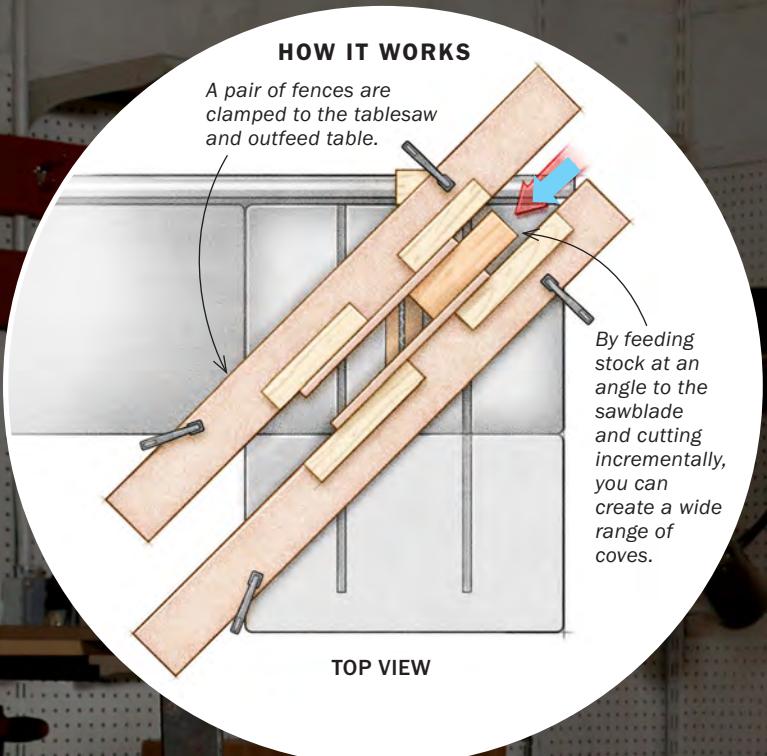


Cutting Coves on the Tablesaw



Take an angled approach to create curves for molding and much more

BY WILL NEPTUNE

While bigger shops can easily produce a wide range of concave surfaces using a shaper or molder, smaller shops often need to get creative to make coves. A router can go only so far. That's where cove cutting on the tablesaw comes in. By feeding stock at an angle on the tablesaw, you can create a wide range of curves, from narrow to wide, flat to steep. Things get even more interesting when you tilt the blade as well, as this angles the cove. If you follow the steps and precautions in this article, you'll be able to comfortably and safely produce curves that are deeper, wider, and more varied than those you can make with a router table.

Two types of coves, plenty of variety

Tablesaws can produce two kinds of coves: standard and angled. Standard coves are simpler and are symmetrical along their vertical axes. They're formed by setting the blade 90° to the table. Angled coves, on the other hand, are the result of tilting the blade. Angled coves are sometimes referred to as asymmetrical coves, but this makes the curve sound overly mysterious. Tilting the blade simply tilts the line of symmetry.

Arbor angle isn't the only thing that determines a cove's shape. Three other factors also come into play. First, there's the height of the blade, which affects the cove's depth. Second is the feed angle. The higher the feed angle—meaning the farther away it is from parallel with the blade—the wider the cove. The last factor is blade diameter, as

Standard coves,
cut with the blade
vertical, are the
bread and butter of
this method.

By varying your
techniques and setups,
partial coves
and **coved panels**
are possible, too.

Angled coves,
cut with the blade tilted,
add further variety and
energy to the array of
shapes available.

SETTING UP

Draw the desired curve. Draw the cove you want on the end of the workpiece to help set up the cut. Be sure to leave enough wood above the cove so the stock doesn't get too thin and weak as you cut it. And leave enough on either side of the cove to ensure solid contact with the saw table.



Online Extra

If you feel more comfortable setting up with a cove angle calculator, go to FineWoodworking.com/281.

