

Turn to Learn

Candlestick

by Walt Wager

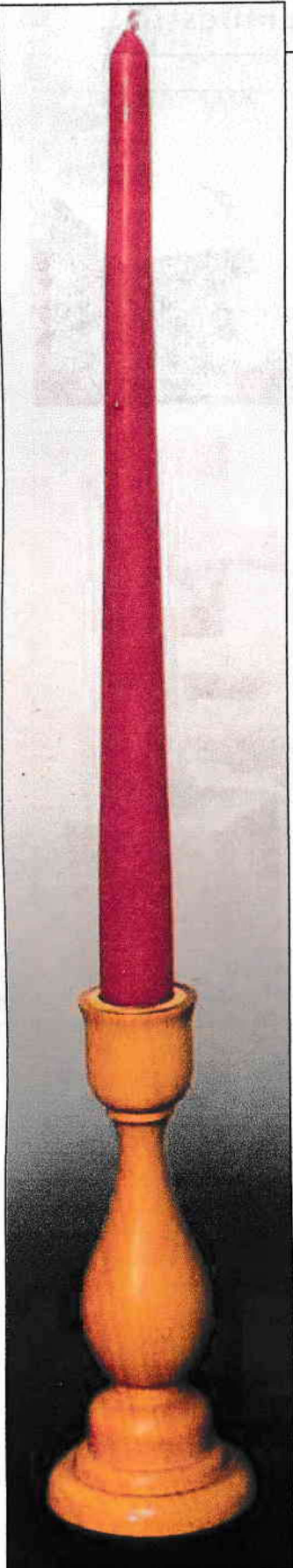
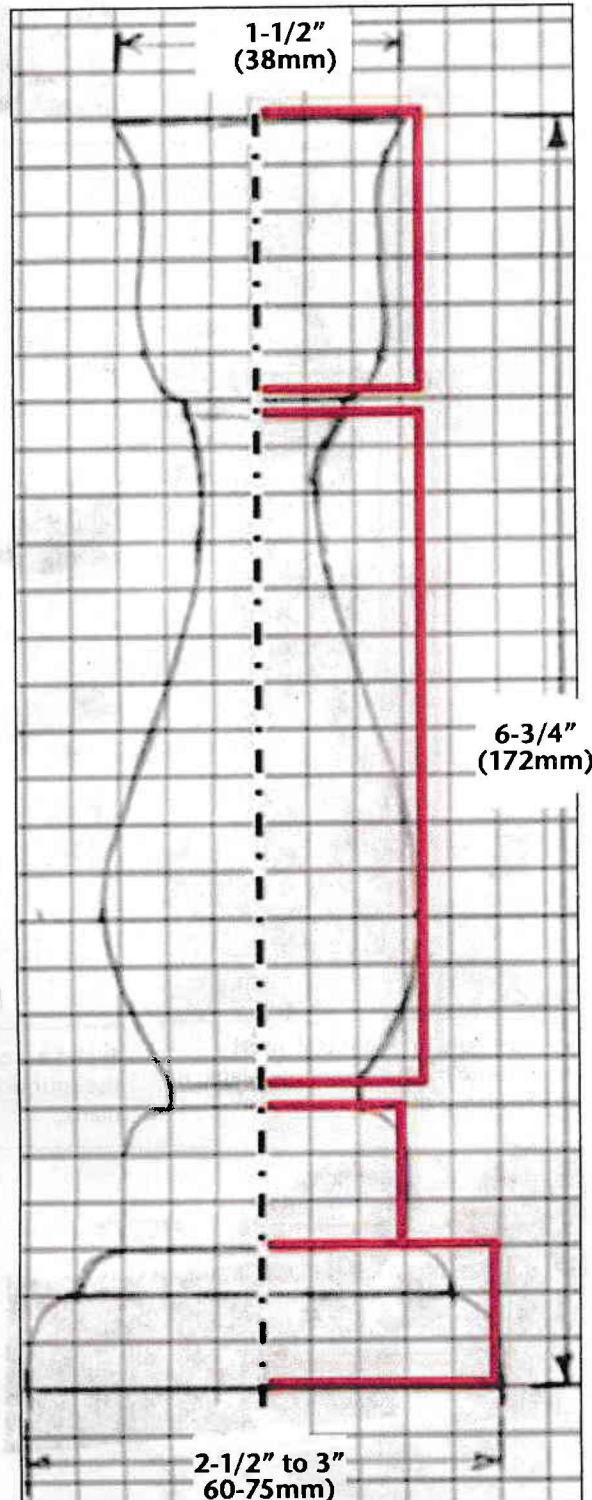
The candlestick, **1**, is a spindle project easily turned on a mini- or midi- lathe, using the spur drive and live center that came with the lathe. Skills include using a spindle-roughing gouge, a spindle gouge, and a parting tool.

