



# Three Easy Woodworking Jigs



# Router Dado Jig

Take the tool to the work for quick and accurate dados.

The quest for accuracy in woodworking is often like trying to find your way out of a maze. Make the wrong choice early on, and you'll find yourself going in circles and not getting any closer to your goal. Often the entrance to a path looks promising but soon becomes an uphill journey.

Making dados seems like a simple task, and it is. The difficulty is that there are so many different ways to go about it that it isn't always clear which choice makes the most sense. On the surface it would seem that setting up an accurate stationary machine, such as a table saw or router table, would be the best way to go. This is true if the pieces are small enough to be manageable all the way across the machine's table.

When the work gets too large, however, it makes more sense to move the machine over the work than to move the work over the machine. This simple jig and a router will make dados that are square, straight, a predictable width and depth and, most important, exactly where you want them to be.

The two parts of the jig will likely come from your scrap bin. A piece of plywood with a straight edge guides the base of the router. Its thickness and width allow you to clamp it to your work without interfering with the handles of your router. The second piece registers the jig at a right angle (or any other angle if you're so inclined) and locates the exact position of the router bit. I make this about 1/8" thinner than the workpiece, 1 1/2"-2" wide and about 12" long.

## Pivot to Perfect Alignment

Two screws and a dab of glue hold the parts together. Spread glue where the parts overlap and drive one screw. Use a square to align the parts at a right angle and drive the second screw. Set the jig aside and let the glue dry.



*In the groove.* Maneuvering a large piece of wood across a stationary machine can be inefficient and yield less-than-perfect results. Take the easy way out and cut dados with a router and this simple jig.

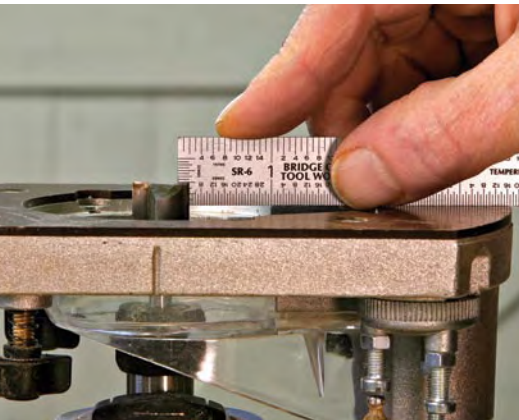
It's important to let the glue dry completely. If you don't wait, the two parts of the jig can slip out of square.

Install a straight bit in your router that matches the width of the dado you want to cut. Adjust the depth of cut by measuring from the router base to the tip of the bit. In most cases, the dado will be 1/4" deep or less so you can make the cut in one pass. Clamp the jig to a piece of scrap and make a cut, keeping the base of the router firmly against the fence, cutting a notch in the other part of the jig. This notch will be used to align the jig with your layout marks.

## On the Straight and Narrow

A router with a straight edge on its base will work better than one with a round base. The advantage of the straight edge is that it keeps the router in the same location on the work. A round base may not be perfectly centered and if so, holding a different part of the base against the fence will change the distance from the fence to the bit.

If your router has a round base, you can either make a new baseplate with a straight edge, or you can make a mark on the router base to ensure the same point is held against the straightedge of the jig.



**Easy setting.** With the base of the router riding on the surface of the work, setting the depth of cut is a simple matter.



**Time to be picky.** Dial calipers will quickly give an accurate measurement. Knowing the size you need is key to obtaining a good fit.



**The fix for plywood.** Most plywood varies so much in thickness that a good match isn't possible. A small rabbet makes a good joint manageable.

To use the jig, lay out the location of the dado on the work, line up the notch in the jig to the layout marks, then clamp the jig in place. Use another clamp to hold the work to your bench if you need to. Turn on the router and run it across the work, holding it firmly against the fence.

If you have numerous pieces, you don't need to measure each and every one. You can lay out one piece, stack up the parts and use a square to transfer the marks to the front edge of all the pieces. Marking both sides of the dado will prevent you from cutting on the wrong side of your layout line.

If you want to make an odd-width dado or stopped dado, you can easily add a second straightedge, or a block to limit the router's forward progress. You can also use a combination of bits. After routing a shallow dado, you can come back with a dovetail bit to make a housed-dovetail joint. The cuts will be centered because the distance from the mid-point of the cutter and the jig is constant.

