

SPECIAL
HOLIDAY
ISSUE

3
QUICK
GIFT
PROJECTS

ALL-NEW SHOP PROJECTS! **Ultimate Home Woodshop**

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December 2003

Tool Review

5 BENCHTOP SCROLL SAWS

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Carving SHORTCUTS

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EDITOR'S NOTES

'T was the night before Christmas, my task it was clear,
To make a small gift box before daylight drew near.
So I headed to the shop, and turned on the lights,
Then fired up the woodstove on that cold winter night.

I searched through my stash of precious wood scraps,
Maple, cherry, or walnut — or an exotic perhaps?
Examining each piece, I turned it this way and that,
Then chose some white oak, straight-grained and flat.

With pencil and rule, I laid the parts out
Now it was time to rip, crosscut, and rout.
My tools hummed to life as the joints all were made
Machined to perfection with sharp bits and blades.

Assembly was next, making sure everything fit,
A few strokes with a hand plane improved it a bit.
Then one final touch, it was a fitting motif,
Carved in a jiffy, two acorns and an oak leaf.

By the wee morning hours, I was just about through,
But there still were a few things I needed to do.
Some sanding, for instance (my favorite part)
And a finish to seal it and make it look smart.

Now the gifts were laid out on the benchtop for wrapping:
Candlesticks, keepsake box, and a desk clock ticking.
As I surveyed the scene, I thought to myself,
Not bad at all for this whiskered shop elf.

Tim

WORKBENCH

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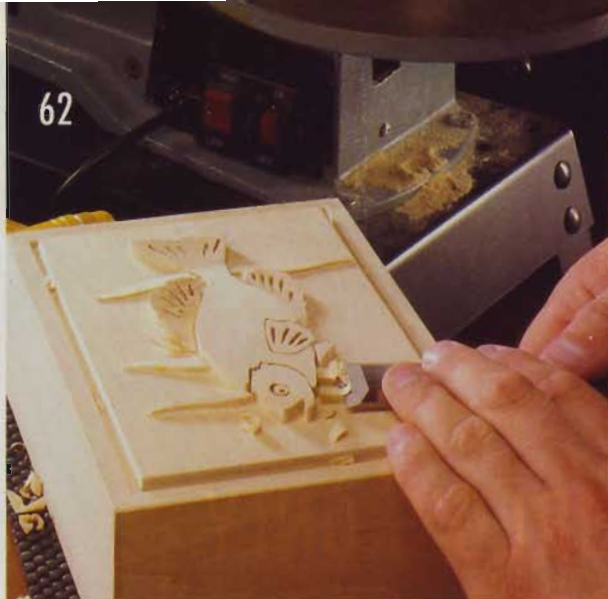
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two-tool fix for a LEANING GARAGE

Q My shop is set up in a wood-frame garage with exposed wall studs. A few years back, the garage started to lean, and now it's several inches out of plumb. Is there anything I can do to straighten it?

A It takes two basic tools to fix a leaning garage: a jack and a come-along. The jack is used with a long post that runs diagonally across the garage (see *Illustration below*). The come-along has a steel cable that also runs diagonally, forming an "X." As the jack applies pressure against one end of the post, the other end pushes against the corner of the garage, which straightens the walls. Tightening the come-along holds the garage in its new position temporarily while you attach permanent bracing.

Jack Support — Before you get started, keep in mind that the jack is capable of producing a great deal of pressure — enough to

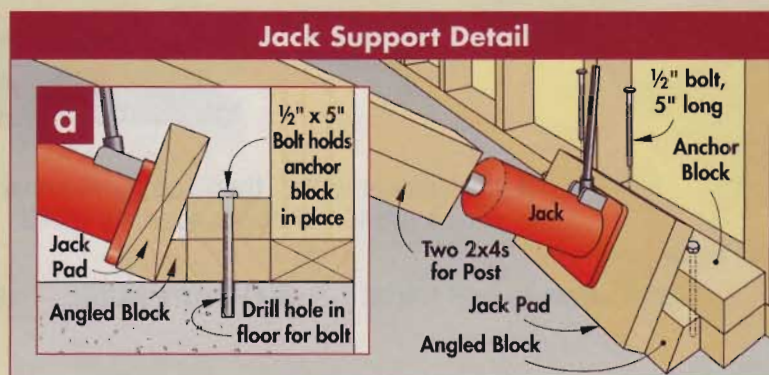
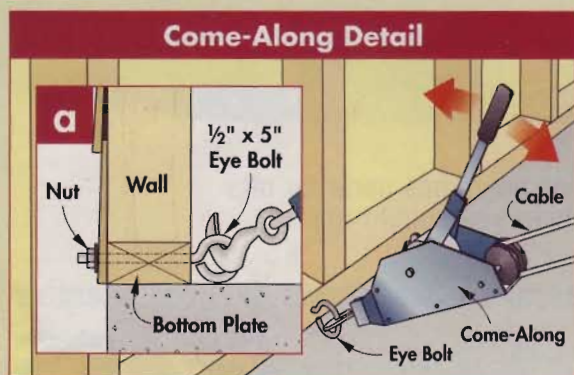
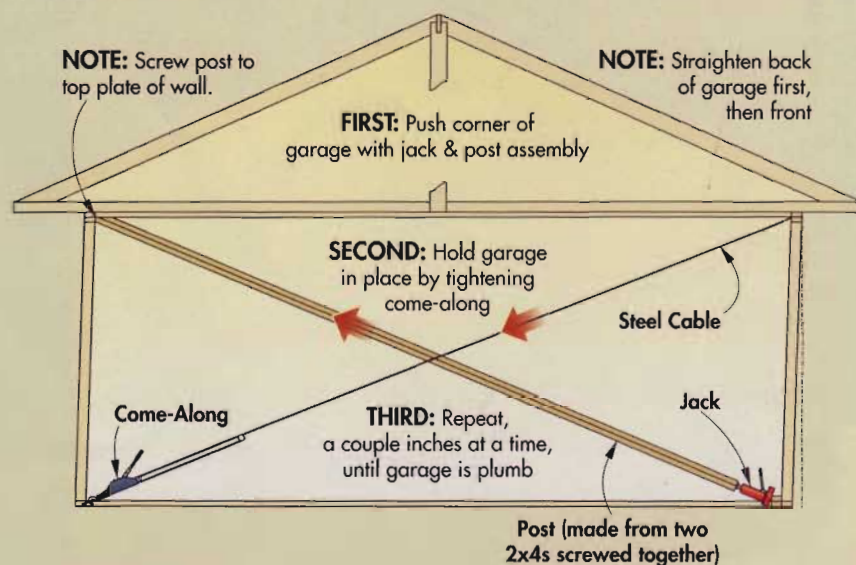
make the bottom of the wall "kick" out. To prevent that, it's important to set up a solid support for the jack to bear against. This support consists of three parts: a thick anchor block that's "pinned" to the cement floor with a couple of bolts, a $\frac{3}{4}$ "-thick hardwood pad, and an angled block sandwiched in between (see *Jack Support Detail*).

Once you've installed the support, it's just a matter of cutting the post to fit tightly between the jack and the top plate of the wall. I made a post by screwing two 2x4s together and then screwed the upper end of the post into the top plate of the garage wall.

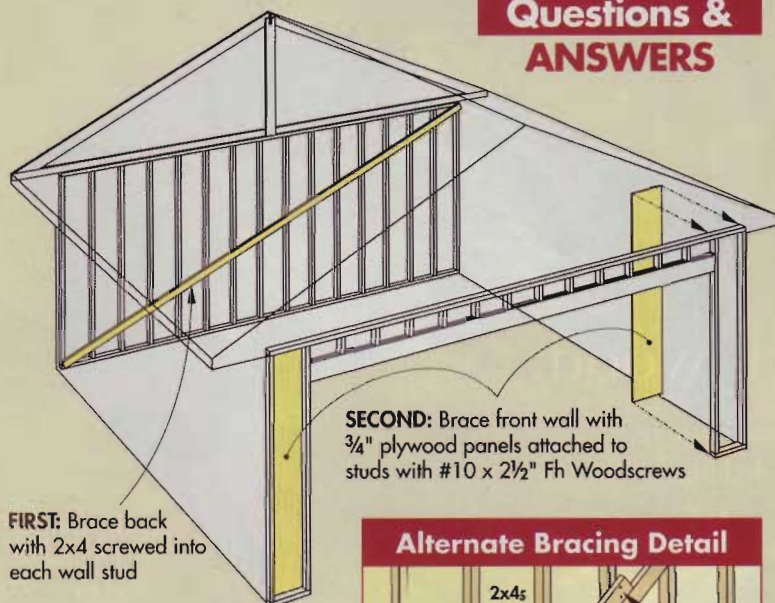
Attach the Come-Along — As for the come-along, it's fastened to an eye bolt that passes through a hole drilled in the bottom plate of the wall. Secure the eye bolt with a washer and nut (*Come-Along Detail*). Then attach the cable to the top plate in the same fashion.

Straightening the Walls — Now you're ready to get started. The whole idea here is to work back and forth between the two tools, pumping the jack until the wall moves a couple of inches, then tightening the come-along to hold it in its new position.

You'll want to let the garage "rest" overnight in its new position before continuing, then repeat the process if necessary. Once the garage walls are plumb, simply install the braces, as shown on page 10.



Questions & ANSWERS

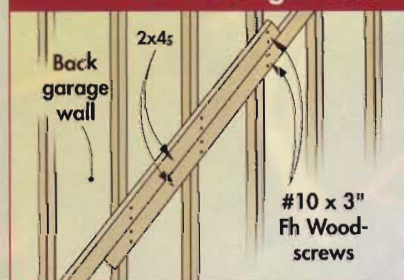


FIRST: Brace back with 2x4 screwed into each wall stud

NOTE: Jack assembly and come-along are removed for clarity

SECOND: Brace front wall with $\frac{3}{4}$ " plywood panels attached to studs with #10 x $2\frac{1}{2}$ " Fh Woodscrews

Alternate Bracing Detail



making it stay put WALL BRACING

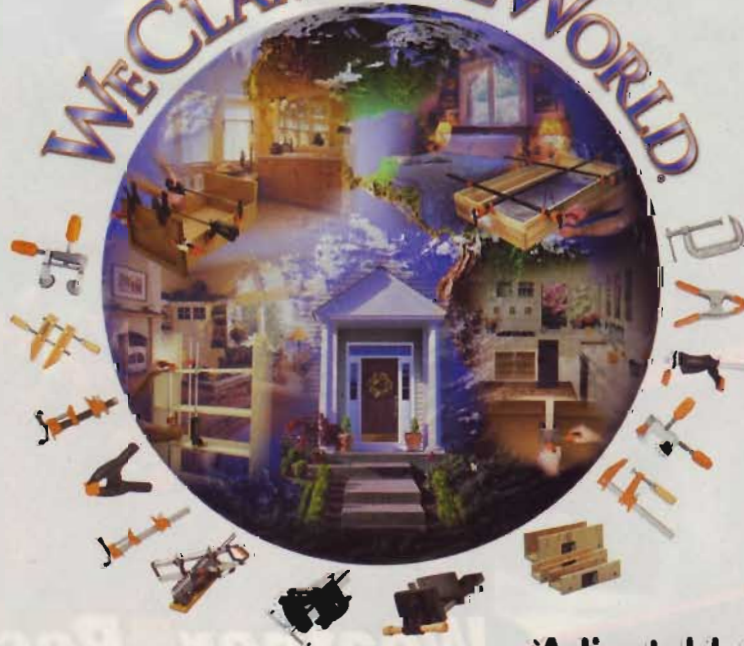
If you straighten a garage using the technique shown on page 8, you'll need to brace it to prevent it from returning to its original position. Even if your garage is plumb, braces are good insurance against developing a lean.

The bracing must be installed *before* dismantling the jack assembly or removing the come-along. As you can see in the *Illustration* at left, the bracing is attached first to the back wall, then to the front.

Back Brace — The back brace is nothing more than a 2x4 that runs diagonally across the back wall and is screwed to each wall stud. If the 2x4s you have on hand aren't long enough to span the entire wall, you can use two 2x4s set edge to edge (see *Alternate Bracing Detail*).

Front Brace — As for the front wall, it requires a different type of bracing because of the opening for the garage door. These braces are $\frac{3}{4}$ " plywood panels that are cut to fit the narrow walls on each side of the opening. For strength, screw the panels to the studs using woodscrews spaced no further than 3" apart.

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mortising tip prevents BROKEN BIT BLUES

Q I'm having trouble using the hollow chisel mortising bits on my new mortising machine. The auger bits break, and the chisels turn blue from overheating. Why is this?

John Palmer
Via the Internet

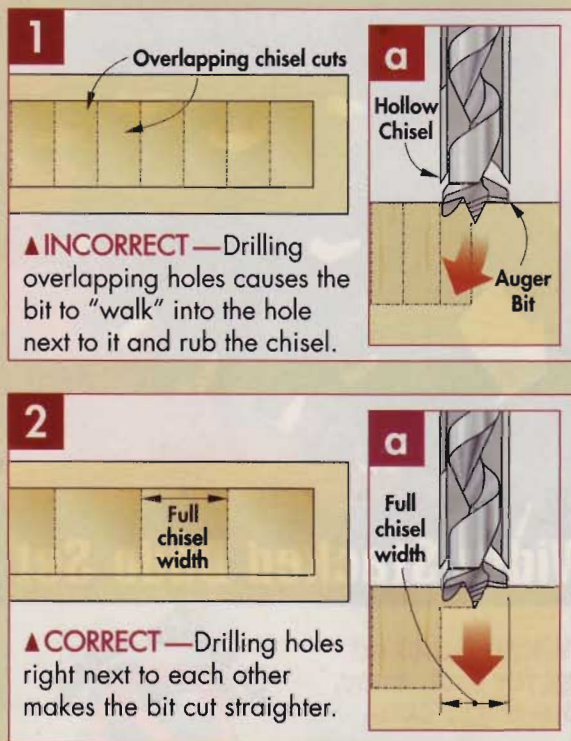
A Most problems with mortising bits result from friction between the bit and the chisel. Friction occurs for one of two reasons—either the waste port on the chisel is positioned improperly during a cut, or the spacing between cuts is incorrect.

First, check the orientation of the waste port on the chisel as you begin cutting. The waste port is a slot in the side of the hollow chisel that allows chips to be expelled as the bit cuts, reducing friction. To give the wood chips space to be expelled into, though, the waste port needs to face the open part of the mortise (see Photo above).

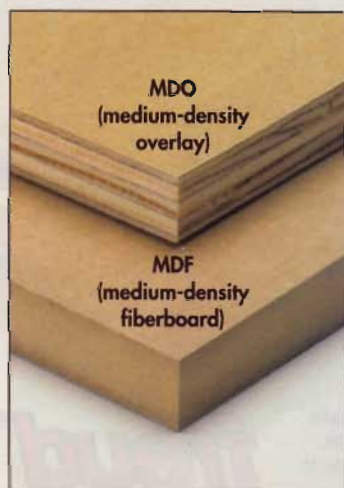
The second thing is to make sure you are spacing cuts correctly. Many people assume the best way to cut a mortise is to start at one end of the mortise and drill overlapping holes. But think about what happens when you try to drill overlapping holes with a twist bit. The bit follows the path of least resistance and “walks” into the neighboring hole.

The same thing happens with a mortising set, only the bit rubs against the chisel as it bends. The result is a lot of friction. The chisel turns blue, and the bit will eventually snap (see Figs. 1 and 1a).

To prevent this, make sure the bit meets equal resistance from wood on all four sides during each cut (see Figs. 2 and 2a). First, start at one end of the mortise and drill the first hole. Then move the workpiece over until the chisel just barely lines up with the edge of the first hole and drill a second hole. Drill each subsequent hole the same way.



MDF and MDO—What’s the Difference?



Q I went to purchase MDF to make some jigs, but the lumberyard was all out. Instead, they recommended MDO, which I had never heard of before. What are the differences, and is MDO a suitable substitute for MDF?

Johnny Johnson
Nashville, TN

A Both MDF (medium-density fiberboard) and MDO (medium-density overlay) are manufactured sheet products, but their make-up is quite different.

MDO is actually just plywood with a resin-impregnated paper on each face of the sheet. This forms an ultra-smooth surface,

which is ideal for sign makers. MDO is available in $\frac{3}{8}$ "-, $\frac{1}{2}$ "-, and $\frac{3}{4}$ "-thick sheets.

MDF is a dense panel made up of wood fibers. This material machines easily and has a uniform surface, making it useful for cabinetry, door parts, shelving, and—most importantly to your question—shop-made jigs. MDF is available in sheets ranging from $\frac{3}{16}$ "- to 2 $\frac{1}{4}$ "-thick.

If jig-making is your main goal, MDF gets the nod due to its lower cost (about half the cost of MDO) and its greater availability of thicknesses. But if the strength of the jig is a big issue, then MDO or standard plywood is a better choice.

choosing the right COMPRESSOR FOR THE JOB

Q I'm in the market for an air compressor, but trying to sort through all the different specifications of these tools is a bit confusing. What are the key things to look for in a compressor?

Shane Perry
Pleasant Grove, UT

A Before buying an air compressor, ask yourself which tools you plan to use with this machine. Then match the air requirements of those tools to the compressor.

Air Pressure — One thing to be aware of is air pressure, measured in PSI (pounds per square inch). Most compressors operate in the 90- to 135-PSI range. And most air tools are designed to run at 90 PSI or less, so you should have adequate pressure regardless of the compressor you choose. All you have to do is set the regulator on the compressor to the appropriate pressure.

Air Delivery Rate — More important than air pressure is the compressor's air delivery rate — the amount of air that the compressor can produce in a given time. This amount is measured as CFM (cubic feet per minute). Check that the CFM rating of the compressor will be adequate for the tools you plan to use (Chart, right).

If you plan to work only with brad nailers, finish nailers, and staplers, most compressors with a 4-CFM output will fit your needs. If

you think you may need a framing nailer to tackle larger projects, it's worth investing extra money in a larger compressor that gives you an average of 6 to 8 CFM. And for tools such as a sander or spray gun, plan to step up to a larger, industrial-type compressor.



Air Requirements

Type of Air Tool	CFM (Cubic Feet Per Minute)	PSI (Pounds Per Square Inch)
Blow Gun	2.5	100
Stapler	1-2	60-100
Brad Nailer	1-2	60-100
Finish Nailer	2.2-3	60-100
Framing Nailer	4-5	60-100
Spray Gun	7.8-11.5	30-50
Orbital Sander	6-11	90

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Product Information Number 210

European hinge DRILLING GUIDE

A recent project required that I make a number of cabinet doors, and drill each for European hinges. I already had the 35mm bit used to drill the counterbored "pockets" for the hinges. But accurately locating these holes promised to be a time-consuming task.

So to save time, I made a drilling guide that clamps to the drill press table (see *Photo at left*). The guide has a fence that locates the holes the proper distance from the edge of the door. And it has a pair of flip stops that establish the locations of the holes from the top and bottom of the door.

The guide only takes a few minutes to make. Built out of scrap pieces of $\frac{3}{4}$ " MDF, each component is cut to the dimensions shown in the *Construction View*.

Before you attach the flip stops to the fence, mark a centerline on the fence to correspond to the center of the drill bit. Then mark a line where the *inside edge* of each stop is placed. (Typically, European hinges are located 3" from the top and bottom.) These points are where each flip stop is attached to the fence with a barrel hinge.

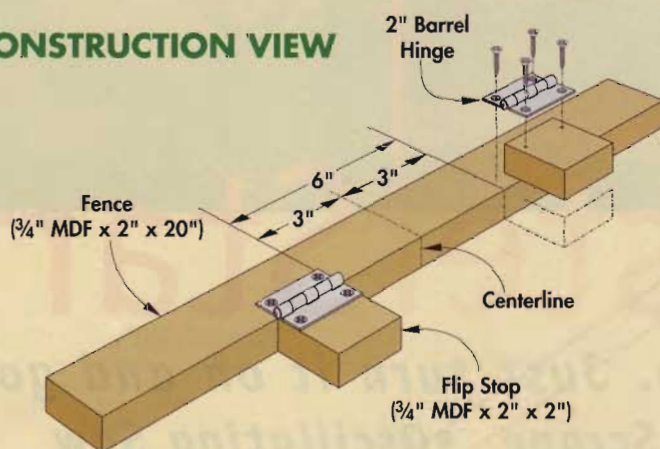
To use the guide, clamp the fence to the drill press table so the counterbore will be drilled the correct distance from the edge of the door (this may vary depending on the hinge.) Then butt the door against each flip stop to drill the top and bottom pockets.

*John Jablonski
New Hyde Park, NY*

▲ The flip stops on this hinge guide make quick work of easily registering and drilling the counterbores for European hinges.



CONSTRUCTION VIEW



tangle-free CORD STORAGE

I got tired of wrestling with tangled power cords, so I solved this problem by coiling my 100-foot cord into a five-gallon plastic bucket.

Start by plugging the cord into the wall outlet, then coil the remainder of the cord into the bucket. You can easily pull out whatever length you need, then coil it back into the bucket when you're done. For long periods of continuous use or heavy loads though, remove the cord *entirely* from the bucket, to prevent overheating of the cord.

*Vic Carpenter
Louisville, KY*



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inside-out tape TIP FOR WIRING



When doing electrical work in close quarters, it can be next to impossible to get your hands into the area, let alone a roll of electrical tape.

Here's a quick solution to the problem. Roll it back on itself, *sticky side out*, then cut off the tape. You'll find it easier to reach in and stick this small roll, rather than a strip of tape, onto the splice. Then simply unroll it around the wires, and you'll end up with a nice, tidy connection.

*Todd Sterling
Bethel, CT*



color-coded GUNS & NAILS



To see at a glance which nails go with each of my air nailers, I use a color-coding system. Wrap colored adhesive tape around the grip on the nailer. Then put a sticker of the same color on each box of corresponding nails, to avoid future mix-ups.

*Randy Smith
Oak Park, IL*

bandsaw Blade Tip



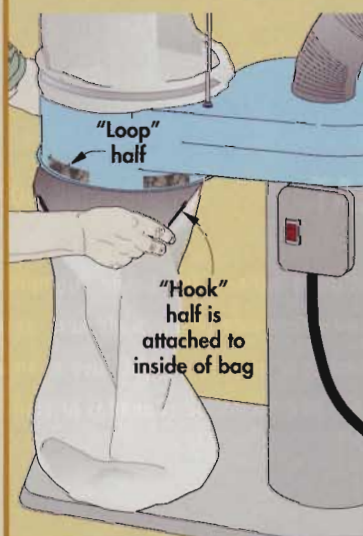
Changing the blades on a band saw can be an awkward task. The blade always wants to slip off one wheel while you're putting it on the other.

I use masking tape as a "third hand" during this task. Just tape the blade in place on the top wheel while you finish installing it on the bottom one.

*Clifford Schwieger
Brooklyn Park, MN*

dust collection

In the Bag



Putting the top bag on my dust collector is easy, but attaching the bottom bag with the metal band sometimes requires three hands.

To remedy this problem, I use "hook & loop" pads. The loop half is attached to the metal housing of the dust collector, and the hook half of each is attached to the inside of the bag. This holds the bag in place while you secure the metal band.

*Richard C. Ickes
St. Joseph, MI*

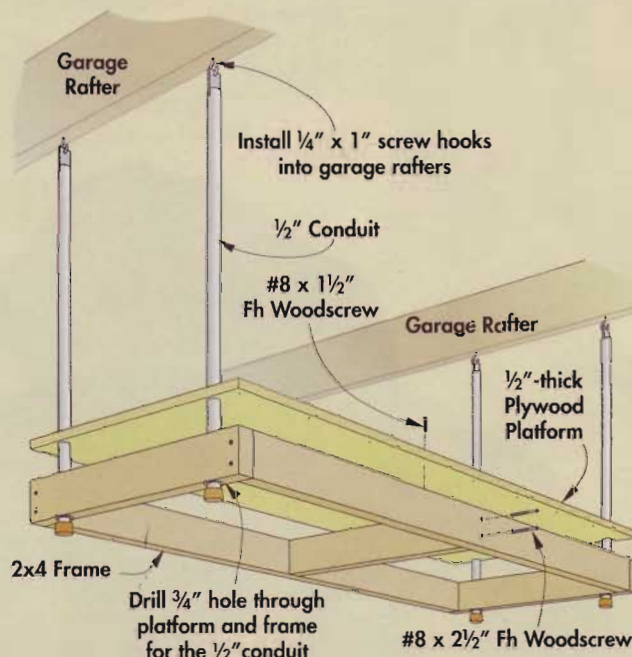
hanging from the rafters 'HEADS UP' STORAGE IDEA

I built a suspended storage platform to use the overhead space in my garage. It's ideal for holding light, bulky items like hoses and sleeping bags. Each storage unit consists of a 2x4 frame and a plywood platform suspended by 1/2" conduit (see *Illustration*). The conduit hangs from screw hooks in the rafters.

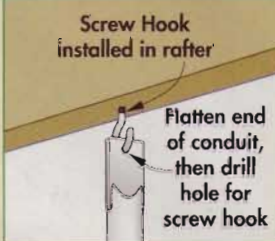
After screwing the frame and platform together, you simply drill holes for the conduit through each corner (*Shelf Support Detail*).

Each length of conduit is flattened at the top end and drilled for a screw hook (*Screw Hook Detail*). The frame is held on the conduit by a large washer and cotter pin (*Shelf Support Detail*). Just make sure the new storage doesn't interfere with the operation of your garage door.

