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picture frame

#112 January 2005

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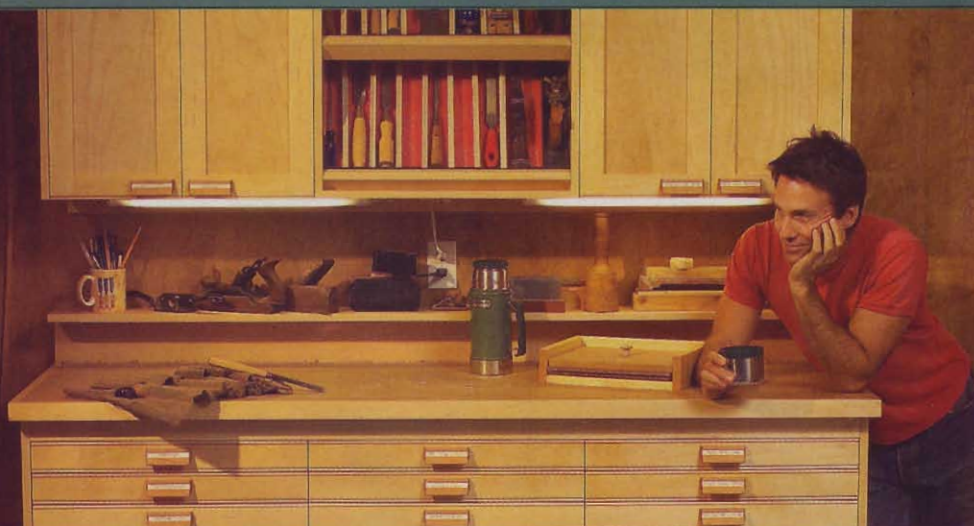
A READERS-DIGEST PUBLICATION

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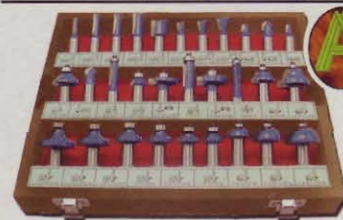
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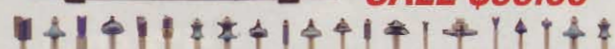
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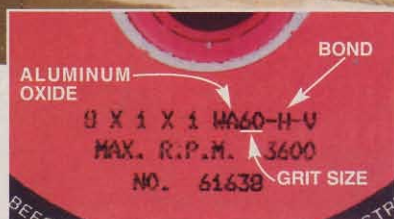
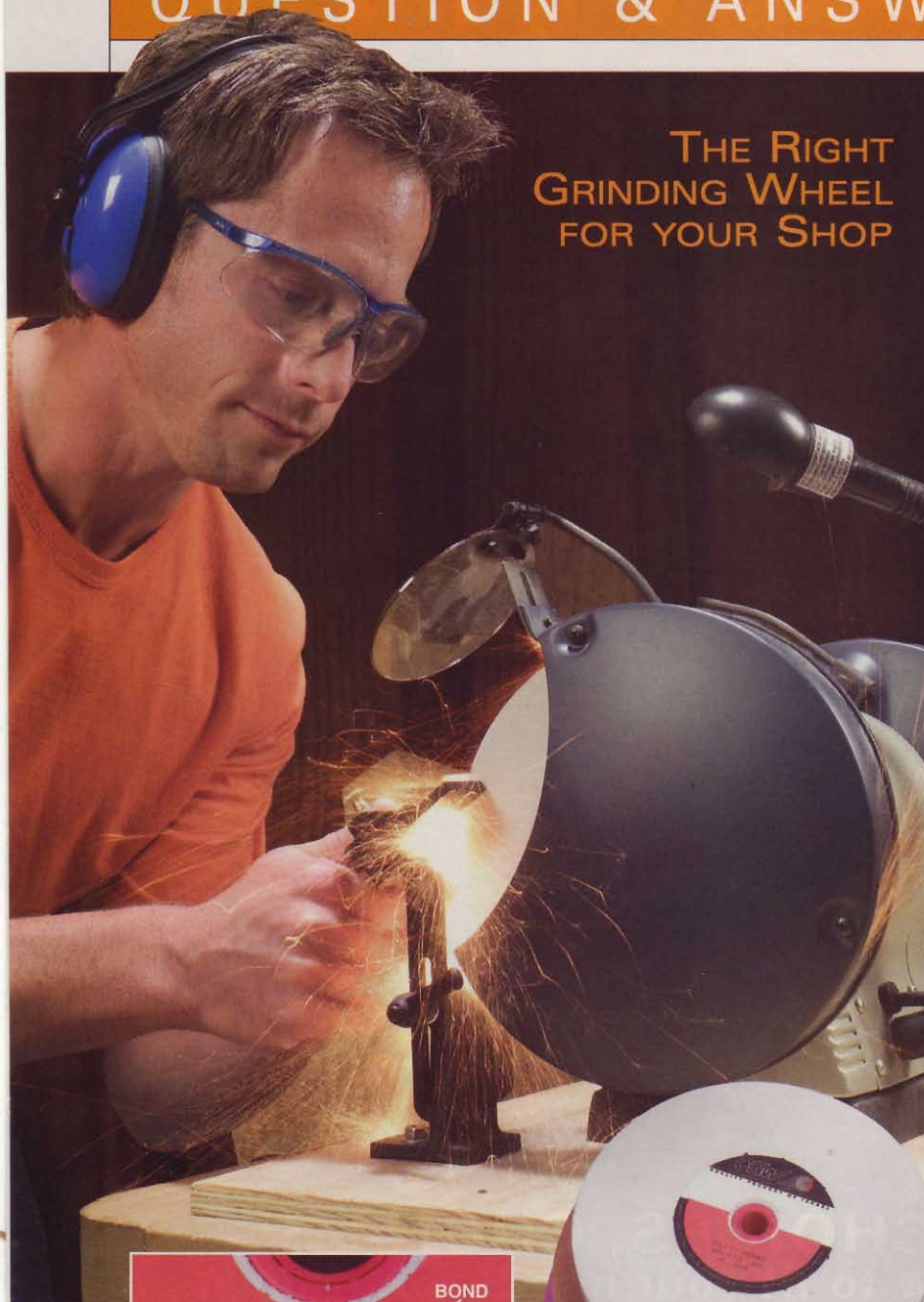
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THE RIGHT GRINDING WHEEL FOR YOUR SHOP