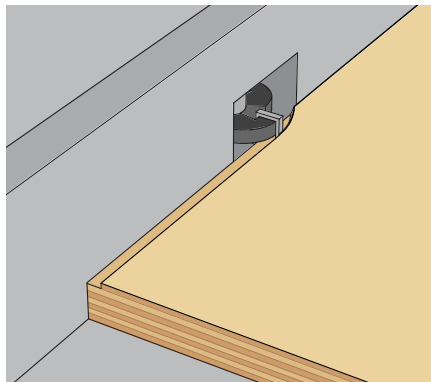
If you mill the wood just slightly oversize, a few strokes with a handplane allow you to sneak up on a perfect fit.

Plywood is a different matter. Most plywood varies in thickness within a sheet and that deviation is enough that you won't be able to match it. If you try to match a thin portion,

the rest of the shelf won't seat in the joint, and if you match a thick portion you will have a visible gap somewhere along the joint line.

Don't waste your money on router bits that claim to be undersized to match plywood thicknesses or believe someone who tells you the plywood is a metric size. What you really need to do is match the wavy edge on the plywood to the straight dado you cut.

If you're working with nominal  $\frac{3}{4}$ "-thick plywood, rout the dado with a  $\frac{5}{8}$ "-diameter bit. At the router table, set up a slot-cutting bit so the bottom of the bit is  $\frac{5}{8}$ " above the table and outside the fence the same distance as the depth of the dado. Run the end of the plywood under the bit, producing a small rabbet. Because you're capturing the plywood between the table and the bit, you'll produce a consistent thickness that will fit the way it ought to. **PW**



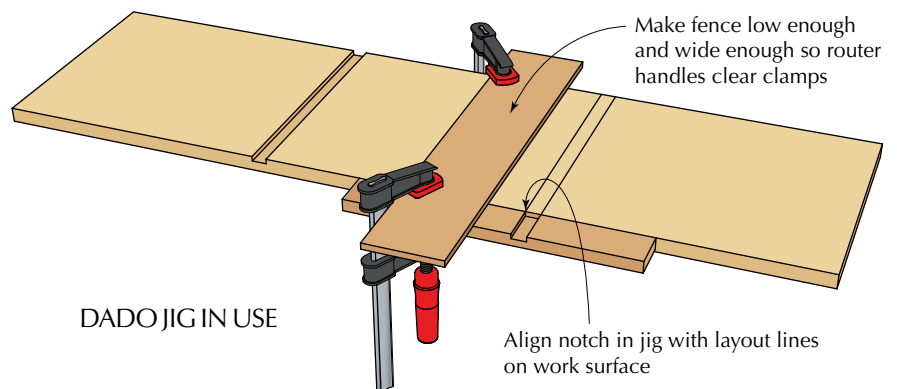
**Trap the rabbet.** Placing the work between the table and the cutter will ensure a tongue with consistent thickness, making a good fit.

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## The Other Part of the Equation

All that remains is to fit the piece that goes in the dado. The fit should be snug, taking a little effort to push it together by hand, but not so tight that you need to beat on it or crank down unreasonably with a clamp. How to achieve this fit depends largely on the material you're using. Solid wood is easy; plywood can be a nightmare.

Now is the time to get a good finicky measurement of the thickness, and a pair of dial calipers will deliver that easily. If you're planning your own solid wood, measure the width of the dado, and compare that to the thickness.



DADO JIG IN USE

# Hold Handwork Without a Vise

Get started with hand tools without spending a bundle on a bench or vise.

A major stumbling block on the road to enjoyable woodworking is “lackoftoolaphobia,” the fear of not being able to do something without the best possible tool available. Common among power-tool woodworkers, it can also strike the would-be Neanderthal.

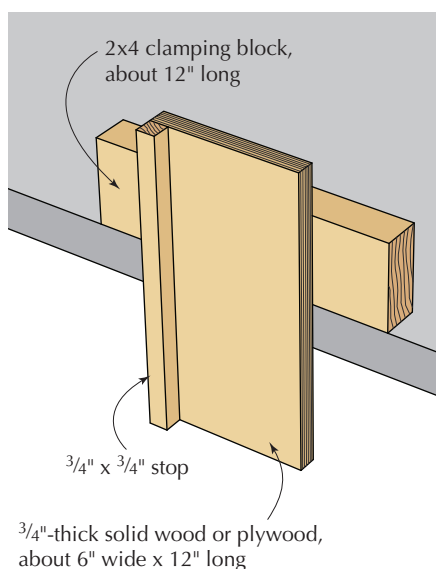
A basic skill such as sawing to a line can take you a long way in woodworking. If you practice, then cutting straight and where you want to isn't that demanding. If you can make cuts repeatedly and consistently, how hard could it be to hand-cut a dovetail or a tenon?