For materials, you'll need a 3" x 3" x 8" (20 x 7.5 x 7.5cm) wood blank, a metal candle insert, and the finish of your choice. I chose cherry because it turns easily without troublesome hard and soft layers in the grain. You'll also need a drill press or portable drill with a 7/8" (22mm) or 1" (25mm) drill bit to match your metal candle insert. You must use a metal insert, because without one a wooden candlestick would pose a serious risk of fire; **3** shows the two types that are readily available online. You'll also need a vernier or outside caliper for measuring diameters, and a small saw for sawing the turning to length — Japanese saw, dovetail saw, coping saw, or hacksaw would all work.

Preparation

The drawing, **2**, will be full size if you download this page and print it out at 100%. Make two copies, one to cut as a template and the other to use for measuring.

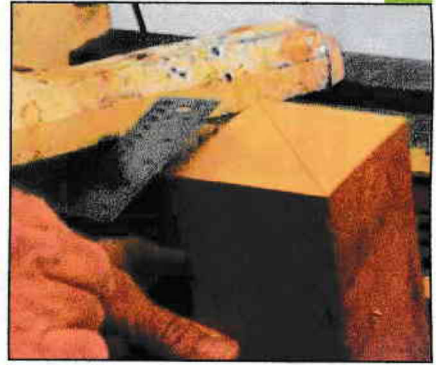
2 Full-size drawing, 1/4" (3mm) squares. Blank is 3"x3"x8"; for stability make the base as wide as your wood allows. Small fillets or flats divide the turning into sections marked in red by their largest diameter.



1 The candlestick project offers a fun and useful way to practice spindle-turning.



3 (left) Two styles of metal candlestick insert, essential to reduce the risk of fire. Measure your insert to dimension the hole you'll bore.



4 (right) Mark center on both ends of the blank by drawing diagonals from corner to corner.

Saw the cherry wood blank square and to size, and mark the centers by drawing diagonals on the ends, as shown in **4**. Bore one end 1-1/2" (38mm) deep to accept the metal insert you are using, **5**, then set the spur drive in the opposite end using a dead-blow hammer or wood mallet, **6**.

Bring up the tailstock with the live center. Its taper will fit into the bored hole, centering the workpiece on the lathe and holding it tight against the spur drive (**7**). Set the toolrest so that you will be cutting at or slightly above center. Rotate the blank to check that it doesn't hit the toolrest, **8**, next page.

Lathe Speed

Check the lathe speed before turning it on. The proper speed depends upon many different factors including the diameter and balance of the blank, and the condition of the wood. This varies for every project. If you don't have an RPM indicator on your lathe, look at its pulley combinations. For this small spindle, set the speed to about 1200 RPM.

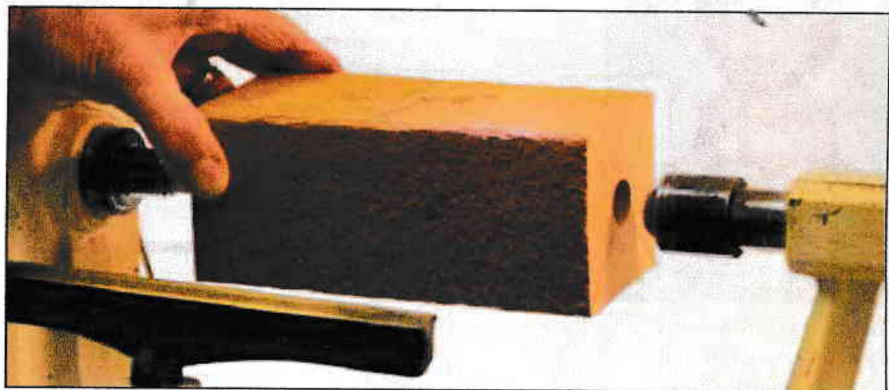
7 Mount the blank between centers. The live center at the tailstock engages the bored hole in the workpiece.