1 Look for three things on a grinding wheel label. First, the letter A, which stands for aluminum oxide, the abrasive you'll want. Next is the grit size; a 60- or 80-grit wheel is best. Finally, a letter right after the grit size represents the hardness of the bond. Letters from H to K are considered soft bonds, with H being the softest.

2 Don't let color be your guide. Aluminum oxide is made from bauxite, a naturally white mineral that can be given any color in manufacturing. The only way to really know what you're getting is to read the label.

Q I've been told that the gray wheels that came with my grinder will burn my woodworking tools and that white wheels are better. True?

A The stock wheels that come with most grinders are hard, coarse and designed for the metal-working trade. They're way too hard for grinding the hardened steel in chisels and plane irons. It sounds strange, but the harder the steel, the softer the bond in the wheel should be. Here's why: Hard steel quickly dulls the abrasive particles in a wheel. With a soft bond, the dull abrasive sloughs off quickly, leaving fresh, sharp abrasive to do the work. A hard bond, on the other hand, holds tight to the abrasive particles, even after they're dull. The dull or "glazed" wheel rubs as much as it cuts, creating the friction and heat that toast your tools.

The best all-around grinding wheel for woodworking tools is an 80-grit aluminum oxide wheel with a relatively soft bond designated by the letter H, J or K on the wheel label (Photo 1). An H bond is the softest and will provide the coolest grinding. Turners tend to prefer a J grade wheel; its harder bond resists grooving by gouges and parting tools.

Smart buyers read labels. Look for a series of numbers and letters that usually comes after the wheel size (Photo 1). It's best to be color-blind when you are buying a new wheel (Photo 2). Instead, trust the label to give you the precise information you need.

Sources

Lee Valley and Veritas
(800) 871-8158, www.leevalley.com
Grinder wheels:
6-in. x 3/4-in. 80 grit, #08M18.02, \$20
6-in. x 1-in. 80 grit, #08M18.01, \$23
8-in. x 1-in. 80 grit, #08M19.01, \$30.

SKINNED-OVER VARNISH

Q I was all ready to varnish, but when I opened the can, a thick skin covered the top. Is the stuff underneath OK to use?

A The varnish underneath the skin should be just fine. Before you use it though, be sure to do two things: First, strain the varnish through one of those paper funnels with a mesh bottom (available at paint stores), some doubled-up cheesecloth or old pantyhose. This will get rid of any small bits of dried varnish that are floating around. Second, try the varnish on a piece of scrap to make sure it dries OK. If you have any doubt, toss the old stuff out and buy new. It's just not worth the risk.

If you have a question you'd like answered, send it to us at Question & Answer, American Woodworker, 2915 Commers Drive, Suite 700, Eagan, MN 55121 or e-mail to qanda@readersdigest.com. Sorry, but the volume of mail prevents us from answering each question individually.



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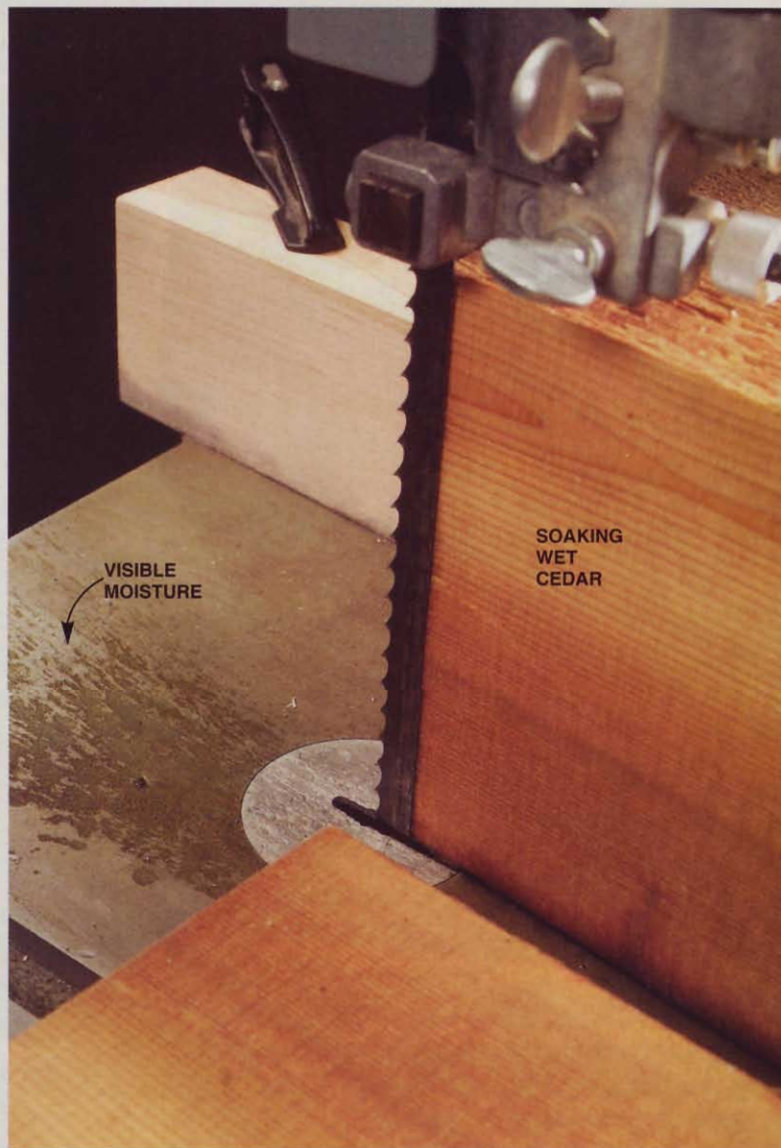
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QUESTION & ANSWER



USING WET WOOD

Q I'm building outdoor furniture from rough cedar. When I cut the wood, it's soaking wet on the inside. Should I use polyurethane glue since it's a moisture-cure glue?