You can satisfy that curiosity without investing in a state-of-the-art bench equipped with a fancy vise. Some scraps of wood and a few clamps will get you started. You will need a saw, but you'll need some experience before you can tell the difference between a good saw and a bad one.

When you start to add hand-tool skills to your woodworking repertoire, the important



**Simple solution.** A vise is nice, but don't let the lack of one keep you from getting started with hand tools. This simple device will hold work vertically for cutting joints by hand.



VERTICAL BENCH HOOK

thing is to acquire skills before you accumulate tools. Then you can load up on the fancy stuff knowing why you absolutely need six or seven different saws, and you'll be able to use them appropriately.

In our November 2007 issue (#165), we wrote about a basic bench hook, a simple work-holding device for making cuts in wood held horizontally. This fixture is a bench hook turned 90° so you can hold work vertically to cut dovetails or tenons.

Start with a piece of 3/4"-thick solid wood or plywood, about 6" wide x 12" long, as a base. Glue a 3/4" x 3/4" strip along one long

edge. On the opposite side, glue and screw the thickest piece of wood you can find to the 6" x 12" piece. I used a piece of 2x4, about 12" long. Attach it so that a couple inches of the base extend beyond the long edge of the cross-piece.

When the glue has completely dried, clamp the cross-piece to the edge of a solid, flat surface with a clamp on each end. If you have a bench, use that. If not, use anything handy and solid, such as a machine table or even your kitchen counter.

Take your workpiece and with a third clamp, fix it to the jig with one edge tight

against the square edge and an inch or two sticking out at the top. Pick up your saw and get set to work.

### But First, Some Practice

Woodworkers are an interesting bunch. Lack of confidence will keep someone from attempting something, but as soon as that hurdle has been crossed, it is often assumed that one's first dovetails may as well be cut in a wide, expensive piece of mahogany that's part of a complex piece of furniture.

Spend some time getting used to how the saw feels in your hand, and what it feels like to make a cut. The best way to do this is to make a lot of cuts. Get some cheap wood and make as many cuts as you can in the end of a board. Don't bother marking lines, just cut.

As you get the hang of it, get out your square and see how you've done. The design of saws has evolved to make things easy, and if you can keep from thinking too much, the weight and balance of the saw, along with gravity, will take care of the hard part. You just need to learn to steer. When you're comfortable starting the saw and cutting straight across and straight down, cut off the end of your board and repeat the exercise by making angled cuts.

Do all of this by eye, and find a vertical angle that looks like a dovetail to you. Make as many cuts as you can, and after a few see if you can make them parallel to each other. Go halfway across the board angling to the left, then make more cuts that angle to the right on the other half.

When you've ruined the end of the board again, cut it off square and practice making cuts that angle front to back and are straight up and down. Keep your pencil and your layout tools away for now. The idea is to get comfortable with the process and figure out how to hold the saw, where to put your feet and how to move your arm.

### Now Worry About the Lines

The half-hour or so that you spent making cuts without lines will enable you to move to the next step with confidence. Now you can practice cutting to a line knowing how it feels to start and make a cut. The first part is making a good line. A pencil line shows where the line should be, but a knife line will actually help you make a better cut.

As it is with all other tools, you can spend a lot of money for a nice marking knife. Something that will make perfect sense, but for now

use a utility knife or an X-Acto knife. Run the point of the knife along the blade of your square or bevel gauge. A knife line can be hard to see; you can run a pencil along it to make it more visible.

If you can make the first saw stroke accurately, you are well on your way to being adept with the saw, and the knife line provides a channel for the saw teeth to ride in. Make a gentle stroke to keep from jumping out of that channel. The saw wants to cut straight, and it wants to be balanced vertically. If you force the process you will be in the way. If you just watch and let it happen, the saw will do most of the work. **PW**

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*Bob is a senior editor of this magazine, and the author of "Shop Drawings for Greene & Greene Furniture."*



**Three clamps and you're ready.** With the work clamped to the jig, and the jig clamped to your bench, you can practice making cuts with a handsaw.

