

Woodsmith®

Bonus: 6 Band Saw Project Plans!

Starts On Page 80

Band Saw Essentials™

Tips, Techniques & Jigs

Hacks, Tips & Add-Ons
for Mastering Your Band Saw

Upgrade Accessories
that Improve Your Saws' Functionality

Practical Projects
to Make Your Band Saw
an Essential Shop Tool



Band Saw Essentials

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Using hand or power tools improperly can result in serious injury or death. Do not operate any tool until you read the manual and understand how to operate the tool safely. Always use all appropriate safety equipment as well as the guards that come with your tools and equipment and read the manuals that accompany them. In some of the illustrations in this book, the guards and safety equipment have been removed only to provide a better view of the operation. Do not attempt any procedure without using all appropriate safety equipment or without ensuring that all guards are in place. Cruz Bay Publishing, Inc. assumes no responsibility for any injury, damage, or loss suffered as a result of your use of the material, plans, or illustrations contained in this book.

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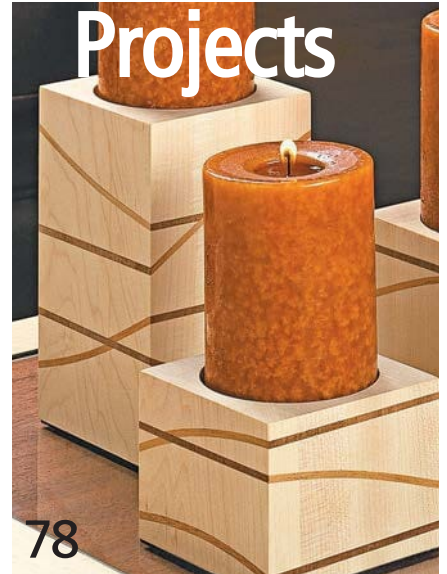
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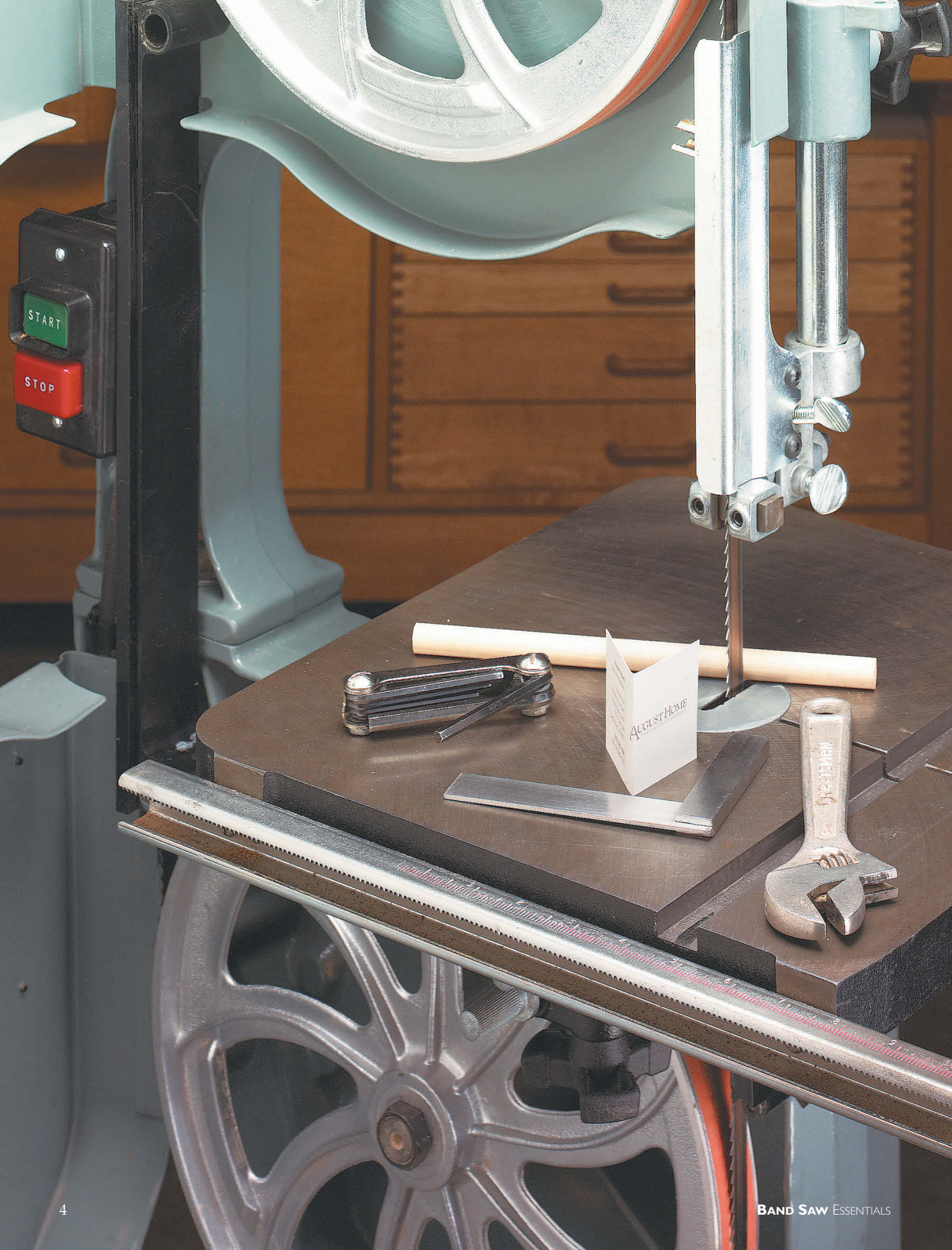
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Band Saw Setup

Here we take the first steps toward mastering the band saw, from choosing the right one for your shop, to tuning and blades, and even how to make a basic, shop-made table and fence.

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shopping for a Band Saw

Saw Selection. Band saws are available in a variety of sizes to fill most any need in the woodworking shop.



A band saw can be one of the most versatile tools in the workshop. From cutting joinery and curves to ripping and resawing, it can see a lot of use.

With all this practicality, you may be considering adding a band saw to your shop. As you can see on the left, there are many options available, so it can be difficult to make the right choice. I'll point out a few things to consider.

PRIMARY USES

The first thing you need to consider when shopping for a band saw is how it will be used. What cutting tasks will you be expecting to perform with the saw?

Does your work involve ripping stock to width or resawing thin veneer from thicker stock, as in the main photo? Are you a modelmaker that works with smaller workpieces? Or are you looking for a mid-range band saw that can handle a wide variety of common tasks in the workshop?

POWERMATIC
La Vergne, TN

MODEL	PM1500	AMPS	12	NO. OF SLOTS
HP	3	1/2	96	6
PHASE	1	RPM	1725	15/16
VOLTS	220	CLASS	A	W. O. S. S. B. G. E. S.

WARNING: MOTOR MUST BE PROPERLY COOLED TO PREVENT EXCESSIVE TEMPERATURES

WoodsmithSpecials.com

SIZE IT UP. Benchtop saws don't take up much space. But 14" saws and larger can take up considerable floor real estate. With any band saw, it's important to also take into account room for the largest workpiece you're likely to cut. You'll need room to maneuver.

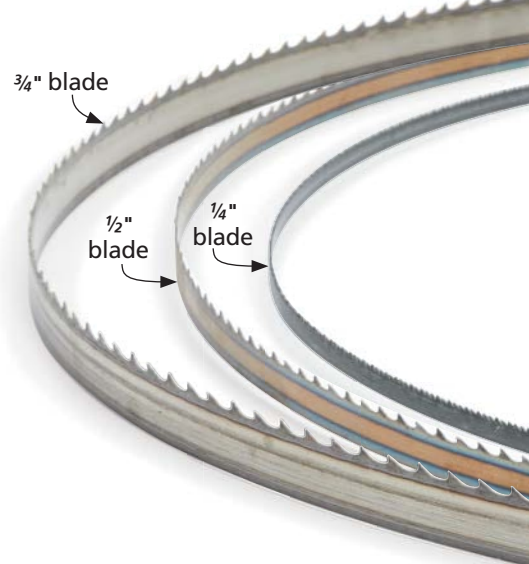
WHAT'S IN A NAME?

6" riser block

WHAT THE NUMBERS MEAN. When you look at the sales information for band saws, you'll see labels like 14" band saw or 18" band saw. You might be led to believe that this number is the maximum width of cut or throat depth from the blade to the frame. And you'd be close to being right.

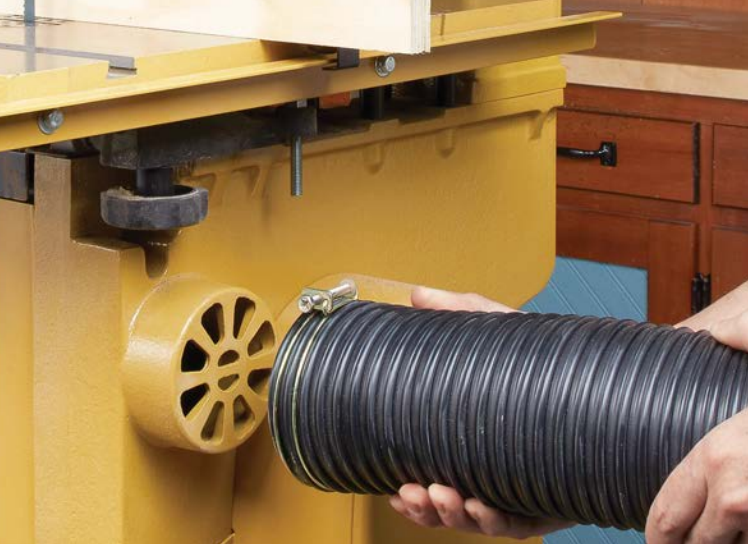
RESAW HEIGHT. If you like to resaw cap thick stock into thinner workpieces, you'll also be concerned with the overall resaw height. This is the distance from the table to the upper blade guides at their highest setting.

BAND SAW CONSTRUCTION. I mentioned two types of frame construction you'll find on band saws: Cast iron and tubular steel (refer to the middle right photos). For decades, 14" band saws were made with a cast iron frame. Over the years,



manufacturers have migrated to lighter steel-frame saws. The ease of manufacturing and costs of shipping were a driving factor. As a result, saws much larger than 14" are more readily available today than ever before.

BLADE CHOICES. The type of work you want to do with your band saw plays into the types of blades you can use (upper right photo). Most saws can accept 1/8"-wide blades for making intricate cuts. But every saw has a maximum blade width it can handle. It helps to make sure the blades that fit your saw are easy to find.



Don't Forget the Dust. Sawdust can get packed between the blade and tires. Dust collection at the underside of the table is a minimum requirement. Another port near the bottom is a bonus.

Table. The mass of a cast iron table (left) is beneficial for reducing vibration which results in smoother cuts. Smaller saws may have a cast aluminum or stamped steel table (right).

OTHER FEATURE CONSIDERATIONS

In addition to the things I've already mentioned, there are some other features you can look for in a band saw. Some of these you may find more important than others but are worth mentioning.

DUST COLLECTION. The blades and wheels on a band saw are shrouded by an enclosure for safety. But this creates areas where sawdust can build up on the tires and blade.

It's important to have dust collection ports on the saw. At a minimum, there should be a hose attachment near the blade on the underside of the table, as in the upper left photo. This grabs the sawdust at its source. Some saws also include a dust port near the bottom of the lower wheel, as you can see in the upper right photo on the next page.

ALUMINUM OR STEEL. As you're shopping for saws, you may notice that some benchtop saws feature a cast aluminum or stamped steel table. Larger saws usually have a cast iron table. Cast iron has the advantage of adding mass to help reduce vibration, as shown in the upper right photos. Benchtop saws can be securely mounted or clamped to a benchtop to reduce vibration.

REPLACEABLE INSERTS. While we're on the subject of tables, you'll want to make sure it's easy to purchase replacement inserts (lower left photo). These are usually plastic or aluminum and can get chewed up over time, which is normal. This creates a larger opening around the blade that can trap cutoffs. You can usually purchase inserts directly from the manufacturer or retailer.

BAND SAW FENCE. As I mentioned earlier, a band saw is ideal for resawing thick lumber into thinner stock or veneer. And ripping stock to width is a safer and more efficient operation on a band saw than it is on a table saw.

For both ripping and resawing, a fence is one feature you'll want to consider. A band saw fence has some unique requirements. First, the angle of the fence relative to the blade should be adjustable. This way, the fence can be set to match the drift angle of the blade. It's also a benefit to have a fence with a tall face for resawing.

Not all saws are supplied with a fence, so you'll want to know this up front. If that's the case, purchasing a third-party fence is always an option (box on next page). As a matter of fact, after-market fences may be of better quality with more features than a stock fence.

BLADE TENSIONING. I briefly mentioned band saw blades and how the size of the saw determines the maximum width of blade you can use. Regardless of the blade, it's important that it be tensioned properly during use.

Band saws have a mechanism (usually a knob) that effectively changes the distance between the wheels to change the amount of tension on the blade. When properly tensioned, there can be as much as 30,000psi of tension on a blade. This creates a lot of strain on the wheels' bearing and shaft assemblies.

Rather than leave the blade tensioned when not in use, some manufacturers have incorporated a tension-release



Inserts. Replaceable inserts create zero-clearance support around the blade for cleaner, safer cuts.



Fence. A quality band saw fence is an important consideration, particularly if you do a lot of ripping or resawing. Aftermarket fences are a good option.



Tensioner. A quick turn of the blade tension release lever makes it easy to relieve the tension on the blade after use. This mechanism can be found on newer saws and is also available as an aftermarket item for older saws.

Brakes. Just like your car or truck, pushing on a pedal engages a braking mechanism to slow the spinning wheels and blade on some band saws.

mechanism into their saws (photo, above left). After using your saw, all it takes is a quick pull on the lever to relax the blade and release the tension.

PUT THE BRAKES ON. If you've ever used a band saw, you may have noticed that the wheels and blade can keep spinning for several seconds to minutes after the power is switched off. This is due to the momentum of the finely balanced wheels. The problem is, it's unsafe. The blade, as

long as it's still moving, has the potential to keep cutting. This is particularly a concern on larger saws with heavier wheels.

Many saws incorporate one of two types of brake mechanism. One type is built into the motor. When the power is shut off, an electromagnet stops the rotation of the shaft.

A mechanical brake is operated much like your automobile. This type of brake is shown in the upper right photo. When you step on a pedal, pads engage a

braking plate to stop the wheel.

BUDGET. Of course, your hunt for a new band saw shouldn't start without consideration of your budget. Benchtop saws can be purchased for around \$100. 14" band saws run from \$500 to \$1,000 or more. From there, the price reaches into the mid \$1,500s and higher. If a new saw isn't in your budget, consider upgrading a used band saw with the products shown below.

Upgrades: Soup Up an Old Saw

If a new band saw isn't in your budget, there are some easy ways to add new life to an older used saw. The products shown here are easy to find at retailers that specialize in woodworking supplies. These upgrades and accessories are easy to install, and you're sure to see better results. Refer to Sources on page 99.



Blocks. Phenolic *Cool Blocks* from *Olson* replace older metal or plastic guide blocks.



Replaceable Tires. Urethane tires replace worn, cracked tires that have become hard and caked with sawdust.



Guide Bearings. Replace factory guide bearings with these high-quality units from *Carter*. You'll get more accurate cuts.



Upgraded Fence. After-market fences like this *Kreg Precision Band Saw Fence* are an easy upgrade that pays off with more accurate ripping and resawing cuts.

Tune-Up Techniques

Slice thin veneers, make intricate scroll cuts, even cut accurate joints — with just one tool. You can turn your band saw into an all-purpose, precision workhorse. All you need are some simple tools and a few minutes of time.



Accurate Cuts. You can be making precise cuts like this on your band saw. We'll show you how.

The first few adjustments only need to be made occasionally, but they're still very important. So, how do you know when to do it? Personally, I like to give my saw a good once over every time I make a blade change or every few months, depending on how much I've been using it.

SAFETY FIRST. It goes without saying that before you check or adjust anything on the band saw always unplug it. Never rely on the "on/off" switch for protection. Now is also a good time for you to take the blade off the wheels.

LOOK IT OVER. With the covers open it's a good idea to take a few minutes to look for any cracks in the frame, loose bolts, or other structural problems.

Before moving on you might also want to clean out any sawdust build up. This can interfere with the function of the blade and wheels of the saw.

TIRES & WHEELS

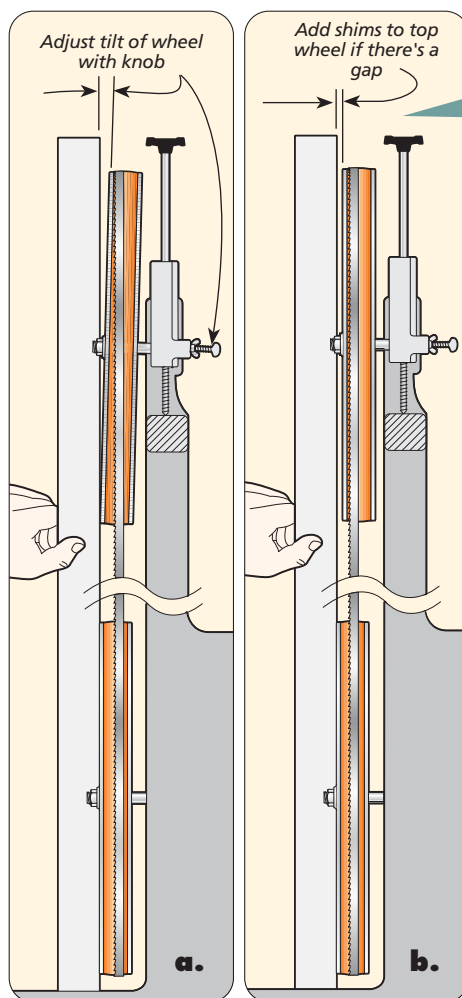
Once the blade is off the next thing to do is to clean the tires. You can easily do this by rotating the wheels and holding an old toothbrush against the tire to clean off any accumulated sawdust or debris. This gives you the chance to inspect the tires for cracks and wear. Worn tires make it difficult to keep the blade tracking on the wheels (see photo in margin at right).

If your tire is bad, don't hesitate to replace it. Whenever you replace one of the tires it's best to replace the other at the same time.

WHEEL BALANCE. It's easy to overlook the importance of having the wheels balanced and properly aligned. Out of balance wheels will cause the blade to wander. This will make it difficult for you to make consistently straight and accurate cuts.

There's a simple way to determine the balance of the wheels. Just mark a spot on one of the wheels and then give it a good spin. Note the position that it stops and then spin it several more times. If the mark on the wheel continues to stop in the same place your wheel is out of balance.

Rebalancing your wheels can be kind of tricky. Refer to your manufacturer's recommendation for rebalancing the wheels, or take it to someone who can do this for you. If the wheel is significantly



Wheel Alignment. Adjust the wheels either by tilting the top wheel (detail 'a') or by repositioning one of the wheels (detail 'b').

out of balance, you may want to consider replacing it with a new one.

WHEEL ALIGNMENT. The other thing you'll want to check is the alignment of one wheel in relation to the other. Before you do this, you'll need to put the blade back on and tension it properly.

You'll find that blade tension affects the wheel alignment and making a change to one thing makes a change to all the others.

Checking the alignment of the wheels is easy but you may need to remove the table. Place a straightedge across the top and bottom of both wheels (photo above). If the straightedge touches both edges at the same time, the wheels are in proper alignment (or co-planar).

You won't always find perfect alignment of the wheels when you check them. But you'll want to see the wheel rims within about $\frac{1}{16}$ " of the straightedge.



Vertical Wheel Alignment. A long straightedge placed across the top and bottom wheel makes it easy to check the alignment of the wheels.

If the straightedge doesn't touch both edges, tilt the top wheel by adjusting the tracking knob until the straightedge just barely touches the lower wheel (see detail 'a' above).

And if the wheels are still not aligned, you may need to use washers or another type of shim to reposition one of the wheels (see detail 'b').



Tire Wear. The ridge on this tire was caused by setting the blade tension too high.

blade & Guides

Once the tires and wheels are in good shape, you can move on to a few other adjustments that you'll need to make more often.

BLADE TENSION & TRACKING

I start by taking a look at the blade tension and tracking. Tension refers to the tightness of the blade on the saw. Tracking is the path the blade takes on the wheels. These two settings can be adjusted by a pair of knobs on the back of the saw, as shown in the photo below.

To keep the band saw cutting straight and true, the flexible blade needs to be pulled tight. The tension knob does this by moving the wheels farther apart. Different width blades require different tensions.

When there's not enough tension on the blade it can wander and leave a "cupped" cut in the workpiece.

You may have heard that increasing the tension is an easy way to solve your cutting problems. But doing this puts a lot of stress on the frame of the saw and will shorten the life of the wheel bearings and blades.

Most saws have a tension gauge as a reference for tensioning different blade sizes, (see photo below). I've found that it's not very accurate, but it will get you close.

To get the tension set correctly, I do a simple push test. First, raise the blade guide to its highest position. Now push on the side of the blade. Narrow blades (less than $\frac{1}{2}$ ") will deflect about $\frac{3}{8}$ " when properly tensioned. The wider blades should deflect no more than $\frac{1}{4}$ ".

BLADE TRACKING. If your wheels are properly aligned and balanced and you have the right tension on the blade, getting the blade to track properly should only take a minor adjustment.



Safety Tip. To prevent catching your fingers in the wheel, use a short dowel to spin the wheel by hand with the saw unplugged.

What you're looking for is to have the blade run near the center of the tire.

To check the tracking, unplug the saw and open the door. Then with a short piece of dowel, rotate the upper wheel several times, as illustrated in the photo above. If needed, turn the tracking knob or screw until the blade stays in the middle of the wheel as it is turned.

Remember to take it slow when adjusting the tracking. If you turn the screw too much, the blade can run off the edge of the wheel and you'll need to start over.

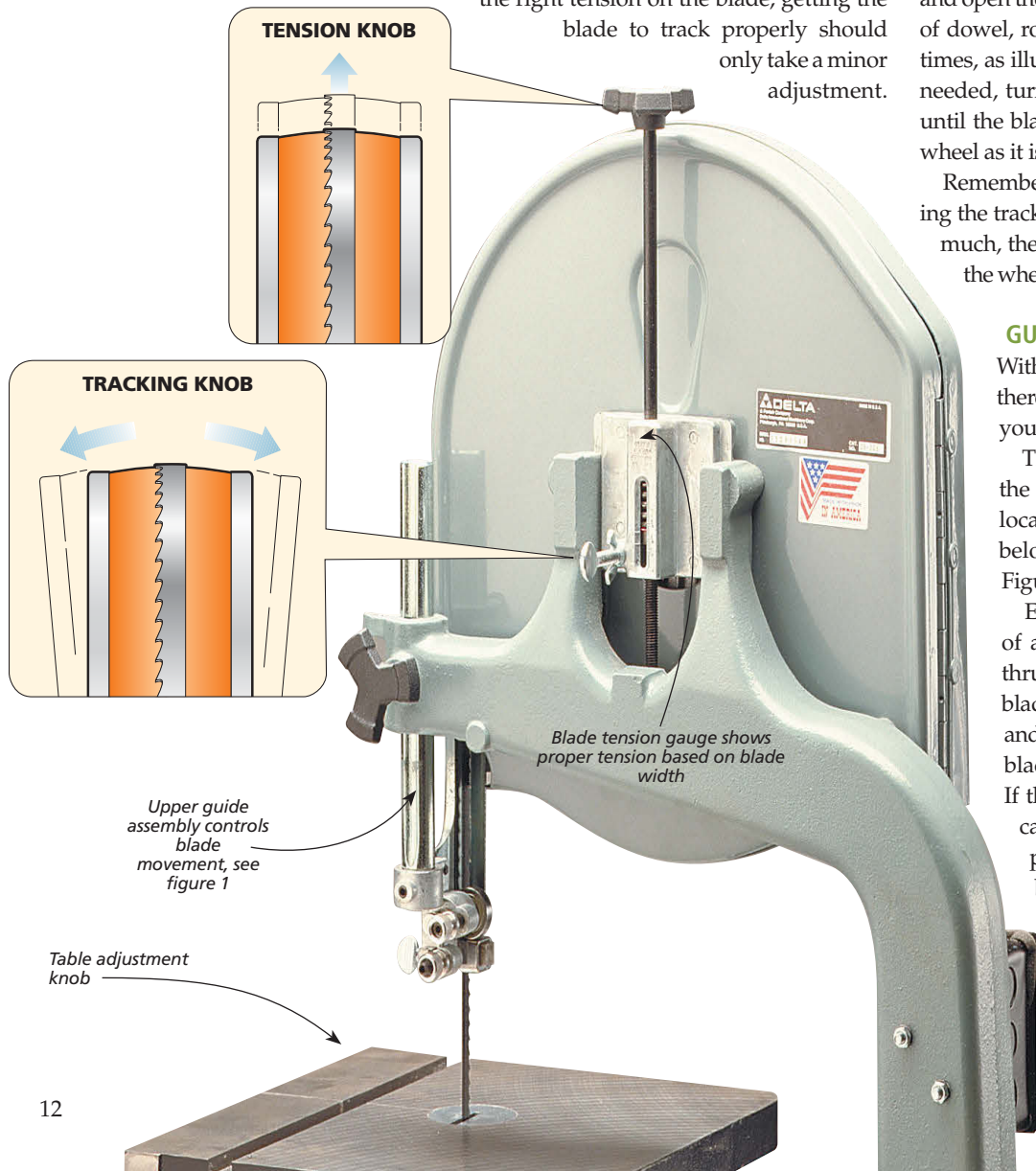
GUIDES & THRUST BEARINGS

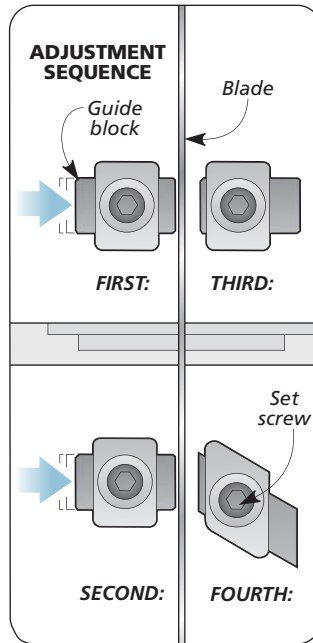
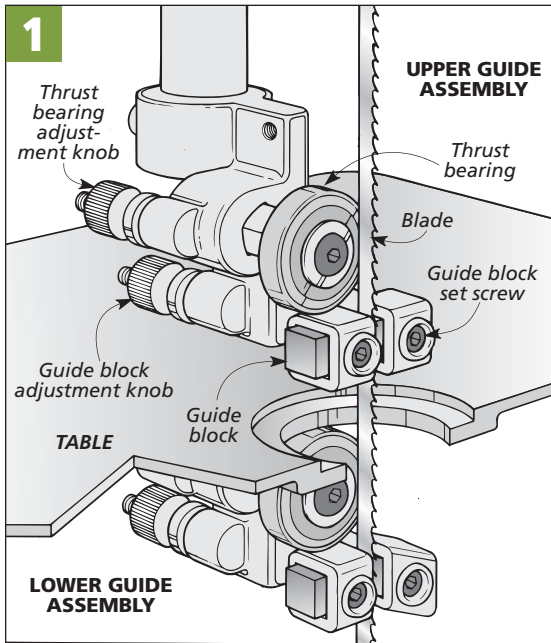
With the tension and tracking set, there are just a few steps left before you're ready to go.

The next things to check are the two guide assemblies. One is located above the table and one below the table, as illustrated in Figure 1.

Each guide assembly consists of a pair of guide blocks and a thrust bearing located behind the blade. The purpose of the guides and bearings is to keep the flexible blade running straight and true. If they're not set right, the blade can end up twisting and getting pushed off the wheel, or even break entirely.

You'll need to make two different adjustments. One for the guide assembly and the second to each of the guide blocks.





Guide Blocks. A business card helps position the guide blocks. Adjust the blocks on one side and then the other (sequence at left).



Thrust Bearing. Use a business card folded in half to set the position of the thrust bearing.

GUIDE ASSEMBLY. Before adjusting the guide assembly, it's a good idea to loosen the guide blocks and back them away from the blade. Don't take them all the way out because you will need them as a reference for the next adjustment.

Next, loosen the thumbscrew and slowly move the guide blocks either forward or backward on the blade, as shown in Figure 2.

The guide blocks should be positioned just behind the gullets on the blade, as illustrated in Figure 2a. After setting the upper guide assembly, set the guide assembly below the table.

GUIDE BLOCKS. With the guide assemblies set, you can adjust the guide blocks. As I mentioned before, they straddle the blade and keep it on track. They should be positioned close to, but not touching, the blade.

I use a business card to set the spacing, as shown in the upper right photo. The

drawing above shows the sequence for setting the blocks. Here I set the blocks on one side of the blade then the other to prevent the blade from being misaligned.

Just place the card between the blade and the guide block and move the guide block until it rests snug against the card. Then just tighten the adjustment screw.

Once all four adjustments have been made, you'll want to turn the wheels (by hand) a couple of times to be sure that there is adequate clearance for the blade.

THRUST BEARINGS. There's one more part to be adjusted on the guide assemblies — the thrust bearing. It supports the blade from the back when cutting. If the thrust bearing is not supported from the back, the blade won't give you square cuts and may even get pushed off the wheels.

Use your business card again, folding it in half and placing it between the back of the blade and the thrust bearing, as shown in the lower photo above.

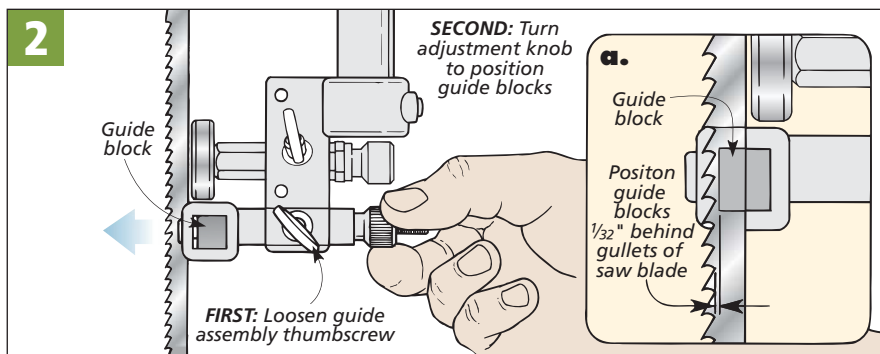
Position the thrust bearing against the card and tighten the thumbscrew to hold the bearing in place.

SQUARE UP THE TABLE

Once the guides and thrust bearings are set, you can make the final adjustment. That is to check that the table is square to the blade. If it's not, your cuts won't be perpendicular.

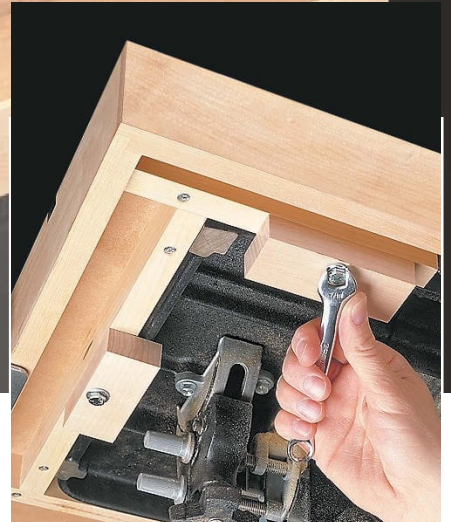
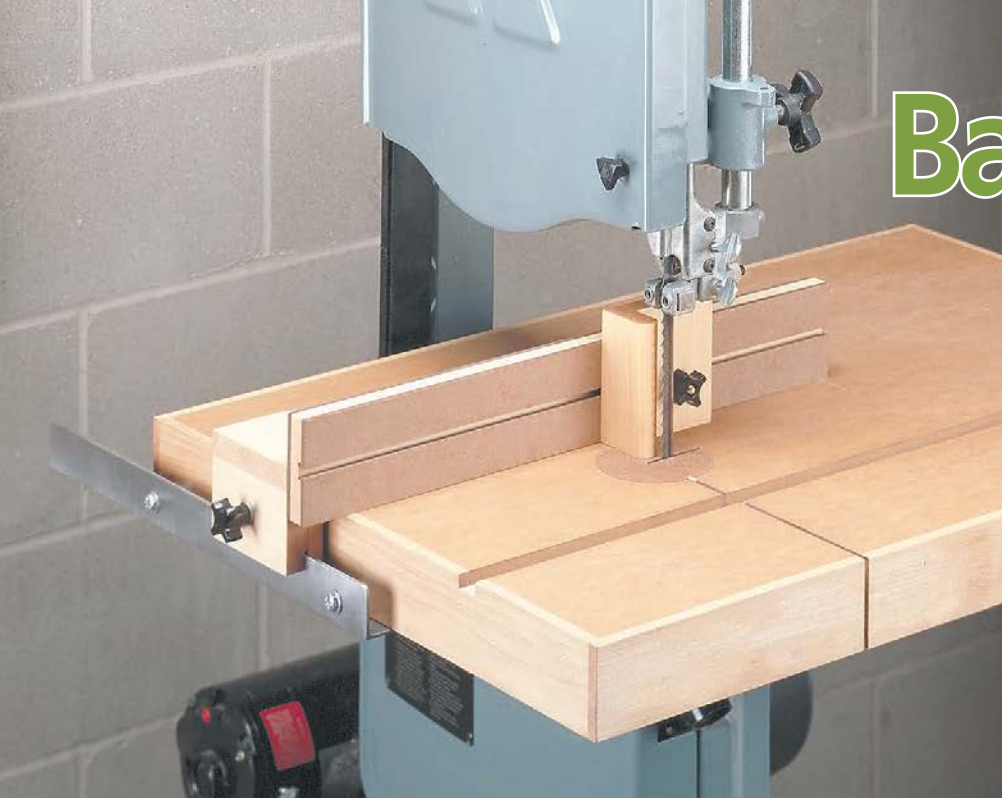
Just raise the upper guide assembly and place a small square on the table against the blade, as you can see in the photo below. If the table isn't square, loosen the table adjustment knob and tilt the table into position. Once you've reached square, retighten the knob.

It's all too easy to put off these simple adjustments, but it only takes few minutes to run through them. With your saw tuned, you'll turn to it more often and get better results in your woodworking projects.



Square the Table. Using a small square, make sure the blade is 90° to the table.

Band Saw Upgrade



Make your band saw even more versatile by building this large, auxiliary table and a precision fence.

I only had one regret after building this auxiliary table and fence for my band saw — I wish I'd done it sooner. If you take a look at the photo above, it's easy to see why.

LARGE WORKSURFACE. First of all, the table creates a large worksurface that's about three times larger than the cast iron table on my band saw. This provides plenty of extra support when making a curved cut. Plus I can rip (or resaw) a long board without having it tip off the back edge of the saw.

The table is designed to mount to the cast iron table on the band saw. By looking

underneath the band saw as in the inset photo above, you can see how this works.

To keep the auxiliary table from shifting around, a simple system of wood cleats surrounds the cast iron table. Tightening a set of small wood blocks against the cleats holds the auxiliary table securely in place.

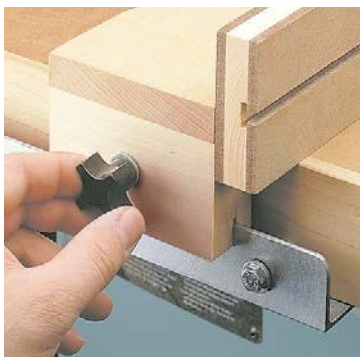
ADJUSTABLE FENCE. As much as I like the large table, the thing that's made an even more significant improvement to my band saw is an adjustable fence. It provides a quick way to produce a straight, accurate cut, and I don't need to fiddle with clamps to lock the fence in place.

The fence rides on a metal rail that attaches to the front of the table. To position the fence, simply slide it along the rail until it's the desired distance from the band saw blade. Then as you can see in photo 'A' below, turning a single knob allows you to lock the fence securely on the rail.

This fence also solves another nagging problem that often crops up when working on a band saw. That's the tendency of the blade to "pull" the workpiece at an angle during a cut (which is called drift). To compensate for this, the metal rail can be adjusted so the fence matches the angle of drift.

STOP/PIVOT BLOCK. Just one more note about the fence. There's a T-shaped slot on the front of the fence that accepts a simple accessory. As you can see in the photos at left, it serves two different purposes.

First, it acts as a stop which comes in handy when cutting tenons. Second, the rounded edge of the block can be used as a pivot point when resawing. (For more information on resawing with a pivot block, refer to page 63.)



A. Fence Clamp. The band saw fence has a built-in clamp that's locked in place with a plastic knob.

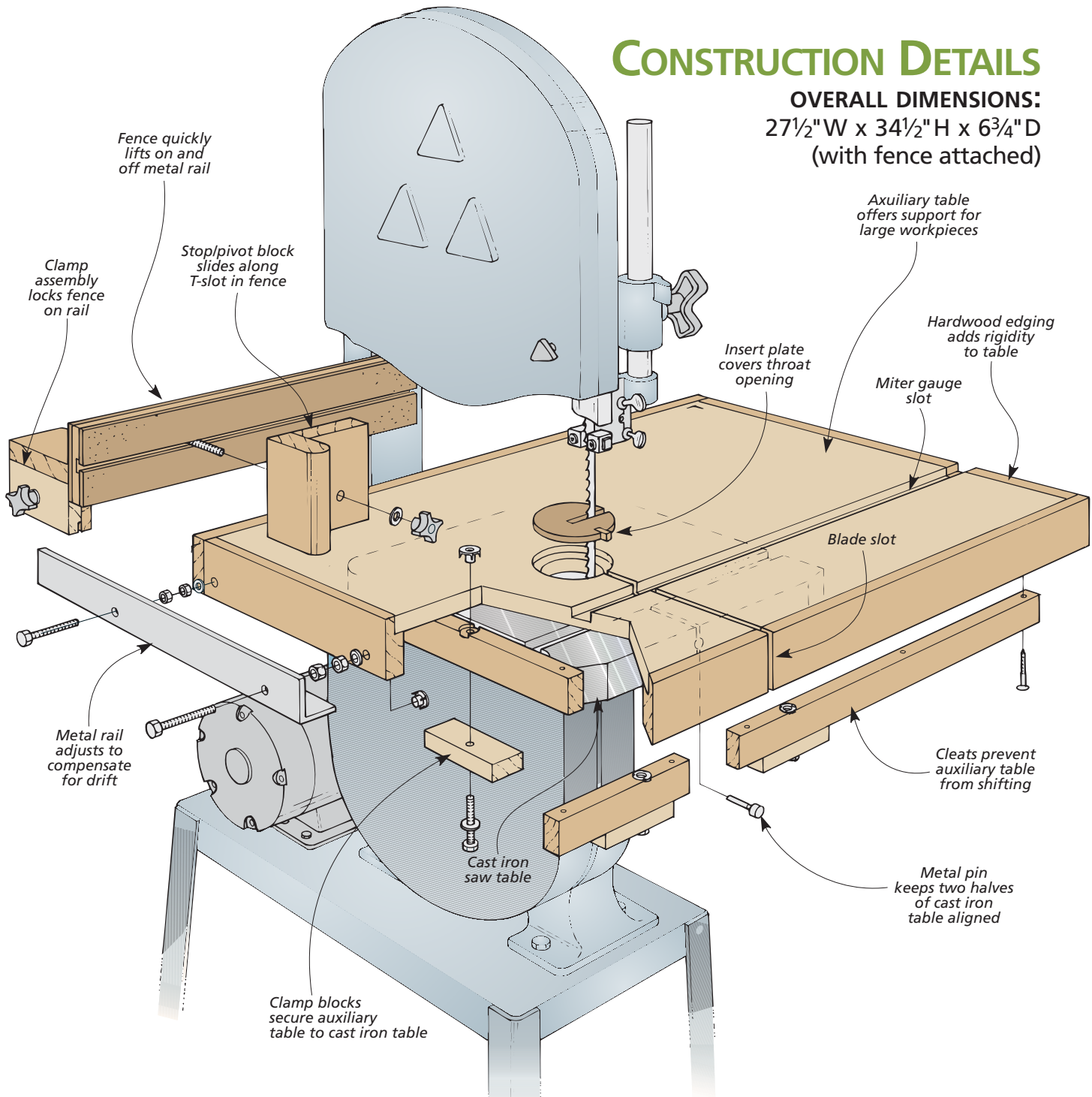


B. Stop/Pivot Block. An adjustable block does double duty as a stop (left) and a pivot block when resawing (right). Tightening a knob clamps the block on the fence.



CONSTRUCTION DETAILS

OVERALL DIMENSIONS:
27½"W x 34½"H x 6¾"D
(with fence attached)



MATERIALS, SUPPLIES & CUTTING DIAGRAM

Auxiliary Table

A	Top (1)	22¾ x 31¼ - ¾ MDF
B	Front/Back Edging (2)	¾ x 2½ - 22¾
C	Side Edging (2)	¾ x 2½ - 32
D	Long Cleats (2)	¾ x 1¼ - 30½
E	Short Cleats (2)	¾ x 1¼ - 14
F	Clamp Blocks (5)	¾ x 1½ - 4
G	Insert Plate (1)	3½ x 3½ - ¼ Hdbd
H	Alignment Key (1)	⅛ x ¼ - ¾

Adjustable Fence

I	Core Piece (1)	½ x 3 - 20
J	Faces (2)	3 x 20 - ¼ Hdbd
K	Fence Support (1)	1½ x 4 - 10
L	Rear Jaw (1)	½ x 2¾ - 4
M	Front Jaw (1)	¾ x 2¾ - 4
N	Support Block (1)	¾ x 3 - 4
O	Stop/Pivot Block (1)	¾ x 2 - 4
		• (5) ¼" x 1¾" Hex Bolts
		• (2) ¼" x 1½" Machine Bolts

- (2) ¼" Lock Nuts
- (2) ¼" Hex Nuts
- (9) ⅝" Washers
- (12) #8 x 1¾" Fh Woodscrews
- (2) #8 x 1¼" Fh Woodscrews
- (1) ¼" x 1½" Toilet Bolt
- (1) ¼" Star Knob w/thru hole
- (1) ¼" Star Knob w/¼" stud
- (8) ¼" T-Nuts (w/prongs)
- (1) 1½" x 1½" - 17¾" Angle Iron (⅛" thick)

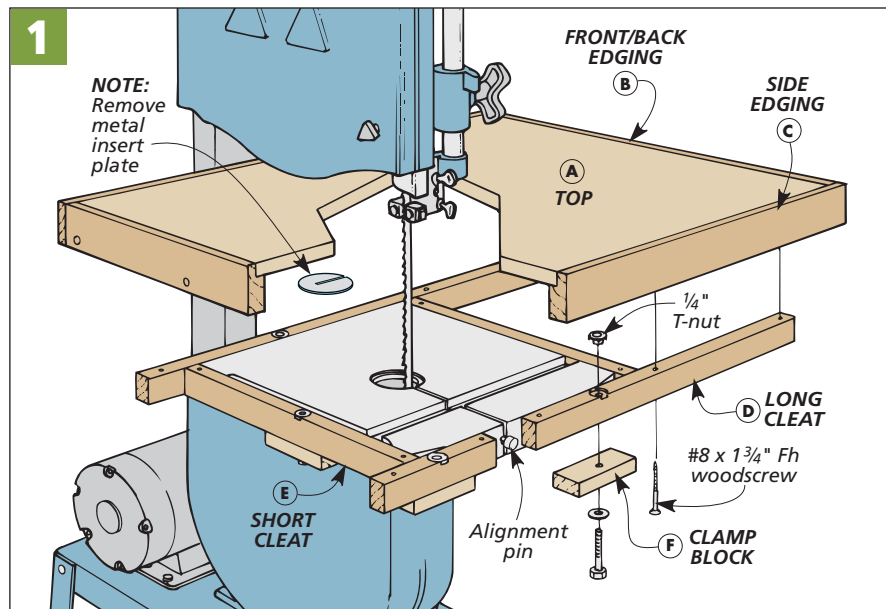
auxiliary Table

There were a couple of challenges when it came to designing the table. First, it had to be rigid enough to support a heavy workpiece. At the same time, I wanted a simple way to attach it securely to the band saw.

To get an overview of the solution, take a look at Figure 1. For starters, the table is made of $\frac{3}{4}$ " medium-density fiberboard (MDF) that's surrounded by wide strips of hardwood. Attached to the bottom of the table are narrow cleats that fit over the cast iron table like the lid on a trash can. Mounting a set of small blocks to the cleats holds the table in place.

With the table in this position, it doesn't butt up against the column of the band saw. Instead, the table sits about 1" away as shown in Figure 2. This space provides plenty of clearance to tilt the table.

TABLE SIZE. The first step in building the table is to determine its overall size. Of course, it should be big enough to



provide support for a large workpiece, but don't get carried away. If the table is too wide (or long), it will be a hassle to work around.

Design Note: The table shown here is $23\frac{1}{2}$ " wide by 32" long. It's sized for a 14" band saw (the distance from the band saw column to the blade). Depending on your band saw, you may want to modify the size.

START WITH THE TOP. With that in mind, you're ready to get started on the top (A) of the table. As I mentioned, it's made

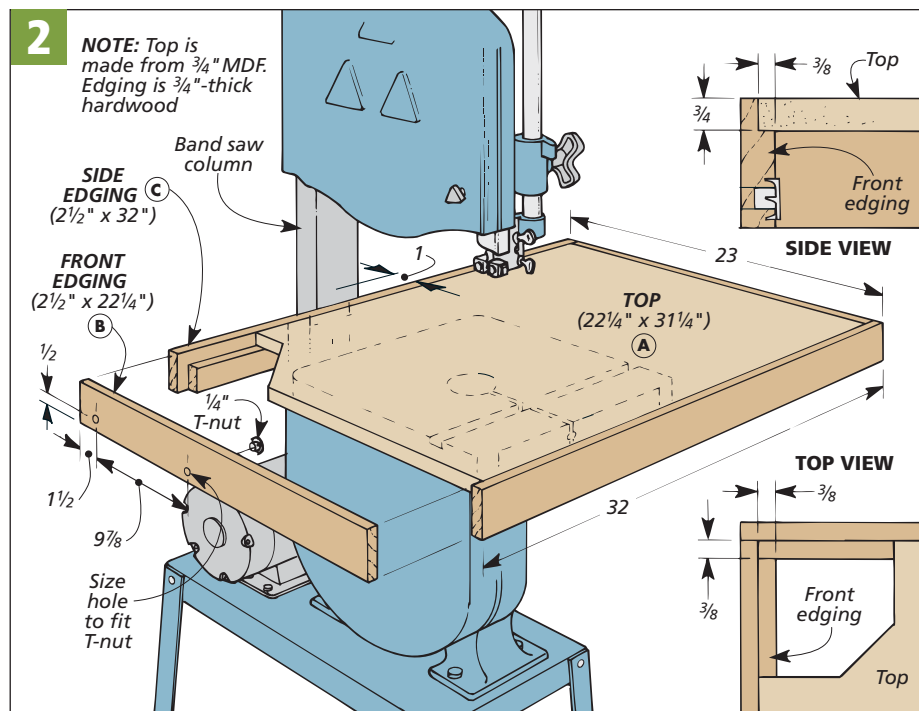
from $\frac{3}{4}$ " MDF. This is a flat, stable material that won't warp or twist, so it's ideal for the top.

If you look at the Side View in Figure 2, you'll notice the top fits into rabbets in the edging strips. The rabbets are $\frac{3}{8}$ " wide, so you'll want to cut the top $\frac{3}{4}$ " smaller than the overall size of the table in width and length (twice the width of the rabbets).

ADD THE EDGING. The next step is to add the front/back (B) and side edging (C) strips. These are pieces of $\frac{3}{4}$ "-thick hardwood that cover the exposed edges of the top. Plus, they add rigidity to the table. You can go ahead and cut the rabbets in the top edge of each strip to hold the top. Then, to allow the edging strips to fit together, you'll also need to cut a rabbet in both ends of each piece as shown in the Top View in Figure 2.

At this point, you're almost ready to attach the edging. But first, to accept a pair of T-nuts that are part of the fence system, it's easiest to drill two holes in the strip of edging that attaches to the front of the table.

CLEATS. After tapping in the T-nuts and gluing on the edging, you can turn your attention to the cleats. The goal is to get the cleats to fit snugly around all four sides of the cast iron table. Figure 3 shows an easy way to do this. Just turn the auxiliary table upside down and use the band saw's cast iron metal table as a guide to position the cleats.

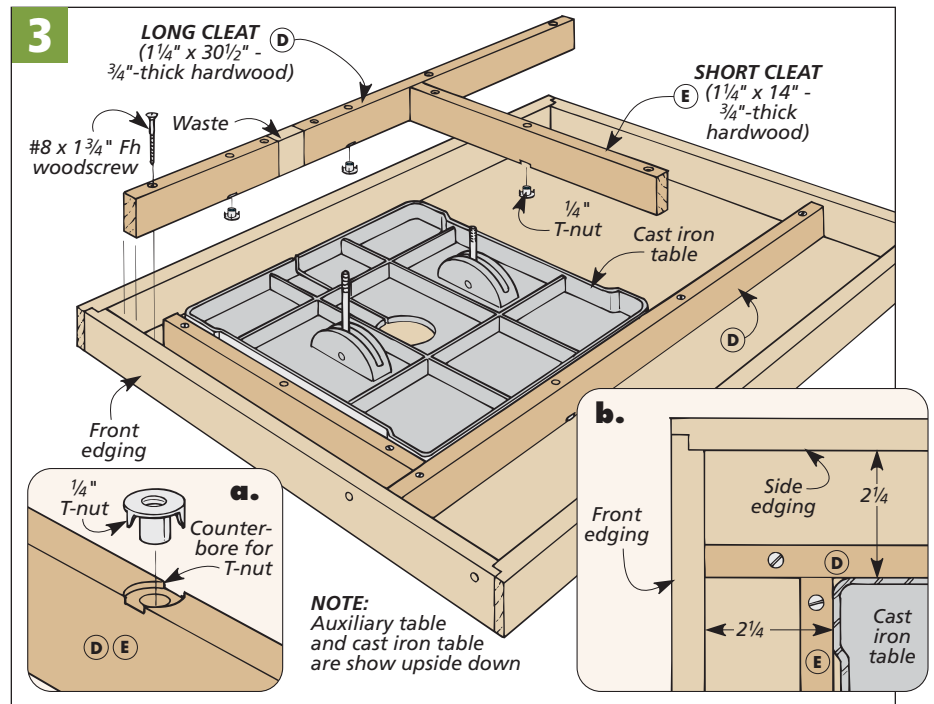


This requires removing the metal table from the band saw. (I only had to unscrew two knobs to do this.) Then lift off the table and set it upside down on the auxiliary table as shown in Figures 3 and 3b.

With the table in this position, it's time to add the cleats. One thing to note is the width of the cleats. As you can see in Fig. 4a, they're narrower (shorter) than the height of the cast iron table. (I made them $\frac{1}{16}$ " narrower.) This way, when the clamp blocks are installed later, they'll exert pressure against the metal table.

Now it's just a matter of ripping enough $\frac{3}{4}$ "-thick hardwood stock to width for the cleats and then cutting them to length. Two long cleats (D) span between the front and back edging strips, and two short cleats (E) are cut to fit between them. Note: Later, the long cleat on the side of the table with the narrow blade slot will be separated into two pieces, but don't cut it just yet. There's still some work to do on the cleats.