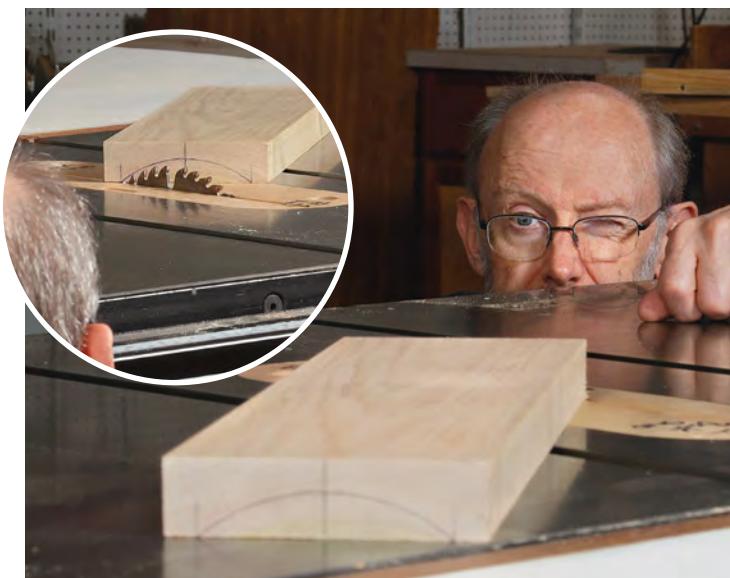
smaller blades can produce tighter coves. Use a rough rip blade if possible, although a combination blade will do.

Straightforward setup ensures safety

While some people use jigs or even computer programs to help figure out their coving setups, I try to keep things simple. After drawing the cove on the stock, I set the height of the blade to the deepest point of the arc. To figure out my feed angle, I put the workpiece behind the blade and sight the blade's arc against the drawn cove, angling the board until the width of the cove matches the width of the blade's silhouette. That's all you need to do for straight coves. If you're doing an angled cove, match the width first, then tilt the



Raise the blade to the depth of the cove. When coving, you raise the blade incrementally between passes, but start by lifting the sawblade to the highest point in the cove (above). Then mark the extent of its cut on the throat plate, using a left-angled tooth at the back and a right-angled tooth at the front (right). This will guide you when setting up the two fences.



Find your feed angle by sighting the blade against the stock. Move the stock until the outline of the blade fits within the cove.



Draw the feed angle on the throat plate. You'll use these lines to align your fences. If you can't directly trace the edges of the stock, use a straightedge to extend the line.

blade. You will then need to readjust the height of the blade.

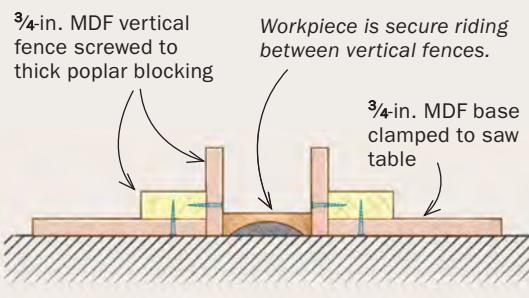
The angle of the board is your feed angle, so transfer the board's edges onto the throat plate with a pencil and you'll know where to clamp the fences. Just be aware that no matter how much you fiddle with the setup, though, you're unlikely to hit your layout lines spot on. The blade gives you what it gives you, so take test cuts and accept when they're good enough.

Use two fences and hold-downs—The safety goal here is to control the path of the workpiece. Coving on the tablesaw means cutting with the sides of the teeth, so I take extra precautions to make sure my stock travels straight and tight to the table. Because I am using two fences and hold-downs, the workpiece can only travel straight and stay tight to the table.

The two fences flank the sawblade, one in front and the other behind. The front fence resists the force of the blade pushing the wood toward the front of the saw. The back fence keeps the wood tight against the front fence. During the cut, the wood pushes against the sides of the teeth, which cut slowly. Without this rear fence, the wood could rub against the saw plate and slide away from the operator—possibly leading to kickback.

ADD THE FENCES

THREE-PART FENCES



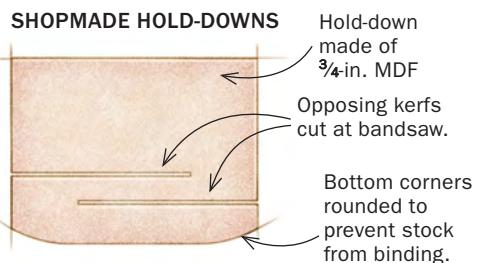
It takes two. The front fence resists the force of the blade pushing the wood toward the front of the saw. The rear fence keeps the wood tight to the front fence. Making both overlong and fairly wide leaves room for clamping them down at different feed angles.



Clamping may require creativity. These fences need to be locked down securely, and you will likely have to use shims in spots where there's otherwise not enough bearing surface. Place the workpiece between the fences as you clamp to ensure accurate spacing.



