

# Coves Cut on the Tablesaw

*Skew the fence and tilt the blade to make  
a slew of hollows*

by Frank Klausz III



Moldings enhance the appearance of furniture and architectural millwork with their ability to catch light and make shadows. Most moldings are a combination of beads (convex curves) and coves (concave curves). Large coves are most often made with a shaper, but shaper blades are expensive, especially when they have to be custom ground—not to mention the cost of shapers themselves. So for short runs of molding or for shops that don't have shapers, tablesawn coves are a surprisingly versatile alternative. This article explains how to make a variety of coves using your tablesaw and examines ways of simplifying the usual trial-and-error set-up process. Safety issues raised by tablesaw coving are discussed in the box on p. 84.

There are two main types of coves: symmetrical and asymmetrical. Symmetrical coves, the more familiar kind, are cut by changing the angle of approach to the blade while leaving the blade perpendicular to the table. The stock rides along a skewed fence and passes over the top of the blade, removing an elliptical arc of wood, as shown in the bottom photo at right.

Asymmetrical coves are cut by changing the angle of the blade's tilt as well as the angle of approach. This type of coving yields logarithmic, or accelerated, curves as shown in figure 2 on p. 85. Partial coves can be cut using special fence setups, such as the one shown in the photo on p. 85.

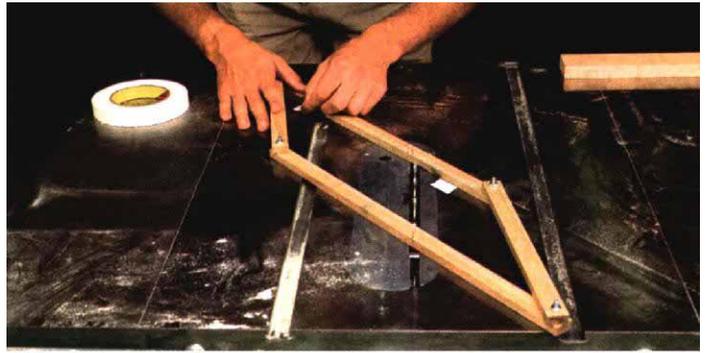
### Symmetrical coves

Symmetrical tablesawn coves are often used to approximate arcs of circles, but with one exception, they are actually sections of ellipses. As figure 1 shows, skewing the fence slightly from the normal ripping position produces a steep-sided elliptical cove; then, as the angle of approach is increased, the ellipse broadens and flattens out until, at 90° from the normal angle of approach, the cove is an arc of a true circle. Because there are only two factors to contend with, the height of the blade and the angle of approach, setting up for symmetrical coving is not too complicated.

**Setting up**—It's best to start by drawing the cove full size on the end of one of the pieces of stock you'll be cutting. Then you can make an accurate setup directly from the drawing of the cove. The height of the blade determines the depth of the cove, so butt the end of the piece up to the blade, and raise the blade to the highest point of the drawn cove.

Next you need to find the correct angle of approach, and clamp a fence to the saw table. An easy way to find the angle of approach is with an adjustable parallelogram like the shopmade one in the top photo. Flat-head machine screws work well at the joints. Countersink the heads so that the parallelogram will lie flat on the tablesaw, and use wing nuts with them so that you can easily lock in particular settings. As long as opposite sides are equal lengths, the construction details are unimportant. Adjust the parallelogram, so its width is the same as the widest point of the cove. Then, with the saw unplugged, place the parallelogram on the saw table, so it surrounds the blade. Turn the parallelogram until it just nicks the front and back of the blade. With pencil or tape, make location marks on the saw table inside the leg of the parallelogram that is touching the front of the blade. Measure back from your marks to account for the distance between the start

*Bringing out the shaper in his tablesaw, the author combines an angled fence and tilted blade to cut an asymmetrical cove for a piece of crown molding. From right, the coved pieces arrayed on the outfeed table are an asymmetrical cove and slices cut from it after every second pass, a symmetrical cove in a section of architectural molding, and two partial coves for an ogee bracket foot.*