A Not when the wood is that wet. Polyurethane glue uses moisture to cure, but too much moisture will cause the glue to cure before it gets a chance to soak into the wood fibers and create a bond. You need to get the moisture content (MC) near the surface of the wood down to 10 to 25 percent before you use polyurethane glue (6 to 15 percent if you use a water-based Type II or Type III glue).

Rough cedar from the lumberyard is often very wet, but it loses that water rapidly. The best thing to do is cut your lumber into rough sizes and then stack the wood indoors with stickers between each board so all four surfaces of each board are exposed to the air. Cedar dries rapidly; leave it for a week or two and you should be good to glue. **AW**

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Circle No. 165

edited by David Olson

LONG-REACH STOP FOR CROSSCUT SLED

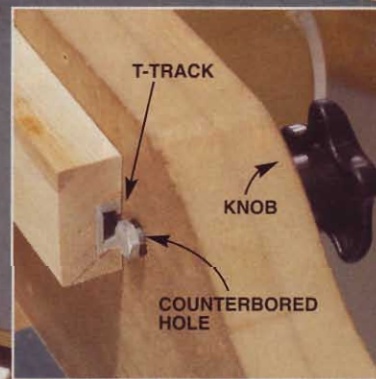
I built the "Ultimate Crosscut Sled" featured in AW #75 (October 1999, page 38). It works great, and recently I've added an adjustable stop, which makes it even better. I thought other AW readers would be interested in my upgrade.

My 50-in.-capacity stop consists of scrap wood, a 48-in. length of T-track (I used Mini Track from

www.prairieriverwoodworking.com), 1/4-20 hex-head bolts and a couple of plastic knobs. I spent less than \$25. My stop makes repetitive crosscutting of long stock—shelves for a bookcase, for instance—a breeze. Any hardwood will do for the rail and stop; I used a 7/8-in. x 2-in. x 60-in. piece of hickory. You can increase the crosscut capacity by using a longer rail.

I cut a stopped dado in the back of the rail to house the T-track, which I installed with screws. I attached the stop to the end of the rail with a glued half-lap joint. I counterbored a pair of holes in the sled's fence and installed the bolts and knobs.

Robert F. Orr



T-track makes the stop easy to install and adjust. When the stop isn't necessary, tightening the knobs draws the bolts into the counterbored holes, so they don't protrude.

EDITOR: TIM JOHNSON • ART DIRECTION: RICK DUPRE • PHOTOGRAPHY: RAMON MORENO, UNLESS OTHERWISE INDICATED • ILLUSTRATION: FRANK ROHRBACH

HANDY BLAST GATE LEVER

Reaching down to open and close my table-saw's blast gate was a real pain until I built this pivoting mechanical arm from pieces of 1/8-in. flat steel and 3/8-in. rod. It may look cobbled together, but it works great.

I drilled holes, fastened the linkages with nuts, bolts and washers and attached the wooden handle. Now the gate operates by a simple push or pull.

Kevin Groenke



MIKE KRIVIT



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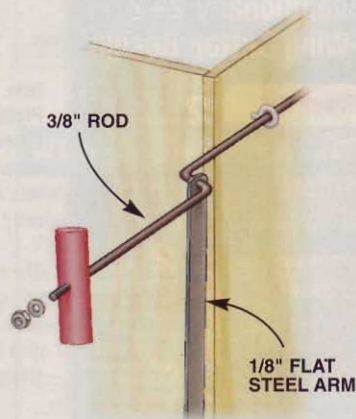
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An S-shaped bend in the rod captures the arm.

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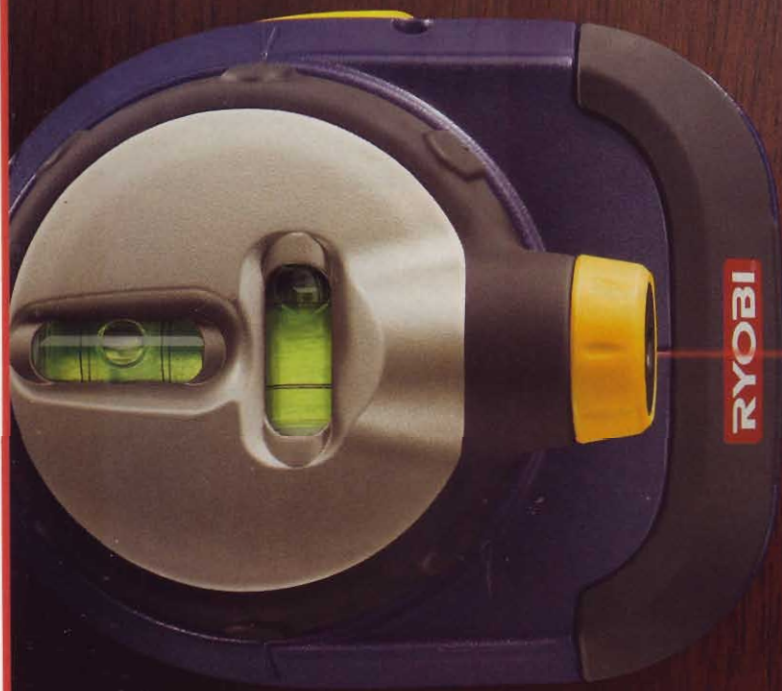
SHOP PLAN PROTECTOR

I like to work from plans, but paper is hard to protect in a workshop. My plans often become so torn, crumpled and soiled that they're impossible to read when I need them the most.