Hold-downs add security. Attaching hold-downs to the fences keeps stock held firmly against the saw table. Without them, the wood can lose contact with the table, possibly leading to kickback.



CUT A STANDARD COVE

Never try to cut the cove all at once. Instead, for a safe, clean cut, take multiple passes, raising the blade $\frac{1}{32}$ in. to $\frac{1}{16}$ in. each time. Examine the early passes and adjust your feed angle in case the cove is off. Feed slowly, and use a push stick to keep your hand away from the blade.



Slow down on final pass for a cleaner surface. On the last cut, back off on your feed rate even more. The tablesaw can leave rough coves, and the slower rate lessens the cleanup you'll have to do.



Clean up the cove. To smooth coves, Neptune rolls up cloth-backed sandpaper made for belt sanders because it's firm but can still bend. Contoured sanding blocks and curved scrapers also work.

The fences are simple affairs. Each has a long, horizontal base that's clamped to the saw table. I screw poplar blocking to the base to bolster vertical fences, which press against and direct the workpiece. The vertical fences are also screwed to the poplar.

The vertical fences should have room to attach hold-downs, which ensure the workpiece stays solidly against the table. With tall pieces, such as panels, I use taller vertical fences and hold-downs. As an added bonus, these rigid setups also limit vibration, producing a cleaner cut.

Feed direction—Feed direction matters too, although much more so on angled coves than standard ones. For standard coves, you can safely feed from the left or right. But I prefer feeding from the left, which gives me a lot more access around the side of the saw, letting me push the board through the cut much more comfortably.

The feed direction on tipped coves is much more important, and there's only one option. That's because a tilted blade is essentially a ramp, so you want to feed into it, not up it. As a result, the feed direction is based on which way your saw's arbor tilts. For left-tilt blades, you feed left to right; for right-tilt, it's the opposite. If you push the wood toward a blade that angles away from you—up the ramp—the stock is more likely to ride up off the table.

Cut slowly, steadily, and in stages

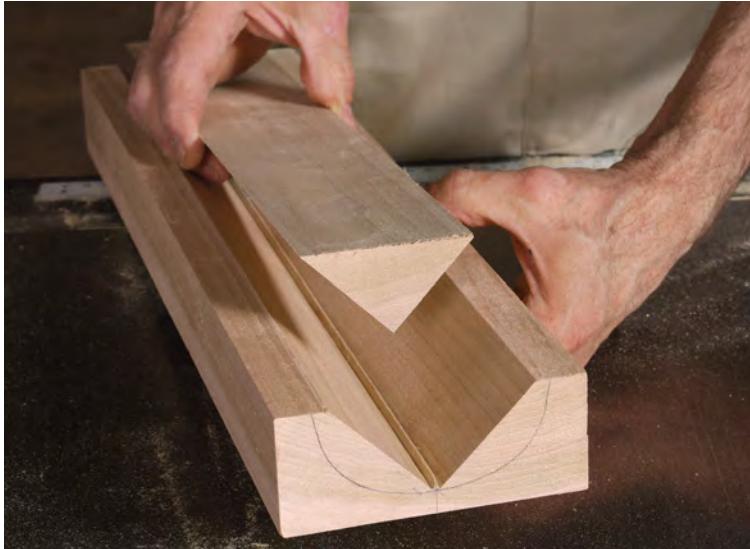
Coving on the tablesaw is inherently inefficient. You're cutting with the sides of



Label offcuts for reference. Build up a library of shapes by writing the arbor angle, feed angle, and blade diameter on coved offcuts. Even if you don't want to duplicate an exact profile, the offcuts still work as references when dialing in a setup.

SPEEDING UP DEEP COVES

Cove cutting on the tablesaw can be slow and dusty, especially with deeper curves. For these, it pays to remove most of the waste beforehand.



Pair of angled rips removes triangle of waste. Neptune laid out these lines at 45°, and fed the stock from opposite ends to complete the triangle.

the saw teeth, which can tax the saw and raise safety concerns. To lessen the workload and make the cut safe, you need to slow the feed rate and take multiple passes, removing small amounts of waste and raising the blade a little bit each time. Consider the width of the cove and the stock's density when choosing your feed rate and depth of cut. If you try to go too fast or take off too much, you risk kick-back—another reason I use hold-downs. On deeper coves, you can speed things up by removing the bulk of the waste beforehand with a pair of angled rips or stepped cuts with a dado stack.