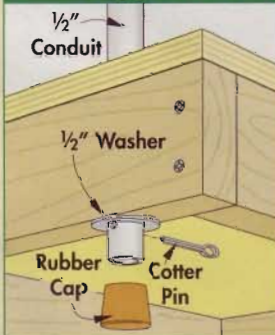
Daniel Lay
Urbandale, IA



Screw Hook Detail



Shelf Support Detail



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4. Other classes mailed	0	0
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D. Free distribution by mail (samples, complimentary, and other free)		
1. Outside county	1,377	1,252
2. In-county	0	0
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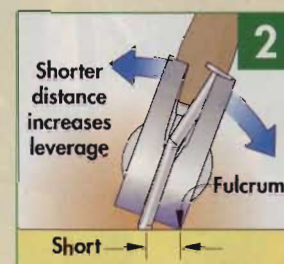
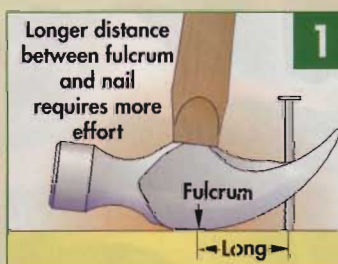
Tips & TECHNIQUES

basic physics A LITTLE LEVERAGE

Understanding some basic physics actually makes the job of pulling nails easier. It has to do with the distance between the nail and the fulcrum of the hammer. The longer the distance, the harder the pull. The shorter the distance, the better the leverage, and the easier the pull.

Say you pull a nail as shown in Fig. 1, for example. There's a relatively long distance between the nail and the fulcrum, requiring more effort. By prying sideways, the distance is reduced, giving you more leverage (Fig. 2). And that's the long and the short of it.

Arthur Lee
Santa Cruz, CA



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clog-free BLAST GATE

A key component in any dust collection system is the blast gate. But these gates often get a build-up of sawdust in their corners, preventing the gates from closing completely. This allows air leaks that hinder the system's effectiveness.

Jerry Darby solved the problem by designing a blast gate that won't clog. The blast gate is made up of two assemblies — the gate itself and a wall-mounted box that the gate slides through. When the gate is slid through the sealed box in both directions, it pushes any build-up out with it.

The gate consists of a slide with a handle on each end (*Construction View*). Notice the large hole at one end of the slide — when that hole aligns with those in the top and bottom of the box, the blast gate is open. Pushing the slide through to the other end closes the gate, shutting off the air flow, so the gate is closed (*see the Photos at right*).

The top of the box houses a section of 4" PVC for the collection system pipe, and the bottom has a hole sized for the 2½" connection to the tool (*see Cross Section Detail*). For a 4" tool connection underneath, see the option shown on page 26.



GATE OPEN

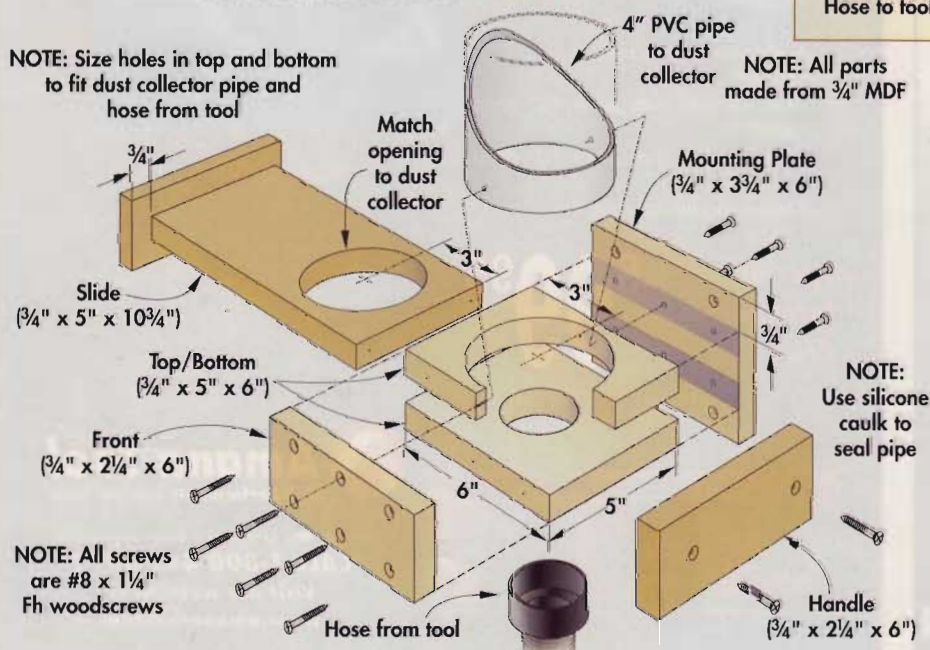


GATE CLOSED

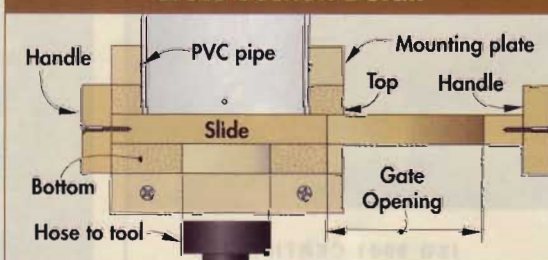
▲ Slide the gate to one side for the open position.

▲ Then slide it to the other side to close the gate.

CONSTRUCTION VIEW



Cross Section Detail



\$350

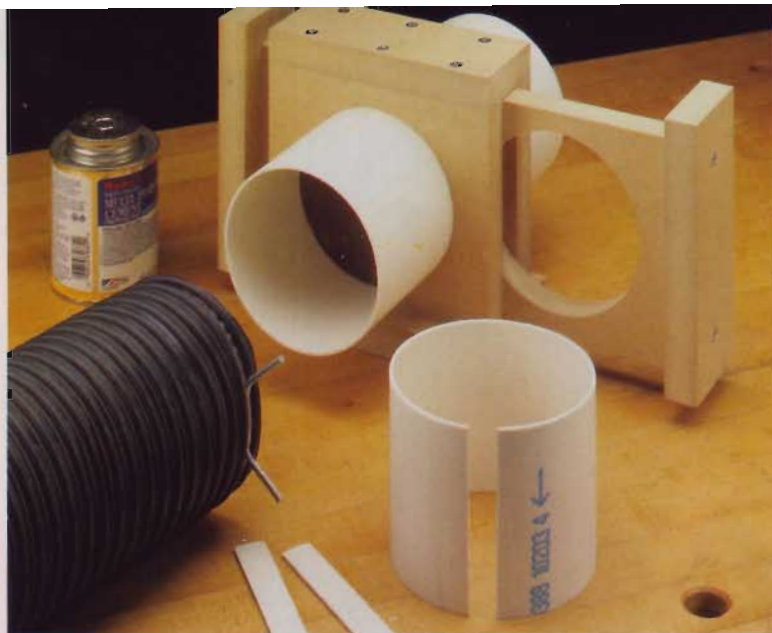
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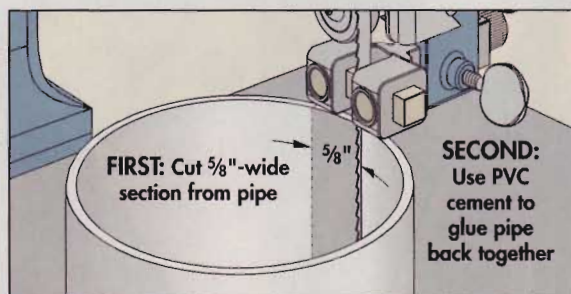
custom-made COUPLINGS

Some tools require a larger hose (or pipe) to connect them to a dust collection system. Take a planer or table saw for instance. Many of them have a 4"-dia. dust port. You can connect one end of a flexible hose to this dust port. But what about the other end? How do you connect it to the bottom of the box in the blast gate?

One way is to install a coupler made from PVC pipe. The only problem is a 4" flexible hose won't fit over the end of 4" PVC pipe — the outside diameter of the pipe is too large.

Fortunately, it only takes a simple modification to decrease the diameter of the pipe (*see Photo*). Just use a band saw to make a couple of cuts in a short length of pipe, removing a $\frac{5}{8}$ "-wide section (*see Illustration*). Then glue the edges together with PVC cement, using duct tape to hold the pipe together while the cement sets up. The result is a coupling with an *outside* diameter that fits perfectly *inside* a 4" hose.

▲ A modified section of PVC pipe provides the perfect fit for a 4" flexible hose from a tool.



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Amana Tool's E-Z DIAL SLOT CUTTER

Now here's an idea that's a long time coming—a router bit that can be quickly adjusted to cut grooves of varying widths. It's the new E-Z Dial Slot Cutter, manufactured by Amana Tool.

Unlike other adjustable slotting bits that require fiddling with different shims and cutters, the E-Z Dial lets you simply dial the width of the cut and lock it in. There are two different bits available. The bit shown in the Photo at left cuts grooves ranging in width from $\frac{1}{8}$ " to $\frac{1}{4}$ ". A second bit, which adjusts from $\frac{1}{4}$ " to $\frac{1}{2}$ ", is also available. The easy adjustability makes these bits ideal for cutting slots for

the router collet, I could make any adjustments to the width of cut right on the router table.

To set the E-Z Dial, simply loosen the nut at the top of the bit, turn the adjustment dial until it reaches the desired width of cut, and then tighten the nut (see *Illustration*).

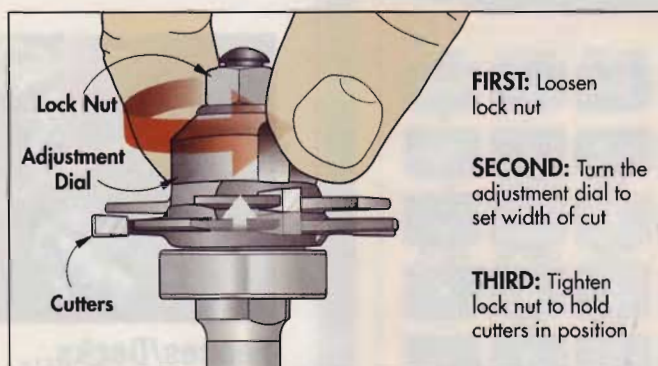
The E-Z Dial's adjustments are so precise that they are calibrated in thousandths of an inch. The top cutter has 10 lines evenly marked along its surface. As the adjustment dial is turned from line to line, the top cutter goes up .004". Turning the dial a full rotation elevates the top cutter .04".

The depth of the E-Z Dial's cut is exactly $\frac{1}{2}$ " — to make a shallower cut, just adjust the position of the router table fence.

The E-Z Dial Slot Cutter is currently available for \$99.95—pretty reasonable when you consider that this one bit can handle multiple slot widths. For more information, call 800-445-0077 or visit Amana's website at www.amanatool.com



▲ By turning the top dial, Amana's E-Z Dial Slot Cutter can be micro-adjusted to cut grooves of different widths.



FIRST: Loosen lock nut

SECOND: Turn the adjustment dial to set width of cut

THIRD: Tighten lock nut to hold cutters in position

plywood or other sheet material that is often slightly thinner than its nominal thickness. When I tried out the E-Z Dial on my router table, I was impressed by how easy this bit is to use. With the shaft tightened in

Norton 3X Sandpaper



This 3X sandpaper from Norton proves one thing—not all sandpaper is alike.

Like many other sandpapers, the abrasive on 3X is aluminum oxide. What's different though, is that the aluminum oxide on 3X is heat-treated to be sharper and longer lasting. It also has a coating of zinc stearate to prevent dust from clogging the paper as it cuts. Finally, the 3X has a latex-impregnated paper backing. This backing is so strong that you can crumple 3X sandpaper into a ball, and the abrasive still won't fall off.

Norton 3X sandpaper is available at many home centers in grits ranging from 60 to 400. For more information, visit www.nortonconsumer.com.



▲ As a test, I made 200 passes with both 3X sandpaper and standard sandpaper. The standard paper was worn smooth, with almost no grit (*left*). The 3X looked good as new (*right*).

Laguna Tools RESAW KING

The first time I used this Resaw King band saw blade from Laguna Tools, I was impressed. It effortlessly sliced a wafer-thin piece of veneer from a tall block of hardwood (see *Photo at left*). Better yet, the veneer was the exact same thickness across its entire width. And to top it off, the cut faces were smooth, clean, and virtually free of saw marks.

To find out why the blade cuts so precisely, I called the folks at Laguna Tools in California. They explained to me the four major reasons the Resaw King works so well.

Tooth Design—The most important factor is the teeth. Most hook tooth blades used for resawing have long, pointy teeth that tend to catch the grain and drift away from the path of the cut. The teeth on the Resaw King, however, are more like tiny chisels that resist drift while slicing through the wood (see *Illustration below*).

C8 Steel—Complementing the design of these teeth is the material used to make them—C8 steel. This alloy matches the toughness of carbide, but it's less brittle to resist breaking.

Ground Sides—The third reason the Resaw King works so well are the shoulders, which are ground flush with the sides of the teeth. These ground sides "polish" the wood immediately after cutting it, nearly eliminating saw marks and subsequent trips to the planer.

Raised Shoulders—Finally, the hump at the top of each shoulder keeps wood from "overfeeding," that is, feeding through the blade too quickly. This further ensures smooth cuts.

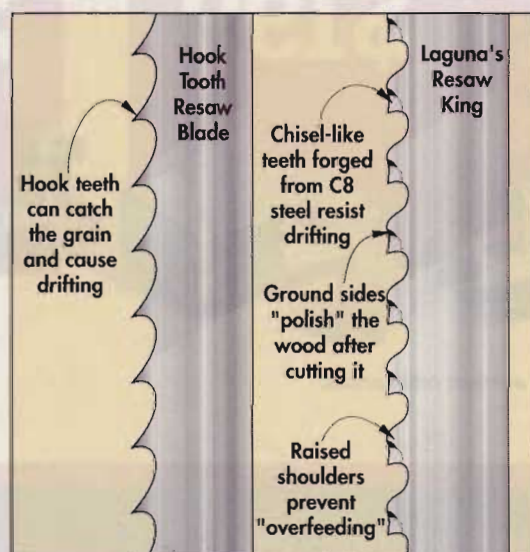
Pricing—The Resaw King is more expensive than a standard hook tooth blade, but it's worth the price for its durable teeth and smooth cutting capability. Also, Laguna will resharpen the blade for \$2 a foot, making it more cost efficient over the life of the blade (see *Box at left*).

▲ With its chisel-like C8 steel teeth and ground shoulders, the Resaw King has no trouble cutting a smooth, wafer-thin slice through a tall block of hardwood.

FAST FACTS

Tooth Material:	C8 Alloy Steel
Width of Blade:	15/16"
Kerf Width:	3/64"
Teeth Per Inch:	1.8
Minimum Length:	93 1/2"
Price of Blade:	\$1.50 per inch
Our 93 1/2" Blade:	\$140.25
Cost of Resharpening:	\$2.00 per foot

www.lagunatools.com
800-234-1976



three easy steps to MAKE GLASS STOPS

The glass in the wine cabinet (page 48) is held in place with some narrow hardwood glass stops. The trouble is that cutting pieces this small can be tricky—and even dangerous if not done properly. To make these stops safely and easily, all it takes is three easy steps using a router and table saw.

The first step is routing a $\frac{1}{4}$ " roundover on all four edges of a workpiece (see Step 1 below). To give yourself plenty of material to work with, it's best to choose a wide piece of $\frac{3}{4}$ "-thick hardwood.

The next step is to cut a groove in the edge of the work-

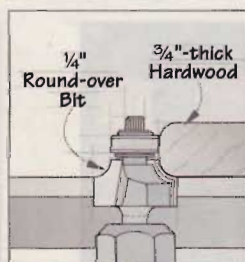
piece. By running the piece through the blade with it held tightly against the rip fence, a table saw can make quick work of this cut (see Step 2). You'll want to make this cut four times, cutting two grooves in each edge of the workpiece.

Now that the grooves are cut, the third step is to rip the glass stops free from the workpiece. For this cut, use a zero-clearance insert to keep the narrow strips from falling between the saw blade and the opening in the insert. Then place the board resting on its face and raise the blade until it's slightly above the workpiece.

Adjust the fence so that the glass stops will fall safely to the waste side of the blade as you make the cut (see Photo and Step 3). Since the first rip reduces the width of the workpiece, you'll need to readjust the fence before making the second cut.

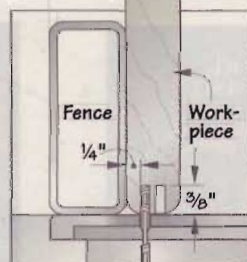
After making these glass stops, miter them to length using the two simple jigs shown on page 34.

▲ A single rip cut on the table saw frees two narrow glass stops from the workpiece. Then, simply flip the piece to cut off the other two stops.



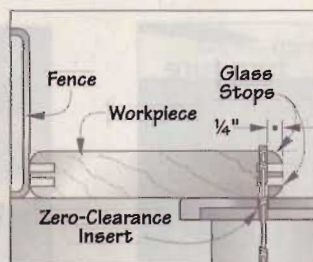
▲ STEP 1

Route a $\frac{1}{4}$ " roundover on all four edges of the workpiece.



▲ STEP 2

Use a table saw to cut two grooves in each edge of the workpiece.



▲ STEP 3

Raise the blade and adjust the fence to rip the glass stops free from the piece.



Got A Screw Loose? Use Epoxy

After using the "Panel-Moving Shuttle" on page 42 for awhile, the small screws in the continuous hinges holding the project together began to work themselves loose from their holes. The problem was that the hinges had a lot of pressure placed on them from hauling around heavy sheets of material.

To hold the screws in place, I used a toothpick to fill the pilot holes with epoxy (see Photo). That way, when I put the screws back in, the epoxy formed a

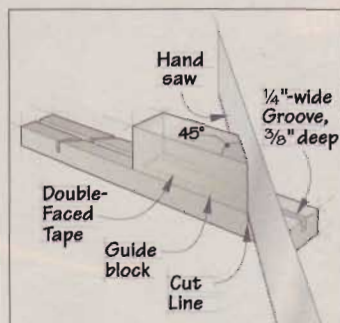
strong bond between the screws and the surrounding wood to hold the hinges tight. The hinges could now withstand the great pressure placed on them without the screws coming loose.

Another advantage of installing screws this way is that epoxy is sensitive to heat. So if you ever want to remove the screws, just hold a soldering iron against the screw head. After a few seconds, the epoxy will loosen its hold, and the screw will come right out.

five-minute MITER BOX

When cutting miters on the small strips of wood used to make glass stops, a power miter saw is really overkill, as it tends to splinter the wood. To avoid this problem, I made my own small-piece miter box and used a hand saw to cut the miters (*see Photo*).

The miter box is just a $\frac{3}{4}$ "-thick scrap piece with a groove to hold the wood strip. The groove is a bit deeper than the thickness of the strip. That way, the strip rests below the surface of the box, letting the saw get a good bite as you begin cutting.



▲ For splinter-free miters on the strips of wood used for the glass stops, I used a miter box made from scrap.

The box has two opposing 45°-angled kerfs to cut both ends of the strip. To make these kerfs, mark their locations with a combination square. Then, tape a mitered guide block on the cut line with double-faced tape and cut the kerfs with a hand saw (*see Illustration*).

When cutting the miters, the idea is to end up with a strip slightly longer (about $\frac{1}{16}$ ") than needed. Then use a hand plane and a shop-made miter trimmer to trim them to final length (*see below*).

perfect joints MITER TRIMMER

Cutting miters by hand using my small-piece miter box got me close to final length on the glass stops. But the angle of the miters was still a little off.

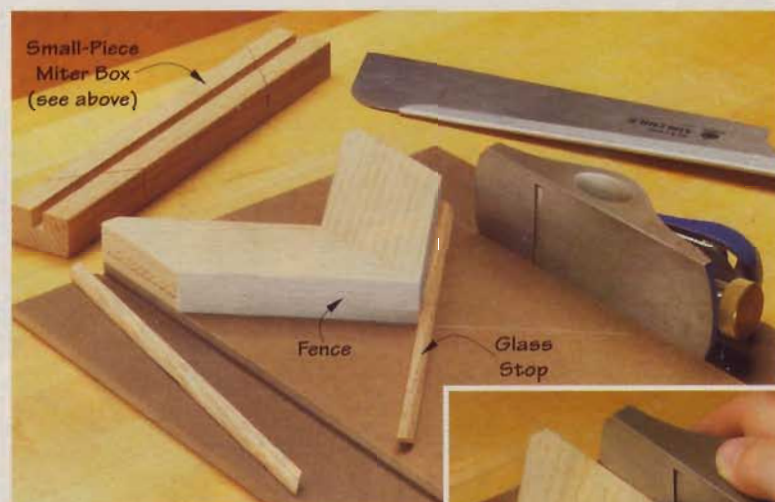
To produce tight-fitting miter joints on the stops, I made the miter trimmer shown at left. It makes it easy to hold the glass stops at a 45° angle while shaving the mitered ends with a block plane (*see Inset Photo*).

The construction of this miter trimmer is pretty simple. It consists of a two-piece hardboard base, a 90° fence, and a bottom cleat (*see Illustration*). The upper part of the base aligns the plane as it trims, and the lower part of the base has grooves for keeping chips out of the path of the plane.

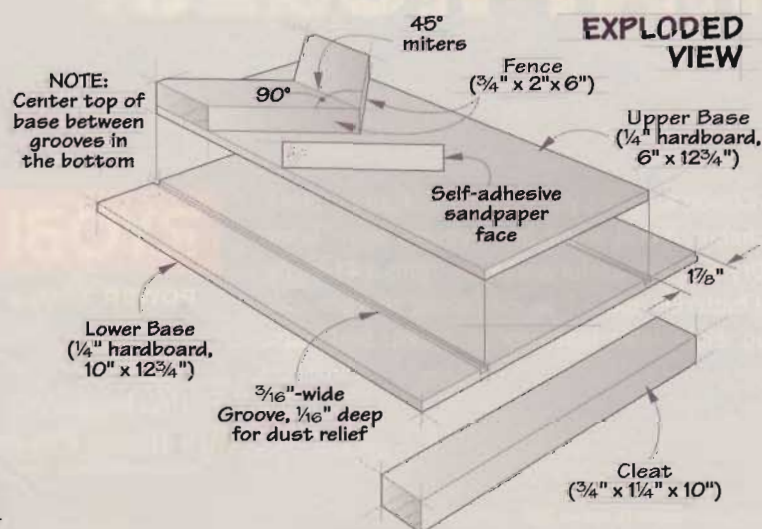
The fence is built from two pieces of $\frac{3}{4}$ "-thick stock with 45° miters on both ends. The key to getting perfect miters with this trimmer is making the fence so it sits at a perfect 45° angle with the base and at a 90° angle at the center. (Note: A combination square is a good tool to use to lay out the fence.) Also, it's equally important that the ends of the fence line up perfectly flush with the edge of the upper part of the base.

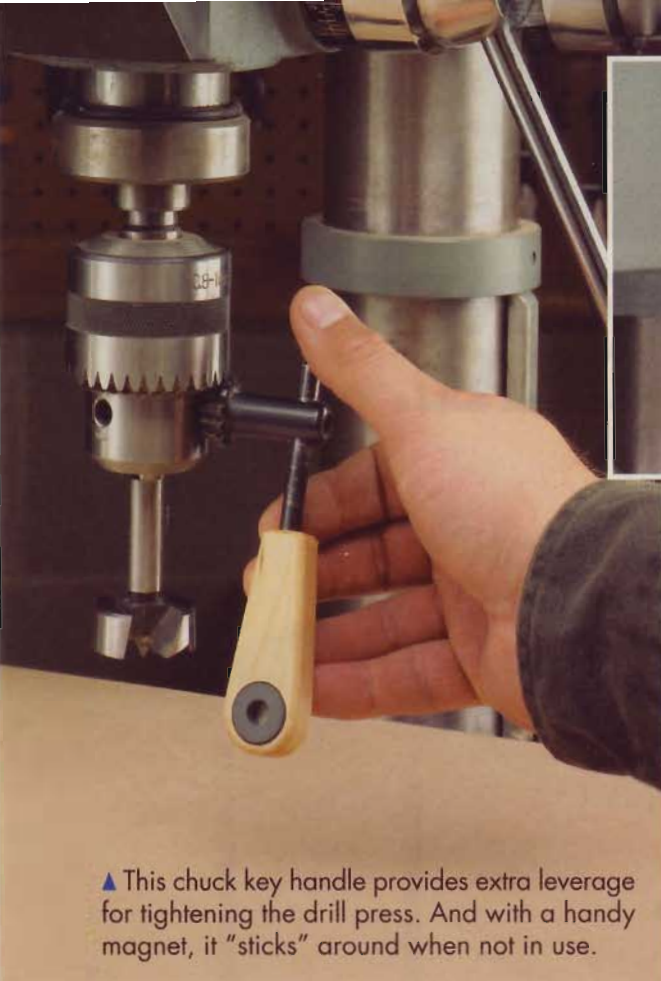
The last part of the miter trimmer is a $\frac{3}{4}$ "-thick wood cleat. It fits against the edge of a bench, holding the miter trimmer in place during use.

After the miter trimmer is glued together, attach sandpaper to the fence to keep the glass stop from slipping. Then, it's just a matter of trimming the mitered ends of the stop so they fit tight.