5 Bore a hole for the metal insert 1-1/2" deep in one end of the blank. Be sure to clamp the workpiece.



6 Use a wood or plastic mallet to tap the spur drive into the other end of the blank.



Roughing out

Using the spindle roughing gouge, turn the blank to round using the ABC approach (8):

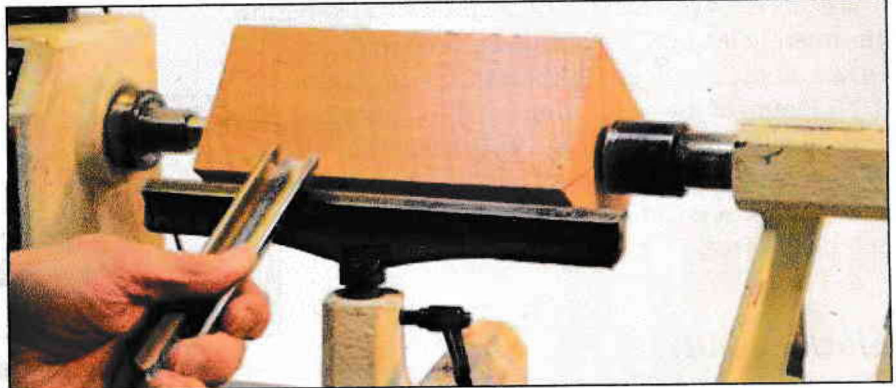
“A” stands for Anchor — anchor the tool on the toolrest before touching the wood.

“B” stands for Bevel—let the bevel contact the wood BEFORE engaging the cutting edge.

“C” stands for Cut. Raise the end of the handle to engage the cutting edge, and then slide the tool across the rest to remove some wood.

The spindle roughing gouge makes a nice clean cut when the angle of the cutting edge to the wood is between 30 and 45 degrees, in the direction of the cut, 8. Note that the spindle roughing gouge should be used for spindle work only, where the grain of the wood is parallel to the lathe bed, never for faceplate work like a bowl where the grain is perpendicular to the lathe bed. The reason is that the large cutting surface will self-feed into the endgrain and you will get a dangerous catch that can destroy the workpiece, the gouge, or both (more on page 10).

Keep your right hand against your body, 9 and 10, so that you can move the tool by rocking your entire body from left to right. This gives you maximum stability and control. Round the blank to a smooth cylinder all the way across, 11, matching the largest diameter at the base of the candlestick. Be sure to shut the lathe off when you need to move the toolrest, to avoid running the rest into the wood or catching your hand between the rest and the spinning workpiece.



8 With the lathe off, set the toolrest below center so that raising the spindle roughing gouge handle will engage the cutting edge on center. Aim the edge in the direction of the cut.



9, 10 Anchor the spindle roughing gouge on the rest with your left hand. Angle the tool upward so its bevel contacts the wood, brace your right hand against your body, and lift the handle to engage the cutting edge. Rock your entire body sideways from your feet to power the tool smoothly across the workpiece.

11 Use the spindle roughing gouge to make a smooth cylinder from end to end. The drawing shows a 2-1/2" (63mm) base, but if you have the wood, it's better to leave it as large as possible.



The blank is longer than the final candlestick. By boring the insert hole to 1.5" (38mm) deep, you left room to face off the cup side of the blank. Face off about 1/2" (12mm) of the blank using the spindle gouge, so it is square on the end, photo **12**. The 1/2" (12mm) engaging on the live center will be parted off after everything else is turned. It is simply there to hold the spindle in place.

Blocking out

Use your drawing to block out the blank for each element of the candlestick. This means to divide the spindle into sections according to the maximum diameter of each element. The drawing at **2** shows the candlestick divided into four elements:

- a: the cup that holds the candle,
- b: the bulb,
- c: the small base,
- d: the large base.