Partial coves are possible

Until now, we've just focused on full coves. But if you get a little creative and plan ahead, you can end up with partial coves via one of two methods.

The method I pick often comes down to my stock. With thick pieces, I cove the face of a board as normal before ripping it down the middle, yielding a pair of quarter coves. Just be sure to account for the kerf of the saw when laying out the initial full cove.

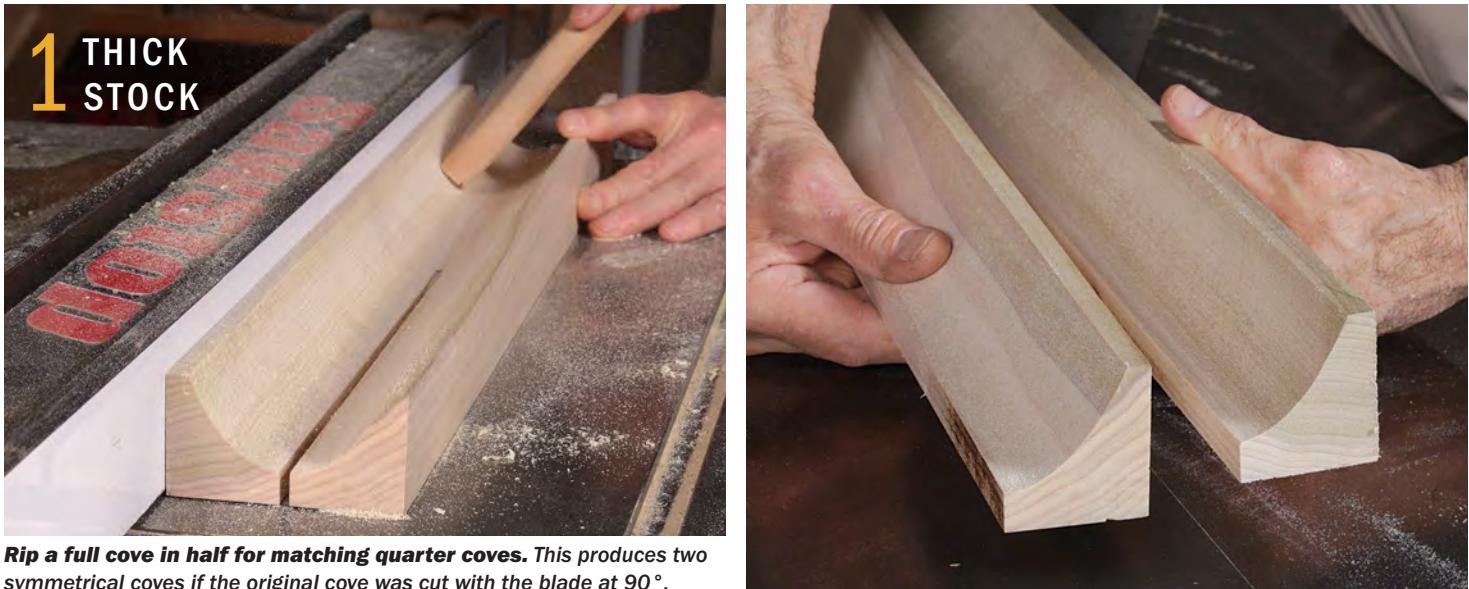
With thinner stock, I use a method that's a bit more involved, but it's more versatile too. Prepare the