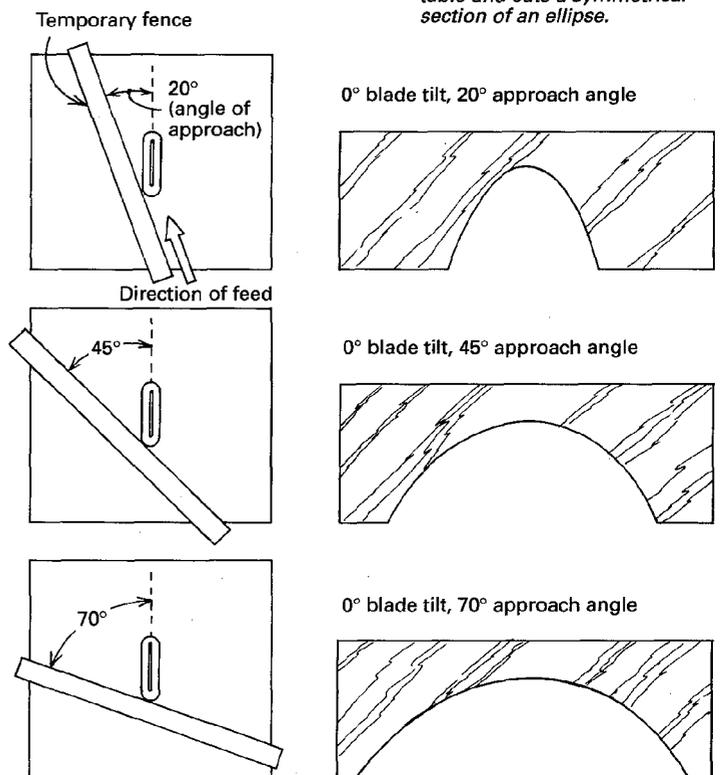
*Klausz finds the angle of approach for a symmetrical cove with a parallelogram set to the cove's width. With the blade raised to match the cove's highest point and the parallelogram just touching the blade at front and back, he marks the front fence location.*



*Symmetrical coves are cut with the blade vertical. Klausz shaves the last 1/16 in. from a piece of symmetrically coved cornice molding. The fence is set up to the infeed side of the blade, so the cutting action holds the stock against the fence.*

**Fig. 1: Symmetrical coves**

*Blade remains perpendicular to table and cuts a symmetrical section of an ellipse.*



## Safety concerns in tablesaw coving

Even if you are an old hand on the tablesaw, cutting coves on one may raise unfamiliar safety issues.

**Setting fences:** Whenever you set up for coving, start by pushing your normal rip fence aside or removing it from the saw entirely. Then select planed and edge-jointed hardwood for your coving fences. Clamp them down securely (deep-reach clamps are a good choice), being sure they don't bow off the table at the center. Be sure the pads of your clamps are seated flat on a wide surface under the tabletop.

For symmetrical coves, if you use only one fence, place it to the front of the blade—the infeed side in normal cutting. With the fence to the front, the cutting action of the blade helps keep the stock against the fence, making the cut safer and more accurate. Though one fence is often adequate to cut symmetrical coves, a second fence makes the operation safer and is especially important when cutting deep coves. In all cove-cutting, the stock weakens along the line of the cut; a back fence will provide a margin of safety, acting as a buttress to keep the piece from caving in. The approach to the blade can be from either the left or the right for symmetrical coves.

Use two fences when cutting asymmetrical coves. Always set up the fences for asymmetrical coving so the stock feeds into the blade on the acutely angled side: If the blade tilts to the right, make the approach from the right. If you feed the stock from the other side, it may have a tendency to ride up the blade and off the table, increasing the risk of kickback.

**Blade guards:** If you want to use a guard over the blade area, you might be best off devising your own and attaching it to one of the temporary fences. Many factory and aftermarket tablesaw blade guards are incompatible with coving. A guard that restricts your view of the workpiece or keeps you from applying constant downward pressure is more of a hindrance than a help. One guard that works well with coving is the Brett-Guard, a shallow open-bottomed box of clear Plexiglas mounted on horizontal steel bars. It can be adjusted vertically and laterally and can be used to exert some downward pressure on the workpiece. The lowest-priced model retails for \$246 and is available from HTC Products, Inc., 120 E. Hudson, P.O. Box 839, Royal Oak, Mich. 48067; (800) 624-2027.

**Feeding the stock:** It's essential to keep the stock pressed down on the table while coving. Once it's off the table, the stock can be caught by the teeth at the back of the blade and thrown. To ensure constant contact with the table, raise the blade between passes in increments of  $\frac{1}{8}$  in. or less. If you try to cut too much, the piece will ride up on the blade. Unless you have a power feeder, you'll need good jointer-style push blocks to enable you to exert downward pressure over a wide area. If you use the rubber-bottomed kind, clean the dust from the pads before each use to maximize their grip. Keep your push blocks by the fence between cuts, so you're never tempted to use your hand to push the stock from the back.