T-NUTS. To accept bolts that apply pressure on the clamp blocks, you need to install several T-nuts. Notice in Fig. 3a that the head of each T-nut sits in a recess formed by drilling a counterbore in the top edge of the cleat. You also need to drill a shank hole that's sized to accept the barrel of the T-nut. You'll need to install two T-nuts in the long cleat that spans the blade slot, one on each side.



Before attaching the cleats, there's one more thing to do. As I mentioned earlier, a section of the long cleat next to the blade slot has to be removed. This will provide clearance when you install (or remove) the pin that keeps the two halves of the metal table aligned. It's not the easiest place in the world to reach, so to provide plenty of knuckle room, I trimmed off a $1\frac{1}{2}$ "-long section that's centered on the blade slot.

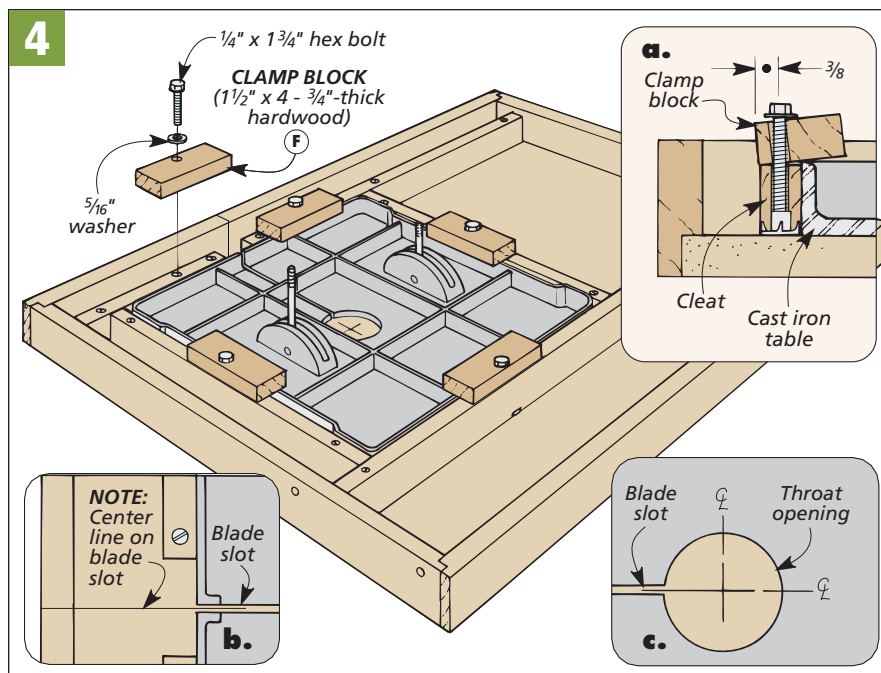
INSTALL CLEATS. Now you're ready to install the cleats. Be sure to tap the T-nuts in first. Then just screw the cleats to the table.

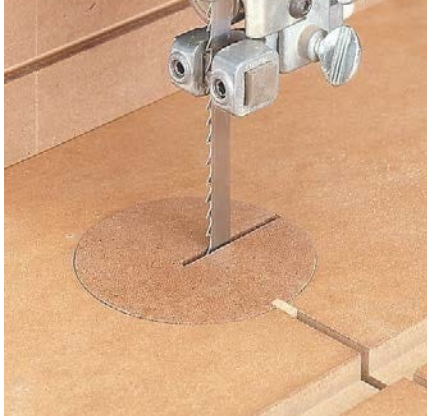
CLAMP BLOCKS. With the cleats in place, you can turn your attention to the clamp blocks (F) that are used to secure the auxiliary table to the cast iron table on the band saw. These clamp blocks are highlighted in Figure 4. They're just scrap pieces of $\frac{3}{4}$ "-thick hardwood that exert pressure against the metal table.

All it takes to produce this pressure is a simple bolt. As you can see in Figure 4a, the bolt passes through a hole drilled in each clamp block and threads into the T-nut in the cleat. Tightening the bolt pinches the clamp block against the metal table which holds the auxiliary table firmly in place.

LAYOUT. After installing all the clamp blocks, I took a minute to mark the centerpoint of the throat opening on the auxiliary table. (This is shown in Figure 4c.) Later, this will ensure that the hole that forms the throat opening in the auxiliary table aligns with the opening in the metal table.

While you're at it, mark the location of the blade slot on the auxiliary table. This is just a matter of drawing a pencil line that's centered on the existing blade slot (Figure 4b).





Insert Key. A disk-shaped insert plate covers the throat opening. To prevent it from rotating, a wood “key” fits into the blade slot.

Insert Plate

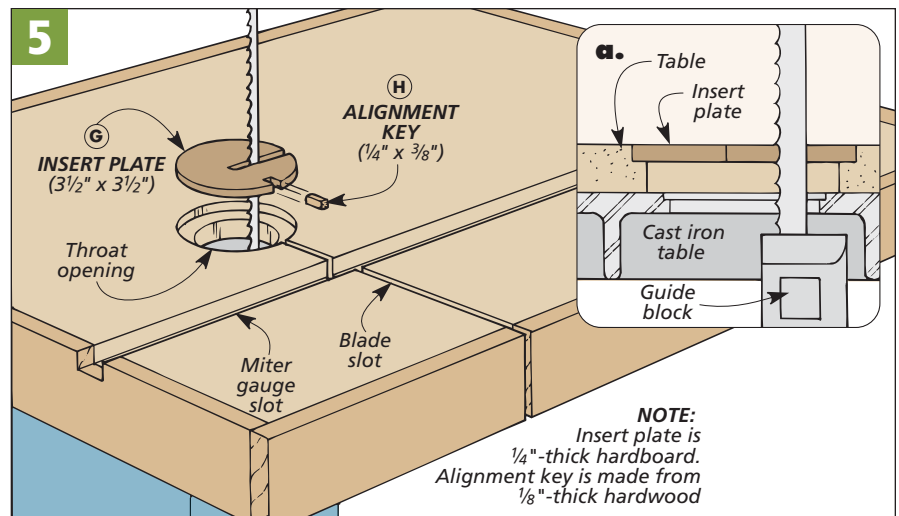
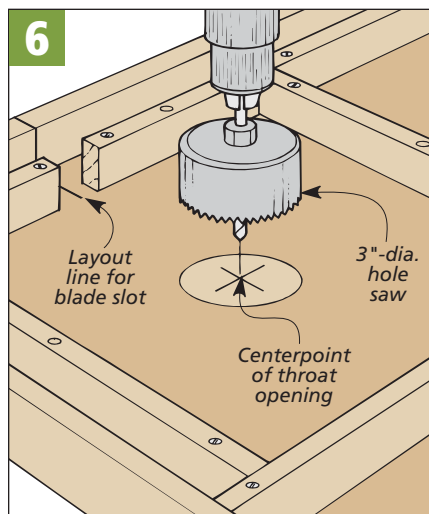
Aside from just its large size, this auxiliary table has a number of things in common with the cast iron table.

As with the metal table, a circular throat opening provides clearance when changing blades. To prevent small pieces from tipping into this opening, a removable insert plate fits down into a recessed lip.

You’ll also notice a long, narrow kerf that lets you slip the blade in and out of the opening. In addition, there’s a groove in the top of the table that holds the miter gauge.

Note: Be sure to remove the clamp blocks and cast iron table before making any of these cuts.

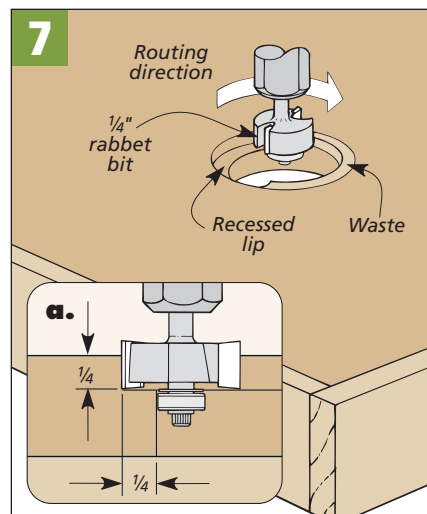
THROAT OPENING. There isn’t anything tricky about making the throat opening, especially since you’ve already located the centerpoint of the opening. (It was marked earlier on the bottom of the table.) So all that’s needed is to drill a large hole through the table.



The best way I found to do this is to use a hole saw chucked in a hand-held drill, as shown in Figure 6. I bought a 3"-dia. hole saw just for this purpose. Although it cost about twelve dollars, with the hole saw I was able to achieve a nice, clean cut. Just be sure to use a backing board underneath in order to prevent tearout on the top surface of the table.

Even with a backing board, the rim of the hole may be a bit fuzzy. But that’s okay. Any roughness will be cleaned up when making the lip that holds the insert plate.

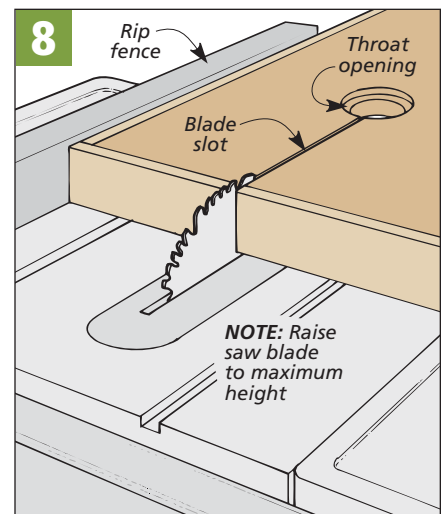
As shown in Figure 7, I used a $\frac{1}{4}$ " rabbet bit in a hand-held router to form the recessed lip. The idea is to adjust the depth of cut to match the thickness of the material used for the insert plate. (I used $\frac{1}{4}$ " hardboard.) Notice in detail ‘a’ of Figure 7 that the bearing of the bit rides against the side of the hole while the cutting edge creates the recessed lip.



BLADE SLOT. Once the throat opening is complete, make the narrow slot that lets you slip the blade in and out of the table. To prevent the blade from twisting, it’s important that this slot aligns with the one in the cast iron table underneath. Carefully extend the layout line for the blade slot (marked earlier) to the outside face of the edging on the side of the table.

As shown in Figure 8, I used the table saw to cut the blade slot. A single kerf is all that’s needed to provide clearance for the blade.

To produce an accurate cut, position the rip fence so the kerf is centered on the layout line. Then lock the fence and raise the blade all the way up. After turning on the saw, hold the table against the fence and slide it forward until the blade cuts into the throat opening. Now turn off the saw and wait until the blade stops spinning before backing out the table.



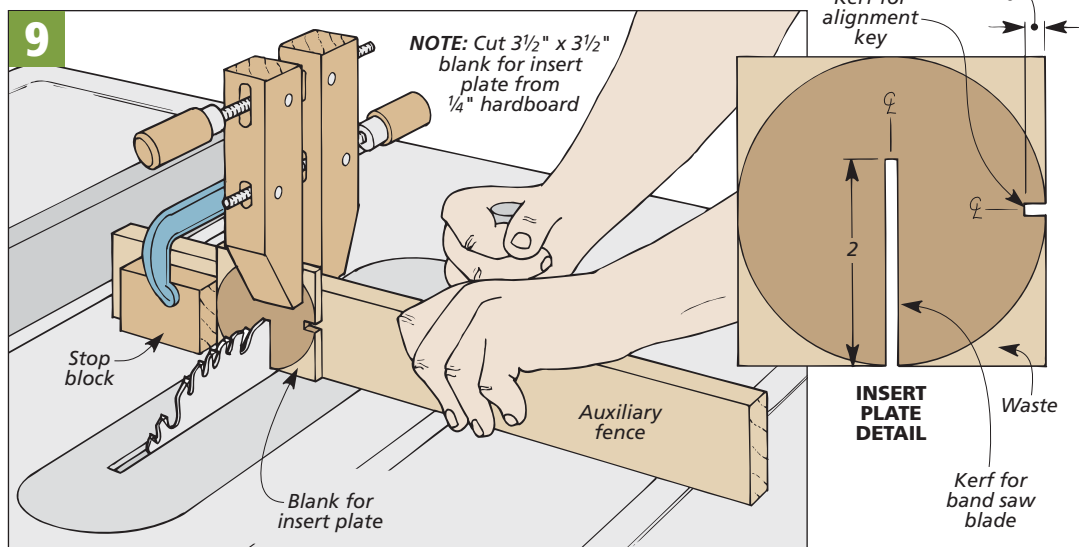
INSERT PLATE. After cutting the blade slot, the next step is to add the insert plate. This is a $\frac{1}{4}$ " hard-board disk that fits into the recessed lip in the throat opening.

At first, it might seem difficult to make a disk that's the exact size and shape of the opening, but it's really quite simple. To get started, all you need is a square blank that's the same size as the diameter of the opening. (I cut a $3\frac{1}{2}$ "-square blank and then used a compass to draw a circle of that same diameter.)

If you look at the Insert Plate Detail in Figure 9, you'll notice there are two saw kerfs in the blank. A long kerf creates an opening for the saw blade. Later, the short kerf holds a wood alignment key that fits into the blade slot in the table.

Each kerf is centered on one side of the blank. To do this, just set the blank against a block that's clamped to an auxiliary fence on your miter gauge. After clamping the blank in place, adjust the blade to the correct height to cut one kerf (Figure 9). Then reposition the blank, reset the blade height, and cut the second kerf.

CUT INSERT TO SHAPE. Now it's just a matter of cutting the insert plate to fit the opening. To get a good fit, start by cutting it to rough shape first with the band saw. Then carefully sand up to the layout line, checking the fit frequently until the insert plate (G) fits just right.



ALIGNMENT KEY. To prevent the insert plate from rotating in the throat opening, I added an alignment key (H). It's just an $\frac{1}{8}$ "-thick scrap of hardwood that fits into the short kerf in the insert plate. The idea here is to cut the key to length so it extends about $\frac{1}{4}$ " past the edge of the insert plate. Once the key is glued in place, the end that sticks out fits into the blade slot and holds the insert plate so it can't turn. (The photo on page 18 gives you an idea of how the key "locks" the insert plate in place.)

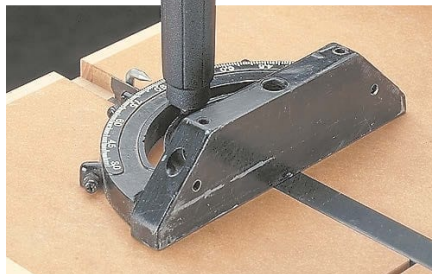
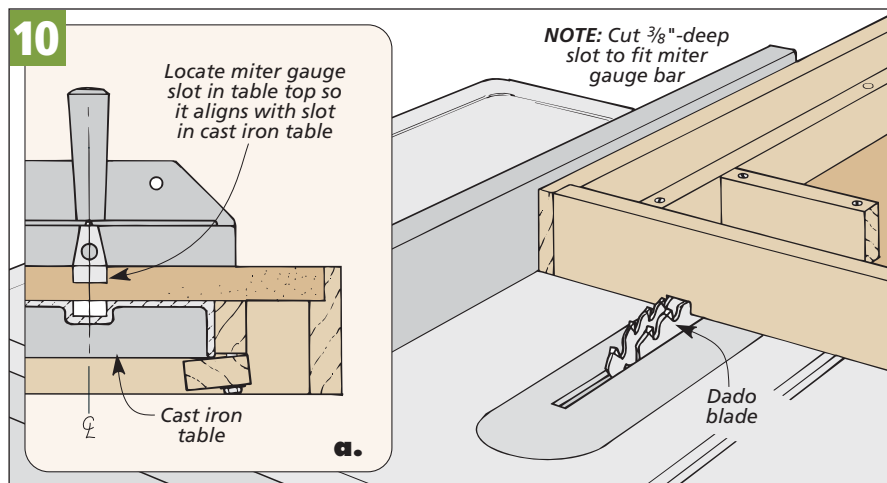
MITER GAUGE SLOT. All that's left to complete the table is to cut a slot that accepts the bar of the miter gauge. As shown in Figure 10, a table saw and dado blade make quick work of this. But before you start making the cuts, there are a couple of things to consider.

First, when determining the location of the slot, be sure to check for clearance

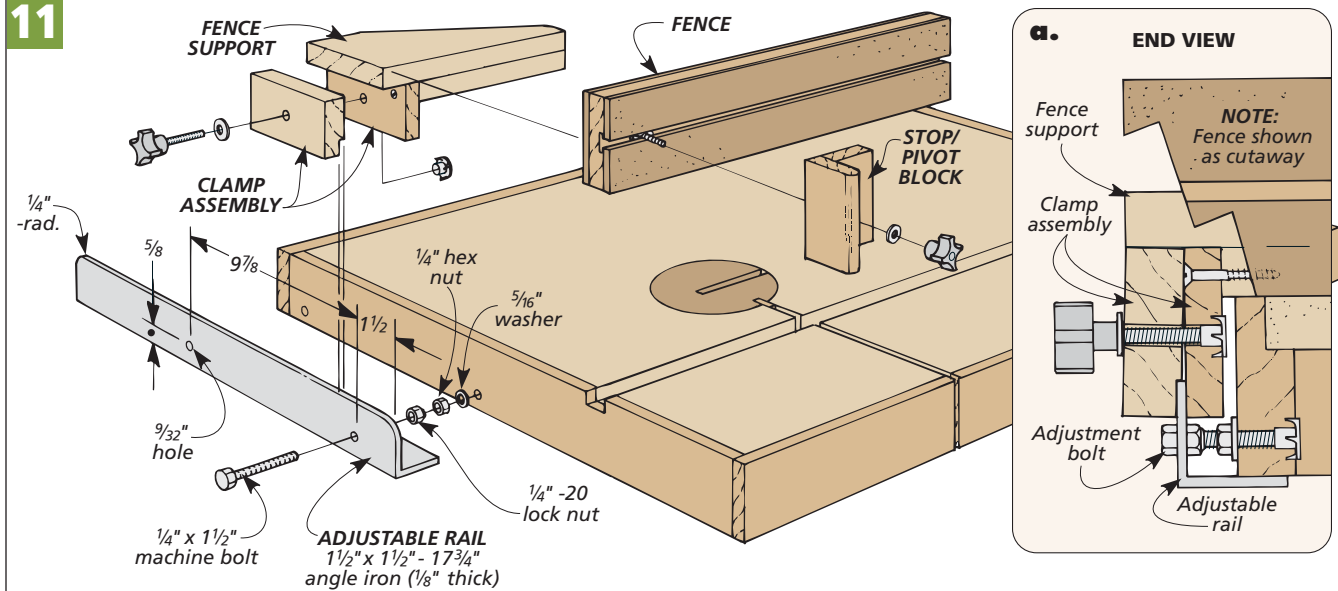
between the head of the miter gauge and the blade. I made it a point to align the slot in the new auxiliary table with the slot in the original cast iron table, as you can see in Figure 10a below.

Another thing to keep in mind is the size of the slot. To match the thickness of the miter gauge bar, it's $\frac{3}{8}$ " deep. As for width, the goal is to create a smooth, sliding fit, not too snug, but without any play. To make sure I have a good fit, I made several test cut first before cutting the slot in the table.

MOUNT TABLE. Once the miter gauge slot is completed, you're ready to mount the auxiliary table on the band saw. Just a note here. It's a good idea to remove the metal throat plate on the band saw. This will prevent dust from piling up between the two tables. Then simply set the auxiliary table in place and tighten the clamping blocks.



Smooth Fit. To produce accurate results, the miter gauge bar should slide smoothly in the slot without any "play."



adjustable Fence

It's easy to get spoiled by the fence on this band saw table. It adjusts quickly, locks tight, and provides sturdy support for a workpiece. But there's more to it than that. If the blade isn't cutting in a perfectly straight line (drift), the fence can be adjusted to compensate. (For more about this, look at the box below.)

Adjusting the Fence

One of the handiest features of this band saw fence is an adjustable rail. By moving the end of the rail in or out, you can change the angle of the fence to compensate for drift.

Trial Cut. To figure out the angle of drift, you'll need to make a trial cut.

Adjust Fence. Once you know the angle of drift, simply "back off" the nut from the band saw table and turn the adjustment bolt. As you can see in the detail, this moves the rail closer to (or farther from) the table. It's this movement that changes the angle of the fence. To "lock in" the adjustment, simply retighten the nut.

ADJUSTABLE RAIL. The key to making this work is an adjustable rail attached to the front of the table. As you can see in Figure 11, the rail is a piece of angle iron with the sharp, upper corners rounded with a file.

To make the rail adjustable, it's held in place with two bolts that pass through holes in the angle iron and into the T-nuts already installed in the table (Figure 11a). There's a lock nut on each bolt that's "snugged" against the rail. This way,

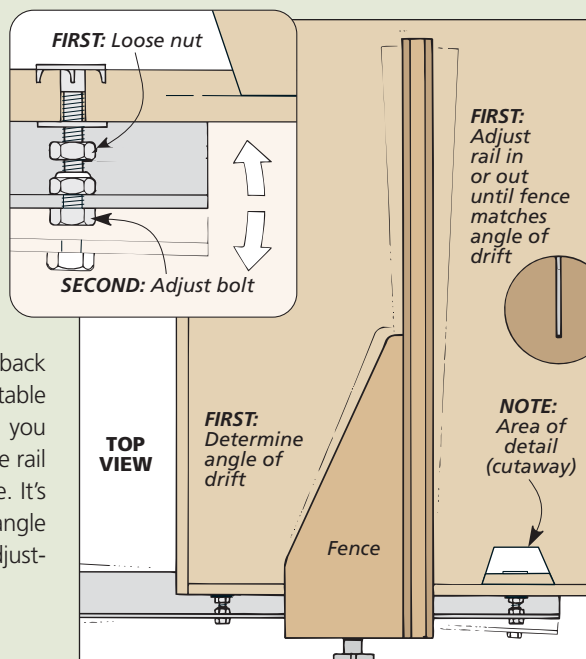
when you adjust the bolt, it moves the rail in or out (see margin). Tightening a hex nut against the table prevents the rail from accidentally getting bumped out of adjustment.

FENCE

After installing the rail, you can concentrate on the fence.

SIZE. To provide plenty of support, the fence is 3" tall. It's also fairly short (20"). In fact, the fence only extends a short distance past the back of the blade. But since it only needs to guide the workpiece up to the blade, that's all that's needed.

THREE LAYERS. One thing you may have noticed in Figure 12 is that the fence consists of three layers of material: a 1/2"-thick hardwood core sandwiched between two 1/4" hard-board faces.



Adjustments. The bolts that hold the rail to the table are also used to adjust it. Here, a quick turn of one of these bolts adjusts the fence for drift.

There are two reasons for this layered type of construction. First, it makes it easy to create a T-shaped slot in the fence. (Later, this slot accepts a toilet bolt that lets you attach an accessory to the fence.) Second, it reduces the chance of the fence warping or twisting with changes in humidity.

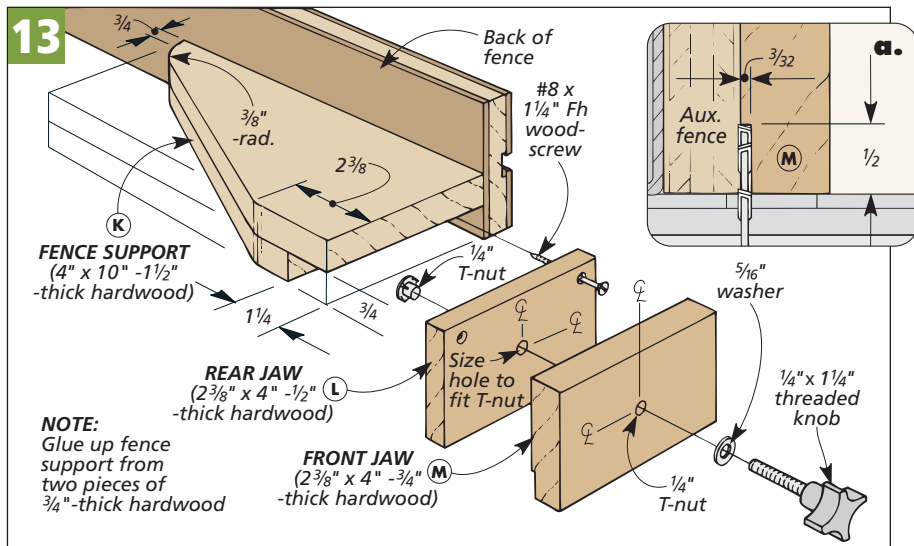
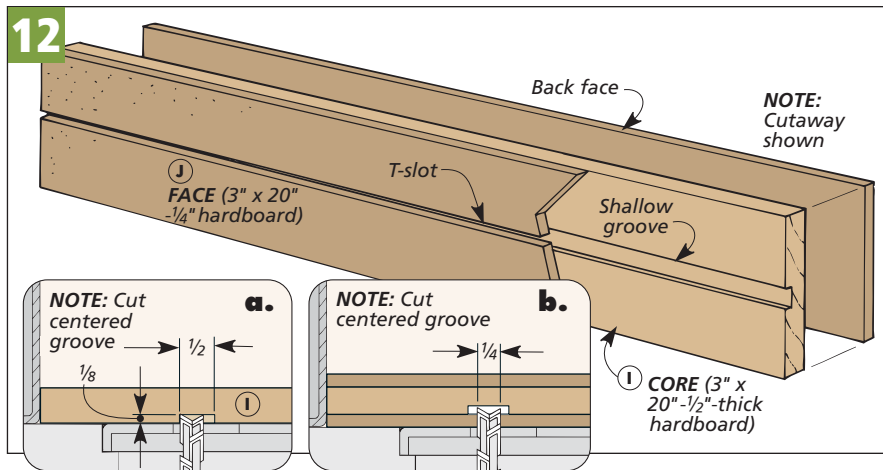
To form the T-slot, start by cutting a wide, shallow groove in the core (I) as shown in Figure 12a. In order to center the groove, I made two passes, flipping the workpiece end for end between each one. Then just glue on both faces (J), trim the edges flush, and complete the T-slot as shown in Figure 12b.

HEAD

Although the fence is complete, there's no way to connect it to the rail. That's where the head comes in. If you look at Figure 11, you'll see it consists of two parts: a triangular-shaped support attached to the back of the fence and a two-part clamp assembly that locks the fence on the rail.

FENCE SUPPORT. To add rigidity, the fence support (K) is a thick block that's made by gluing up two pieces of $\frac{3}{4}$ "-thick hardwood (Figure 13). A rabbet in the wide end of the support holds the clamp assembly. Also, to provide clearance for the column of the band saw, the fence support tapers toward the narrow end. I used the band saw to cut the support at an angle and then rounded the outside corner on the narrow end.

CLAMP ASSEMBLY. After gluing on the fence support, you're ready to add the clamp assembly that locks the fence on the rail. As shown in Figure 13, it consists of two



blocks: a rear jaw (L) made of $\frac{1}{2}$ "-thick hardwood and a $\frac{3}{4}$ "-thick front jaw (M).

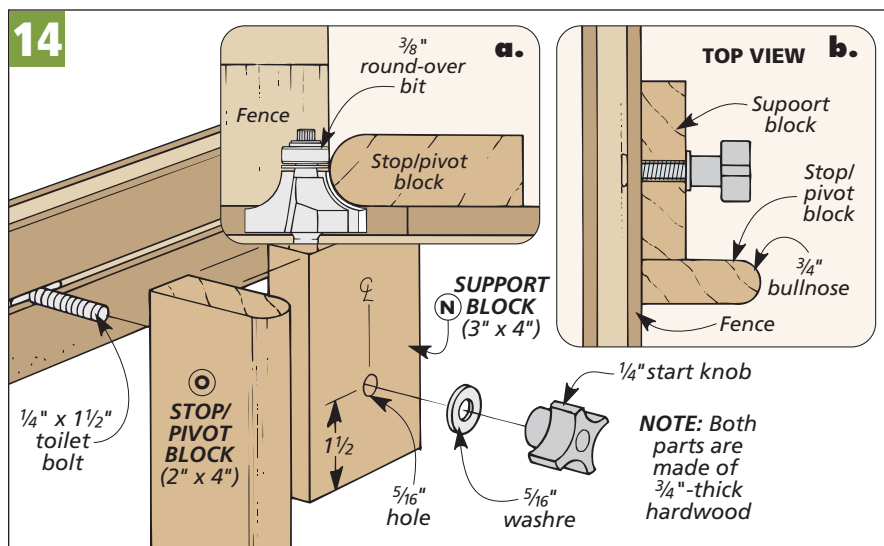
One thing to note is there's a shallow rabbet in the front jaw. Notice in Figures 11a and 13a that this rabbet is slightly thinner than the thickness of the rail. This way,

when you tighten a knob, the two jaws pinch against the rail.

All that's needed to apply this pressure is a T-nut and a threaded knob. The T-nut fits into a hole drilled in the rear jaw, and the knob passes through a hole in the front jaw and threads into the T-nut. To mount the clamp assembly, screw the rear jaw to the fence support, then thread the knob loosely in place to attach the front jaw.

STOP/PIVOT BLOCK. With the fence completed, I added a simple accessory. It does double duty as a stop block when cutting tenons and as a pivot point when resawing. To make it adjustable, it's attached to the fence with a toilet bolt that slides in the T-slot.

This accessory consists of two hardwood blocks: a sliding support block (N) and a stop/pivot block (O) with a radius on one edge (Figures 14 and 14b). After drilling a hole in the support block and routing a bullnose on the stop/pivot block (Figure 14a), the two blocks are glued together.



3 must-have Band Saw Blades

The right blade will allow you to cut faster, smoother, and work more efficiently. Here's what you need.

When it comes to buying a band saw blade the choices, from tooth shape, to width, to the number of teeth per inch, and even price seem almost endless. Unfortunately, there isn't one blade that will do it all. But, over the years, I've narrowed it down to three blades that handle just about all of the work I need to do with my band saw.

THE MAIN BLADE. The first blade is also the one I use the most — a $\frac{1}{4}$ "-wide blade. It's the middle one in the photo at left. If there was a blade that would come close to being a "jack-of-all-trades," this would be it. The one I use has 6 teeth per inch, which makes it cut well in both thick and thin stock.

The width of this blade strikes a good balance between curve cutting and straight-line cutting. I can cut curves down to a $\frac{3}{8}$ " radius. And it's still wide enough to resist twisting and deflecting during a straight cut.

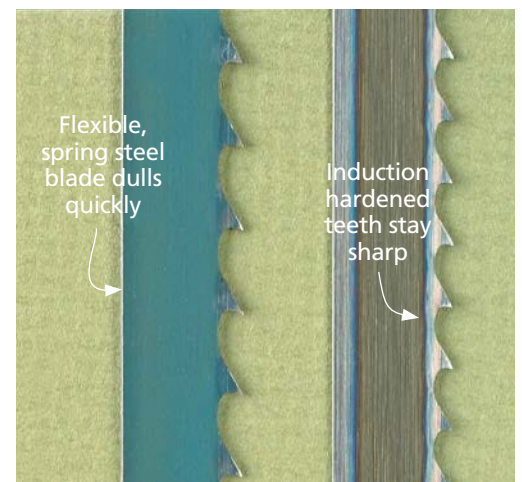
STRAIGHT BLADE. The second blade I'd choose is a $\frac{1}{2}$ "-wide blade with 3-4 teeth per inch. (The left blade in the photo at left.) It does a great job of ripping thick stock without wandering. I like to use this blade for ripping a straight edge on a crooked board, and it'll do just fine for resawing. The extra width prevents it from flexing or bowing in the cut.

If you plan on doing a lot of resawing, you may want to pick up a blade specifically designed for that task. You can read more about a couple of them in the box on the opposite page.

CURVE-CUTTING BLADE. The final blade in my trio is a narrow $\frac{1}{8}$ "-wide blade for cutting tight curves (right blade in photo on the left). I picked one with 14 teeth per inch. Having this many teeth means it leaves a pretty smooth cut so I don't have to spend a lot of time sanding afterwards. Even though the high tooth count means this blade will cut slower than the other blades, it still cuts faster than any scroll saw. This means you cut can fine details accurately and quickly.

BLADES UP CLOSE

While each of my top three blades are suited to a few specific functions, they do have several characteristics in common. These include the tooth shape, the way the teeth are formed, and the type of steel used to make the blade. To see why I like



Tougher Teeth. Inexpensive spring steel blades (left) are very flexible but won't stay sharp long. By induction hardening the teeth only, high-quality blades can combine flexibility with a blade that stays sharp longer.

$\frac{1}{2}$ "-wide blade is ideal for ripping thick stock and resawing

$\frac{1}{4}$ "-wide general-purpose blade handles curves and straight cuts

A narrow, $\frac{1}{8}$ "-wide blade makes quick work of tight curves and fine details

these blades so much, it helps to take a closer look at these features.

BLADE STEEL. The first thing these blades have in common is the steel used to make them. Band saw blades need to be flexible so they can bend around the wheels of the saw without breaking. But the teeth also need to be hard to stay sharp for a long time.

One option is to make the blades from spring steel, a strong yet not particularly hard type of steel. These blades are the most flexible and last a long time, especially on smaller, benchtop saws. However, the soft teeth will dull quickly and are more suited to cutting thin stock. This type of blade is the one shown on the left in the photo at the bottom of the opposite page.

The blades I like to use have soft, flexible backs and hard, sharp teeth. To do this, blade manufacturers apply a little technology. They start with a flexible steel alloy. The teeth are then hardened through an electrical induction process. An electrical current only hardens the teeth, leaving the back of the blade untouched.

The result is tough, long-lasting teeth on a blade that won't break under the stress. This is shown in the right blade in the lower photo on the opposite page. Even though these blades cost more than spring steel blades, the difference is more than made up for by the quality of the cut and the longer blade life.

GROUND TEETH. While the blade steel is important for the durability of the blade,

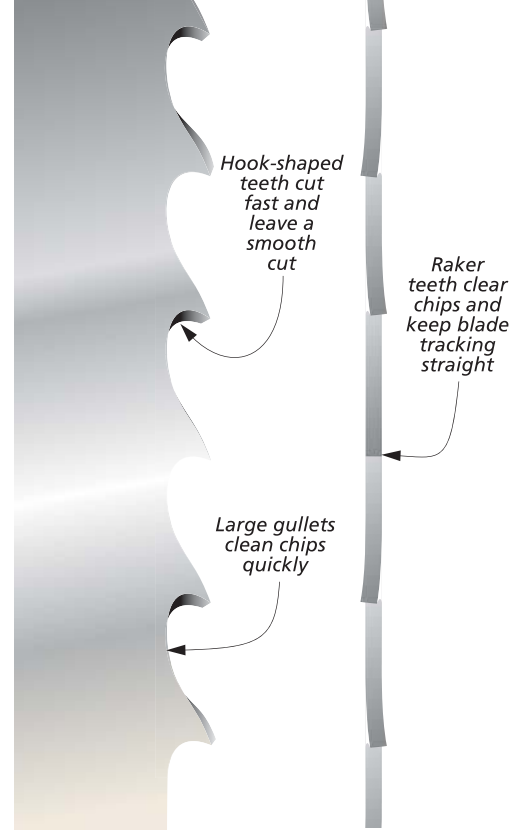
the teeth are where the the action is. There are two things to look at here: how the teeth are formed and their shape. Teeth can either be ground or stamped. I steer clear of stamped blades. Stamped teeth aren't very sharp. They'll often have burrs on the edges and a blunted or deformed look from being punched out.

The better choice is ground teeth. These teeth are precisely cut and have crisp, sharp edges for smooth, accurate cuts. So, how can you tell if the teeth on a blade are ground? Side by side the difference is hard to see unless you have a magnifying glass. The best way to know is to see if it's featured on the packaging. Another indicator is price. The most inexpensive blades are likely to be stamped to save on costs.

TOOTH SHAPE & SPACING. The other feature of the teeth to look at is their shape. Here, the choice is between speed and quality of cut. The shape, as well as the number of teeth per inch, affects the speed and smoothness of the cut.

The blades I use have hook-shaped teeth. You can see how they look in the drawing at right. The forward tilt of the teeth allows the blades to cut quickly and smoothly.

As for spacing, also called pitch, the greater number of teeth per inch (tpi), the cleaner but slower a blade will cut. Fewer and larger teeth are more suited for thick stock. They'll cut faster and, in general, leave a rougher surface.



Hook Teeth. A blend of fast cutting and smooth edges. The downward-pointing, hook-shaped teeth quickly slice through stock while leaving a clean cut edge. Raker teeth clear chips and keep the blade cutting straight.

One of the best things about band saw blades is that you don't have to spend a lot of money to get all this technology. In fact, at about \$25 each, you can get all three blades for the price of a good table saw blade. To find out where you can find these blades, take a look at the sources on page 99 of this book.

Shop Tip: Resaw Blades

Resawing thick stock into veneer or thinner stock places a lot of strain on a band saw and the blade. This can lead to slow, rough cuts that can wear out a blade quickly. But blade makers have come up with a couple unique solutions to these problems.

Carbide Tipped. The Tri-Master blade (left photo) has carbide teeth like those on a table saw blade. The result is a thick, heavy-duty blade that makes clean cuts and resists heat buildup.

Thin Kerf. The blade in the right photo takes a different approach to resawing. The Wood Slicer is made from thin, flexible spring steel. Unlike inexpensive blades though, the hook-shaped teeth are ground (not stamped) and electro-hardened to stay razor sharp. This blade's kerf is only half the width of a typical band saw blade, so the cut is fast and smooth.



Durability. The carbide-tipped teeth stay sharp for a long time, cut smoothly, and can be resharpened.



Flexibility. The thin, hardened teeth on a back of flexible spring steel leave a narrow kerf and cut quickly.





Add-ons & Jigs

Digging deeper into the band saw, here are some of our favorite accessories to this tool. Whether shop-made or store-bought, we've found that these really bring out the best in the band saw.

ULTIMATE TABLE & FENCE26

SHOP-MADE RIP FENCE.....32

GREAT GEAR.....38

CIRCLE CUTTING42

TEMPLATE JIG46

CARTER CIRCLE JIG.....50



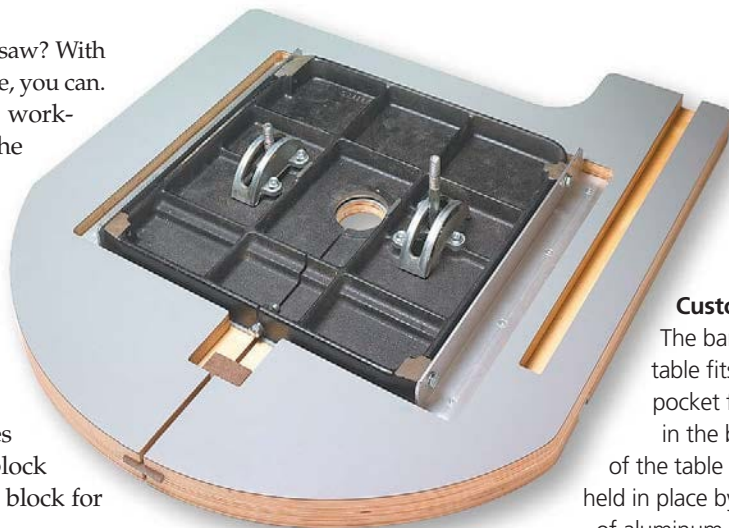
Increase the capability of your band saw by adding this feature-packed table and fence.

Ultimate Table & Fence

Want to improve the results you get with your band saw? With the shop-made band saw table and fence shown above, you can.

LARGE WORKSURFACE. Handling just about any size workpiece on this oversized table isn't a problem. The table mounts securely to the cast iron table of the band saw, as you can see in the photo at right.

ADJUSTABLE FENCE & ACCESSORIES. The table isn't the only thing to like about this project. There's a fence that adjusts quickly and locks down firmly, so it's a snap to make straight, accurate cuts. And to account for the tendency of some blades to "drift," there's a simple adjustment mechanism to compensate. The fence also features a piece of T-track to accept accessories — a stop block for making repetitive cuts like tenons, and a pivot block for accurate resawing.

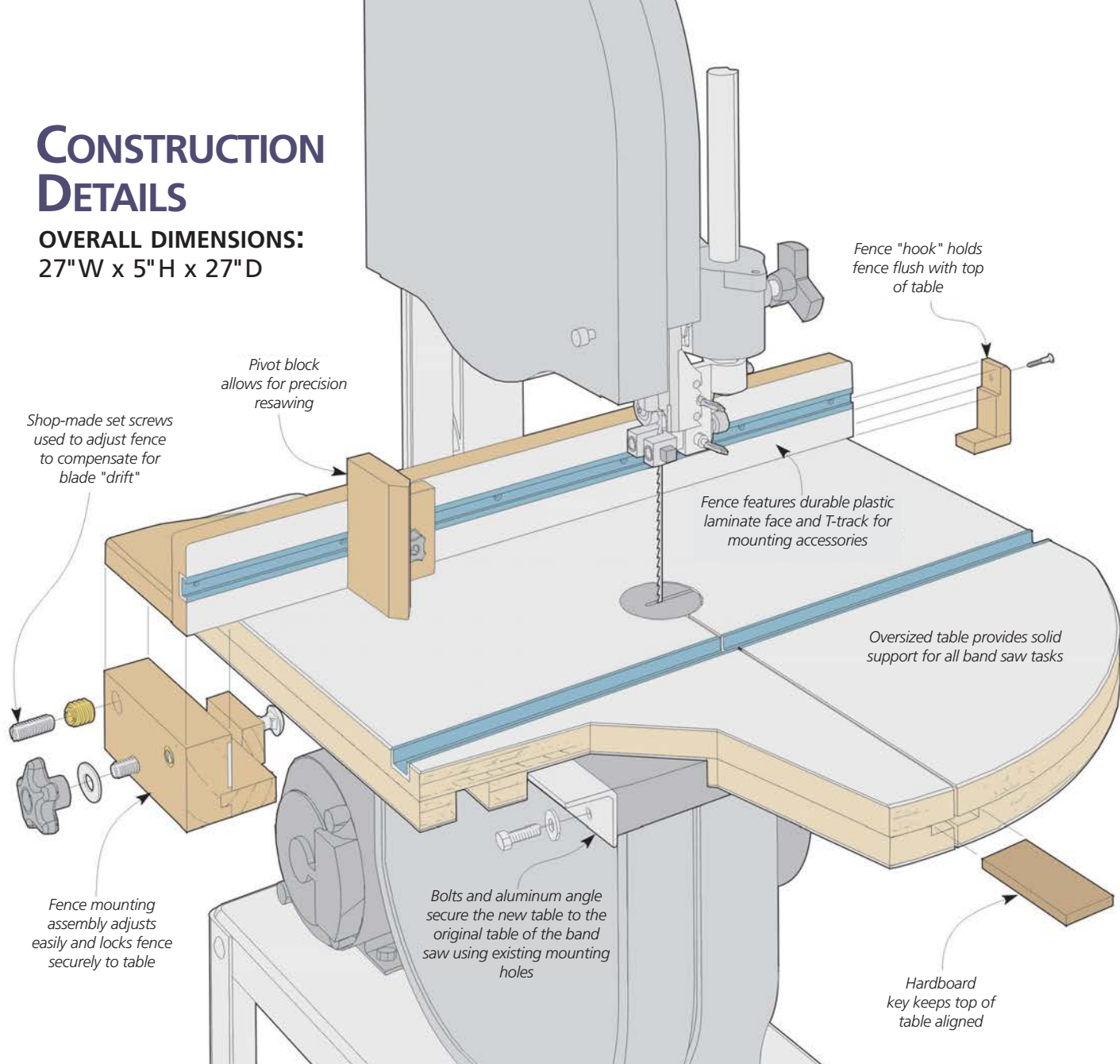


Custom Fit.

The band saw table fits into a pocket formed in the bottom of the table and it's held in place by a pair of aluminum angles.

CONSTRUCTION DETAILS

OVERALL DIMENSIONS:
27"W x 5"H x 27"D



MATERIALS & SUPPLIES

Table

A Bottom (1)	24 x 27 - $\frac{3}{4}$ Ply.
B Top (1)	24 x 27 - $\frac{3}{4}$ Ply.
C Alignment Key (1)	$1\frac{1}{2}$ x 5 - $\frac{1}{4}$ Hdbd.

Fence

D Fence Face (1)	1 x $2\frac{3}{4}$ - $25\frac{3}{4}$
E Face Support (1)	$\frac{3}{4}$ x $4\frac{1}{4}$ - $11\frac{1}{2}$
F Fence Mount (1)	$1\frac{1}{2}$ x $2\frac{1}{2}$ - 6
G Clamping Bar (1)	$\frac{3}{4}$ x $1\frac{13}{16}$ - 6
H Clamping Block (1)	$\frac{3}{4}$ x $1\frac{1}{4}$ - $2\frac{1}{2}$
I Hook Mount (1)	$\frac{1}{2}$ x 1 - $2\frac{5}{8}$
J Hook (1)	$\frac{1}{2}$ x 1 - 1

Fence Accessories

K Stop Block (1)	$\frac{3}{4}$ x 2 - $2\frac{3}{4}$
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L Mounting Block (1)	$\frac{3}{4}$ x 2 - $2\frac{3}{4}$
M Pivot Block (1)	$\frac{3}{4}$ x $2\frac{3}{8}$ - 4

- (1) Miter Track (24" Long)
- (2) $1\frac{1}{2}$ " x $1\frac{1}{2}$ " - $14\frac{1}{8}$ " Aluminum Angles ($\frac{1}{8}$ " thick)
- (4) Table Mounting Bolts & Washers (match to threaded holes in cast iron table)
- (8) #8 x $\frac{3}{4}$ " Fh Woodscrews
- (10) #8 x $\frac{5}{8}$ " Fh Woodscrews
- (1) T-Track ($25\frac{3}{4}$ " Long)
- (1) $\frac{3}{8}$ " x $4\frac{1}{2}$ " Carriage Bolt
- (1) $\frac{3}{8}$ " Washer

- (1) $\frac{3}{8}$ " Star Knob
- (2) $\frac{5}{16}$ " Threaded Brass Inserts
- (2) $\frac{5}{16}$ " x 2" Hex Bolts (to make set screws)
- (1) 1" x 6" Aluminum Strap ($\frac{1}{16}$ " thick)
- (2) #4 x $\frac{1}{2}$ " Fh Woodscrews
- (1) #8 x 1" Fh Woodscrew
- (2) #8 x $1\frac{1}{2}$ " Fh Woodscrews
- (2) #6 x 1" Fh Woodscrews
- (2) $\frac{5}{16}$ " x $1\frac{1}{2}$ " Flange Bolts
- (2) $\frac{5}{16}$ " Star Knobs
- (2) $\frac{5}{16}$ " Washers



Access. A small cutout in the bottom of the table provides access to the pin and hardboard key that keep the surfaces of the cast iron table and the auxiliary table aligned.

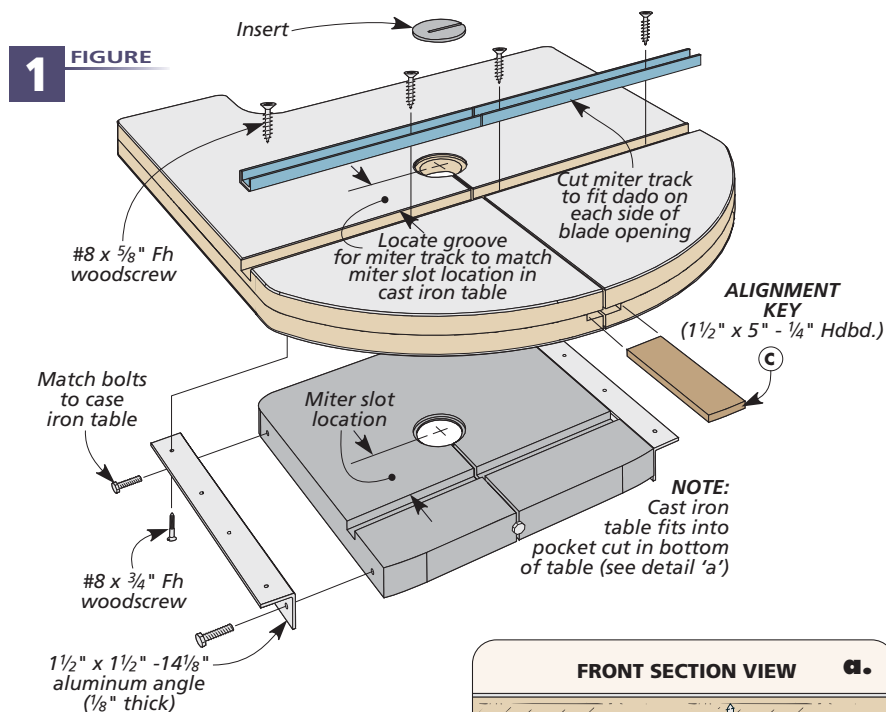
making the Table

The main thing I like about this table is the larger worksurface it provides compared to the standard cast iron table on my band saw. It provides solid support so I can easily work with just about any size workpiece.

To get an overview of the table, take a look at Figure 1. For starters, the table is made of $\frac{3}{4}$ " Baltic birch plywood covered with layers of plastic laminate on the top and bottom. The laminate provides a smooth, durable surface and keeps the table flat. A pair of aluminum angles are used to attach the table to the cast iron table of the band saw.

TABLE SIZE. The first step in building the table is to determine how large it should be. Of course, your table should be big enough to provide support for a large workpiece, but don't get carried away. If the table is too wide or too long, it's going to be a hassle to work around.

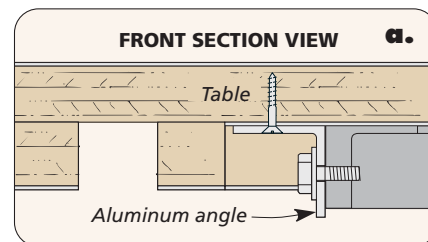
Design Note: This table is sized and shaped for a 14" band saw (the diameter of the wheels within the band saw). You may need to modify the size and shape for your band saw.



START WITH THE BOTTOM. Since the cast iron table fits into a pocket in the band saw table, I started building by working from the bottom up. The first thing I did was to cut the bottom (A) to final width and length. Then I glued a piece of plastic laminate to its bottom face, like you see in Figure 2.

The next step is to locate and size the pocket for the cast iron table. The easiest way to do this is to remove the cast iron table from your band saw and use it as a template. (My table comes off by simply removing the knobs that allow you to tilt the table.)