Recently I discovered view binders—notebooks with

clear sleeves on the covers—for less than \$3 at the office supply store. Cutting out the three-ring center section creates a pair of sturdy protectors. Now I don't have to worry about wrecking my paper plans and I don't have to handle them with kid gloves, either.

Ron Morris



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PATRICK HUNTER



GRIT-FREE BENCHTOP WEIGHTS

I keep a few landscape pavers handy in my workshop to use as hold-downs and weights when clamping is inconvenient. The only problem is that they leave grit behind with every use, and grit and woodworking don't mix.

I solved this gritty problem by encasing my pavers in rubberized plastic, the same stuff you dip tool handles in.

To knock off all the loose grit and round the sharp corners, I rubbed the pavers together. Then I dipped them into a shop-made box containing a 1/4-in.-deep layer of rubberized plastic. After the plastic dried, I dipped the pavers' other sides. I sealed four pavers with one bottle of rubberized plastic; a 14.5-oz. bottle cost \$7 at the home center. **AW**

Gary Wentz

American Woodworker JANUARY 2005 19

Circle No. 32

Our new AIRgrip Laser Level utilizes innovative vacuum technology, allowing you to attach the level to a variety of smooth surfaces without using pins or tacks. So when you're hanging paintings on expensive wallpaper or putting up chair rail on your custom paneling, you don't have to puncture what's priceless just to get a level. Just use AIRgrip. You'll never know it was there.

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RYOBI

THE WELL-EQUIPPED

THREE GREAT NEW DUST-CONTROL SYSTEMS

TOOL-CONTROLLED DUST COLLECTION

Do you use your dust collector every time you should? Probably not. With this new system, you will—without any extra effort. System 1 from Creative Dust Control is fully automatic.

The system consists of a motorized blast gate, a tool module and a vacuum module. It's available for both 110- and 220-volt machines. When a tool is turned on, the System 1 automatically opens the blast gate *and* turns on your dust collector. When you turn off the tool, your dust collector will also shut off and the blast gate motors will shut.

Each tool plugs into the tool module, which connects to the motorized blast gate by telephone cord. Yes, telephone cord! A second telephone cord connects the tool module to the vacuum module. The vacuum module controls the dust collector. Like the tool module, the vacuum module, which the system requires to work, is a plug-and-play system.

You'll need one tool module (which includes a 4-in. motorized blast gate) for each tool you want on the sys-

tem. Multiple tool modules can be daisy-chained, and you can mix and match tool voltages.

Each module has a manual override, so you can open the gate and run the collector without the tool running.

Connecting three tools to this system costs \$275 but means never doing more than turning on a connected tool to make sure your dust collector is running. Hookup is easy.

Late in 2004, Creative Dust Control also introduced a nonmotorized blast gate, \$10, that can be used independently or with the rest of the system. The gate can be wired directly to the vacuum module so opening and closing the gate turns the vacuum on and off.

Source

Creative Dust Control
(314) 434-1655, www.creativedustcontrol.com

System 1:

Vacuum module, V-1, 110-volt, \$50; V-2, 220-volt, \$50

Tool module with motorized blast gate, TG-1, 110-volt, \$75; TG-2, 220-volt, \$75.

BLAST-GATE-CONTROLLED DUST COLLECTION

JDS and Penn State Industries offer systems that provide less automated, but less expensive, solutions. With either system, when you open a blast gate, the dust collector automatically comes on. Close the gate and the collector shuts off.

The systems are nearly identical. Each includes a control box that the dust collector plugs into. The control box is wired to special 4-in. blast gates throughout the shop. Each blast gate contains a low-voltage micro switch that opens and closes along with the gate. You can wire as many blast gates as you need into one control box. As long as one gate is open, the collector will run. The wiring is simple and the instructions are easy to follow. Different control boxes are required for 110-volt and 220-volt dust collectors.

Connecting three tools to one of these systems costs \$100. You'll need to reach for and open the blast gate each time you run the tool to make sure the collector is on.

The JDS Dust Gate start-up kit, \$60, includes one dust gate, one 110-volt central control box and 100 ft. of connection wire. An expansion kit, including two gates and another 100 ft. of wire, costs \$40.

Penn State Industries' Long Ranger kit, \$50, includes the control box for a 110-volt dust collector, one 4-in. blast gate and 100 ft. of connection wire. Each additional gate costs \$11.