Because you can't see the blade in cove-cutting, you have to rely even more than usual on listening to it. And listen to the saw's motor. If either one sounds like it's struggling, slow down your feed rate and take smaller cuts. —*F.K.III*

of the cove and the edge of your stock. Clamp a sturdy, freshly edge-jointed piece of wood along your new marks as a fence.

You can cut symmetrical coves with a single fence, though a second fence to create a channel for the stock will make the operation safer. If you do use a single fence, it *must* be placed to the front (infeed) side of the blade, as shown in the bottom photo on p. 83. Otherwise, the blade will tend to pull the stock away from the fence, making the cut more difficult and more dangerous.

**Cutting the cove**—After using a tablesaw in the conventional way, it may be natural to assume that a cove could be cut all at once, but it can't. Because the stock approaches the blade from the side, cutting only takes place in an arc as wide as the blade's teeth are high. (And when you are cutting coves with the blade tilted, the effective cutting height of the teeth is reduced further.) So all cove-cutting must be done in a series of passes.

Start with the blade lowered into the table, and make a test pass to see if the clamps are out of the way and if you have enough support at the end of the cut. If you are using two fences, the stock should slide easily between them but have no play. Also, be sure your push blocks are handy. Jointer push blocks work well: You can use either the rubber-bottomed kind, as shown in the photos, or the shopmade type with a lip along the underside of the back edge to catch the end of the stock. A regular tablesaw push stick is not appropriate because it concentrates pressure in one spot and doesn't provide the downward pressure required for coving.

Cut the cove in stages, raising the blade  $\frac{1}{8}$  in. or less with each successive pass. A finish cut of  $\frac{1}{16}$  in. will give a smoother surface and reduce sanding time.

### Asymmetrical coves

Asymmetrical coves are cut with many of the same procedures used for symmetrical coving. The key difference is that asymmetrical coves are produced by tilting the blade as well as angling the fence. This makes asymmetrical coves far more difficult to set up. There are low- and high-tech ways to find the coves you're after. You can proceed by trial and error, eyeballing the shape and building a library of cove profiles, or you can use a computer-aided design (CAD) program.

**Finding your cove by eye**—To find a cove, squat in front of the saw with your eye at table height, and look across the blade in the path the wood will follow. When making asymmetrical coves, you always feed the stock from the side the blade tilts toward. Because some tablesaw blades tilt right and some tilt left, the angle of approach you take will depend on your tablesaw. As you or someone else changes the tilt of the blade, you will see the potential cove changing. Change your position to see how the approach angle will affect the cut. Closing one eye might help you see the blade as a silhouette.

When you think you have a shape close to the cove you want, set up a pair of fences and make a test cove. As you reset the fence and blade to find the correct shape, remember that you can steepen the acceleration of the cove—making the cove more asymmetrical—either by tilting the blade farther or by bringing the approach angle closer to normal ripping position (see figure 2 on the facing page).

**A library of coves**—If you use the sighting method to find asymmetrical coves, record the angle of blade tilt and the angle of approach on a cutoff from the finished piece. As these templates accumulate, you can easily reproduce old coves, or interpolate between them to get in the ballpark of a new curve. The fuller your collection, the less guesswork. A few hours spent methodi-

cally cutting test coves at a series of angles of approach and tilt would be a good way to explore the interrelation of these two variables. And at the same time, you would be building a good foundation for a library of cove profiles.

**CAD-generated coves**—With access to a CAD program, you can determine the tilt and approach angles for various coves by creating a tablesaw blade in the computer. This will eliminate much of the trial and error involved in the sighting method. Start by drawing two circles  $\frac{1}{8}$  in. apart. The circles should be the same diameter as your tablesaw blade, most commonly 10 in. Incorporate a baseline 2 in. above the center point to represent the saw table. Then print the image of the blade at various angles of rotation and tilt, being sure to record the angles for each. I have generated a wide range of coves this way and published them in a booklet described at the end of this article.

To set up for asymmetrical cutting using CAD-generated profiles, set the blade tilt using the bevel gauge on the front of your saw. Then raise the blade to the highest point of the cove as drawn on your stock. Set your miter gauge to the approach angle designated on the printout, and slide the front fence into place using the miter gauge. Be certain you set the fence so that the blade will be tilted toward the stock as it approaches. Clamp the front fence in place; then lower the blade into the table, lay a piece of your stock against the front fence and set up a back fence snug to the stock. The cutting can proceed just as it does with symmetrical coving.

### Partial coves

This last category of coves is really a variation on the first two. Partial coves are portions of symmetrical or asymmetrical coves. One type of partial cove is cut with a fence that has a gap or cutout in the middle, like the fences on shapers and router tables. The gap allows you to set up the fence right over the blade, and moving the fence exposes more or less of the blade for cutting. Another type is cut with one edge of the stock elevated, riding on a stepped fence, as shown in the photo above.