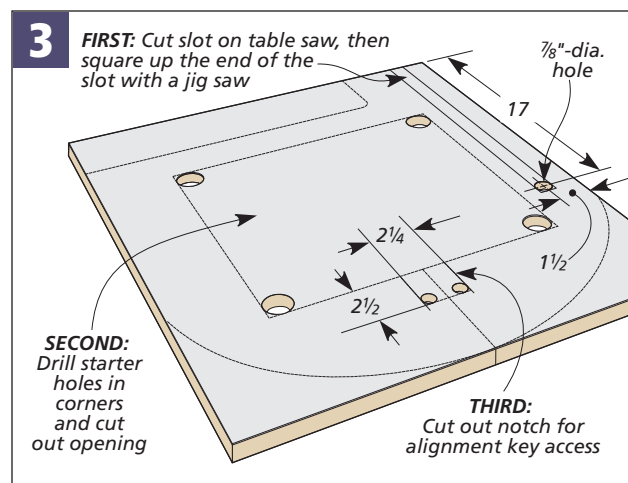
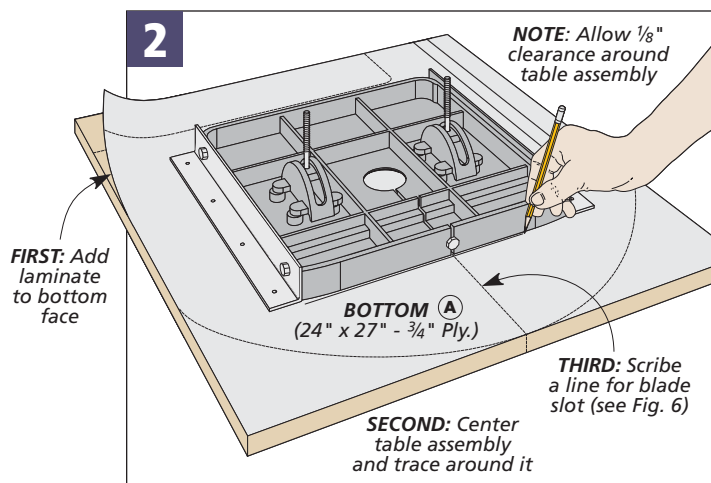
At this point, I cut a pair of aluminum angles to size and attached them to the cast iron table, like you see in Figure 1. The angles attach to the table using mounting



holes already drilled in most band saw tables. You'll need to buy the mounting bolts to fit your saw.

Once the angles are attached, set the assembly on the bottom so it's centered both side to side and front to back, as illustrated in Figure 2. Then trace around the outside of the table and aluminum angle, providing $\frac{1}{8}$ " clearance all around.

Before cutting out the opening, cut a slot along the edge of the bottom for mounting the fence. You can see this clearly in Figure 3. I did this by drilling a hole to establish



the end of the slot and then raising my saw blade as high as it would go and cutting the waste free.

With that complete, you can create the opening. Figure 3 shows how to do this by drilling starter holes in the corners and then using a jig saw to remove the waste.

ALIGNMENT PIN & KEY ACCESS. You'll also notice a small notch near the front edge of the table (Figure 3). This opening provides access to the metal pin that keeps the cast iron table aligned across the slot that provides access to the band saw blade.

The opening also makes it easy to get to a hardboard key that keeps the top of the band saw table flush during use. You can see this in the margin photo on the opposite page. To create the slot for the key, you'll need to cut a wide, shallow dado in the front of the table to fit the $\frac{1}{4}$ " hardboard key (Figure 4).

ADD THE TOP. Once you've completed the dado, you're ready to add the top of the table. The top (B) is identical in size to

the bottom. And like the bottom of the band saw table, the upper surface of the top has a piece of plastic laminate glued in place, as illustrated in Figure 4 above.

Next, you can glue the top and bottom together. A spacer ensures that a consistent slot width is maintained. Finally, cut

a small piece of laminate to fit the opening in the table and glue it in place (Figure 4).

There are just a few things left to do before mounting the table to the band saw. First, you'll need to cut an opening for the band saw blade as well as a slot to allow for installing (and removing) the blade.

To locate the hole, simply set the cast iron table in place and trace an outline of the hole on the bottom of the table (Figure 5). Figures 5a and 5b show how I used a hole saw to form the opening and a rabbeting bit to create the lip for the metal insert of my band saw table. Note: You'll need to drill a small hole along the edge of the recess to allow the "nub" of the insert plate to fit.

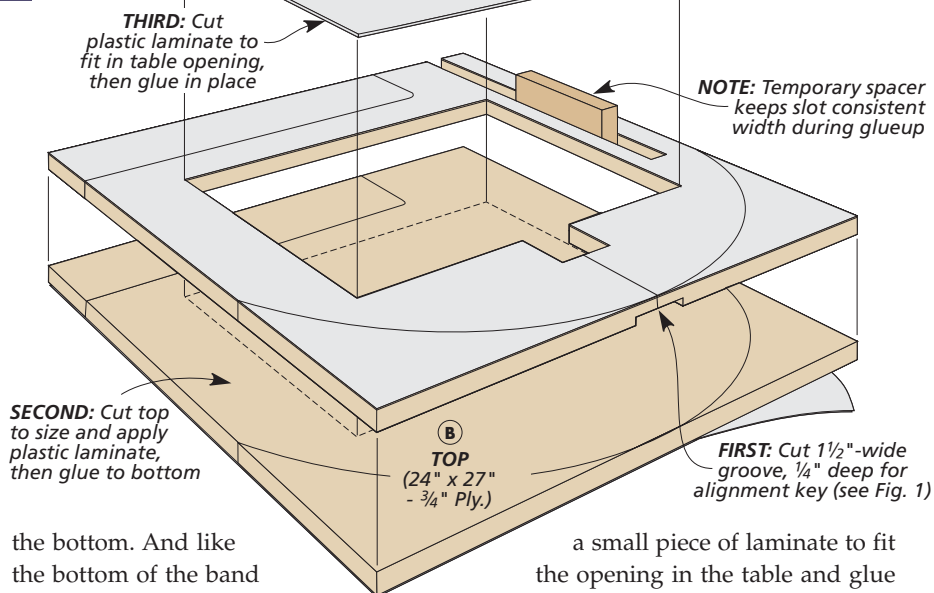
With the hole complete, you can cut the slot from the front of the table to the hole. To do this, raise your saw blade as high as it will go and then make a single pass centered on the hole, as in Figure 6.

At this point, you're ready to cut a dado on the top side of the table. The dado accepts two pieces of miter track that allow you to use your miter gauge for making a cut. Locate the dado to match the miter slot in your cast iron table.

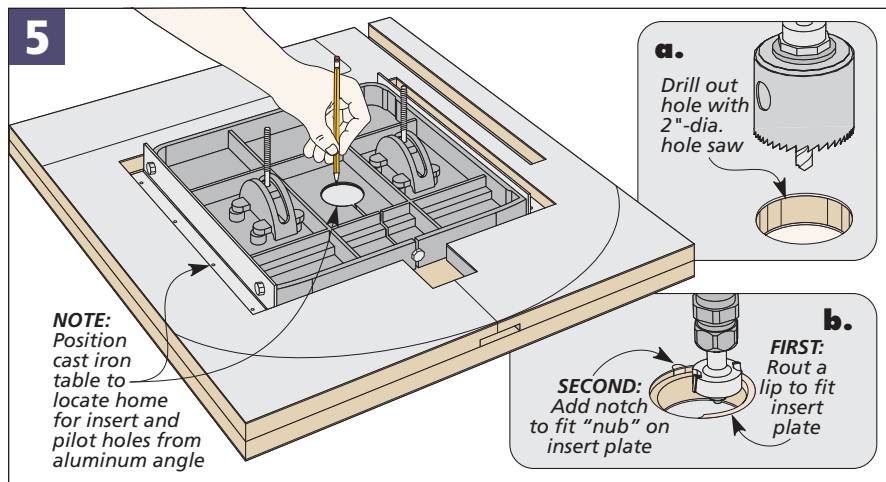
Now you can shape the table as shown in Figure 6. This removes the sharp edges and provides plenty of clearance to tilt the table when you need to make an angled cut.

All that's left to do before mounting the table is to cut a couple pieces of miter track to fit the dado and screw them in place (Figure 1). Then you can cut a $\frac{1}{4}$ " hardboard alignment key (C) and slip it into place.

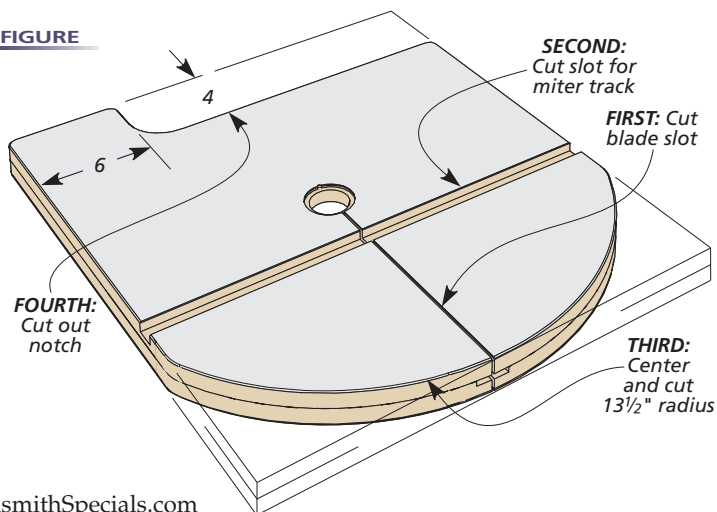
4 **FIGURE**



5



6 **FIGURE**



add the Fence

7 OVERVIEW

The curved cuts I make on my band saw don't require a fence. But cutting tenons, ripping pieces to width, and resawing require a fence that adjusts easily, locks securely, and accepts accessories.

The fence you see in Figure 7 meets all those needs. The fence houses a piece of T-track so you can attach accessories and the mounting assembly adjusts easily yet locks securely to hold the fence in place.

MAKE THE FENCE FACE. I started on the fence by making the face. The fence face (D) is just a 1"-thick piece of hardwood. To allow a workpiece to slide smoothly along the face, I attached a strip of plastic laminate to one side. Then to mount the accessories, I cut a centered groove and installed a piece of T-track, as in Figure 8a.

Attaching the fence face to the mounting assembly is just a matter of adding a support (E) to the back side of the face. Figure 8 shows how the support is shaped.

FENCE MOUNT. With the fence assembly complete, you can turn your attention to the mounting assembly the fence attaches to.

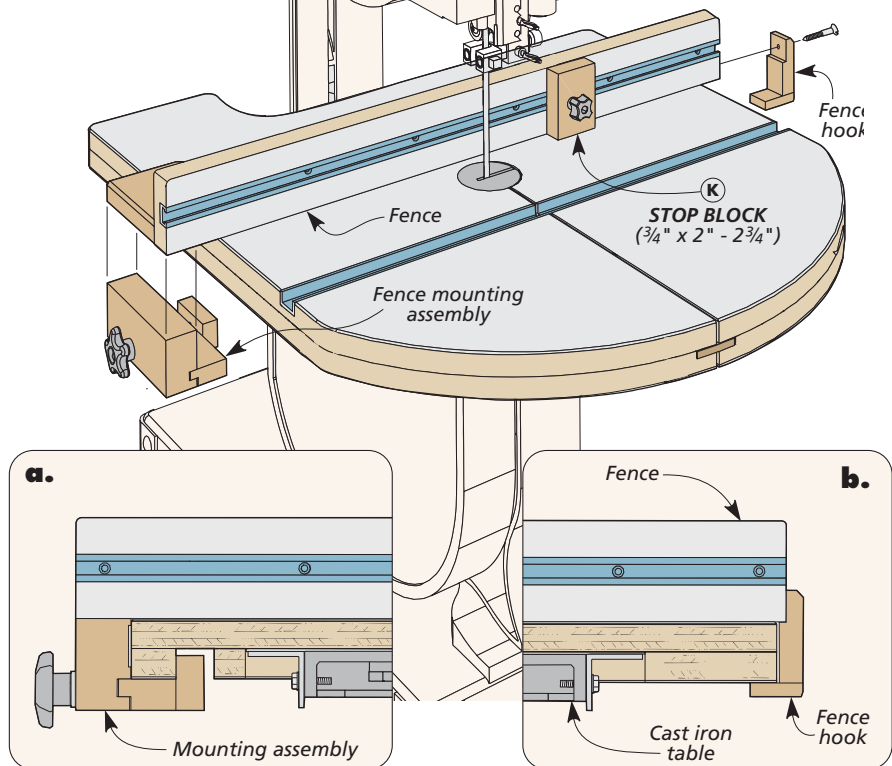
This assembly is designed to make the fence easily adjustable and lock securely. As you tighten a knob on the front of the mounting

assembly, it pulls a clamping block tight to "pinch" the fence against the table, as you can see in Figure 7a.

I started on the assembly by making the fence mount (F) from a piece of 1½"-thick hardwood and cutting a pair of grooves in it (Figure 10). One groove is wide and

shallow to accept an aluminum strip. The strip allows you to angle the fence to compensate for any blade "drift." To do this, a pair of shop-made set screws (cut-off hex bolts with a slot cut in them) can be adjusted to "tweak" the angle slightly.

The other groove accepts the rabbet cut



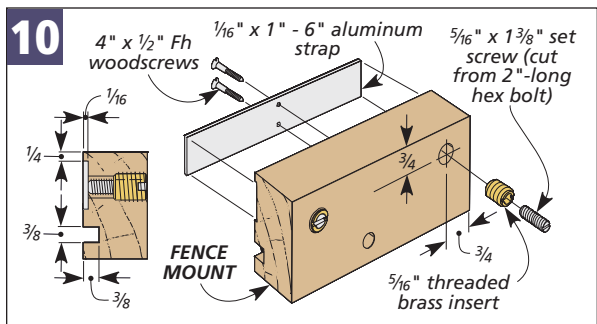
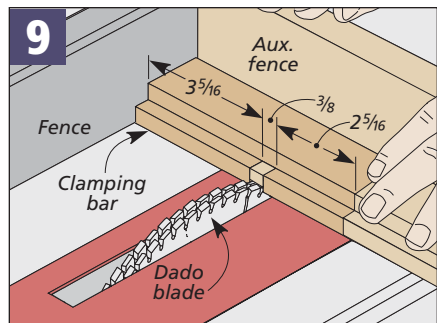
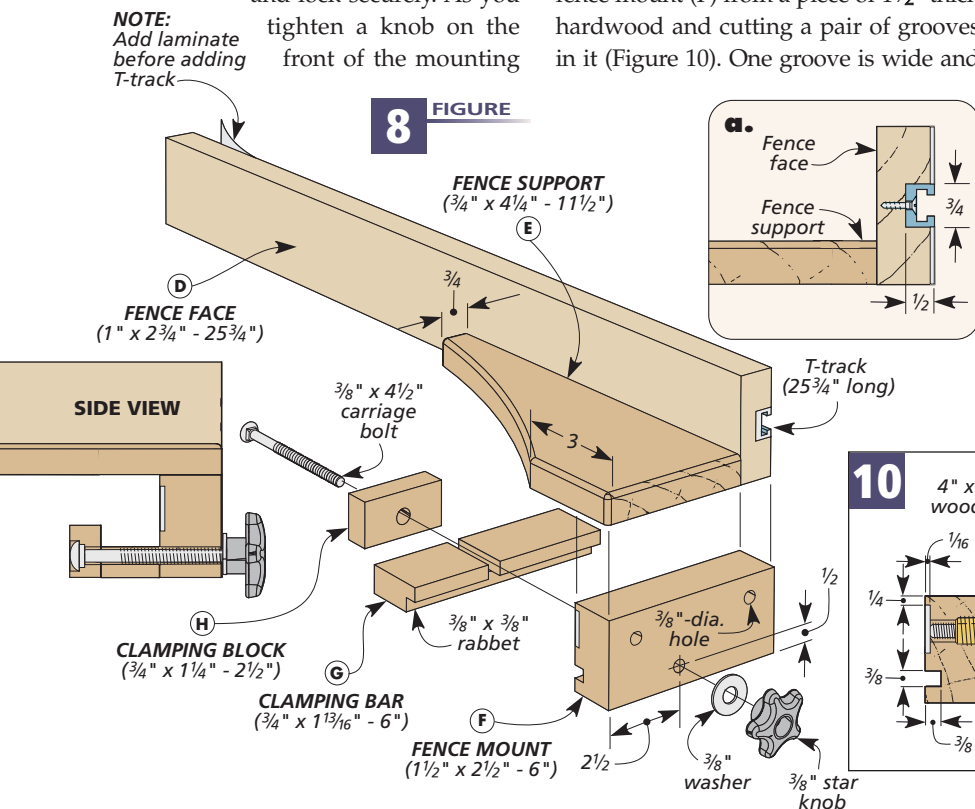
assembly, it pulls a clamping block tight to "pinch" the fence against the table, as you can see in Figure 7a.

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8 FIGURE



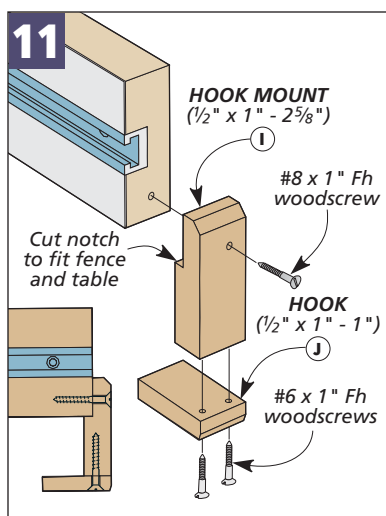
on the end of a clamping bar (G). A small clamping block (H) attached to the edge of the bar fits into the slot on the bottom of the table. To lock the fence in place, a carriage bolt glued into the clamping block passes through all three parts of the assembly (Figure 7a).

With the mounting assembly complete, you're ready to glue the fence assembly to it. First, cut the fence to length so it extends $\frac{1}{4}$ " past the edge of the table when it's flush with the mount at the front end of the table, as in Figures 7a and 7b. Then glue the fence in place so it's parallel to the miter slot in the table.

ADD THE FENCE HOOK. All that's left to complete the fence is to add a hook (I, J) to the end to hold the fence tight against the table. You can see how I did this in Figure 11.

MAKE THE ACCESSORIES

You can use the fence just the way it is. But to get more out of it, you'll want to add a



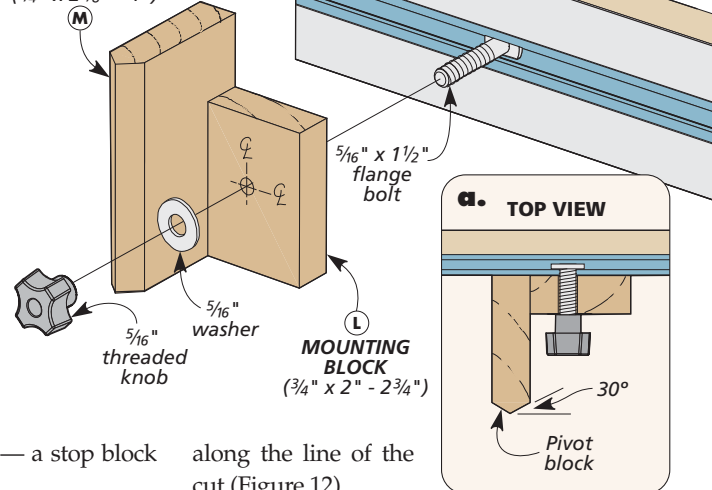
pair of handy accessories — a stop block and a pivot block.

STOPPED CUTS. The stop block (K) makes stopped cuts a snap and it's just a $\frac{3}{4}$ "-thick piece of hardwood. A hole in the block makes it easy to mount the stop to the T-track (Figure 7 and photo below).

RESAW WITH EASE. A band saw is tailor-made for cutting thick stock into thinner pieces, but that isn't always easy to do using the fence as a guide. Instead, I like to use a pivot block that allows me to make small adjustments to track perfectly

12 FIGURE

PIVOT BLOCK
($\frac{3}{4}$ " x $2\frac{3}{8}$ " - 4")



along the line of the cut (Figure 12).

The pivot block consists of two pieces — a mounting block, and a pivot block shaped to a point. The mounting block (L) is identical to the stop block. After shaping the edge of the pivot block (M), you can glue it to the mounting block.

With the accessories complete and the table and fence in place, you're ready to make just about any cut on the band saw — with precision and ease.

Fence Highlights



Stopped Cuts.

Making stopped cuts is a snap with a simple stop block that fits into the T-track in the fence.



Blade Drift. Adjusting the fence to match the drift of the blade is just a matter of "tweaking" the set screws in the fence.

Hold-Down. A small hold-down at the end of the fence prevents it from lifting off the surface of the table.



Resawing. The adjustable pivot block allows you to resaw thick stock into thinner stock with precision.



Band Saw Fence

With a built-in clamping system, adjustable rails, and a pair of handy fence accessories, you'll get accurate cuts on your band saw every time.

How many times have you simply clamped a scrap piece of wood to the table of your band saw as a fence and then spent the next hour fiddling around with it just to get a straight cut?

The solution is simple — add a fence system. But this is an expensive option for most band saws, so I decided to build my own. The system I came up with consists of two main parts: a wood fence and a set of metal rails that guide it.

FENCE. The fence supports the workpiece to determine the width (thickness) of the cut. To make sure it stays in place after it's been positioned, there's a simple but effective fence clamp. Once it's tightened

down, the fence is rock solid — there's no side to side play.

While the wide end of the fence provides plenty of clamping pressure on the rail, the other end is narrow to give you as much clearance as possible between the blade and the riser of the saw.

RAILS. The fence fits into a set of aluminum angle rails: a two-piece front rail and a single back rail. The two-piece front rail allows you to quickly adjust the angle of the fence in relation to the blade to get a straight cut. Details about adjusting the fence are on page 36.

In addition to being adjustable, the fence system is also designed so that you

can easily lift the fence off the rails whenever it isn't needed.

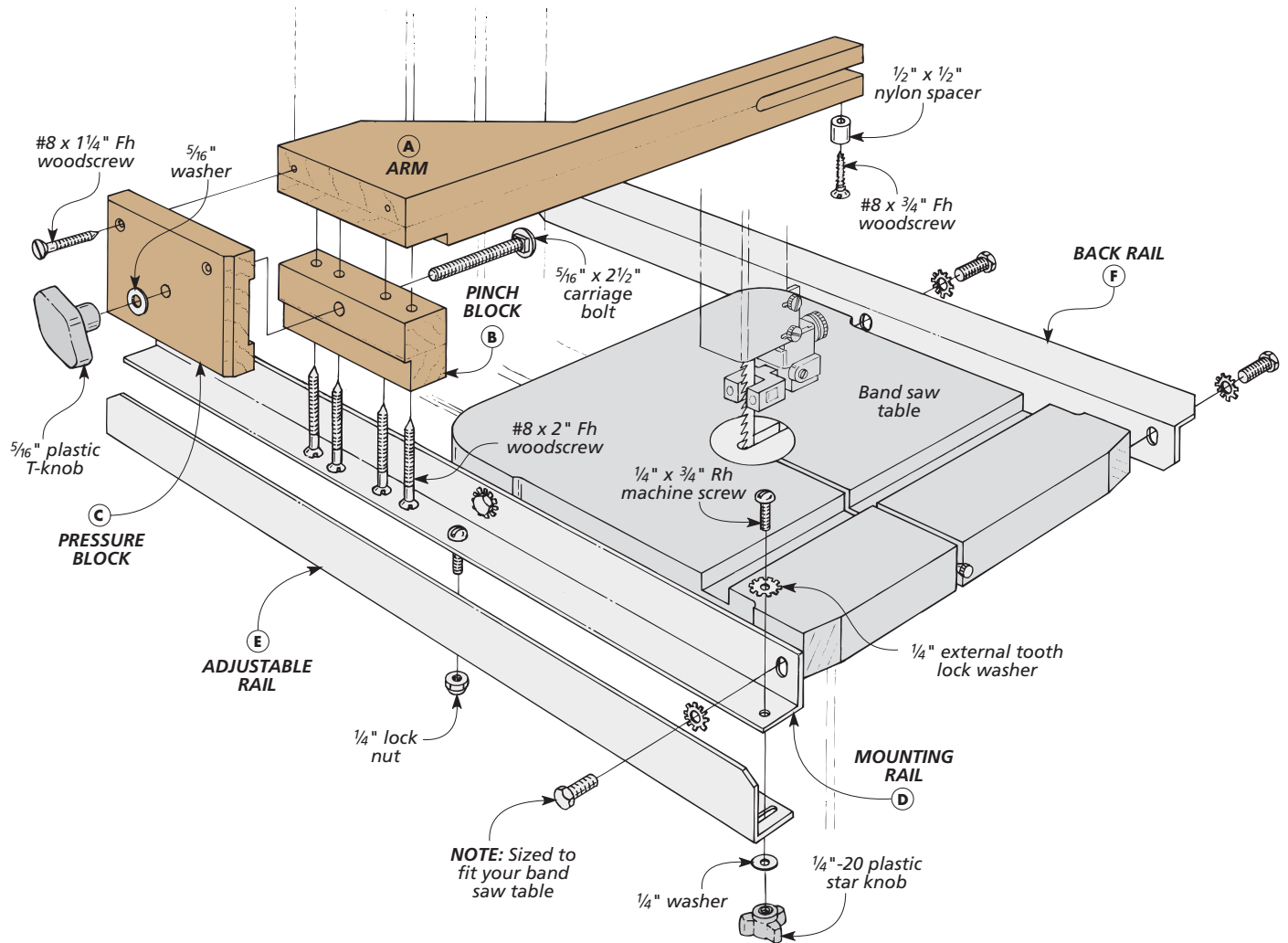
ACCESSORIES. There's a slot cut in the end of the fence to accept two optional accessories. One is a simple block that acts as an adjustable stop for repeat cuts. The other is a tall auxiliary fence that provides added support when resawing wider stock. Instructions for these easy-to-make add-ons are on page 37.

MATERIALS. Despite all the features, there isn't much material required to build the fence system. You may have enough wood in your scrap bin, and all of the hardware is readily available at most hardware stores.

CONSTRUCTION DETAILS

OVERALL DIMENSIONS:

23⁷/₈" W x 5⁷/₈" H x 19¹/₈" D

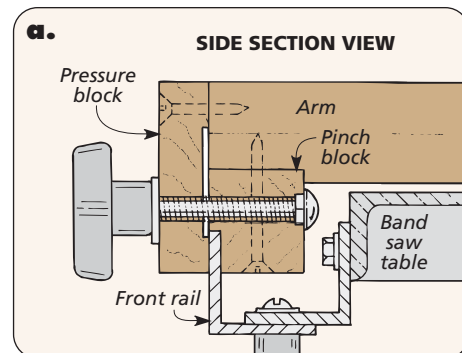
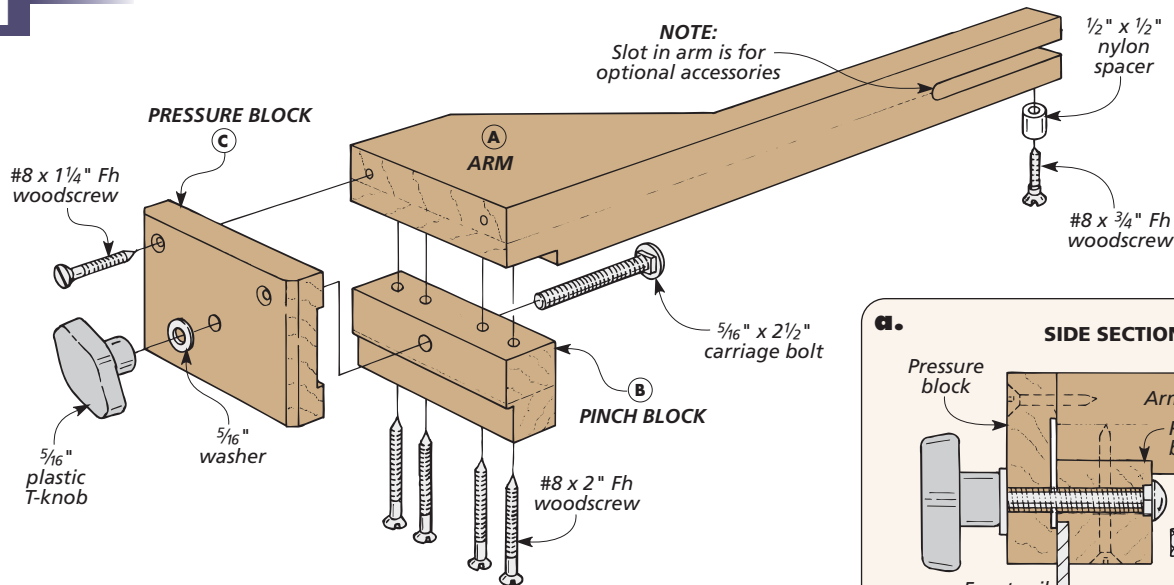


MATERIALS & SUPPLIES

- | | | |
|---|--------------------|------------------------------------|
| A | Arm (1) | 1 1/2 x 5 - 17 3/4 |
| B | Pinch Block (1) | 1 1/2 x 1 3/8 - 5 |
| C | Pressure Block (1) | 3/4 x 2 3/4 - 5 |
| D | Mounting Rail (1) | 23 7/8 - 1 1/2 x 1 1/2 alum. angle |
| E | Adj. Rail (1) | 23 7/8 - 1 1/2 x 1 1/2 alum. angle |
| F | Back Rail (1) | 23 7/8 - 1 1/2 x 1 1/2 alum. angle |
- (4) #8 x 2" Fh Woodscrews
 - (2) #8 x 1 1/4" Fh Woodscrews
 - (1) #8 x 3/4" Fh Woodscrew
 - (2) 1/4"-20 x 3/4" Rh Machine Screws
 - (1) 1/4"-20 Lock Nut

- (1) 1/4" External Tooth Lock Washer
- (1) 1/4"-20 Plastic Star Knob
- (1) 1/4" Washer
- (1) 5/16" x 2 1/2"-long Carriage Bolt
- (1) 5/16" Washer
- (1) 5/16" Plastic T-Knob
- (1) 1/2" x 1/2" Round Nylon Spacer
- (4) Hex-Head Machine Bolts w/Lock Washers to fit your band saw table*

*For mounting rails to saw table



easy-to-build Fence

The heart of the band saw system is the fence (Figure 1). It consists of three hardwood parts: an arm, a pinch block, and a pressure block. The pinch block and pressure block create a slot that supports the arm on the front rail (Figure 1a).

ARM

I started by making the arm. It's shaped like the letter "d" — wide at the front to provide a large clamping surface and narrow at the end to clear the throat of the band saw, as you can see in the photo below.

The arm is made by gluing up two 5"-wide blanks of 3/4"-thick stock face to face, as in Figure 2 below. (I decided

to use hard maple.) To determine the length of these blanks, measure the length (depth) of your band saw table and add 5". (In my case, the blanks were 17 3/4" long.) After the glue dries, cut the arm to shape and sand the edges smooth (Figure 2).

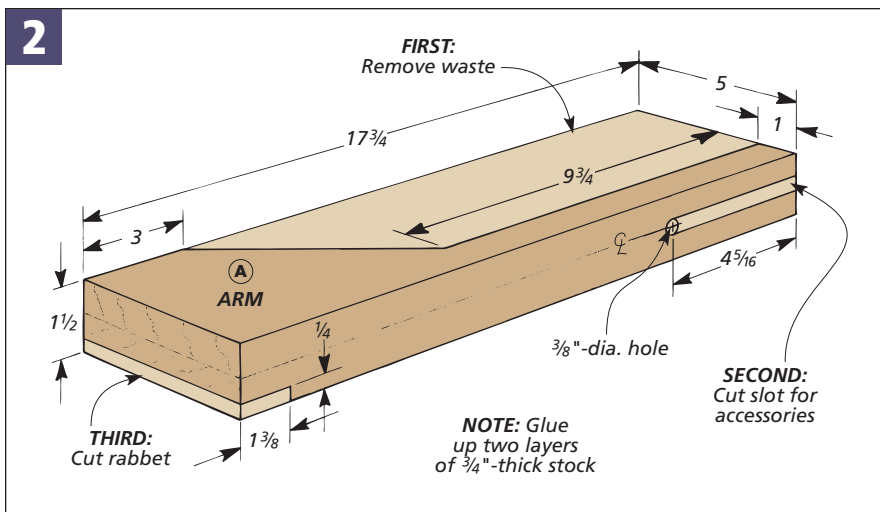
SLOT. If you're planning on making the fence accessories that you see on page 37, now is the time to cut a slot in the arm (Figure 2). I did this by laying out the location of the slot on the inside face of the arm. That way, the arm can rest on the flat edge while you're drilling a 3/8"-dia. hole at the end of the slot. Finally, remove the remaining waste with the band saw.

RABBET. The arm slides on a rail and is held on this rail by a pinch block and a pressure block (Figure 1a). To prevent the pinch block from twisting when it's screwed to the arm later, I cut a 1/4"-deep rabbet in the front of the arm to "lock" it in place (Figures 1 and 2).

PINCH BLOCK

The next step is to make the pinch block that fits in the rabbet you just cut in the arm (Figure 3). This block forms the rear "jaw" of the clamp that holds the arm in place on the front rail (Figure 1a).

To start making the pinch block, glue up two pieces of 3/4"-thick stock to make a blank about 8" long. Rip this blank to



"d" Shape. The shape of the fence allows it to wrap around the riser of the band saw. This way, you can slide it all the way to the left to accommodate wide pieces.

match the width of the rabbet ($1\frac{3}{8}$ "), as in Figure 3a.

LIP. To create a "lip" so the pinch block can ride on the front rail, cut a rabbet on the edge (Figure 3a).

After creating the lip, trim the pinch block to match the width of the arm (5") and screw it in place (Figure 3). I used four screws here so the pinch block will resist twisting when the pressure block is tightened. Note: Position the screws so that a hole can be drilled through the center of the block later.

PRESSURE BLOCK

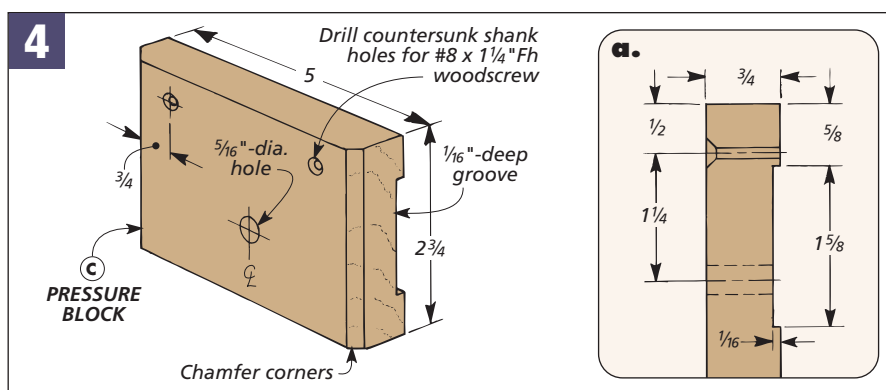
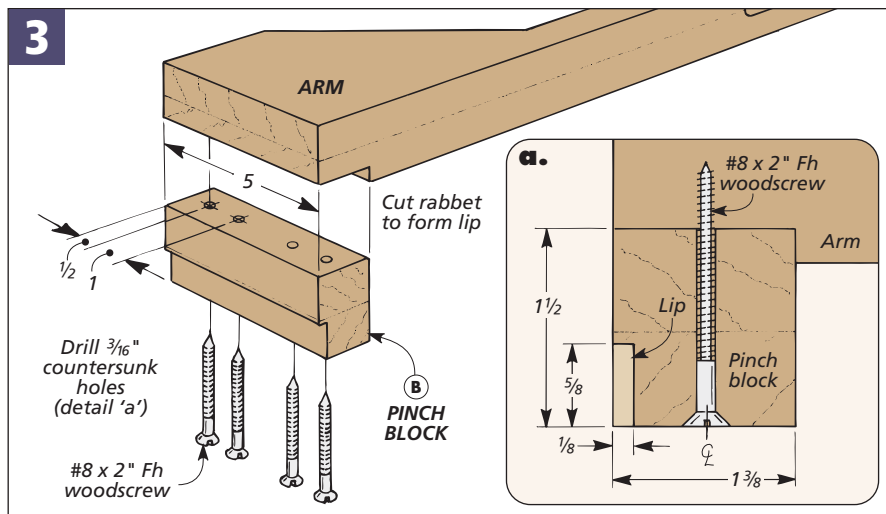
All that's left is to add the pressure block to the arm (Figure 1). Again, I started with an extra-long blank. Then I cut this blank to match the combined height of the pinch block and arm ($2\frac{3}{4}$ "), as in Figure 4.

SHALLOW GROOVE. To help concentrate clamping pressure on the front rail, cut a shallow groove in one face of the pressure block (Figure 4). Then trim the block to match the width of the arm (5") and chamfer the outside corners.

CLAMP. Once that's done, you can attach the pressure block to the arm with two woodscrews. Clamping pressure is exerted by a carriage bolt and a T-knob (or a wing nut).

The carriage bolt passes through both the pressure block and the pinch block (Figure 1a). When the T-knob is tightened on the end of the bolt, it pinches the guide rail and locks the fence in place.

TEMPLATE. The tricky part to all this is getting the screw and bolt holes to align perfectly in both pieces.

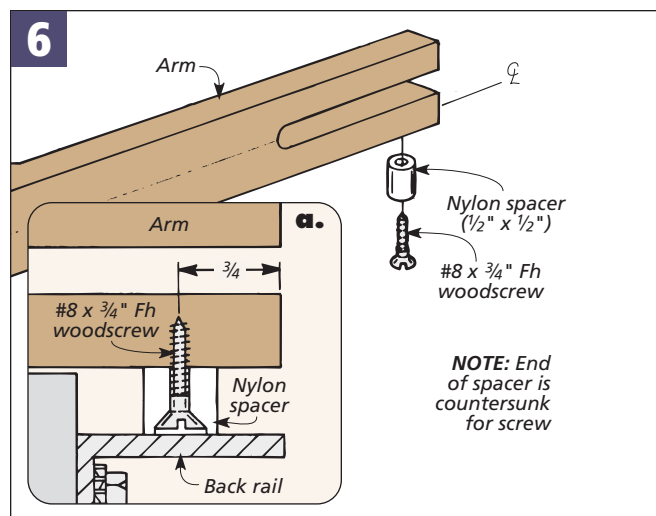
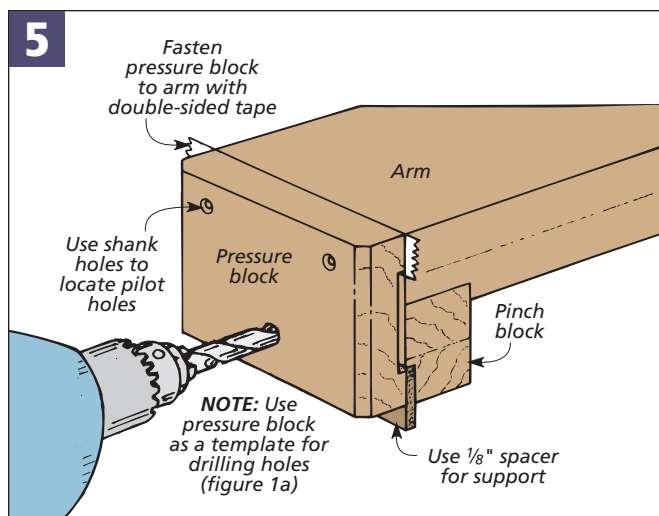


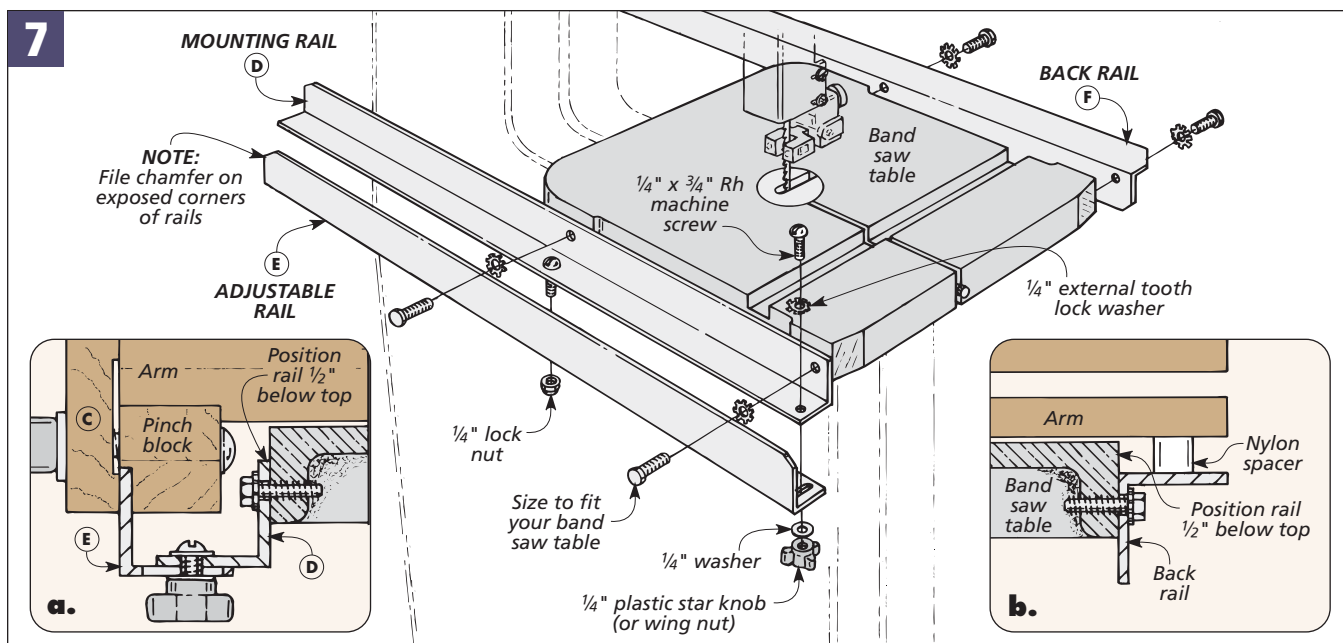
To solve this problem, I drilled three holes in the pressure block first (Figure 4). I fastened the pressure block to the arm with double-sided tape and used the holes as a template to drill through the pinch block into the arm (Figure 5).

ASSEMBLY. After the holes are drilled, assemble the fence. Drive the carriage bolt into the pinch block. Then, screw

the pressure block to the arm and place a washer over the carriage bolt, threading on the knob (or nut), as in Figure 1a.

NYLON SPACER. To complete the fence, screw a round nylon spacer to the narrow end of the arm, as you see in Figure 6. This spacer will ride on the back rail and support the fence when the arm doesn't rest directly on the saw table.





RAILS

At this point, work can begin on the rails that attach to the band saw table. There is a two-piece front rail and a single back rail (Figure 7).

ALUMINUM ANGLE. All three rail pieces are made from $1\frac{1}{2} \times 1\frac{1}{2}$ " aluminum angle. I used a hacksaw to cut three equal-length rails from a single six-foot length of angle (each piece is just under 24" long).

FRONT RAIL. Two pieces of angle make up the front rail (Figure 7). A mounting rail attaches to the table of your band saw. An adjustable rail attaches to the mounting rail and pivots so you can adjust your fence to get a straight cut.

The pivot point is centered on the length of the rails. A slot on one end lets you adjust the rail in or out and then "lock" it in position.

SPACER BLOCK. The tricky part is drilling the holes in both rail pieces so they align. The solution is to clamp a spacer block between the rails (Figures 8 and 8a). Then lay out and drill the holes.

MAKE SLOT. Next, to create the slot in the adjustable rail, drill a series of holes and file the slot (Figure 8b).

MOUNT RAIL. Mounting the front rail involves drilling two oversized holes in

Adjusting the Fence

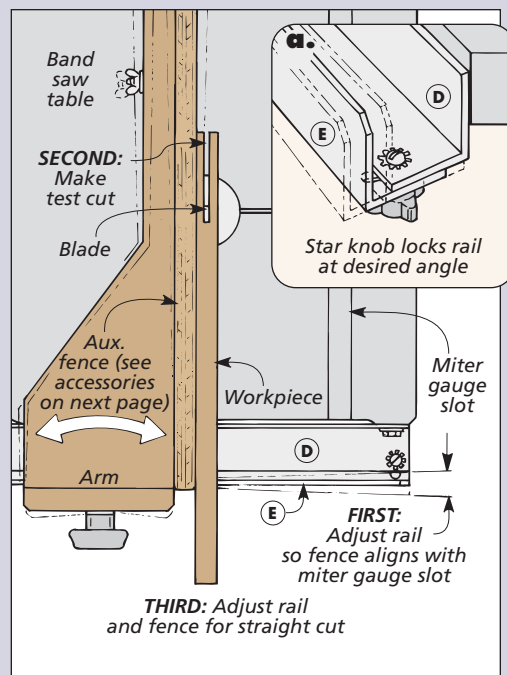
A unique feature of this fence system is its ability to compensate for drift. Drift is the tendency of the blade to "pull" one way or the other while cutting. Most band saw blades have a certain amount of drift. It's worse with a dull blade or one with uneven set. Fortunately, the problem can be solved by adjusting the angle of your fence to match the drift.

Align Fence. The first step is to align the fence so it's parallel to your miter gauge slot. Position the fence next to the edge of the miter gauge slot and lock it in place. Loosen the star knob on the adjustable rail (detail 'a'). Next, pivot the adjustable rail until the arm of the fence aligns with the edge of the slot and tighten the knob.

Test Cut. To check the fence system, make a test cut. Stand a scrap piece of wood on edge (drawing). Then position the fence to cut the scrap in half, and resaw the board. If the cut is straight, no more adjustment is needed.

Drift. If the cut isn't straight, move the fence so you can kick out the end of the board until the blade begins to follow a straight line. After cutting several inches of a straight line, turn off the saw, but don't move the workpiece. Then pivot the adjustable rail until the fence matches the angle of the workpiece (see detail 'a').

Now you should be able to cut a straight line with the workpiece against the fence.

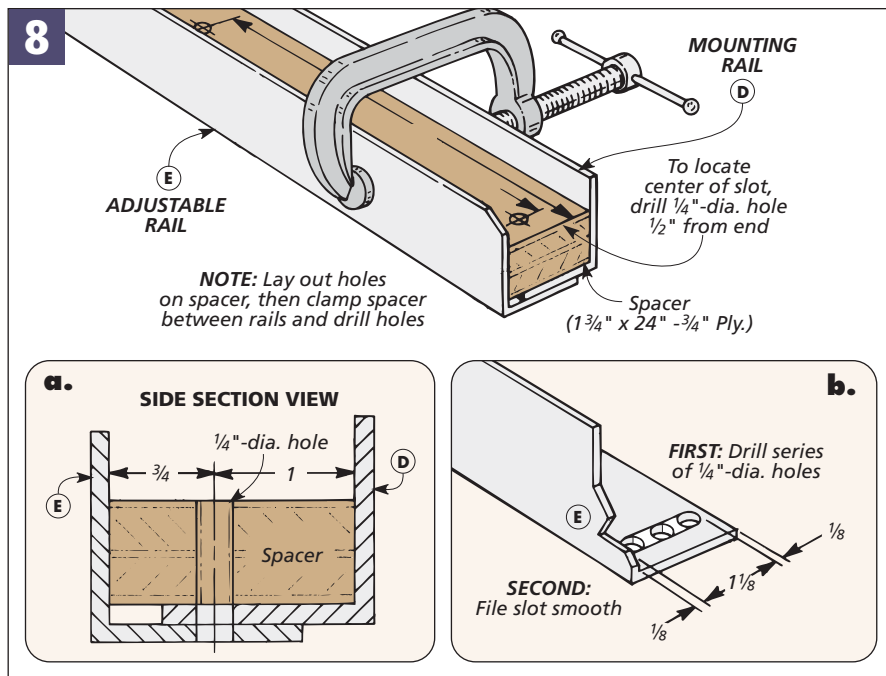


the mounting rail for bolts. These bolts thread into the pre-drilled holes in your tabletop (Figure 7). Note: If your band saw doesn't have these holes, you'll need to drill them.

It's important to install the rail $\frac{1}{2}$ " below the top of the table (Figure 7a). This way, you'll still be able to get the bar of your miter gauge in and out of the slot without any fiddling. (Figure 7).

BACK RAIL. Once the front rail is bolted into place, the only thing left is to add the back rail to the rear of the table to support the narrow end of the fence (Figures 7 and 7b). Drill two oversized mounting holes and bolt it to the band saw table.

CHAMFER CORNERS. As a finishing touch to the rails, file the sharp exposed corners into a chamfer (Figure 7).



Fence Accessories

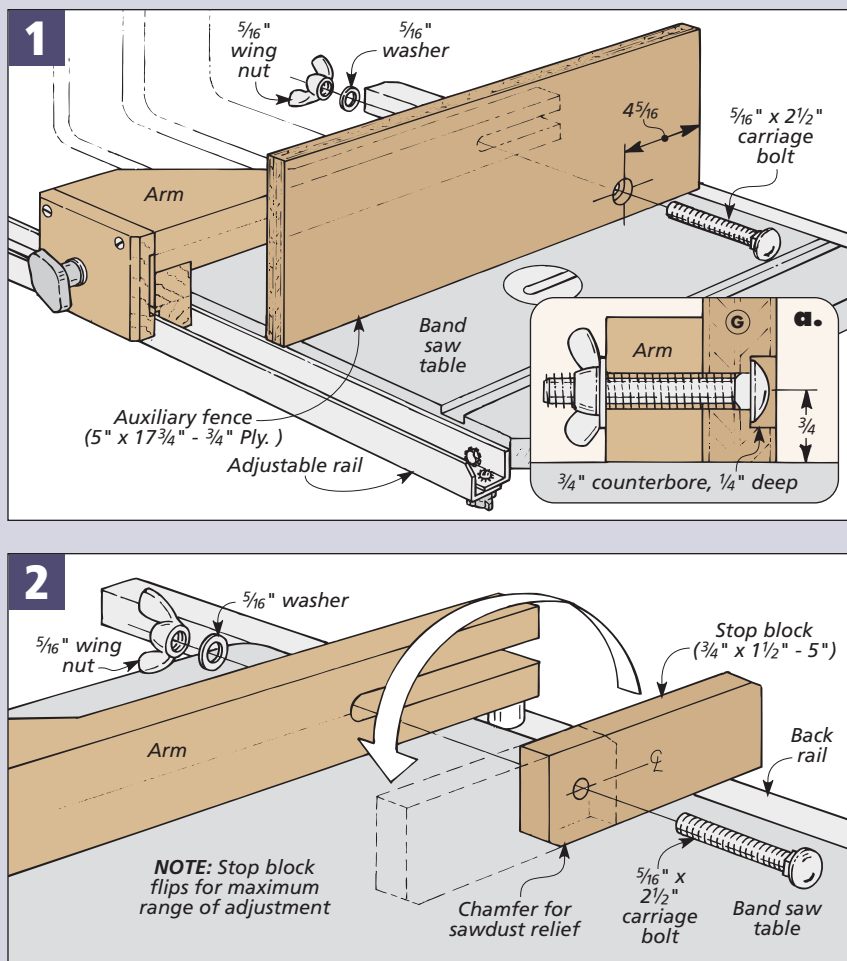
There are two accessories for the band saw fence that I find myself reaching for all the time. One is a tall auxiliary fence that makes resawing safe and simple, as shown in Figure 1. The other is an adjustable block that's handy for making stopped cuts (like cutting tenons), as in Figure 2.