Sources

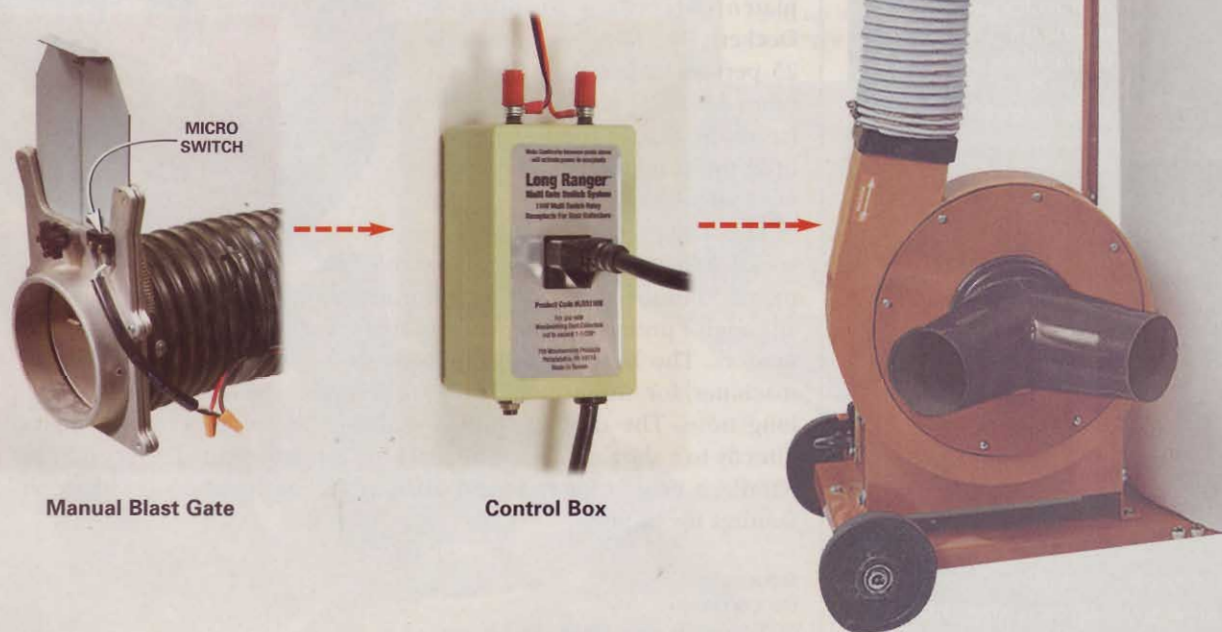
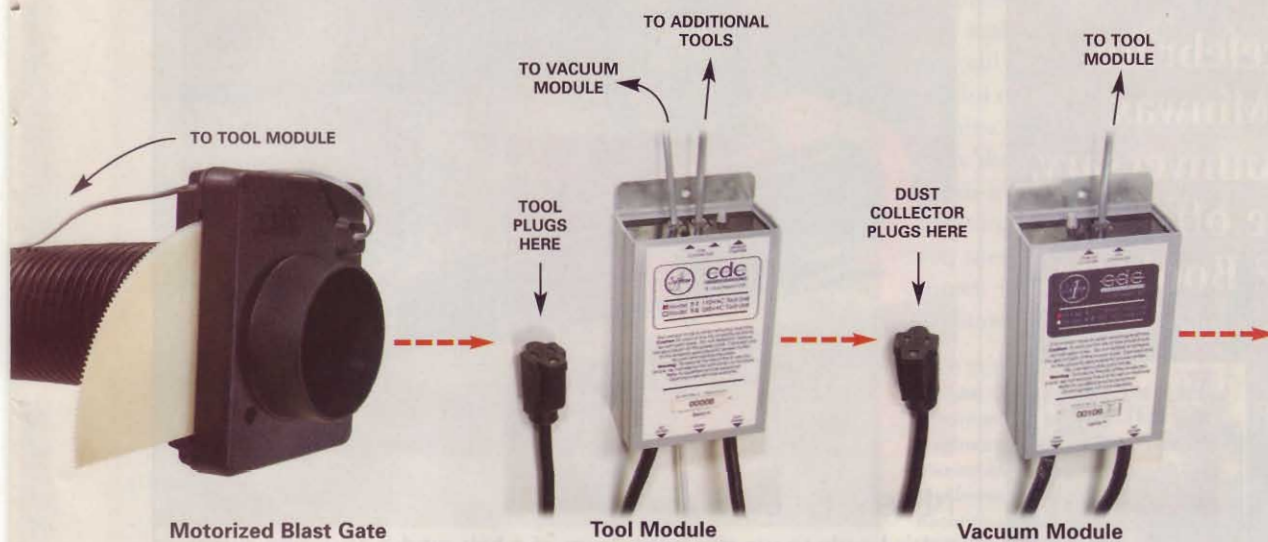
JDS Co.
(800) 480-7269, www.jdstools.com
Dust Gate 110-volt start-up kit, \$60
Dust Gate 220-volt start-up kit, \$70
Expansion kit, \$40.

Penn State Industries
(800) 377-7297, www.pennstateind.com
Long Ranger Multi Switch set:
110-volt set, LRMSET110, \$50
220-volt set, LRMSET220, \$60
Blast gates, LRGATE, \$11 ea.

SHOP

NEW TOOLS, SUPPLIES AND MATERIALS

by George Vondriska



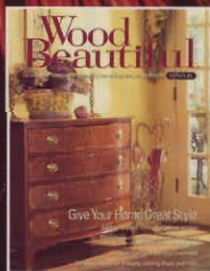


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Circle No. 25



NOSY BELT SANDER

It's handy to use the front drum of a belt sander on inside curves. But the body on many sanders limits the front drum's usefulness by limiting its accessibility. The new Dragster belt sander from Black & Decker, \$70, has a narrow nose that can poke in almost anywhere.

The "hood" on the Dragster can be flipped up and locked out of the way. The small front drum fits into tiny inside curves. The multiposition top handle can be fine-tuned for comfort in whatever job you're doing.

The small front drum also gives the Dragster a larger-than-usual platen. According to Black & Decker, the Dragster platen is 25 percent larger than those on other 3-in. x 21-in. machines. The larger the platen, the easier it is to hold the machine flat when you're sanding panels.

The Dragster has a 6-amp, single-speed motor, which is comparable to motors on other belt sanders in its price range, although I prefer the finer control that comes with variable-speed belt sanders. The Dragster will do the same work as comparably priced machines, for instance, flattening panels, with the added benefit of its long nose. The dust bag works well, but the sander can't connect directly to a shop vacuum. The machine is lightweight and very easy to handle, a benefit for freehand work. It's a handy machine with good features for its price.