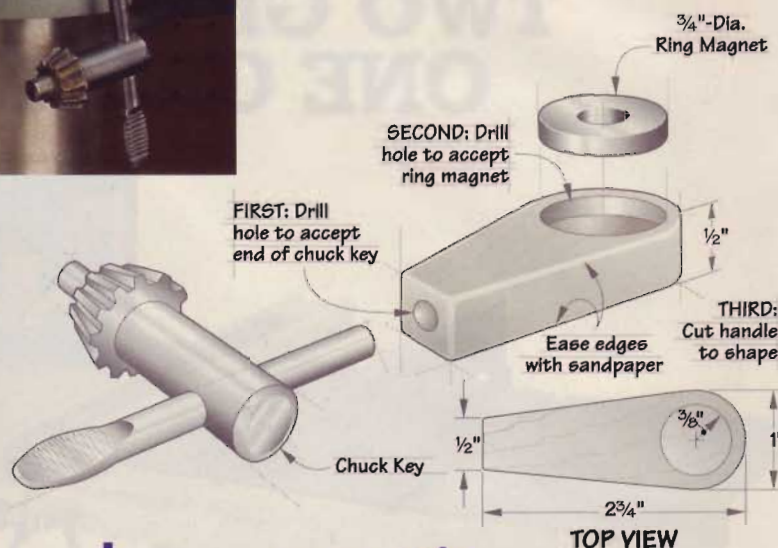
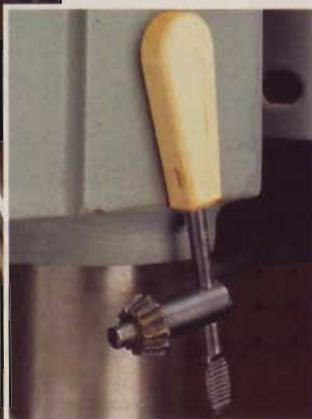


▲ For perfect-fitting miter joints, hold the glass stops against the fence and shave the ends with a hand plane.





▲ This chuck key handle provides extra leverage for tightening the drill press. And with a handy magnet, it "sticks" around when not in use.



make a magnetic CHUCK KEY HANDLE

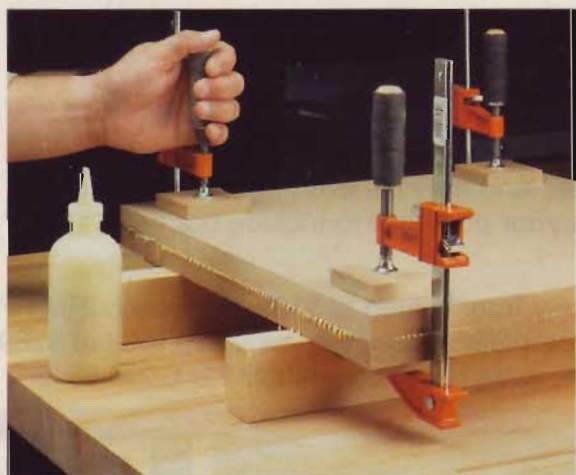
Most problems I have with my drill press don't involve the tool itself, but the chuck key. First, I often have trouble tightening the chuck on my drill press as tightly as I want. And perhaps even worse, sometimes I can't find that pesky little key in the first place.

To solve both problems, I made a wood handle for the key that provides extra leverage and a larger gripping

surface. Plus, a magnet in the handle lets me stick the key to the side of the drill, so I'll never misplace it again.

To make the handle, simply drill holes in a small block of wood to accept both the end of the chuck key and the magnet (see *Illustration*). Then cut the handle to shape with a band saw or scroll saw. Finally, use epoxy to secure the key and the magnet in the handle.

Get a Grip on Wood-Handled Clamps



When tightening clamps for a dry assembly or glue-up, my hand sometimes slips on the wood handles. This gets aggravating when I have to use a lot of clamps on one project, as I often can't get the clamps quite as tight as I would like them to be.



Luckily, this problem can be solved easily with some cloth friction tape. By wrapping the tape around the wood handles of the clamps (as shown here), I get that extra bit of grip needed to clamp boards tightly (see *Photos at left*).

Laguna Tools 14" BAND SAWS

Resaw capacity is invariably one of the foremost things on a woodworker's mind when he's considering a new band saw for his shop. Resaw capacity is expressed in terms of how wide a board can be fed between the table and the blade guide in its highest position.

On that score, Laguna leads among available 14" band saws. It has 8⁵/₈" of resaw capacity on the LT14 (shown here) and an incredible 12" of capacity on the LT14SE (which you can see at LagunaTools.com).

Of course, the engineers at Laguna also understand that power and blade capacity are just as important to a band saw's resaw capability. To that end, they equipped the LT14 and LT14SE with a 1¹/₂-

hp and 2-hp motor, respectively and built both saws to accept up to 1"-wide blades.

We had no trouble tensioning and tracking a 3/4" blade on the LT14 during our testing. And the ceramic guide system, while a bit involved to set up, held the blade rock steady during some very aggressive resawing.

From top to bottom, we found the LT14 to be one of the best-built, most powerful, smoothest-running band saws we've had the pleasure to use. Which is no surprise when you look at the quality of the individual features of the saw. We've highlighted just a few of them in the accompanying *photos*, below.

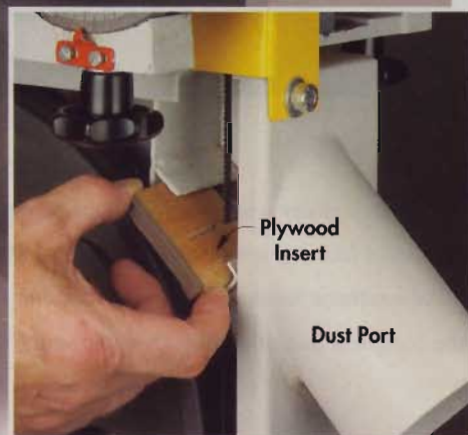
Laguna lists the LT14 for \$945 and the LT14SE for \$1,045 on their website. Visit the site or call 1-800-234-1976 for more information.

FEATURES AT A GLANCE

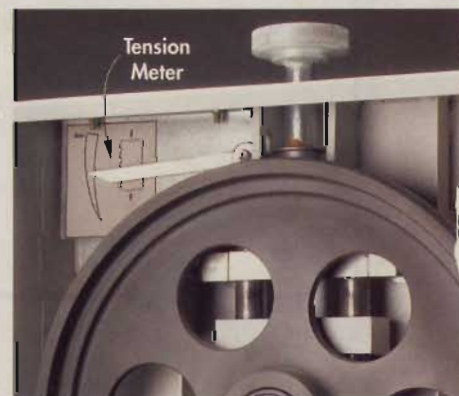
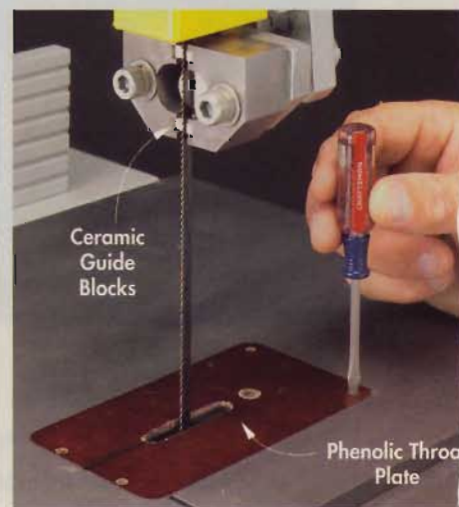
1 Laguna's proprietary guide system uses large ceramic blocks that can be adjusted to touch the blade lightly, offering excellent blade support.

2 The phenolic throat plate can be finetuned to perfectly match the height of the cast iron table.

3 Perfect blade tension is easily accomplished thanks to a large tensioning knob on top of the machine and the easy-to-read tension meter inside the wheel cover.



4 A plywood insert creates a virtually enclosed compartment from which dust is drawn out through an integral 3" dust port.





ULTIMATE HOME WOODSHOP

Take the strain out of storing, moving, and cutting sheet goods with three simple projects: a nylon-strap "file" system, a folding sheet shuttle, and a web-frame cutting table.

In this second installment of our ultimate home woodshop, we are focusing on the daunting task of managing sheet goods. This includes storing, moving, and cutting sheet goods.

Beginning with storage, our solution was to construct a heavy-duty rack using store-bought standards and supports. The rack holds both sheet goods and lumber. What makes our rack unique is a "filing" system for the sheet goods (see *Photo at right*).

This system uses an ordinary nylon strap that ties into the shelf standards. With the strap loosened, lean the stack of plywood against it.

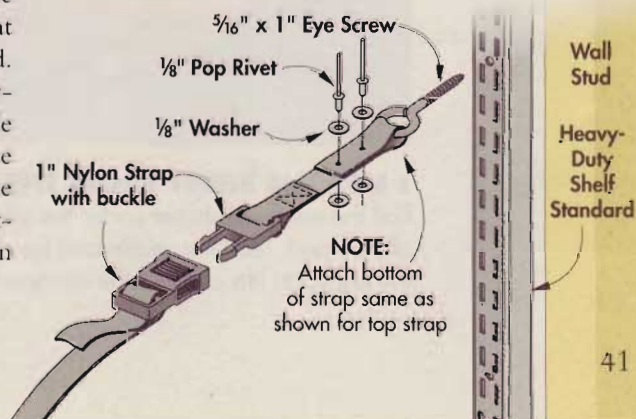
Let the strap support the weight of the plywood while you leaf through the stack until you find what you need. Then tighten the strap to hold the plywood flat against the wall.

As you can see in the *Illustration at right*, we did fashion a special connection between the ends of the strap and the two eye screws that hold the strap ends to the wall stud.

Once you've uncovered the plywood you need, our sheet shuttle makes it easy to move around the shop and lift it onto a web-frame sheet cutting table. The sheet shuttle and cutting table are detailed on the following pages.



LUMBER STRAP



no strain, no pain Panel-Moving Shuttle

If you've ever put off starting a new project because the thought of wrestling yet *another* sheet of plywood was more than you could bear, then this panel-moving shuttle is for you. From lifting a sheet out of the stack, moving it into the shop, and even raising it to a comfortable work height, this simple shuttle makes plywood management as effortless as it gets.

Shuttling Sheet Goods

The three-step photo sequence below shows exactly how this shuttle makes working with sheet goods remarkably less strenuous.

With the shuttle unfolded, simply roll it under the edge of a sheet of plywood and tip the shuttle

3-step sheet shuttling



▲ LIFT THE SHEET FROM THE RACK

Roll the unfolded shuttle under the edge of the sheet of plywood. Lean the shuttle and the sheet back until the plywood lifts clear of the storage rack.



▲ LIFT SHEET TO TABLE HEIGHT

Rock the shuttle back onto its curved sides to elevate the sheet of plywood to the height of the cutting table. (Plans for the cutting table begin on page 46.)

back to lift the plywood clear of the storage rack (see *Step 1 below*). To lift the sheet onto a table or bench, rock the shuttle back onto its curved sides (*Step 2*). Now use the "leg" to prop the shuttle up while sliding the sheet onto a cutting table (*Step 3*). Note: To build the cutting table shown here, turn to page 46.

Other Ways of Working

Besides taking the strain out of moving plywood, this shuttle is all the more useful since you can do quite a bit of cutting with the sheet still on the shuttle.

One way to make a quick cut is to simply lean the shuttle back so it rests on its curved sides (see *Photo at right*). In this position, the shuttle offers just enough clearance at the bottom of the sheet to accommodate a circular saw or jig saw. In fact, the arc in the sides and the wheel size and placement are all important design considerations to make the shuttle work this way.

By the same token, the curved sides make it easy to roll the shuttle into a table position. A leg made from a length of metal conduit supports the shuttle in this position and turns it into a handy cutting table.

The shuttle is also great for moving sheets of plywood more than just a few feet to a cutting table. To use the shuttle for longer hauls, lift the sheet of plywood off the storage rack, just as before. But this time, fold it closed to turn it into a two-wheel cart (*Photo, below right*).



always ready for a Quick Cut

To quickly and easily cut sheets of plywood into smaller, more manageable panels, simply let the shuttle rest on its curved sides and make the cut. In this position, the bottom edge of the plywood is far enough off the floor to allow clearance for a circular saw.



3

▲ TRANSFER THE SHEET OF PLYWOOD

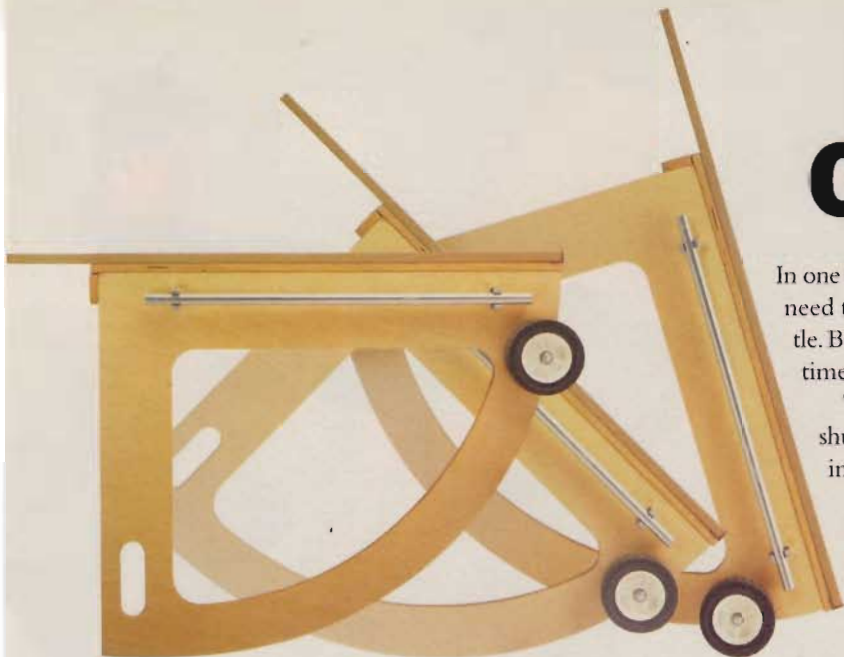
With the shuttle propped up by a metal leg made of electrical conduit, you can move to the end of the sheet and slide the plywood onto the cutting table.



always ready to Roll Ahead

When you need to move a sheet of plywood more than just a couple feet, fold the shuttle into a two-wheeled cart. This is excellent for taking sheet goods through gates or doorways, or even moving it from your truck to your lumber storage rack.

Shuttle Construction



In one of those funny ironies that keep woodworking interesting, you'll need to wrestle one sheet of $\frac{3}{4}$ "-thick plywood to build this shuttle. But only one. And on the bright side, it will probably be the last time you move a heavy sheet of material without the shuttle.

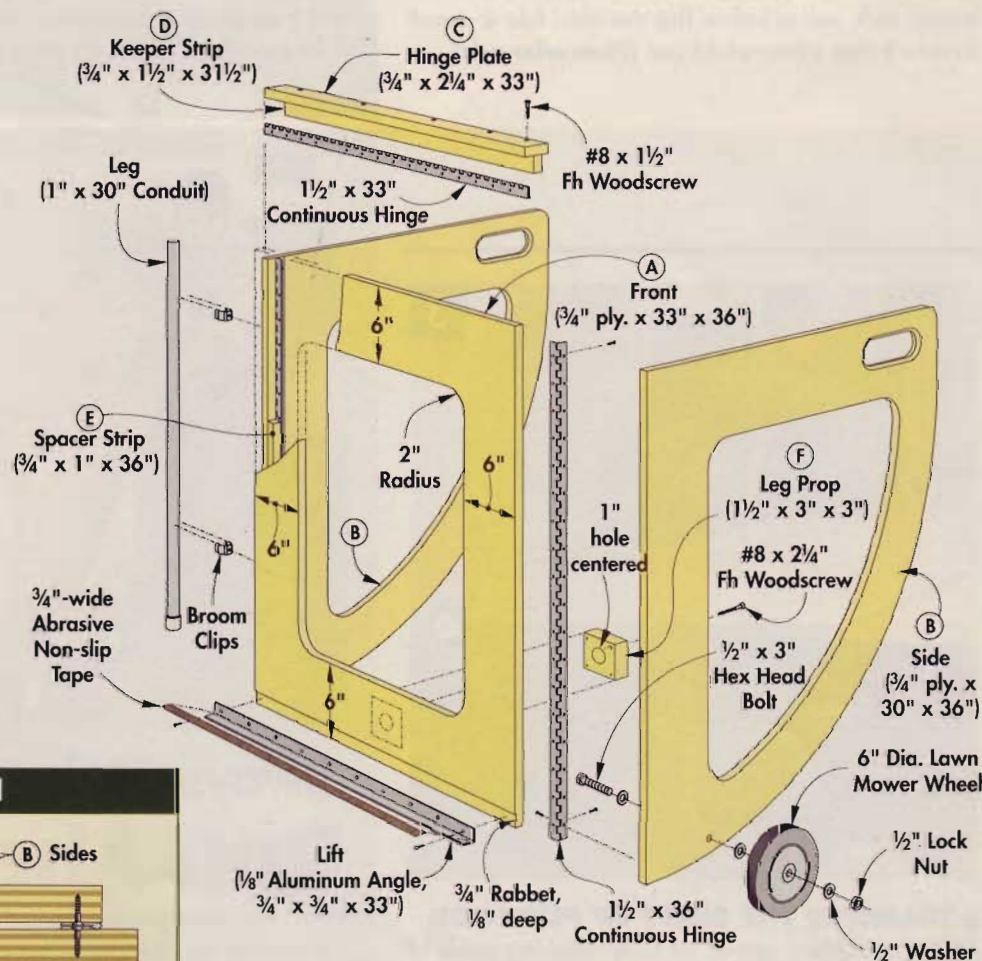
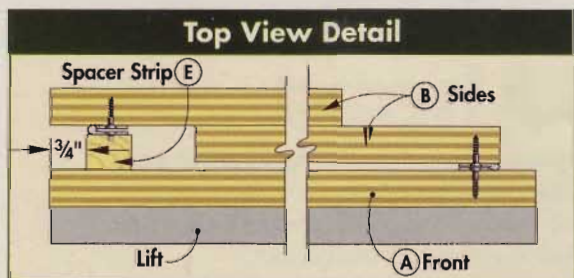
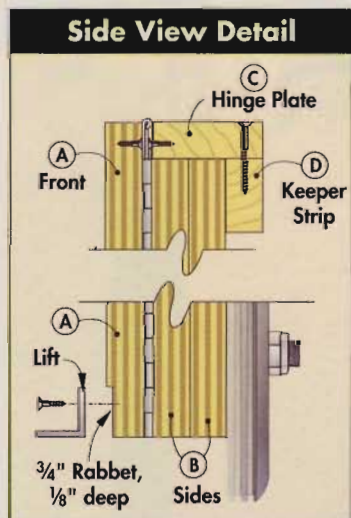
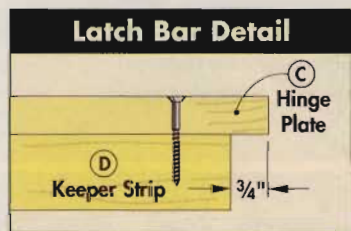
The first step is to rough cut the front (A) and sides (B) of the shuttle. To reduce the weight of these pieces, there's a large opening in each one.

Laying out this opening on the front is pretty straightforward. Simply draw the opening and add a 2" radius at each corner. But laying out the the openings in the sides is more involved because of its large, sweeping curves. Here, you'll want to use the centerpoint shown in the *Side Elevation* on page 45, strike the inside and outside arcs, and then cut the openings with a jig saw.

This is also a good time to cut a handhold in the side pieces (*Handhold Detail*). Then to produce a com-

▲ The curved sides of the shuttle make it easy to rock the shuttle back and lift the weight of a full sheet of plywood up to table height.

CONSTRUCTION VIEW



fortable grip, rout a $\frac{1}{4}$ " roundover on both edges of the handholds.

Add a "Lift" — There's one final cut to make on the front piece. That's a shallow ($\frac{1}{8}$ ") rabbet for a piece of aluminum angle. This angle serves as a "lift" that's used to pick up the sheet of material and hold it on the shuttle.

Because this rabbet is so wide, it didn't make sense to cut it in the conventional manner (face down on the table saw). Instead, I used a tall auxiliary fence to steady the workpiece and made the cut with the piece standing on edge (see Photo at right).

The Wheel Deal — After attaching the lift with screws, you can turn your attention to the wheels. I used 6" lawn mower wheels that I picked up from the hardware store.

The wheels are attached to the sides with bolts that serve as the axles. The location of these bolts is shown in the *Wheel Detail* below. As simple as it sounds, this location is critical to making the shuttle work in the three

configurations shown on page 44.

Folding Features — To hold the sides of the shuttle in position (open or closed), I built an L-shaped latch bar. It consists of a hinge plate (C) and a keeper strip (D) made from $\frac{3}{4}$ "-thick hardwood. After gluing and screwing these pieces together, attach the latch bar to the front of the shuttle with a continuous hinge.

Next, to allow the sides of the shuttle to fold flat, I attached a wood spacer strip (E), as shown in the *Top View* on page 44. This spacer strip allows one of the sides to overlap the other when the shuttle is closed.

With the spacer strip in place, it's time to hinge the sides and front together. I used epoxy to increase the holding power of the short mounting screws (see *Tips from the Workbench Shop* on page 32).

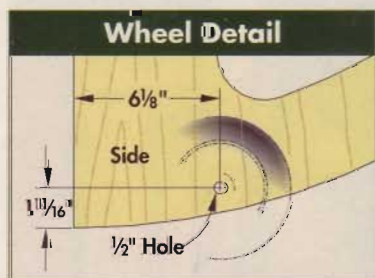
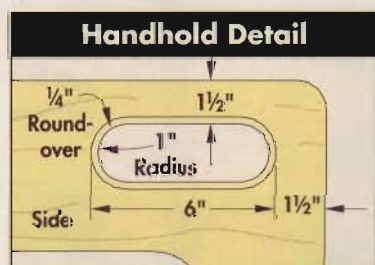
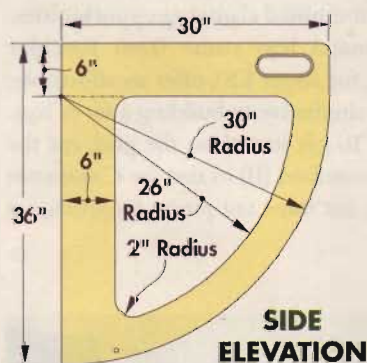
Metal Leg — One last important piece is a metal leg that's used to prop the shuttle up when sliding a sheet onto the cutting table (See Step



3 on page 43.) The leg is made from electrical conduit and attached to one side with broom clips. To keep the leg from slipping while it's in use, it fits into a prop (F) that's screwed to the front of the shuttle.

Ready to Roll — The shuttle is ready to go to work. However, it may not be obvious *how* to fold and unfold the shuttle. The *Sidebar* below illustrates the three-step sequence.

▲ When cutting the rabbet for the aluminum "lift," a tall auxiliary fence helps steady the workpiece.



Unfolding the Shuttle

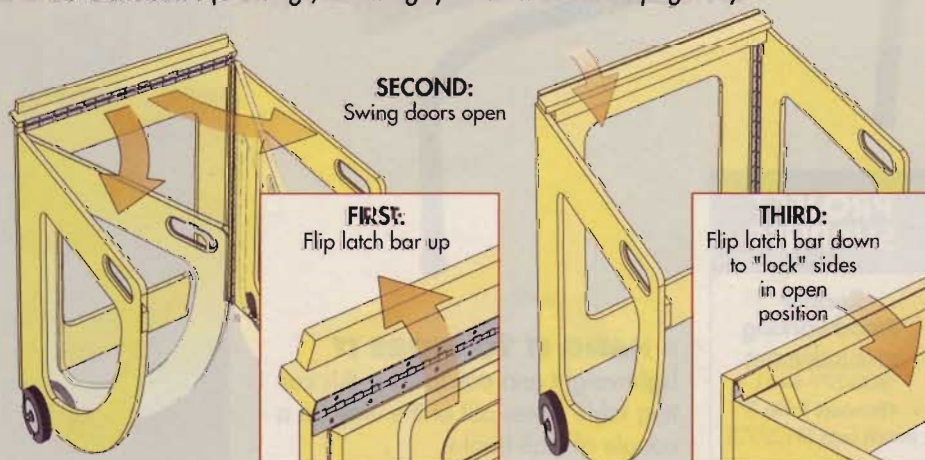
Changing the shuttle from one position (closed) to the other (open) hinges quite literally on the latch bar. Its job is to hold the sides opened or closed.

To open the shuttle, simply flip the latch bar up and over (see *Illustrations below left*). This allows the sides to swing freely away from the front of the shuttle.

When the sides are fully opened, flip the latch bar back down (Drawings, below right).

Now it will serve as a doorstop of sorts, keeping the sides from folding back into their closed position.

To close the shuttle, flip the latch bar out of the way and close the side *without* the hinge spacer first. Then close the other side and flip the latch bar down. With both sides folded flat against the front, the latch bar straddles the sides and holds them firmly together (see *Side View Detail* on page 44).



stow-away Cutting Table

After building this cutting table, I've put my sawhorses out to pasture for good. They were never much good for supporting sheet stock during a cut anyway. And besides, they're heavy and I couldn't seem to store them anywhere that was truly out of the way.

By contrast, this table supports a full sheet of plywood, it's light enough for one person to move, and it folds up to hang on the wall.

The table's "surface" is a grid of plywood stretchers and crossmembers. The grid locks together with notches at each intersection. This interlocking design doesn't require any glue to keep it sturdy. And the open grid has the added benefit of almost unlimited clamping opportunities.