## The Cheap Approach to Handsaws

If you are new to using a handsaw and want a decent tool on a budget, there are a couple reasonable options. The first is to purchase a Japanese Dozuki-style saw with a replaceable blade and a reinforced back. Expect to pay \$30-\$50. Stay away from the really cheap saws at the big box stores.

Japanese saws are usually sharp and functional when new, and they cut on the pull stroke. The teeth are exceptionally hard, a condition with both pluses and minuses. The good thing is that the saw will stay sharp. The bad things are that it is easy to snap off a tooth if you force the saw while making a cut, and that the teeth can be too hard to be sharpened.

We work with harder woods than the Japanese do, and while a Dozuki will outperform a Western-style saw at a comparable price, many woodworkers find pushing a Western saw preferable. A quality backsaw costs about as much as a good router or jigsaw does. It's a worthwhile investment, once you're adept enough to recognize the fine points.

There is a new alternative, the Veritas dovetail saw ([leevalley.com](http://leevalley.com)). At \$65, it nicely fills the gap between cheap saws that don't work at all, and the high-end saws. It also allows you to learn with the same technique you'll need if you decide to move up to a premium saw. —RL



**A good start.** Many woodworkers start with a Japanese Dozuki as their first joinery saw. It is sharp, functional and doesn't cost a fortune.



**A new alternative.** A good Western-style joinery saw can be expensive, but the new Veritas dovetail saw is a quality tool at a reasonable price.

# Table Saw Tenon Jig

With five pieces of wood and a clamp, you can make vertical cuts safely.

**M**ost magazine articles about jigs miss the point entirely. Jigs exist to make work easier, safer and more accurate. They shouldn't be complicated projects in and of themselves – they should be something simple you can put together quickly so you can get on with your work.

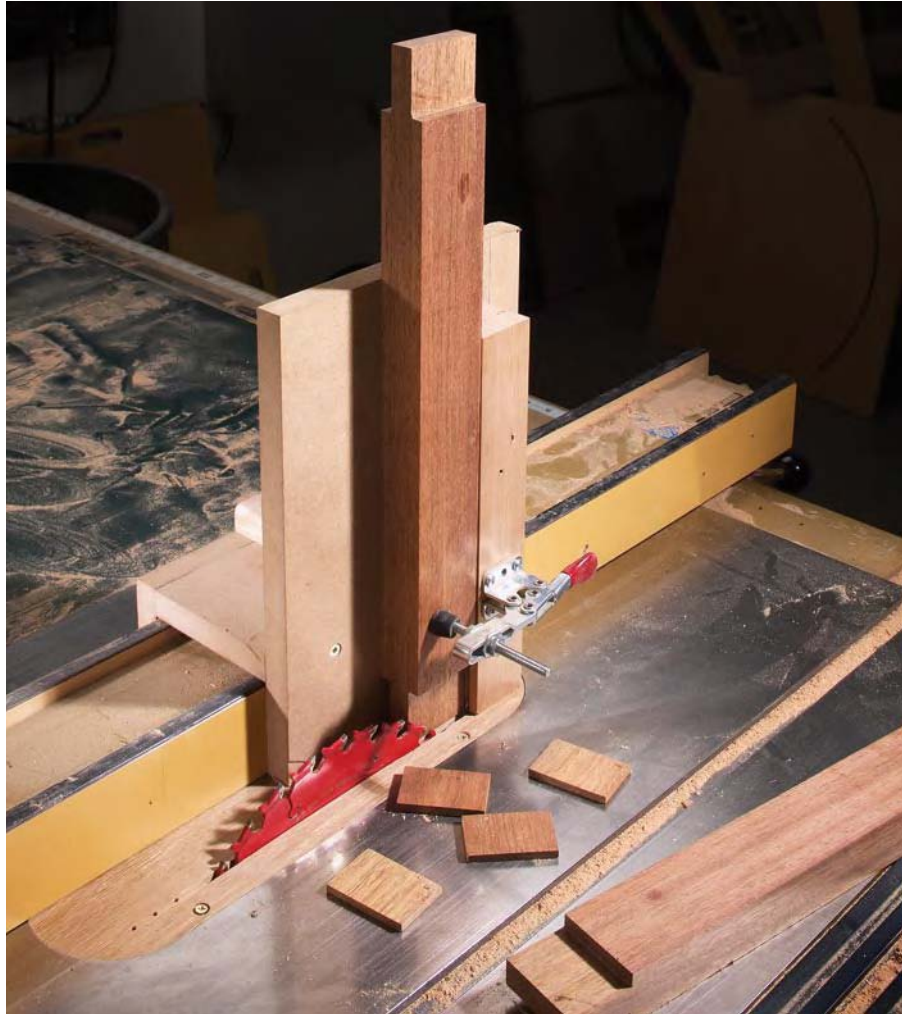
We admit to falling into this trap ourselves in the magazine's shop. The corners of our shop are home to jigs that were built for articles about jigs. We can't throw them out because the amount of hardware and time that went into making them has us convinced that they're valuable. The problem is, we almost never use them. They're too big, heavy and complicated to bother with.