POP-UP HOOD

Source

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Dragster 3-in. x 21-in. belt sander, #DS321, \$70.

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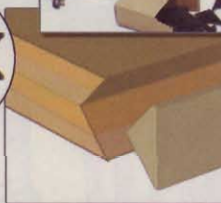
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EASY-TO-CUSTOMIZE MOBILE BASE

Whether your shop is spacious or petite, you can't beat the convenience of having your equipment mobile. The new Universal Mobile Base Hardware, \$60, will help you get rolling. Customizing the base for any tool is simple. It has a high load rating and rolls like dream.

If you can cut a piece of 3/4-in. plywood and drill holes, you can size the mobile base. Cut the plywood 1/2 in.



larger, in both directions, than the tool you're mobilizing. Drill holes for the mounting bolts (included with the base) and you're home free. The Universal Mobile Base Hardware will handle machines as small as 12 x 12 in., as large as 37 x 37 in., or any size in between.

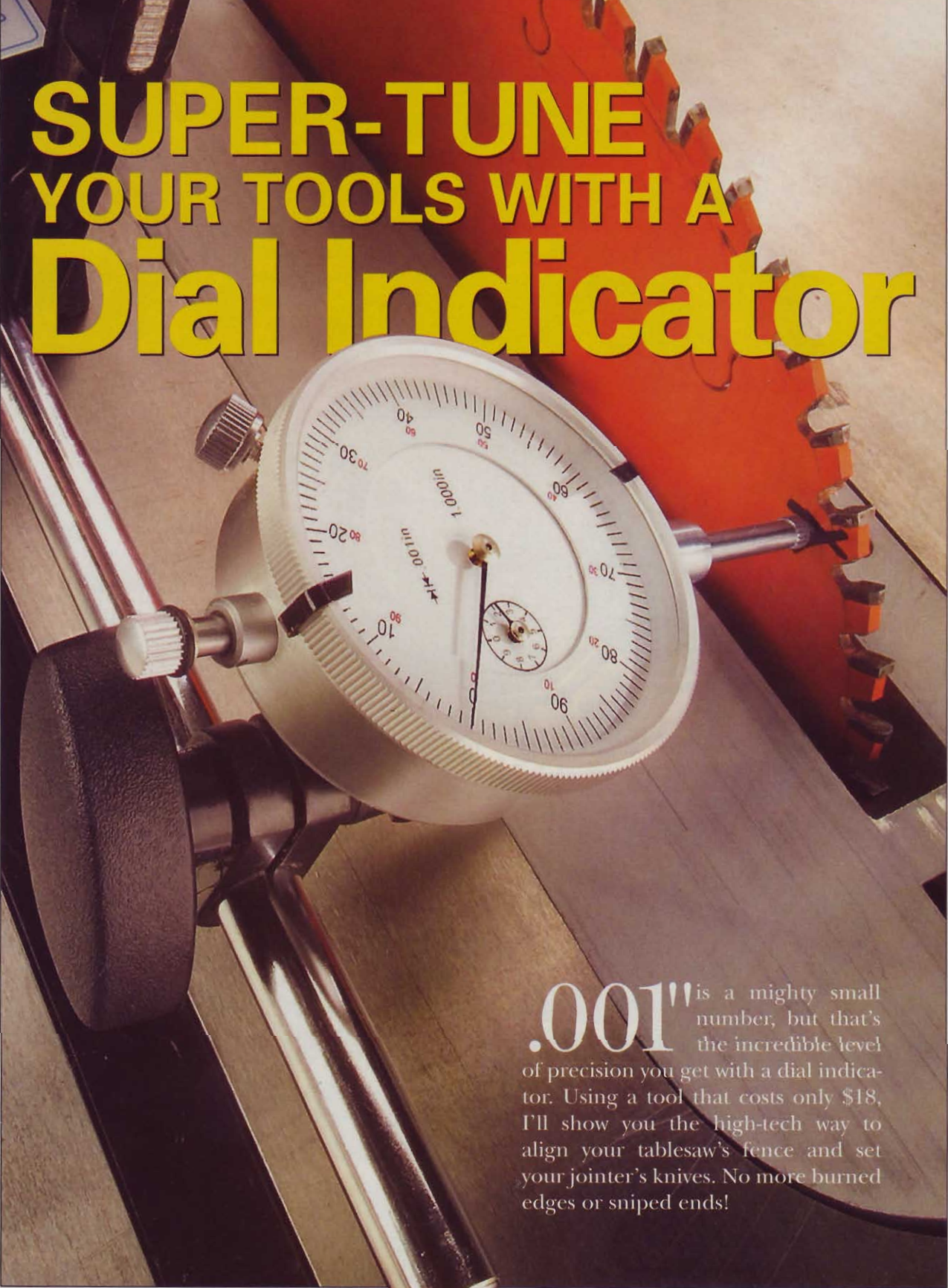
With its maximum load rating, this mobile base can handle most tools. For the base to handle the load and roll easily, however, the tool must rest squarely on the steel corners.

Two foot-operated pedals raise and lower the machine. Swivel casters take over after the machine is lifted. The base also has leveling screws to accommodate a less-than-perfect floor. **AW**

Source

Woodcraft Supply
(800) 535-4482, www.woodcraft.com
Universal Mobile Base Hardware,
#145488, \$60.

SUPER-TUNE YOUR TOOLS WITH A Dial Indicator



.001" is a mighty small number, but that's the incredible level of precision you get with a dial indicator. Using a tool that costs only \$18, I'll show you the high-tech way to align your tablesaw's fence and set your jointer's knives. No more burned edges or sniped ends!

