnut is a good choice, although I have made these projects using more open-grained woods such as ash, oak, and butternut as well. For the projects illustrated here, I used Russian olive, which has stunning grain but tends to fracture along the grain lines.

Mark off-center turning points

This simple process will produce a three-sided spiral, with a 120-degree counterclockwise twist. After turning a spindle round, remove the cylinder

from the lathe and begin to mark the off-center turning points. On both ends, use a compass to draw a centered circle with a ¾" (19mm) radius. Starting at any point on the circle on one end, “step” the compass around the circle

(using the same ¾" radius) to mark six equal divisions. Draw lines from the center of the block to the outside edge through every other division to arrive at three equal pie-shaped sections. Use an awl or center punch to make

JOURNAL ARCHIVE CONNECTION

EXPLORE!

To learn more about the fundamentals of multiaxis turning, check out these articles by Barbara Dill in the AAW archives. Log on at woodturner.org and use the Explore! search tool.

- “A Systematic Approach to Multiaxis Turning” (vol 22, no 3, page 34).
- “Multiaxis Spindle Turning: Further Exploration” (vol 26, no 6, page 32).



Mark off-center turning points



Use a compass to draw a centered circle at both ends of the cylinder, then step off equidistant sections to locate, punch, and label three off-center turning points.

indentations where the three radiating lines intersect the circle (*Photos 1, 2*).

Now extend the lines along the outside of the cylinder with a heavy pencil line. This can be done freehand (with the piece removed from the lathe) or with the aid of the toolrest while the piece is still mounted between centers (*Photos 3, 4*). Where the lines intersect the opposite end, draw lines to the center to divide the opposite end into three similar sections.

At this point, you should have a cylinder with three roughly equidistant lines down the sides. Label the lines 1, 2, and 3. As you did with the first end, use an awl or center punch to mark the three off-center turning points on the other end, where the lines intersect the circle you had drawn earlier. Label these new center points 1, 2, and 3 to match the lines.

Turn a twisted spindle

Remount the cylinder on the lathe using center 1 on the headstock end and center 3 on the tailstock end. The spindle blank will now be mounted on a new axis that passes on an angle through the original axis. Using a spindle-roughing gouge (which works better for this than almost any other tool), carefully turn away the wood until you have reached the pencil lines at either end (*Photo 5*). The cut should result in a large-radius cove. Stop the lathe frequently to ensure your cut is a smooth spiral the length of the spindle blank. Cut carefully to minimize the need for sanding.

Now remount the blank using center 2 on the headstock end and center 1 on the tailstock end. Pay attention—it's easy to get confused. Rotate the blank by hand and observe where the cuts will be to verify that you will be cutting in the next spiral. Repeat the cut. The line between the two cuts should be crisp and smoothly define a spiral (*Photo 6*). Stop the lathe frequently to verify the result.

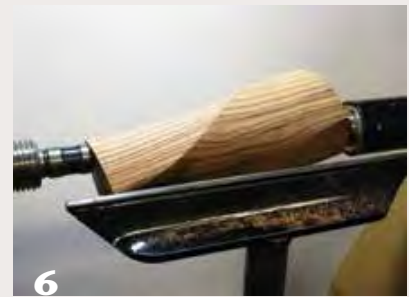
Finally, remount the workpiece a third time, using center 3 on the

Extend section lines to other end



Extend the section lines down the cylinder to the opposite end, either freehand or with the aid of the toolrest. Locate and punch the three turning points at the opposite end, and label them as you did the first end.

Turn a twist



Mount and turn the spindle on three axes to produce a twist.

Twist centers at a glance

	Headstock End	Tailstock End
1st mounting	Center 1	Center 3
2nd mounting	Center 2	Center 1
3rd mounting	Center 3	Center 2

Figure 1. To produce a twist, mount and remount the spindle on these three axes.

headstock end and center 2 on the tailstock end. Repeat the cutting process on this axis. If you need to adjust the cuts to refine the spiral,

the blank can be remounted on any of the axes.

These three off-center mountings are summarized in *Figure 1*. If need ►

Turn tenon, chuck spindle



Remount the twisted spindle between centers on the original (true) axis. Form a tenon and mount the piece in a four-jaw chuck.

