Multiaxis TABLET STAND

Larry Sefton

The best paperweights have always been conversation starters that also keep stacks of papers in place. The subject of this article, a touchscreen tablet stand, will definitely start conversations, function as multi-dimensional paperweight, *and* support a tablet, digital reader, or smart phone at a variety of angles for hands-free reading.

Chance and need contributed to the birth of these tablet prop stands. I had been experimenting with off-center turning and left one of my pieces on the kitchen table instead of taking it out to my shop. The next day, while reading the morning newspaper on my tablet—you guessed it—I leaned the tablet against my experimental turning. The real "A-ha moment" happened when my wife came into the room and said, "What a great idea! I want three of them in red, one for my quilt studio, one for my desk, and one for *my* side of the kitchen table."

The beauty of these weighted tablet stands is that each one will finish at a different shape and/or size with a wide variety of multiaxis angles. It comprises two parts that are joined with a dowel and glue: a multiaxis top section and a hollowed and weighted base. They can be painted any color of the rainbow, have a natural wood finish, or be even further embellished with an infinite number of designs.

Considerations

I use a safety drive, which is essentially a dead center with either serrated or smooth contact surfaces, as shown in *Photo 1*. If you have a catch, the workpiece will stop as the drive continues to spin. The more tailstock pressure you apply, the greater the catch required to stop the wood. I never use a chuck or pronged drive for this kind of project.

Because off-center, or multiaxis, turning requires the intermittent cutting of air and wood, higher lathe speeds (within safe parameters) are your friend. Faster lathe speed equates to less time with the tool passing through air, which, in turn, causes less tool bounce and smoother cuts.

The process

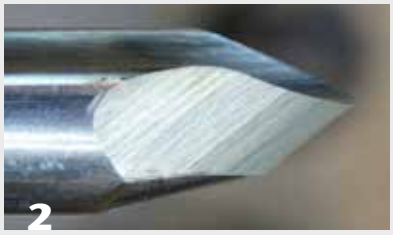
Note: For safety reasons I always use the safety cage guard on my lathe, a faceshield, and safety glasses. In these

Safety drive

1

A safety drive, with less bite into the wood than a spur drive, provides assurance in the case of a catch: the drive keeps spinning, while the wood is stopped by the cutting tool. Varying the tailstock pressure adjusts the amount of drive friction applied. Note the different axis points used for this off-center turning.

Better access



2

The author's spindle gouge with the heel ground away for better access into tight spaces.

process photos, the lathe is stopped and the guard lifted for easier viewing.

At first glance, you might think this tablet stand requires advanced woodturning skills. In reality, it is fairly straightforward and a lot of fun to make. All the turning is done between centers using a ½" (13mm) spindle gouge, with the gouge's heel removed in order to reach into the narrow areas (*Photo 2*).

Note that you will need two similarly sized blanks, one for the multiaxis top portion and one for the base (you will get two bases from one blank). I started with a round blank 4" (10cm) long and 3" (8cm) in diameter. Different blank sizes will allow for creativity and design opportunities.

To mount the blank for turning the first off-center "ledge," position the blank between centers with the safety drive center ⅜" (10mm) off center toward you and the revolving/live center ⅜" away from you.

Starting at the drive end of the blank to create the first V-cut, make a couple of slightly curved convex cuts (not straight) on one side, then a couple of cuts on the other side. Note that the position of the tool's flute at the end of the cut has been rotated 90 degrees from its open starting position (*Photos 3, 4*). I turned mine so the center is between 1" (25mm) and 1¼" (32mm) in diameter.

At this point, sand the turned surfaces lightly to remove any fuzz at the center of the cut. Cloth-backed abrasives typically work best for this type of sanding. In the process illustrated here, I did not sand, knowing that I would paint the piece.

Second and third axes

Adjust the axis of your workpiece for the second cut. In this example, the blank was shifted ⅜" off center in the opposite direction from its first position at both the drive and live center ends. This puts the turning on a new axis.

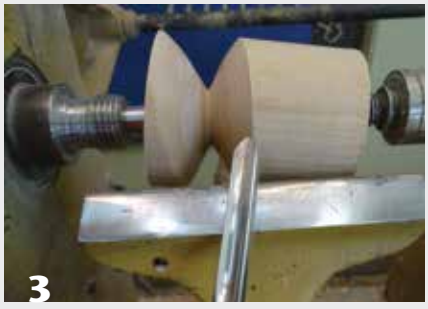
Cut your second V-cut and sand as desired (*Photo 5*).