EDITOR: TOM CASPAR • ART DIRECTION: VERN JOHNSON AND RICK DUPRE • PHOTOGRAPHY: MIKE KRIVIT

Machinists use a simple measuring device called a dial indicator for setting up metalworking equipment. It works great in the woodshop, too, though for woodworking, you don't need a real fancy model. I found a perfectly adequate dial indicator, complete with all the accessories, for only \$18 (see below).

The big advantage of using a dial indicator for setting up your machines is that you get instant, clear readings. The needle shows you exactly how far you've gone when you make a minute adjustment.

Let's be honest, though. Fine-tuning a machine is fussy business. Even with a dial indicator, it takes some patience and finesse. Grab a comfortable stool, and let's begin with the table saw.

WHAT IS A DIAL INDICATOR?

A dial indicator is nothing more than a spring-loaded rod, a needle and a dial. Move the rod up or down and the needle rotates around the dial's face. The dial tells you how many thousandths of an inch the rod has traveled. The one at right is measuring the thickness of a dollar bill at .003 in.

A complete dial indicator kit also contains a magnetic base, a long articulating arm and a set of contact points.

The heavy magnetic base holds the instrument absolutely rigid on any metal surface. It's not electronic (there's no cord to plug in); you flick a switch to raise or lower the magnet inside the base.

The articulating arm is used for holding the dial at a distance from the base. It's tricky to adjust, so we won't use it for these two jobs.

Contact points screw onto the bottom of the measuring rod. Each one has a special shape for measuring different kinds of objects. We'll be using three contact points: a ball, a disc and a bent arm.

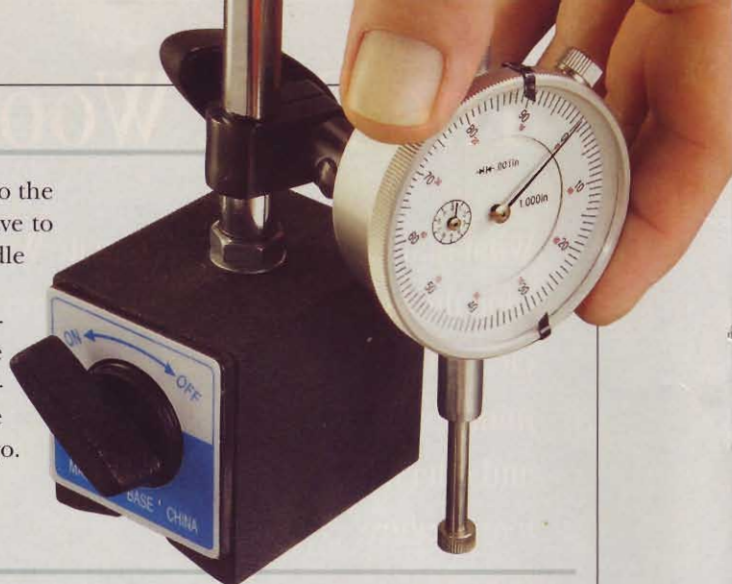


Complete dial-indicator kits can cost a lot, but I found one that's only \$18. You can order the kit, including all the elements shown above, from the Little Machine Shop, (800) 981-9663, www.littlemachineshop.com. Ask for kit #1782.

ZERO THE DIAL

The first step in using a dial indicator is to turn the dial so the zero mark lines up with the needle. This way, you don't have to add or subtract any numbers to calculate how far the needle moves when measuring a distance.

Let's practice on the top of the tablesaw. Install a disc contact point on the end of the rod and place the base on the saw. Turn on the magnet. Clamp the dial and rod so the contact point touches the table and slightly compresses the spring-loaded rod. Turn the dial to zero and you're ready to go.

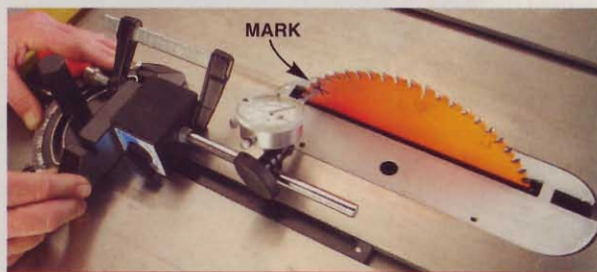


TABLESAW TUNE-UP

Here we're going to make sure the blade, fence and miter-gauge slot are absolutely parallel to each other. This reduces the chances of kickback, eliminates burning and produces the smoothest cut. Install the ball contact point on the measuring rod.

If your miter gauge wiggles in the slot, you'll have to take out the play for an accurate reading with the dial indicator. Simply push the miter gauge and bar toward one side while you measure. Always push to the same side.

ALIGN THE BLADE TO THE MITER-GAUGE SLOT



Caution: Unplug your saw for these procedures.



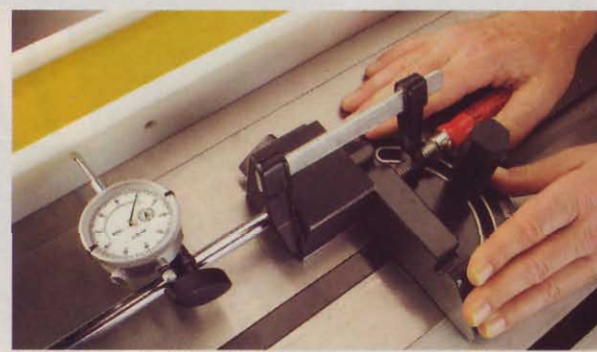
1 Measure the front of the blade. Raise the blade as high as it will go. Turn off the magnet. Clamp the base to the miter gauge so the rod is slightly compressed when it touches the saw blade just below a tooth. Mark where the contact point touches the blade. Zero the dial.

2 Measure the back. Rotate the blade by hand and realign the marked spot with the contact point. If the needle has moved less than .003 in. either way, you're OK. If it has moved more than .003 in., the saw's trunnions or table should be adjusted. Consult your owner's manual for step-by-step help on aligning the blade.