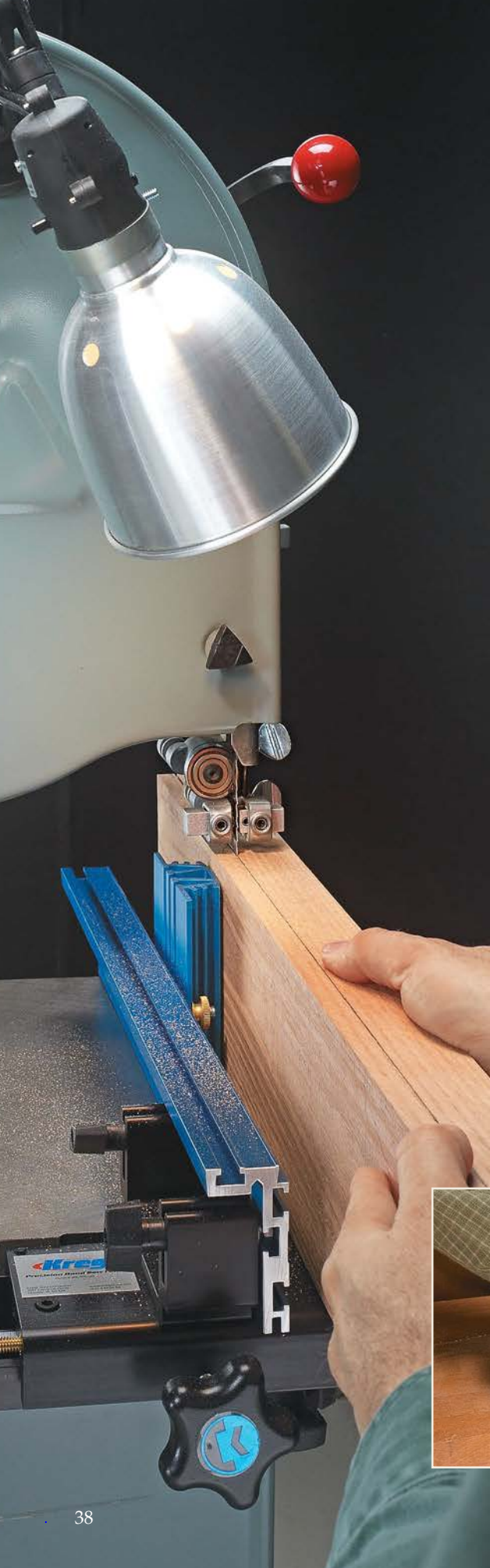
Auxiliary Fence. The auxiliary fence offers additional support to your workpiece when resawing. As you see in Figure 1, it's just a piece of plywood cut to match the length of the arm ($17\frac{3}{4}$ ").

This fence attaches to the arm with a bolt and a wing nut. To prevent your workpiece from catching on the bolt, counterbore the hole (Figure 1a).

Stop Block. The stop block is simply a piece of scrap hardwood with a hole drilled at one end for a carriage bolt. Locating the hole near one end allows you to flip the block and position it either close to the blade or back by the end of the arm, as illustrated in Figure 2.

To complete the stop block, chamfer the two opposing corners of the block (Figure 2). This prevents sawdust from building up between the stop block, the table, and the workpiece.





Great Gear 12 Add-Ons & Upgrades

Take a look at some great ways to make this essential tool work harder and better.

Whether you need to cut a curve on a workpiece, resaw stock, or just make a quick, accurate cut, there's often no better tool for the job than the band saw. It's without a doubt one of the most versatile performers in the shop. So maybe this trusty old tool deserves more respect and attention than we give it.

What I'm suggesting is pretty simple. Just make certain that your band saw is in top working order and always up to any task you ask of it. And a simple way to do this is to outfit your saw with some of the aftermarket upgrades and accessories that are available.

With a few exceptions, these items are all pretty inexpensive and the payback period is short. Your band saw will run smoother and quieter, make cuts easier and better, and probably even tackle some new chores. You'll find all the source information on page 99.

1. URETHANE TIRES

The original equipment tires installed on your band saw wheels are most likely rubber. They work fine until the rubber dries out, cracks, loses its elasticity, and starts to slip on the wheel. At this point, the blade probably won't track right and you need to find a fix.

My suggestion is that you upgrade to urethane tires, as shown in the photo below. Urethane tires have several advantages over rubber. Unlike rubber tires on some band saws, they don't need to be glued to the wheel, so installation is a snap. You simply stretch the tire over the wheel, reinstall it, and you can get back to work.

Once the tire is in place, you can forget about it. Urethane tires hold up much better under load and can last as much as five times longer than a rubber tire. For the cost (14" tire, \$25), you can't beat them.



2. WHEEL BRUSH

Installing a wheel brush on your saw is an easy and cost-effective way to ensure trouble-free operation. The concept is shown in the photo at right. As the wheel turns, the brush gently “dusts” the lower tire, keeping the chips and sawdust from building up on the tire. The blade tracks better and the tire will last longer. Only \$6 to \$8.



3 SWIVEL LIGHT

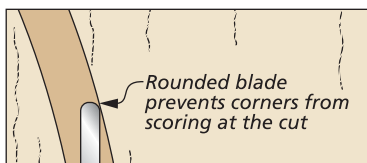
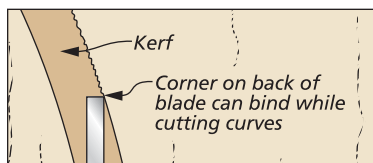
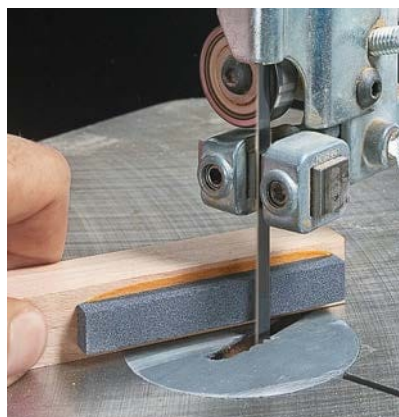
For me, one of the best ways to improve the quality of my cuts is to shine some light directly on the subject. A versatile work light, like the one shown at right, fills this bill nicely.

This light has two nice features. The first is a strong magnetic clamp that allows you to quickly attach it to the band saw cabinet. Then you can use the multiple swivel points to direct the light right where it's needed. For \$30, you can't go wrong.



4. TUNING STONE

Dressing a blade with a tuning stone allows you to cut tighter and smoother curves. The idea is simple. With the saw running, you hold the tuning stone against the back of the blade to round over the sharp edges (left photo). As shown in the drawings below, the rounded edge won't drag in the kerf, scoring and burning the cut. About \$13.



5. LINK BELT

Vibration is the enemy of smooth cuts. A good way to reduce vibration and improve the quality of your band saw's cut is to replace the stock drive belt with a link belt (right photo).

A link belt very effectively dampens vibration from the saw's motor. In addition, a link belt will hold up much better than a stock belt. You'll pay \$7 to \$8 per foot.



6. GUIDE BLOCK UPGRADES

There are a couple of inexpensive, after-market guide block upgrades that offer improved performance for this all-important part of your band saw.

Cool Blocks (left photo) are made from a self-lubricating, non-metallic material. As the name implies, they provide firm support for the blade without generating friction or heat. Your blades will run quieter and last longer. A good deal at about \$14.

The *Spaceage Ceramic Guideblocks* in the right photo offer improved performance with a different twist. These blocks are made from a wearproof ceramic material. They reduce friction and run quieter while removing resin buildup from the blade. For \$20 you get a lifetime guarantee.



7. BANDROLLERS

If you'd like to take a step up from stationary guide blocks, the easy-to-install ball bearing *Bandrollers*, shown below, are a good option. Virtually frictionless and wearproof, these guides provide snug blade support for better cuts and longer life. At \$75, a sound purchase.



8. ROLLER GUIDE SYSTEM

Some band saws see more use than others. If you rely on your saw as a do-everything, all-the-time tool, an upgrade to the *Carter Roller Guide Conversion Kit* might serve you well. This system replaces both the upper and lower guide units of your saw with the heavy-duty, ball bearing guide assemblies shown in the photo at right.

Ball bearing guides can be snugged up tight to the blade to provide more rigid support than standard stationary guides. The advantage is much less flex and twist in the blade while



making tough cuts. You'll be able to follow a curved or straight line with dead-on accuracy. A conversion kit will run in the \$150 range, but give you a lifetime of service.

9. A NARROW BLADE STABILIZER

A band saw is designed for and excels at cutting curves in wood. And if you use your saw to do a lot of fine scroll work, the Carter Stabilizer, shown at right, might be a good investment.

The stabilizer is designed for use with $\frac{1}{8}$ " to $\frac{1}{4}$ "-wide blades. It uses a unique approach to keep these narrow blades on track. The stabilizer replaces the rigid, three-sided

support of the standard guide system with a grooved, bearing-mounted, metal wheel.

The blade rides in the groove in the wheel and is prevented from moving backward or side to side. But it can twist slightly as you follow a curve. The upshot is that this flexible support allows you to cut tighter, smoother, and burn-free curves. For \$75 your band saw can take on the roll of a scroll saw.



10. QUICK-RELEASE TENSIONER

If you change blades often or always release the tension on the blade when the band saw is not in use, the *Carter Quick-Release Tensioner* should be high on your wish list. No more cramped hands from endlessly turning the tension knob. The quick-release tensioner allows you to release and then reapply precise blade tension with the flip of a lever, as shown at left.

In addition to full release and full tension, a mid-tension setting makes blade changes much easier. You'll have no reason to put off a necessary blade change and you can make the blades, tires, bearings, and tension spring last longer. The tensioner will fit most 14" band saws and even at around \$160, is well worth the cost.



11. HIGH-TENSION SPRING

For accurate cuts, proper blade tension is essential. If the tension isn't up to specs, the blade can flex and start to wander in the cut.

The stock tension spring on your saw can weaken over time and may not be able to deliver the necessary tension, especially when using wider blades for resawing. Replacing it with a high-tension spring (yellow spring below) will guarantee proper tension for any width blade or cutting operation. About \$20.



12. KREG PRECISION FENCE

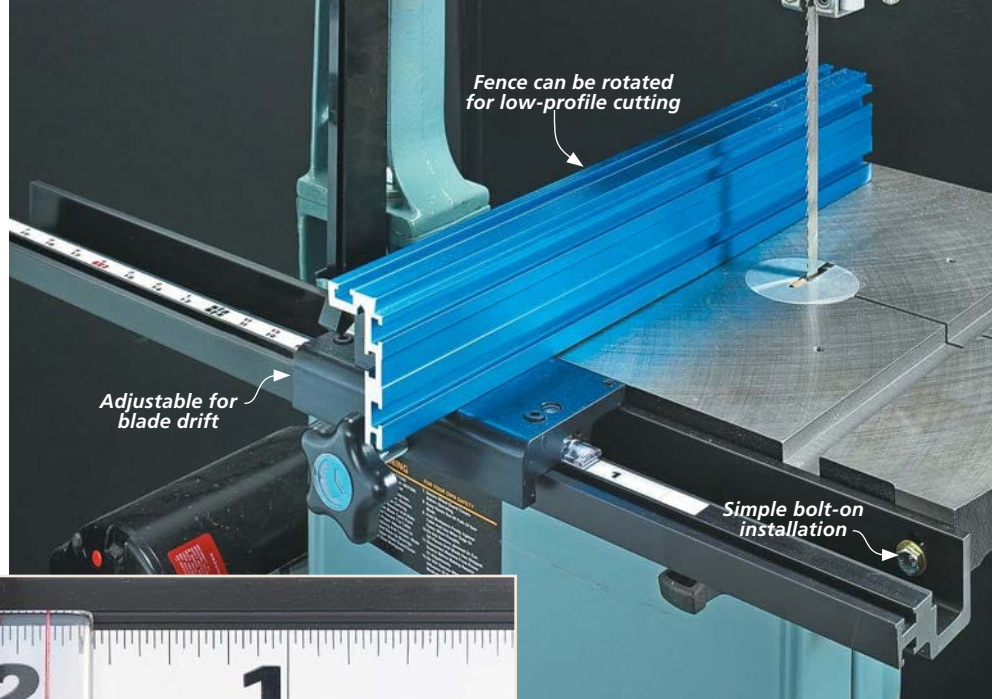
I'll admit that I never considered a high-quality band saw fence a necessity. But a little time spent using the Kreg Precision Band Saw Fence changed my attitude.

EASY MOUNT. As with all of Kreg's offerings, their band saw fence is well thought out and well made. The photo at right shows the basic fence package. What immediately impressed me was how easy it is to assemble and install the fence. The mounting rail simply bolts in place using the existing threaded holes in the saw's table. The rail is pre-drilled to fit a variety of common band saw brands.

VERSATILE ADJUSTMENT.

Once the fence is installed, you can begin to explore the range of easy-to-make adjustments. The fence is mounted to a clamping block that slides effortlessly along the rail and is locked down with a "finger-friendly" knob. It can be positioned on either side of the blade. A tape and cursor allow fast, accurate adjustment (inset photo).

Next, a pair of easily accessible nylon



Cursor. You can keep the ruler in your pocket. The tape and lens cursor make for quick fence adjustments.

set screws allow you to align the fence perfectly parallel to the blade. The fence can also be adjusted side-to-side by simply loosening a pair of T-knobs and sliding it along its mounting bracket.

If blade drift is a problem, there's a simple solution. The fence mount can be pivoted on

the clamping block to either align it parallel to the blade or adjust for drift.

Finally, when cutting thin stock, the L-shaped fence can be remounted in a low profile configuration. This allows you to lower the guides for better blade stability. You get a lot of fence for \$119.

Inexpensive Add-Ons

Kreg also offers a couple of low-dollar add-ons for their band saw fence that are definitely worth a look.

Precision Micro-adjuster. If you add the *Kreg Micro-Adjuster*, shown below, you won't have to rely on the "gentle



No More Nudge. To make a precise adjustment, you simply lock down the adjuster, unlock the fence, and dial in the position.

nudge" technique of fence positioning. It works pretty slick. As you can see, the adjuster rides on the mounting rail and is connected to the clamping block by a threaded rod. You lock down the adjuster, unlock the fence, and then turn the dial to make adjustments as fine as .005". Not bad for \$15.

Resaw Guide. Without a reliable way to guide and steady the workpiece, accurate resawing can be hit or miss. The Kreg Resaw Guide (right photo) eliminates this uncertainty.

As you can see, the guide face is curved. This allows you to adjust your feed for blade drift and accurately follow a layout line. It's available in a 4½" and 7" height. (\$18 to \$20)



Reliable Resawing. The *Kreg* resaw guide mounts easily to the fence. Its curved face allows you to steer the workpiece to track a line.



band saw Circle Cutting Jig

Cut perfect circles and arcs with this simple, easy-to-use band saw accessory.

The band saw is one of the most versatile tools in any shop. One of the tasks it excels at is cutting curves. And with the jig you see above, you can cut perfect circles quickly and reliably.

The jig's base is made from phenolic plywood. Its durable, slick surface is perfect for supporting the workpiece as you rotate it through the cut. An adjustable

pivot pin in a heavy-duty aluminum bar allows you to cut circles up to 38" in diameter. Finally, a unique stop system lets you align the pivot pin with the front edge of the blade. This way, the jig automatically stops at the correct point for you to begin rotating the workpiece for the cut.

SIZING THE BASE. To get started, you'll want to measure the width and depth of your

band saw table. I sized the jig base 4" larger in both directions to provide solid support for the workpiece (Figure 1).

LOCATE THE RUNNER. An aluminum runner rides in the miter slot to align the jig for the initial cut into the workpiece (but I'll talk more about that later.) To locate the runner, place the base on the saw table with the left side of the base flush with

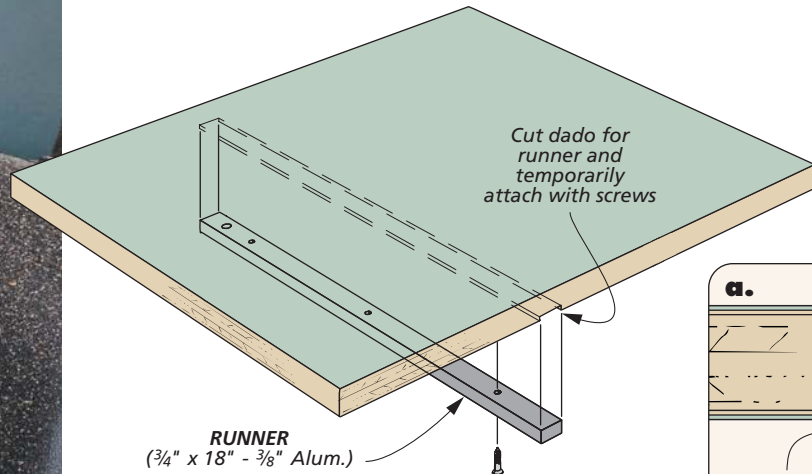
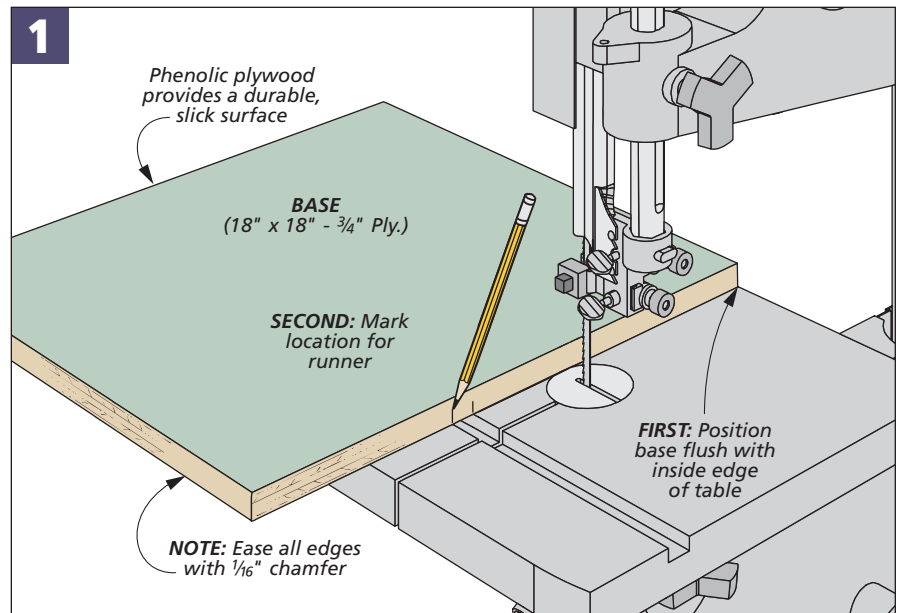
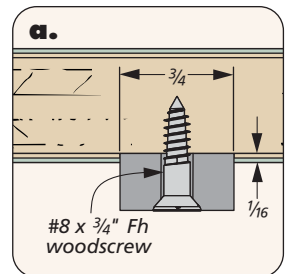
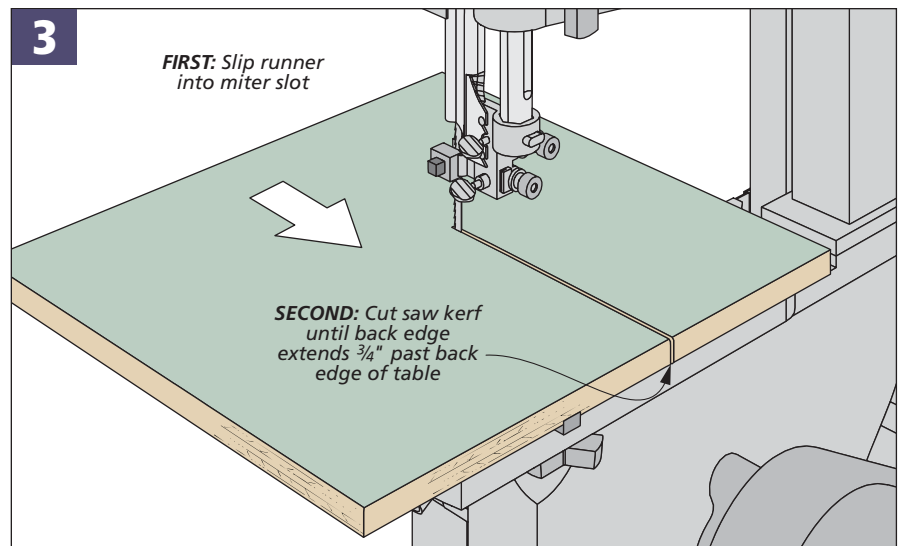


FIGURE 2

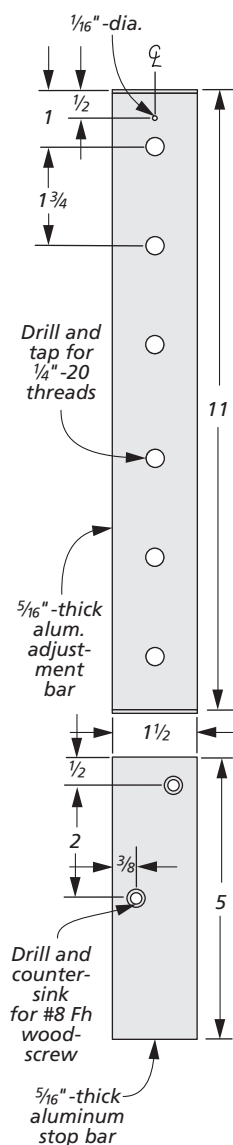


the edge of the saw table. After marking the location of the miter slot, cut a shallow dado sized to fit the runner (Figure 2). You can temporarily install the runner to complete the next step.

MAKING A SAW KERF. The next task is to create a kerf in the base. This kerf locates the end of the stopped groove used to house the adjustment bar. It's a simple matter to turn on the saw, set the runner in the miter slot, and push the base forward. When the back edge of the base extends 3/4" past the back edge of the table, stop the cut, as shown in Figure 3. You can now turn your attention to making the adjustment bar.



attaching the Bar & Stop

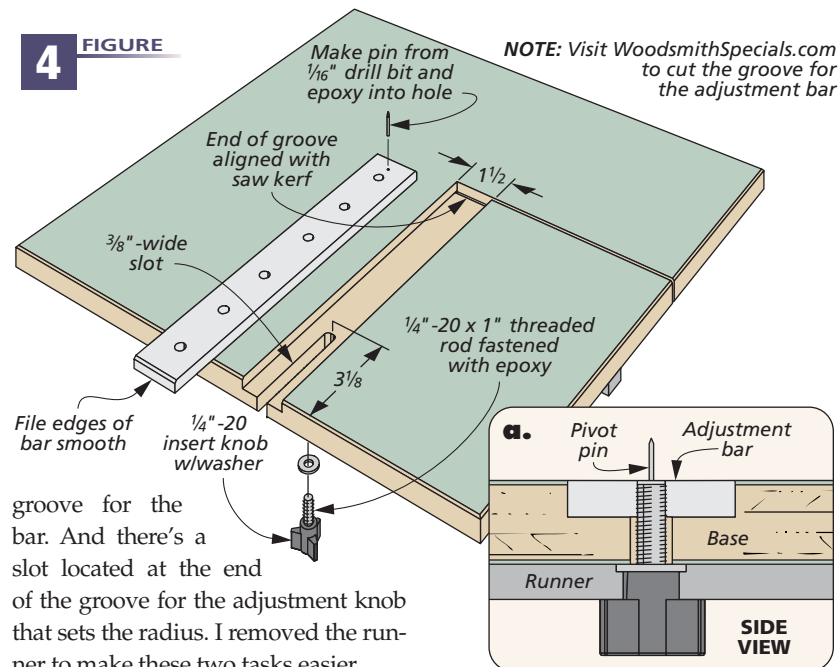


The next task is to add an adjustment bar that locks in the cutting radius. The last step will be to add an adjustable stop. This stop correctly positions the pivot pin relative to the blade. It also prevents the jig and workpiece from lifting off the table once you start the cut.

ADJUSTMENT BAR. The first thing to do is cut the $\frac{5}{16}$ "-thick aluminum bar to length. I took the time to file off the sharp edges before drilling and tapping all the holes (margin drawing). The tapped holes allow for a wide range of adjustment for the cutting radius.

Figure 4 and the margin drawing show all of the hole locations in the adjustment bar. The pivot pin is made from a $\frac{1}{16}$ "-dia. drill bit ground to a point. It's glued with epoxy into the aluminum bar. The remaining holes are drilled and tapped for a $\frac{1}{4}$ "-20 thread.

GROOVE & SLOT. You can set the bar aside for now and get to work on the stopped



groove for the bar. And there's a slot located at the end of the groove for the adjustment knob that sets the radius. I removed the runner to make these two tasks easier.

Routing the stopped groove is easy (see the article at WoodsmithSpecials.com). Then, I routed the adjustment slot at the router table, as shown in Figure 4. You can fasten the adjustment bar in place with a studded knob and washer. Now would also be a good time to reinstall the runner on the bottom.

STOP ASSEMBLY. When using the jig, it's important that the pin is directly aligned with the front edge of the blade's teeth (see opposite page). This prevents the blade from binding and results in a smoother cut. To accomplish this goal, I made the stop assembly shown in Figure 5.

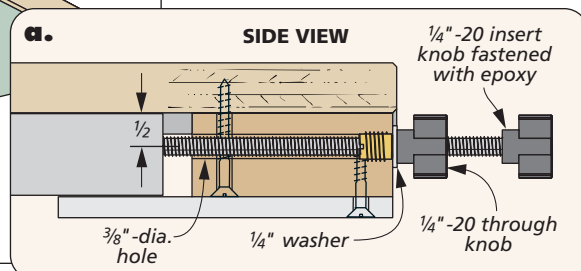
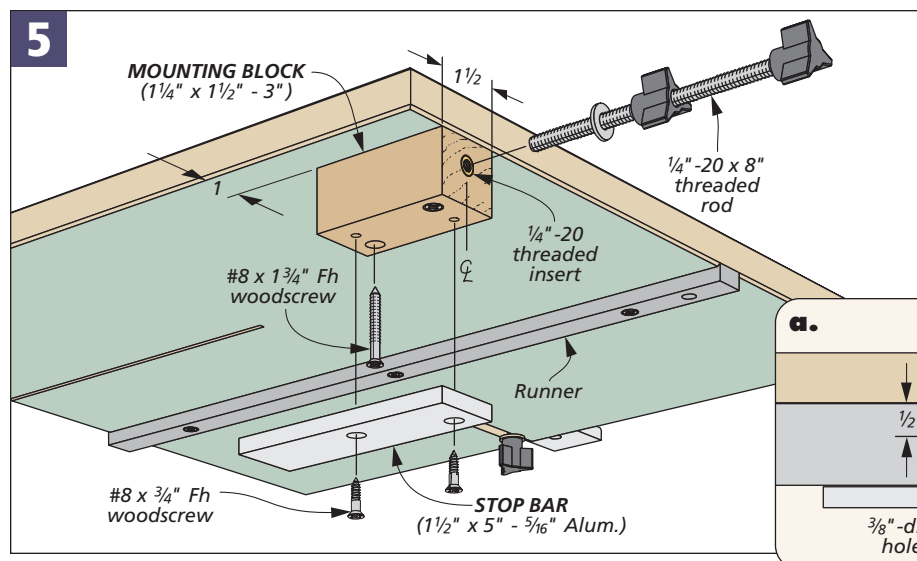
The assembly starts with the mounting block. Its thickness matches the thickness of the band saw table (Fig-

ure 5a). Drill the through hole for the threaded rod and the two screw holes used when attaching it to the base. You can go ahead and install the threaded insert while you're at it.

After fastening the block to the underside of the base, all you need to do is install the hardware. This starts with a short length of aluminum bar. It's longer than the mounting block and creates a "hook" to keep the jig in place. You can see how it's installed in Figures 5 and 5a.

Next comes the knob assembly. Begin by cutting the threaded rod to length and using epoxy to fasten a knob at one end. After the epoxy sets up, you can spin on a locking knob before threading the rod into the insert in the mounting block.

FINAL ADJUSTMENT. The last thing to do is install the jig on your saw and make some adjustments following the process detailed on the next page. Once everything is set up, you'll soon discover how easy it is to cut perfect arcs and circles in no time at all.



Using the Circle-Cutting Jig

Setting up the jig and using it is pretty simple. The photo sequence below will step you through the process.

Initial Setup. The most important part of using the jig is making sure the pivot pin is aligned with the front edge of the blade. This is a matter of adjusting the stop to contact the edge of the table and locking it using the locking knob.

Set the Radius. The next step is to set the radius for the desired cut.

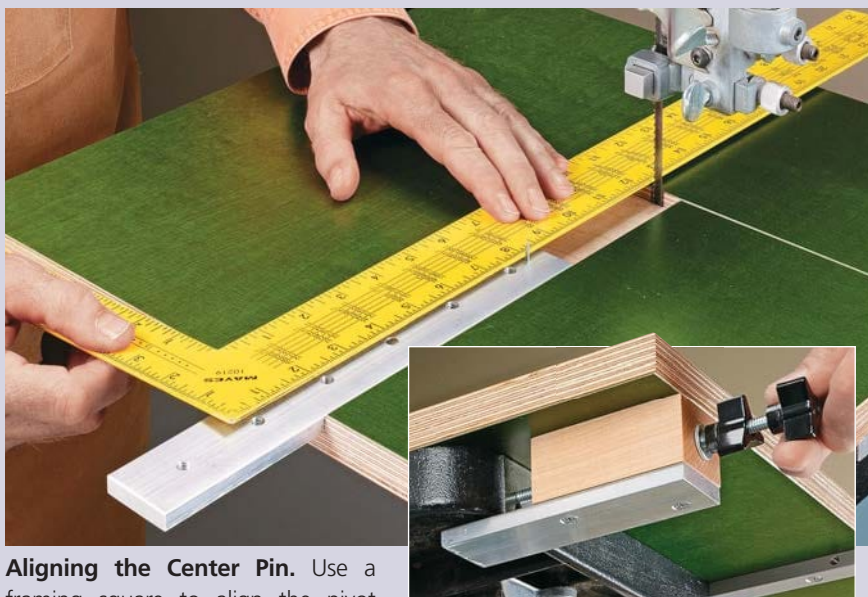
Here, you're measuring from the center of the pin to the outside edge of the blade's teeth.

Cutting. You're almost ready to start cutting, but first you need to drill a centered pivot hole in the workpiece. This involves drilling a stopped hole on the bottom face.

With the saw off, slip the workpiece over the pivot pin. Now you can turn on the saw and get ready to make the cut. While holding the workpiece steady, slide

Perfect Circles. After cutting the workpiece to shape, a little sanding is all it takes to remove the saw marks.

the jig forward, making a straight cut, until the jig stops against the table. Then, you can begin rotating the workpiece into the blade to cut a perfect circle.



Aligning the Center Pin. Use a framing square to align the pivot pin with the front edge of the blade. After adjusting the stop underneath so that the threaded rod contacts the table, lock it in place (inset).



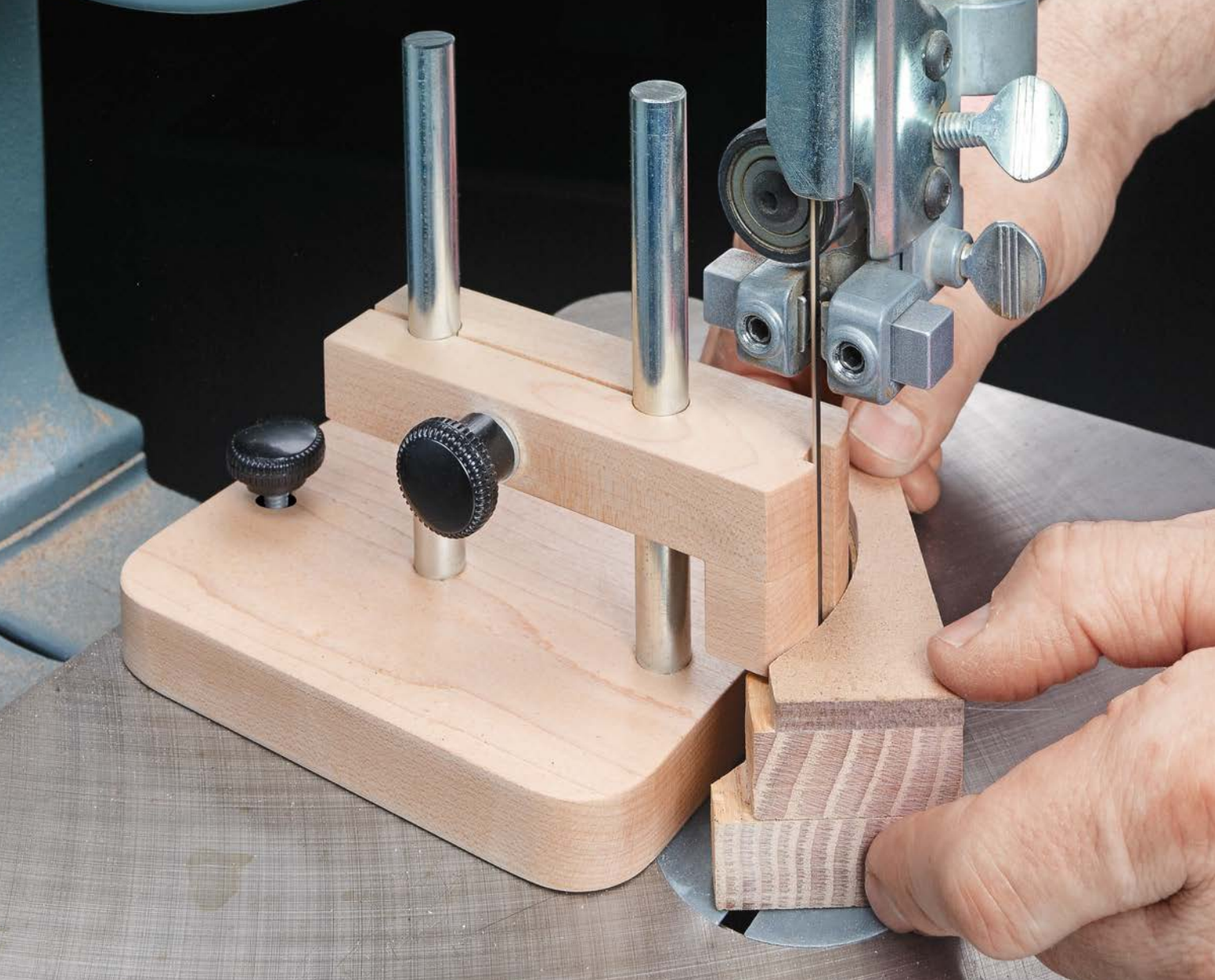
Setting the Radius. To set the radius, loosen or remove the adjustment knob and slide the bar so the pivot pin is located at the desired radius and tighten the knob.



Straight Cut First. After drilling a pivot hole (inset), place the workpiece on the jig. As you make the cut, hold the workpiece straight until the jig stops.



Perfect Circles. Once the stop contacts the band saw table, you can start rotating the workpiece into the blade in a clockwise direction. The key to a smooth edge is to maintain a consistent feed rate throughout the cut.



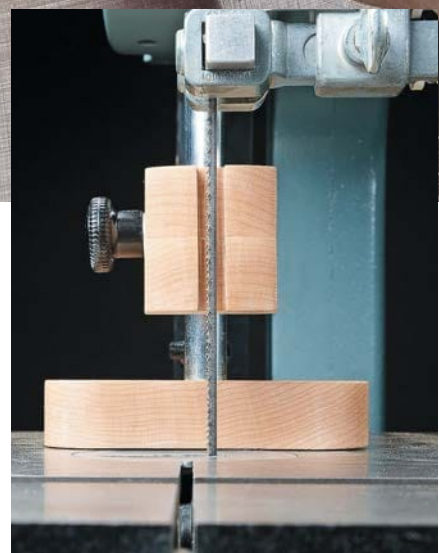
template Jig

Cutting multiple, identically shaped parts has never been easier. This simple jig is the key.

Whenever I have a project that calls for identically shaped, contoured parts, I like to use a template to quickly lay them out. Another benefit is the template can also serve as a cutting guide to rough out multiple parts on the band saw, as you can see in the photo above. And after the parts are cut, you can clean up the cut using a flush trim bit in your router table.

The trick to quick and easy results is to use a jig to help guide the workpieces through the blade. The simple jig you see here does the job by nestling the blade between two contact points on the curved guide (photo at right). These points guide the template and workpieces as you cut.

SIMPLE JIG. If you take a look at the Exploded View, you'll soon realize that



Guide. The template is steadily guided by a contact point at the front and rear of the blade.

the template jig is a quick build. A hardwood base supports two steel rods and an adjustable guide. A set of rare-earth magnets keep the jig secured on your saw's table.

MAGNETIZED BASE. To start building the jig, cut the base to size, as shown in Figure 1. The next few steps are going to require

some time at the drill press.

It's important that the jig doesn't slip out of position in the middle of a cut. Three large rare-earth magnets and cups

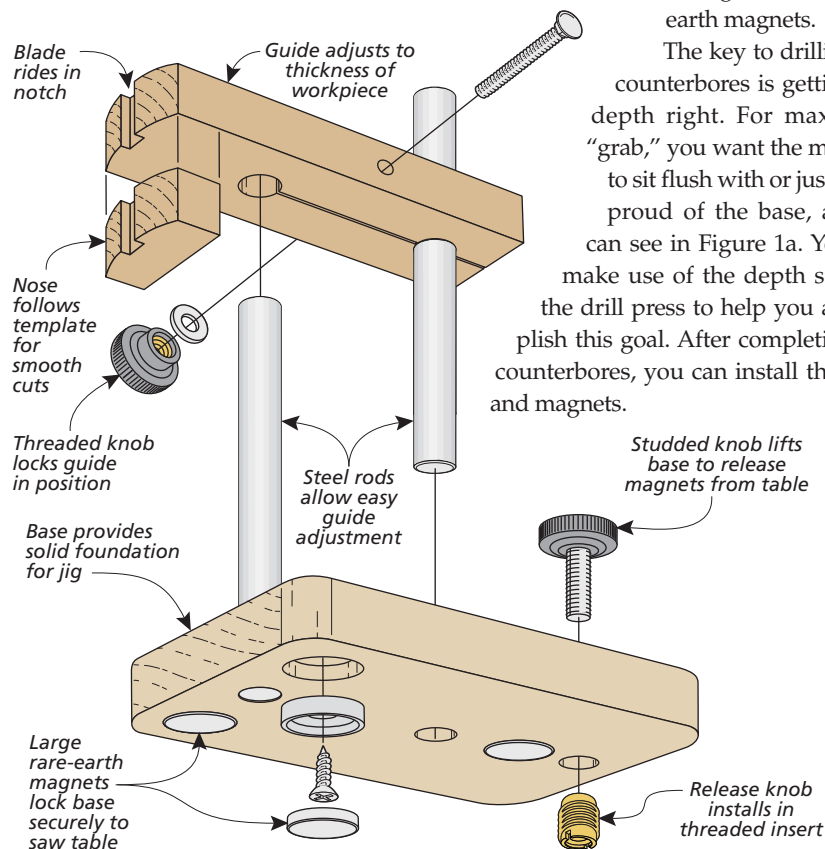
strength of the rare-earth magnets.

The key to drilling the counterbores is getting the depth right. For maximum "grab," you want the magnets to sit flush with or just a hair proud of the base, as you can see in Figure 1a. You can make use of the depth stop on the drill press to help you accomplish this goal. After completing the counterbores, you can install the cups and magnets.

DESIGNING A RELEASE. The challenge with using these types of magnets is they're so strong I found they made the jig difficult to remove from the saw. I had to find an easy way to release the magnets without damaging the jig. A studded knob in a threaded insert does the trick. You simply turn it to "pry" the magnets off of the saw's table. I filed the end of the stud smooth to prevent marring the saw table. While you're at the drill press, it's a simple task to drill the hole for the threaded insert (Figure 1).

There's a trick I use to install threaded inserts. I use a bolt with the head cut off as an installation tool (margin photo). Just chuck the smooth end in your drill press. Spin a pair of hex nuts and threaded insert onto the bolt. You can snug the nuts tight against the top of the insert.

Then with the power off, use one hand to spin the chuck while using the other hand to apply downward pressure with the quill lever. Finally, loosen the chuck to remove the bolt from the threaded insert.

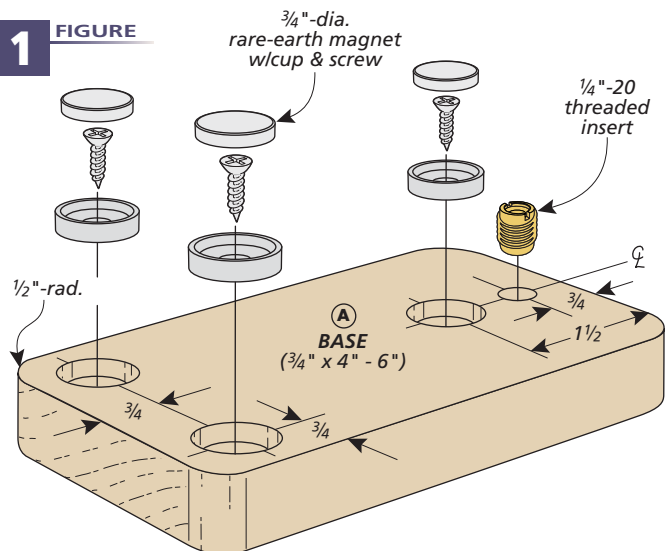


MATERIALS & SUPPLIES

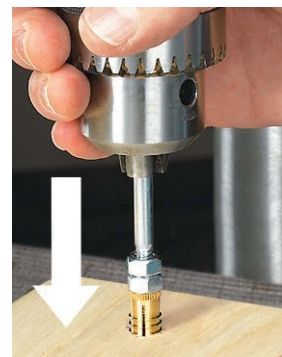
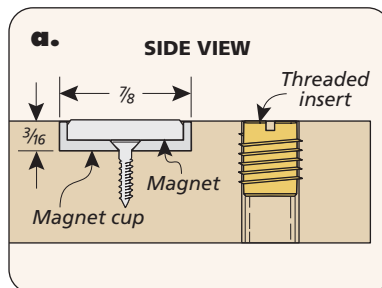
A	Base (1)	$\frac{3}{4}$ x 4 - 6
B	Guide (1)	$\frac{3}{4}$ x $1\frac{1}{2}$ - 5
C	Nose (1)	$\frac{3}{4}$ x $1\frac{1}{2}$ - $\frac{3}{4}$

- (2) $\frac{1}{2}$ "-dia. x 6" Steel Rods
- (1) $\frac{1}{4}$ "-20 x $1\frac{3}{4}$ " Carriage Bolt
- (1) $\frac{1}{4}$ " Washer
- (1) $\frac{1}{4}$ "-20 Insert Knob
- (1) $\frac{1}{4}$ "-20 x 1" Studded Knob
- (1) $\frac{1}{4}$ "-20 Threaded Insert
- (3) $\frac{3}{4}$ "-dia. Rare Earth Magnets
- (3) Magnet Cups w/Fh Screws

1 FIGURE



NOTE:
base shown
bottom side up



Straight. Use the drill chuck to ensure the threaded insert is installed straight.

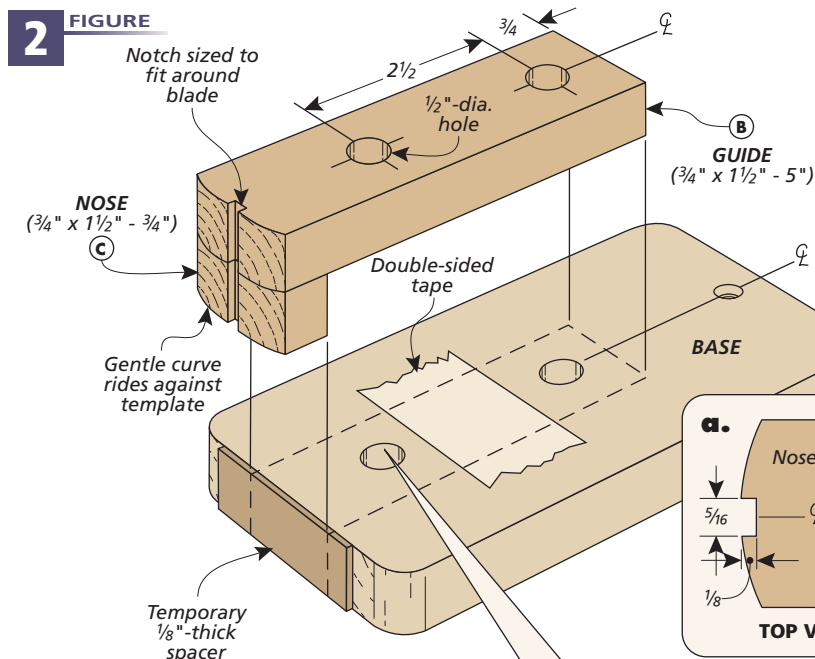
creating the Guide

To complete the jig, the next step is to install two steel rods and make the adjustable guide. Figures 2 and 3 provide the details.

TWO-PIECE GUIDE. The guide is made from a long blank that's drilled to fit over the steel rods. The guide adjusts up and down to accommodate thick or multiple workpieces. A short "nose" piece adds contact area to the guide and allows you to lower the guide to cut thin workpieces.

I started by cutting the guide to length and gluing on the nose. Then form a gentle curve that allows you to follow a contoured template, as shown in Figures 2 and 2a. The shape of the curve can be modified to suit your project — the tighter the curve on the guide the smaller the radius it can follow on the template.

I used a narrow blade on the band saw to form the notch shown in Figure 2a. This creates the two contact points for the template — one each at the front and rear of the band saw blade.



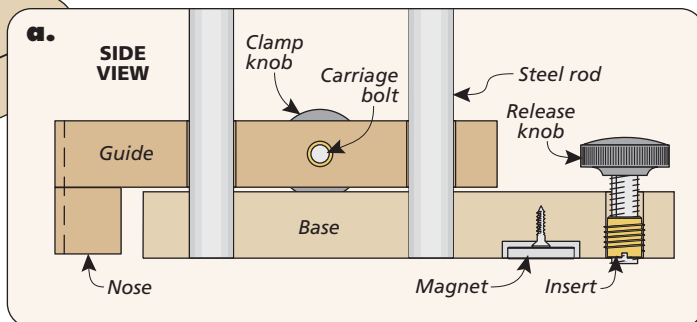
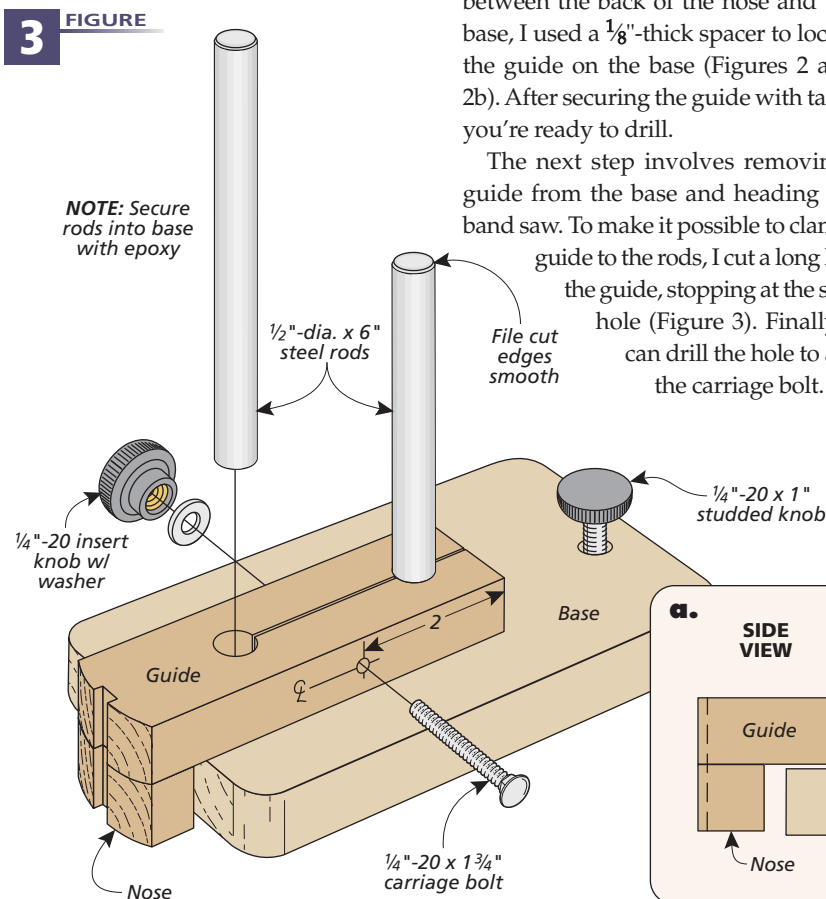
GUIDE RODS. At this point, you're ready to drill the pair of holes for the rods. I drilled through the guide and base at the same time to ensure the holes were aligned. To create a little clearance between the back of the nose and the base, I used a $\frac{1}{8}$ "-thick spacer to locate the guide on the base (Figures 2 and 2b). After securing the guide with tape, you're ready to drill.

The next step involves removing the guide from the base and heading to the band saw. To make it possible to clamp the guide to the rods, I cut a long kerf in the guide, stopping at the second hole (Figure 3). Finally, you can drill the hole to accept the carriage bolt.

INSTALL THE RODS. I cut the steel rods to length and filed the ends smooth before securing them in the base with epoxy. All that's left is to install the hardware before you can put the jig to good use.

HARDWARE. You can also see in Figure 3 the hardware I added that allows the guide to be clamped in position on the rods. It consists of a carriage bolt, washer, and knob.

Once the jig is complete, there are a few tricks to getting consistent results. Take a look at the next page for some helpful, step-by-step instructions.



Using the Template Jig

When it comes to cutting identically shaped workpieces, the template is the key. First, the template is used with the jig at the band saw for cutting the parts to rough shape. Then you can use the same template to finish smoothing the workpieces at the router table.

The photos here step you through the process I used to cut a set of small corbels, like the ones shown on the right. The process starts by stacking the blanks for the parts and the template using double-sided tape (Photo 1).

For the next step, I like to make a rough cut to remove the bulk of the waste, as shown in Photo 2. Doing this makes it

easier to maneuver the template along the jig for the finish cut. You don't have to be too exact here. This step should go fairly quickly.

Now you're ready to set up the jig on the band saw. You can see how this is done in Photo 3. The goal is to set the jig so the contact points on the guide are about $\frac{1}{16}$ " beyond the blade.

The next step involves adjusting the height of the guide. For this, I use the workpiece as a gauge (Photo 4).

With the jig set up, you're ready to make your final pass at the band saw to trim the workpiece closer to its final shape (Photo 5). The key is to keep the

template riding against the contact points of the guide as you go.

Finally, you can head over to the router table and use the same template for final shaping. For this, I use a flush trim bit. The template rides on the bearing of the bit for a smooth cut (Photo 6). After a little sanding, you're ready to put your parts to use on your project.



1
Stick & Stack. Use double-sided tape to stack the workpieces and fasten the template in place.



2
Roughing to Shape. To allow the workpiece to clear the base of the jig, you may have to remove some waste.



3
Jig Position. The blade fits in the notch on the guide. The points of the nose should extend $\frac{1}{16}$ " beyond the blade.



4
Guide Height. Adjust the guide so it contacts the template, making sure it doesn't contact the workpiece.



5
Cutting to Shape. Keep the template in contact with both points of the guide as you move through the cut.



6
Final Trimming. With the template still attached, use a flush-trim bit to create a smooth, finished shape.



simple jig for cutting Band Saw Circles

When it comes to cutting a circle in wood or sheet goods, there are a lot of ways to go about it. Some woodworkers choose to equip a drill press with a circle-cutting tool, while others use a router outfitted with a trammel.

A band saw is another viable option for cutting circles. But in order to get good results, you need a method for holding the workpiece in a fixed position as you rotate

it through the band saw blade. A jig from Carter Products promises to do that relatively easily and inexpensively. It's known as the Accuright Circle Cutting Jig.