Re-adjust your turning's axis position a third time to finish the tailstock end of your piece. In this example, I changed the axis point by another ⅜". Finish turning the tailstock end (*Photo 6*), making sure to leave enough wood to support ▸

JOURNAL ARCHIVE CONNECTION

For additional information on multiaxis turning, see Barbara Dill's *AW* article, "Multiaxis Spindle Turning: Further Exploration," (vol 26, no 6, page 32). AAW members can access all past journal articles online at woodturner.org.

Turn on first axis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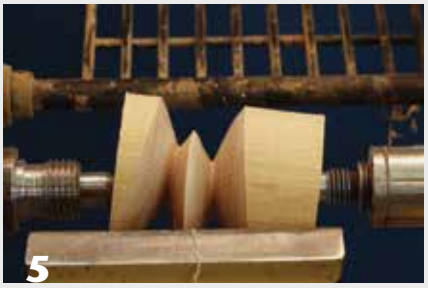
With the blank mounted off center, form the first of the V-cuts starting at the headstock end.

Turn on second and third axes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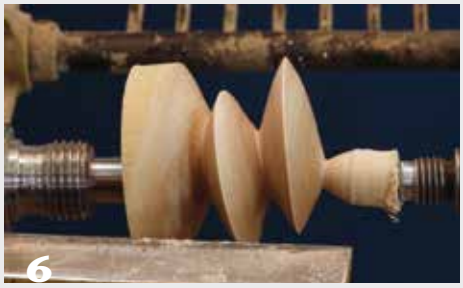
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7

Reposition the blank to a second set of axes and form another V-cut. Repeat this process a third time and complete the turning at both ends, leaving stubs that will be removed later.

Trim and sand ends

Remove the end stubs with the piece off the lathe. If you are using a bandsaw, be sure the workpiece is held securely. Cutting round objects on the bandsaw without proper support is dangerous, as the piece could roll into the blade and out of control. Sand the ends smooth.

the turning while finishing at the drive end.

I could have cut the blank shorter. However, you may want thicker levels, different angles, and/or a taller tablet stand. For those into math and geometry, the shorter the blank, the less offset needed. In other words, shorter blanks create the opportunity for more extreme angles. There is room here for lots of experimentation with different axis points.

You may or may not choose to reposition the drive center before finishing the headstock end of your turning. In this case, I moved the piece about ¼" off center before finishing the turning (*Photo 7*).

Now is the time to round any sharp edges. The outer angle edges are typically sharp enough to cut skin, so hand sand carefully to get the feel you want.

Trim and sand the ends

Remove the turning from the lathe and cut off the waste ends using your bandsaw or a handsaw. If using a bandsaw, make sure to use a fine-tooth blade and support/secure the turning, as shown in *Photo 8*. With a soft sanding pad mounted in a drill chuck on your lathe, remove any remaining stub, being careful to keep the original shape (*Photo 9*). I used 150-grit abrasive, as this tablet stand would be painted.

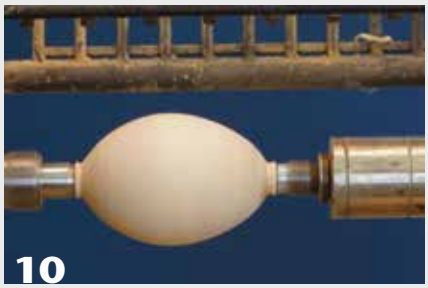
Turn the base

Now it is time to make the base (again, one blank yields two bases). I started with a base blank similar in size to the first part of the turning (about 4" long and 3" in diameter). Turn the base into an oval (*Photo 10*), but there is no need to be overly precise with the shape. Sand and add details as desired.

Cut off the ends using a bandsaw, a holding sled, and a fine-tooth saw blade (*Photo 11*). The ends can also be removed using a small handsaw or power sanded off.

Slice the oval turning in half to create the necessary flat bottom surface for your base. In order to safely and accurately slice the oval in half, make a sacrificial scrapwood sled using wood wedges hot-melt glued to a board. The hard-to-hold oval base should be supported by the wood wedges, while just barely touching the bottom board. Depending on how you plan to finish/embellish your tablet stand, orient the wood grain accordingly. Attach the oval base to the wood wedges using hot-melt glue; this holds the oval turning steady during the cutting process. Cut the oval turning and sacrificial sled in half. Remove the two halves from the sled (*Photo 12*).

