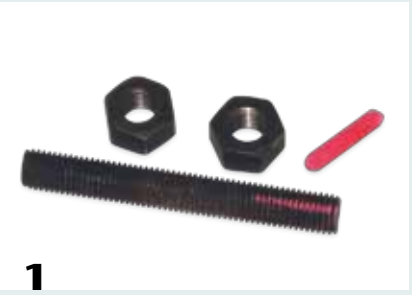
Tapping Tool for Turners

Jim Duxbury

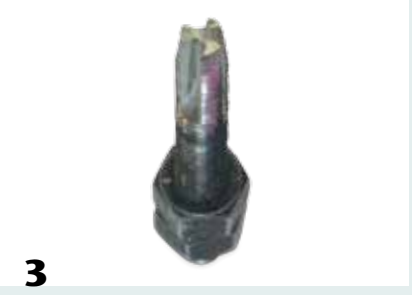


1

Using chalk, make three marks on the threaded rod, equidistant apart, and about 2" (50 mm) long. Flutes will be ground between these lines. Two nuts could be threaded onto the rod to secure the rod in place while grinding.

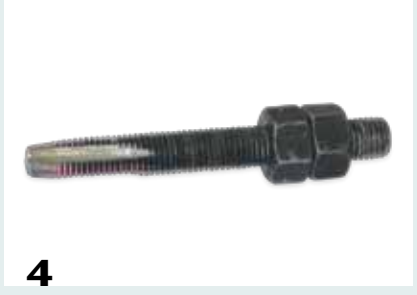
2

Cut the flutes in the rod. Be sure to wear appropriate safety gear.



3

Grinding three flutes will transform the threaded rod into a tap. Be sure to leave the leading edge (the cutting part) of the threads square or slightly undercut.



4

The completed tap will have all the threads removed from the end with a taper up to about 1" (25 mm) where the full threads begin.

There are many times when I need to thread a block of wood: to make a waste block or jam chuck, to devise an adapter of some sort to drive a turning, or to make an object to hold a uniquely shaped turning while it is on the lathe.

Tapping wood is distinctly different from working with metal. Considerations are many: the species of wood and its hardness, the type of grain, the orientation of the object to be made, and the realization that there is an assortment of tap sizes. One thing is certain: Tapping endgrain does not work at all.

Getting the tap started straight without losing the first half of the threads in the hole can also be a problem, especially if you have to start the tap by hand.

I finally came up with a solution that is low cost, easy to make, and more important, works every time. The tap described in this article is ¾" (19 mm) diameter × 10 threads

5

Tap the first hole into a scrap piece of hardwood. Make sure the tap is held perpendicular to the wood.

per inch (tpi). Many of the live tailstock centers now have a ¾" (19 mm) × 10 tpi. Various shapes and sizes of cups, cones, balls, or even flat ends can be custom-turned from hardwood scrap and mounted on these centers. Note: Another reason for making this particular tap is that the thread commonly used on ¾"- (19 mm-) diameter wood is only 6 tpi. Taps for wood are very limited and in many cases not available at all.

Make the tap

Making a tap is not that difficult. The material is inexpensive and easy to procure. If you fail to make this tap correctly the first time, cut off the damage and simply start over. I do not have a metal-turning lathe or milling machine. The tap is made by eye using a 4" (10 cm) high-speed grinder or a rotary tool.

Be sure to wear a full faceshield and a good particulate respirator. Grind in a well-ventilated area and keep the respirator on until the air has cleared. Protective gloves and ear protection are also advised.

You will need a short length of threaded rod and two nuts. Black steel or plated rod is fine. I am using black steel, which can be purchased at most local hardware stores. Start by cutting a 6" (15 cm) length off the length of threaded rod. Using chalk, mark three lines around the circumference of the rod, each 2" (50 mm) long and an equal distance apart *(Photo 1)*. Draw the lines lightly at first and respace them as needed to achieve even spacing. Once you have the lines spaced properly, chalk the lines about ¼" (6 mm) wide. These lines represent where the threads will remain when creating the tap. Between these three lines, grooves will be ground out.

Clamp the rod securely into a vise. Attach a metal-cutting disc onto either a 4" (10 cm) high-speed grinder or use a black metal cutting disc inserted into a rotary tool. Put on your safety equipment. Cut a U-shaped groove (flute) about 2" (50 mm) long into the rod between each of the three chalk lines *(Photo 2)*.

I removed most of the steel with the grinder and touched up the cutting surface using a black metal-cutting wheel mounted into a Dremel tool. Because this tap is a cutting tool, be sure to leave the leading edge (cutting part) of the threads square or slightly undercut *(Photo 3)*. Repeat this same cut for the remaining two grooves.

