Make a "Tumbling" Bowl

Peter M. Smith

Tumbling Bowl,
Maple, cherry, walnut, 3" × 11" (8cm × 28cm)

"Tumbling" bowls and platters are so-called because they present an M.C. Escher-like illusion of tumbling cubes, and this appearance changes as the piece is rotated. All it takes to achieve this surprising effect is precision sawing and attention to the wood grain direction.

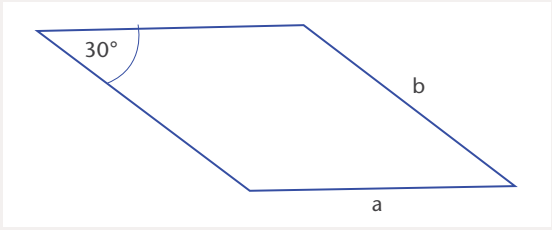
Make diamond segments

A tumbling-bowl blank is built up from diamond-shaped segments. It is critical that the sides of each segment are exactly equal, and the acute angle is 30 degrees. From the top view, you can see that three segments will form a hexagonal "cell" (*Figure 1* and *Photos 1, 2*).

For the table saw setup, move the fence to the "open" side of the tilted blade to avoid trapping the offcut between the blade and the fence, which could cause a kickback (*Photo 3*). A new thin-kerf blade will provide clean cuts.

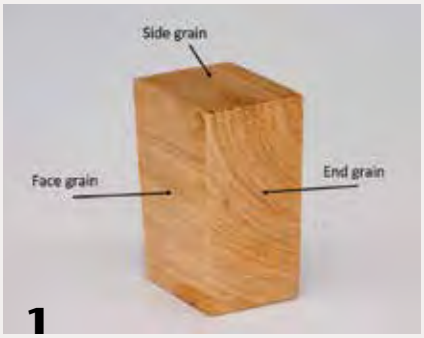
Use three lengths of contrasting woods, such as walnut, cherry, and maple. The stock must be of uniform thickness—in the example shown here, I planed the wood to 1" (25mm) thick from readily available 5/4 lumber. The stock's width, which determines the height of the bowl (minus a small amount of turning waste), should be the same for each species of wood. Anywhere from 2½" to 4" (6cm to 10cm) wide is appropriate, depending on whether you are making a platter or bowl.

Use three of the first segments you cut to test the hexagonal fit. An imperfect fit now will be magnified during assembly, so be prepared to sacrifice some segments to get it right. Adjust the blade angle and/or fence as needed. When you are satisfied with your table saw setup, the segments can be cut quickly, so have a box handy to collect them (*Photo 4*). Be careful when ▸



Diamond segments form hexagonal cell

Figure 1. Tumbling-bowl segment shape. Sides a and b must be equal length.



A diamond-shaped segment in cherry, 4" tall. Note the grain orientation.

Top view of a "cell" of three segments. The optical illusion is already at play—it looks like a cube, but it's actually a 4"-tall hexagon.

Cut segments

(*3*) The shim on the table saw fence prevents binding of the acute segment after the cut. The magnetic gauge is critical for ensuring the correct angle. Even so, trial and error are needed to achieve the "perfect" fit.

(*4*) Upon proper setup, cutting the segments goes quickly. The long scrap stick allows for safe pushing of the segments into a collection box.

sawing, even if there is little chance of kickback because of the obtuse angle of the saw blade and the spacer shim on the fence. Use a waste stick to push the segments through and into the collection box.

Assemble cells

As noted, a basic "cell" comprises three diamond segments, one of each wood color. There are two important factors to note when assembling the cells—the position of the different woods and the grain orientation (*Photo 5*). The positioning is easy since the woods are different colors. Just be consistent with their positioning for all cells. Here, I have chosen to put walnut to the left, cherry to the right, and maple on top. More critically, the sidegrain at the top must be oriented the same way in each cell. This forms the main visual element, which is the illusion of a cube.

It's easy to make a mistake here and spoil the visual effect. I recommend setting one established cell aside as a reference for the subsequent cells. Each cell will have three facegrain sides, three endgrain sides, and two sidegrain faces (top and bottom).

When you have the segments oriented correctly, glue three segments of the different woods into a cell. Rubber bands at the top and bottom will hold the cells together while the glue sets (*Photo 6*). Wipe off any glue squeeze-out with a damp towel. After the glue is dry, clean up the sides of the cells very lightly on a belt sander.