There are two small fillets. A fillet is small flat that serves as a transition between two design elements. The first is between the cup and the bulb, and the second between the bulb and the base. Lay the diagram against the blank and mark the different component part on the blank, as shown in **13**. Remember that the 1/2" at the tailstock end is waste, so the top of the cup will be at the edge of the blank past the waste. Make pencil marks at the bottom of the cup, the bottom of the bulb, the bottom of the small base, and the bottom of the large base.

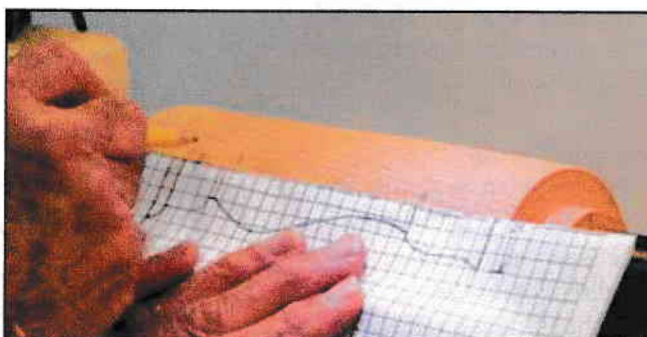
Photo **14** shows the marked blank. Use the parting tool to cut the component sections to the maximum diameter for each section. Start at the cup. The largest diameter is 1-1/2", and it is 1-1/2" long to the fillet. From the fillet by the cup to the fillet at the end of the bulb the maximum diameter is 1-3/4". The base just below the bulb is 1-1/2" diameter, and 2-1/2" to 3" is the maximum diameter of the base.

When using the parting tool, rest the bevel on the blank and raise the handle as you push the tool forward, as shown in **15**. This makes a peeling cut. You can make the same cut using a bedan if you have one.

15 Part each section to the maximum diameter of that section. Rest the bevel on the blank, lift the handle, push.



12 Face off the end using a small spindle gouge. Hold the tool level, rotate to the closed-flute position, and aim the bevel.



13 With the lathe off, use the full-size drawing to mark out the candlestick components.



14 Mark the bottom of the cup, bottom of the bulb, bottom of small base, and bottom of large base.



Shaping

The blocked-out spindle is shown in 16. The next step is to cut the fillets down to their small diameter, then shape each element using the 3/8" or 1/2" spindle gouge. You can use the diagram as a template to guide the work, as shown in 17. Shape the candlestick elements by cutting from the largest diameter down toward the smallest diameter, often called "cutting downhill." This is cutting across or with the grain, as opposed to cutting into or against the grain, and you are more likely to get a smooth finish, not all ragged and splintery.

Use the ABC approach to the spindle gouge:

A - Anchor the tool on the rest;

B- rest the bevel on the wood with an open flute (flute straight up or 12 o'clock), and

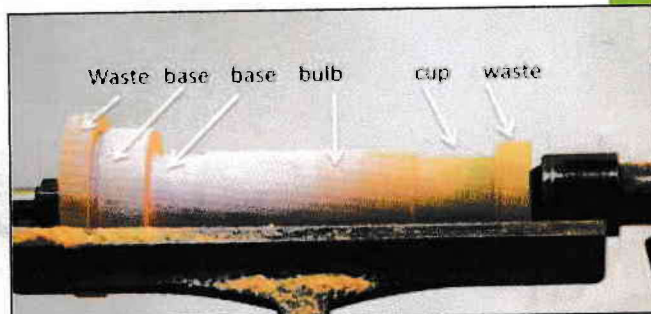
C-raise the handle to begin the cut.

The bevel of the tool should face the direction of the cut. So if you are cutting to the right, the handle should be to the left of the cutting edge. As you make the cut, rotate the gouge to a closed position (3 o'clock). This rotating motion is difficult to describe in words, but you can watch a video on using a spindle gouge at: <https://vimeo.com/174507794>.