The folding metal legs come from Rockler Woodworking and, for about \$20, offer an affordable, lightweight, and fast alternative to building a set of legs.

Construction — To get started on the grid, cut the stretchers (A) and crossmembers (B) to size (see *Construction View*). While you're at it, cut some test pieces for setting up to cut the notches.

PROJECT SUPPLIES

Rockler
Woodworking

www.rockler.com

800-279-4441

• Banquet Table &
Bench Legs (#13772)

HANG IT TO STORE IT

Lightweight and collapsible, this cutting table stores out of the way on a couple of wall hooks.



As you go about setting up for the cuts, there are two objectives: setting the width of the dado blade to match the thickness of the plywood and then raising it to cut halfway through the width of the grid parts.

Focus on one thing at time as you do this. I started by setting the width of cut. It took me three test cuts to find the perfect width.

To set the height, raise the blade just under half the width of a test piece, cut a notch in two pieces, and test the fit. Now "sneak up" on the final height by raising the blade slightly and repeating the cut and test-fit operation until the test pieces go together with their edges flush.

Gang Cutting the Grid — With the intricacies of setup behind you, the business of cutting the notches in the grid is done quickly by ganging

the pieces together (see Photo at right). In this fashion, I was able to cut the notches in all seven crossmembers at the same time. When those were done, I ganged the stretchers together and cut them the same way.

Assembly — To assemble the grid, first connect the crossmembers to the two inner stretchers (*Frame Assembly*). Then add the two outer stretchers. (Notice that these are inverted compared to the inner stretchers.) Now drive a brass screw at each intersection along the perimeter to hold the grid together. Using brass screws for this is a good idea in case you inadvertently cut through a screw. Brass won't damage a saw blade like a steel screw.

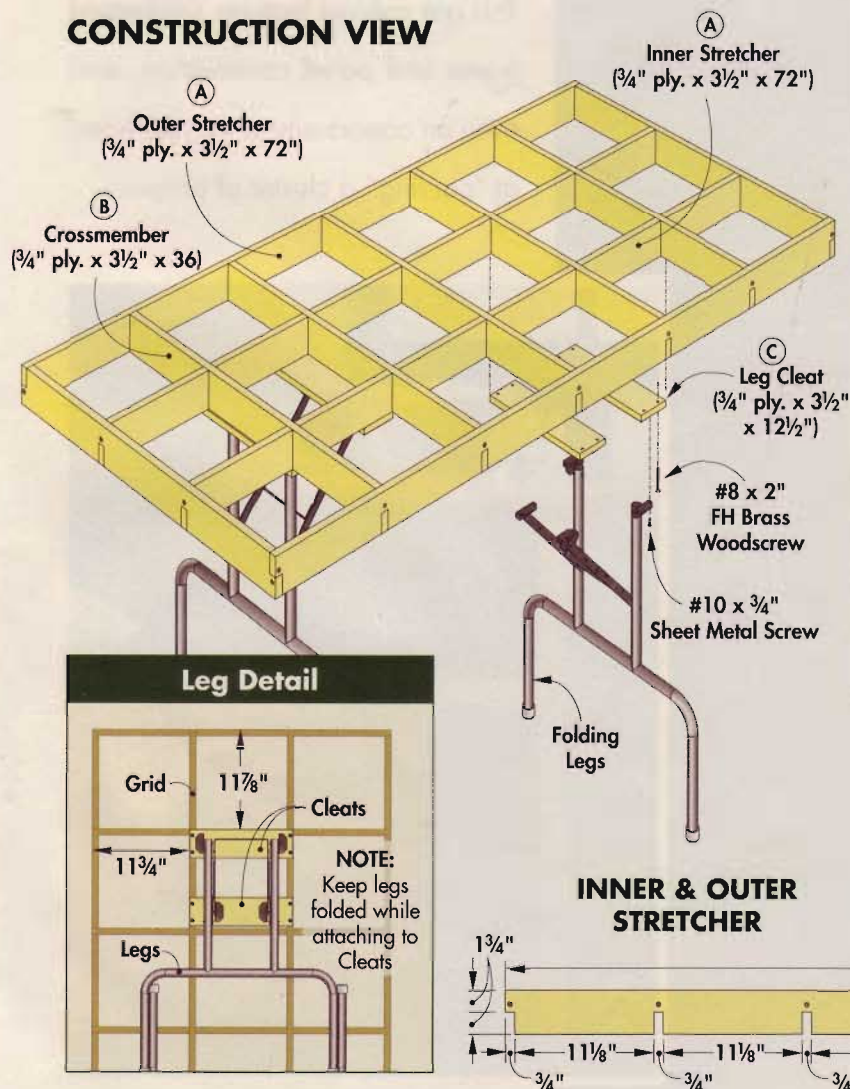
Finally, attach the legs to cleats (C). (*Leg Detail*). Note: It's best to attach the legs *before* you unfold them.



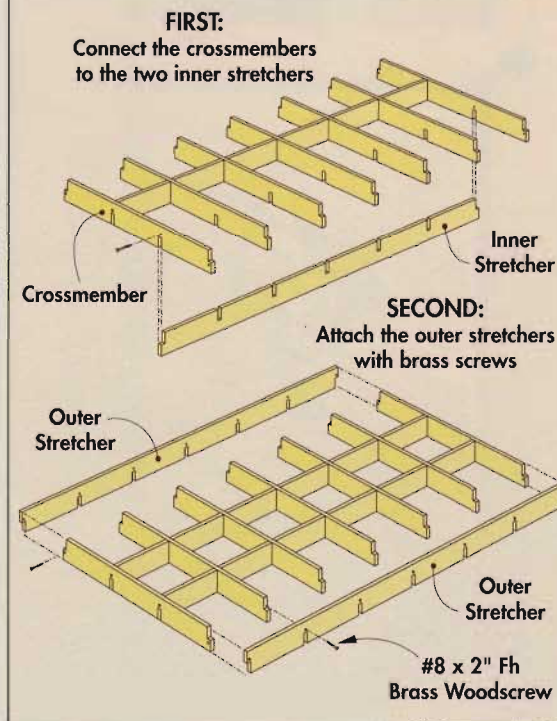
GANG CUTS SAVE TIME

Gang the pieces together and clamp them to an auxiliary fence on the miter gauge. Use layout lines on the outside piece to align the cuts.

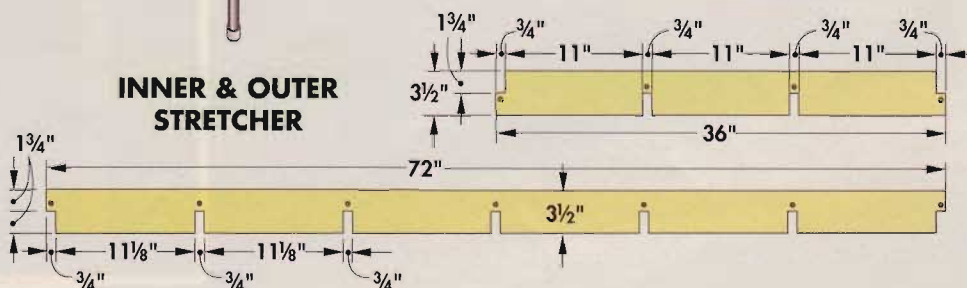
CONSTRUCTION VIEW



Frame Assembly



CROSSMEMBER



INNER & OUTER STRETCHER

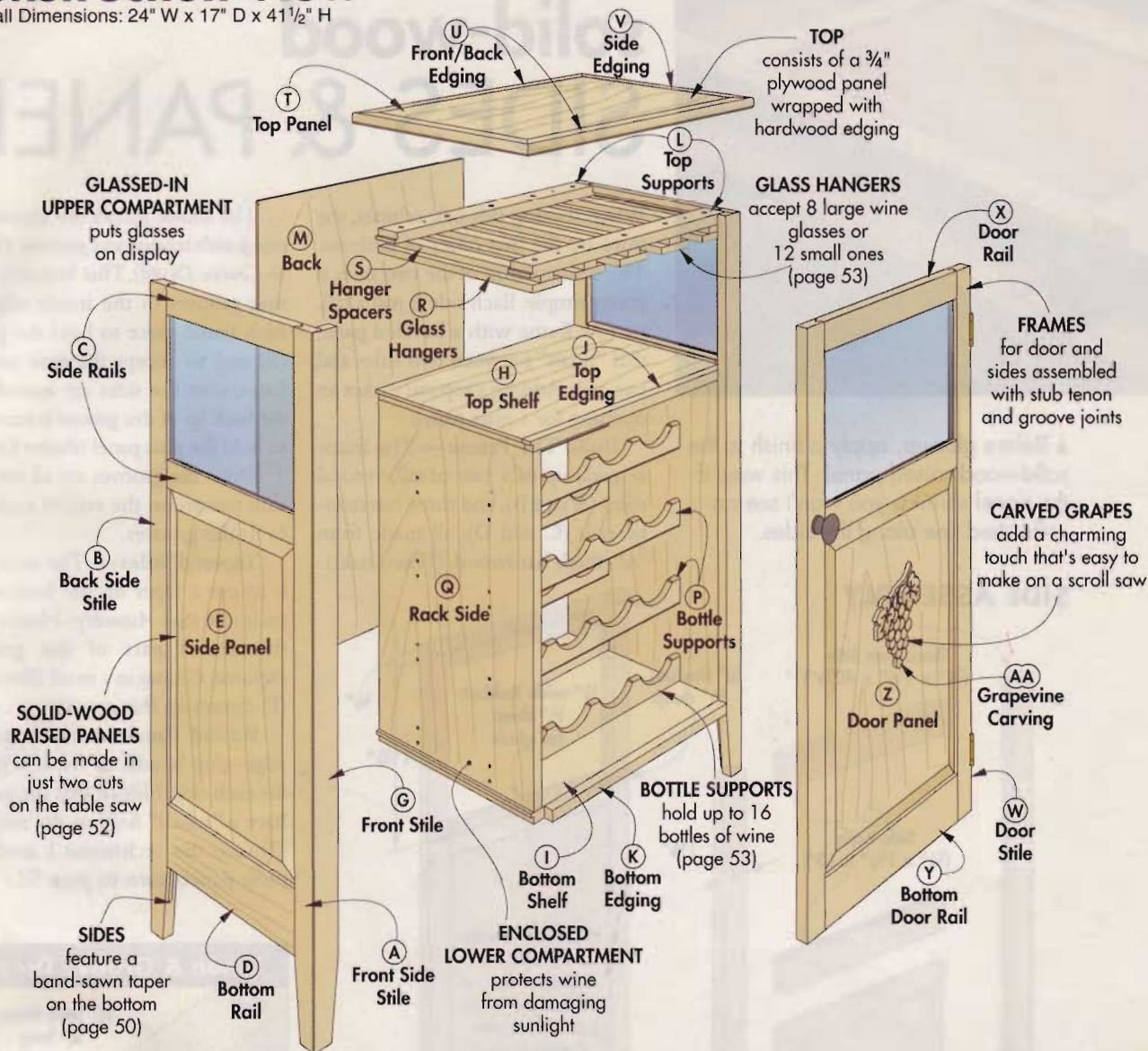
CLASSIC OAK WINE CABINET

Picking out the perfect wine can be complicated — but building the perfect wine cabinet doesn't have to be. This oak cabinet features solid-wood frame and panel construction, and even an opportunity to try your hand at "carving" a cluster of grapes.



Construction View

Overall Dimensions: 24" W x 17" D x 41½" H



When it comes to wine, I wouldn't refer to myself as an "aficionado." Truth be told, I have more appreciation for a piece of quartersawn oak than I do for a vintage Merlot.

But even though wine shopping isn't for me, building this wine cabinet for a friend was right up my alley. Aside from its good looks, the cabinet has all the features needed for safely storing bottles of wine and wine glasses.

Glass & Bottle Storage — First off is the lower bottle rack. Enclosed by solid-wood raised panels, it protects wine from exposure to sunlight, which can ruin it. And with a

set of scalloped bottle supports, the rack holds up to 16 bottles.

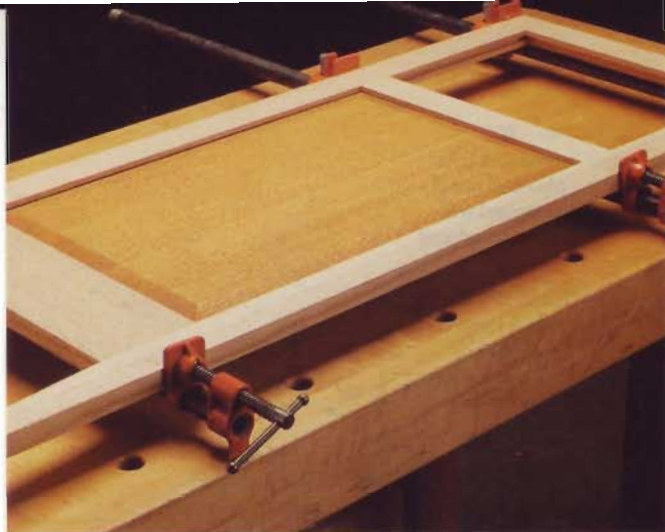
The second item of note is the top glass rack, which has a set of hangers and glassed-in sides for putting a set of wine glasses on display.

"Carved" Grapes — But probably my favorite feature of the cabinet is the "carved" cluster of grapes. At first glance, it almost looks like a relief carving created right out of the wood surface of the door.

In reality, this "carving" is a lot easier to do than it looks. The individual grapes are scroll-sawn from thin stock with a grain that matches the door and glued in place. Then, the grapes are sculpted using a chisel and a gouge (see Photo at right).



▲ These carved grapes actually start out as individual pieces that are scroll sawn to shape, glued onto the door, and shaped with a chisel.



solid-wood SIDES & PANEL

When starting this oak cabinet, the sides are the first order of business. The construction of the two sides is pretty simple. Each side is just a tall, narrow frame with a beveled panel that "floats" between two stiles and two rails. Adding a top rail makes an opening for a glass panel.

▲ Before glue-up, apply a finish to the solid-wood raised panel. This way, if the panel shrinks, you won't see an unfinished line along the sides.

Build The Frame—The frame is made up of a pair of tall, vertical stiles (A and B), and three horizontal rails (C and D), all made from $\frac{3}{4}$ "-thick hardwood. (I used oak.)

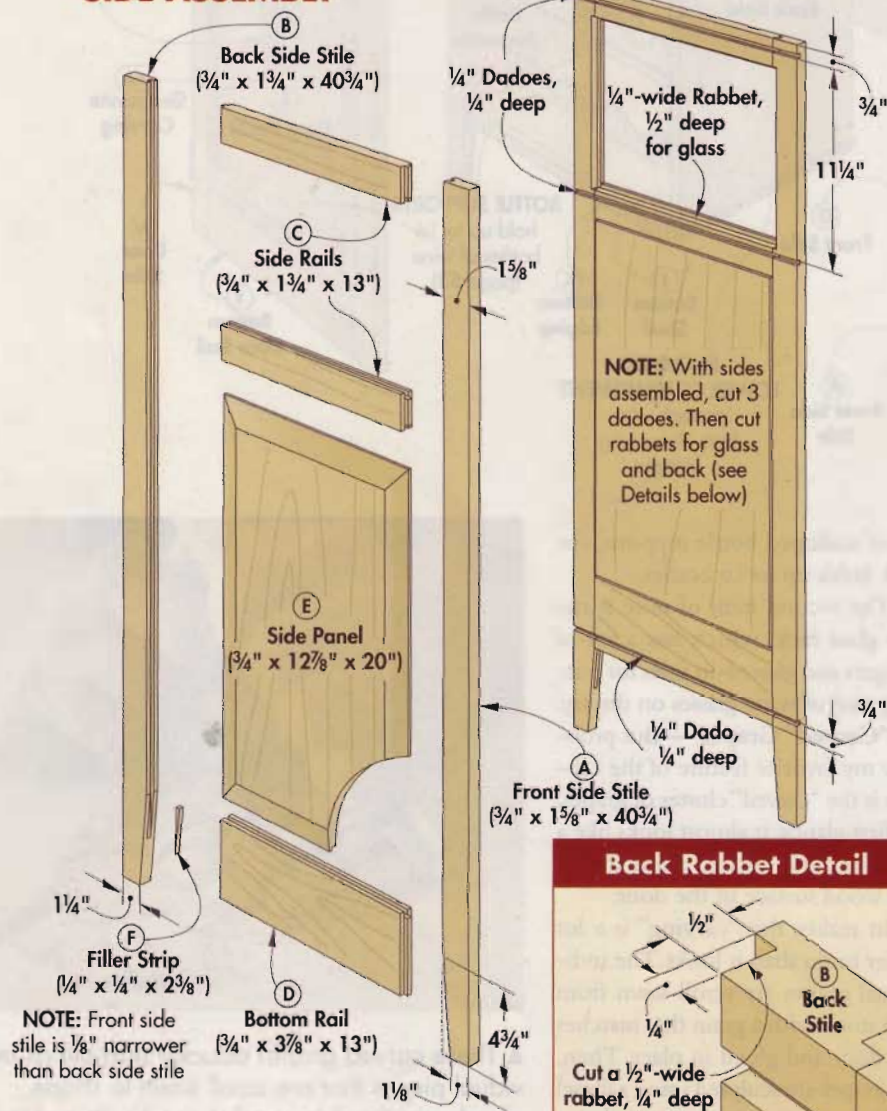
The frame pieces are assembled using stub tenons and grooves (*Tenon & Groove Detail*). This requires cutting grooves in the inside edge of each frame piece to hold the panel (E) and to accept the stub tenon. Later, after the sides are assembled, the back lip of this groove is removed to hold the glass panel (*Rabbet Detail*).

Once the grooves are all cut, cut stub tenons on the end of each rail to fit the grooves.

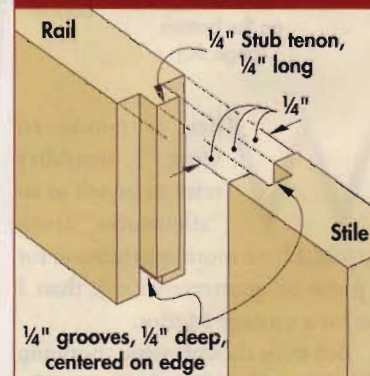
Tapered Stiles—The next step is to cut a taper on the bottom of each stile (*Side Assembly*). Notice that this leaves part of the groove exposed. Gluing in a small filler strip (F) covers up this groove.

Raised Panels—At this point, edge-glue boards to make a panel for each side. Notice that the panels have a "raised" field in the middle. (To see the technique I used for these panels, turn to page 52.)

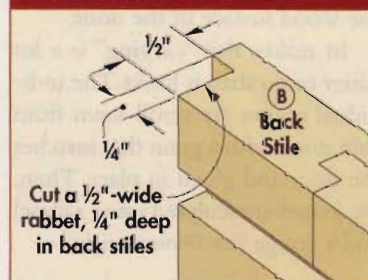
SIDE ASSEMBLY



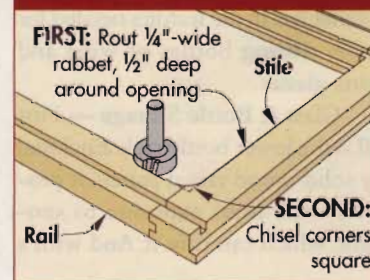
Tenon & Groove Detail



Back Rabbet Detail



Rabbet Detail



Front Stiles — There's just one last thing to do to complete the sides. That's to add a pair of front stiles (G) (*Case Assembly*). A deep rabbet in these stiles makes the joint lines at the front of the cabinet virtually disappear (*Support & Front Stile Detail*).

Notice that the rabbet on the top shelf is cut *after* the edging is glued to the top shelf (*Top Shelf Detail*). The edging on the bottom shelf does not

Glass and Glass Stops— With the case assembled, install the 1/8"-thick glass. To hold the glass in place, I glued in some glass stops (N and O) (*Glass Stop Detail*). To see how I made these stops, turn to page 32.

NOTE: Stops have $\frac{1}{4}$ " roundover along one edge

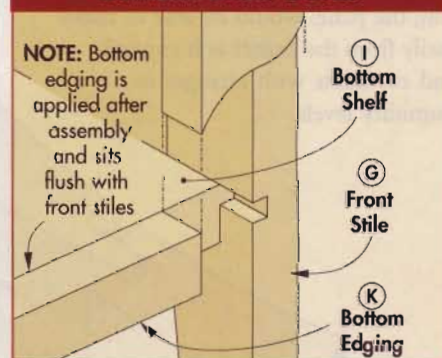


TABLE SAW TECHNIQUE Raised PANELS

The solid-wood panels in the door and sides of the wine cabinet have a “raised” field in the center, giving them much more depth than, say, a flat plywood panel. This field is formed by making a bevel cut on all four edges of the panel (see Photo at right).

Making the Panel—The panel is made by edge-gluing several $\frac{3}{4}$ ”-thick hardwood boards. It’s best to make the glued-up panel a couple of inches longer and wider than needed, then trim it to final size after the glue dries.

Before glue-up, joint the edges of each piece to create a tight-fitting joint. Then clamp the boards and tap the joints with a mallet to get the flat surface you desire. After glue-up, plane it smooth and trim it to size.

Get in the Groove—Getting the panel to fit just right in the frame can be challenging. Not only does the panel have a bevel cut on all four edges, but it also has to fit perfectly in the groove in the frame pieces. As it turns out, fitting the panel takes just two cuts on the table saw. First, cutting a bevel on all four edges provides the perfect angle for the face of the panel (Fig. 1). Then, cutting a rabbet on the back forms a lip that fits into the grooves (Fig. 2). The bevel slides tightly against the top of the groove, while the rabbet aligns perfectly with the bottom (Panel & Rabbet Detail).

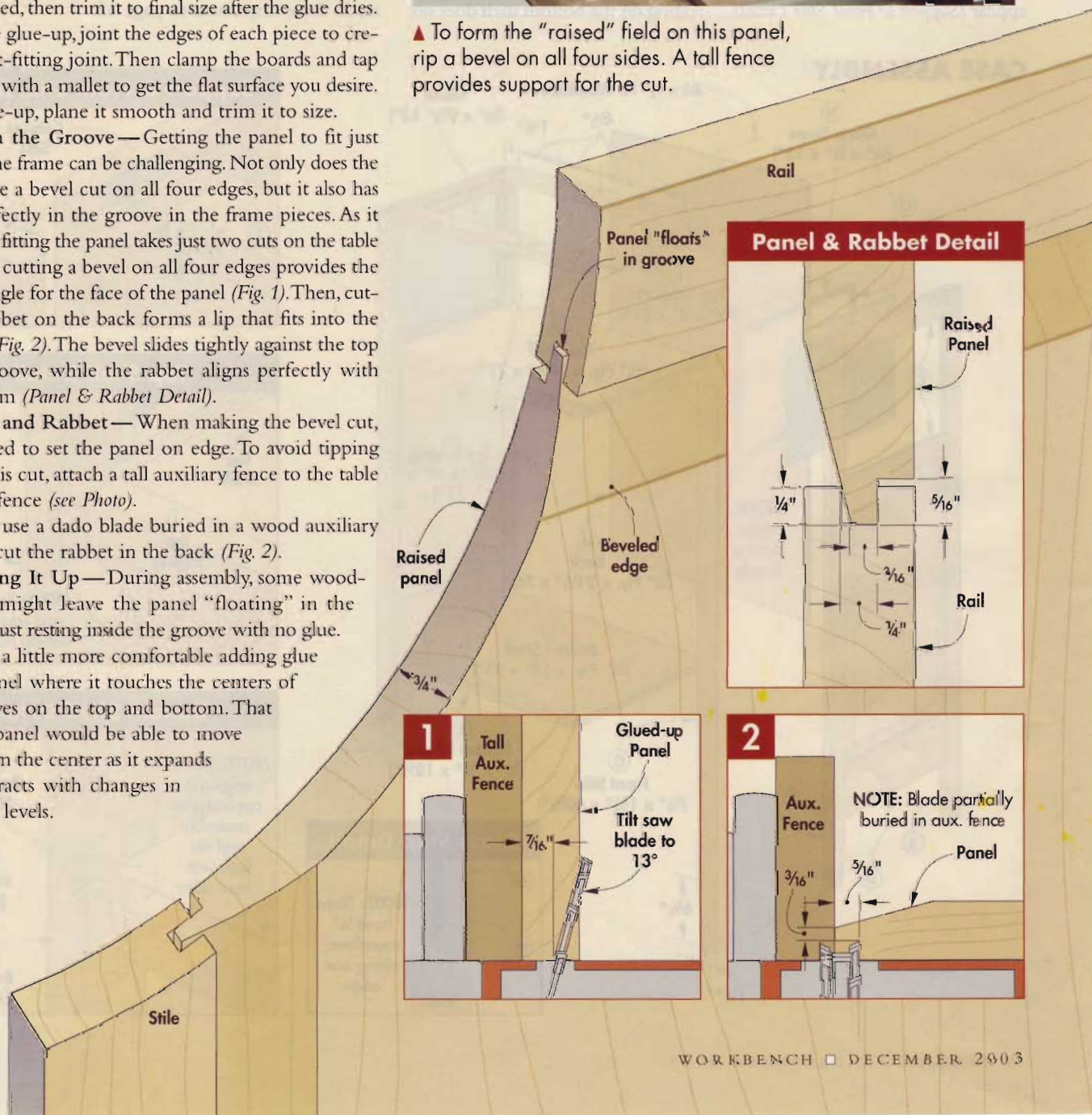
Bevel and Rabbet—When making the bevel cut, you’ll need to set the panel on edge. To avoid tipping during this cut, attach a tall auxiliary fence to the table saw’s rip fence (see Photo).