Turn and cut the base



Turn the second blank into an oval. Trim the ends and cut the base in half, holding the workpiece securely during cutting, here with hot-melt glue in a custom jig. (This yields two bases.)

Join the two sections

The next step is to join the base to the multiaxis top section. Hold them together to get a feel for the angle and location of the holes that will need to be drilled for attaching them together. Experiment with different angles and positions.

Drill a ⅜" (10mm) hole 1" deep at your desired angle into the bottom end of the top section, making sure to drill into the center of your lowest V-cut. Chamfer the drilled hole so the top section will nest onto the base (*Photos 13, 14*).

Dry fit a ⅜" dowel 2" (5cm) long into the just-drilled hole. Using the top section with the dry-fit dowel in place, double-check the angle and determine the location of the hole to be drilled in the base. Drill a ⅜" hole ½" deep into the top of the oval base (*Photo 15*). This hole serves two purposes—as a place for the connecting dowel pin during final assembly and as a wall-thickness indicator when hollowing the bottom.

Glue the dowel pin into the multiaxis top section only and set aside. I used five-minute epoxy because I feel it fills voids more effectively.

Hollow the base

To add stability to the tablet stand, I hollowed out the base section and added weight. There are many ways to do this, but I used a mini-grinder with the workpiece held securely in a carving jig with hot-melt glue. When using a grinder, wear eye protection and cut-resistant gloves. As you hollow, stop when you see your pre-drilled hole. The wall thickness and interior finish are not overly critical because this carved out surface will be filled and not seen (*Photos 16, 17*).

Remove the hollowed base from your carving jig. Cut off and/or scrape away excess hot-melt glue. Using a soft sanding pad mounted on ▸

Drill and chamfer top section


13


14

After experimenting with different positions of top on base, determine the location of holes for a connecting dowel pin. Drill a hole into the bottom of the multiaxis top section; then form a chamfer around the hole so the parts will nest together better.

Drill base


15

Drill a hole in the base to accept the connecting dowel pin. Be sure the piece is held securely for safe drilling. Note the author's holding buttons, which help prevent the piece from spinning.

Hollow the base


16


17

Hold the base securely for safe hollowing. Gluing it to a carving jig using hot-melt glue provides a good temporary solution. The author hollowed this base using a handheld mini-grinder.

Glue top to base


18

Glue the two sections together using a dowel to reinforce the joint.

your lathe, sand the outside surface of the base, bringing the ends to finished shape.

Final steps

Test fit the hollowed base and top section, making sure the assembly balances well and looks good. Mark the finished length of the dowel pin, unassembled, and trim it to length. Then, using epoxy, glue the multiaxis top into the base (*Photo 18*).

You are now ready to add the weight. Using epoxy glue that is just starting to set, add a dam around the inside surface of the connecting dowel pin to prevent possible leaking of resin during the weight-filling process. If you are using a particularly porous wood, planning a natural wood finish, or going for a thin wall thickness, you may need to first use a wood sealer on the outside of your turning to prevent resin bleed-through.

Create a way to hold the assembly upside down and level so the hollowed area can be filled. I poured uncooked rice into a plastic container and nestled the assembled unit headfirst into the rice. I also used a bubble level to guide me in adjusting the base so it was perfectly level.

There are many casting resins that can be used to fill the base. I used Smooth-Cast® 326 Resin by Smooth-On, Inc., which sells mold-making supplies (smooth-on.com). Mix the resin per the manufacturer's instructions and add a small amount into the base around the dowel pin. Add your weights almost to the rim (I used reclaimed shot, but you could also use nuts and bolts, fishing weights, or other small, heavy items). Fill in around the weights with additional resin so it reaches the upper edge of the base's rim (*Photos 19, 20*). When the resin has dried fully hard, sand the bottom smooth.

Up to this point, you have been exercising your left-brain analytical skills. Now it is time to shift gears and let your right brain's creativity shine by using the completed prop as a canvas for embellishment. Lean your tablet or digital reader against your new stand for easy, hands-free reading. ■

Add weight to base


19


20

With the entire stand held level in a container of uncooked rice, partially fill the hollowed base with resin. Then add weight (in this case, reclaimed shot) and pour more resin until the cavity is filled to the rim.

Larry Sefton has worked as an engineering manager in manufacturing and recently celebrated twenty-three years as a risk control consultant with Liberty Mutual Insurance Company. Larry is a member of the AAW and a member and former president of the Mid-South Woodturners Guild (Tennessee). He blogs at sandboxtime.blogspot.com and can be reached at larry@sefton.info