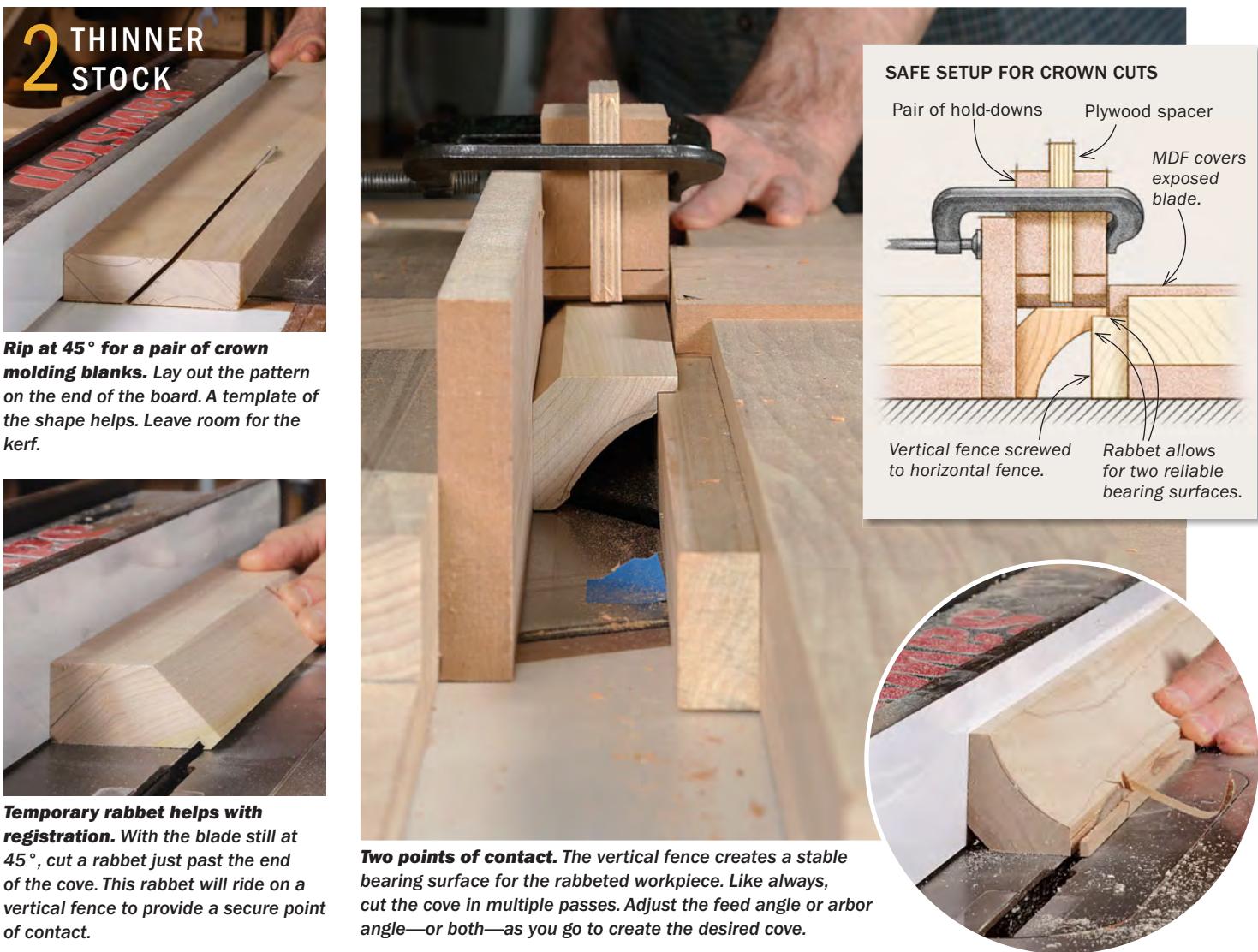
Dado stack also removes stock rapidly. Make stepped grooves as wide as you can to remove the bulk of the waste (left). This lets you make the cove more quickly and efficiently (below).



Two methods for partial coves



Rip a full cove in half for matching quarter coves. This produces two symmetrical coves if the original cove was cut with the blade at 90°.



Rip at 45° for a pair of crown molding blanks. Lay out the pattern on the end of the board. A template of the shape helps. Leave room for the kerf.



Temporary rabbet helps with registration. With the blade still at 45°, cut a rabbet just past the end of the cove. This rabbet will ride on a vertical fence to provide a secure point of contact.

Two points of contact. The vertical fence creates a stable bearing surface for the rabbeted workpiece. Like always, cut the cove in multiple passes. Adjust the feed angle or arbor angle—or both—as you go to create the desired cove.