HOW IT WORKS. The concept of the jig is simple. A long rail is clamped in a fixed position behind the blade and perpendicular to the band saw's miter slot. This fixed rail accepts an adjustable crossbar that can be positioned anywhere along the length of the rail. It allows you to adjust the crossbar's position to match the radius of the circle you want to cut.

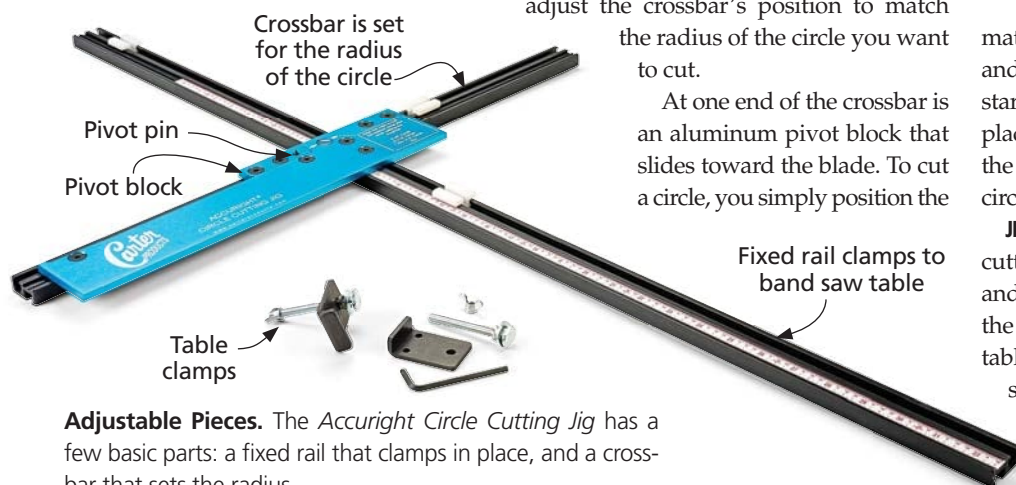
At one end of the crossbar is an aluminum pivot block that slides toward the blade. To cut a circle, you simply position the



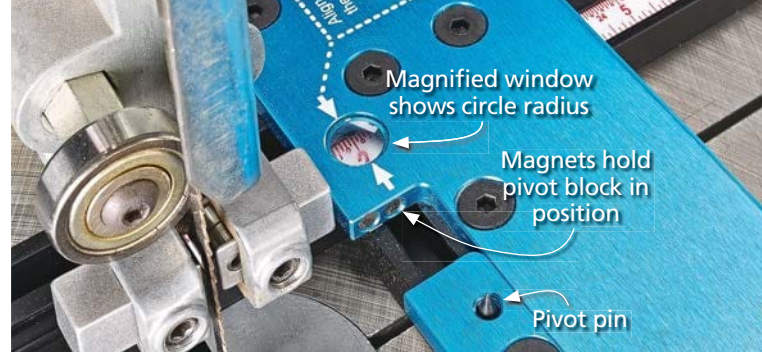
Support. An optional MDF block supports the blank on the waste side of the workpiece. It's a worthwhile addition for the jig.

material on top of a pin in the pivot block, and slide the workpiece into the blade to start the cut. Once the pivot block locks in place against a magnetic catch, you rotate the material clockwise on the pin to cut the circle (main photo above).

JIG SETUP. One nice aspect of this circle-cutting jig is how simple it is to set up and use. The fixed rail simply clamps to the band saw table courtesy of a pair of table clamps. Still, it does require a bit of squaring up and alignment of the rail, crossbar, and pivot pin as you install the jig. Part of this process is shown in the photo above.



Adjustable Pieces. The Accuright Circle Cutting Jig has a few basic parts: a fixed rail that clamps in place, and a crossbar that sets the radius.



Alignment. Set up the jig so that the fixed rail is perpendicular to the miter slot, the crossbar is parallel to the miter slot, and the pivot pin is perfectly aligned with the front of the blade (above).

Cutting the Circle. The circle blank slides back and forth on a pin in the pivot block. When the pivot block contacts the magnets shown, you can then begin rotating the blank clockwise to cut out the circle.

The crossbar moves easily along the fixed rail. It incorporates a scale and a magnifying glass for helping to cut circles of a precise diameter. The pivot block slides smoothly on the crossbar and locks securely in position thanks to a pair of built-in magnets (photo, above right). The jig is also available with an added support assembly. This is just a hook made

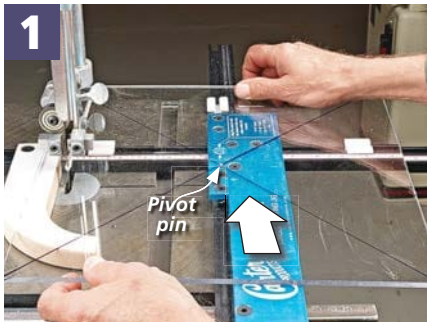
from MDF (right photo, opposite page). It matches the thickness of the jig and provides additional support for the workpiece.

USING THE JIG. The first step, as when cutting any circle on the band saw, is to choose the right blade. For circles less than 12" in diameter, a $\frac{1}{4}$ " blade works best. Larger than 12", and you can use a $\frac{3}{8}$ " or $\frac{1}{2}$ " blade. Once you cut a square

blank to rough size, you can find the center by drawing intersecting diagonal lines and dimpling the center (photo, below left). This allows the workpiece to fit more securely on the pivot pin.

Now position the crossbar to match the radius of the circle you're planning to cut, and lock it in place by securing the Allen screws. Set the workpiece on the pivot pin, and start the band saw. Slide the workpiece and pivot block toward the blade, and cut into the workpiece until the pivot block contacts the magnets (Step One at left). Rotate the workpiece to complete the circle (Step Two). Once the circle is done, just shut off the saw to remove the circle and the waste piece.

A GOOD OPTION FOR CIRCLE CUTTING. Overall, I found the Accuright Circle Cutting Jig very easy to set up and use. If you cut a lot of circles for your woodworking projects, then I think it'll be a worthy investment for your shop at a reasonable price.



Starting Place. Dimple the center point on the back of the blank (below), position it on the pivot pin, and move it into the blade.



Finishing. Once the pivot block hits the magnets, you rotate the blank clockwise into the blade until you've completed the circle.

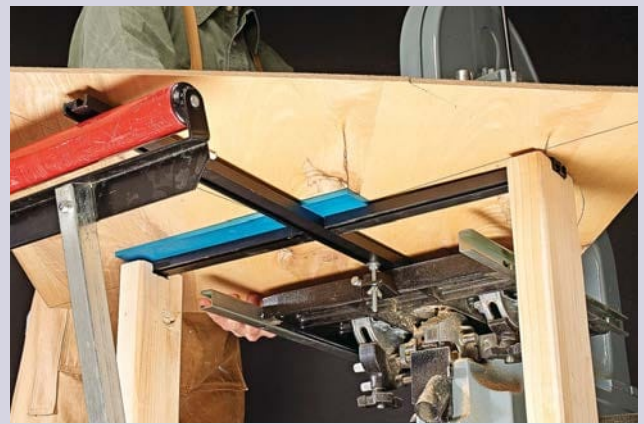
Cutting Large Circles

You can cut circles up to 4' in diameter with the jig. However, the center of a larger circle will be located well beyond the edge of the band saw table. That means you'll need to support the crossbar and the fixed rail as you cut the circle.

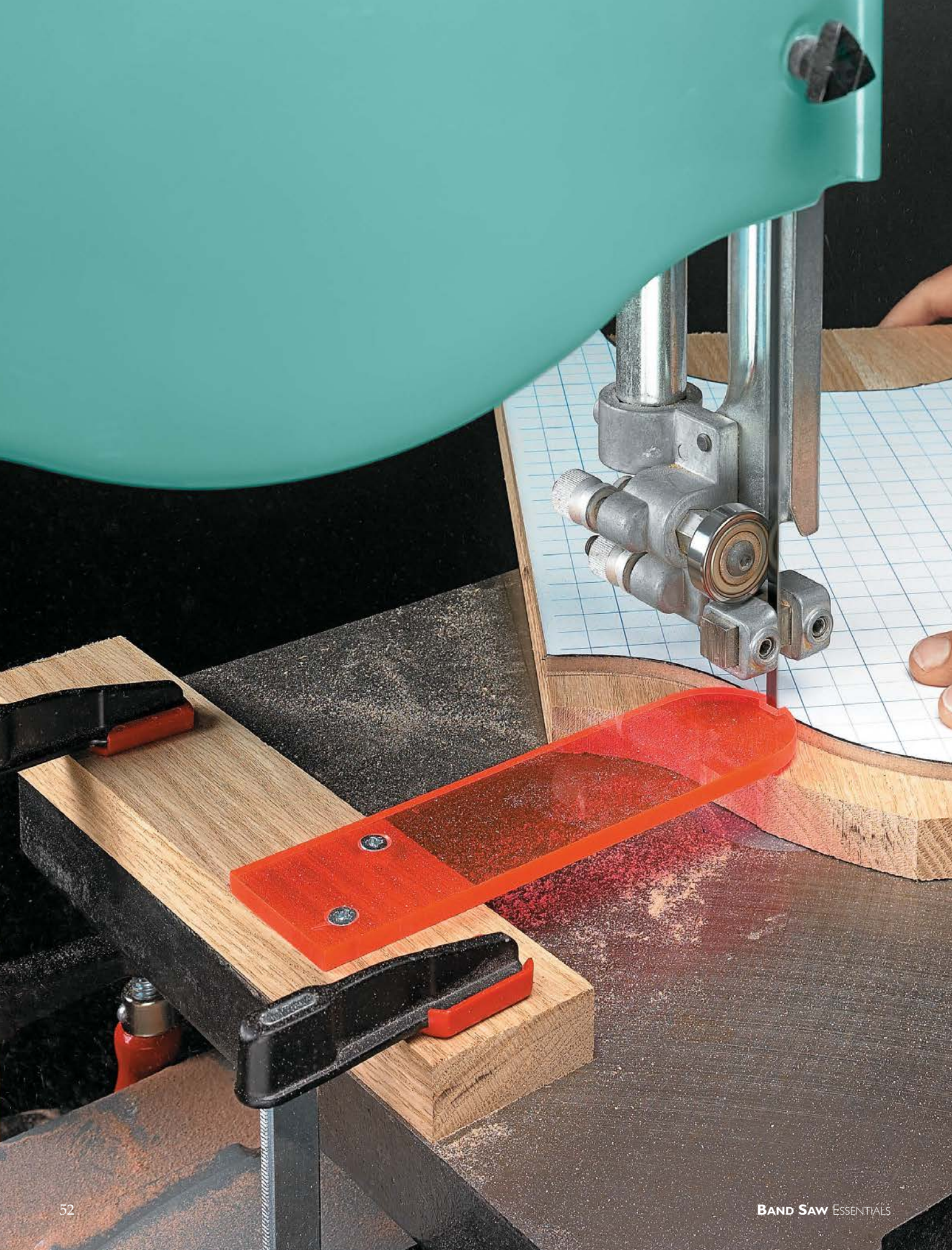


Centering. To find the center, draw lines from opposite corners and dimple the intersection.

To do this, I made support posts out of 2x4s, and notched the ends to surround and support the ends of the crossbar. Then I used an adjustable roller stand to support the end of the fixed rail, as shown in the photo at right.



Homemade Hold-up. Notched 2x4 posts support the ends of the crossbar. A roller stand holds up the end of the fixed rail and keeps the jig level when cutting a larger circle on the band saw.





Tips & Techniques

The band saw is a more versatile tool than many give it credit for. Here's a collection of our favorite tips and techniques, including smooth curves, straight lines, tapers, and even a bit of joinery.

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cutting Perfect Curves

The band saw is great when it comes to curved cuts — with a few key tips.



There is something beautiful about smooth, curved lines in a piece of furniture. But cutting graceful curves on the band saw doesn't happen by accident. Like most aspects of woodworking, it's an acquired skill.

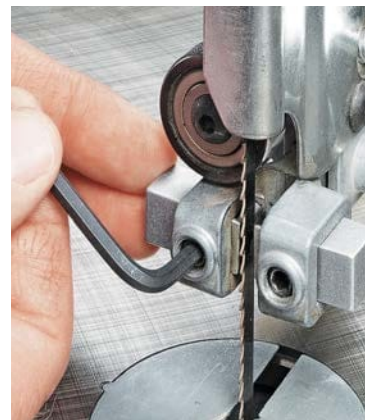
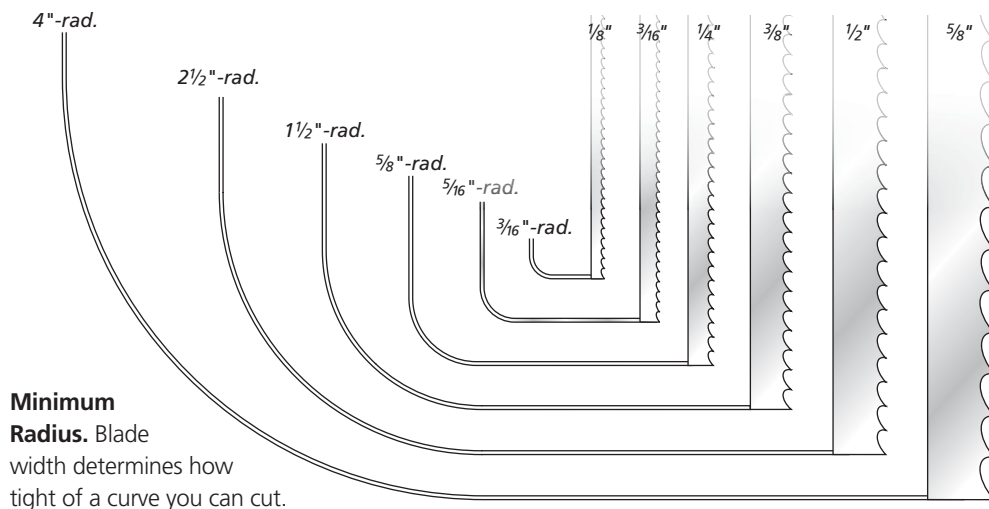
A few tips to help you along this path include choosing the right blade, tuning up your saw properly, and making a plan for each cut. When you combine these fundamentals with a little practice, you'll be surprised at just how quickly you'll be getting great results.

BLADE SELECTION. The width of the blade you use can make the difference between following a layout line accurately or constantly veering off course. This is because the blade width determines how tight a curve you're able to cut. The drawing below shows the typical minimum cutting radius of six different blade widths.

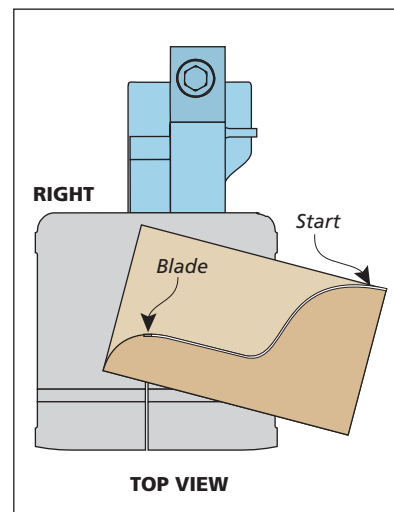
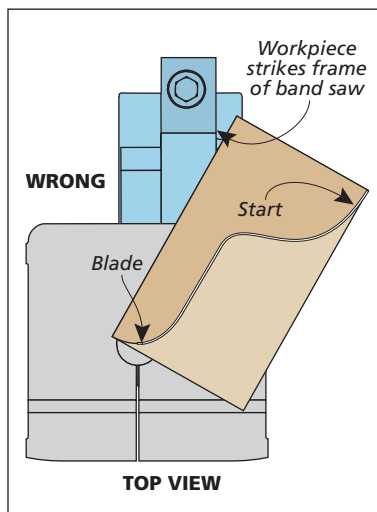
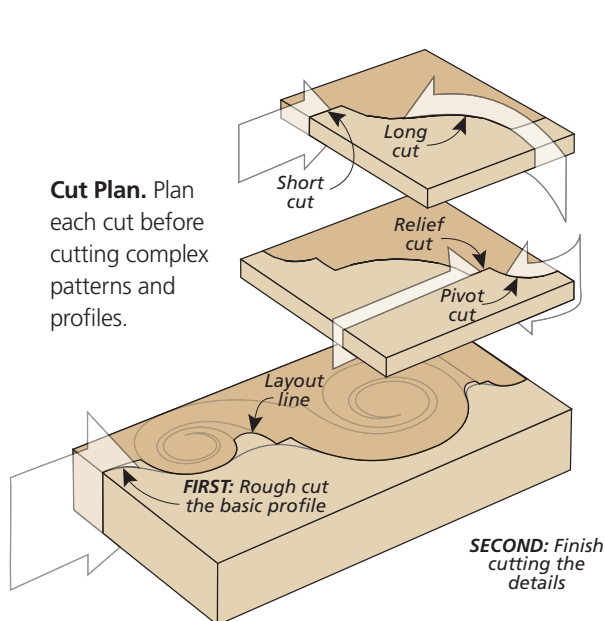
It's important to match the blade width to the task at hand. For the cleanest cut, choose a blade that will cut a radius slightly smaller than the tightest

turn in your profile. A blade that's too narrow will make it difficult to follow the cut on long, sweeping curves.

SAW SETUP. Blades work their best when the saw is set up correctly. This starts with adjusting the tension on the blade to the manufacturer's specifications. The guide blocks and bearings on your saw should also be adjusted close enough to the blade to prevent it from twisting. Be careful that they don't actually touch the blade, however. A good rule of thumb is to leave a paper's thickness between the



Guides & Bearings. Set up your saw to minimize blade twist and deflection.



blade and guides.

PLAN THE CUTS. Take a moment to mentally walk through each cut before you begin. In doing so, identify if you have both short and long cuts to make. It's easier to back out of short cuts, so make them first when possible. And make relief cuts when abrupt changes in direction are required.

When cutting complex patterns, it's best to rough cut the profile first, then go back and finish the details. See the drawings above for more details. Or use turning holes when cutting a combination of tight turns and straight lines (main

photo, opposite page).

Try to keep the frame of the saw in mind, as well. It can be an obstruction during sharp turns, making it difficult or impossible to finish a cut. The drawings above (right) show what I mean.

DUPLICATES. When I need to make multiple copies of the same workpiece, I'll stack two or more blanks together secured by double-sided tape. The photo at right shows how to do this. The result: identical copies.

Keep these tips in mind the next time your project calls for more than just straight lines. You'll be glad you did.



Stack Workpieces. Create multiple copies of a workpiece by cutting them all at the same time.

Making Parallel Cuts

Some projects require parts with parallel curved lines. This can be a challenge, but here's a tip: If the layout line curves in only one direction, you can set your fence and use it to help make the parallel cut (first photo to the right).

For parts that have parallel curves in both directions, use a single-point-of-contact fence. You can see an example of this in the far right photo. The single point makes it easy to change directions while keeping the same distance from the blade.



Parallel Curve. Use the fence to maintain a consistent distance from the blade for parallel cuts.



Changing Directions. Guide your workpiece against a single-point-of-contact fence when cutting parallel curves that change direction.



ripping Challenge

With the right setup and technique, you can give your table saw a break and turn to your band saw for safe, efficient ripping.

Over the years, I've heard a lot of tool-buying advice. One suggestion that often pops up is that the first power tool you should buy is a band saw, even before a table saw.

The upshot to this argument is versatility. A band saw can shape curves, saw rough lumber safely, cut joinery, and even rip boards to width.

The last item on this list is often met with skepticism. After all, most woodworking plans mention using a table saw for ripping boards. On top of that, band saws have the reputation of only being useful for rough cutting.

So I took it on as a challenge. Could I really use a band saw for ripping project parts to width? And if so, how well does the technique really work?

TWO KEYS. Getting the best results when ripping depends on two items — the right blade and the right setup. After that, it's almost as simple as pushing the workpiece through the blade.

THE BLADE. Since the blade does the work, let's start there. To make straight cuts, select the widest possible blade for your saw. The saw shown here is an older, well-used Delta that can accept a 1½"-wide blade.

For efficient cutting, the blade should have a low number of teeth with large gullets. A hook-toothed blade with 3 or 4 teeth per inch is a good starting point.

I found that it pays to spend a little more to get a higher quality blade for ripping. It will last longer and cut smoother. For the ultimate edge, you can use a blade designed for resawing thick boards into thin stock.



Blade Setup. A blade with 3-4 teeth per inch gives the best results. Set the guides as close as possible.

THE SETUP. With the right blade on hand, you can turn your attention to the saw itself. In only a few minutes of work, you can transform your saw into a smooth-cutting machine.

Start by installing and tensioning the blade. With the power off, spin the upper wheel and see where the blade is tracking. You want the blade to be centered on the wheel, so it doesn't pull the workpiece off course.

Even a wide blade is still relatively flexible, so it requires some support. That's where the blade guides come in. Located above and below the table, these corral the blade to keep it from twisting and wandering. Position the guides and thrust bearings as close as possible to the blade without touching it.

RIP FENCE. The final requirement is a rip fence. Some saws come with a poor-quality fence or no fence at all. So I purchased an aftermarket fence that slides smoothly and locks securely.

MAKING RIP CUTS

Making rip cuts is where the rubber meets the road for my challenge. There were a few qualities that I wanted to evaluate: speed, consistency, and the smoothness of

the cut edge. To do this, I tried two common types of rip cuts — cutting long, wide boards and cutting multiple narrow boards.

WIDE BOARDS. The first type of cut is ripping a single wide workpiece. You'd do this to cut the boards needed for creating a wide glued-up panel, for instance.

What's important here is making a smooth and straight cut. This way, you can get a tight edge joint without a lot of added effort.

In the main photo on the facing page, you'll see the technique I use. My right hand holds the workpiece firmly against the fence while my left feeds the workpiece. Don't be in a hurry to force the cut. A gentle, consistent push is all that's necessary.

In the upper right photo, you can see an example of the results. Frankly, the saw marks look worse than they really are. After one pass over the jointer, the edge is ready for glue. The box below shows a couple other options for smoothing the edges.

NARROW PARTS. Another ripping situation is cutting stiles and rails to make doors, for example. Here, several pieces are ripped to identical width from a wider blank.



Before & After. The blade marks left by the saw (bottom) can be quickly removed to create a finished edge.

Straight, smooth cuts also matter here. But more importantly for joinery and assembly, the parts need to be consistently sized. My worry was that it would be difficult to keep the edges parallel when removing blade marks. This was my biggest surprise.

Here's how it worked. After making each cut at the band saw, I rejoined the board's edge. This way, I always had a smooth, clean edge to run against the rip fence. The planer trick, shown below, completed the job.

Overall, I was impressed. A band saw works great to make accurate, consistent rip cuts.

Easy Edge Cleanup

The sticking point with ripping on the band saw is how to clean up the edges. Using the techniques shown in the article and choosing the right blade will get you in the ballpark. From there, you have a few options. The one you choose depends on the workpiece and the tools you have.

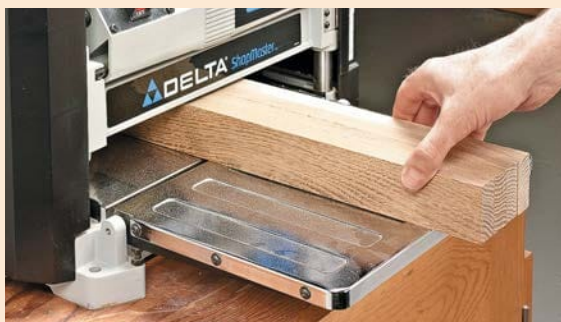
Wide Boards. For boards that I plan to glue up into a panel, I often use a hand plane to clean up the edges, as shown in the upper photo. It only takes a few swipes to remove the blade marks and get a glue-ready joint. (Another good option is to use a jointer.) Since these boards don't need to be exactly the same width, I can focus my attention on keeping the edges smooth and square.

Stiles & Rails. Some pieces need to be identical in width (stiles and rails for doors, for example). To do that, run them through a thickness planer at the same time. After just a pass or two, the parts will be smooth and ready for joinery.



Smooth Edges.

A hand plane works well for creating smooth edges on wide boards.



Plane Multiple Pieces.

Gang narrow parts for stability and plane them to consistent width all at once.



tips for Perfect Tapers

Three simple steps — that's all it takes to get smooth tapers with a band saw.

Tapers are simple details that can take an ordinary project and give it some flair. What's even better is that tapers are pretty easy to make using your band saw.

I know — you can get the job done with a jig at the table saw. But setting up a jig (or making one) takes time. So unless you need to make a lot of tapers, this technique is quicker and easier.

THREE STEPS. The technique boils down to three basic steps: layout, cutting, and smoothing. Sounds simple, right? It is, but there are still a few tips that will guarantee you get perfect results.

LAYOUT

The first step to creating tapers is layout. It's the road map you'll follow in the next two steps, as you see in Figure 1. One more thing before I get into the details. When I have to make a number of parts that are identical, it's a good idea to do each marking step on all the workpieces before moving on. This will go a long way toward keeping the parts consistent.

START & END POINTS. I begin by marking each part with a starting and ending point. The

table leg shown here will have a taper cut on two sides. So I draw the final size on the bottom of the leg. Near the top of the leg, all you need to do is mark where the taper ends.

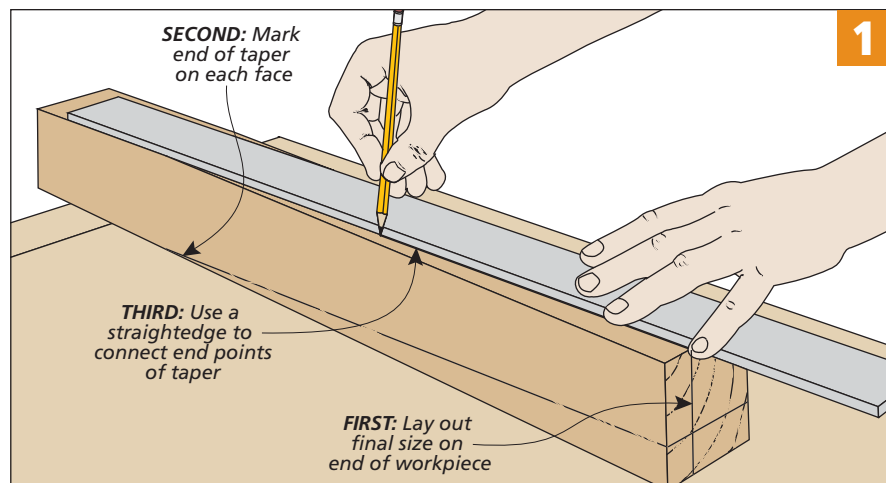
CONNECT THE DOTS. Since the cutting on the band saw will be done freehand, also mark the cutline. To do this, connect the starting and ending points with a straightedge, as shown in Figure 1.

At first, you'll want to mark all

four faces of the workpiece. This way, you don't have to worry about cutting away all your layout lines. But once you get the idea, you'll be able to make your layout marks on just the two untapered faces. Now, you can head to the band saw.

CUTTING THE TAPER

As I mentioned earlier, the band saw is the perfect tool for cutting a taper. All the



cutting force is down against the table, so there's no danger of kickback. And you have a lot of control over the workpiece as it moves through the blade.

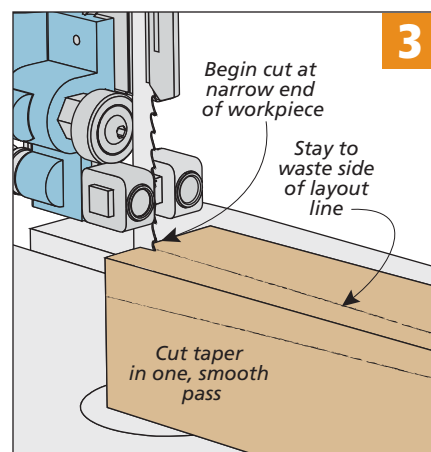
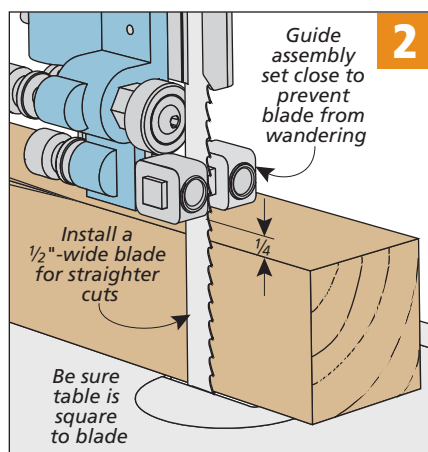
THE SETUP. Even though you're just rough-cutting the taper, you still want the cut edge to be as clean and even as possible. It will save you time smoothing it later. That's why I give the saw a quick once over before getting started.

Cutting a taper is essentially a rip cut, so I install a $\frac{1}{2}$ "-wide blade with 3-4 teeth per inch. This width cuts quickly and tracks straight throughout the cut.

Once the blade is in place, it's a good idea to double-check that the table is square to the blade. Then set the upper blade guide assembly so it's about $\frac{1}{4}$ " above the workpiece, as you can see in Figure 2.

START AT THE END. When you think about it, making the cut is a pretty straightforward task. But there are a few techniques that can help you get the best results. I like to start cutting the taper from the narrow end of the leg, as in Figure 3. If you start at the other end, the blade tends to skip along the surface before gouging in and leaving a large divot that can be difficult to remove later on.

ONE EVEN PASS. Your goal in cutting is to remove as much of the waste as



possible, so cut as close to the line as you feel comfortable, and make the cut in a smooth, single motion. A practice cut or two helps you get a feel for it. Also, try not to hunch over close to the blade. Instead, I've found that sighting down the length of the board leads to a straighter cut. One final thing — let the blade do the work. You'll quickly get an idea of how fast to feed the workpiece.

SECOND CUT. If the workpiece needs a second taper, the process is just a repeat of the first cut. What you're left with will look something like the leg shown in the upper right margin. With just a thin band of waste remaining, you'll have no trouble cleaning up the cut faces. For more on how to do that, take a look at the box below.

Rough Cut. Cut just to waste side of line to leave room for removing blade marks.

Smooth Results. Using one of the techniques shown below, work down to the layout lines to create a flat, square taper.



Three Options: Smooth it Out

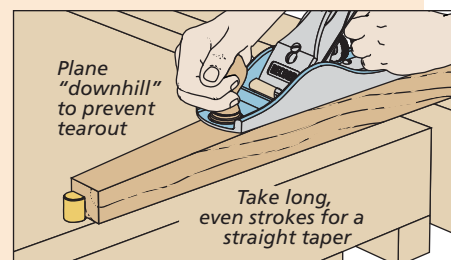
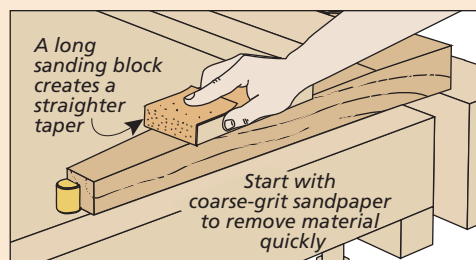
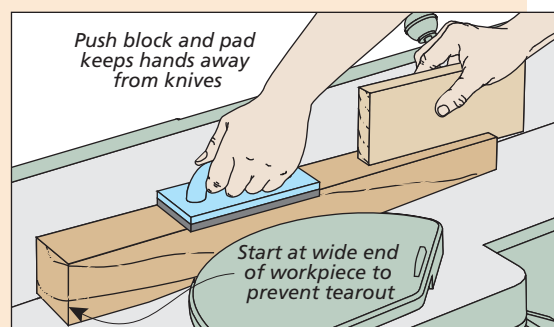
You have a few options to take your workpiece from rough-cut to perfectly smooth. All three of the methods shown here work well, so take your pick.

Jointer. If you have a jointer, you can get the job done in a hurry (upper drawing). Just be sure to work "downhill" to prevent tearout. Start by taking light passes over any high spots. Then run the whole piece through to obtain a smooth, even taper.

Hand Plane. Another quick option is to use a hand plane. Any bench plane will work, but the longer the sole, the flatter the results. Set the blade for a light cut and

tackle the high spots first. Check your progress with a square to keep the pieces consistent and keep an eye on the layout lines.

Sanding Block. A third method is to use a long sanding block. Don't be afraid to start with 100-grit sandpaper to speed up the process.



resawing on the Band Saw

All it takes to make thin stock from a thick board is a band saw, a sharp blade, and a little know-how.

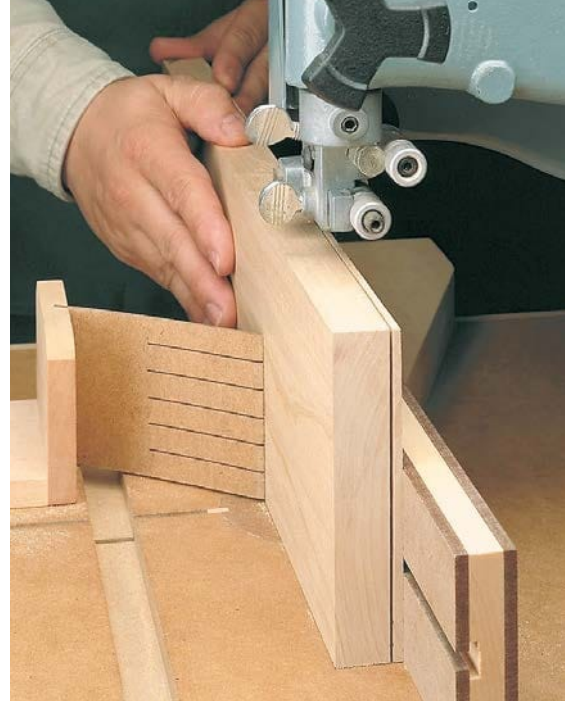
Where do you get thin wood? If you're building a project requiring thin stock (less than $\frac{3}{4}$ "-thick), one of the quickest and easiest ways is to make your own by resawing a thick piece into two (or more) thin pieces.

Resawing is a lot like ripping. However, instead of placing the board with its wide face down, you stand it on edge and make the cut through the width of the piece.

THIN STOCK. The biggest advantage of resawing your own lumber is it's an inexpensive and readily available source of thin stock. A good example is the thin, curved sides of the Shaker boxes shown in

the upper photo below. They're made of $\frac{1}{8}$ "-thick hardwood, which can be difficult to find at most lumberyards. And if you buy thin wood through a woodworking catalog, you'll probably pay a premium price.

BOOKMATCHING. But making thin stock isn't the only reason to resaw. The lower photo shows the striking grain pattern that can result when you resaw a board, open the two pieces like a book, and then edge-glue them together. On the bookmatched panel of this chisel case, the pattern on the left side of the joint



line looks like a mirror image of the pattern on the right.

Although there are several ways to resaw stock, I prefer using a band saw. As you can see in the photo above, it's an ideal tool for producing uniformly thin slices of wood.

REDUCES WASTE. One of the benefits of using a band saw is the blade cuts a kerf that's only about half as wide as a table saw blade, so there's less waste. It may not seem like much, but if I'm working with highly-figured wood, getting one additional piece from a board is a big plus.

ELIMINATES KICKBACK. Perhaps the most important reason to use a band saw for resawing is safety. Since a band saw blade cuts with a continuous down stroke, it holds the workpiece against the table during the cut. As a result there's no chance for kickback like with a table saw.

BAND SAW SETUP

Before you get started resawing, it's worth taking a few minutes to check that your band saw is running properly.

BLADE. As a rule, I use a wider blade for resawing than for routine band sawing. A $\frac{1}{2}$ "-wide blade is stiff enough to hold its shape while cutting through wide stock. As a result, it won't twist like a narrow blade.

Another thing to consider is the tooth pattern of the blade. What I've found works best is a blade with a hook-tooth pattern as shown in the box on the next page.



Thin Stock. The thin, curved sides of these Shaker boxes are simply resawn from thick stock.



Bookmatching. A resawn board can create a dramatic grain pattern with a mirror image on each side.



TRACKING. After installing the blade, check to see if it “tracks” (shifts) toward the front or back edge of the wheels. To do this, start by increasing the blade tension until the blade is stretched tight between the wheels. (Final tension is applied later.)

Now turn one of the wheels by hand a few times. If the blade tracks true, go ahead and tension the blade all the way. If the blade shifts, it’s easy to correct. Most saws have a tracking knob (or screw) that lets you tilt the angle of the upper wheel. Just “tweak” this knob until the blade tracks evenly on both wheels.

APPLY TENSION. At this point, you can apply full tension to the blade. This is accomplished by raising the upper wheel to stretch the blade. Most band saws have a tension gauge which indicates an approximate setting. But these indicators usually aren’t very accurate.

So how do you know if the blade is properly tensioned? The secret is to slowly increase the tension. “Pluck” the blade like a guitar string and listen to the sound. When it’s properly tensioned, the blade will produce a clear, low tone.

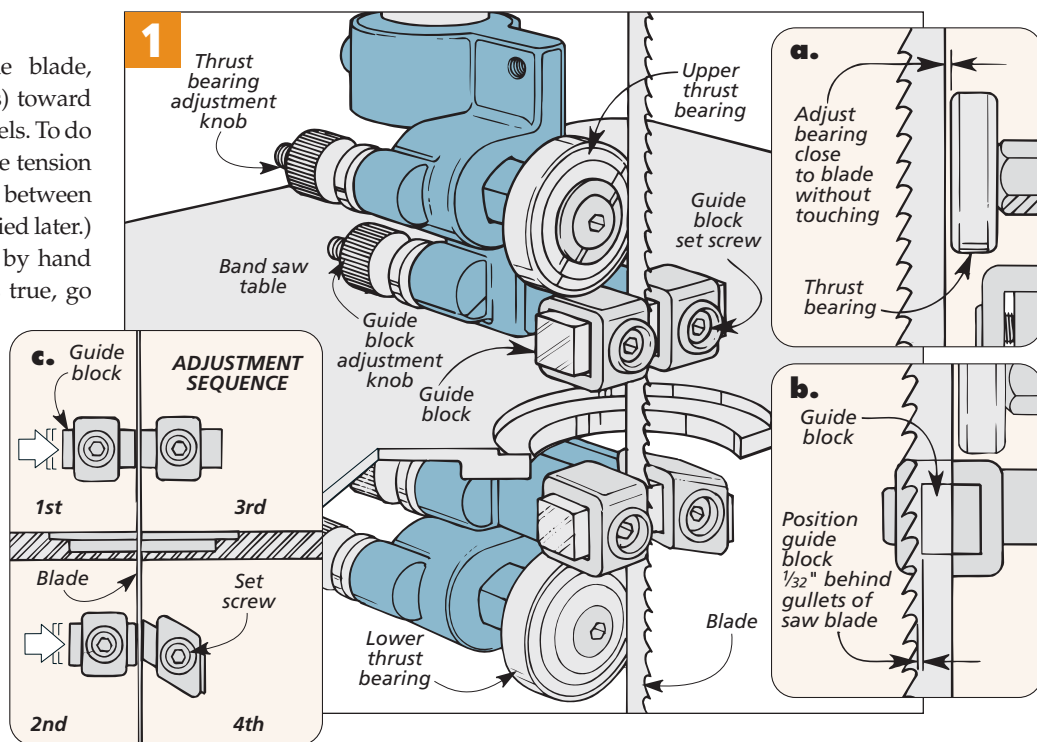
THRUST BEARINGS. Once the blade is tensioned correctly, the next step is to adjust the thrust bearings. As you can see in Figure 1, there are two thrust bearings, one above the table and one below.

The thrust bearings prevent a workpiece from pushing the blade backwards as you make a cut. This way the teeth can’t come in contact with the guide blocks and ruin the blade.

As shown in Figure 1a, the thrust bearings are adjusted by moving them forward until they almost touch the back of the blade. (A gap about the thickness of a piece of a paper is just right.) The blade should only touch the bearings and cause them to spin when it flexes back during a cut.

GUIDE BLOCKS. After tightening the thrust bearings, the next step is to adjust the guide blocks. There are two pairs of blocks (one above the table, and one below) that keep the blade from twisting during a cut.

For the blocks to do their job, they need to support as much of the blade as possible. As shown in Figure 1b, the idea is to

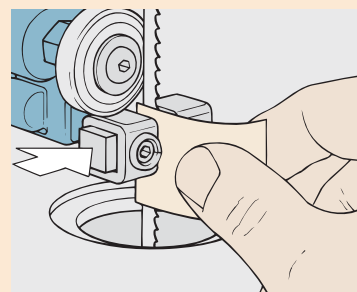


move them forward so the front edge of each block is about $\frac{1}{32}$ " behind the gullets of the teeth.

You’ll also want to bring each guide block in close to the blade, but not touching it. Notice in the margin that a slip of paper comes in handy here as well.

Keep one more thing in mind as you adjust the guide blocks. If you set one pair of guide blocks first and then the other pair, the blade may shift slightly to the left or right. Even a small of misalignment can cause the blade to bind or overheat. I make it a point to adjust the upper and lower guide blocks on one side of the blade first, and then the other (Figure 1c).

Shop Tip



Spacer Slip. To set the guide blocks quickly and accurately, use a slip of paper as a spacer.

Hook-Tooth Blade

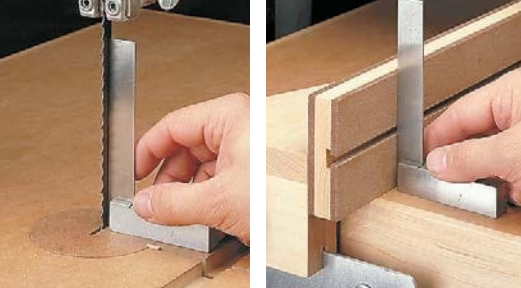
When resawing on a band saw, I use a $\frac{1}{2}$ "-wide hook-tooth blade like the one shown here.

Tooth Pattern. One reason is a hook-tooth blade cuts more aggressively than a “standard” blade. If you look at the teeth on this blade, you’ll see why — they point down a little (usually about 5° to 10°). This creates a shearing cut that removes material quickly.

Teeth per Inch. Another thing to

note is this blade only has three teeth per inch. Each tooth takes a big “bite,” so to prevent the blade from bogging down, there has to be a way to remove the waste.

Gullets. That’s the job of the deep, rounded gullets between the teeth. By scooping out the waste, the gullets allow the blade to cut quickly without getting too hot. (For mail-order sources of hook-tooth blades, refer to page 99.)



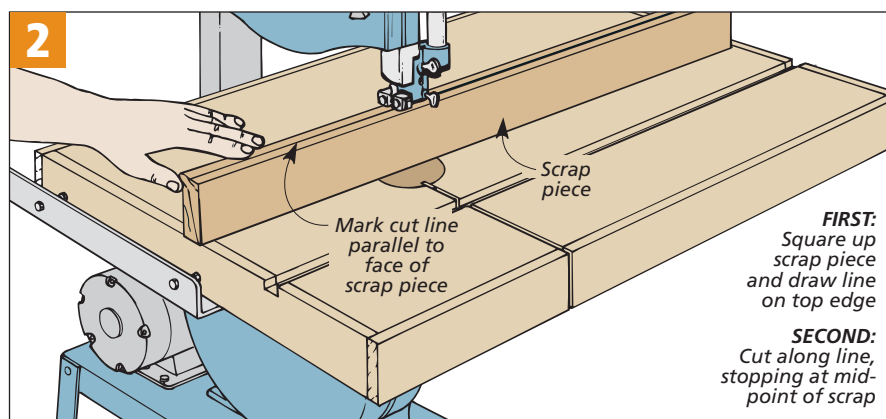
Squaring up. To ensure accurate results, square the table to the blade (left photo). Then square the fence to the table (right photo).

fence Setup

At this point, the blade is installed and properly adjusted. Now all that's needed is to set up a fence to provide support for the workpiece. (If you only need to cut a few pieces, you may want to use a pivot block instead, as shown in the box on page 63.)

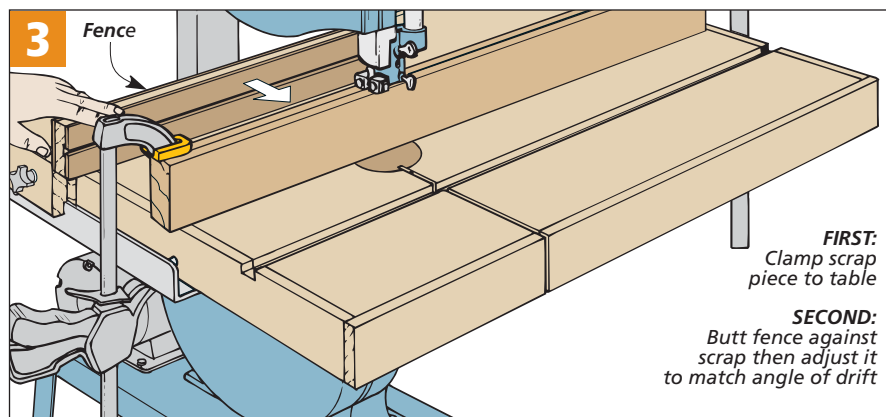
TALL FENCE. When you resaw, the board rests on its edge, so the fence needs to be tall enough to keep it from tipping. The fence can be as simple as a scrap piece of wood clamped to the band saw table. Alternatively, if you want to build the fence and table that are shown here, then you can find the step-by-step plans on page 14.)

No matter which fence you use, the important thing is that the face of the fence is parallel to the blade. This will produce a resawn piece that's uniform



FIRST:
Square up
scrap piece
and draw line
on top edge

SECOND:
Cut along line,
stopping at mid-
point of scrap



FIRST:
Clamp scrap
piece to table

SECOND:
Butt fence against
scrap then adjust
it to match angle of drift

in thickness across its width and from one end to the other.

So how do you end up with a piece that's consistent in thickness instead of a wedge-shaped board? The best way is to start by squaring up the table and fence, as shown in the upper left photos.

DEALING WITH DRIFT. Even after squaring up the table and fence, it still won't guarantee a straight cut. Almost every band saw blade I've used has an annoying tendency to "pull" the workpiece at an angle when making a cut. (This is called drift.)

The problem is the teeth on the blade are bent outward (set) more on one side than the other. This causes the blade to cut more aggressively on that side of the kerf, and this leads the workpiece off course.

There's no cure for an uneven set, but there is a simple solution. All you need to do is determine which way the blade is leading and then set the fence to match the angle of drift.

TEST CUT. To do this, make a test cut in a scrap piece of wood without using the fence (Figure 2). Start by jointing one edge of the piece and marking a pencil line on the opposite edge. Then set the jointed edge on the table and cut along the line.

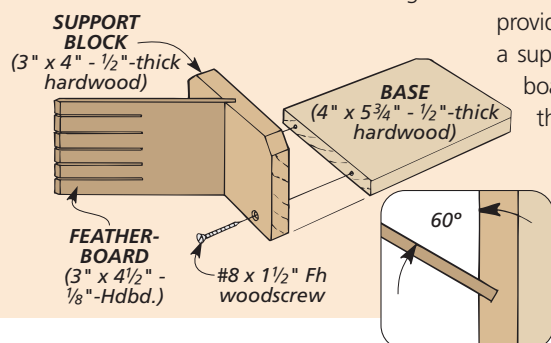
If the blade drifts to the right or left of the line, swing the tail end of the piece toward the direction of drift. Then continue feeding the workpiece steadily into the blade until you reach the approximate halfway point.

Now stop, turn off the saw, and without moving the scrap, clamp it to the table as

Resaw Featherboard

To ensure a straight cut when resawing, I made a featherboard that applies gentle pressure against the workpiece and holds it flat against the fence.

As you can see in the drawing below, the featherboard is a piece of $\frac{1}{8}$ " hardboard with flexible "fingers"



that are formed by bandsawing a number of thin kerfs. I also sanded a bevel on the end of the featherboard. It allows the workpiece to slide smoothly between the fence and featherboard.

The featherboard is attached to an L-shaped assembly made of $\frac{1}{2}$ "-thick hardwood. A wide base provides a clamping surface, and a support block holds the featherboard at an angle, as shown in the detail.

After cutting this angled kerf, it's just a matter of screwing the support block to the base, then gluing in the featherboard.

shown in Figure 3. This is the “drift angle” of the saw blade. At this point, you can butt the fence against the scrap and adjust it to match the angle of drift.

CHECK SETTING. Before you start resawing the “real” workpieces, it’s a good idea to check the fence setting by making another test cut. Even though the fence is at an angle to the blade, the blade should cut straight along the line. If not, readjust the fence and try again. The important thing is to find the correct angle, adjust the fence, and stay with it.

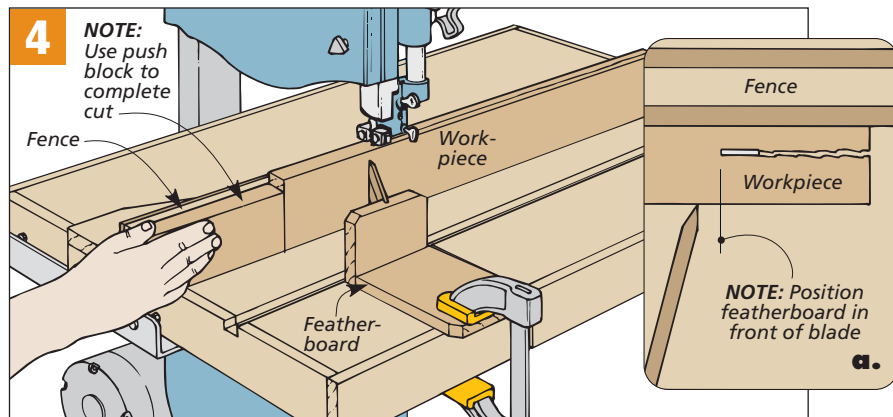
READY TO RESAW

Once the fence is adjusted, you should be able to resaw a straight line without worrying about drift.

STOCK PREPARATION. To get accurate results, make sure the stock is flat, straight, and square. I joint the face of the piece that slides against the fence as well as the bottom edge that rides on the table.

GUIDE ASSEMBLY. To provide as much support for the blade as possible, lower the upper guide assembly as close to the workpiece as you can, yet still high enough to see the kerf. This reduces the chance of the blade bowing in the middle of a cut. If you’re resawing narrow stock, try using the tip shown in the margin.

SET FENCE. Now it’s just a matter of setting the fence at the correct distance from the saw blade. The location of the fence determines the thickness of the resawn piece. To provide “extra” material for planing off the ridges left by the saw blade, I set the fence $\frac{1}{16}$ ” farther from the blade than



the desired thickness.

FEATHERBOARD. After locking the fence in place, it’s a good idea to clamp a tall featherboard to the band saw table, as shown in Figures 4 and 4a. The featherboard exerts even pressure that holds the workpiece flat against the fence. (For details about making this featherboard, refer to the box on previous page.)

MAKING THE CUT. At this point, it’s just a matter of placing the edge of the board flat on the saw table and feeding it into the blade. As you can see in the photo on page 60, I push the board from behind with one hand and guide it along the side with my other.

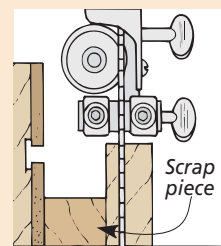
SLOW & STEADY. There’s no need to hurry here. The key to success is a slow, steady feed rate. If you push the board too fast, the blade can flex and create a “barrel” cut. If you stop sawing, it makes a wider kerf.