Then, use a dado blade buried in a wood auxiliary fence to cut the rabbet in the back (Fig. 2).

Framing It Up—During assembly, some woodworkers might leave the panel “floating” in the frame—just resting inside the groove with no glue. But I felt a little more comfortable adding glue to the panel where it touches the centers of the grooves on the top and bottom. That way, the panel would be able to move easily from the center as it expands and contracts with changes in humidity levels.



▲ To form the “raised” field on this panel, rip a bevel on all four sides. A tall fence provides support for the cut.



adding the interior BOTTLE RACK

With the case fully assembled, it's time to turn your attention to what's inside—a rack that holds bottles and a set of hangers for wine glasses.

A Rack for Bottles—The nice thing about this bottle rack is that it's built as a separate unit. Once it's assembled, it just slides right into place through the back of the cabinet (see *Photo*). The rack consists of eight scalloped bottle supports (P) sandwiched between two plywood rack sides (Q).

Bottle Supports—The bottle supports themselves are $\frac{1}{2}$ "-thick hardwood with four curved notches evenly spaced in each piece. For consistent results, I used double-faced tape to "gang cut" four supports together at one time.

To do this, lay out the cut line on one support (*Bottle Support Detail*). Then, tape them together and cut them on the band saw. Repeat this process for the other four supports. As a final touch, I routed a $\frac{1}{4}$ " roundover on both sides, top and bottom.

Rack Sides—Now it's time to attach the rack sides to the supports.

To make assembling the rack easy, drill pilot holes in the rack sides for hanging the supports (see *Illustration below*). Then simply screw the supports in place.

Glass Hangers—In the top of the cabinet, five hangers are installed to hold the wine glasses.

Each hanger is essentially an upside-down T-shaped assembly of a hanger (R) and a spacer (S). By spacing them out evenly along the top supports, the opening between each two hangers forms a slot that accepts the base of a wine glass (see *Glass Hanger Detail*).

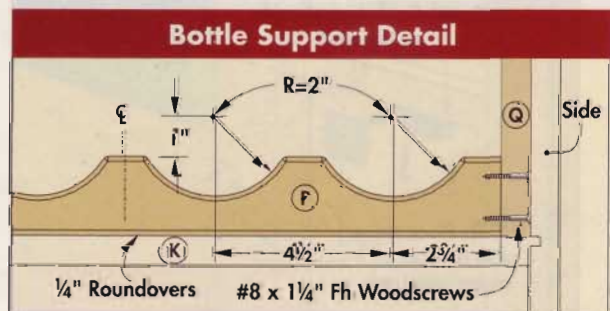
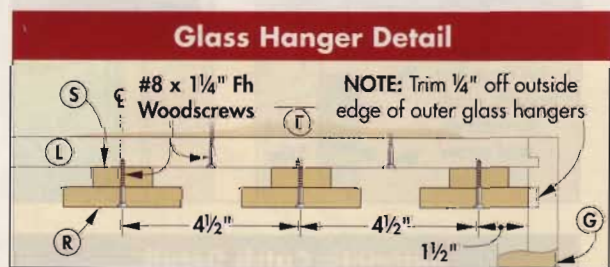
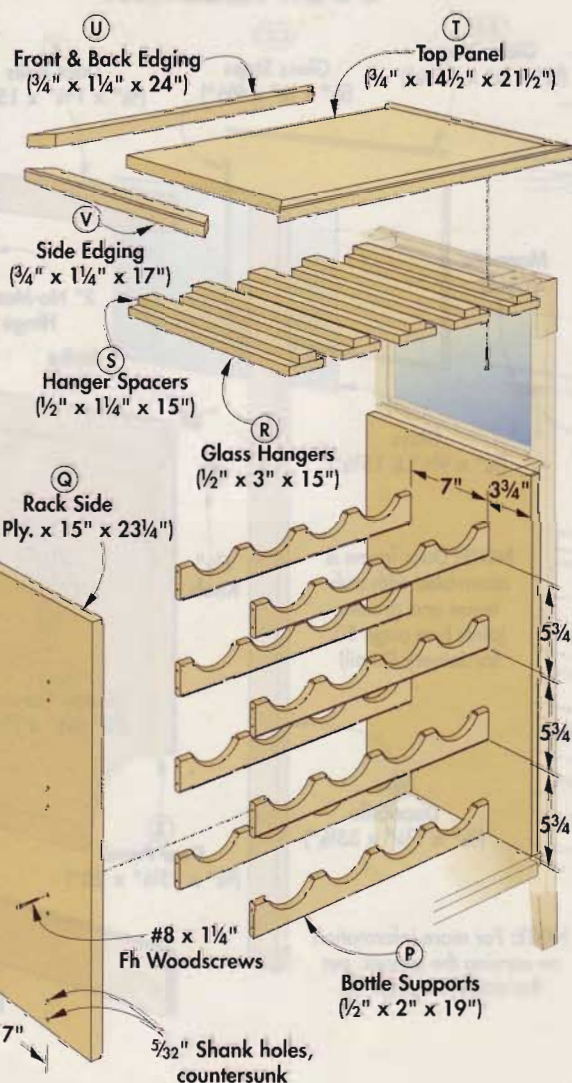
Installing the Hangers—After gluing up the T-shaped hangers and cutting them to size, use the pre-drilled holes to secure the hangers with woodscrews. For the two outer glass hangers, I had to rip $\frac{1}{4}$ " off the outside edge to make them fit.

Topping It Off—The cabinet top is a $\frac{3}{4}$ " plywood panel (T) wrapped with hardwood edging (U and V) that's mitered on the ends. The top is simply screwed in place by drilling up through the top supports into the top.



▲ The bottle rack is easily built as a separate unit from the cabinet. After assembly, it slides right into place through the back between the two shelves.

TOP AND INTERIOR PARTS



build & fit THE DOOR

The door does quite a bit more than just enclose the wine cabinet. A solid-wood door with carved grapes gives the cabinet a distinct look befitting the wine inside.

Just like the sides, the door frame is made up of two stiles (W) and three rails (X and Y) assembled with stub tenons and grooves. Here again, an opening is left for glass, and a solid-wood panel (Z) is framed in below.

Carved Grapes—Before assembling the door, though, you might want to add the grape carving to the panel (see page 55). After adding the grapes, go ahead and build the door (see *Door Assembly for dimensions*).

Installing the Door—Once assembled, the door is inset in the opening with an even gap all around it. But during installation, trying to hold the door in proper position to achieve this gap can be difficult.

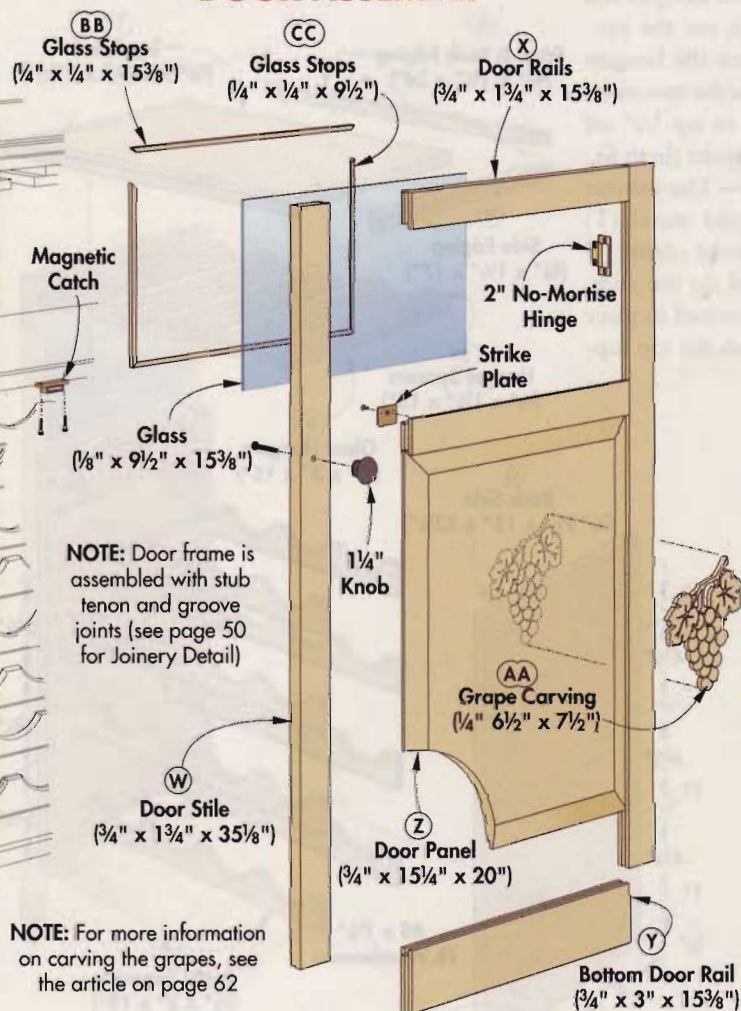
To solve the problem, I set the cabinet on its back (see *Photo*). I needed to keep the door from falling into the opening, so I attached a couple of support blocks with double-sided tape (*Inset Photo*). Now I was able to position the door exactly where I wanted it.

The door is attached to the cabinet with two 2" no-mortise hinges, which are attached to the door first. Then, it's just a matter of marking hinge locations on the cabinet and screwing the hinges in place.

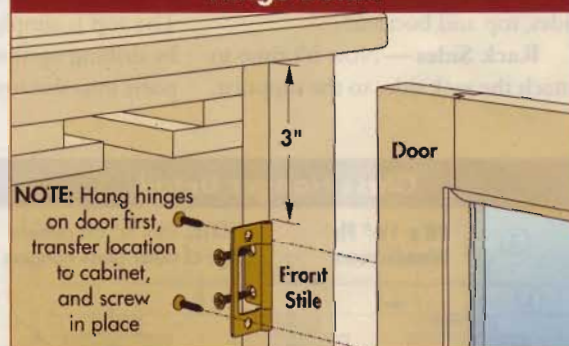


▲ Installing temporary support blocks (*Inset*) and setting the cabinet on its back makes it easy to fit the door into its opening.

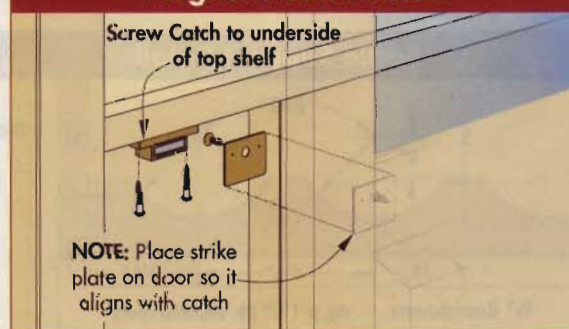
DOOR ASSEMBLY



Hinge Detail

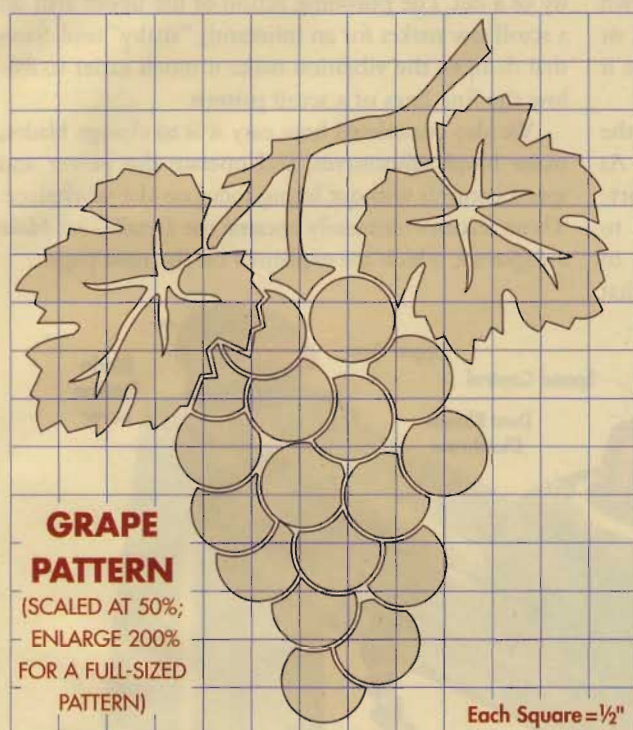


Magnetic Catch Detail



Scrollsawn Carving SCULPTED GRAPES

This grapevine carving was created using the scroll saw technique on page 62, with one difference. To give the carving its sculpted look, both a chisel and a gouge were used (*see Photos*).



▲ To give a three-dimensional perspective to the grapevine carving, cut facets into the grapes and leaves using a gouge, a chisel-like tool with a curved blade.



▲ Then, use a sharp bench chisel to gradually whittle away at the surface and edges of the grapes to give the scroll-sawn carving dimension and a rounded appearance.

MATERIALS & HARDWARE

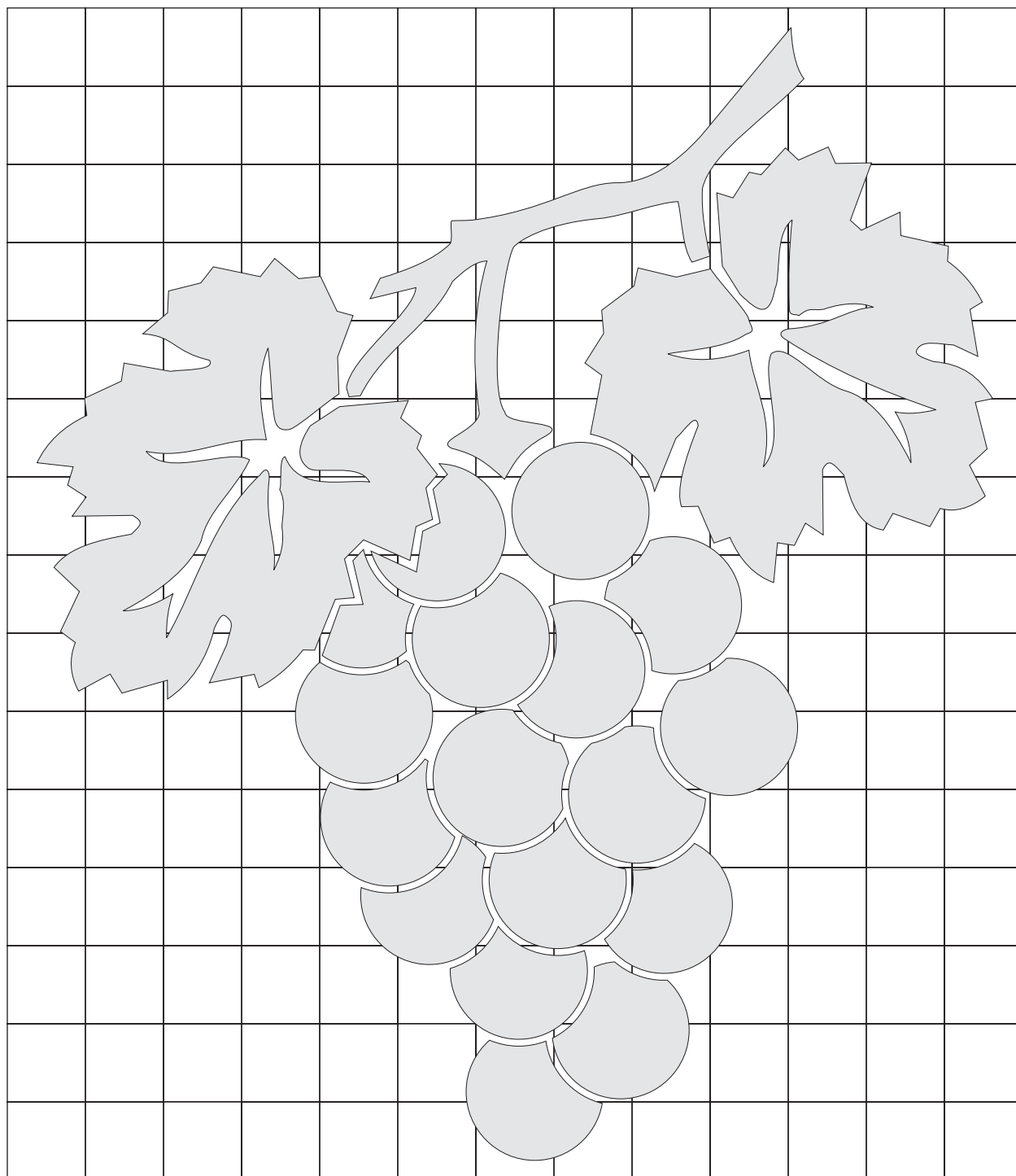
Part	Qty	T	W	L	Material
A Front Side Stiles	2	3/4"	15 5/8"	40 3/4"	Oak Hardwood
B Back Side Stiles	2	3/4"	13 3/4"	40 3/4"	Oak Hardwood
C Side Rails	4	3/4"	13 3/4"	13"	Oak Hardwood
D Bottom Rails	2	3/4"	37 5/8"	13"	Oak Hardwood
E Side Panels	2	3/4"	12 7/8"	20"	Oak Hardwood
F Filler Strip	4	1/4"	1/4"	23 3/8"	Oak Hardwood
G Front Stiles	2	3/4"	13 3/4"	40 3/4"	Oak Hardwood
H Top Shelf	1	3/4"	14 1/4"	21"	Oak Plywood
I Bottom Shelf	1	3/4"	15"	21"	Oak Plywood
J Top Edging	1	3/4"	3/4"	21"	Oak Hardwood
K Bottom Edging	1	3/4"	3/4"	18 1/2"	Oak Hardwood
L Top Supports	2	3/4"	2"	21"	Oak Hardwood
M Back	1	1/4"	21 1/2"	36"	Oak Plywood
N Glass Stops	4	1/4"	1/4"	13"	Oak Hardwood
O Glass Stops	4	1/4"	1/4"	9 1/2"	Oak Hardwood
P Bottle Supports	8	1/2"	2"	19"	Oak Hardwood
Q Rack Sides	2	3/4"	15"	23 1/4"	Oak Plywood
R Glass Hangers	5	1/2"	3"	15"	Oak Hardwood

Part	Qty	T	W	L	Material
S Hanger Spacers	5	1/2"	1 1/4"	15"	Oak Hardwood
T Top Panel	1	3/4"	14 1/2"	21 1/2"	Oak Plywood
U Front/Back Edging	2	3/4"	1 1/4"	24"	Oak Hardwood
V Side Edging	2	3/4"	1 1/4"	17"	Oak Hardwood
W Door Stiles	2	3/4"	13 3/4"	35 1/8"	Oak Hardwood
X Door Rails	2	3/4"	13 3/4"	15 3/8"	Oak Hardwood
Y Bottom Door Rail	1	3/4"	3"	15 3/8"	Oak Hardwood
Z Door Panel	1	3/4"	15 1/4"	20"	Oak Hardwood
AA Carving Blank	1	1/4"	8"	9"	Oak Hardwood
BB Glass Stops	2	1/4"	1/4"	15 3/8"	Oak Hardwood
CC Glass Stops	2	1/4"	1/4"	9 1/2"	Oak Hardwood

- (46) #8 x 1 1/4" Fh Woodscrews
 - (14) #6 x 1/2" Fh Woodscrews
 - (2) 2" No-Mortise Bronze Hinges (#28688)
 - (1) 1 1/4"-dia. Rubbed Bronze Knob (#43063)
 - (1) Narrow Magnetic Catch (#26559)
 - (2) 1/8" x 9 1/2" x 13" Sheets of Glass
 - (1) 1/8" x 9 1/2" x 15 3/8" Sheet of Glass
- All hardware is available from Rockler at 800-279-4441 or www.Rockler.com.



Grape Pattern at 100%



BENCHTOP SCROLL SAWS

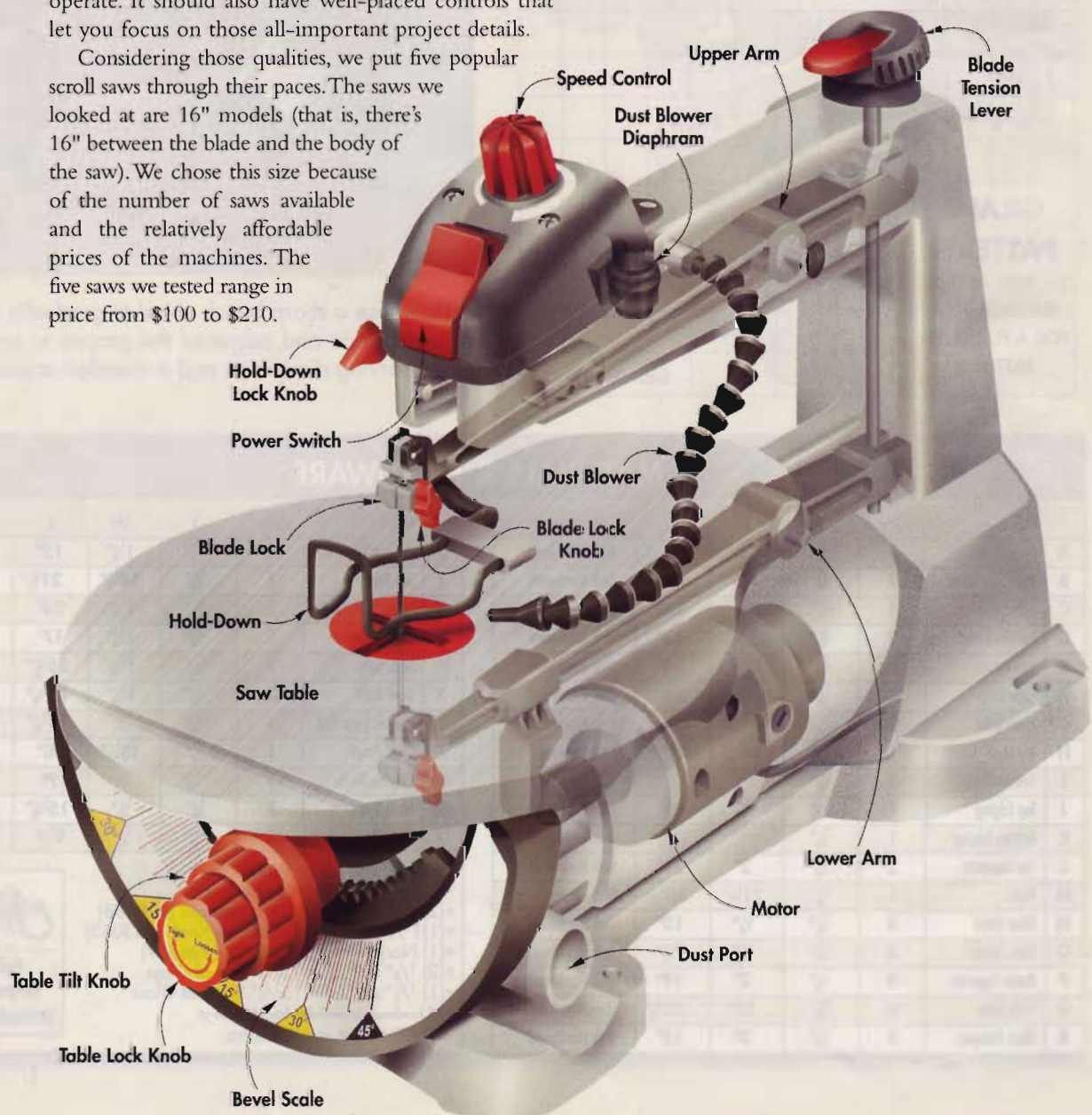
Few operations in a woodshop inspire creativity or offer instant gratification the way scroll sawing does. No matter how many times I sit down to scroll some intricate detail for a project, or even to create an entire project on the scroll saw, it *never* feels like production work.

In short, scroll sawing is an escape from some of the more mechanical procedures of woodworking. As such, it's important that your scroll saw be a comfortable and dependable tool that you look forward to using. It should be easy to set up and a pleasure to operate. It should also have well-placed controls that let you focus on those all-important project details.

Considering those qualities, we put five popular scroll saws through their paces. The saws we looked at are 16" models (that is, there's 16" between the blade and the body of the saw). We chose this size because of the number of saws available and the relatively affordable prices of the machines. The five saws we tested range in price from \$100 to \$210.

One of the most important test criteria was the vibration of the saws and how that impacted the quality of a cut. The pistoning action of the upper arm on a scroll saw makes for an inherently "shaky" tool. Saws that dampen the vibration make it much easier to follow the fine lines of a scroll pattern.

We also considered how easy it is to change blades, make bevel adjustments, and operate the power and speed controls without losing focus on the workpiece. Those features ultimately became the *Details That Make a Difference*, which are explained on the next page.



6 Details That Make A Difference

Convenient Controls

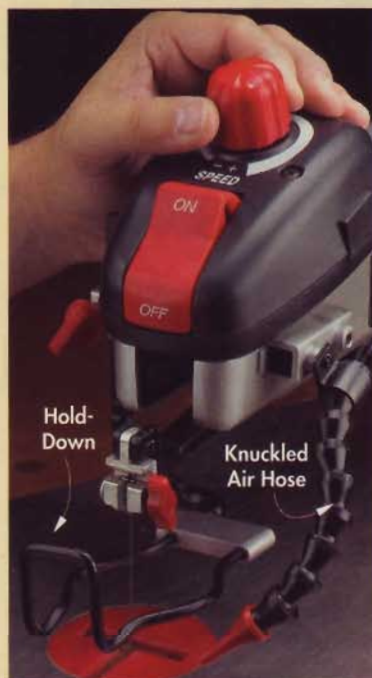
Top-mounted controls (versus under the table) are easy to locate and adjust without losing your concentration on the workpiece. They also offer a more universal "fit" for right- or left-handed users when compared to controls mounted on one side or the other.