Instead, we use a handful of truly useful jigs that we've put together quickly to meet a need. This new column is all about this kind of jig. We've made some promises to ourselves about the kind of jigs we're going to present. For starters, we're going to keep it simple. Most of the jigs we really like only do one thing, but they do it very well.

And we're going to focus as much on how to use the jigs as on how to make them. You won't see a cutting and hardware list that takes up more than a line or two, and we'll let you decide whether to get a sheet of Baltic-birch plywood or use whatever you have.

We will show you sound principles and simple techniques that we have used over and over again. If your hobby is making jigs, you may be disappointed; if you want to work smarter, we think you'll be pleased.

This table saw tenon jig is a good example of what we mean. There are only five wood parts to it, and you don't really need the hold-



**Nothing wrong with simple.** This tenoning jig performs one task, and does it safely and accurately. It costs little, and makes use of the existing table saw fence for fine adjustments.

down clamp. A “C” or “F” clamp will work just as well, but it will slow things down. You can make precise tenons as long as the maximum depth of cut of your saw, and there are probably a thousand variations to the jig.

This jig enables you to safely make a cut on the table saw with the workpiece held vertically as it moves over the blade. I've seen this done freehand on television and it always makes me cringe. The chances of the piece catching and kicking back are too big to risk.

## Smooth Moves Make Tight Joints

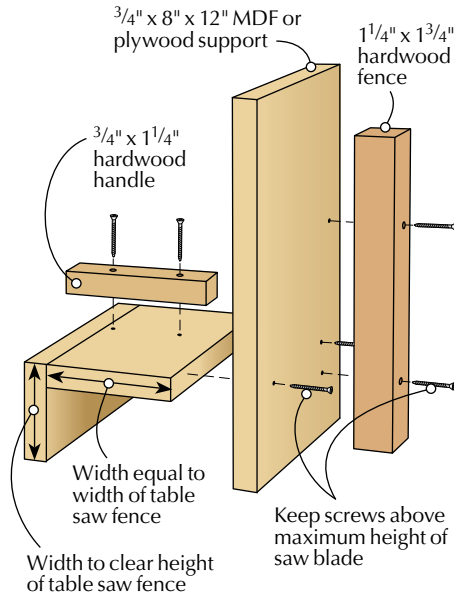
The key element in making this jig is to get it to slide nicely along your table saw's rip fence. It needs to be free to move, but not sloppy. This depends on the width of the horizontal piece that goes on top of the fence, between the two vertical pieces. If you screw the pieces together without gluing them, you'll be able to make some trial runs and get it just right.

Changing the width of the horizontal piece changes the fit, so if you're not sure of the exact width you need, start big and trim

a little off at a time. Trial and error is a good process, but it's wise to structure it so that an error doesn't ruin the part.

I made this jig from  $\frac{3}{4}$ "-thick MDF, but it could just as easily have been made from a decent piece of plywood. Stay with the  $\frac{3}{4}$ " thickness so there will be room to drive screws without splitting the wood.

After getting the width of the horizontal piece right, put glue on the two long edges, set it on top of the fence, then put the vertical pieces in position on either side. Use clamps to hold things in position and drill countersunk holes for #8 x  $1\frac{1}{2}$ " screws. The large vertical piece is  $\frac{3}{4}$ " x 8" x 12", but this can be varied to suit your needs. The smaller vertical piece that captures the jig on the fence is wide enough to reach from the top of the saw table to the top of the horizontal piece.