So how do you know if the feed rate is correct? Once again, listen to the sound of the saw blade. It should make a smooth, rasping sound as it cuts through the wood.

You’ll know if you’re pushing too fast — the sound will change to a high-pitched squeal.

The point is to let the blade do the work — use your hands just to guide the board and feed it through the blade. Speaking of hands, be sure to keep them well away from the blade at the end of the cut. I use a scrap of wood as a push block when resawing the last few inches of the board.

Shop Tip



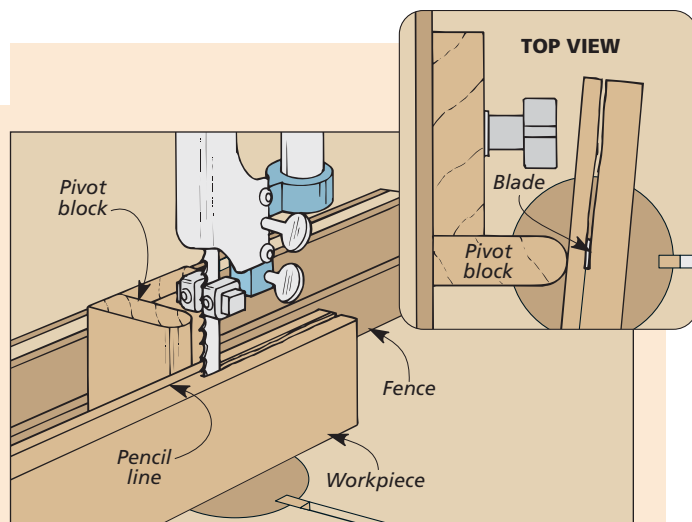
Keeping Clear. When resawing narrow (short) stock, carpet-tape a long scrap to the fence to provide clearance for the guide assembly.

Resawing with a Pivot Block

If you only need to resaw a few pieces, it’s quicker to use the pivot block than to adjust the fence for drift.

Setup. To get a straight cut, start by marking a line along the top edge of the workpiece. As shown in the detail at right, the idea is to slide the pivot block along the fence so the “high” point of the radius aligns with the leading edge of the blade. Note: The distance between the pivot block and the blade equals the desired thickness of the piece, plus $\frac{1}{16}$ ”.

Making the Cut. Now just turn on the saw, and feed the workpiece into the blade, holding it against the pivot block as you make the cut. If the blade “drifts” off the line, simply swing the tail end of the workpiece in that direction.





from log to Lumber

Ever dreamed of having a miniature sawmill? Your band saw and a simple sled are all it takes to create one-of-a-kind boards from firewood.

A chance for free lumber is hard to pass up for most woodworkers. As a result, I've often been tempted by the possibility of using

unique-looking pieces of firewood. Even logs and branches from trees cut down in the neighborhood catch my eye. These are often from species you won't commonly find in a lumberyard. Small pieces of wood like this can be used for making everything from turning blanks and tool handles to small cabinets and boxes.

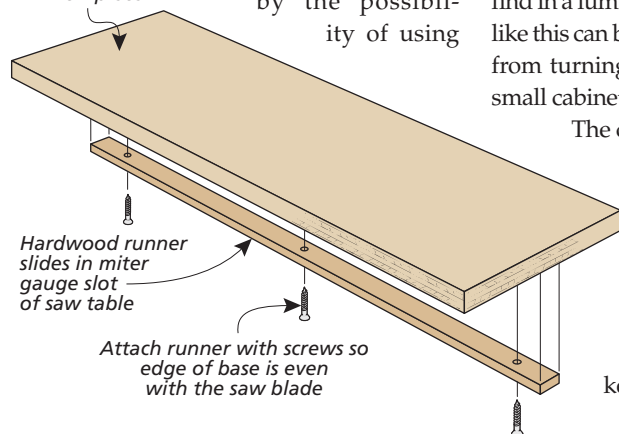
The challenge is turning a log into usable boards. But if you have a band saw, you're halfway there. Think of it as a miniature sawmill. However, there are a few things to consider.

KNOW YOUR LIMITS. For starters, keep the cutting capacity of

your saw in mind as you look for wood. It doesn't do any good to pick up a log or branch if you can't cut it with your band saw. For example, most 14" band saws can cut pieces up to 6" thick.

HAVE PATIENCE. Another consideration is that freshly cut logs and branches are pretty wet. So don't expect to use the boards you cut right away. This also means you need a place to stack the boards while they dry.

TAKE CARE. The final consideration is safety. Be on the lookout for metal objects that people may have embedded in the wood over the years, like nails and staples. A hand-held metal detector can locate items lurking below the surface.



SETUP. It won't take much work to prepare your band saw to turn logs into lumber. But I do want to mention something about the blade. Normally, I recommend using a high-quality blade for top-notch results. But in this case, an inexpensive blade is a better choice. Bark, grit, and metal are hard on blades.

In addition, the blade should be as wide as your band saw will allow, and have 2-3 teeth per inch. This way, the blade will cut straight without bogging down.

SIMPLE SLED. Before you can saw the log into boards you need to create a flat surface to ride on the saw table. For that, I turn to a plywood sled (drawing on the previous page).

By attaching the log to the sled with screws, you can prevent it from rolling as you cut two faces flat and square. I also use

an old chisel to remove some of the bark so the log isn't wobbly.

REFERENCE CUTS. At this point, you're ready to make the first cut (upper right photo). Feed the log steadily through the blade to keep the blade on track.

Once you complete this initial cut, you'll use the sled to create a second surface square to the first. This allows you to slice boards from the log using just the band saw's rip fence. So remove the log from the sled, rotate the flat side down, and secure it again with screws, as shown in the lower right photo.

MAKING BOARDS. After cutting the reference faces, you can start making boards. How you plan to use the wood will determine how thick to cut the boards.

Keep in mind that the wet, rough-cut boards may warp and shrink. So don't cut the pieces to the final thickness. Instead, I like to leave some extra material to allow for jointing and planing the wood smooth and flat once it's dry. Adding about a 1/4" is a good rule of thumb.

Cutting the boards from the log is really the same as resawing, as you can see in the main photo on the opposite page. And you'll have a pile of boards in a short time. However, your work isn't quite done. Freshly cut lumber needs to be stored and dried properly to end up as stable boards. For more on this, read the box below.

Now it's just a matter of waiting. When the time is right, you'll have unique lumber ready to turn into a great-looking project.



First Cut. Use a steady push to cut a wide, flat reference face on the log. An outfeed stand supports the sled.



Square Face. Rotate the log cut side down on the sled and make a second cut to create a square corner.



Overhang. Attach the log with screws so it overhangs the edge of the sled for the first cut.

Drying Boards

Patience is the name of the game when it comes to drying lumber cut from a log. But that doesn't mean you can just place them in a bin. You want to make sure the boards have good air circulation for drying and to prevent the growth of wood-rotting mold. And you want to keep the wood flat.

The way to do this is to stack the boards on a couple pieces of "two-by" stock to keep them off the floor. And add thin strips of wood (called stickers) between each board to allow air to circulate and water vapor to escape. Arrange the stickers so they're aligned vertically over the two-by stock. This helps the boards stay straight. How long you need to wait depends on the thickness of the boards. A good rule of thumb is to allow one year for each inch of thickness in the board.





the secrets to cutting Precise Parts

Using your band saw, a router, and this fool-proof technique will ensure you too can make perfect, identical pieces.

Cutting several pieces to the same size sounds simple, right? It's easy to do if the parts are straight and square. But if the parts include angled cuts or curves, then it can be tough to make multiple, identical parts.

The nice thing is, you don't have to settle for less than perfect results. I've found the best way to make matching pieces is to use a technique that combines a template with your band saw and router.

Now I know that making a template

sounds like a time-consuming step. But in the long run, I think you'll find that adding this step will save you headaches and hassles down the road. You may even find that you'll save some time, too.

EASY-TO-USE PROCESS. The biggest advantage of using a template is consistency. Once you've made a good template, all the parts that are made from it will be exactly the same. Of course, there's more to it than simply making a template. In the following pages, I'll show you a straightforward

approach for making templates and using them at your band saw for rough cutting and then flush trimming parts with a router.

MAKING A TEMPLATE

The starting point for creating a template is laying out the overall shape of the final workpiece. While you could do this right on your template blank, I like to make a paper pattern first, as you can see in the photo at right.

A paper pattern has a couple of advantages I'd like to point out. First, it's much easier to see markings on white paper. And you can correct the shape you're drawing without much trouble.

In the pattern shown at right, I transferred the profile onto some graph paper based on the project plans. But there's another way you can make a pattern. Many plans include a scaled drawing of the workpiece. So if you have access to a photocopy machine, you can enlarge the drawing to create a full-size pattern.

When you're satisfied with the look of your pattern, you'll attach it to the template blank to shape the template. For this, I use spray adhesive (photo above).

TEMPLATE MATERIAL. But what exactly do you make a template from? To be honest, you can use just about any stable material, such as plywood, MDF, or even acrylic.

The template material of choice for me is $\frac{1}{4}$ " hardboard. It's thick enough to provide a solid bearing surface for cutting and routing. And I like it because its even texture means it can be cut and smoothed to shape without splintering or chipping.

SHAPING THE TEMPLATE. Since the final workpieces you make will only be as accurate as the template, you want to take extra care to make sure the template edges are as smooth as possible.

To shape the template, I start by rough cutting the blank. For this, I turn to my band saw fitted with a $\frac{1}{4}$ "-wide blade. This all-purpose blade is narrow enough to handle most curves. But the band saw doesn't leave a smooth enough edge to use as a guide for flush trimming on the router.

Instead, stay just to the waste side of the

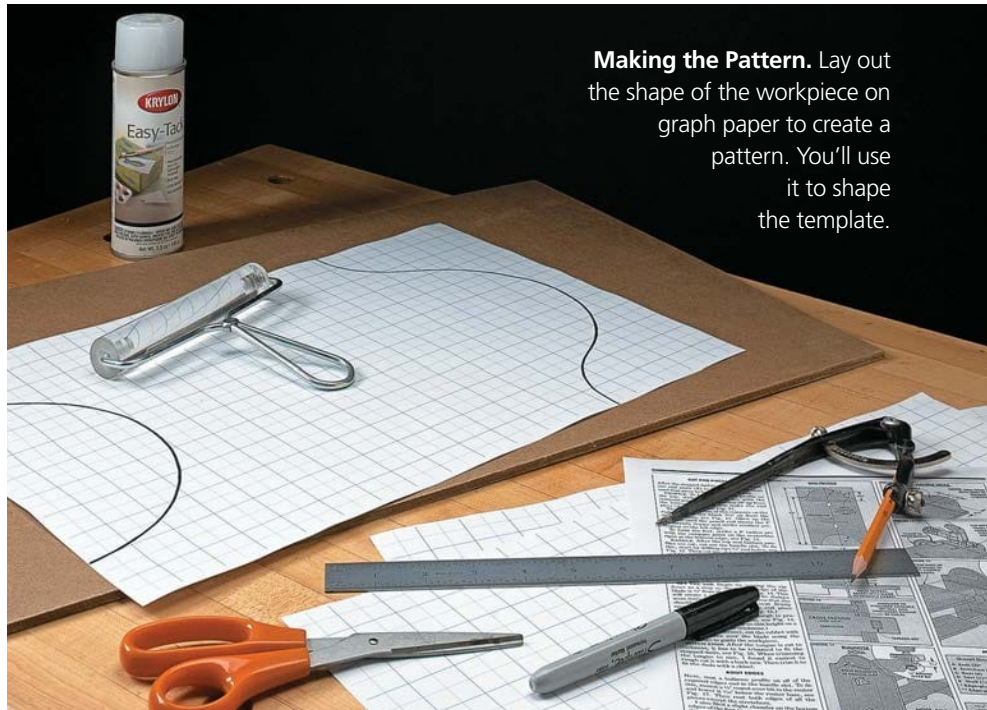
pattern (about $\frac{1}{16}$ "). Leaving a little extra waste allows you to clean up the blade marks and create a smooth edge. An easy way to do this is to use a drum sander mounted in the drill press, like you see in the photo below.

ATTACHING THE TEMPLATE

In order to use your template, you'll need to attach it to the workpiece. And you have a couple of options: carpet tape or screws.

CARPET TAPE. The one I use most often is carpet tape. It's my favorite because it provides a secure grip without marring the workpiece. The only downside is you'll go through a lot of tape if you have a large number of pieces to make.

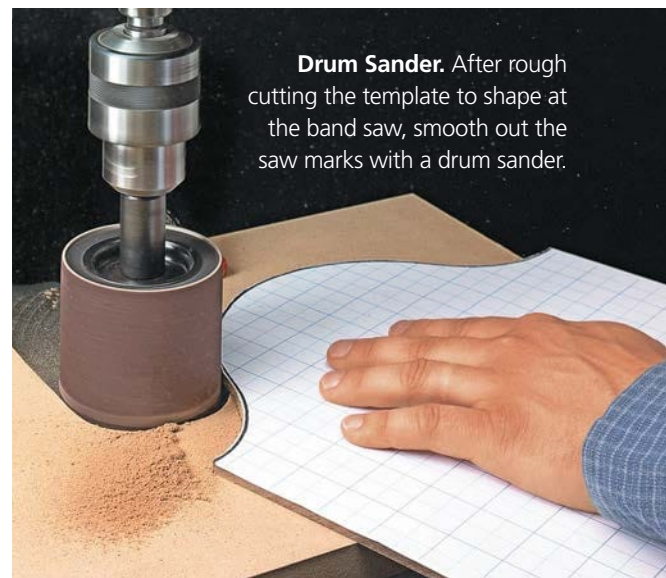
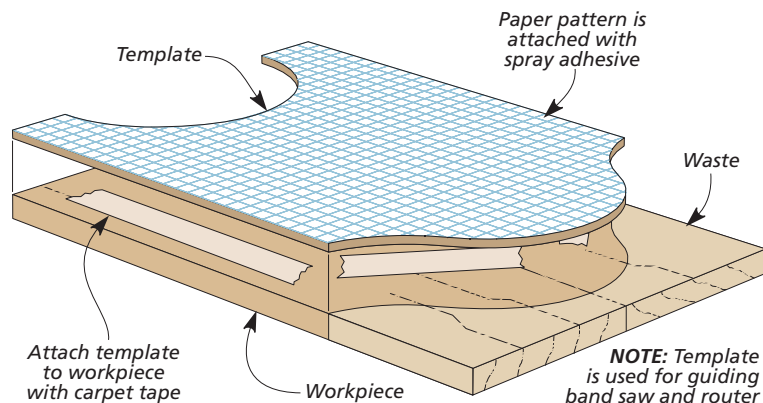
Making the Pattern. Lay out the shape of the workpiece on graph paper to create a pattern. You'll use it to shape the template.



SCREWS. The other choice is to attach the template with screws. There's no question they provide a solid hold. The key is to locate them where the holes won't be visible when the project is complete.

There's one final thing I'd like to mention before moving on. It's a good idea to label the template with the project name and any other important information that will help jog your memory should you use it again in the future.

On the next two pages, you'll put your template to work in the two steps of creating the workpieces — cutting and shaping.



Drum Sander. After rough cutting the template to shape at the band saw, smooth out the saw marks with a drum sander.

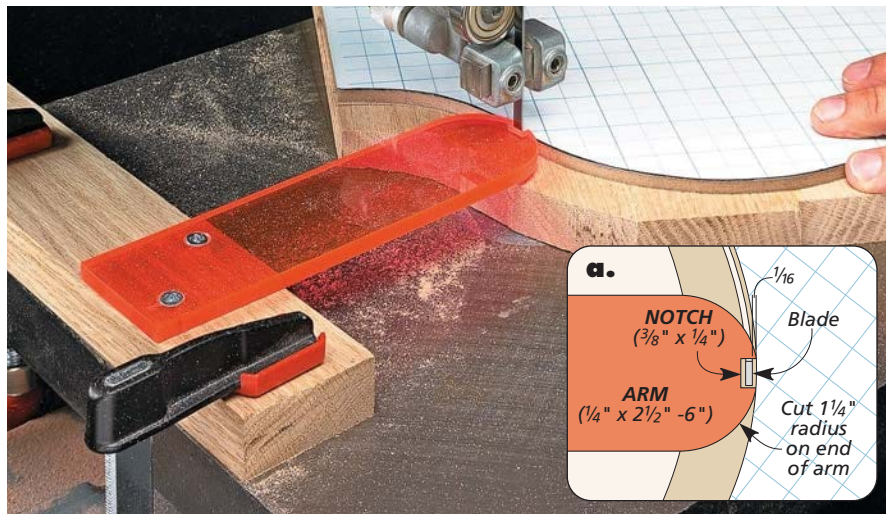
rough cut on the Band Saw

Taking the extra time to create a template gets you to the next stage in the process: using it to create identical workpieces. As I mentioned before, there are two steps to work through. The first step is rough-cutting the pieces at the band saw. The second is trimming them at the router table.

ROUGH CUTTING. I used to cut the pieces freehand at the band saw. This was a slow and nerve-wracking experience.

The goal when cutting is to stay as close to the layout line as possible. This way, there isn't as much material to remove for the following flush-trimming step. On the other hand, you don't want to cut across the layout lines, ruining the workpiece and template.

RUB ARM. I used the same template that'd be guiding my router bit as a guide for the band saw, but I needed a way to allow the blade to follow the template. To do this, I made the rub arm you see in the drawing above and in the photo on page 66.



The band saw blade is recessed in a notch in the rounded end of the rub arm. The acrylic rub arm follows the edge of the template, guiding the cut. This allows you to quickly cut out each workpiece without worrying about spoiling the profile. It also leaves a thin, consistent amount of material for the router to remove later on.

The rub arm is attached to a block that gets clamped to the saw table. The rub arm needs to clear the workpiece below, yet stay

in contact with the template, so the block needs to be a bit thicker than the workpiece.

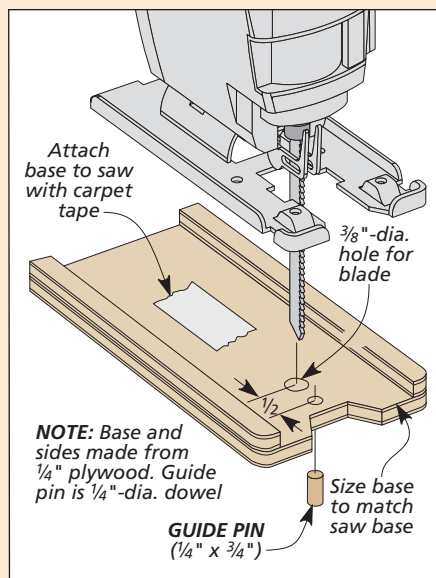
PATTERN SAWING. In detail 'a' above, you can see the setup of the rub arm on the band saw. Cutting with the rub arm is pretty straightforward, but there's one thing I'd like to highlight.

The idea here is to focus your attention on keeping the edge of the template parallel to the blade while also staying in contact with the rub arm. At the same time, you

Template Cutting: Jig Saw Guide

It's much easier to rough cut large pieces using a jig saw. The trouble is trying to stay close to the layout lines. To make things a little easier, I came up with a way to guide the saw along a template (photo at right).

The guide is nothing more than a $\frac{1}{4}$ " plywood base with narrow sides that cradle the saw foot. (It's held in place with carpet tape.) A guide pin mounted ahead of the blade follows the edge of the template and keeps the blade from drifting into the template and damaging the workpiece (drawing at left).



To use the guide, I steer the jig saw with one hand and place the other hand on the base to keep the guide pin in con-

tact with the template. When you're finished cutting, you'll have a thin amount of waste to remove with a router.

need to provide steady enough pressure and speed to move the workpiece along for a smooth cut.

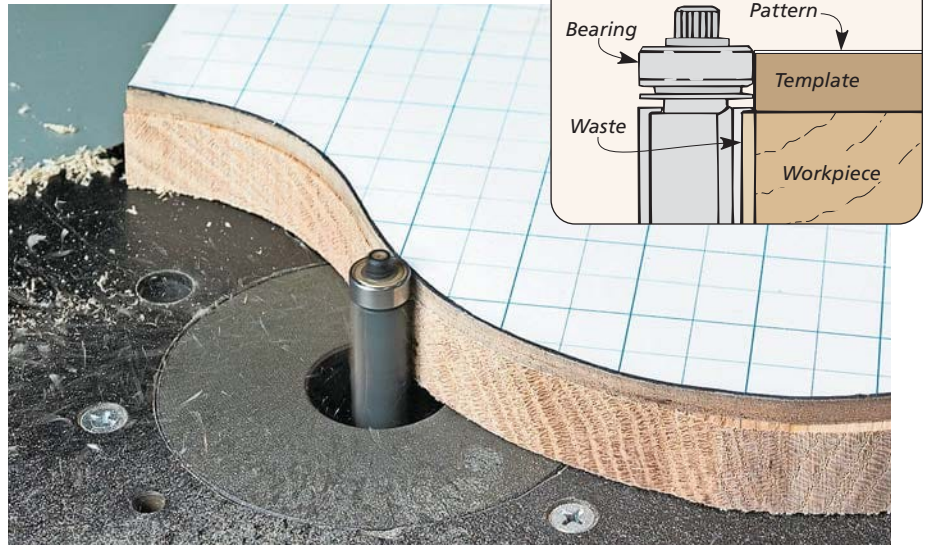
JIG SAW WORKS, TOO. But what if you don't have a band saw? Don't worry. You can use an ordinary jig saw and a simple auxiliary baseplate. For details, take a look at the box on the opposite page.

SMOOTHING THE PIECES

Using the template and rub arm to cut out the workpieces means the edge will be a lot smoother than a freehand cut. But you'll still need to remove the blade marks to bring the piece to final shape. For this, I turn to the router.

TWO TECHNIQUES. There are a couple of ways you can go about trimming the workpieces flush to the template. You can use the router table with a flush trim bit or a hand-held router with a pattern bit. Both methods will give you great results. But I want to mention a few details about each technique that will help you get the best results.

ROUTER TABLE. Let's start with the router table, as shown in the photo above. This is the option I use most of the time. Fitted with a flush trim bit, you have a lot of visibility as the bearing on the bit follows the



Router Table. Flush trimming a workpiece on the router table will give you a good view of your progress, plus you'll be left with a startling smooth edge.

edge of the template.

One of the big advantages of this technique is that other than the bit height, there are no other setup steps to take care of, as you can see in the detail drawing above. Just turn the router on and start trimming the piece to shape.

WATCH THE GRAIN. As you're trimming away the waste, pay close attention to

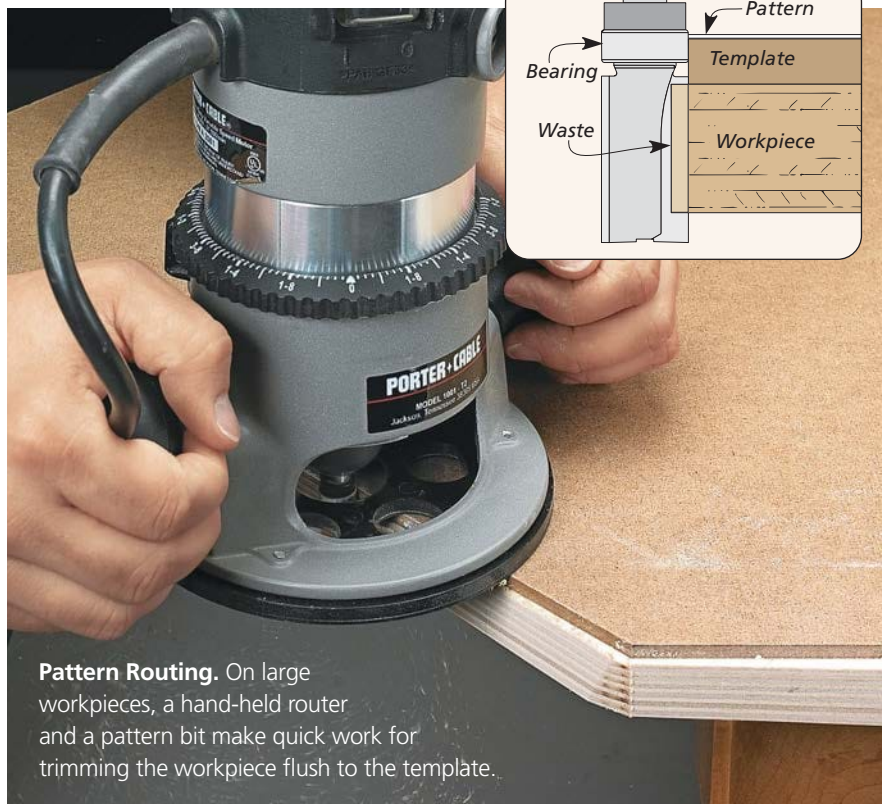
the grain direction. In curved sections, you may notice some chipout occurring. If that happens, it's best to pull back and try routing from the opposite direction (backrouting).

HAND-HELD ROUTER. The router table works best for small and mid-sized workpieces. When the parts are large, I switch to a hand-held router. I find that it's easier to control a router than trying to wrestle with a large workpiece on the router table, as you can see in the photo at left.

There are a couple of other differences to mention as well. The first difference is the bit used to make the cut — a pattern bit. The bearing on this bit is mounted on the shank, as shown in the detail at left. This allows the template to remain on the top of the workpiece, and that lets you keep an eye on what's going on.

However, there's a downside to using a pattern bit. With the bearing on the shank, you need to extend the bit so the full length of the flutes are exposed. So to avoid damaging your workbench, make sure the workpiece is supported above the benchtop. Along with that, you'll need to make sure the workpiece is held securely.

FLAWLESS RESULTS. When you turn off your router, you'll be left with a smooth, perfectly shaped part. And having used a template to cut and shape them, you can be sure each part is absolutely identical. Consistent results, and efficient working methods make creating a template well worth the effort.



Pattern Routing. On large workpieces, a hand-held router and a pattern bit make quick work for trimming the workpiece flush to the template.



creating Perfect Tenons

Recently, I was in the shop cutting tenons for a project when Phil Huber, one of our senior editors, walked in. I explained how a band saw is ideal for cutting tenons, but getting consistent results can be tricky. Phil showed me a method he uses to cut perfect tenons on the band saw. The simplicity of his technique, and the results, really surprised me.

The beauty of this system is that after the initial setup to cut the first tenon, the tenons will always be a consistent thickness on the remaining parts. The secret is in a notched block of wood.

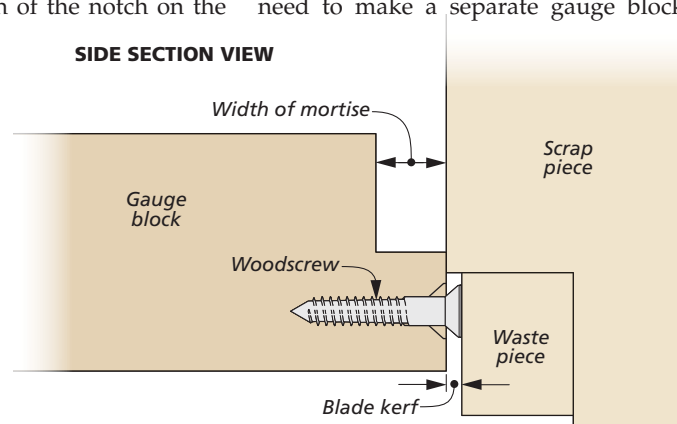
GAUGE BLOCK. This block serves as a gauge to set up the two fence positions required for cutting the cheeks of a tenon. The width of the notch on the

block equals the width of the mortise, which ultimately determines the thickness of the tenon. In the lower left photo, you can see how I use a hollow chisel from the mortiser to ensure the notch is the correct width for sizing the tenon. This is the same chisel I use to cut the mortises in all of the workpieces. You'll need to make a separate gauge block



Notch. The key to accurate tenon thickness is using the tool you use to create the mortises, such as a chisel from the mortising machine, as a guide for sizing the width of the notch in the gauge block.

SIDE SECTION VIEW



Screw Height Adjustment. Cut a kerf partway into a scrap piece, cut the waste free, then close the kerf to create a "step" to use as a guide for adjusting the screw.

for every mortise and tenon width you intend to make for your projects.

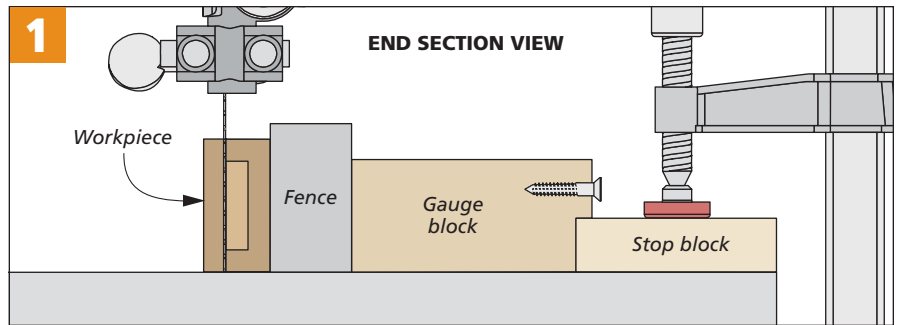
A woodscrew in the gauge block serves an important function: It accounts for the kerf created by the saw blade. You'll see how this works in a minute.

To set the correct depth of the screw, use the band saw to cut a notch in a scrap piece, as shown in the lower right illustration on the previous page. (You'll want to use the same blade you'll be using to cut the tenons.) Place the waste into the notch of the scrap piece to create an offset that precisely matches the width of the saw kerf. Use this offset to set the depth of the screw in the gauge block. (You'll fine-tune the depth later.)

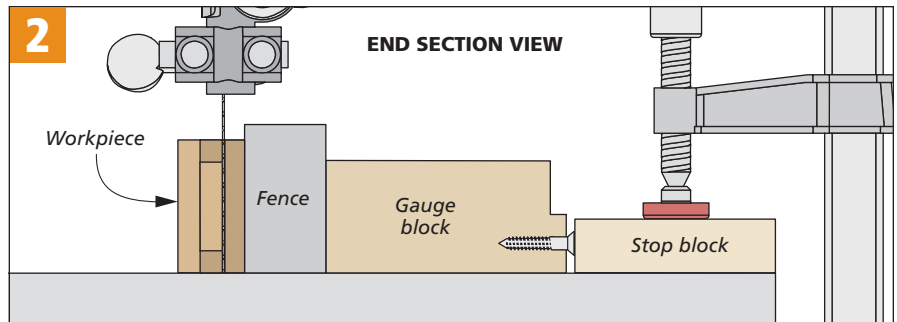
BAND SAW SETUP. The first order of business is to lay out and cut the shoulders of the tenons on the workpieces. A table saw makes this task quick and accurate. Then you can head over to the band saw to cut the tenon cheeks.

The drawings on the right show how the gauge block is positioned between a fixed stop block and the rip fence on your band saw. It's a good idea to have a couple of test pieces on hand that are the same thickness as your final workpieces. This way, you can test the setup before making cuts in the actual workpieces.

To set the band saw fence location, place the workpiece against it and move the fence so the blade aligns with the waste side of the line for the tenon cheek,



First Tenon Cheek. Align the first cheek cut on the blade and then position the gauge block, notch down, between the fixed stop block and the rip fence.



Second Tenon Cheek. Flip the gauge block over with the screw against the end of the stop block and then slide the fence against the gauge block.

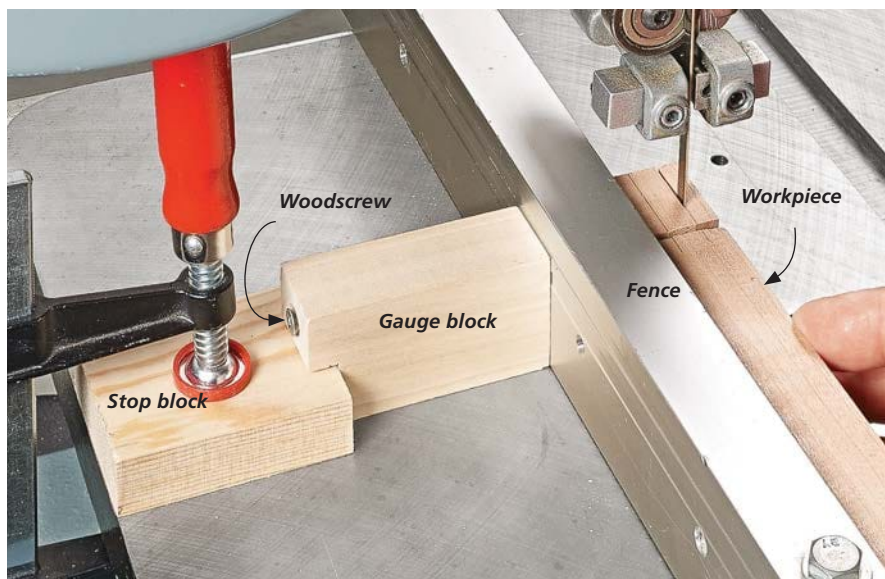
as shown in Figure 1. Lock the fence in this position and then place the gauge block on the opposite side with the notch facing down.

Clamp a stop block to the band saw table with the end of the stop block firmly against the inside of the notch. The stop block remains in this position through all of the cuts.

MAKING THE CUTS. Make the first cut in a test piece to create the first tenon cheek, as in the photo below. Now you can flip the gauge block over and reposition the fence. It's important to ensure that the screw on the gauge block is tight against the stop block. Figure 2 and the main photo illustrate this setup and how it differs from the first step. As I mentioned before, the stop block remains clamped in place.

This automatically positions the workpiece to cut the second cheek of the tenon (main photo, previous page). You may need to tweak the depth of the screw to align the workpiece to ensure the blade is on the waste side of the layout line. (You'll only make this adjustment once for the blade you're using.)

A SNUG FIT. The ultimate goal is a snug fit of the tenon in the mortise. Once you have the setup tuned in, you can cut perfect-fitting tenons all day long. You can use the same setup (with a different gauge block) to cut the edges of each tenon. Or you can simply set the fence to make these last two cuts. The best part is, if you label each of the gauge blocks, your setup for the next project is sure to go a lot more quickly.



Set-up. The fence and workpiece are aligned to cut the first tenon cheek. The gauge block is set against the fence with the notch placed over a stop block clamped to the saw table.

cutting better Bridle Joints

Don't limit your band saw to rough-cutting curves and tapers. Teach this tool a new trick — cutting joinery.

Most band saws spend their time in a shop being used to rough-cut curves. A few others are used for tasks like straight-line ripping, resawing, or even breaking down scrap pieces into firewood. But a band saw is so much more versatile than that.

One overlooked area is cutting joinery. It's not hard to see how a band saw can be used to cut the tenon for a mortise and tenon joint. But if you take it one step further, there's one joint that you can cut entirely at the band saw — the bridle joint.

The advantage of using a band saw is

that you don't need any jigs or complicated setups to cut bridle joints. And if you're working with long stock, you'll find that cutting the joints (especially the mortises) at the band saw is far easier than holding the workpiece vertically as you would have to when using a table saw.

The lower left photo shows the details of the joint. It looks like a cross between a mortise and tenon and a large finger joint. Since all the cuts are straight, through cuts, it's a good way to teach your band saw a new trick.

ARRANGEMENT. I like to arrange the open mortise and tenon of the bridle joint the same way as a standard mortise and tenon joint. So the mortise is cut in the vertical stile and the mating tenon is cut on the horizontal rail.

LAYOUT. Accurately laying out the joinery on the parts gives you a good idea of how the pieces will fit together. I use a marking gauge to scribe the lines for both the mortise faces and tenon cheeks. This helps me get a tight, gap-free fit between the mating parts.

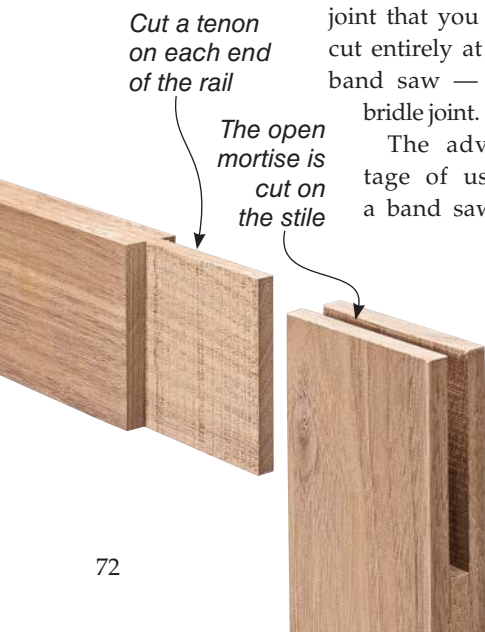
The scribed lines are used to set up the



Layout. A marking gauge creates a fine scribe line that's useful for setting up the saw and showing where to cut.

band saw. You'll cut inside the lines for the mortise and outside the lines for the tenon. The scribed lines form the visible, finished edges of the joint.

SET UP THE SAW. Setting up the band saw comes once the layout is complete. Like I mentioned earlier, you don't need much





Two Cuts for the Mortise Side. Hold the workpiece against the fence to cut the side of the mortise. Slide the workpiece forward until it contacts the stop block.



Clean Up the Bottom. Angle the workpiece to cut out most of the mortise waste. Then make a few bump cuts against the stop block to clean up the baseline.

in the way of saw equipment: just a rip fence and a miter gauge. For the blade, I like to use a $\frac{1}{2}$ "-wide blade with 3-6 teeth per inch for straight, smooth cuts.

In order to get consistent cuts on all the parts, a stop block clamped to the rip fence behind the blade is hard to beat. To set it up, use one of your workpieces as a gauge to position the stop block. Line up the scribed shoulder line on a stile with the leading edge of the teeth of the blade to locate the stop block.

I like to cut the mortises first. So I position the rip fence to cut on the inside edge of the scribe line farthest away from the fence. This arrangement gives me a better view of the blade and the progress of the cut.

MAKING MORTISES. Creating the mortise begins with two straight cuts that define the faces of the mortise. Slide the workpiece forward until it contacts the stop block, as shown in the upper left photo. To cut the other side of the mortise cut, simply flip the piece over and repeat the cut.

Use your left hand to push the workpiece forward. Your right hand applies gentle side pressure to keep it against the rip fence.

The upper right photo shows the steps to remove the waste between these cuts. I make a gentle, sweeping cut from the outside kerf toward the inside kerf, ending at the baseline. The remaining triangle of waste is cleaned out with a series of straight-on, nibbling cuts along the

baseline, as you can see in the inset of the upper right photo.

CUTTING THE TENONS. For the most part, cutting the tenon follows the same process as a mortise. In fact, if you compare the main photo on the facing page with the upper left photo, it's tough to tell the difference.

However, you do need to make a slight adjustment to your setup. The rip fence has to be repositioned to account for the kerf created by the blade.

It's a good idea to use test pieces to fine-tune the position. After each adjustment, cut a new sample tenon. Trying to tweak an existing tenon can cause the blade to deflect, spoiling the cut.

Your aim is for a snug fit that goes together with firm pressure or a few light taps from a mallet. You can always plane or sand the tenon a little thinner.

After making the tenon cheek cuts, the final step is to remove the two tabs of extra material on the outside of the tenon, as you can see in the middle right photo. For this step, I turn to the miter gauge to guide the workpiece.

Here, I use the rip fence here as an end stop for consistent tenon lengths. Take care as you cut the waste free so that you create a crisp inside corner without



Crosscut Tenon Shoulders. Slowly advance the miter gauge, pushing the workpiece into the blade until the waste piece falls away.

cutting into the tenon.

With that, the joinery work is complete. During assembly, the sides of the mortise tend to flare out a little. The solution is simple: A clamp pinching across the joint keeps it tight while the glue dries. The result you see at right is a strong, good-looking joint that will stand the test of time.

Finished Joint. The assembled joint is sturdy and has a nice appearance.



band-sawn Dovetails

Find out how easy it is to get great-looking dovetails like these. All it takes is a simple band saw technique and sharp chisels.

You just can't beat the look of hand-cut dovetails. But when it comes to cutting big dovetails, like those on the nesting tables, this can be a lot of work. To make things a little easier and faster, I used a technique that lets the band saw do most of the heavy work. You'll only need to do some fine tuning of the joint with a chisel. That's what I like about this technique — it combines the speed of power tools with the fine-crafted look that only hand tools can provide. So take some extra time to sharpen your chisels and put a new, sharp $\frac{1}{4}$ "-wide blade on the band saw and you'll be ready to get started.

BAND SAW TUNE UP. The first thing you'll want to do is make sure your band saw is running well. Start by checking to make

sure that the blade is square to the table. Like I mentioned before, put in a new blade. This will give you the smoothest cuts and the best results. And one more thing: I usually crank up the tension a little more than usual to make sure that the blade runs straight and true.

ACCURATE LAYOUT. With your band saw prepared, the next thing to do is lay out the dovetails. Although it doesn't really matter whether you start with the pins or tails, I like to start with the tails. And like a lot of woodworking joints, one of the

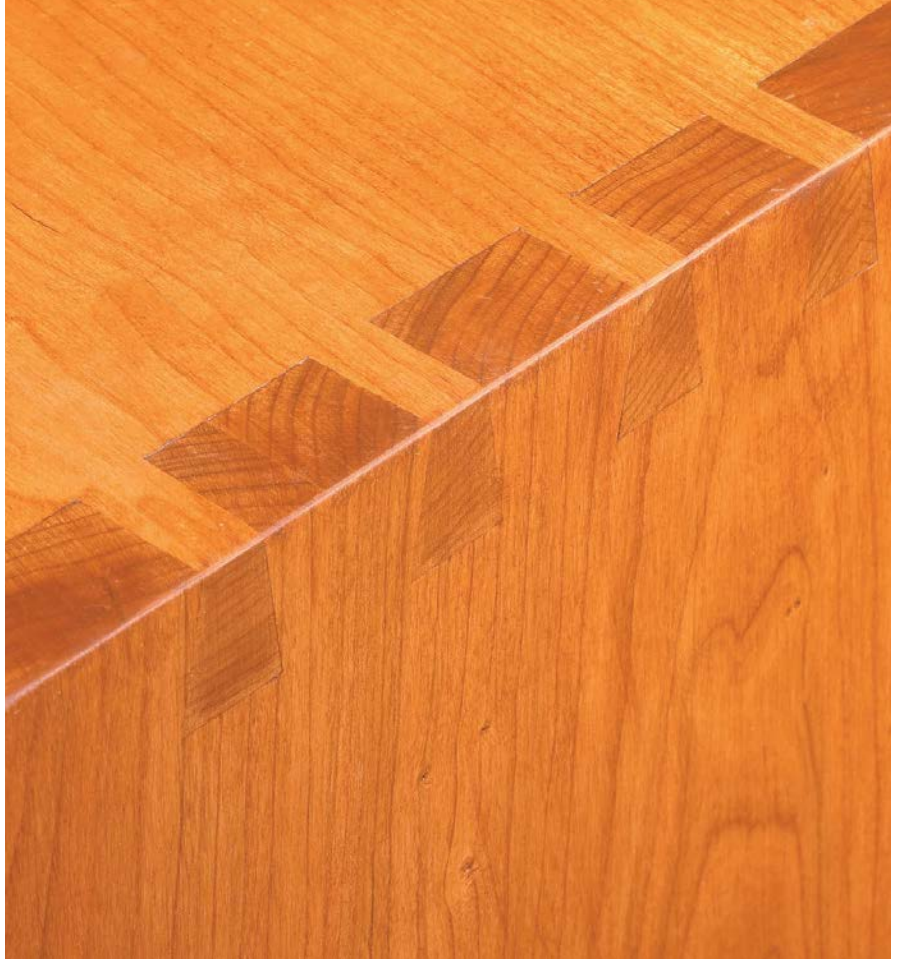
keys to crisp dovetails, like you see in the photo above, is precise layout.

The layout begins by marking the baseline on the tail workpiece, as shown Fig. 1. The baseline should be equal to the thickness of the pin board. To do this, I simply set the tail piece on end next to the pin piece. Then trace a line on all four sides with a pencil running along the edge of the pin board.

The next step is to measure and mark the tails on both sides of the board. Since the pieces on the nesting tables are oversized, the easiest way to mark the tails is to start from the center and work your way out.

Now measure and mark the tails on the end of the board, as shown in Fig. 1. To mark the angles on the faces, I set a bevel gauge to the angle of the dovetails (10°) and drew in the lines, as in Fig. 2. (Note: I used pliers to tighten the bevel gauge to prevent it from slipping.) By marking the dovetails on both sides it'll help you see the tails take shape when trimming.

To help keep things straight, mark an "x" in the waste area. This will help you see on which side of the line to cut at the band saw.



REMOVING THE WASTE. Now that you've got the tails laid out, you're ready to start cutting. Doing this with the band saw really makes things simpler, as there are just two steps here. First, you'll rough out the waste between each tail. Second, you'll need to trim the baseline using the fence.

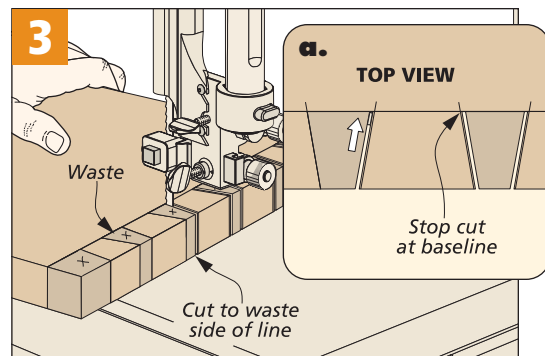
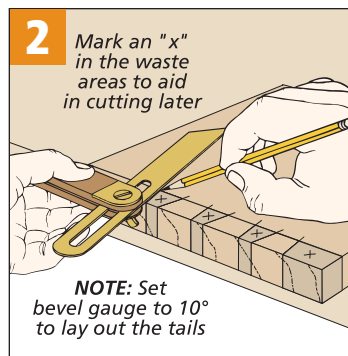
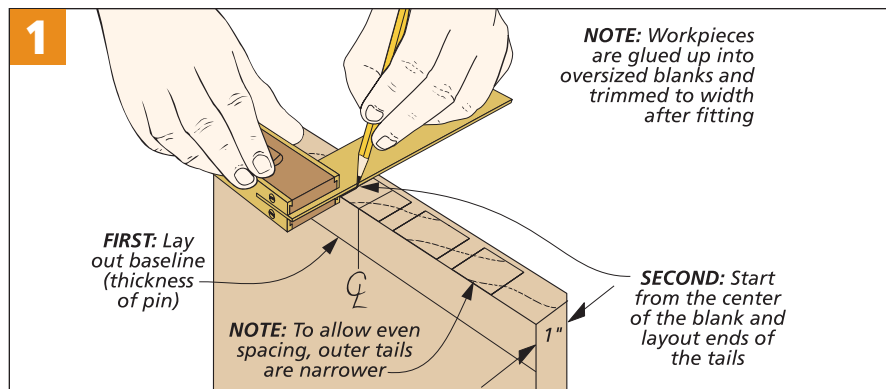
There's really nothing unusual about roughing out the waste. Begin by making straight cuts on the waste side of the layout lines. I stop at the baseline, as you can see in Fig. 3 and the bottom photo on the opposite page. (Staying close to the layout lines cuts down on the amount of chisel work later.) Then back the blade out of the cut.

Once all the straight cuts have been made, you can go back and make a curving cut to remove the waste. Note: The loose waste piece is trapped by the tails, so you'll want to back the blade out slowly.

CUTTING THE BASELINE. Up until now, there's been nothing too difficult about this technique. But this next step is where the advantages of using the band saw really stand out.

One of the challenges of hand cutting dovetails is getting a straight baseline. But instead of doing this by hand, I use the fence on the band saw to help cut the baseline to its final position. Once this is done, you won't have to touch it again.

The first thing you'll need to do is set the fence to the baseline measurement. What you're looking for is the blade to cut along the baseline as the end of the workpiece runs along the fence, as in Fig. 4b.

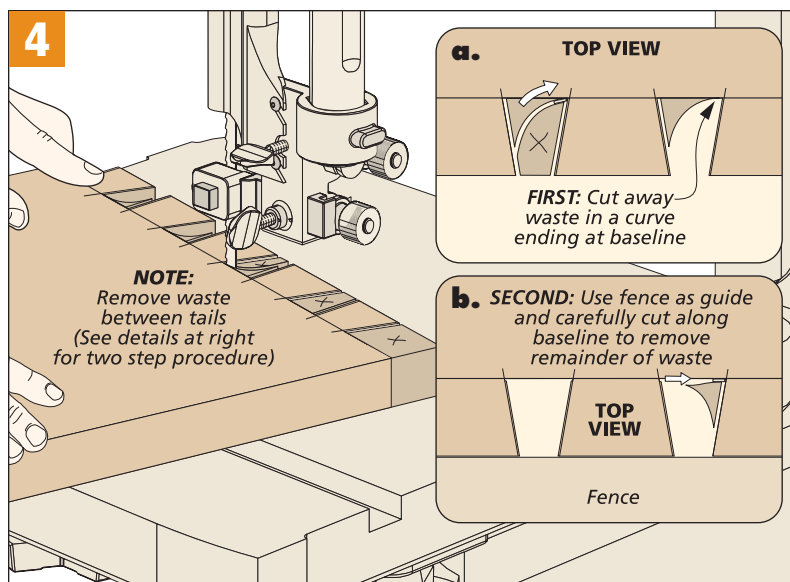


At first, the workpiece probably won't be able to run against the fence at all because of the waste. That's okay, because it takes a couple of passes to get there. As you cut, angle the workpiece so the blade will cut closer to the baseline.

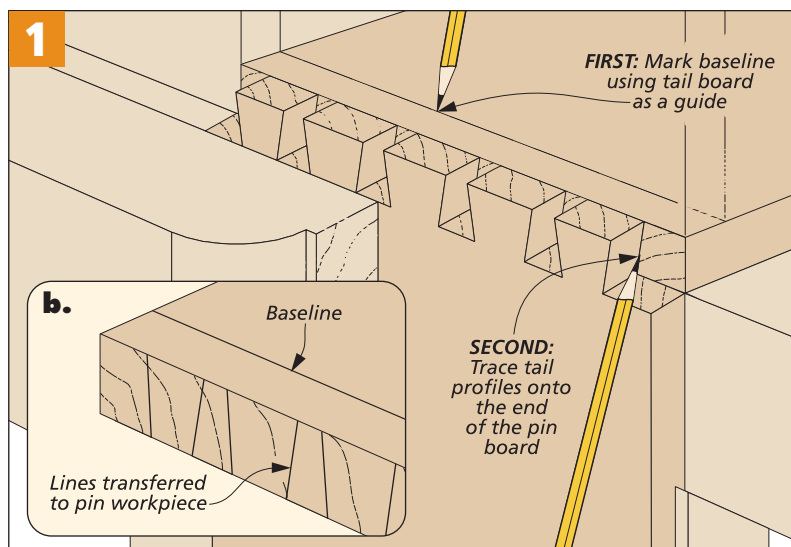
Then, to clean up the other corner of each socket, I flipped the piece upside down and made another set of cuts. By this time, you should be pretty close to the line. Just repeat this process until the workpiece can ride smoothly along the fence.

TRIMMING THE TAILS. At this point, the tails are cut to rough shape and the baseline has been cut. The tails can now be pared down to the layout lines, as in the photo below.

While trimming, pay close attention to the feel of the cut. There's usually only light resistance with a sharp chisel. But if the pushing becomes more difficult and the wood starts chipping, the grain is changing. When this happens, I change the direction of the chisel and pare from another angle.