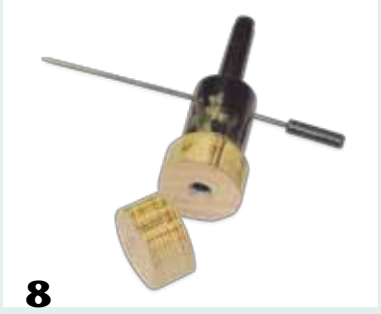
Grind off all the thread on the end of the tap and taper upward from there about 1" (25 mm) to a full thread. Check the depth of cut and configuration *(Photo 4)*. Note that ▸


6

After drawing a series of circles onto a length of hardwood, drill holes centered into those circles.

7

Use the first tapped hole to align and tap subsequent holes.


8

Thread a tapped disc onto a live tailstock center.


9

Glue and clamp two discs together using the tailstock to apply pressure.

10

After the glue has set, shape the new tailstock center to whatever configuration is required. (Note that the author is using tape to cover the bent nail.)

11

The new tailstock center is in position and ready for use.

12

A variety of shapes for tailstock centers are handy to keep in your shop. (Finishing and burn lines are optional.)

for the final cuts and shaping, I have put the two nuts on the tap and locked them together. This provides a good way to securely hold the tap in a metal-working vise without damaging the threads. These nuts are also used when turning the tap in future holes.

Tap the first hole

Now that the tap is completed, it is time to tap the first hole. This is the most difficult hole to tap and should be done in a block of scrap hardwood that will probably be discarded. The block should be about 2" (50 mm) wide by 6" (150 mm) long, and at least ¾" (20 mm) thick. Drill a ⅝" (16 mm) hole in the center of the wood, 1½" (38 mm) from the end. Clamp this block in a vise and insert the tap into the hole.

"Once you start using this tap, all sorts of things can be made. Be creative!"

This is the difficult part—the tap requires as much force pushing it into the hole as possible, while at the same time turning the tap clockwise and holding it perpendicular. I use a socket wrench with a socket to fit over one of the nuts *(Photo 5)*. The socket wrench provides a good surface to press down hard on and a long lever arm to turn the tap with. An open-end, box-end, large crescent, or pipe wrench would work to turn the tap itself and a block of wood over the end of the tap would enable downward pressure to be applied as needed. Turn the tap in about one and one-half turns and back it up one-half turn. Keep doing this until the threads have been cut all the way through.

The block just tapped is going to aid in tapping future holes to assure perfect results. The thread-cutting section of a purchased tap is less than 1" (25 mm) long. The tap just made has a continuous thread its entire length. This tap, threaded through the waste block, will ensure the tap starts perpendicular in the new hole, and advances at the exact rate to cut a perfect thread. It's magic!

Shopmade tailstock centers

Here is where this tap really makes things happen. Select a block of good hardwood 2" (50 mm) wide by 1" (25 mm) thick, and about 8" (20 cm) long. Draw three 2"- (50 mm-) diameter circles on it. Mark the centers of each, and drill a ⅝"- (16 mm-) diameter hole in each of these circles *(Photo 6)*. Place the block in a vise. Put the tap into your tapped waste block so that about ¼" (6 mm) of it protrudes out of the bottom. Place the protruding end of this tap into one of the newly drilled holes and clamp it down securely *(Photo 7)*.

Using the previous method of turning the tap, tap this hole. Notice how the tap starts square and with little or no downward pressure required. When all three holes have been tapped, take another similar-sized block of hardwood and draw three more 2"- (50 mm-) diameter circles on it. Using a bandsaw, cut

all six discs out of the two blocks. Screw one tapped disc onto your live tailstock center *(Photo 8)*. Next, lock the tailstock bearing with a nail through the locking hole so the tailstock will not rotate. Bend the nail over so it cannot come out. (A bolt and nut will also work.) Place the tailstock center into the headstock (drive end) of the lathe. Spread yellow wood glue on one surface of a blank disc and the mating surface of this tapped disc, put them together and bring the tailstock up to clamp them in place *(Photo 9)*.

When the glue has dried, wrap the bent nail in the live center with tape so you are aware of its presence. Turn the piece to the desired configuration *(Photo 10)*. (Optional: You could sand, burn trim lines, and finish with a coat of wax.) When complete, remove the tailstock center from the headstock, take out the nail and insert the live tailstock center back into the tailstock *(Photo 11)*. A few useful configurations of these tailstock centers can be seen in *Photo 12*. Many of these centers have seen hours of service. You will soon devise shapes and sizes for your own use.