Turn and drill napkin ring



Turn the end of the twisted spindle to a slightly convex shape, and match that curve at the other end of the napkin ring.



Drill through the napkin ring until it is cut free.

Reverse-mount napkin ring



A length of bicycle inner tube fits over the chuck jaws to protect the napkin ring from being marred. Reverse-mount the napkin ring, using the chuck in expansion mode.

be, carefully sand the spiral surfaces with the lathe off. Do not sand the lines between the surfaces—you want them to remain crisp.

Turn napkin rings

Remount the now-twisted spindle on the original true centers. At the headstock end, turn a tenon sized to fit your chuck jaws (Photo 7). Remount the blank in a four-jaw chuck, using the tailstock to center and provide additional support (Photo 8).

With the tailstock still in place, use a sharp spindle gouge to shape

the end of the blank. Make a cut as though you were forming a bead. This slightly convex cut will define the top edge of the napkin ring (Photo 9).

Using the spindle gouge again, start a V-cut about 1" (25mm) from the end, and then form a matching convex shape to define the opposite edge of the napkin ring. Extend this curved cut until it is at least $\frac{3}{16}$ " (5mm) deep. Then, using a parting tool, part farther into the spindle until the remaining wood is less than $1\frac{1}{2}$ " (38mm) in diameter.

Using a drill chuck in the tailstock, drill into the blank with a $1\frac{1}{8}$ " (41mm) Forstner bit until the ring spins free on the bit (Photo 10). The drilling can also be done with a spindle gouge or scraper if you don't have a Forstner bit. Repeat this process until you run out of wood. As previously noted, you should be able to get three or more napkin rings from each 6"-long blank.

To remount the napkin rings on the pin jaws of my chuck for final turning, I used a piece of bicycle inner tube to cushion the jaws

(Photo 11). Carefully expand the pin jaws into the napkin ring, with the side you just parted off facing out (Photo 12). Scrape or sand a small radius on the inside edge, and sand the exposed portion of the inside of the ring and the top curve. Flip the ring around and repeat the process for the other end.

Turn tea light holders

The 1 $\frac{5}{8}$ "-diameter hole used in the napkin rings will also accommodate most tea light candles, so you can use the same drill bit. To make a tea light holder, form a cove in the end of the twisted spindle, as though you were going to make a shallow bowl. You will end up with points where the spiral cuts intersect the cove. Cut carefully at the cove to reduce the need for sanding (Photo 13).

Now drill the 1 $\frac{5}{8}$ "-diameter hole a bit over $\frac{5}{8}$ " (16mm) deep (Photo 14). You want the tea light candle to sit all the way in the hole.

The bottom of the tea light is formed in a similar fashion as the second side of the napkin ring. Start a $\frac{3}{16}$ " V-cut $1\frac{1}{2}$ " from the end to make sure you leave enough wood for the bottom of the holder (Photo 15). When cutting the bottom, angle the parting tool slightly toward the top of the holder to create a slight concave area. This will help ensure the tea light holder sits flat on a table.

Reverse-mount the tea light holder on a jam chuck or with pin jaws in expansion mode to complete the bottom (Photo 16).

Finish and beyond

For a finish, I find that walnut oil with a wax topcoat works well and is easy to maintain. But of course you can use whatever finish you like on these items.

Several variations are possible with this process. Instead of mounting the blank between centers on an axis that passes through the true center of the blank, mount the blank on center 1 on both ends. Cut to the lines and repeat for centers 2 and 3. This will give you a roughly triangular piece (like the inside of a Wankel engine), rather than a twist.

You can use this process to make other projects, too, such as a goblet. Simply turn a twisted spindle and hollow it to form a goblet. Or turn

a twist with one end smaller than the other to make a tapered candle-holder. Have fun exploring these multiaxis techniques. ■

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Turn and drill tea light holder



13 Begin a tea light holder by turning a concave shape at the end of the twisted spindle.



14 Use a Forstner bit to drill into the spindle deep enough to allow the tea light candle to sit all the way in and flush with the top.

Part off and reverse-mount



15 Part off the tea light holder by forming a concave area at the bottom.



16 Reverse-mount the holder, using the chuck in expansion mode, to complete the bottom.