Chiseling Dovetails. When trimming the tails, use a wide chisel to keep the surfaces flat. And by just pushing the chisel (rather than using a mallet), it's easier to sneak up on the fit.



When it comes to laying out and cutting the pins, you'll find that it's a lot like the procedure for making the tails. And this is just one of the things that I like about cutting dovetails this way. Once you've completed one half of the joint, the other half is done pretty much the same way.

TRANSFER THE LAYOUT. Here again, you'll begin by marking the baseline on the workpiece using the tail board as a guide. Then the pins can be marked onto the end of the workpiece. To do this, lay the pin board flat on the workbench and clamp the tail piece in front of it. Then trace the sides of the tails onto the end of the pin board with a pencil (Fig. 1).

The next step is to lay out the pins on both side of the board. I did this by drawing lines that connect the end markings to the baseline with a square, as in Fig. 2. And just as you did before, mark the waste areas.

CUTTING THE PIN SIDES. At this point, the pins can be cut. The biggest difference from cutting the tails is that here the pins are angled. So to do this, you'll need to tilt

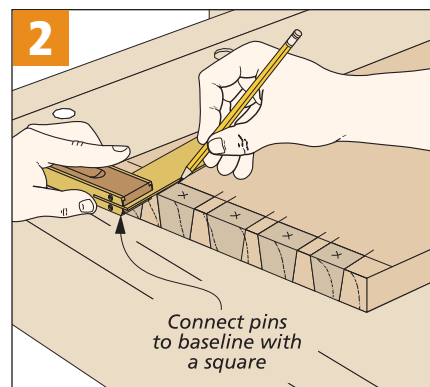
the table of the saw to the same angle as the pins (10°), as in Figs. 3 and 3a. I like to double check the angle by going around to the outfeed side and looking to see that the band saw blade matches the layout lines.

With the table tilted, you can now cut one side of each pin, stopping just short of the baseline. To cut the other side of the pins, you'll need to tilt the table in the other direction.

CUTTING OUT THE WASTE. Removing the waste for the pins is a little different than you might expect. Start by resetting the saw table square to the blade. Then place the workpiece with the outside face up on the table, as you can see in Fig. 4.

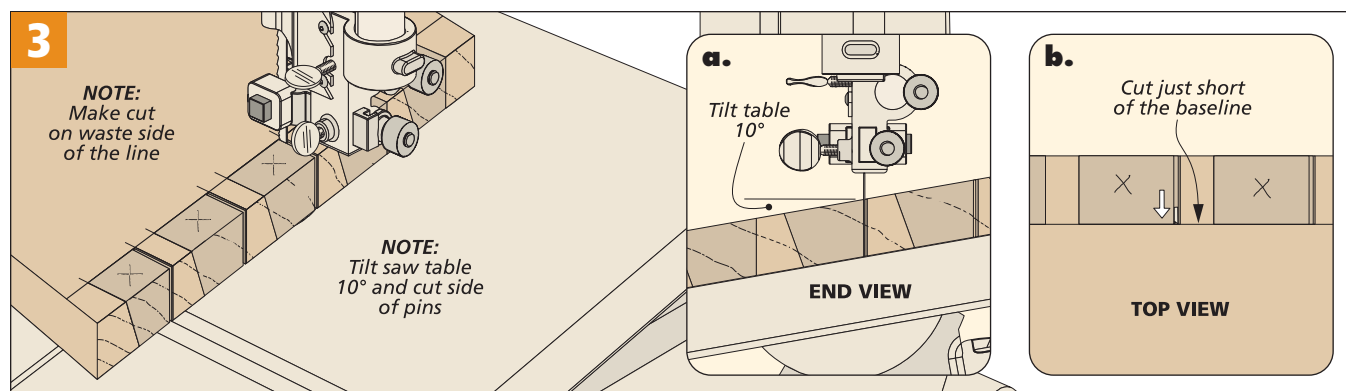
Now, make curving cuts down to the baseline. But instead of cutting down one of the lines already cut, you'll need to start further in on the waste side (Fig. 4a). To see why, take a look at the end of the workpiece. If you were to start at one of the previous cuts, you'd end up cutting off the corner of the pin.

As you cut, slowly curve the blade to one



of the previous cut lines. When you reach it, you can stop the cut when you see the waste piece break free. Now you may notice that the blade cuts into the pin slightly, as shown in Fig. 4b. But don't worry, this is on the side of the joint that won't be seen and doesn't affect the strength of the joint.

CUTTING THE BASELINE. Once you've removed all the waste, you can set up to cut the baseline. The baseline is cut the same way as the tails. First set the fence and cut the pin sockets in one direction.



Then flip the workpiece over and cut in the other direction, as shown in Fig. 4c. Finally, trim the pins to the layout lines, as you can see in the photo at right.

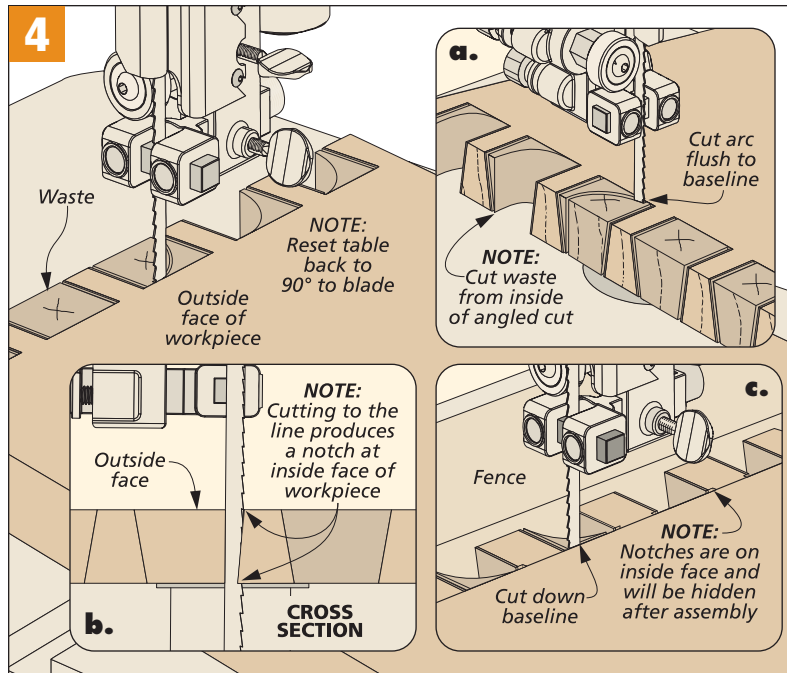
FITTING THE JOINT. With both pins and tails cut out, this is where the band saw work really pays off. The reason is that you've eliminated a lot of the hassle by cutting the baseline accurately with the band saw.

Now you'll notice that the joint doesn't fit together at this point. But that's okay. There's still some final trimming left to do. The process is relatively simple. For some tips on how to do this, check out the box below.

Basically, you stop and test the fit of the joint often and take small shavings with a chisel to sneak up on a snug fit.

This way, the dovetails can simply be tapped together.

GLUING THE JOINT. The last step is to glue the joint together. And since there's a nice, snug fit, you won't need much glue. I've found that it's only necessary to brush glue on the sides of the pins and tails. When the glue dries, plane or sand the pins and tails flush to the sides.



Paring the Joint. After cutting the waste and baseline on the band saw, a sharp chisel makes quick work of trimming the pins to the layout lines. Then with careful paring of the inside, unseen faces of both pins and tails, you'll end up with a snug fit and a crisp-looking dovetail joint.

Paring for a Tight Fit

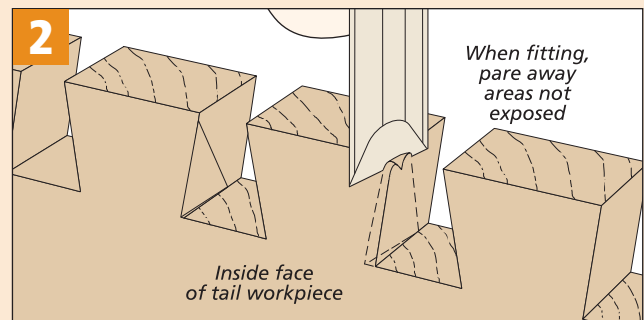
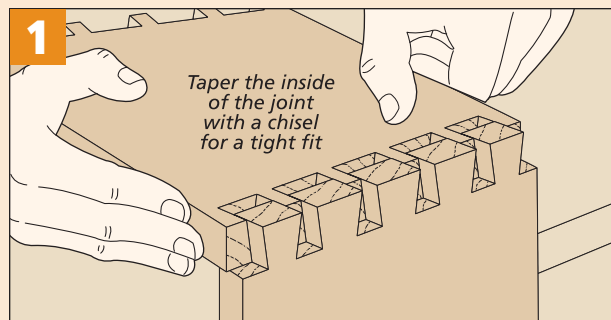
To get really tight-fitting joints there are only two simple steps — testing the fit and paring with a chisel.

I start by testing the fit of the joint. To do this, try and fit the pin board into the tail board, as shown in Fig. 1. Then mark the pins and tails that need the most work with a pencil.

From there, you can move on to paring the joint. By paring, you are carefully slicing tiny amounts of material off the faces of the joints. As you do this, check the fit fairly often.

There's one other trick I use to get a tight fit. As you can see in Fig. 2, I cut a very slight taper on the lower, inside

faces of each tail. Now when you test the fit again, you'll notice that the wide portion of the pins will begin to slip further in. Now, just repeat the steps shown in Figs. 1 and 2 until the joint can easily slide together about $\frac{3}{4}$ of the way. From here, you should be able to tap it home with a mallet.







Band Saw Projects

Your band saw is tuned up and your skills are honed, so it's time to start building. Each of these projects will push a different aspect of the band saw, so pick which one to start with and get cutting!

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arch-top

Every woodworker who sees these bookends asks the same question: “How did you do it?” You’ve got to admit, the answer isn’t exactly obvious. Even though you know the top hasn’t been literally bent into its curved shape, there aren’t many clues that might suggest how it’s done.

FINISHING OPTIONS. From the start, I decided to spray paint these bookends. The top and base of the bookends were given a clear top coat and then masked off. But be sure to give the finish plenty of time to dry before applying the tape.

A decorative bookend with a classical architectural design. It features a base with several vertical columns and a curved, pediment-like top. The bookend is resting against the spine of a book, which has the text "LUS AND EDWARD" visible on it.

A Body Blanks (10)* $\frac{3}{4}$ MDF - 4 x 8 $\frac{1}{2}$ rhg.
B Bases (2) $\frac{1}{2}$ x 4 $\frac{1}{4}$ - 4 $\frac{3}{4}$ "
C Curved Molding (4) $\frac{1}{2}$ x 4 $\frac{1}{2}$ - 4 $\frac{1}{2}$ rhg.
D Straight Molding (2) $\frac{1}{2}$ x 4 $\frac{1}{4}$ - 5 rhg.
• (8) #6 x 1 $\frac{1}{4}$ " Fh Woodscrews
• (2) Cherry Veneer (4 $\frac{1}{2}$ " x 5")
• (2) Non-Slip Tape (4 $\frac{1}{4}$ " x 4 $\frac{3}{4}$ "")

1

a. FRONT SECTION VIEW

1/2" 1/8" (A) (B)

b. SIDE SECTION VIEW

Back edges are flush (A) (B) 1/2"

FRONT SECTION VIEW

SIDE SECTION VIEW

NOTE: Body starts out as five 3/4" MDF blanks (4" x 8 1/2")

BODY BLANKS (A)

8" 3/4" 3 3/4" 4 1/4" 1" 1" 4 3/4" 1" (B) **BASE** (1/2" thick) #6 x 1 1/4" Fh woodscrew

Curve cut on body after molding blanks are added

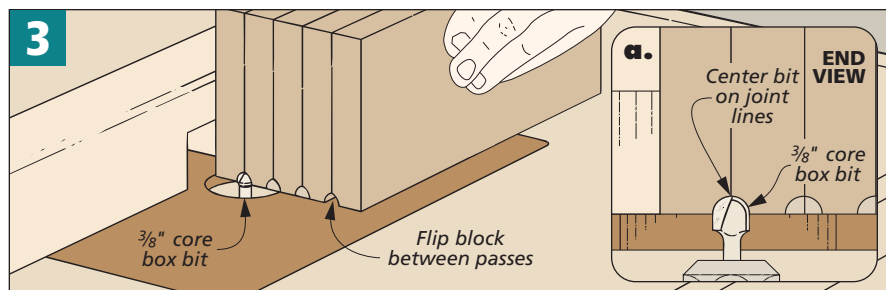
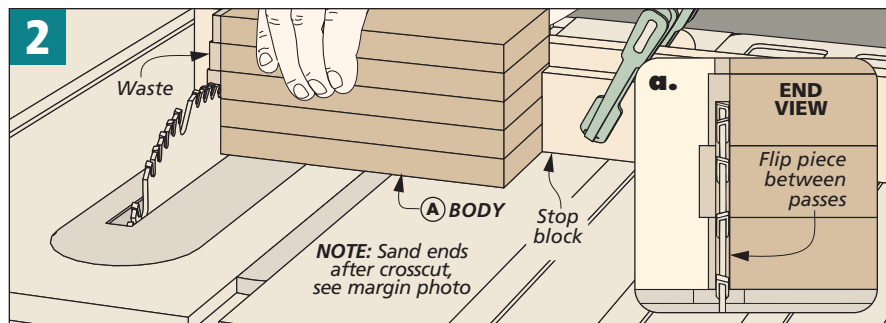
BODY. Regardless of the finish you use, I'd recommend $\frac{3}{4}$ " MDF for the body, as shown in Fig. 1. This isn't just because MDF is cheaper — it's also more stable. Changes in humidity aren't going to cause it to expand and contract over time and work the molding joints loose. Plus, MDF provides a good surface for paint.

The body starts out as five body blanks (A) that are glued together. Fig. 1 shows the final size, but you'll want the rough blanks a bit larger. (Mine were 4" x 8 $\frac{1}{2}$ ".) After the glue dries, the body can be ripped to width ($3\frac{3}{4}$ "), but it should be left long (8") until the molding is added.

Trimming the body is easier said than done. It's too large for a single pass at the table saw (and may even be too big to cross-cut with some miter saws). So you'll need to make two passes, as shown in Fig. 2 at right. Then to remove any shoulders or saw marks, you might want to do a little sanding. I did this with some adhesive-backed sandpaper placed on a flat surface (like a table saw), as shown in the margin photo.

ROUT FLUTES. When the body is cut to size, all that's left is to rout some flutes on the front edge. I did this with a $\frac{3}{8}$ "-dia. core box bit at the router table, as in Fig. 3. You don't even need to get out your ruler to set the fence. Just center the bit on a joint line and make two passes, flipping the body end for end between passes. Then reset the fence and rout the other pair of flutes.

BASE. At this point, the body is done, and you're ready to work on the base (Fig. 1). Mine is $\frac{1}{2}$ "-thick cherry, but if you're going to paint the entire book-end, then you can use almost any $\frac{1}{2}$ "-



thick hardwood. (I'd recommend you avoid "open grain" woods like oak and ash. You can't paint over them as smoothly as you can "fine grain" woods like cherry, maple, and poplar.)

The base (B) is cut to extend past the body $\frac{1}{2}$ " on the front and sides. If you're not going to paint the base, you'll want to make note of its grain direction, as shown in Fig. 1. I oriented the piece this way so it would match the grain of the top veneer that's added later.

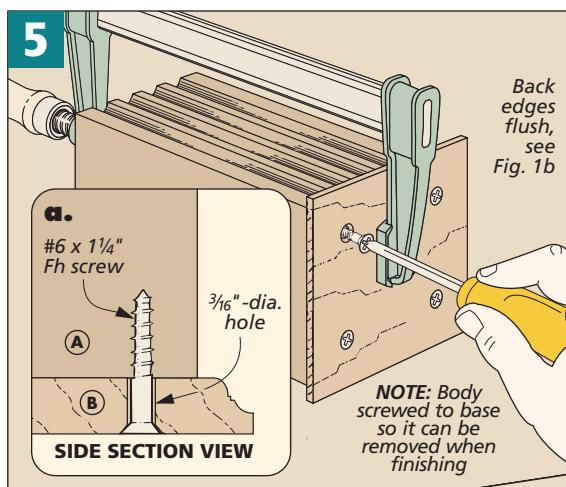
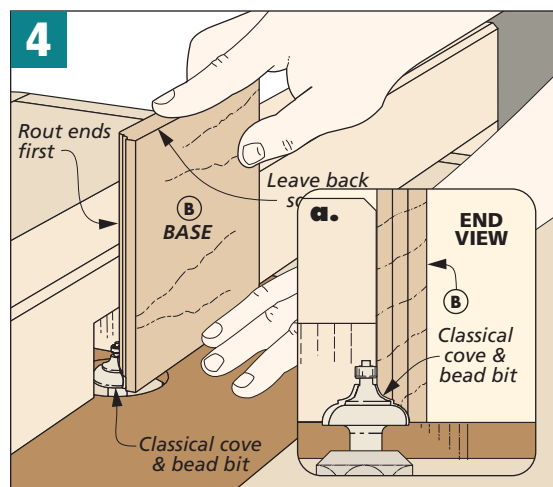
ROUT PROFILE. The base is routed on three sides. And I did this with a "Classical Cove & Bead" bit (refer online for sources). But you could also use a Roman ogee bit, as shown in the margin at right. To orient the profile correctly, the base piece needs to stand on edge when rout-

ing, as in Fig. 4. I took light passes to avoid chipout, sneaking up on the final depth of the cut by adjusting the fence to expose more of the bit.

Finally, you can screw the base to the body so the back edges are flush, as in Fig. 5. But don't use any glue. The book-ends will be easier to finish if you can remove the base.



Sanding Adhesive-backed sandpaper on a table saw makes a flat surface for sanding the ends of the body blank.



BASE PROFILE OPTION



Profile. You don't have to use the cove and bead profile I chose for the base and molding. The profile shown here is a little more common and will work just as well.



Template. If you're making multiple sets of bookends, you may want to make a cardboard template for tracing the curved profile on the moldings.

molding & Veneer

Now that the body and base are built, you're ready to add the molding and the veneer to the top. As you can see in Fig. 6, the molding starts out as three large pieces. They're mitered and glued to the body, and the whole assembly is cut to shape.

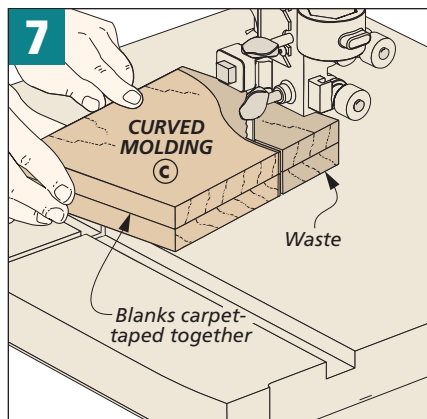
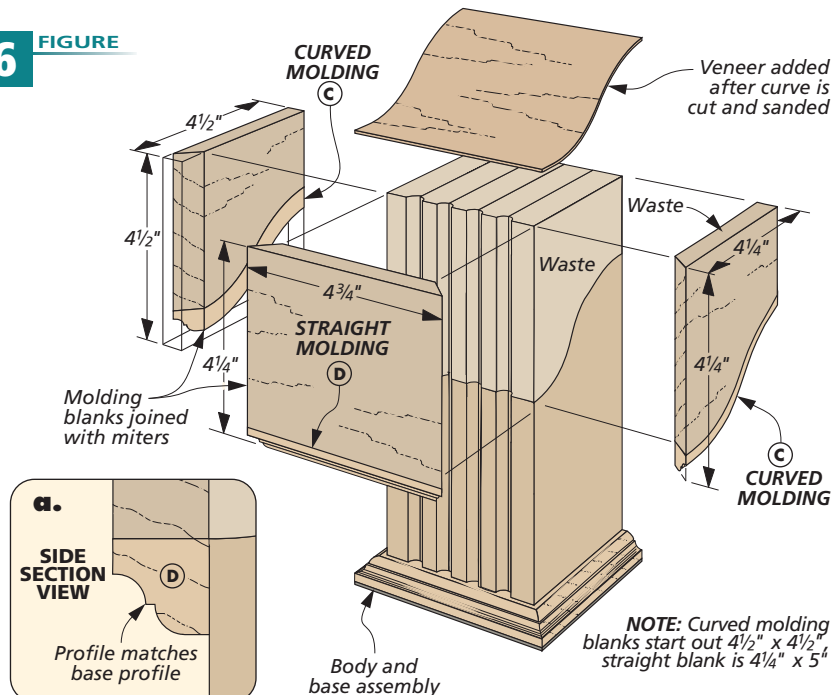
The veneer covers the joint lines and MDF. And it's actually one of the easier parts of the bookends. The grain is oriented so the veneer lays down nicely. And the trimming can be done with a sanding block.

MOLDING BLANKS. The first thing to do is cut $\frac{1}{2}$ "-thick blanks for the molding, as shown in Fig. 6. The curved molding (C) and straight molding (D) are oversized in both length and width. (Note that the curved pieces are $4\frac{1}{2}$ " wide to start out. The straight piece is $4\frac{1}{4}$ " wide.)

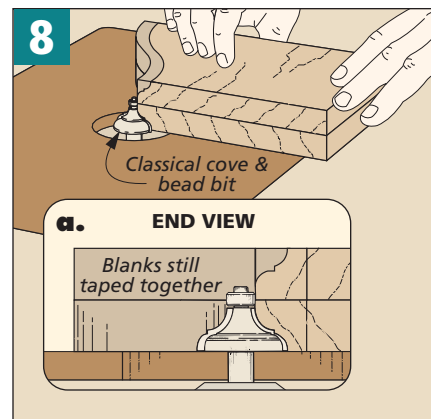
CREATE CURVES. The next thing to do is lay out the curve on one of the curved molding blanks. To help with this, the pattern on the next page can be photocopied at 100% and cut out. But if you plan to build more than one set of bookends, you may want to make a more durable posterboard template, as you can see in the photo in the left margin.

With one of the pieces laid out, I taped the two curved molding blanks together, using

6 FIGURE

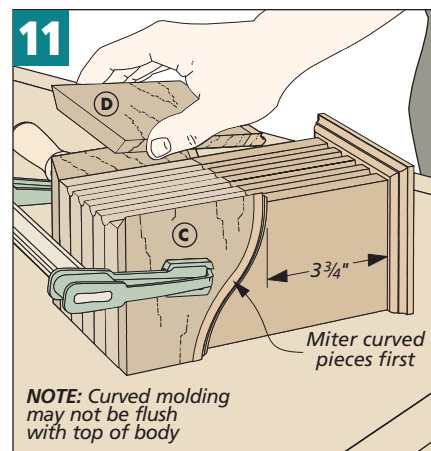
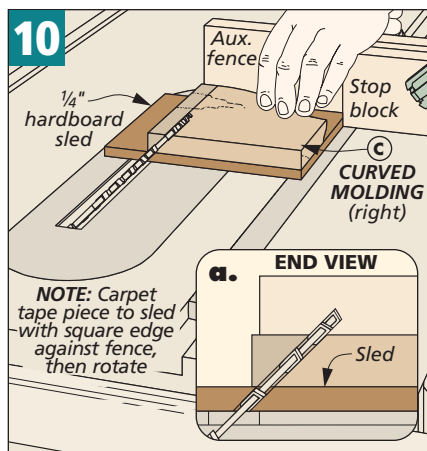
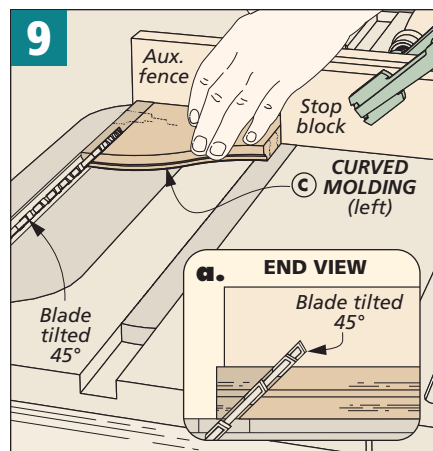


carpet tape, as in Fig. 7. This way, their profiles would end up exactly the same. Cutting the curves was a quick job with the band saw. Just stay to the waste side of the layout line. Then the saw marks can be removed and the profile fine-tuned by doing a little



sanding. (I used a drum sander.)

ROUT PROFILE. Now the curves you just cut will get a routed profile, using the same bit that was used on the base. But as you can see in Fig. 8, this time the pieces have to lay flat on the table so you can use the



bearing on the bit to guide the curved edges. And to make sure the bearing had something to ride against, I left the pieces taped together (Fig. 8a).

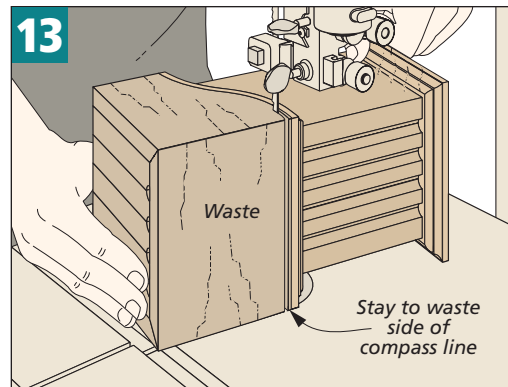
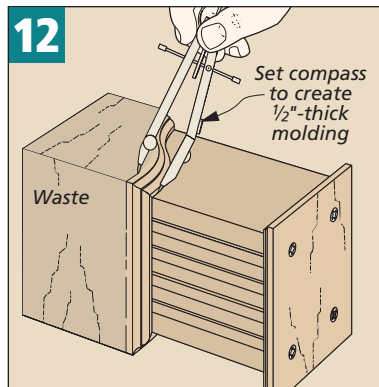
The straight molding also gets this same profile. This time, though, I used my router table fence to guide the piece across the bit.

Once the profiles are routed, you can miter the molding pieces so they wrap around the body. For all the pieces, the blade is tilted 45° and an auxiliary fence and stop block provide support, as in Fig. 9.

I started with the curved molding. They end up mirrored images of each other, so you can't cut them both the same way. The square edge of one piece (the left) simply rests against the auxiliary fence, as in Fig. 9. But the other piece (the right) will have to be flipped around so its curved edge is against the fence (Fig. 10). So to keep this piece square to the fence, I taped it to a hardboard sled first and then flipped it around to make the cut.

When the two curved pieces were mitered, I clamped them in place so they lined up 3¾" from the bottom of the body, as indicated in Fig. 11. The top edges of the molding pieces and body may not line up, but that doesn't matter — it's going to get cut away soon anyway. The important thing is that the bottom edges of all the pieces align.

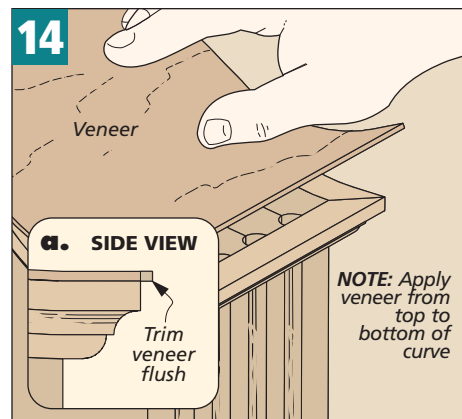
Now you can miter the straight molding to fit between the curved pieces, as you can see in Fig. 11. (Remember that your focus should be on the bottom ½" of the molding.) Then with all the molding pieces mitered to length, you can go ahead and glue them to the body.



SHAPE TOP. At this point, you're ready to shape the top of the bookend. It should match the curved edge of the molding, which is easy enough to do. Just set a compass to draw a parallel line ½" up from the bottom edge, as shown in Fig. 12. Then you can cut the curve on the band saw (Fig. 13). But don't force the cut — this is a pretty thick block, and you don't want the blade to wander as it's cutting.

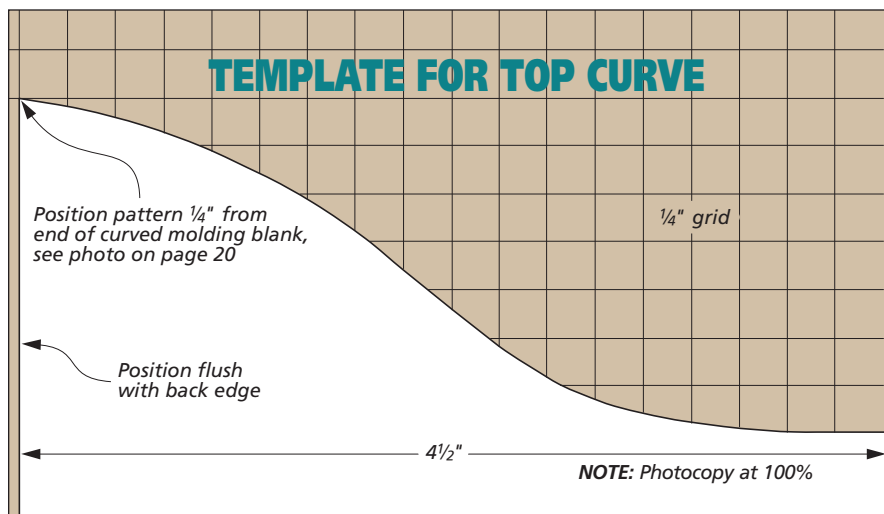
Since the top face of the bookend is too large for a drum sander, smoothing it takes a little elbow grease (but not much else). I used a regular, flat sanding block to work on the outside curve. For the inside curve, you'll need a rounded sanding block. The important thing is that you end up with a smooth, flat surface for applying the veneer.

APPLY VENEER. As you can see in Fig. 14, a small piece of veneer will hide the MDF and the joint lines on top of each bookend. I used solid-wood veneer here (not pressure-sensitive or paper-backed). And to glue it down, I used a gel-formula contact cement. (Yellow or white glue can work its way through the veneer and affect the finish.)



As you lay the veneer down, make sure its grain runs from curved edge to curved edge (Fig. 14). This way, it'll almost form itself to the curves.

Trimming the veneer isn't a problem either. In fact, you could do the entire thing with a sanding block, though I trimmed just the curved edges this way. For the straight ones, I used a sharp utility knife. I finished the project by applying a few coats of laquer paint and clear coat, as well as the non-slip tape in the photo below.



No-slip Grip. To keep the bookends from sliding under weight, I added adhesive-backed non-slip tape that's made for stair treads.

taper & pillar Candle Holders

Create two different candle holders using contrasting accent strips and the same band saw technique.

I made mine by gluing up thinner workpieces and then trimming them to size.

Once you have the blanks glued up, the next step is to add the accent strips. You can find out exactly how to do this in the Online Extra. The only thing to keep in mind as you add the accent strips is to locate them so they're within the boundaries of the shape you'll be cutting out. You can see the shape I used in the margin drawing at left.

SHAPE THE BLANKS. After adding the accent strips, all that's left to do is shape each blank and then drill a hole in the top for the candle holder cup.

As you can see in Figure 1, a band saw makes quick work of shaping the blank. To make the final shaping cuts you see

Sometimes, projects that look quite challenging at first glance are really the simplest of projects when it comes right down to actually building them. And that's the case with the two sets of candle holders shown on these pages.

Each of the candle holders you see starts out as a square block of hardwood that's been cut to rough size. Then to create the unique look, you make curved cuts on

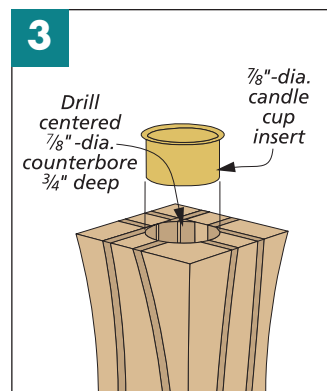
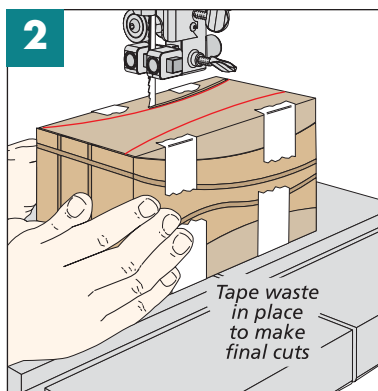
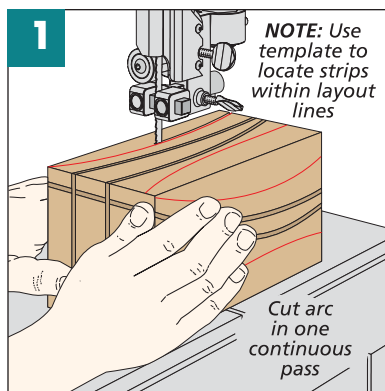
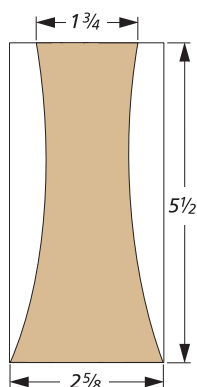
the band saw and glue in the accent strips. I used mahogany strips to provide a contrast to the maple that makes up the body of each holder.

CURVED CANDLE HOLDERS

The first set of candle holders I worked on were the tall curved ones you see in the photo above.

MAKING THE BLANKS. To start, you'll need a pair of 3"-square blanks about 5½" long.

CANDLE TEMPLATE



in Figure 2, which give the vase a lifted look, tape the waste pieces back in place.

FINAL DETAILS. Once the shaping is complete, you can sand the curves smooth. Once sanded, drill a $\frac{7}{8}$ "-dia. hole in the top of each holder for the brass insert, that will securely hold a slim taper candle, as in Figure 3.

All that's left to do at this point is apply a finish. I rubbed in a few coats of oil. And when the oil was dry, I glued a felt pad to the bottom of each candle holder.

SQUARE HOLDERS

The curved candle holders provide an refined, elegant look. For something a little different, take a gander at the set of square candle holders at right.

The process for making this set of candle holders isn't all that different from the curved holders. It's a bit easier since you don't have to make any final shaping cuts on the band saw. But that's not to say there aren't some interesting challenges in making the square candle holders. You can see what I'm talking about by looking closely at the photo and drawings at right.

CROSSGRAIN & THROUGH CUTS. For starters, instead of working with the grain as before, I made all the cuts across the grain. As I did

this, I made sure to do three things.

The first was to rotate the blank between each cut. This alternates the curve from face to face. Second, as I glued in each accent strip, I made sure the edge grain followed the curve of the cut. And finally, I made a couple of the cuts through the accent strips that had already been glued in place.

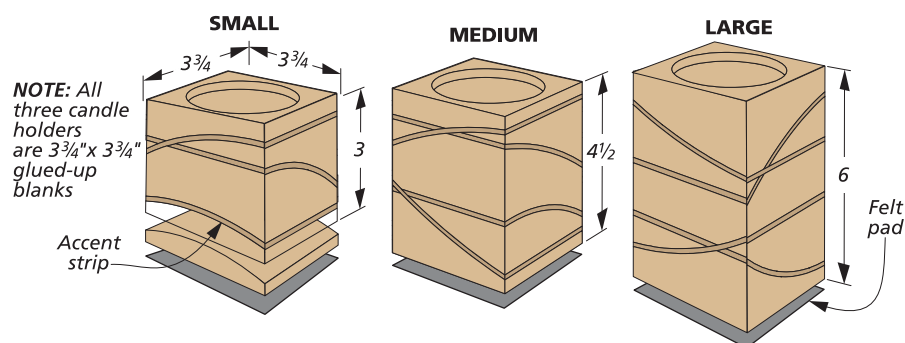
HOLDING THE CANDLE. Once all the accent strips are in place and sanded flush, you can trim the blank to final size and then complete a couple final details.

Since the large candles for these holders don't need an insert to hold them in place, I simply routed a counterbore in the top of each holder (see the box below).

Finally, all that's left to do is apply a finish and then glue a felt pad to the bottom of each holder.



Switching it Up. Varying the heights and adding intersecting accent strips across the grain provides a different look for the square candle holders shown above.

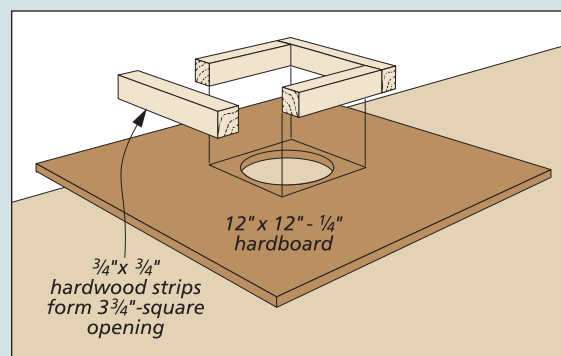


How-To: Routing a Hole for a Candle

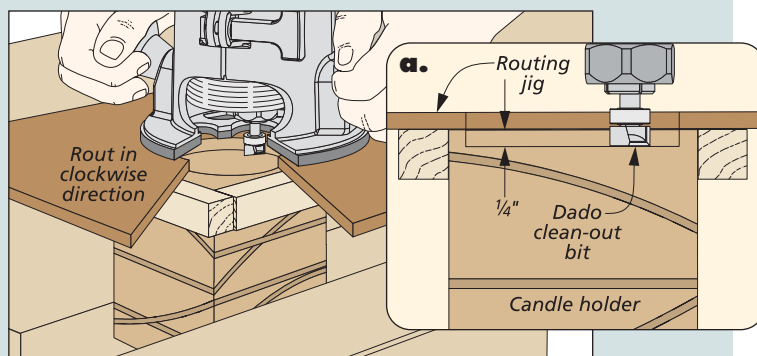
To hold the candles in place, you'll need to add a large counterbore into the top of each holder. To do this, I used a hand-held router, a routing jig, and a dado clean-out bit.

The jig is a scrap of hardboard with a $\frac{3}{8}$ "-dia. hole cut in it. To position the jig, there's a hardwood frame (left drawing). Routing the hole is just a matter of setting the jig in place

and making a $\frac{1}{4}$ "-deep cut with a dado clean-out bit (see page 49 for sources). After routing around the edge of the hole, nibble away at the remaining waste.



Routing Jig. The routing jig starts out as a piece of hardboard with a hole in it. To center the jig, hardwood strips are glued in place to form a frame.



Route Hole. Now set the jig in place and adjust the bit for the depth of cut (detail 'a'). After routing clockwise around the hole in the jig, clean out the remaining waste.



smartphone Amplifier

This clever project boosts the sound coming from your smartphone, and all it takes is a little creative work at the band saw.

Whether I'm out in the workshop or in the house, more than likely there's music playing from my smartphone. And while the speakers on smartphones have improved over time, the sound coming from them doesn't project very well.

However, with a little shop time, you can create an amplifier like this one. The unique design dramatically increases the volume coming from the speaker located on the bottom of the phone. A tapered opening in the top of the amp accepts most phone models and positions them correctly, even with a case.

BAND SAW SKILLS. Of course, if you're going to build a project, it's nice to hone some woodworking skills along the way. For this project, you'll spend some quality

time working with your band saw. Even though the amp is small, making it involves resawing thick boards into thin parts, making accurate rip cuts, and cutting smooth, flowing curves.

In order to give the amp a unique look, I incorporated "inlay" strips in a contrasting material. But instead of recessing the strips in a shallow groove, the blank is cut apart and the strips are sandwiched in between (drawing on the next page).

A THICK BLANK

The starting point for the project is making a thick blank. If you have access to lumber this size, a single-piece blank is a great option. But it isn't always easy finding thick material — especially when

you only need a small amount. Figure 1 shows the three-layer assembly I used to create the blank. A $\frac{3}{8}$ "-thick top and bottom sandwich a thick center piece.

Gluing up the three pieces isn't difficult. It does pay to spend a little time in selecting pieces that have similar color and grain patterns. The glue seams practically disappear with some extra attention spent aligning the grain when you glue the parts together.

MAKE INLAY STRIPS. You can make the inlay strips while waiting for the glue to dry on the blank. Begin by ripping material to match the thickness of the blank. Over at the band saw, resaw the boards into thinner pieces that are long enough to yield five inlay strips, as you can see in Figure 2.

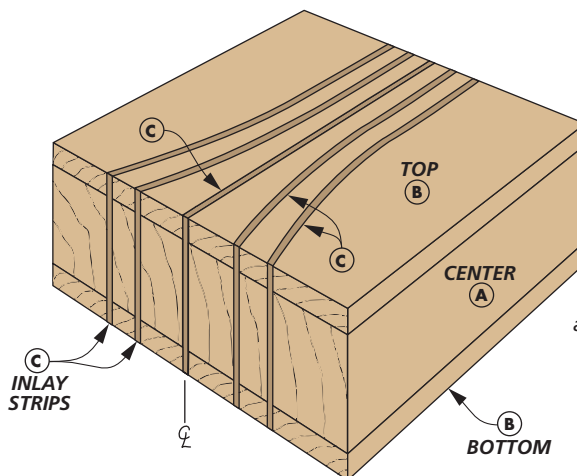


To print full-size patterns, go to:
WoodsmithSpecials.com

Complete the strips by planing them to final thickness (Figure 3) and cutting them to rough length.

CENTER CUT FIRST. With the inlay strips in hand, you're ready to start cutting the blank apart. To simplify the layout, I used a paper pattern. I began by making the straight center cut and installing one inlay strip, as in Figure 4. The square, flat surfaces left by this cut allow you to get the hang of the glueup process without having to deal with curves at this point.

Speaking of the surfaces, the key here is making the saw cut in a continuous pass. Combined with a sharp blade, the surface is smooth enough that I found sanding unnecessary. Once the glue and



NOTE: Top and bottom are $\frac{3}{8}$ "-thick hardwood. Center is $1\frac{3}{4}$ "-thick hardwood. Inlay strips are resawn from a contrasting hardwood and planed to $\frac{1}{8}$ " thick

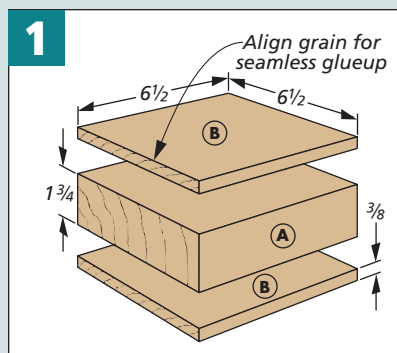
inlay strip are added, the results are tight joint lines, as shown in Figure 5.

SLICE & REPEAT. After removing the clamps from the first glueup, you'll just repeat this process for the other strips. The only difference for the remaining cuts is that you follow along the pattern making a curved cut, as in Figure 6. It's tempting

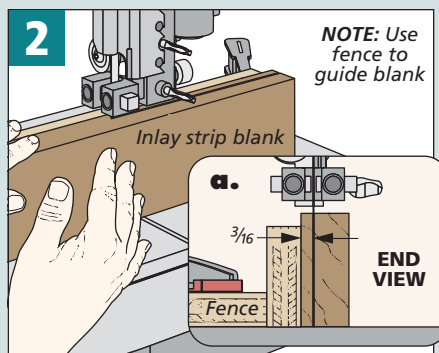
to cut and glue more than one inlay strip at a time, however doing so increases the number of small parts, which are difficult to keep aligned.

Work your way out from the center strip. Once the last inlay strip has been glued in place, it's time to transform the blank into the amplifier.

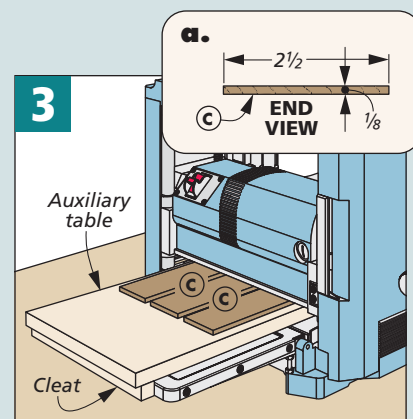
How-To: Create an Inlaid Blank



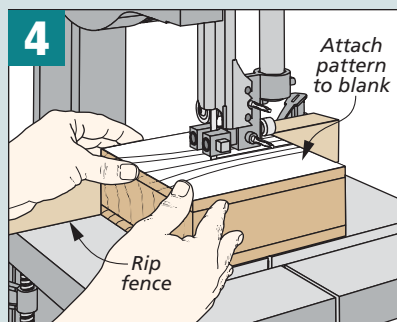
Three-Part Blank. A thin top and bottom sandwich a thicker center piece to create the body for the amplifier.



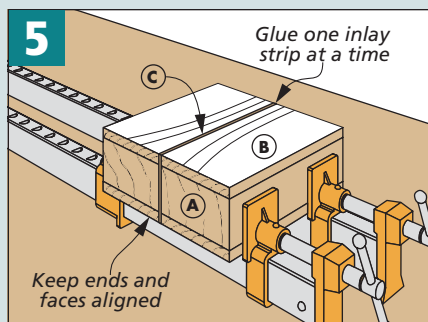
Thick to Thin. Resaw a board to create two inlay strips. Cut the strips slightly wider than the final thickness.



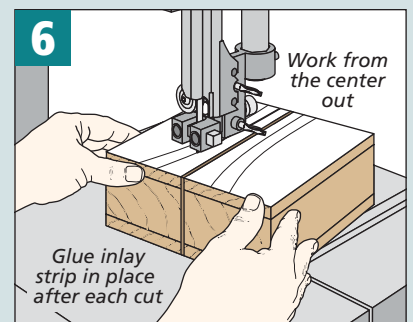
Final Thickness. An auxiliary table allows you to plane the strips to final thickness safely and accurately.



Center Kerf. Use a paper pattern to set a rip fence and cut the blank in half to accept the first inlay strip.



Glue & Clamp. Apply glue to the strip and blank. Be sure to keep the parts aligned as you tighten the clamps.



Curved Strip. Cut the first curved line in a fluid, even pass for the smoothest result. Sanding isn't necessary.

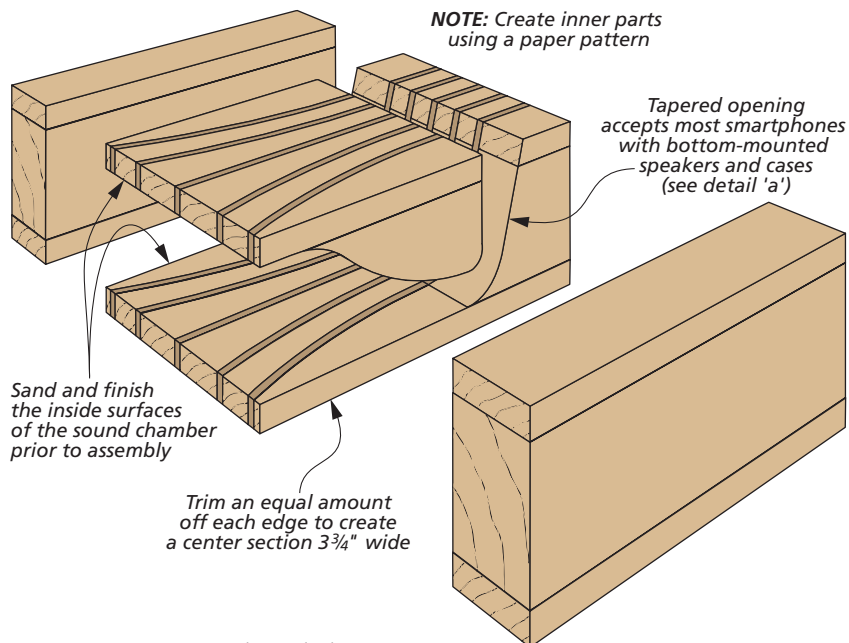
boosting the Sound

Adding the inlay strips involved quite a bit of cutting, gluing, and clamping. That work continues here, just with a different purpose. Your focus turns now to the functional part of the amplifier — shaping the sound chamber. The drawings at right show you where you're headed while the box below highlights the steps required to get there.

THE CENTER SECTION. The opening for the phone and the sound chamber that amplifies the music from the speaker occupies the center of the blank. A few cuts at the band saw allow you to do this. The first step is separating the center section from the sides, as in Figure 1.

A smooth surface transmits sound better. So unlike the earlier cuts, I sanded the inner surfaces of the sides that form part of the sound chamber.

As you can see in detail 'a,' an irregular shape forms the sound chamber. Once again, I used a paper pattern (available at Woodsmith.com) as a guide. Attach the pattern to one side of the center section and cut just on the waste side of the lines, as shown in Figure 2.

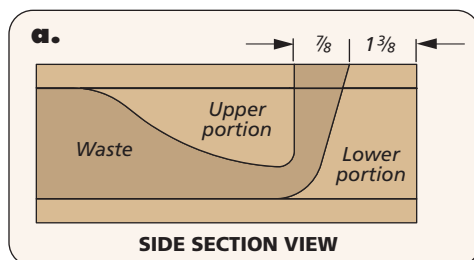


PREFINISH. Once you've shaped the upper and lower portions of the sound chamber, it's a good idea to sand and finish the inner surfaces. Like I said, it helps to get the best sound possible from the amplifier. I sprayed several coats of gloss lacquer on these surfaces. Apply masking tape to the edges of these two pieces to avoid gluing problems later.

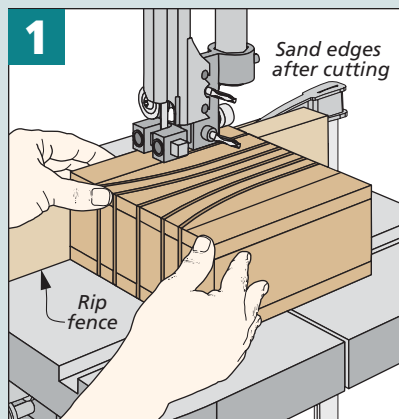
Don't forget to apply finish to the inside of the side pieces. To do this, position the center pieces on each of the sides and trace their profile onto the sides. Then mask off the glue surfaces

and erase your lines before spraying on a couple coats of lacquer.

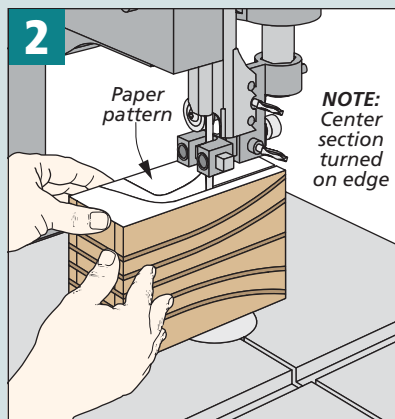
THE FINAL GLUEUP. It's time to get out the glue bottle and clamps one last time. There are four parts to manage here.



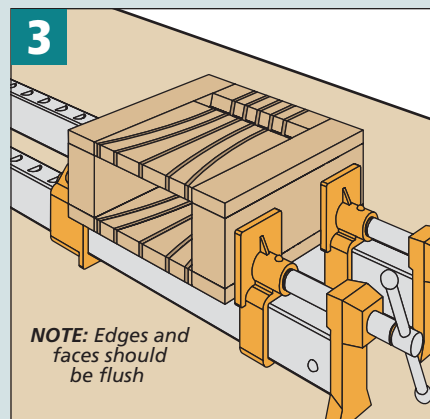
How-To: Shape the Sound Chamber



Straight Rip Cuts. Trim away each side of the blank, leaving a center section that's 3 3/4" wide.

