When first introduced, four-jaw chucks were viewed by many as a luxury just for professional turners. But they offer so many advantages that anyone from novice level on up would benefit from owning one.

With prices ranging from about $35 up to $280, you’re probably asking yourself why you should buy a four-jaw chuck for your lathe. Here are some of the best reasons:

- Chucks provide quick, accurate, and positive centering of bowl blanks and standard turning squares.
- There’s no need to glue a waste block to your turning blank or give up bowl-blank thickness to accommodate the screws needed to fasten it to a faceplate.

Teknatool of New Zealand started the woodturning chuck revolution in 1988. Shown above is the business end of its Nova Titan chuck.

- When using a chuck to turn a bowl from green stock, you can rough it out, remove it from the lathe, and then later remount it with greater ease and convenience than with faceplate mounting.
- Accessory chuck jaws are available to hold work as small as a 1/4”-diameter tenon on a miniature vessel and as large as the rim of an 18”-diameter platter.
- You can turn a bowl and finish it inside and out with little or no trace of how it was held on the lathe.
How a chuck works

A chuck consists of a body, jaw slides, and jaws, as shown above. Internal spiral gearing moves all four jaws simultaneously, keeping them equidistant from the center of the chuck body. The jaws operate with twin levers or a single key. Lever action requires either the simultaneous use of both hands, or temporarily locking the lathe spindle to adjust the chuck with one lever. Single-key chucks offer the advantage of one-hand operation without the necessity of locking the lathe spindle. One-hand tightening or loosening leaves the other hand free to control stock when mounting it or a finished piece when removing it from the chuck.

Jaw design

There are two basic jaw designs, dovetail and serrated, as shown below. Most jaws for Vicmarc and Axminster chucks are of the dovetail design. The flanged SuperNova jaws are a variation of this design. Serrated jaws are most common on Oneway chucks.

How a chuck grips

Chuck jaws either contract around a turned spigot (round tenon) or expand into a hollowed-out recess. In contracting mode, the jaws commonly supplied with chucks grip spigots from 1½" to 3" in diameter. These same jaws expand into turned recesses from 2" to 3½" in diameter.

Because chuck jaws form a circle when completely closed, they make continuous contact when contracting around a spigot or expanding into a recess that is just slightly larger than the diameter of the circle, as shown above. This provides the greatest holding power and safest operation. As the jaws approach their maximum open position they make only point contact with the workpiece, as shown above. Gripping only at these points (eight in contracting mode, or four in expanding mode) is less secure and risks marring the wood. Manufacturers offer accessory jaws to cover a wide range of gripping diameters.

When turning, be careful of chuck jaws adjusted near their maximum diameter. The farther open the jaws, the more they extend beyond the chuck body, and if touched, the more likely they are to cause injury.

Dovetail jaws usually leave minimal or no marking on the finished vessel, reducing the need to remount it to remove any marks.

Serrated jaws have great holding power, particularly when gripping end-grain stock, but leave marks that must be removed.
Turning a bowl with a four-jaw chuck

Start on the outside
For mounting side-grain bowl blanks, many chucks come with a screw center. To use this center, install it in the chuck by gripping it with the jaws. Drill a hole equal in diameter to the root of the screw and slightly deeper than its length, centered on the top face of the blank. Then thread the blank onto the screw. Engage the lathe tail center for additional support while turning the rough shape of the bowl. Now turn the outside of the bowl, shaping its bottom to be held by the chuck jaws, as shown in the photo at left. Screw-center mounting allows for easy removal and remounting of the blank while maintaining its centered position.

Shape the bottom
When shaping the outside of a bowl, form its bottom to fit your chuck jaws so you can reverse the blank, grip it with the chuck, and form the inside. For contracting dovetail jaws, form a dovetail spigot as shown below left. Cut the inside corner where the spigot meets the bowl body crisp and clean to provide a positive gripping corner for the chuck jaws. Leave a flat bearing surface for the jaw ends. Because the jaws pull in on the spigot as well as squeezing it, make the spigot slightly shorter than the jaw depth, so it does not bottom out. Sand and finish as much of the outside of the bowl as possible.

The same jaws that contract onto a spigot also will expand into a recess hollowed out in the bottom of a bowl, as shown below. When planning the shape of your bowl, leave extra thickness in its bottom to accommodate this recess. Make it about \( \frac{3}{16} - \frac{1}{4} \) deep, cleanly cut, and with its edge following the shape of the jaws. Leave sufficient

**FIRST, MOUNT THE BLANK ON A SCREW CENTER, AND SHAPE THE OUTSIDE**

**THEN, GRIP THE BOWL BOTTOM IN ONE OF TWO WAYS, AND FORM THE INSIDE**

Dovetail jaws contracting around a spigot: When forming a spigot at the bottom of a bowl, match the angle of the outside edge of the spigot to the angle of the jaws.

Dovetail jaws expanding into a recess: When forming a recess in the bottom of a bowl, match the angle of the inside rim of the recess to the angle of the jaws.
wood around the recess to support the outward force exerted by the expanding jaws. Gripping the bowl in this manner allows you to completely form the outside, including its bottom. With the outside of the bowl formed, sand it and apply a finish.

Generally speaking, contracting onto a spigot provides the greatest holding power. However, for turnings of large diameter but shallow depth, such as a large platter, expanding into a recess gives better results. Regardless of how the chuck holds the workpiece, be sure to periodically check its tightness.

**Now form the inside**

With the outside of the bowl complete, remove it from the screw center, and remove the screw center from the chuck. To hollow the inside of the bowl, remount it as shown, opposite page, bottom. When turning the inside, take care not to catch the tool. Chucks do not hold turning stock as securely as a standard faceplate where several screws secure the blank. A bad catch can dislodge the bowl from the chuck. Once the final inside shape and wall thickness of the bowl have been achieved, sand it and apply the finish. For a bowl gripped in a recess, simply remove it from the chuck.

**Back to the bottom**

For a bowl gripped by a spigot, reverse-chuck it, gripping the rim with a shop-made jam chuck or accessory adjustable bowl jaws, as shown above. Then turn away the spigot, and form a slight recess in the bottom of the bowl. Whether using a jam chuck or a four-jaw chuck fitted with bowl jaws, support the workpiece with the tail center for as long as possible. Finish-sand the turned area, and apply a finish.

**Sources**

Woodturning chucks.
- Packard Woodworks. Call 800/683-8876, or go to packardwoodworks.com.
- Grizzly Industrial. Call 800/523-4777, or go to grizzly.com.
- Penn State Industries. Call 800/377-7297, or go to pennstateind.com.
- Craft Supplies, USA. Call 800/551-8876, or go to woodturnerscatalog.com.

**Coming in issue 159.** See Wise Buys in this upcoming issue for reviews of four chucks priced from about $35 to $235.

**Meet the authors**

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