Other useable items

In *Photo 13*, there are a few other items tapped with this tap. After you use the tap repeatedly, you may discover that an actual tapping handle would be nice to have *(Photo 13, top center)*. The T-shaped tool with two large, smooth gripping surfaces on the handle make the tap much easier to control. The handle is made from ash, 1½" (38 mm) square and about 12" (30 cm) long, turned between centers, burned, sanded, waxed, and then drilled and tapped.

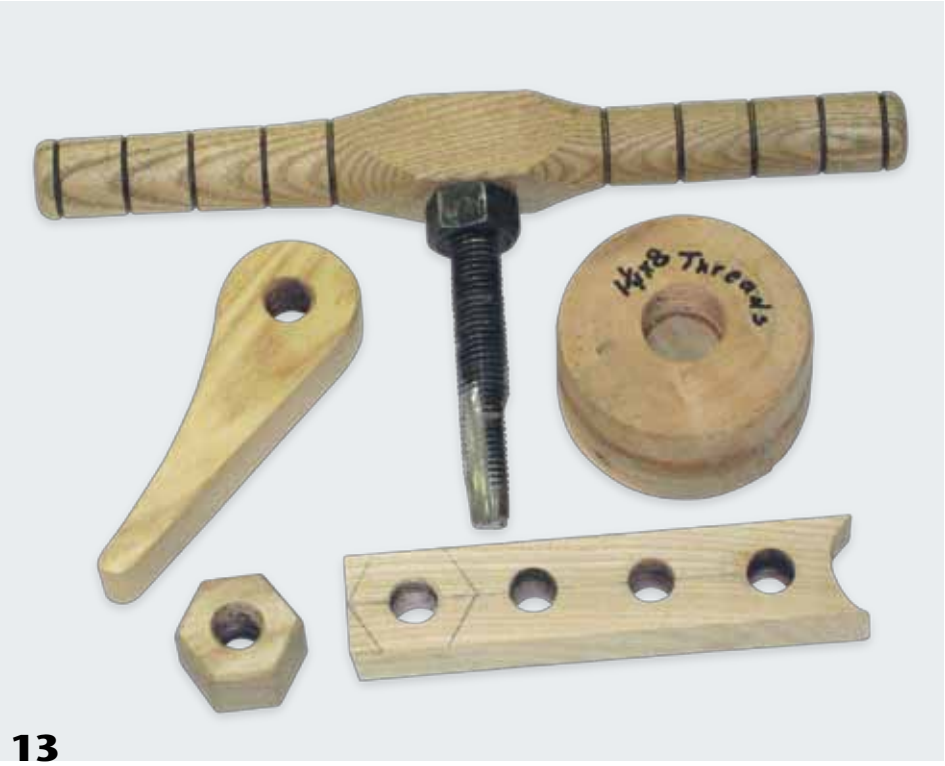
Similarly, threaded wooden jam chucks and waste blocks *(Photo 13, center right)* can be made to fit the drive spindle in the headstock of your lathe. These taps would be cut in a similar manner from a threaded steel rod with the same diameter and thread size as your headstock drive. For any size of steel rod, you need to drill the hole to be tapped ⅛" (3.2 mm) smaller then the tap size. For example, a 1" (25 mm) tap would require a ⅞"- (22 mm-) diameter hole and a 1¼" (32 mm) tap requires a 1⅛"- (29 mm-) diameter hole.

Wooden nuts can also be made *(Photo 13, bottom)* and are often useful as trim on projects. Nuts are usually hexagonal and about twice the diameter from flat to flat as the tap size. In this case a ¾" (19 mm) nut would be 1½" (38 mm) from flat side to flat side.

Once you start using this tap, all sorts of things can be made. Be creative! The unique teardrop-shaped block *(Photo 13, center left)* was specifically designed for a situation where absolutely nothing else would possibly work. It is sanded and finished to gallery quality. And, for the life of me I cannot remember why I made it or what it was for.

There is just no end to the fun! ■

Jim Duxbury, woodturner and inventor, thinks and creates "out of the box." His turnings are unique and he seldom turns the same thing twice. Jim is a member of Piedmont Triad Woodturners, Carolina Mountain Woodturners, and Woodturners Guild of North Carolina. Jim's kaleidoscopes are custom designed and have received numerous blue ribbons. More of Jim's work can be seen on his website, duxterity.com/ec.



13

At the top is a tap with a wooden handle. Other useful items can also be made with wood taps.