Knuckled Air Hose

Air hoses with "knuckles" allow a wide range of adjustment, which lets you place the blower tip where it will do the most good.

Stock Hold-Down

Hold downs should be easy to adjust (no tools required) with a full range of motion and a clear sight line.



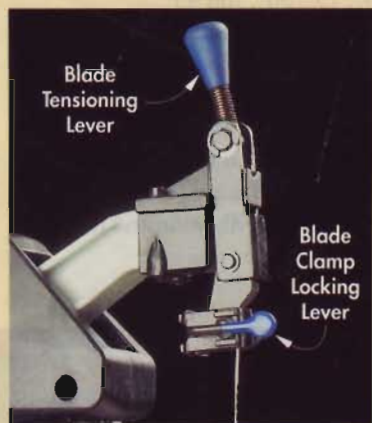
Left/Right Table Bevel

Tables that tilt left and right (instead of just left) offer greater flexibility in the way you make beveled cuts. But we discovered another benefit to tables that tilt both ways. Changing blades on the saws with right- and left-tilting tables was easier because, with the table tipped to the right, there's more room to access the blade clamp.

Blade Changing

Mounting a blade in these saws was quite different from one machine to the next. So different, in fact, that we can't point to one saw and say it has the perfect system.

The type of controls, where they are located, and how much space there is to operate them all influenced our opinion of blade changing. We've explained the pros and cons of each configuration in the individual saw write-ups.



Work Light

We prefer saws that are equipped with a light, or at least have some provision for adding one as an accessory.

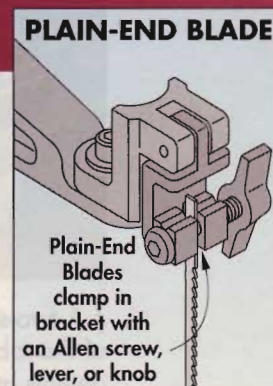
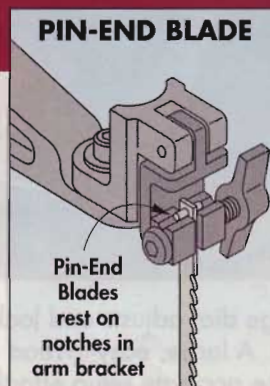
The Wilton and Dremel saws came with worklights. Ryobi offers a light as an accessory for their saw.



Pin-end vs. Plain-end

Another important factor in choosing a scroll saw is whether a saw accepts pin-end blades, plain-end blades, or both. Both is the best, naturally. But each type of blade has its merits.

Pin-end blades are popular with beginning scrollers because they're easy to install. Their downfall is that they are available in a limited variety of tooth patterns. Plain-end blades, while trickier to install, are available in a wide variety of tooth patterns. They're also better suited to pierce cuts since they have no pins to get in the way as you thread the blade through a hole in the workpiece.



Craftsman 21610



The Craftsman 21610 has some of the most worthwhile features in this group of scroll saws. The power and speed control are not only located on top of the machine, which we prefer for convenience and safety to controls mounted under the table, but they're also large and easy to use.

The table bevel and lock operation is another big plus for this saw (Fig. 1). It operates with a two-stage dial. The outer collar of the dial

adjusts the table, the inner dial locks it in the desired position. This, combined with the large angle scale, make it easy to fine-tune the table to an exact setting. The bevel system also has detent stops at 0°, 15°, 30°, and 45°.

The table itself is cast steel, providing a flat, solid worksurface. The base of the saw is also cast. Together these two components contribute significantly to the solid heft of the machine, which does a great deal to dampen the vibration and make this a smooth running saw.

At a Glance:

Price:	\$139.99
Motor:	1.4 amp
Weight:	53 lbs
SPM Range:	400-1,600
Blade Type:	Plain/Pin
Blade Stroke:	7/8"
Warranty:	1 year

Virtues: Top-mounted controls; L/R tilting table w/dial settings.

Vices: No worklight.

Verdict: Best of class, based on price and performance.

www.Craftsman.com
800-549-4505

Changing blades on the Craftsman is relatively easy, using both plain- and pin-end blades, thanks to large tightening knobs on the blade holders. The operation could benefit from a little more space to get at the lower blade holder.

This saw also has a knuckled dust blower hose, which is good. But we found it to be even more useful when we removed the bracket that holds the blower to the upper arm housing (Fig. 2).

All in all, we found the Craftsman to have the right combination of features, performance, and price to award it our Editor's Choice.



▲ A two-stage dial adjusts and locks the bevel of the table. A large, easy-to-read scale and detents make accurate setup effortless.



▲ Large, overmolded knobs, an oversized, open hold-down, and an articulating hose are among the many stand-out features of the Craftsman saw.

At a Glance:

Price:	\$199.99
Motor:	2 amp
Weight:	60 lbs
SPM Range:	600-1,650
Blade Type:	Plain only
Blade Stroke:	3/4"
Warranty:	2 years

Virtues: Smooth running;
Quick-change blade system;

Vices: Troublesome dust bin

Verdict: Good performance,
but with a high price.

www.DeltaWoodworking.com
800-438-2486

The Delta SS350 is a top-notch scroll saw with many outstanding features. But there are a couple things about this saw that had us scratching our heads.

On the upside, this is a stout machine that does a nice job of negating vibration, so it runs and cuts quite smoothly. Only at the highest speeds was it necessary to secure the saw to keep it from "walking." Once secured to a bench, vibration became a non-issue.

This saw also has excellent blade changing manners. That's thanks to Delta's Quickset II Blade Chuck System, which uses quick-release

levers instead of the typical knobs. And this saw has the blade tensioning lever located right up front on the saw (Fig. 1).

We also liked the hold-down foot on this saw. It's easy to adjust for both flat and bevel work and effective at stabilizing any size workpiece.

The knocks we have to give the Delta aren't serious, but were enough to cost it the top spot in the test.

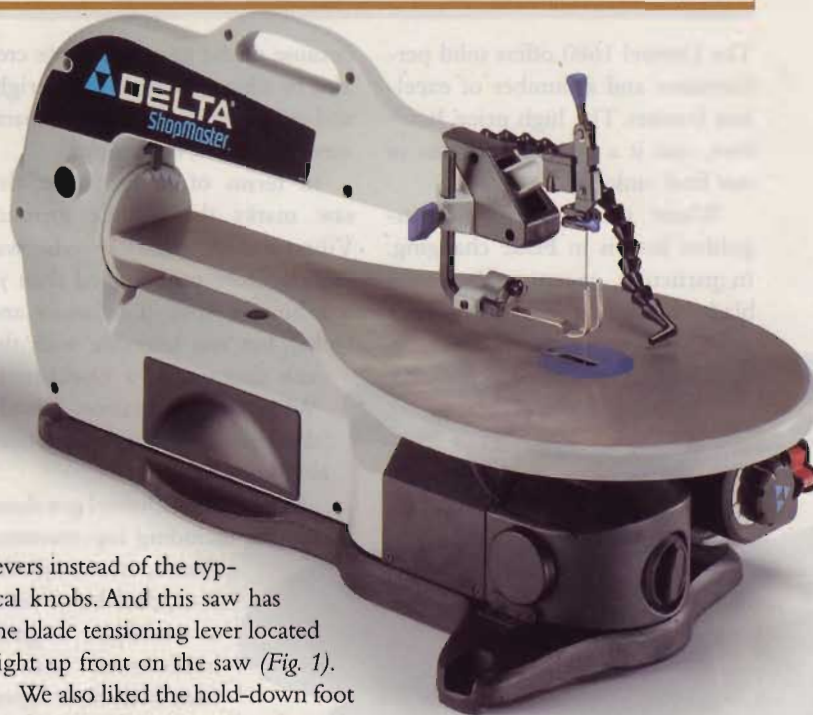
First is the table — it only tilts left, which limits the saw's versatility compared to those with tables that tilt both directions.

One more feature that could be improved is the dustbin (Fig. 2). The

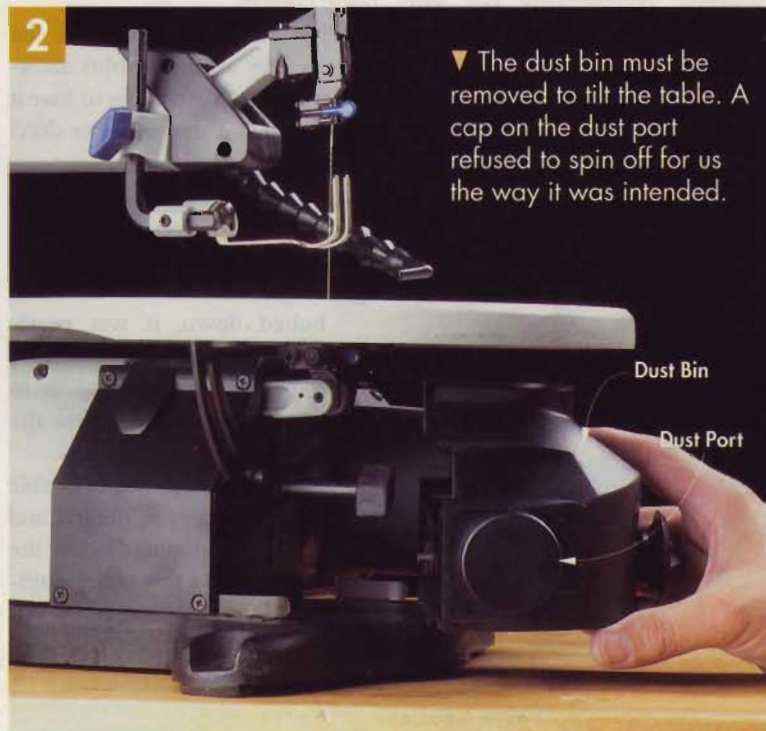
container is effective at collecting dust, but it must be removed to tilt the table. Another oddity of the dustbin is the vacuum port. The port is supposed to twist off for attaching a hose. The cap on our saw wasn't coming off unless we cut it off.

But overall, this saw is a top performer with great features. A few quirks and a relatively high price put it in the runner-up spot in this test.

Delta SS350



▲ Delta's blade tensioning and locking system uses quick release levers instead of knobs.



▼ The dust bin must be removed to tilt the table. A cap on the dust port refused to spin off for us the way it was intended.

Dremel 1680

The Dremel 1680 offers solid performance and a number of excellent features. The high price, however, cost it a couple positions in our final ranking.

Where this saw truly distinguishes itself is in blade changing. In particular, operating the lower blade holder is especially nice

because of the generous space created by tilting the table to the right and removing the storage compartment (see Photo, below right).

In terms of performance, this saw marks the middle ground. Vibration at high speeds was slightly more pronounced than in the heavier saws (Craftsman and Delta), but was tolerable with the saw fastened to a workbench. With the vibration thusly dampened, cutting was noticeably smoother.

As for details, Dremel got those all right, including top-mounted controls, an articulating hose, dual-bevel table, a worklight, a good hold-down, and it takes both blade types.

Considering all that, we'd never call the Dremel 1680 a *bad* investment — it's just a sizable one.



At a Glance:

Price:	\$209.99
Motor:	1.4 amp
Weight:	40 lbs
SPM Range:	500-1,600
Blade Type:	Plain/Pin
Blade Stroke:	3/4"
Warranty:	2 years

Virtues: Top-mount controls; Worklight; Hold-down foot.

Vices: Worklight is dim.

Verdict: An excellent saw, but at a premium price.

www.Dremel.com
800-437-3635



▲ Dremel's right-tilting table creates abundant space to access the lower blade holder.

Ryobi SC164VS

The Ryobi SC164VS is an affordably priced scroll saw that sacrifices some of the qualities of its more expensive counterparts, but still offers a good starting point with some growth potential.

That growth potential is evident in the fact that this

saw accepts both pin- and plain-end blades. So even if you buy it as a beginner, you won't be limited by blade choices.

The base saw can also be improved by adding Ryobi's accessory worklight. We'd prefer to have it included, but at this price, we don't mind adding it later.

Of course, there are more meaningful sacrifices. Vibration is quite pronounced in this lightweight machine. Even when bolted down, it was nearly insufferable at the highest speed setting, forcing us to moderate the speed for the smoothest possible cuts.

A fixed air hose, a table that tilts only to the left, and controls mounted below the table are a few more com-

At a Glance:

Price:	\$99.97
Motor:	1.2 amp
Weight:	28 lbs
SPM Range:	400-1,600
Blade Type:	Plain/Pin
Blade Stroke:	7/8"
Warranty:	2 years

Virtues: Affordable price.

Vices: Tensioning knob; Fixed dust blower.

Verdict: Entry-level scroll saw at a budget price.

www.RyobiTools.com
800-525-2579

promises that come with the Ryobi's bargain price.

Just the same, we consider the Ryobi SC164VS a "Top Value" with a retail price that's under \$100, and a worthwhile choice for the entry-level scroller.



At a Glance:

Price: \$109.99
Motor: 1.2 amp
Weight: 33 lbs
SPM Range: 500-1,700
Blade Type: Pin only
Blade Stroke: 7/8"
Warranty: 2 years

Virtues: Controls; Worklight.

Vices: Fixed dust blower; Hold-down foot is too large.

Verdict: Very basic saw at a bargain price.

www.WiltonTool.com
 800-519-7381

► A single knob controls the power and speed of the Wilton 99166 scroll saw.



Wilton 99166

The Wilton 99166 is a value-priced scroll saw with a mixed bag of strengths and weaknesses.

The performance is adequate, but it's essential that this lightweight saw be fixed to a workbench when running at higher speeds. Even then, we found it necessary to reduce the speed to keep vibration at a workable level so that we could stay true to the cut lines.

A couple of pluses for this saw are a fully adjustable worklight that's standard equipment and a unique power and speed control mechanism.

We don't care for the location of the control, but having both functions combined in a single knob is convenient (Photo, left).



One problem we do have with this saw is its unnecessarily tall hold-down. As far as we can tell, that extra height doesn't do anything but obstruct the view of the cut line. Other limitations include a fixed dust blower, pin-end-only blade capacity, and a table that tilts only to the left.

In general, the Wilton scroll saw is best suited to the occasional user with no plans for exploring advanced techniques requiring plain-end blades.

Fortunately, the reasonable price makes it an attractive tool for beginning scrollers.

SCROLL SAW RATINGS

Model	SET-UP				PERFORMANCE		FIT & FINISH	
	Table Tilt	Blade Change	Blower	Hold-down Foot	Vibration	Controls On/Off	Table	Base
CRAFTSMAN	A+	B	B	A	B	A	B	A
DELTA	B	B	A	A	B	B	A	A
DREMEL	A	A+	A	A	B	A	B	A
RYOBI	C	C	C	B	C	C	C	C
WILTON	C	C	C	D	C	A	C	C

Final Recommendations

Editor's Choice

CRAFTSMAN 21610

Solid construction, top-rate performance, and some excellent features earned Craftsman the top spot among these scroll saws. The remarkably fair price makes it an even more obvious choice for scrollers of any skill level.



Top Value

Ryobi SC164VS

For the truly budget-conscious woodworker, or for just occasional use, Ryobi is a good way to get an affordable start in scroll sawing while still having the versatility of using both pin-and plain-end blades.





▲ What appears to be a relief carving in the main photo is actually an applied pattern that is shaped using everyday bench chisels and a bit of sanding.

SCROLL SAW CARVING

If you've ever wanted to try your hand at carving, but didn't want to spend years perfecting the techniques, here's a simple shortcut that will have you making great looking carvings in no time.

In a nutshell, it involves scroll sawing small pieces, gluing them to the project, then shaping them with chisels and sandpaper (see *Inset Photo*).

The result is a three-dimensional detail that appears to have been relief-carved. This technique, in a manner of speaking, substitutes a little time on the scroll saw for a lot

of time carving away all the stock surrounding a detail, as is done in relief carving.

In the photo above, I "carved" a fish motif, but this technique works with all kinds of patterns. Likewise, just about any wood will work fine for this. In this case, I used basswood. But I used the same technique in oak to carve the grapes on page 48 and the acorn on page 70.

And by the way, the patterns for this project can be downloaded and printed from the "Online Extras area at www.WorkbenchMagazine.com.

1 Scroll Saw the Pieces

As with most scroll saw projects, this one begins with a pattern. However, in this case you'll actually need *two* patterns.

The second pattern gets applied to a hardboard backer board. In turn, the scrollsawn pieces will be glued to this pattern (see *Photo*). The unusual thing about this second pattern is that it's actually a *mirror image* of the original (see *Illustrations below*). That's because after the cutout pieces are glued on, the backer board will be turned upside down to transfer the pieces to the project.

So to get started, apply the "normal" pattern to a thin piece of stock ($\frac{1}{4}$ " or less). You should choose this piece of stock to match the grain of the project as closely as possible. This will complete the illusion that the pieces were carved *from* the project and not applied to it.

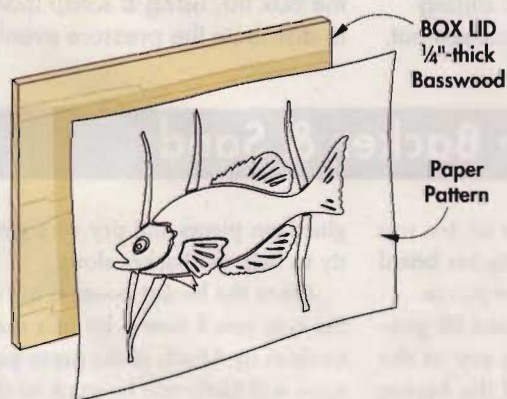
Tip: For a perfect grain match, resaw the thin stock from the same board the scrollsawn pieces will be applied to (see the *Sidebar below*).

Now, as you cut the pieces out of the thin stock, apply each piece *face down* to the mirrored pattern mounted on the backer board. Since the backer board is just a temporary place holder for the carved pieces, I used an ordinary glue stick to lightly adhere the pieces to the mirrored pattern. That way, when the backer board and mirrored pattern get peeled away later, there's a lot less chance of any of the small pieces being damaged.

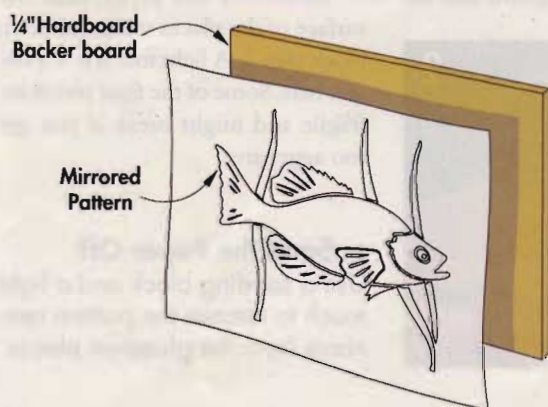


▲ **Start by cutting away the waste.** Then go to work cutting out the carved pieces. As each piece is cut out, glue it face down to the mirrored pattern that's mounted on a backer board. Use a glue that will release easily when it's time to remove the backer board.

NORMAL PATTERN



MIRRORED PATTERN



resaw for perfectly-matched WOOD GRAIN



◀ To get the best possible grain match for my gift box carving, I resawed the scrolling stock from a $\frac{3}{4}$ "-thick block of basswood. I then made the lid of the box from the remaining stock.

SCROLLSAWN CARVING

2 Glue Scrollsawn Pieces to Lid



▲ Brush on Glue

To prevent squeeze-out on the box lid, brush a *light* coat of glue onto the scrollsawn pieces.

Transferring the “mirrored” scrollsawn pieces to the workpiece (in this case, a box lid) is a three-step process that demands a fine touch.

The first step is to brush a *thin* coat of glue onto the pattern pieces (Fig. 1). Thin is the operative word here. Once the pieces are applied to the lid, there’s almost no space for cleaning up any excess glue. And any wayward glue will stick out like a sore thumb after the finish is applied.

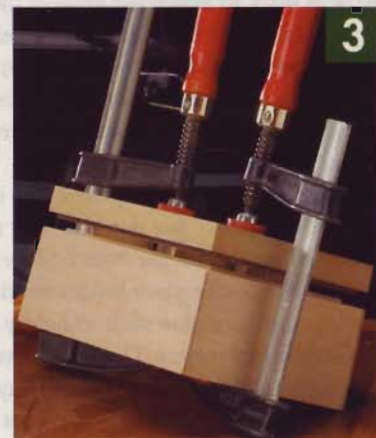
Next, turn the backer board upside down, positioning it carefully on the box lid (Fig. 2). Be careful not to let the backer board slide around or you’ll have that excess glue problem.

Once in position, hold the backer board in place by hand for a few seconds to let the glue get a solid tack. Then clamp the backer board to the box lid, using a scrap piece to distribute the clamping pressure evenly (Fig. 3).



▲ Apply the Scrollsawn Pieces to the Box Lid

Turn the backer board upside down to position the scrollsawn pieces on the lid. Avoid sliding the pieces, which would cause glue squeeze-out.



▲ Clamp the Pieces to Box

Clamp the scrollsawn pieces to the box lid, using a scrap block to distribute the pressure evenly.



▲ Remove the Backer Board

Peel the backer board slowly away from the glued-on pieces, beginning at one corner and lifting gently but steadily.

3 Peel the Backer & Sand

After allowing the glue to dry, you can carefully peel the backer board away from the glued-on pieces.

Start at one corner and lift gently to avoid damaging any of the small pieces (Fig. 1). If the backer resists coming off, slide a putty knife between the backer board and the

glued-on pieces and pry very gently to help the backer along.

Once the backer board is out of the way, you’ll have a bit of a mess to clean up. Much of the paper patterns will likely still be stuck to the scrollsawn pieces.

To remove the paper, sand the surface of the pieces using a sanding block (Fig. 2). A light touch is important here. Some of the finer pieces are fragile and might break if you get too aggressive.



▲ Sand the Paper Off

Use a sanding block and a light touch to remove the pattern remnants from the glued-on pieces.

4 Establishing Depth of Detail

The first step in “carving” the underwater scene is to establish the depth of the various parts (Fig. 1). This will give the scene the three-dimensional character that makes carving so attractive.

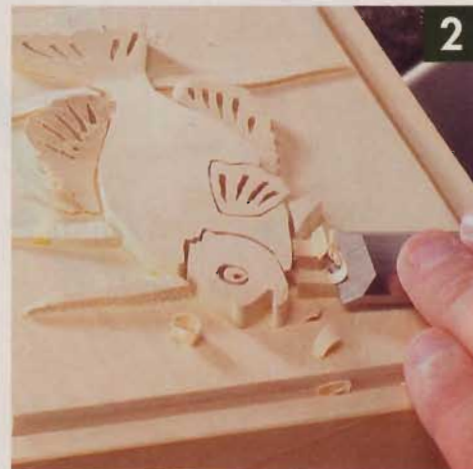
In this example, the fish is in front of the reeds, so the reeds need to be thinned down to appear further away. I also wanted the scene to fade away at the edges, so I tapered the reeds toward the outer edge of the box (Fig. 2). To make the fish appear more realistic, I also thinned the body near the tail and fins.

The carving can be done with regular bench chisels by paring the wood until the details appear just as you want them. Keep the chisel as near to flat as you can and shave off a thin curl with each pass.



▲ Establish the Depths

Use a sharp chisel and remove thin layers of wood to taper the scene to various depths. Think in terms of foreground and background to determine proper levels.



▲ Fade the Scene

To make the scene appear as though it fades away at the edges of the project, taper the carving details in that direction. Keep the chisel flat and make light cuts.

5 Final Details

Once you’ve established the different levels in the carving, you’ll want to soften any edges that haven’t been carved thus far.

For this, I switched to a narrower chisel and softened all the edges that looked sharp (Fig. 1).

Since you’re working near the edges here, the chance for tearout is great. Use a sharp chisel and work *with* the grain whenever possible to keep the cuts clean and accurate.

After knocking off the square edges with the chisel, sand the pieces with 100-grit sandpaper (Fig. 2). This isn’t the final sanding, and you shouldn’t feel as though all the chisel work needs to be done by the time you start sanding. This is actually a good point to find any edges that might need easing or areas that might look better with just a bit more tapering or thinning.

Also, keep a close eye out for any dried glue that needs to be removed before applying the finish. If you do find a bit of errant glue, an X-acto knife is your best bet for reaching into the small spaces.

After the shaping is done, sand the lid with 150- and 220-grit sandpaper before applying a finish. An oil finish is an excellent choice to highlight the grain of the carved details.