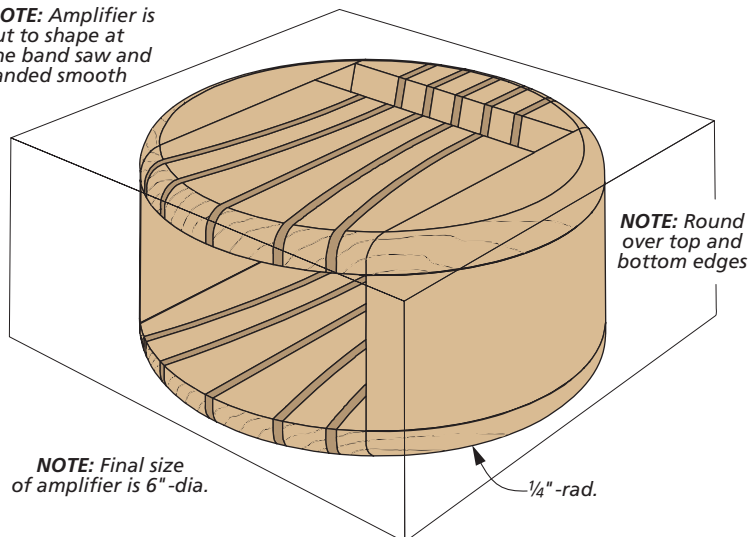


Curved Cuts. Follow a pattern to create the tapered opening and sound chamber on the center section.



Glue It Up. After prefinishing the inner surfaces, glue and clamp the amp blank back together one last time.

NOTE: Amplifier is cut to shape at the band saw and sanded smooth



NOTE: Round over top and bottom edges

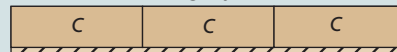
NOTE: Final size of amplifier is 6" -dia.

1/4" -rad.

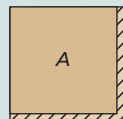
MATERIALS, SUPPLIES & CUTTING DIAGRAM

- | | |
|---------------------------|-----------------------|
| A Center (1) | 1 3/4 x 6 1/2 - 6 1/2 |
| B Top/Bottom (2) | 3/8 x 6 1/2 - 6 1/2 |
| C Inlay Strips (5) | 1/8 x 2 1/2 - 6 1/2 |

3/4" x 3" - 24" Mahogany (0.5 Bd. Ft.)



1 3/4" x 7" - 7" Hard Maple (0.7 Bd. Ft.)



1/2" x 7" - 14" Hard Maple (0.7 Sq. Ft.)



NOTE: Resaw parts 'C' to 1/8" thick. Parts 'B' planed to 3/8" thick

While it may seem that the center pieces would be tricky to keep in the correct orientation, the answer is straightforward. All you need to do is keep the ends and upper surfaces of the parts flush as you apply the clamps, as illustrated in Figure 3 on the previous page.

FINAL SHAPING

The home stretch on the amp involves creating its final shape. This shape can be whatever you choose to make it. I opted for a simple circle for a compact, pleasing look, as in the drawing above.

After smoothing the upper and lower faces, locate the center of the amplifier and

draw a circle using a compass. I made the marks on the bottom face so the dimple left by the point of the compass wouldn't be visible (Figure 1 below).

CUTTING A CIRCLE. After all the band saw work done to this point, you should be pretty comfortable cutting around the circle, as shown in Figure 2. The key is making the cut in a smooth, steady pass. Try to avoid stopping and starting, which leaves lumps and bumps that are more difficult to sand away.

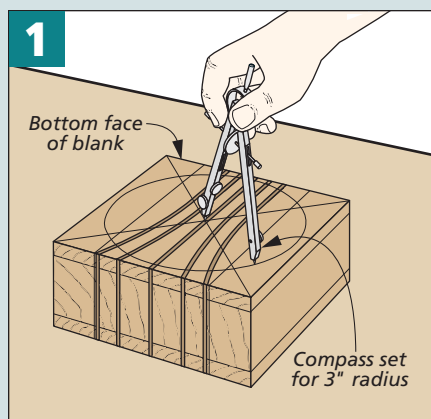
With a steady hand, a disc or belt sander makes quick work of cleaning up the blade marks left by the band saw. Use the layout line as a general guide.

I've found that I can track down uneven places by feeling the surface with my fingers. Finish up with some hand sanding to leave a smooth surface.

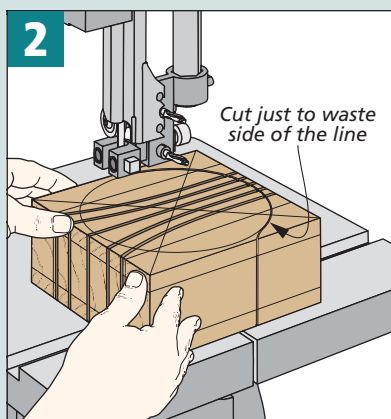
ROUT A ROUNDOVER. For the final construction step, head over to the router table and shape a roundover on the upper and lower edges (Figure 3).

A small project like this offers the ideal opportunity to use a spray can finish. In contrast to the sound chamber, I applied a couple coats of satin lacquer to the outside (just be sure to mask off the inside). The fast drying time means it won't take long before you'll have this accessory sending out your favorite tunes.

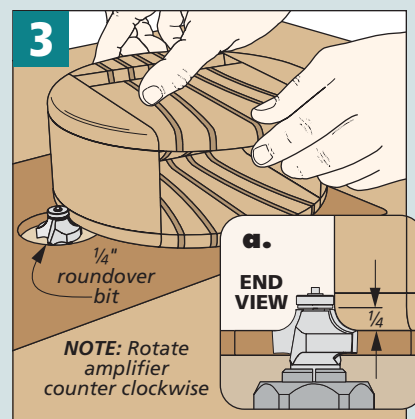
How-To: Make it Round



Layout Work. Draw diagonal lines to find the center of the blank and mark the final size with a compass.



Rough Cut & Sand. Cut close to the circle in order to minimize the amount of sanding you need to do.



Roundover. A gentle roundover eases the edges. After a final sanding, the amplifier is ready for finish.

nesting Tables

Build one or build all three. Either way, these tables with their hand-fit dovetail joinery are sure to stand out in a crowd.

Big dovetails. That's what first gets noticed on these nesting tables. After all, there's really not much to the tables. Each table is made from three boards — two sides and a top. Although they are an unusual shape, you'll notice that only the top is tapered slightly. This taper lets them nest together neatly. But what makes the tables really stand out is how you join the three boards.

Because these dovetails are big, we decided to use a new technique for making them. This band saw technique makes cutting them much simpler. You can read more about that on page 74.

With just two sides to join, there's not a lot of work involved here either. Once you've cut and fit one set of dovetails, you'll find that making more goes a lot quicker. So if you've never tackled dovetails before, this is the project for you. Whether you choose to build one table or all three, you'll be a dovetail expert by the time you're done.

CHOOSING THE RIGHT MATERIALS. Before getting into cutting the dovetails, there are a couple of things you'll need to do first. Getting the tables to fit together nicely, and getting the best-looking joints, requires selecting the right stock.

To begin with, for these tables to be sturdy, I chose hefty 5/4 cherry stock. You'll also want to select boards that are as straight as you can find. Cupped boards will make cutting tight-fitting dovetails difficult. And boards with any twist in them will make it hard for the tables to slide together freely.

Band Sawn Dovetails. To find out how to cut good-looking and tight-fitting dovetails with the band saw, check out the article on page 74.



This is also one of the rare times where you don't want highly figured grain. For one, the dovetails would get lost in the figure. And besides, straight-grain stock makes the joints easier to trim and less likely to tear out.

PREPARING THE BLANKS. With the stock selected, the boards can be planed to the same thickness and glued up into blanks for the tops and sides. At this point, I would normally cut the pieces to final size and then start on the joinery. But the shape of these tables called for something a little different. I left the pieces extra wide while cutting the dovetails, as shown in Fig. 1. Afterwards, they can be ripped to final width.

There's just a couple of things left to do before cutting the dovetails. First, the sides can be cut to finished length. Then the top gets a slight taper (10°) cut on each end. Note: save the waste pieces for use later, as you can see in Fig. 1.

CUTTING THE DOVETAILS. With the parts cut to rough size, you can begin laying out and cutting the dovetails. The problem is, how do you lay out the tails on an extra-wide blank so they'll end up balanced? The solution is to start marking from the center and work your way out on the side pieces.

Next, the tails can be cut out on the

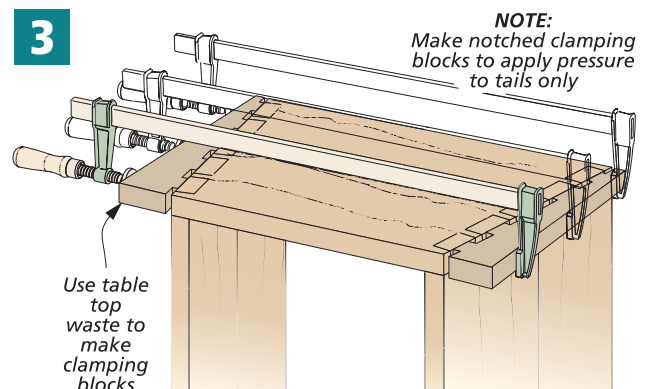
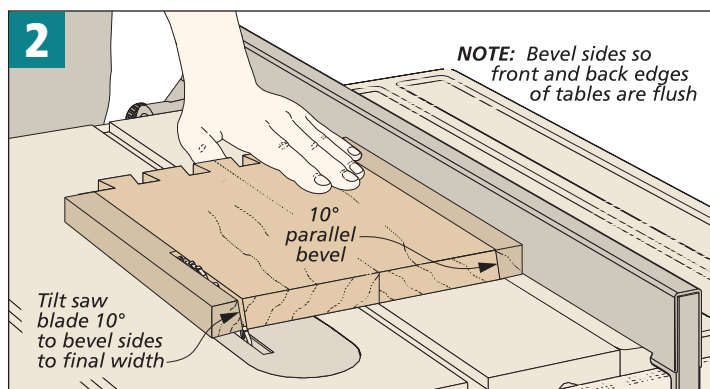
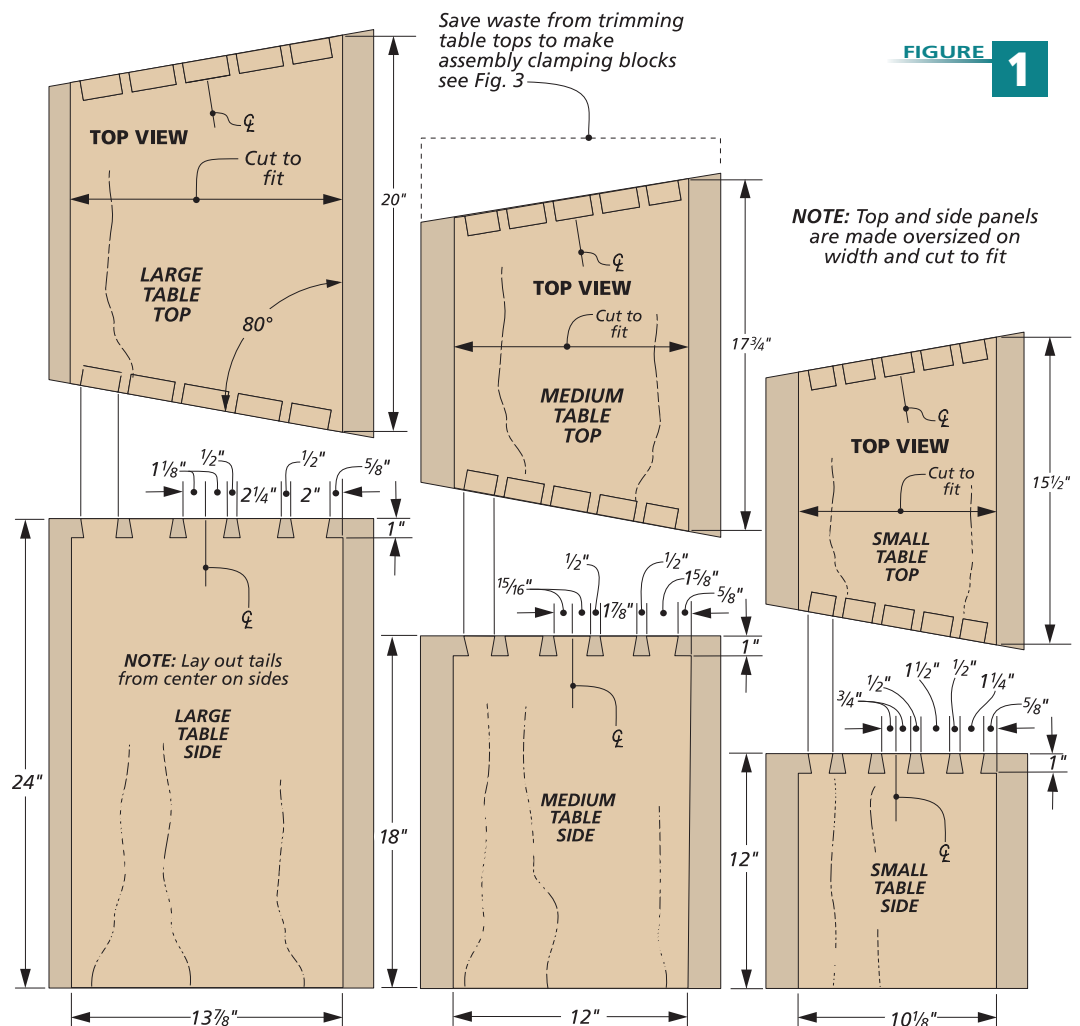
band saw and trimmed with chisels. Then the pins can be marked and cut. Now, the dovetails are hand-fit together for a tight joint. For more on how to do this, turn to page 74. Once you're satisfied with the fit, you can rip the pieces to final width, as in Fig. 2.

ASSEMBLING THE TABLES. At this point, the tables are ready to be assembled. But for a project with such a unique shape,

just using clamps won't work. To draw the dovetails together, I made a pair of notched clamping blocks for each table as illustrated in Fig. 3. They apply pressure only to the tails so that they are pressed into the pin sockets.

After the glue is dry, all that's left is to sand the pins and tails flush and soften the sharp edges.

FIGURE 1





curved-handle Serving Tray

Whether you use this tray to decorate your table or serve your guests, it will surely bring style and grace to your home.

Building a tray is a great way to practice new techniques in the shop. The joinery is often just as unique as the design. And this tray is no exception. It has splayed sides and arched ends that meet curved handles. This is a project that will look great on display in your home and will be a challenge to build, too.

The splayed sides are easy to make and

require just a couple cuts on the table saw. The contrasting handles are cut on the band saw from a square blank, so there's no bending involved.

BUILDING THE TRAY. The design of the tray is based around the splay of the sides. The other parts are sized to fit between them, so that's where I started.

Your first task is to cut the blanks for

the sides. I cut them to length, but left them extra wide.

SPRAY THE SIDES. Cutting the joinery along the bottom edge of the sides is a multi-step process. The key is to create a square reference face for the bottom of the tray. This is done by making two bevel cuts. In addition, a groove in each side mates with a tongue cut along the edge of the

bottom (detail 'a'). The How-To box at the bottom of the page steps you through the process.

To make the first bevel cut, I tilted the saw blade to $22\frac{1}{2}^\circ$ and positioned the fence $\frac{1}{8}"$ from the blade. With the saw set up, you can hold the piece on edge and bevel the inside bottom edge of each side, as shown in the left drawing below.

GROOVE. As I mentioned, a groove in the face of the beveled edge holds a tongue on the bottom. To cut the groove, lay the workpiece flat on the table saw. You'll need to lower the blade to make the groove the proper depth, but remember to leave the angle of the blade the same. The setup here is shown in the "How-To" section below, in the second box from the left.

BEVEL. The second bevel cut squares up the edge to mate with the bottom. Your goal here is to leave a $\frac{5}{16}"$ -wide beveled face to match the bottom (second box from the right below). Then you can trim the sides to width with a 90° cut along the top edge of each side.

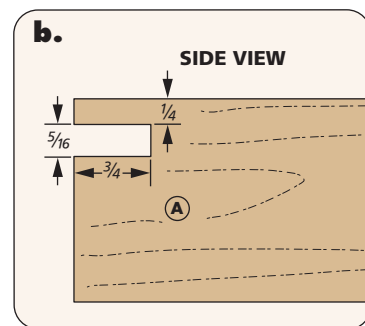
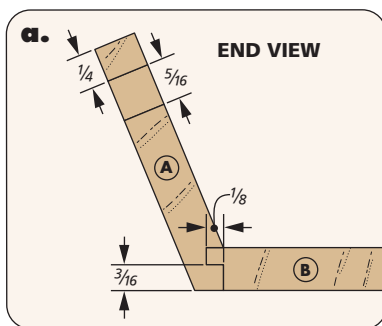
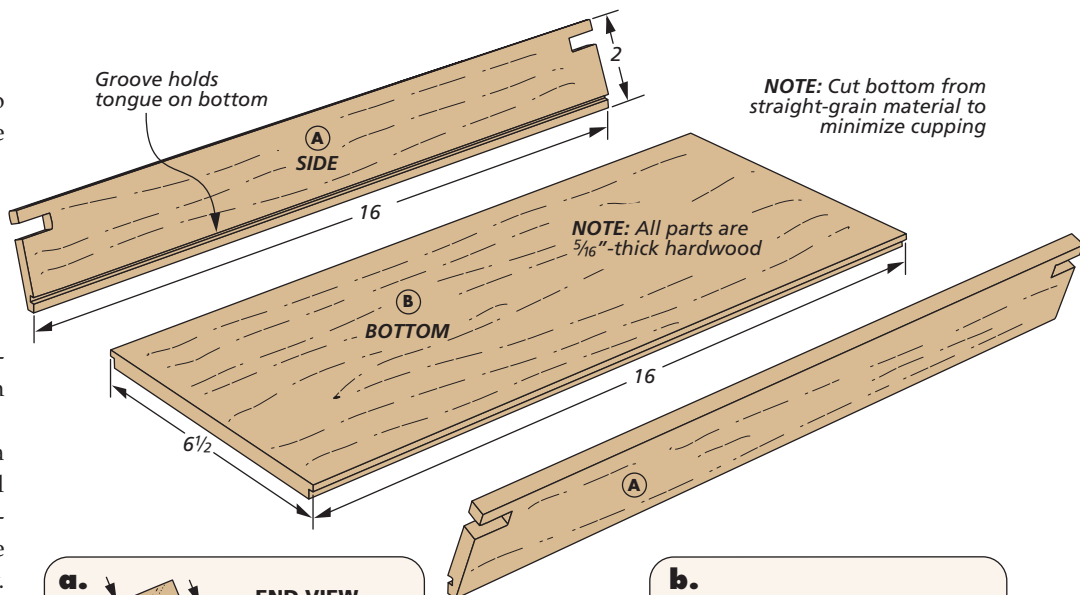
NOTCHES. The final step for the sides of the tray is to cut a notch in each end for the handles you'll make later

(detail 'b'). I did this with a dado blade in the table saw, standing the workpiece on end (far right drawing below).

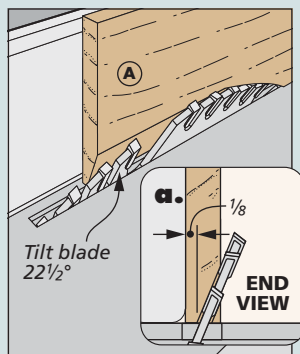
After you've cut the notches for the handles, take a minute to cut an identical notch in a scrap piece of hardboard. You can use this later to gauge the thickness when making the handles (page 94).

BOTTOM. The bottom is simply cut to size from straight-grain lumber, reducing the chance of it cupping. Cut a rabbet each edge to create tongues, as in detail 'a'.

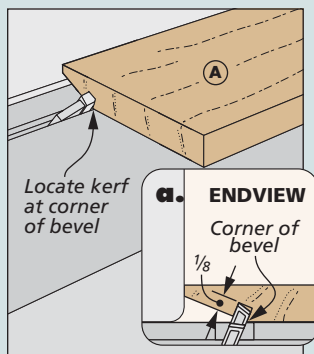
GLUE UP. At this point, I took the time to glue the sides to the bottom. Clamping the splayed sides is a challenge, so I used tape to hold them in place.



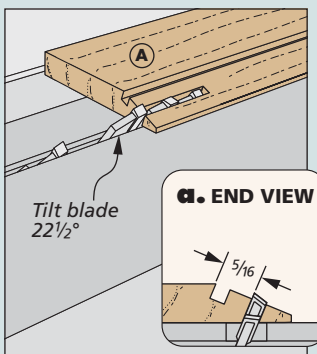
How-To: Make the Tray Sides



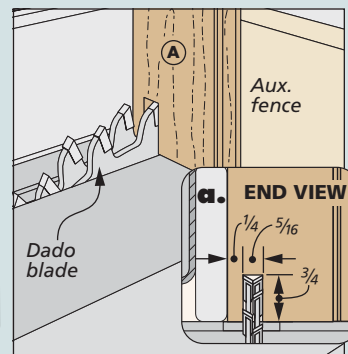
Bevel Edge. A beveled edge creates a surface to locate the cut for the groove.



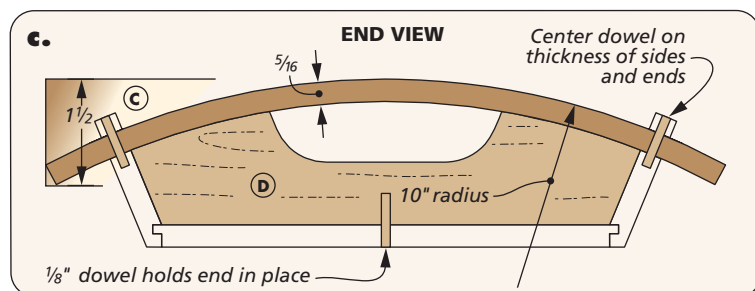
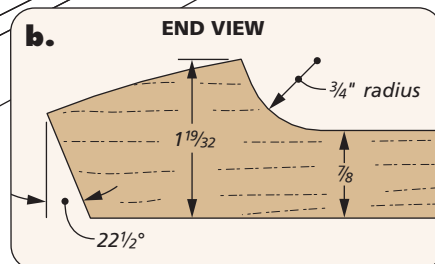
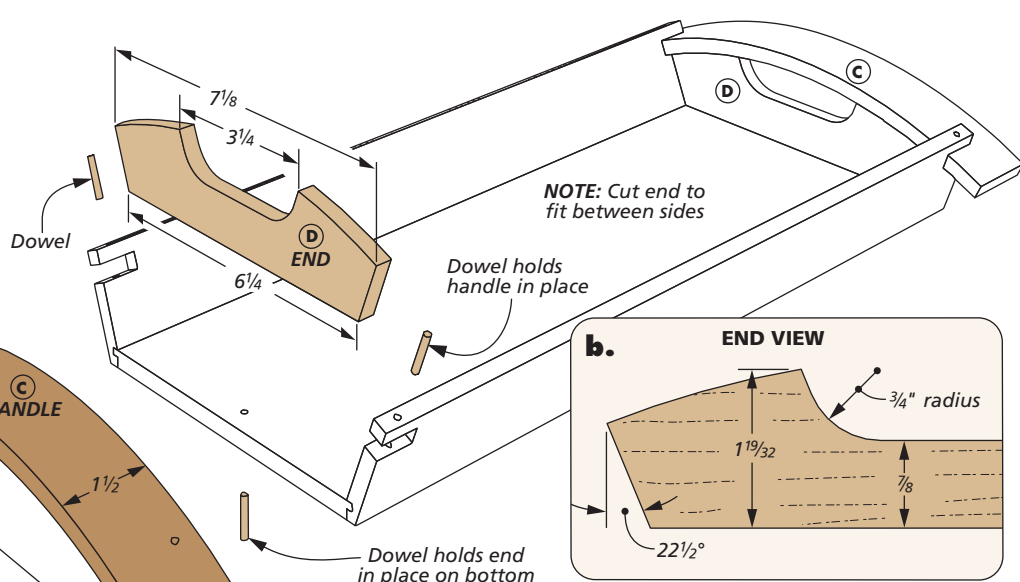
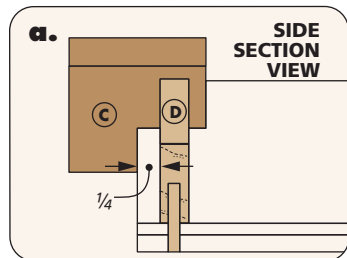
Groove. A groove cut along the face of the bevel will hold the tongue on the bottom.



Second Bevel. A second bevel creates a flat so the tray sides are flush with the bottom.



Handle Notch. Once the sides are cut to width, cut a notch to hold the curved handle.



Sand It Smooth. A hardboard gauge will help you check your progress when sanding.

completing the Tray

The tray is completed by adding the ends and handles. These integral parts fit together to close up the ends and give the tray its distinctive look. The arc at the top of the end needs to match perfectly with the curve on the handle. To do this, I made the handle first and then used it as a template to shape the end.

HANDLE. Shaping the curved handle requires a couple of cuts on the band saw and some sanding. I started with an oversized blank. You can make a beam compass to mark the arcs on the side of the blank, as shown in the left drawing in the box below. Once the arcs are

marked, bevel the blank on both ends to square the ends of the finished handle with the arc (center drawing below). Then cut the arcs on the band saw.

Cutting a smooth curve on the band saw can be difficult. But if you cut just outside the layout line, you'll find you have less material left to sand it smooth (right drawing). When the handles are cut to rough shape, you can clean up the inside curve with a sanding drum. Use a soft sanding pad to sand the top of the

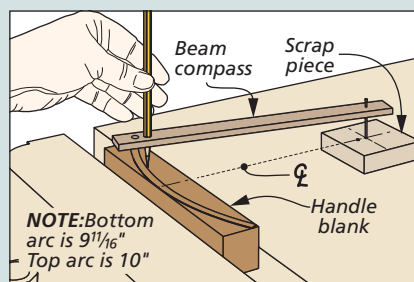
handle. As you sand, you can check the thickness of the handle with the hardboard gauge you cut earlier, as shown in the margin photo on the left.

MAKE THE ENDS

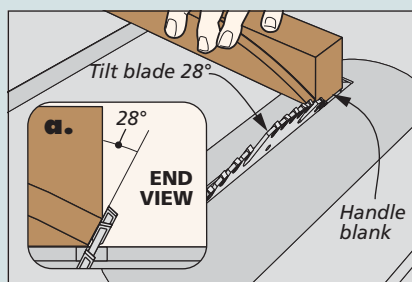
The tray ends are also shaped with several cuts on the table saw and band saw. For this reason, I again started with a pair of extra-long, wide blanks.

BEVELS. The first step is to bevel the ends. They're cut at the same $22\frac{1}{2}^\circ$ angle you

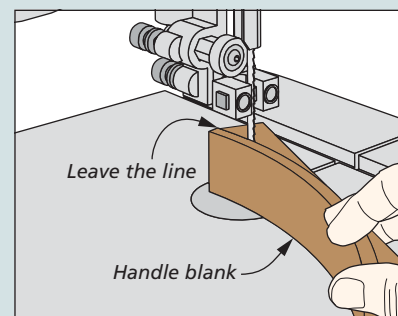
How-To: Make the Handles



Lay Out Arc. Use a scrap block as a pivot point for the beam compass as you mark the arcs in the handle blank.



Trim Ends. Tilt the saw blade 28° to square the end of the handle. Then bevel the ends of the oversized block.



Band Saw Arc. A band saw will make short work of the arcs. After they're cut, sand the handle to remove saw marks.

used earlier for the sides. But this time you'll use a miter gauge. This is shown in Step 1 on the right. After you cut the bevels, check that the fit of each end is snug to the bottom and sides of the tray. You may need to sand the bevels a bit to get a good fit.

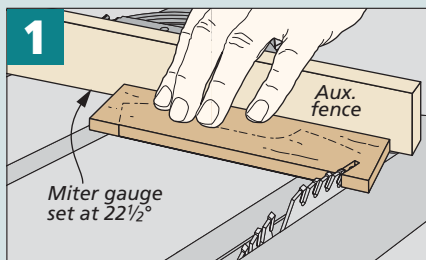
ARC. With the ends fit, you can slip the handles into the notches on the sides and mark the arc at the top of each end, as shown in Step 2 on the right. When they're marked, cut the arcs on the band saw, leaving the line again (Step 3).

OPENING. To cut the finger opening on each end, I used the band saw, as shown in Step 4. The measurements are shown in detail 'b' on the opposite page. Then it's back to the sanding drum to clean up the cutouts, as illustrated in Step 5. Sand the ends, too, until they fit snugly under the curve of the handle, as shown in the Shop Tip below.

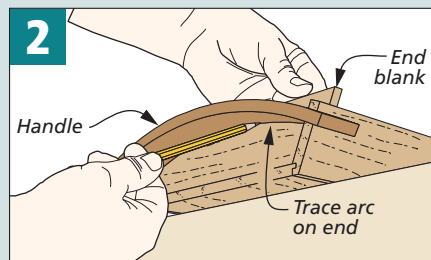
FINAL ASSEMBLY. To attach the ends and handles to the tray, start by gluing the ends into place on the tray. Remember to inset them $\frac{1}{4}$ " from each end of the bottom. Next, insert the handles in the notches and center them. You can drill holes from the top of the sides through the handles and insert dowels to hold them in place (Step 6). A final pair of dowels is inserted through the bottom to hold the ends. Finally, trim the dowels and sand them.

ALL THAT'S LEFT IS TO ADD A FINISH. Then fill your new tray with snacks and drinks to enjoy with friends.

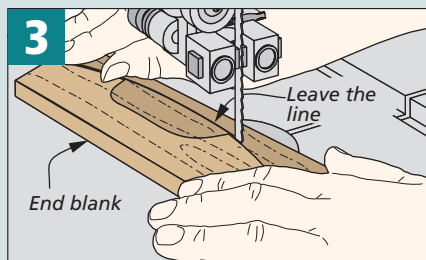
How-To: Make the Ends



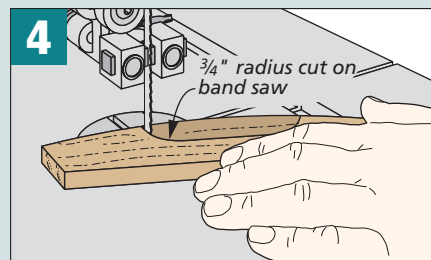
Bevel Ends. With the miter gauge set at $22\frac{1}{2}^\circ$, bevel both ends of the blank to match the splay of the tray sides.



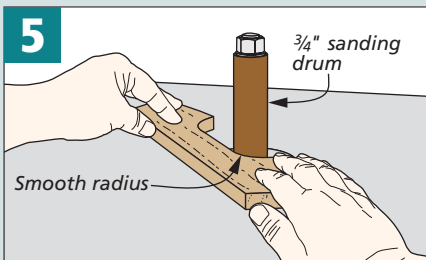
Trace Handle. To fit the ends to the curved handle, insert the handle in the notches and use it as a guide to mark the curve.



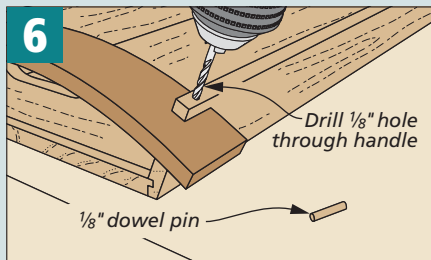
Cut Arc. The arc at the top of the end is cut on the band saw. Cut on the waste side of the line to allow a custom fit.



Cutout. The cutout for the handle openings is also cut on the band saw. Again, cut on the waste side of the line.

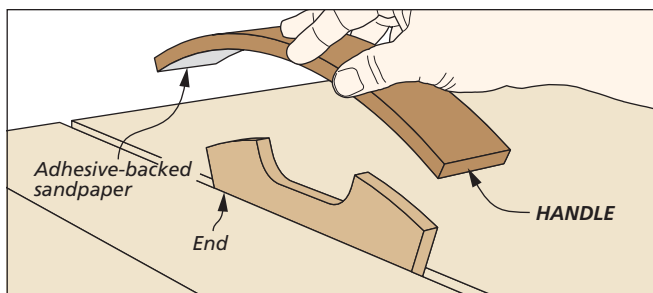


Drum Sand. After cutting away the waste, use a sanding drum to clean up the edges of the cutout and sand to the line.



Install Pins. With the ends and handle in place, drill a hole through the sides and into the handle, then insert a dowel pin.

Shop Tip: Sanding to Fit

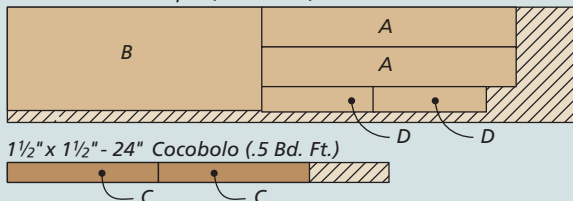


Fit End to Handle. In order to get a good fit between the end and the handle, use the handle as a sanding block to smooth the arc.

MATERIALS, SUPPLIES & CUTTING DIAGRAM

- A Sides (2) $\frac{5}{16} \times 2 - 16$
- B Bottom (1) $\frac{5}{16} \times 6\frac{1}{2} - 16$
- C Handles (2) $\frac{5}{16} \times 1\frac{1}{2} \times 9\frac{1}{2}$
- D Ends (2) $\frac{5}{16} \times 1\frac{3}{4} - 7\frac{1}{8}$
- Dowel (1) $\frac{1}{8}$ "-dia. x 5" rgh.

$\frac{5}{16}$ " x $7\frac{1}{4}$ " - 36" Maple (1.8 Bd. Ft.)



sculpted wood Vase

Have a prized piece of wood you're looking to use? You can make this vase with just a few cuts at the band saw.

Most woodworkers I know have a treasured "stash" of wood. These are the pieces they've squirreled away over the years. They're not quite sure what they're going to do with them, but the wood was just too good-looking to pass up.

With this vase design, I finally found a

way to use a few of these special pieces of wood. The project is woodworking at its essence — just a block of wood that's shaped at the band saw to achieve its sculpted appearance. It really lets the look of the wood itself do the talking. Of course, I should probably also note that these vases

aren't meant to hold water. They're for dried or artificial flowers only.

VASE DETAILS. In reality, each of these "blocks" of wood you see here is actually built up from five separate pieces. Gluing them together creates the rectangular opening at the top of the vase. Then, a series of simple band saw cuts is all that's required to shape the vase into what you see above.

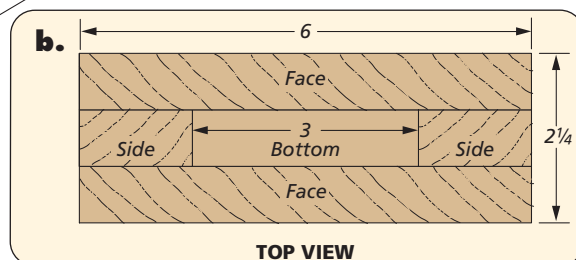
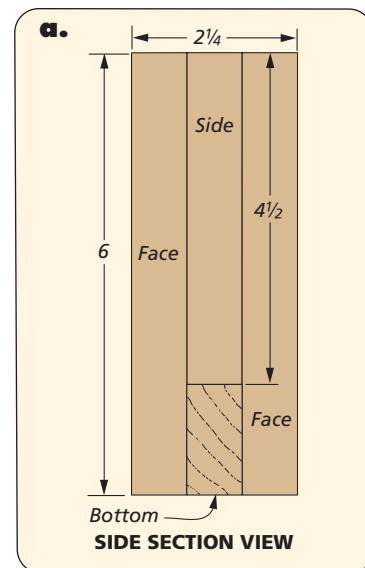
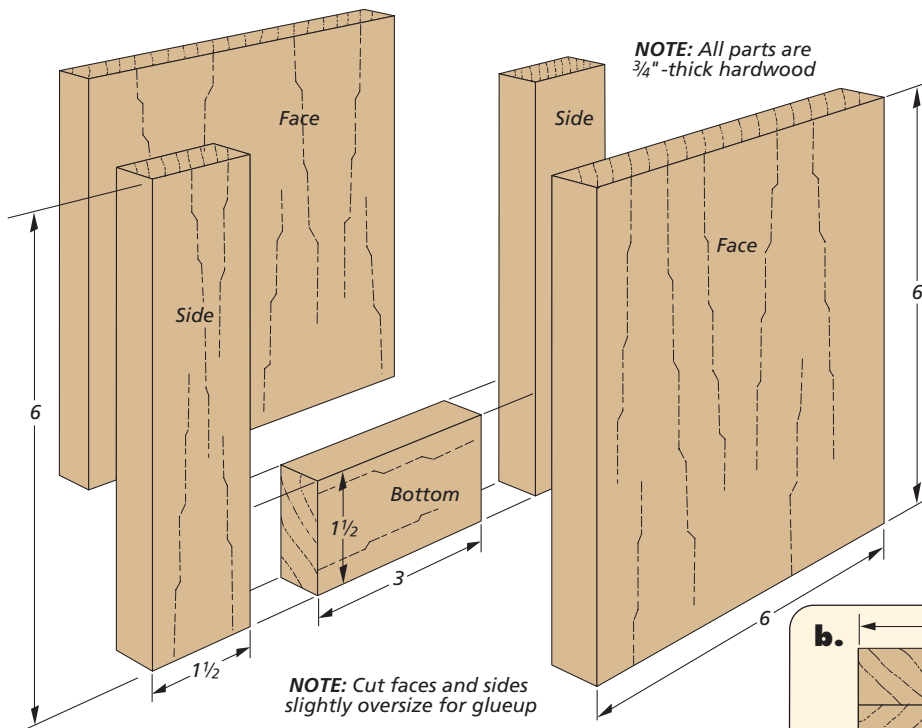
ENDLESS POSSIBILITIES. What I really enjoy about the project is all the different directions you can take it in. You can see just a few of the possibilities in the photo at left. Using an attractive, exotic wood is one option. The vase shown above and on the far left of the photo is made from wenge, and the one next to it is zebrawood.

Another option is to use a less exotic wood for the vase, and then face it with an attractive veneer. The one shown second to the right, for example, features a maple cluster veneer over maple.

Wood and aluminum also make for a unique combination. The far right vase simply has two strips of aluminum sandwiched between the face pieces.



Make it Your Own. This vase design offers many possibilities. Making it from exotic wood, covering wood with highly figured veneer, or using a combination of metal and wood are just a few of the options.



build & shape the Vase

Each vase starts as a blank glued up from five pieces: two faces, two sides, and a bottom. Making the blank this way automatically creates the opening in the vase.

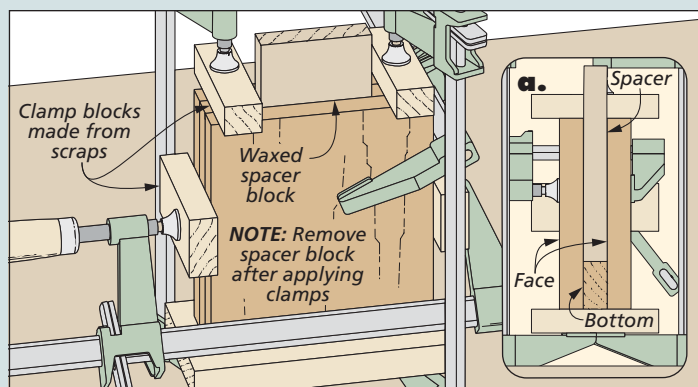
As far as how to make the blank, you have a number of options. One interesting possibility for this project is to start with a thick board or a bowl turning

blank, and then resaw it to make the pieces. This gives the appearance of the vase being one solid block. Of course, you can also get a nice look by matching the grain carefully among multiple pieces of your choosing.

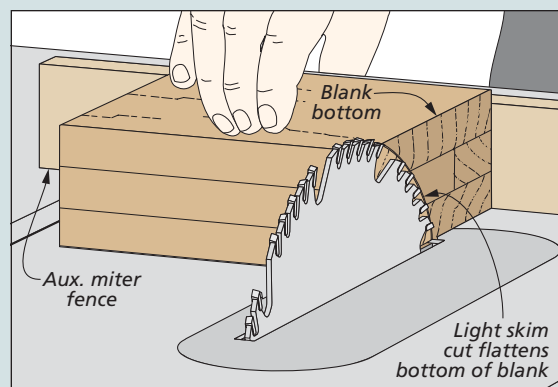
GLUEUP TIPS. There are a few tips to get a successful glueup, however. First, I'd recommend starting with the face and

side pieces sized slightly larger than what's shown above. This will help you compensate for any slipping as you glue and clamp them together. Then, when you're ready for the glueup, you can employ a series of clamping blocks to keep everything square and in alignment (lower left drawing). Probably the most important of these

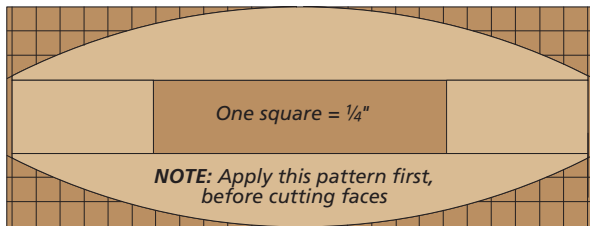
How-To: Five-Piece Glueup



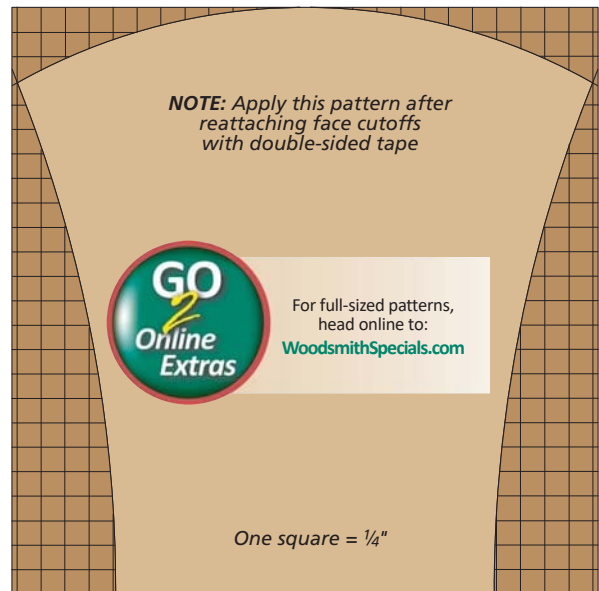
Glue the Blank Together. Clamp blocks ensure alignment when gluing the five pieces together, while a waxed spacer block preserves the size of the rectangular opening in the top.



Trim the Bottom Flat. Before shaping the vase at the band saw, it's critical that the bottom be flat. A quick table saw cut will take care of this.



VASE TOP VIEW PATTERN



VASE SIDE VIEW PATTERN

blocks is the spacer that keeps the opening in the top of the vase square. Make sure to wax this block and remove it after it's all clamped up, so that the block doesn't get glued in place.

The one facet of the block that won't get shaped at the band saw is the bottom. You can get it completely flat with a table saw cut, as shown in the lower right drawing on the previous page.

BAND SAW CUTS. Now you're ready to cut the faces, top, and sides of the blank on the band saw to create the shape. The patterns that are provided above and on our website can simplify this process.

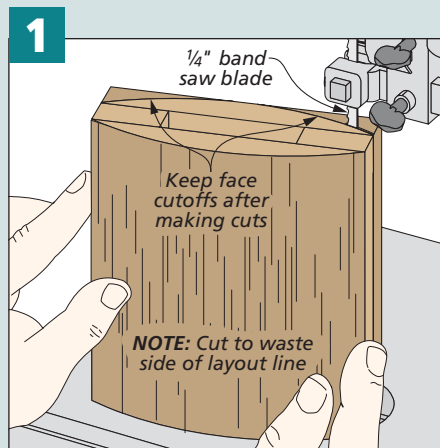
You'll start by cutting the faces of the vase. First, print out and glue or trace the full-size top view pattern on the top of the vase. Then cut along the lines of the pattern, as shown in Figure 1.

The next steps are cutting the top and sides of the vase. This may seem difficult now that the faces are curved, but the trick is to reattach the four waste pieces using double-sided tape. This allows the blank to rest flat on the band saw table as you make the next sequence of cuts.

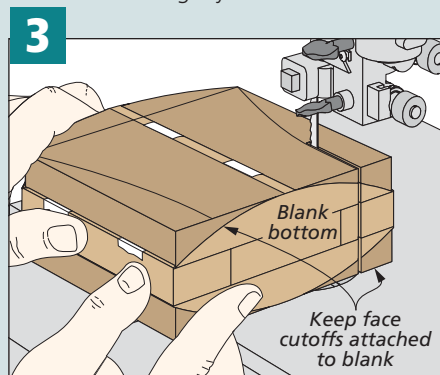
Now you can glue or trace the side view pattern on the face of the blank. Then cut along the top and sides, as shown in Figures 2 and 3.

FINISHING THE VASE. A little sanding is all that's left to complete the vase. To get smooth surfaces, I made sanding blocks curved to match the sides and the top (see Figure 4). Once the vase is glass-smooth, apply a finish. You'll probably have enough shop time left during the weekend to make more vases for your friends and family members, too.

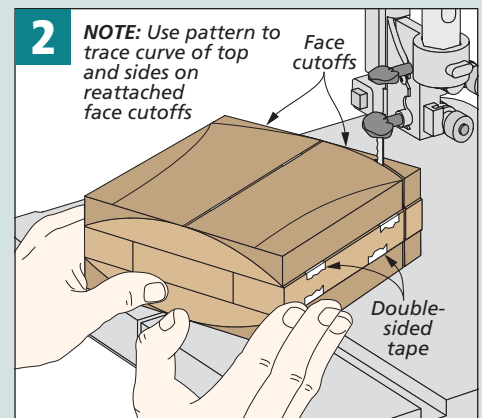
How-To: Shaping



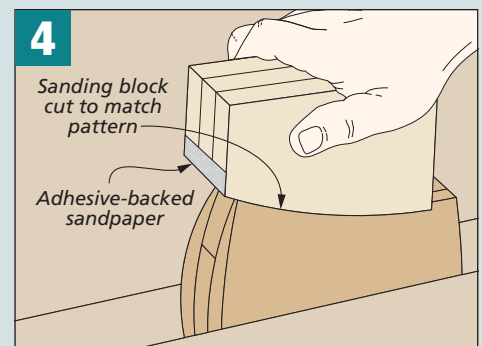
Cut the Faces. After tracing the shape from the top view pattern, trim the faces at the band saw. Cut slightly outside the lines.



Finish on the Sides. The final band saw cuts are on the sides. Here again, cut slightly outside the pattern's layout lines.



Trim the Top. Before making the next band saw cuts, reattach the cutoff pieces. Now trace around the pattern and cut the top.



Sand It Smooth. You can use the pattern again to make sanding blocks to match the sides and top of the vase.

Band Saw Essentials Sources

MAIL ORDER SOURCES

Infinity Cutting Tools
877-872-2487
infinitytools.com

McMaster-Carr
Mcmaster.com

MLCS Woodworking
800-533-9298
mlcswoodworking.com

Lee Valley
800-871-8158
leevalley.com

Reid Supply
reidsupply.com

Rockler
800-279-4441
rockler.com

Suffolk Machinery
suffolkmachinery.com

Woodsmith Store
515-254-9494
thewoodsmithstore.com

Woodcraft
woodcraft.com

Most of the supplies you'll need for projects in this book are available at hardware stores or home centers. For specific products or hard-to-find items, take a look at the sources listed here.

CHOOSING A SAW (P. 6)

- **Rockler**
 - Olson Cool Blocks* 25997
 - Carter Bearing Guides* 39360
 - Carter Magfence II* 62399
 - Kreg Band Saw Fence* 26186
 - Urethane Tires* varies
- **Infinity Cutting Tools**
 - Magswitch Fence* varies

BAND SAW BLADES (P. 22)

The three blades shown in the article on page 22 are *Timberwolf* blades from *Suffolk Machinery* (see source in margin).

TABLE AND FENCE (P. 28)

- **Rockler**
 - Miter Gauge Track* 48037
 - T-track* 26420
 - Flange Bolts* 83311
 - Five-star Knob* 51036
 - Four-star Knob* 54589

Threaded Inserts 28811

GREAT GEAR (P. 38)

The upgrades for your band saw shown in this article are readily available from woodworking stores. Since most items will be specific to your saw brand and model, you may need to contact the manufacturer for some upgrades. Several other suppliers are listed in the right margin.

CIRCLE CUTTING JIG (P. 42)

- **McMaster-Carr**
5/16" x 1 1/2" Alum. Bar ... 8975K18
- **Reid Supply**
1/4" -20 Insert Knob DK-1204
1/4" -20 Through Knob .. DK-1210
- **Rockler**
Aluminum Miter Bar 22987
- **Woodcraft**
Phenolic Plywood 192901

TEMPLATE JIG (P. 46)

- **Lee Valley**
1" Studded Knob 00M5621
Insert Knob 00M5620
Magnet Cups 99K3254
Rare-Earth Magnets 99K3211

RESAWING (P. 60)

For best results when resawing, we recommend using a 1/2"-wide, hook-tooth band saw blade with three teeth per inch. This blade cuts aggressively, and the large gullets remove material quickly. Hook-tooth blades are available at many woodworking stores and from the sources listed in the margin.

ARCH-TOP BOOKENDS (P. 80)

The special finishes that I used on the bookends are a product called *American Accents* made by *Rust-Oleum*. It comes in a variety of different colors and "effects." I used a self-adhesive non-slip tape made by 3M on the bottoms of the bookends. You can find the non-slip tape and the *Rust-Oleum* finishes at most hardware stores.

CANDLE HOLDERS (P. 84)

- **Rockler**
Brass Ferules 21766
- **MLCS Woodworking**
Dado Clean-Out Bit 5382



DIGITAL WOODSMITH

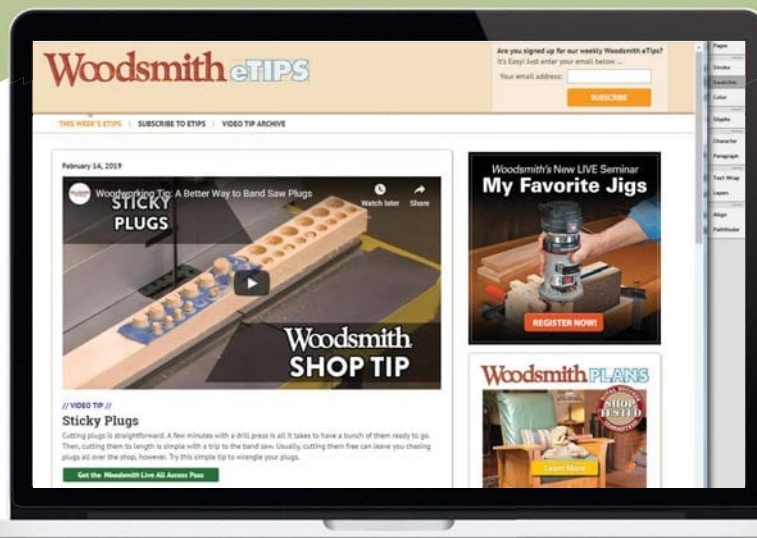
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Now you can have the best time-saving secrets, solutions, and techniques sent directly to your email inbox. Simply go to:

Woodsmith.com
and click on,

Woodsmith eTips

You'll receive one of our favorite tips by email each and every week.



26



64



Practical Tips, Tricks, Jigs & Projects
for the Band Saw in Your Shop.

80



96