RAISED PANELS



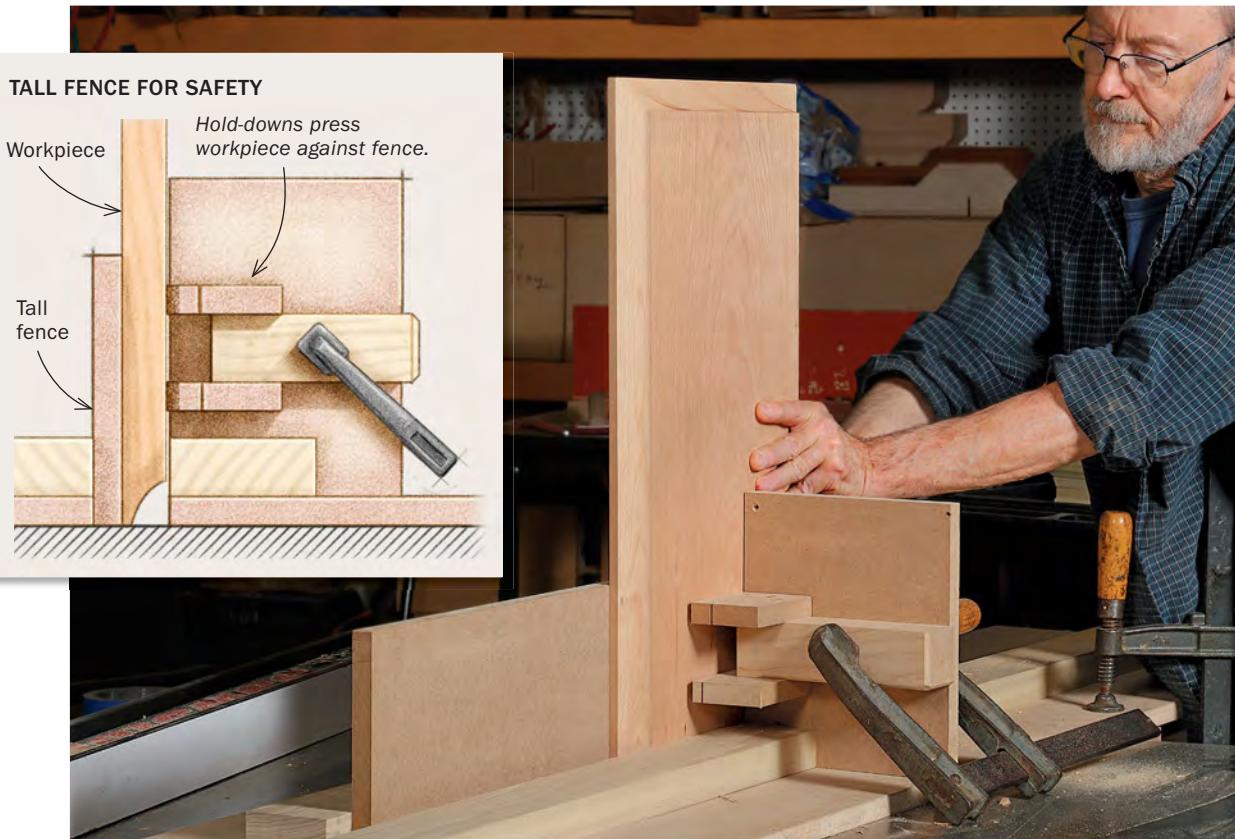
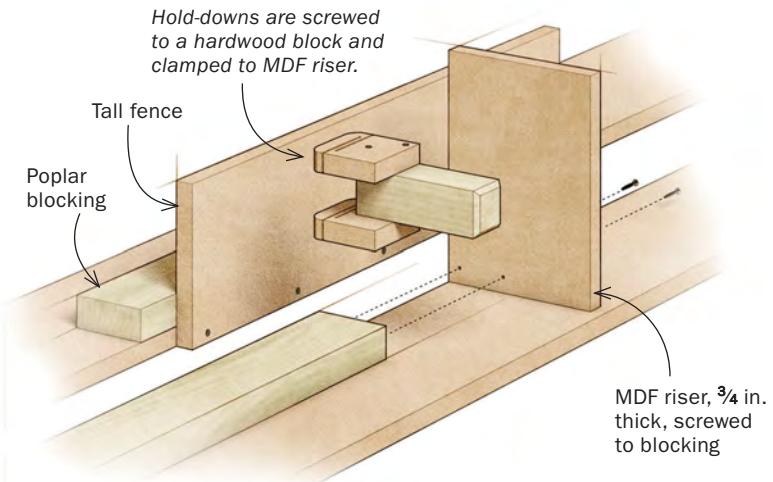
Panels need a tall fence. To keep oversize parts from tipping, screw a tall fence to the poplar blocking.

workpiece slightly overwide and cut a temporary rabbet into an edge. This rabbet will ride on the edge of a short vertical fence, letting you cut with only a portion of the blade. I recommend using hold-downs here. Once the cove is cut, you'll cut off the rabbet.