Before starting to turn the bulb section draw a line at the largest diameter as shown in photo 17. Using the 3/8" or 1/2" spindle gouge, cut from the line down to the fillet, first rounding the bottom of the bulb and then the top. The goal is to make a nice clean curve from the largest diameter to the smallest diameter. You can't do it in just one cut, so make several small cuts. Note in 18 that the cut is to the right, so the handle is to the left.

Under the cup section the bulb has a cove that comes back up to meet the edge of the fillet, 19. Cut from the fillet down to the center of the cove, then round off the cove on the bulb side. Remember, cut from the large diameter toward the small diameter.

Round the bottom of the cup down to the fillet, and note that the side of the cup has a slight inward cove, coming up to the top edge, a tulip shape as shown in photo 20 (next page). All that's left to do now is sand the candlestick, and part it off from the waste.



16 Block out the spindle by cutting each section to its largest diameter, indicated by the parting tool cuts.



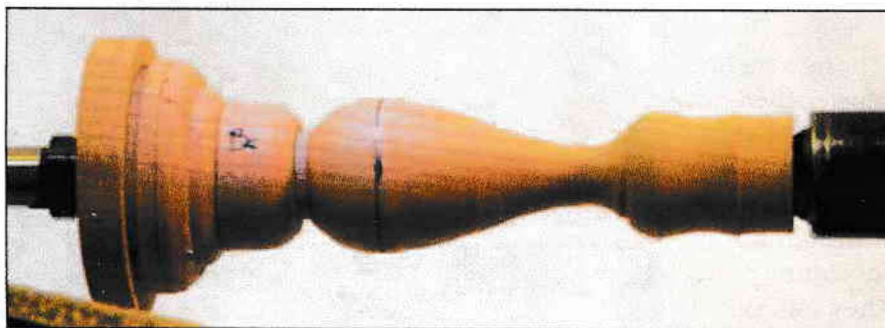
17 Shape the elements using the spindle gouge, always cutting from large diameter down to smaller diameters.



18 Work downhill both directions from the largest diameter line on the bulb section. Cutting to the right, the gouge handle angles downward and to the left, with the gouge flute rolling from fully open (12 o'clock) to closed (3 o'clock) at the end of the cut.



19 The bulb section ends with a cove that meets the fillet beneath the cup. Cut from the fillet down to the center of the cove, then smooth it off from the bulb side.



20, 21 The turned elements are complete. To prepare for removal from the lathe, use the spindle gouge to pare the headstock waste down to a slender plug (right).

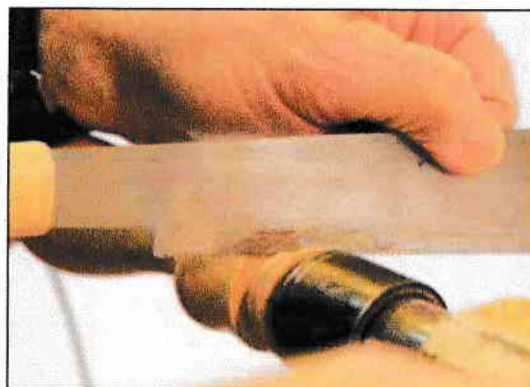


Parting off

After sanding, use a spindle gouge to remove the bulk of the waste from both the headstock and tailstock ends of the blank. Photo **21** shows using the spindle gouge to cut the waste away from the base of the candle stick. Cut this down to a plug about 1/4" in diameter, and cut the base a tiny bit concave so the candlestick can't rock in use.

Because the candlestick is being supported on both ends by the lathe, you can't just part off one end. Instead, saw through the waste at the cup end using a small handsaw, then take the workpiece off the lathe to saw the remaining plug at the head end (**22, 23**). I use a thin-kerf Japanese saw.

Press in the insert and apply a finish of your choice, and you're done! Unless, of course, you would like to have a pair of candlesticks. It's always instructive to make a design for a second time, with the added challenge of making two the same.



22, 23 Use a small, fine handsaw to cut the waste and separate the candlestick from the lathe.



24, 25 Clean up and chamfer any sharp edges, and press the metal insert into place. The candlestick is ready for the finish of your choice, and, better yet, for you to duplicate to create a matched pair that will grace your dinner table.

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