Be particularly careful when cutting partial coves to eliminate

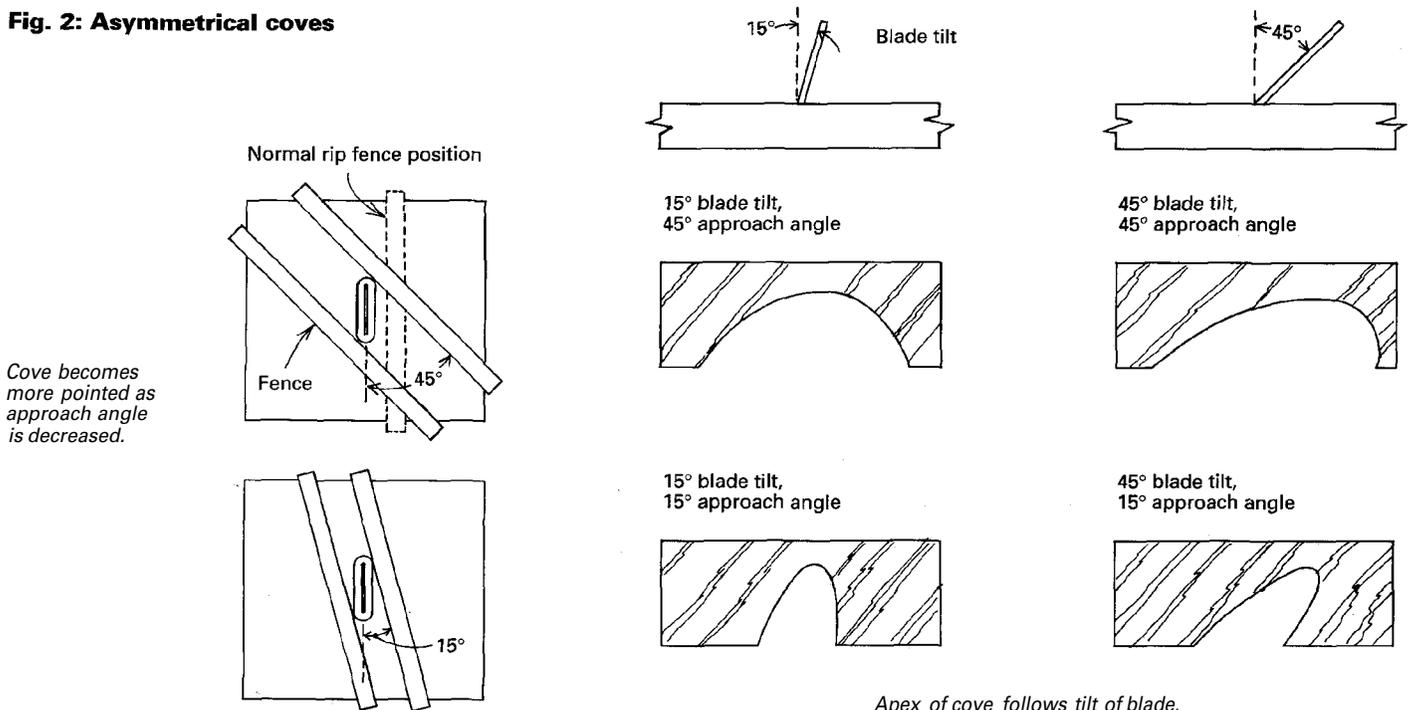


*A stepped fence raises one edge of the workpiece as Klausz cuts a partial cove in a piece of cherry. For all asymmetrical coves, partial or full, two fences are required, and the stock is fed into the acute side of the blade's tilt.*

any play between the stock and the fences, and take a number of test passes to determine if there will be any problems of splintering or compression at the points of contact between the stock and the fences. □

*Frank Klausz III studied cove-cutting for his senior thesis at Harvard University; he works for C.U.C. International in Stamford, Conn. His father, Frank Klausz, and Will Neptune of the North Bennet Street School also contributed their expertise to this article. The author's booklet, which gives the angles of approach and blade tilt for 56 coves, is available for \$9.95 plus \$2 for shipping and handling from Klaus-Tech, P.O. Box 43, Pluckemin, N.J., 07978; (908) 658-4396.*

**Fig. 2: Asymmetrical coves**



*Cove becomes more pointed as approach angle is decreased.*

*Apex of cove follows tilt of blade.*