Assemble turning blank

Once the cells have been prepared, they can be built into a turning blank in different ways. A basic approach is to take seven cells and glue them together to form a core, making sure the wood positions are aligned (walnut on the left, etc.). I recommend using quick-grip clamps with shims to ensure a good fit (*Photo 7*). After the core is set, twelve more cells can be added to extend the diameter (again, paying attention to wood species and grain orientation). Using 1"-thick stock, this method will increase your core from about 7" (18cm) to about 10" (25cm), as shown in *Photo 8*.

The core and the outer layer could also be glued together at the same time, giving some wiggle room for the fit (literally). Here, the need for precision cutting becomes obvious. Use lots of glue since glue-starved joints risk failure during turning. A strap and quick-grip clamps with shims hold the cells together tightly while the glue sets.

If you are using tall segments, say 4", another approach is to cut four of the cells in half and use seven of these shorter 2" (5cm) cells for the core, creating a "well" in the center. Otherwise, more than 3" (8cm) of waste per core cell will be turned away, which is difficult, unnecessary, and uneconomical. Even after turning past faceplate screw holes on the short cells and accounting for the tenon, there would still be enough thickness for the bowl base. The disadvantage of this approach is that when gluing the taller cells around the core, it is more difficult to keep the joints tight.

Another option is to add an outer edge to your glue-up so you are not left with a jagged perimeter. You can use eighteen individual segments (not

Wood species orientation

5 Three segments are ready to be glued up into a cell. Be consistent with positioning of wood species in all cells.

Glue segments into cells

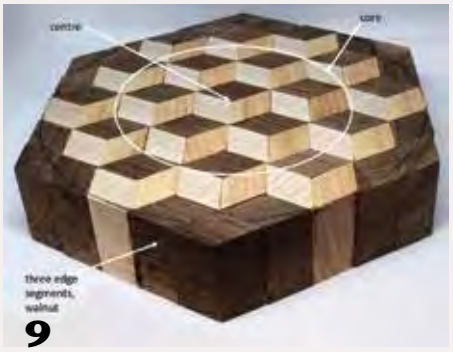
6 Segments are glued up into seven 4"-tall cells, with gluing pressure provided by rubber bands. After the glue dries, the cells are sanded lightly.

Glue cells into a core, then expand

7 *From a separate example*, 2"-tall cells are glued into a seven-cell core.

8 The author surrounds a core with additional cells, widening the diameter of the blank.

glued into cells) to fill in the outside angles and complete a hexagonal blank (*Photo 9*). In this example, this added 1" to the outside diameter. The same wood can be used for all of these edge segments, or you can alternate species to contrast with adjacent cells. If desired, trim the hexagonal points on the bandsaw to create a circular blank before turning. The example shown resulted in a blank of about 11" (28cm) diameter.



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Complete the hexagon

A glued-up blank, ready for bandsawing to a circle for turning. The author has added eighteen individual walnut segments to fill in the angles at the outside edges.

Turn the bowl

Shaping and finishing the bowl are the easy steps. Standard lathe mounting techniques apply. For example, you can initially mount the blank on a faceplate or screw chuck, true it up, shape the outside, and form a chucking tenon. Then remount the work in a chuck to hollow the bowl (*Photos 10-12*). Sand and finish as you normally would. Any slight gaps between cells can be filled with sawdust and glue.

Sweeping curves will distort the cube illusion somewhat, so aim to have steeper sides and the bottom of the bowl relatively flat, as shown in this article's *lead image*.

Take note that with this glue-up, you'll be turning dry hardwood, which is slower and more difficult than turning green wood (no long ribbons flying from the lathe). And the sharp edges of the segments can fracture if they have not been glued securely enough.

Looking beyond bowl forms, shorter cells (about 1" tall) can also be glued together to form an attractive sidegrain cutting board of tumbling cubes. ■

Tumbling Platter/Bowl, Maple, cherry, walnut, 2" × 11" (5cm × 28cm)

Peter M. Smith, a woodturner for many years, turns bowls of all shapes and sizes from native hardwoods found in New Jersey. His work is in many collections (and kitchens) nationwide. In search of the "perfect" bowl, Peter aims to simplify form, using classic shapes that have evolved over time in different cultures.

Turn the bowl


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11


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(*10*) A 4"-tall blank with a "well" in the center, mounted on a screw chuck and trued up.

(*11-12*) The author forms a chucking tenon on the bottom of the bowl, then remounts the work in the chuck for hollowing and final turning.