▼ Soften the Edges

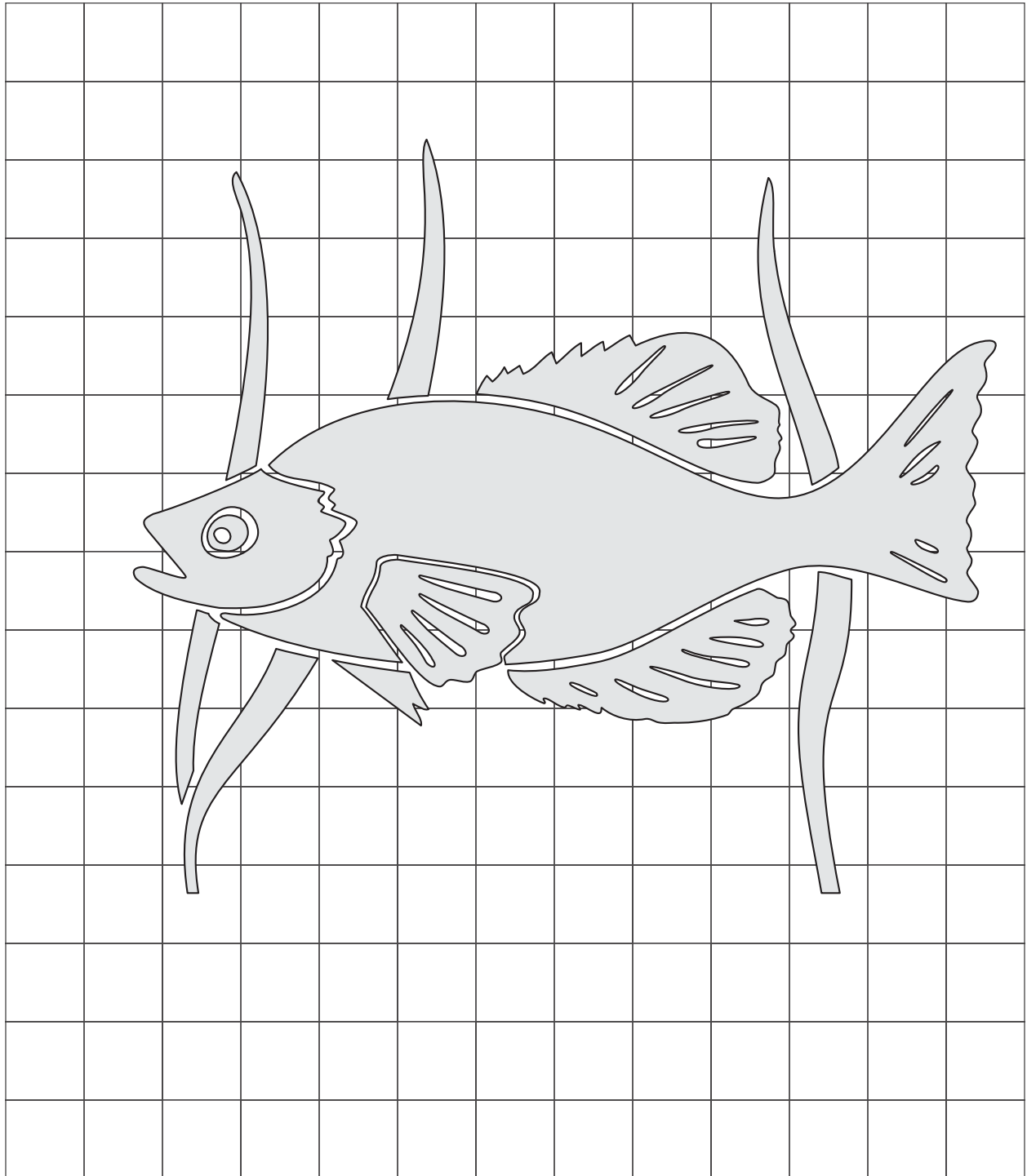
Using a narrow chisel, ease any edges that haven’t been shaped. Work *with* the grain to avoid any tearout in the pieces.

▼ Final Sanding

After shaping the carving with chisels and coarse sandpaper, prepare the entire box for an oil finish by sanding with 150- and 220-grit sandpaper.



Fish Pattern 100%





art deco DESK CLOCK

The gracefully curved wings of this desk clock are “layered” to add visual interest. The trick is making these wings perfectly symmetrical — a task that’s accomplished with a router table, a template, and two common router bits.

This holiday season, I’m building desk clocks that are as much about form as function. The form though is what sets this clock apart. In a design reminiscent of the art deco period of the 1930’s, this clock features a pair of gracefully curved wings that complement the arched top of the body of the clock. Contrasting colors and shop-made hour markers complete its distinctive look.

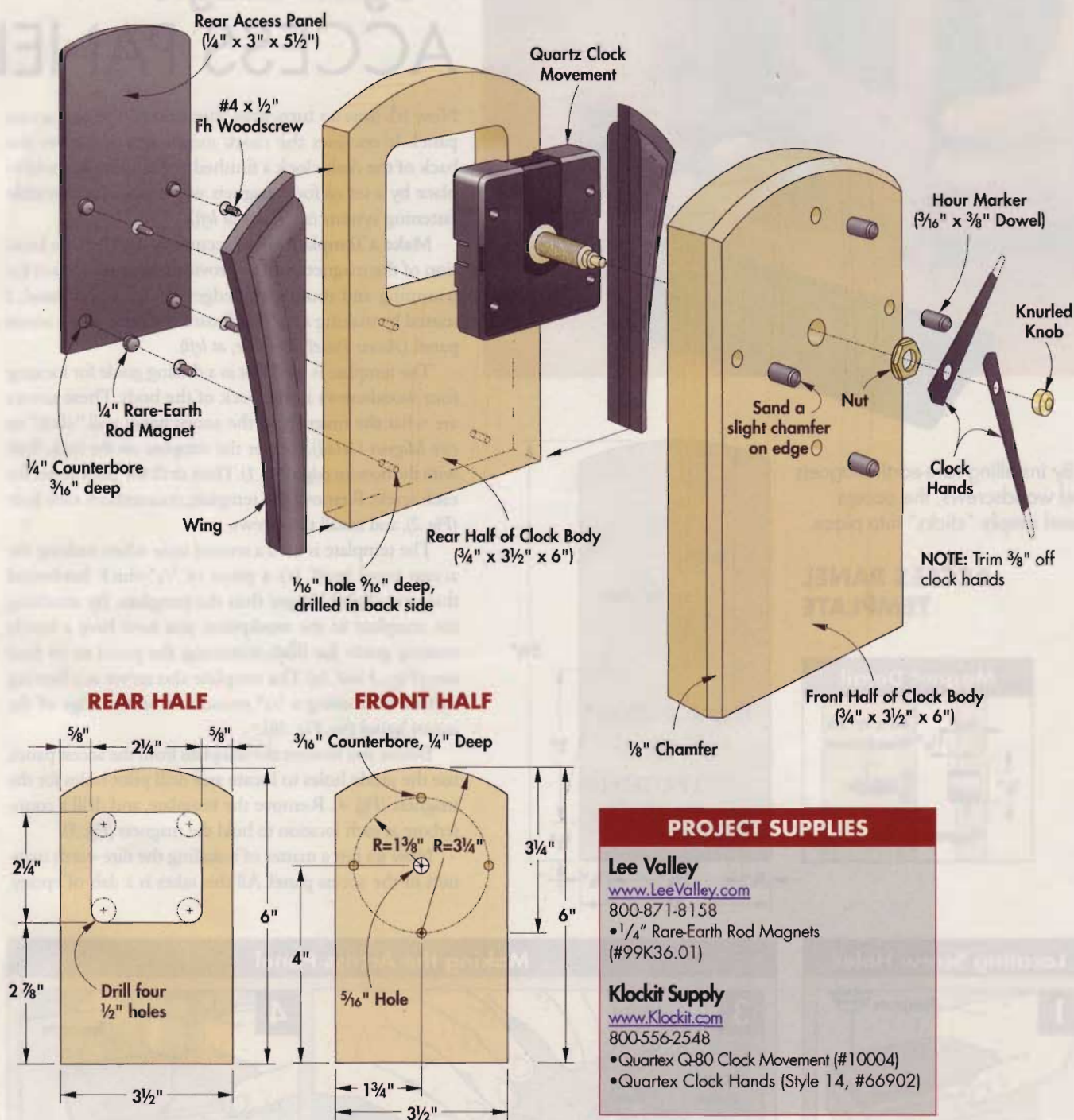
Body Basics — The first step in this project is making the body of the clock. As you can see in the *Construction View*, it’s a thick block consisting of two $\frac{3}{4}$ ”-thick pieces of hardwood (cherry, in my case). I used two pieces because it made it easier to create the opening for the clock

movement, which is all contained in the rear half.

Start to work on the rear half of the body. As shown in the *Rear Half Illustration*, there’s a $2\frac{1}{4}$ ”-square opening in this piece that accommodates the clock movement. To create this opening, drill a hole in each corner, then use a jig saw to cut along the layout lines from one corner hole to the next.

Once the opening is complete, you can turn your attention to the front half of the clock body. It serves as the face of the clock, displaying the hands and hour markers. Using the *Front Half* drawing as your guide, mark the locations for the shaft of the clock movement and the four hour markers. Notice how the 6 o’clock

CONSTRUCTION VIEW



PROJECT SUPPLIES

Lee Valley

www.LeeValley.com

800-871-8158

- 1/4" Rare-Earth Rod Magnets (#99K36.01)

Klockit Supply

www.Klockit.com

800-556-2548

- Quartex Q-80 Clock Movement (#10004)
- Quartex Clock Hands (Style 14, #66902)

marker location doubles as the centerpoint for striking the arc across the top of the body. Once you've drawn the arc, take the front half to the drill press and drill a 5/16" hole for the clock shaft. Then drill four shallow counterbores for the hour markers.

At this point, you can glue and clamp the halves together to form the body of the clock. Once the glue dries, cut the gentle curve on top with a band saw or jig saw and then sand the edge smooth. All that's left to complete the body is to rout a 1/8" chamfer on all the edges of the body, except the bottom.

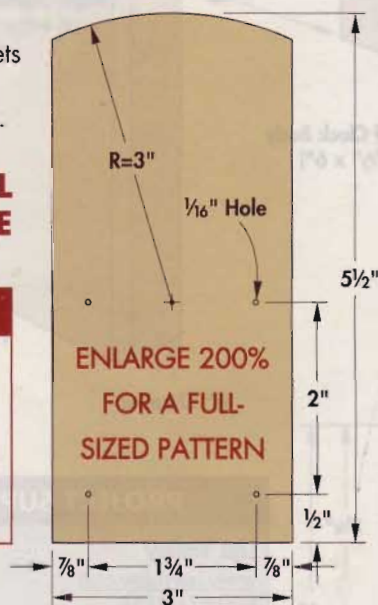
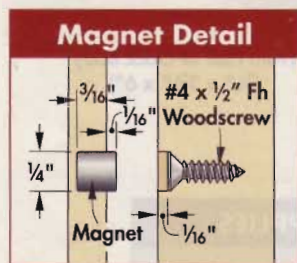
You'll want to wait until the entire clock is built before going back and installing the clock components (see *Construction View*). The movement slips easily into the opening cut in the rear half of the body, with the shaft extending through the face of the clock. The hour markers are short sections of a 3/16" dowel, painted black and glued into the four shallow counterbores.

A pair of hands came free with the quartz clock movement, and I chose a contemporary design. To better match the proportions of the clock face, I modified them a bit by snipping about 3/8" off each one.



▲ By installing rare-earth magnets and woodscrews, the access panel simply "clicks" into place.

ACCESS PANEL TEMPLATE



magnet magic ACCESS PANEL

Now it's time to turn your attention to the rear access panel. It encloses the clock movement and gives the back of the desk clock a finished appearance. It's held in place by a set of four magnets which act as an invisible fastening system (see Photo at left).

Make a Template — To accurately establish the location of the magnets, and to provide a bearing surface for trimming and routing the edges of the access panel, I started by making a 1/4" hardboard template of the access panel (Access Panel Template, at left).

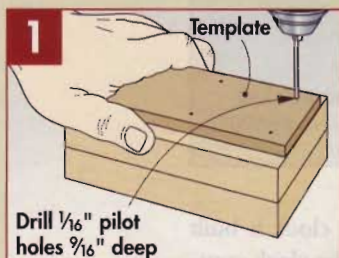
The template is used first as a drilling guide for locating four woodscrews in the back of the body. These screws are what the magnets in the access panel will "click" to (see Magnet Detail). Center the template on the back, flush with the bottom edge (Fig. 1). Then drill the pilot holes for each screw. Remove the template, counterbore each hole (Fig. 2), and install the screws.

The template is used a second time when making the access panel itself. It's a piece of 1/4"-thick hardwood that's cut slightly larger than the template. By attaching the template to the workpiece, you now have a handy routing guide for flush-trimming the panel to its final size (Figs. 3 and 3a). The template also serves as a bearing surface for routing a 1/4" roundover on the edge of the access panel (see Fig. 3b).

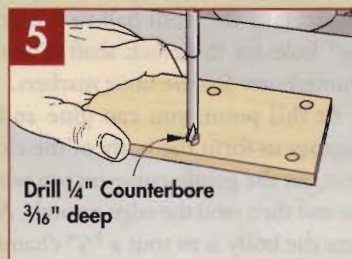
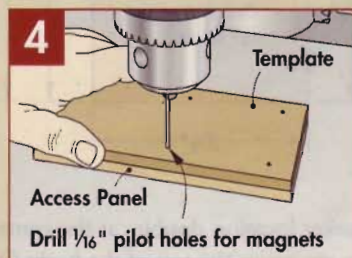
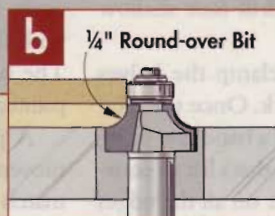
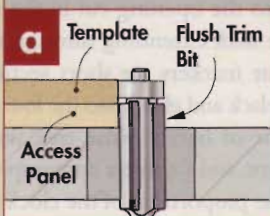
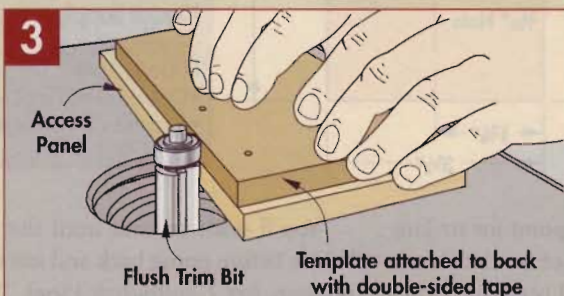
Before you remove the template from the access panel, use the guide holes to locate and drill pilot holes for the magnets (Fig. 4). Remove the template, and drill a counterbore at each location to hold the magnets (Fig. 5).

Now it's just a matter of installing the rare-earth magnets in the access panel. All this takes is a dab of epoxy.

Locating Screw Holes



Making the Access Panel



finishing touch

TIME TO "WING" IT

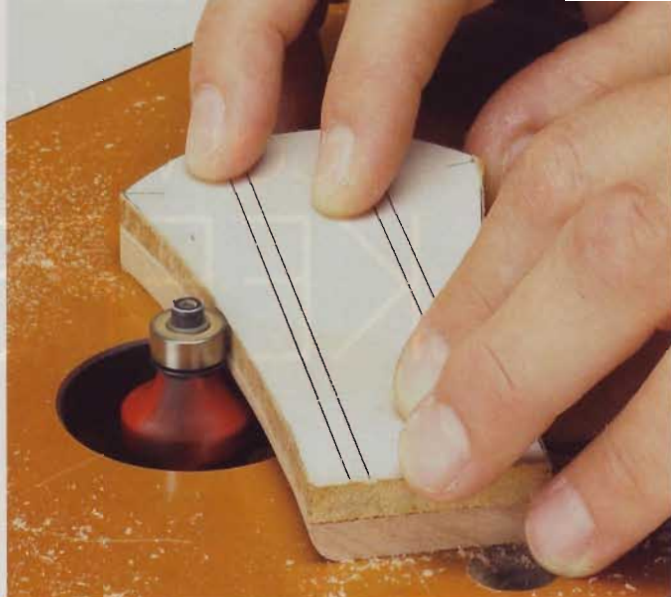
The feature that makes this clock one-of-a-kind are the layered wings attached to each side.

Each wing actually consists of three 1/4"-thick pieces of hardwood. Notice that there's a larger center wing segment sandwiched between two smaller segments (see *Wing Assembly* below).

As with the access panel, you'll be using hardboard templates to make the wings. But as you can see in the *Full-Size Wing Patterns* below, you'll need to make *two* templates — a larger one for the center wing segment and a smaller one for the outer wing segments.

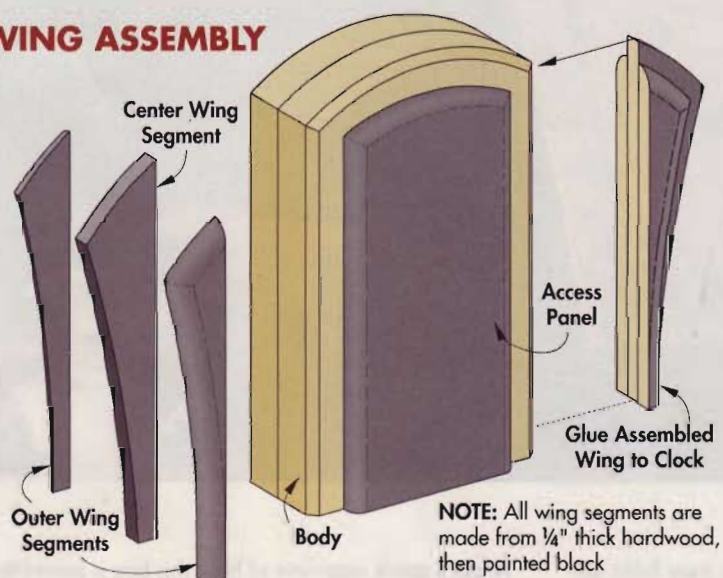
On the larger center segment, there's no roundover, so they're simply trimmed flush to match the template. The smaller outer segments, however, are produced just like the access panels. That is, trim the wing segments flush to the template, then rout a 1/4" roundover (Photo, right). Just a note here. You'll need two sets of these outer wing segments, so repeat the process to make a second pair.

Once all three wing segments are completed, glue them together, as shown in Fig. 6. Cut the wings free on a band saw, as shown in Fig. 7. Then sand the edge flat, and glue the wings to the clock.

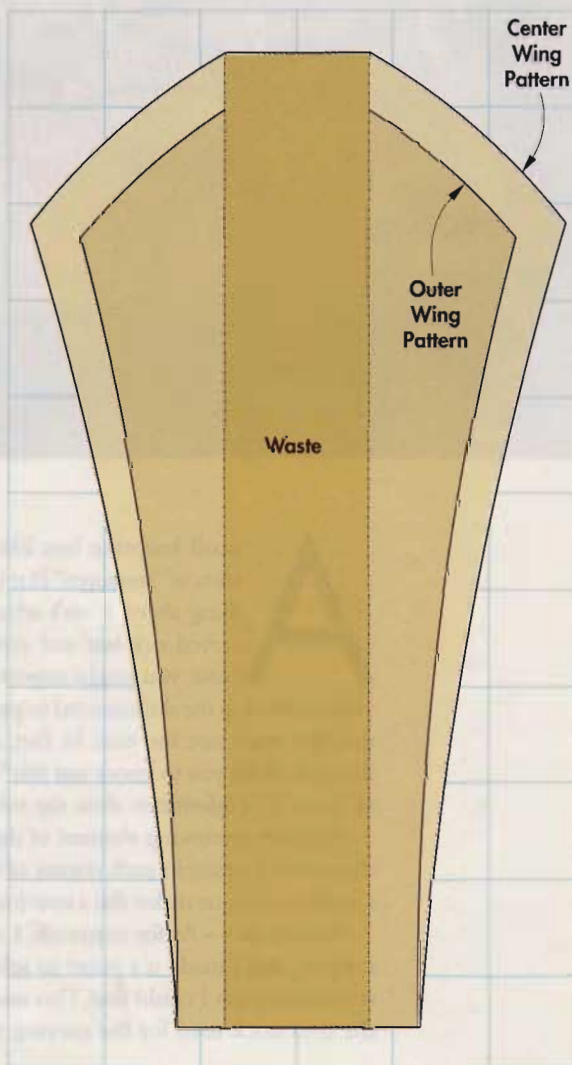


▲ The template for the wing components is designed to let you work safely with a larger workpiece, making two segments at a time.

WING ASSEMBLY



FULL-SIZE WING PATTERNS



carved-lid KEEPSAKE BOX



A small keepsake box like this may hold all sorts of “treasures.” But the most intriguing thing about it isn’t what’s *inside* — it’s the carved oak leaf and acorns on the *outside*. Now you might expect that it would take years to develop the skills needed to produce a carving like this, but that’s not the case. In fact, a simple scroll saw shortcut allows you to knock out this “carving” in a matter of hours. (For information about this technique, see page 62.)

Another interesting element of this box are the three decorative recesses in each corner of the lid. Here again, a simple technique makes this a snap (more about that later).

Materials — As for materials, I used white oak for my box, and I made it a point to select pieces with the straightest grain I could find. This made it easy to match the thin stock used for the carving with the box lid.

To get a quick overview of how this box is assembled, take a look at the *Construction View* on page 71. Notice that the corners of the box are connected with locking rabbet joints, a strong joint that’s easy to cut on the table saw. (The three-step sequence in the *Sidebar* on page 71 will walk you through this process.)

There’s one more thing worth mentioning before you get started. To ensure that the lid fits perfectly flush with the box, they’re built as a single large unit. Then the lid is cut apart from the box on the table saw. (The information on page 72 explains a simple way to do this safely.)

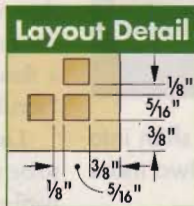
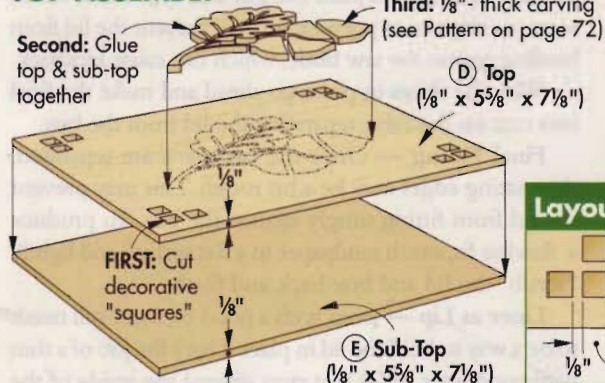
Construction — With that in mind, the first step is to plane stock for the sides (A) and ends (B) of the box to $\frac{3}{8}$ " thick. Then, using the dimensions in the *Sidebar* on page 71, cut the pieces to size. Once that’s done, you can concentrate on cutting the locking rabbet joints.

With the joinery complete, the next step is to cut two grooves in each piece to hold the top and bottom. The bottom (C) is a $\frac{1}{4}$ "-thick hardwood panel made by edge-gluing two pieces together. The top will also end up as a $\frac{1}{4}$ "-thick panel. But what's a bit unusual here is it starts out as two $\frac{1}{8}$ "-thick pieces, a top (D) piece and a sub-top (E) (see *Top Assembly* below).

This double layer simplifies the job of making the decorative recesses in the corners. You simply cut square openings in the top piece using a scroll saw or jig saw (*Layout Detail*), and then glue it to the sub-top.

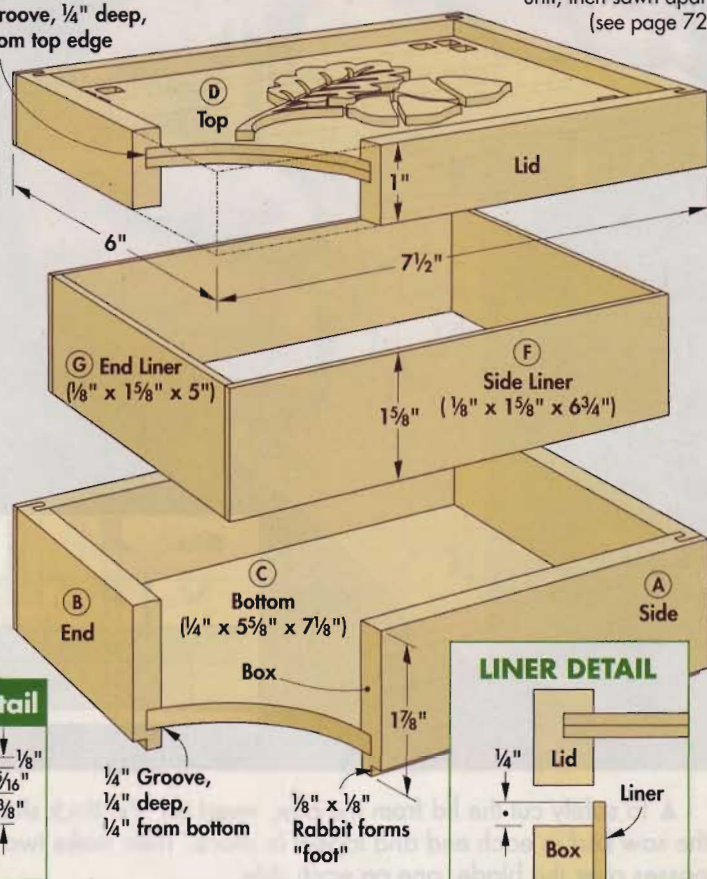
Assembly — Now it's just a matter of gluing and clamping the box together. Note that the top and bottom aren't glued in. To allow for expansion and contraction due to changes in humidity, they "float" in the grooves.