### EXPLODED VIEW

### Get on the Fence

When the screws are in place, remove the parts from the saw fence and clean up any excess glue on the fence, or the inside of the jig. After the glue has dried, rub some paraffin on the inside to help it slide smoothly.

The fence can be made from any hardwood. I used a  $1\frac{1}{4}$ "-thick by  $1\frac{3}{4}$ "-wide scrap of cherry. These dimensions are also arbitrary, but this size works well to mount and use the clamp on material between  $\frac{3}{4}$ " and  $1\frac{1}{4}$ " thick. It was 12" long originally, but the bottom became ragged from use, so I cut the end off and remounted it. No glue is used to hold the fence on, only screws so it can be replaced as needed.

Locate the clamp above the highest position of the saw blade, and screw it in place. Adjust the arm on the clamp to firmly hold the material. Add a handle to the jig to make it easier to push.



**Start low and move up.** Set the height of the saw blade to the shoulder line by sighting from the edge of the table. Make sure that one tooth is at top dead center, and make your initial setting slightly lower than you think you should. It will be easier to move up after a test cut than it would be to move down.

The advantage to a jig like this is that once it is set up, you can quickly make a bunch of identical tenons. Layout work and fussing is minimized by making a few extra pieces for test fitting. Setting up the cuts is an easy, two-step process.

Cut the tenon shoulders first, then clamp a part in the jig and move the fence next to the blade. A rip blade will make easier cuts than a combination blade, but either will work. Raise the blade until it is just below the shoulder line.



**Start wide and move in.** When you're satisfied with your height setting, set the fence. A zero-clearance insert on the saw will make it easier to set the blade to your layout line.

Setting the width is next; a zero-clearance insert on the saw makes this easier as well as safer in use. Slide the fence over until your layout line is on the edge of the kerf in the insert. Set up so that the scrap falls to the left. Make a test cut and examine the result.

If the blade is too low, there will be a ridge of material left between the cheek and shoulder of the tenon. If the blade is high, it will show as a nick in the shoulder line. With most saws the blade is likely to drop from backlash in the mechanism if you lower the blade. Starting with the blade low allows you to raise the blade a tiny bit at a time.

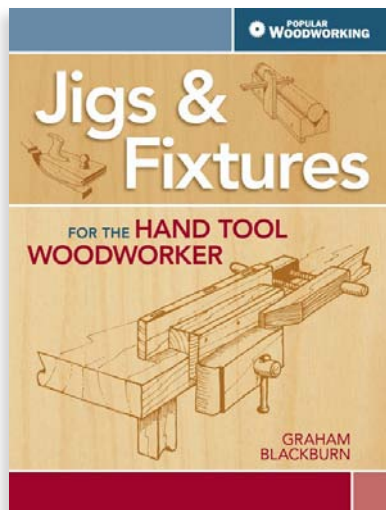
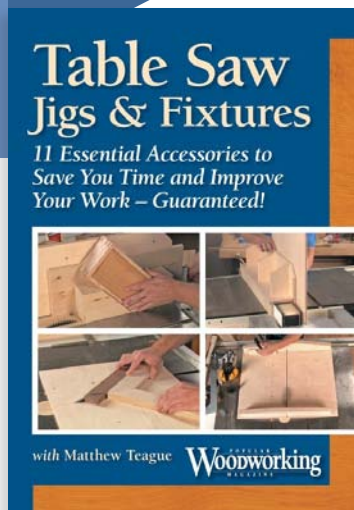
Adjustments in the thickness of the tenon are made by adjusting the rip fence. Start outside the layout line and make a cut on both cheeks. Measure the mortise with a pair of calipers, and check the thickness of the tenon with the outside jaws. When you think you're close, check the fit of your test tenon in a mortise and tweak as necessary. Make a final test cut in a new piece of stock. If you're just shaving a bit off, the blade can deflect, affecting the size of the tenon. **PW**

*Bob is the author of "Shop Drawings for Craftsman Furniture" (Cambium) in addition to other books. More information is available at his web site: [craftsmanplans.com](http://craftsmanplans.com). Contact him at 513-531-2690 x1327 or [robert.lang@fwpubs.com](mailto:robert.lang@fwpubs.com).*



**Don't trap the scrap.** Push the work through the blade in one smooth motion. My right hand is on the handle, and my left hand is well above the clamp and saw blade. Because the cut is made on the side away from the fence, the scraps fall harmlessly out of the way.

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