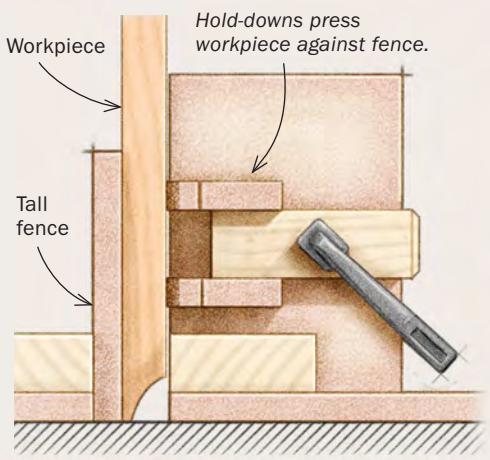
The rabbet method has a further benefit: It can be used to cut any partial cove, not just quarters of one. Since I'm cutting with part of the blade (the rest is buried in the rear fence), I can, for example, match the shape from ripping a thick, coved workpiece down the middle—meaning I can get the same curve from thick and thin stock. More importantly, I can also angle the arbor to sneak up on



Hold stock against the fence. For safety, secure high and low hold-downs (see p. 65) to an MDF riser. To ensure the proper pressure, have the panel in place when setting the hold-downs.



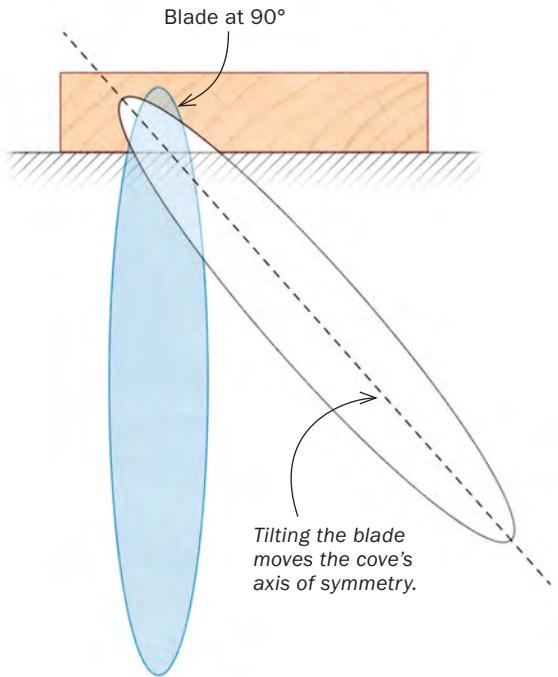
TALL FENCE FOR SAFETY



Cove around the panel. Again, work in stages, raising the blade slightly between each pass. Cut the end grain first, then the long grain; that way you'll clean up any blowout. Keep the panel down against the saw table. For safety, don't attempt this on panels less than 12 in. wide.

ANGLED COVES

Tilting the blade leads to swooping ellipses and additional sculptural possibilities.



The top photo shows a hand holding a black circle of cardboard mounted on a saw blade arbor, used to sight the cove. The bottom photo shows a person using a combination blade on a table saw to cut a cove in a piece of wood.

TIP

Black cardboard blade helps visualize cove. Cutting out a circle of cardboard the size of your blade, coloring it black, and mounting it on the arbor makes it easier to sight the cove of any given setup.

desired curves, like when I miss my layout line but really want that shape.

Expect cleanup

When cutting coves, tablesaws typically leave a fuzzy, scratchy surface that needs to be sanded or scraped. It helps to back off on your feed rate and take lighter cuts on the final passes, since these reduce vibration, thereby yielding a cleaner cut.

You may have to contend with a little bump in the middle of the cove. This is due to the thickness of the blade, as the left-angled teeth are producing one curve and the right-angled teeth a second, identical curve—but in a different plane. The effect can be especially pronounced on angled coves. While the ridge can be scraped and sanded fair, in extreme cases, I switch to a triple-chip blade for plywood on my final passes because the blade's grind eliminates the ridge. Changing the blade means temporarily removing the fences, so mark where they go first. □

Will Neptune is a woodworker and instructor in Acton, Mass.



Tilted arbor, angled cove. Coving with a tilted arbor involves the same fence setup but opens up much more energetic, sculptural curves. Here, Neptune is making a finger pull for a drawer.



TRIPLE-CHIP BLADE

Small flats in the middle of the teeth help to fair the curve.

Special blade for the last pass. Combination blades can leave a little bump, especially in angled coves. If you want, take a final pass or two with a triple-chip blade, although this means temporarily removing and resetting the fences.