TOP ASSEMBLY



CONSTRUCTION VIEW

$\frac{1}{4}$ " Groove, $\frac{1}{4}$ " deep,
 $\frac{1}{4}$ " from top edge



NOTE: Lid & Box are made as single unit, then sawn apart (see page 72)

LINER DETAIL

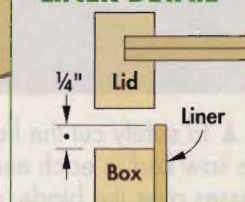
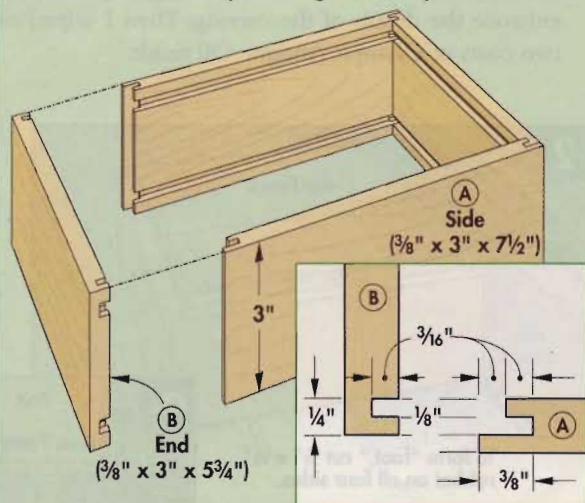
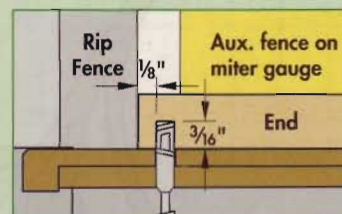


Table Saw Joinery: Locking Rabbits

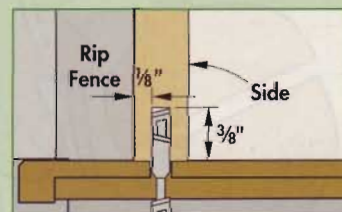
The locking rabbit joints for this box are easy to make. All it takes is three cuts on the table saw. Even so, they're quite strong. To provide mechanical strength, a short tongue on the side fits into a dado in the end. This also makes for a large glue surface, which helps strengthen the joint.



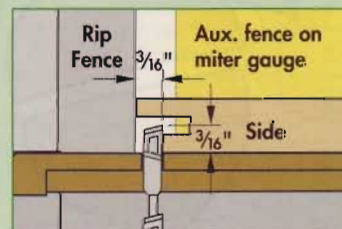
1 The first step in making a locking rabbit joint is to cut a dado in both ends of each end piece. Use a miter gauge to push the piece through the saw blade.



2 Without changing the fence setting, raise the saw blade. Then with the side piece standing on end, clamp a scrap block to the back edge for support, and make a single pass.



3 Now trim the tongue on the side pieces to length. Make two passes, one with the end of the piece held slightly away from the fence, and a second pass using the fence as a stop.



final details

At this point, the keepsake box is completely assembled. There are just a few final details to take care of.

Cut Lid from Box — First of all, the lid has to be separated from the box. That's easy enough to do on the table saw. The trick is doing it safely and accurately.

To accomplish that, start by raising the saw blade so it barely clears the thickness of the sides (see *Detail at left*). Next, adjust the rip fence so you'll end up with an 1"-tall lid. Then stand the box on end, set it against the rip fence, and make a single pass to cut through the end. Then simply flip the box end for end and repeat the process.

Shim for Safety — At this point, you've made two cuts, one in each end. But don't make the cuts in the sides yet. Before going any further, insert $\frac{1}{8}$ "-thick shims in each end and tape them in place (see *Photo at left*). These shims serve an important purpose — they prevent the lid from binding against the saw blade, which can cause kickback.

With the shims in place, go ahead and make the final two cuts on the sides, separating the lid from the box.

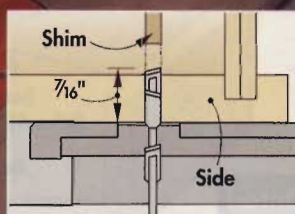
Final Fitting — Once the two parts are separated, the mating edges may be a bit rough. This may prevent the lid from fitting snugly against the box. To produce a flawless fit, attach sandpaper to a flat surface and lightly "scrub" the lid and box back and forth.

Liner as Lip — Even with a good fit, there still needs to be a way to hold the lid in place. That's the job of a thin hardwood liner (F, G) that runs around the inside of the box (see *Construction View on page 71*). The liner consists of four $\frac{1}{8}$ "-thick pieces that are ripped to width so they stick up $\frac{1}{4}$ " above the box (*Liner Detail*). This creates a small lip that automatically registers the lid.

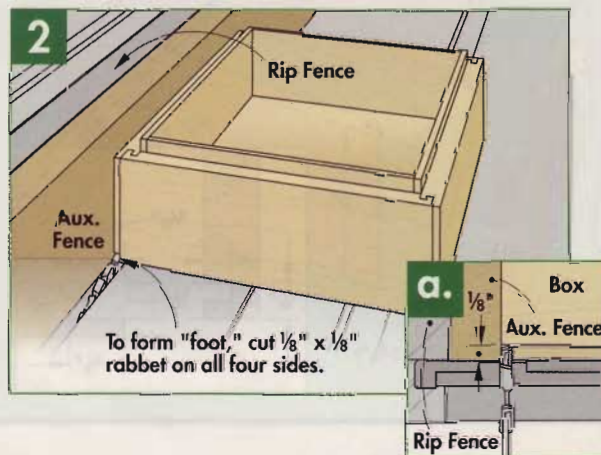
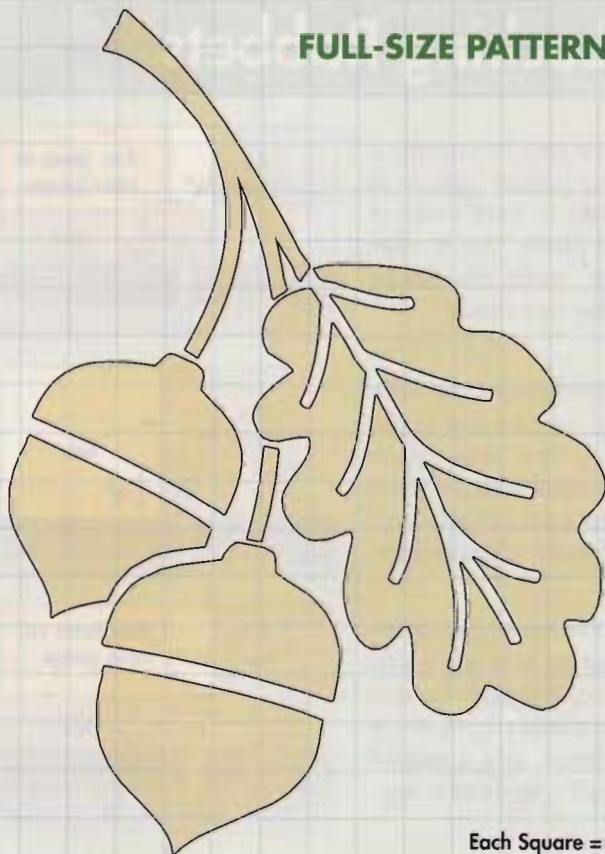
Add a "Foot" — After gluing in the liner, I added a small "foot" that runs around the bottom of the box. The foot is purely aesthetic, creating a shadowline under the box where it sits on the table. Four passes on the table saw, as shown below is all it takes to make this detail.

Finishing Up — All that's left to complete this box is to apply a finish. I used Minwax's Aged Oak stain to enhance the details of the carving. Then I wiped on two coats of Olympic Antique Oil finish.

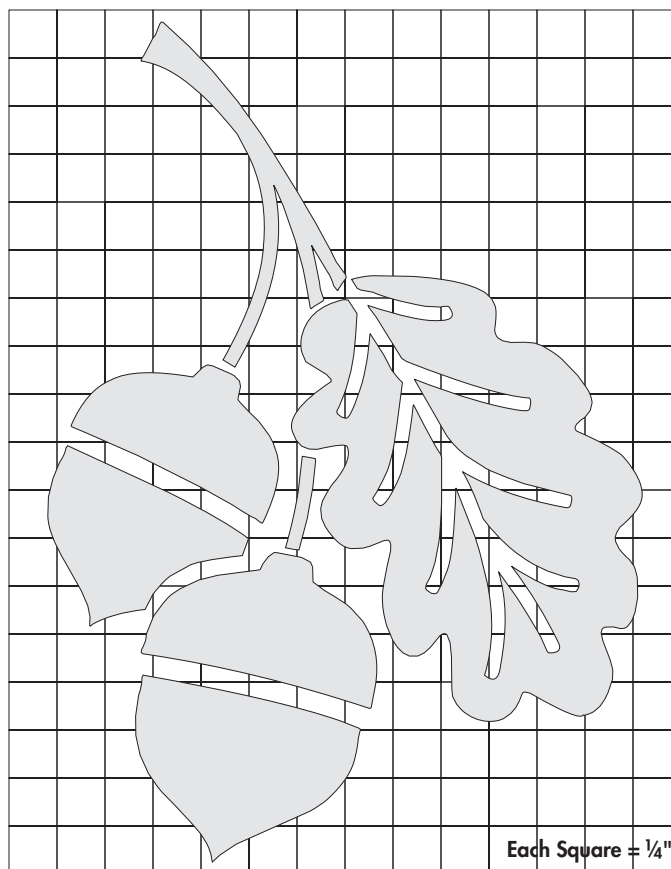
▲ To safely cut the lid from the box, insert an $\frac{1}{8}$ "-thick shim into the saw kerf in each end and tape it in place. Then make two more passes over the blade, one on each side.



FULL-SIZE PATTERN



Acron Pattern 100%



A photograph of three lit candles in wooden holders. The holders are made of light-colored wood with a wavy, undulating shape. The candles are white and lit, with flames visible. The background is dark and out of focus, showing some decorative items like a bowl of fruit and a vase with flowers.

bandsawn CANDLESTICKS

Three hours — that's all it takes to make this stunning set of candlesticks. And don't worry about those graceful sweeping curves — they're easily cut on the band saw.

Although the shape of these candlesticks is the real attention-getter, the type of wood you use also makes a dramatic impact. Notice how the "ribbons" in the curly maple I used appear to almost flicker, like the flame itself.

Turning Blank — Now you just may have a chunk of highly figured wood that you've "squirreled" away for this sort of project. If so, that's great.

If not, your best bet is to buy a turning blank that's used for turning bowls on a lathe (see *Turning Blank Illustration on page 75*). Just be sure to get a seasoned (dried) blank. Otherwise, the candlesticks may change shape or split as the wood dries.

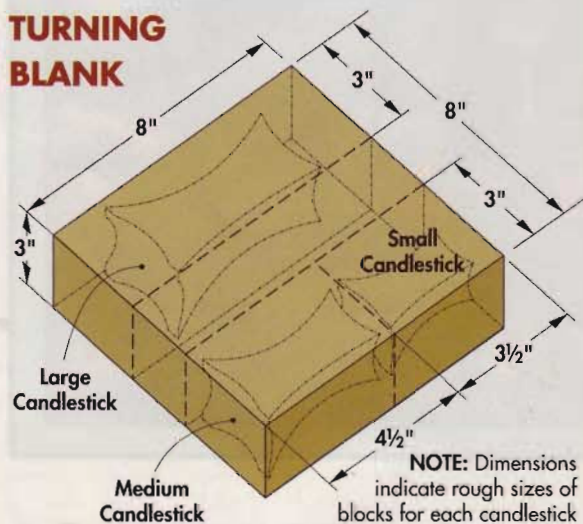
Rough Cut Blocks — The first step in making these candlesticks is to rough cut blocks from the large blank. The *Illustration* below shows the rough sizes.

Apply Patterns — Once that's done, make two photocopies of each pattern on page 76. Then attach the patterns to two adjoining faces of each block.

Shaping the Candlesticks — Now you're ready to begin shaping the candlesticks. The idea is to make two series of cuts, rotating the block a quarter turn in between (see *Steps 1 through 3 at right*).

One thing to note is that after the initial cuts, the pattern on the adjoining side will be removed. Also, rotating the block means there will be a curved side against the band saw table. The problem is this curved side won't provide a flat, stable surface for cutting. The solution is to use double-faced tape to reattach the waste pieces (see *Step 2*).

TURNING BLANK



CONSTRUCTION VIEW



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Band Saw Sculpting



◀ After attaching a paper pattern to two adjoining sides of the block, begin the shaping process by cutting the curved sides. Save the waste pieces, as you'll need to reattach them. Then make the curved cuts in each end (*Inset*).



◀ Before making the second series of cuts, attach the waste pieces to the block with double-sided tape. This replaces the pattern that was removed with the initial cuts in *Step 1*. Plus it provides a flat, stable surface for the block to ride on as you make the curved cuts on the sides.



◀ Once the sides are shaped, you're ready to complete the cuts on each end of the block. One thing to note is the bottom end of the block (*shown in the Photo at left*). As you make the cut in this end, it produces four small "flats," which create a stable platform for the candlestick.



◀ With the waste pieces still attached, sand the candlesticks to shape. A 3" drum sander mounted in the drill press makes quick work of sanding to the pattern line. You'll need to reattach the waste pieces on the adjacent sides to sand the remaining two sides and ends.

ferrules & finish

With the candlesticks cut and sanded to shape, there are two things left to do: install holders for the candles and apply a finish.

Brass Ferrules — Each candle is held in place with a brass ferrule, which is a ring with a lip around the top (see *Construction View* on page 75). The ferrule fits into a counterbore that's drilled in the top of the candlestick (see *Photo at left*). This counterbore is $\frac{3}{4}$ " deep,

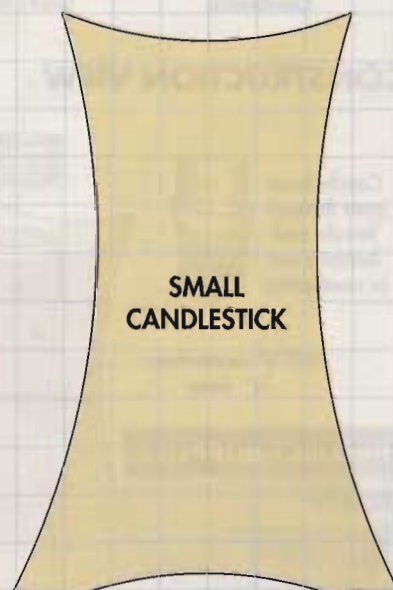
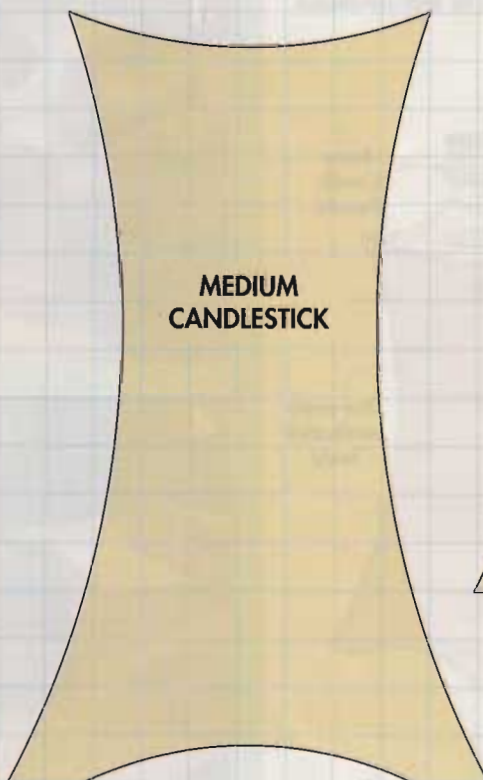
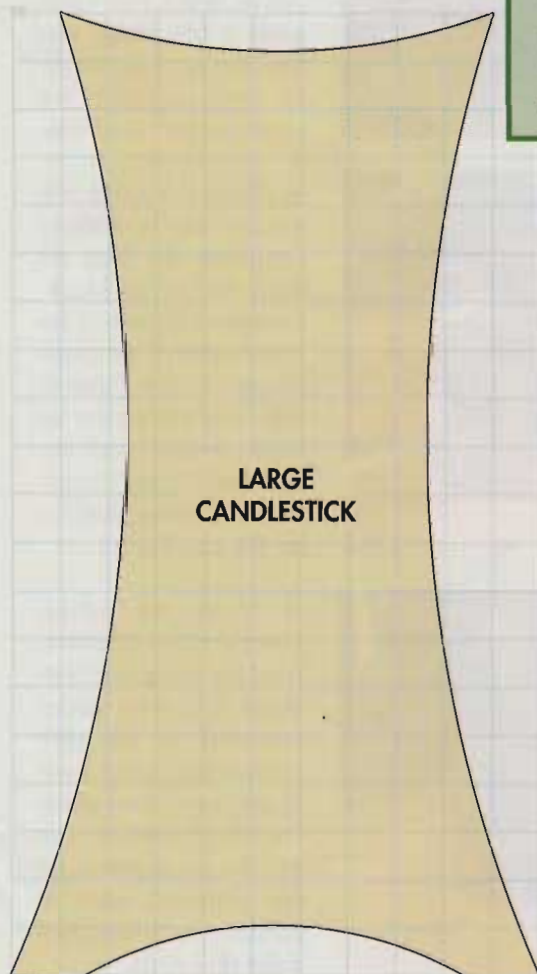
which is deeper than the ferrule. This way, the candle will fit through the ferrule and "bottom out" in the counterbore, holding it securely in the candlestick.

Finishing Up — Now it's just a matter of applying a finish. I sprayed on two coats of spray lacquer (satin), rubbing it down with steel wool after each coat. Then simply press the ferrules into place.



▲ A Forstner bit carves a clean, flat-bottomed hole for the brass ferrule that holds the candle. Using a $\frac{7}{8}$ " bit will result in a snug fit for the ferrule.

FULL-SIZE PATTERNS



Each Square = $\frac{1}{4}$ "

finish tip

Here's an easy way to get a flawless spray finish. Just stick a dowel in the counterbore in the top end and use it to rotate the candlestick as you spray the finish. To hold the candlesticks off the bench as they dry, insert each dowel in a dog hole. A spring clamp will keep it from slipping into the hole.



Porter-Cable router combos ONE MOTOR, SIX KITS

Porter-Cable recently introduced its new line of router kits dubbed the 890 series. At the core of these new kits is a 12-amp, 2 $\frac{1}{4}$ -hp motor with soft start and electronic variable speed.

All six kits include a motor, fixed base, and plunge base. Expanded kits are available with a GripVac handle for dust control (Photo at right) and a router table accessory kit.

Among the many outstanding features we found in the 890 series are a dual-position power switch that can be operated at the top of the motor or on the side near the grip handle, a collet that extends past the router base and locks automatically for one-wrench bit changing, and through-the-table depth setting for router table work. Especially valuable is the fact that the 890 motor will fit all existing 690 bases.



Dust Port

Grip-Vac Handle



Plunge Base

Micro-Height Adjustment Knob

Fixed Base

Suggested retail prices for the 890 kits range from \$199 for the most basic kit (motor, two bases, and carrying case) to \$269 for the 895PK which also includes both bases, carrying case, and a router table accessory kit.

Visit www.Porter-Cable.com or call 1-800-487-8665 for more information or to locate a dealer near you.

CMT now offers POCKET JOINERY

CMT's new Pocket-Pro Joinery System is an economical though quite capable kit for woodworkers interested in adding pocket hole joinery to their list of choices.

For under \$70, the starter set includes the jig, toggle clamp, step drill bit, stop collar, driver bit, and some sample screws (see Photo below). You supply a drill and a mounting base (Photo, right), and you're in business.

Besides the bargain price, another distinguishing feature of this jig is how easily it adjusts for various stock thicknesses. By loosening two star knobs, the jig can be adjusted to one of ten pre-set thicknesses (Inset Photo, right).

For more information on this kit or to locate a CMT dealer near you, visit www.CMTUSA.com or call 1-888-268-2487.



Ridgid power tools EXPANDS BRAND

Ridgid, Inc. has expanded its well-known line of wood-working tools to include a collection of portable power tools, both corded and cordless. At the unveiling, we found a couple of highlights worth mentioning.

First is the 6" random-orbit sander (model R2610) pictured above right. The sander features two random-orbit settings. One setting is for finish sanding, the other is for aggressive stock removal. I found this to be a smooth running sander that switches easily between its sanding modes and does an admirable job of dust collection. Expect to pay about \$159 for this sander.

Distinguishing Ridgid's cordless offerings is a Rapid Max Twin Charger that comes standard with their cordless combo kits. The fan-cooled charger can refuel two batteries simultaneously in only 30 minutes. The four-piece kit shown here sells for about \$269. Ridgid products are available at Home Depot and other tool retailers.



▲ Ridgid's new 6" random-orbit sander features dual-orbiting modes.



▲ Ridgid's X2 18-volt cordless combination kits come standard with a two-battery, 30-minute charger and heavy duty tote bag.

Pergo Paradigm PRE-GLUED FLOOR

Water-filled
Applicator

As if installing a laminate floor wasn't easy enough, Pergo just eliminated the one nasty step in the whole process — gluing.

Pergo's Paradigm line is a "pre-glued" laminate floor that offers the ease of tongue-and-groove assembly with the added strength of glue. The pre-applied glue is "activated" with ordinary tap water during installation (see Photos).

Pergo Paradigm has a suggested retail price of \$3.29 sq. ft. and is available in 18 color choices. Visit www.Pergo.com or call 1-800-337-3746 for more information.

Activated
Glue



▲ Moisten the plank tongues with tap water and watch for the glue color to change.



▲ Use a hammer along with Pergo's tapping block to tap the planks into position.

fold-up utility SUPERKNIFE

The SuperKnife from RDR Tools is a hybrid pocket knife/utility knife. It folds closed or locks open like a pocket knife, but uses replaceable utility blades.

Conventional utility blades fit the SuperKnife, but

I prefer the company's heavy-duty blades for their superior durability. The SuperKnife costs \$25 with one blade. Six replacement blades sell for \$5.

Visit the website, SuperKnives.com, or call 1-480-348-0544 for information.



Trim Gauge SLIDE RULE & LEVEL

Find space in your shop apron or tool pouch for the Trim Gauge from Brumley Tools. This simple slide rule has more than enough uses to justify its \$9 price tag.

As a slide rule, the Trim Gauge is great for adjusting bit or blade settings (*Photo at left*), scribing a line (*below*), making repetitive measurements, transferring measurements, or set-

ting trim with the perfect reveal. Two spirit-filled vials on the back of the Trim Gauge also make this a handy level (*below*).

Visit www.TrimGauge.com to see all the ways this tool can be used or to place an order. You can also call Brumley Tools toll-free at 1-866-278-8665 for more information or to find a dealer in your area.



▲ Inches are marked on one side with centimeters on the other for quick, precise scribing with the Trim Gauge.



▲ Two spirit-filled vials in the back of the Trim Gauge make it perfect for quick checks of level and plumb.

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Product Information Number 343

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The PROXXON line features more than 50 high-quality power tools and a huge selection of matching accessories for versatile applications at affordable prices.

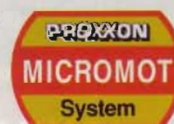
Table saw
FKS/E



More information on the line and PROXXON-dealers:

— www.proxxon.com/us —

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Product Information Number 292

heated fan ENDS COLD SPOTS

Cold spots are a fact of life in most homes. No matter where you set the thermostat, there's one room that just never warms up. The answer is the Reiker Room Conditioner.

The Room Conditioner is a ceiling fan with its own heat source. The heat comes from four elements located in the housing above the fan blades (see Illustration). To raise the temperature in a room, all four elements will be active. As the room temperature nears the desired level (as measured by a thermostat in the remote control), the elements will shut off one at a time.

The fan blades distribute the warm air throughout the room, keeping the temperature consistent in all four corners.

This heating fan costs about \$400 and installation is no more involved than a standard ceiling fan. For more on the room conditioner, visit BuyReiker.com or call 1-866-473-4537.



▲ Air is drawn into the fan, heated, then distributed throughout the room.



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WOOD RHYTHMS

Pete Stanbridge doesn't just work with wood. He *listens* to it. And what he's hearing has led to some beautiful percussive masterpieces.

As woodworkers, we tend to focus on the beauty of wood. But rarely do we focus on its *sound*—unless you're a woodworker who makes drums, that is.

Pete Stanbridge is this proverbial different drummer. Literally. A university percussion major and avid woodworker, Pete experimented with a variety of drum shell construction techniques. After trying many different methods, he concluded that a lathe-turned shell yields the best sound (*see Box below*).

This method requires countless hours of handcrafting prior to the turning, and an equal number of hours afterward to painstakingly complete each percussive masterpiece. But to Pete, each drum shows what wonderful sounds can come from wood.

▲ The intricate inlay work on this cherry and bubinga snare drum, coupled with superior tonal qualities, garnered a Stanbridge drum a Gold Medal in the "Artist/Custom" category at the recent Snare Drum Olympics in Nashville, Tennessee.



Building the Drums

Pete Stanbridge's drum-making technique is basically a three-step process.

Drum Shells—Regardless of the size of the drum, each shell is comprised of dozens of hand-mitered blocks of solid wood, both domestic and exotic (*see Photo, above right*). This type of construction requires far less glue than a mass-produced drum and results in superior strength and resonance, as well as a warmer tonal quality.

Once these shells are glued up, they are turned on a specialized lathe to achieve a smooth, true surface.

Drum Hoops—The drum hoops are turned on a lathe just like the shells, but

building the hoop blanks is slightly different. Each hoop blank is made up of two 12-block rings, glued together (*see Photo, right*). For extra strength and durability, the blocks are all finger-jointed.

Hardware—With the drum shell and hoops assembled, the last step is to add all the drum hardware (*see Photo above*).

All Stanbridge drums are custom-built for each customer. For more information, visit Stanbridge's website at www.stanbridgedrums.com



▲ A cherry tom-tom shell, just off the lathe; the photo below shows a completed set of cocobolo hoops.