LINE UP THE FENCE WITH THE MITER-GAUGE SLOT



3 Measure the front of the fence. Reposition and clamp the dial indicator on the right side of the miter gauge. Slide the fence so it slightly compresses the rod. Lock down the fence. Zero the dial.



4 Measure the back. Slide the dial indicator to the back of the fence and check the reading. If the needle is off the zero mark, adjust the angle of the fence until you get the same reading front and back. Consult your owner's manual about how to make this adjustment.

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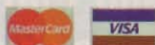


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MODERN CABINETMAKER

SETTING JOINTER KNIVES

In this procedure, we're going to set all three jointer knives so they project the correct distance from the cutterhead and are parallel to the infeed and outfeed tables. These instructions assume you've installed jointer knives before and know the ins and outs of how to raise or lower knives and tighten them down.

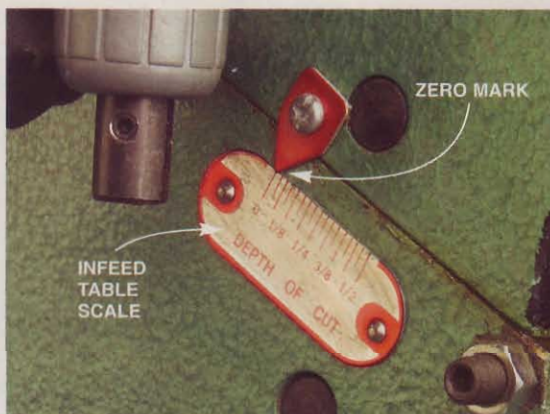
If you have a knife-setting gauge for your jointer, skip ahead to Step 4. Then set the knives with your gauge and use the dial indicator to fine-tune their height.

Caution: The jointer must be unplugged throughout this process.



BENT-ARM
CONTACT POINT

1 Zero the dial. Install the bent-arm contact point on the dial indicator. Place the dial indicator on the infeed table and turn on the magnet. Clamp the dial on the base's post so the spring-loaded rod is slightly compressed. Turn the dial to zero.



2 Zero the infeed table. Raise or lower the infeed table until the depth-of-cut scale reads zero. If you haven't reset this scale in the past, this step ensures that your knives will project the correct distance from the cutterhead. If you have reset this scale, consult your owner's manual about how far the knives should project above the cutterhead.

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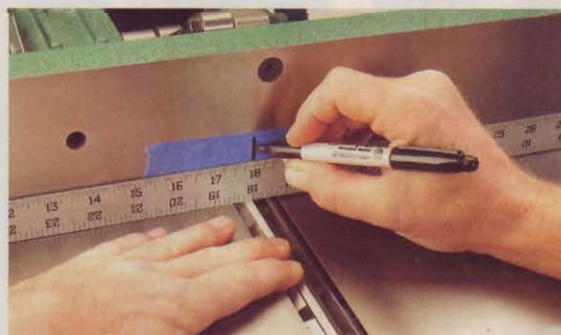
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SETTING JOINTER KNIVES



3 Level the outfeed table. Reposition the dial indicator so the bent arm touches the outfeed table. (On some jointers, you may need to use the articulating arm to reach across the tables.) Raise or lower the outfeed table until the needle reads zero. Lock the table.



4 Mark the top dead center. This is the position of the cutterhead where the knives reach their highest point. Apply a piece of masking tape to the fence and place a ruler across the tables. Turn the cutterhead by hand. Mark the spot where the knives touch the ruler.



5 Change contact points. Remove the bent-arm point and install the disc. The wide, flat bottom of the disc makes it the best choice for knife-setting. The disc gives you more latitude in positioning the dial indicator on the table when the knives are at top dead center. Zero the dial again.

SETTING JOINTER KNIVES



6 Position the dial indicator. Slide the fence out of the way. Remove all the dull knives from the cutterhead and install sharp ones. Use the knife-setting gauge if you have one. Snug the knives and slide the fence over the end of the cutterhead. Place the dial indicator's rod in line with the top-dead-center mark and directly over the jack screw under the knife.



7 Zero the right side. Rock the knife by hand back and forth through top dead center. If the needle never reaches zero, the knife is too low. If the needle goes above zero, the knife is too high. If you used a knife-setting gauge, readjust the height of the outfeed table until the needle reads zero, and leave the table there for all three knives. Otherwise, adjust the height of the knife until the needle reads zero.



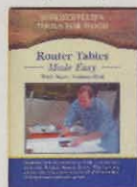
8 Level the knife. Move the dial indicator to the left side of the knife, directly over the jack screw. Sight down the rod so it's still in line with the top-dead-center mark. Rotate the knife again and watch the needle. The reading on this side of the blade should be within .002 in. of the reading on the other side of the blade. Raise or lower the left side of the knife as needed. Recheck the right side and tighten the knife. Repeat Steps 6 through 8 for each knife, zeroing each to the outfeed table.

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A lifetime of woodworking wisdom



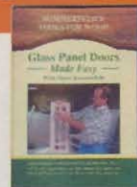
Arched Raised Panels
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#VID-AW1 #DVD-AW1
(30 min.)



Router Tables
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#VID-AW3 #DVD-AW3
(120 min.)



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#VID-AW4 #DVD-AW4
(105 min.)



Glass Panel Doors
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#VID-AW2 #DVD-AW2
(30 min.)



Mini Raised Panels
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#VID-AW6 #DVD-AW6
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MODERN CABINETMAKER

2 TIPS FOR SOLVING JOINTER PROBLEMS

No matter how carefully you use the dial indicator, sometimes you must tweak the height of the outfeed table to get everything just right. Begin by jointing a 24-in.-long board, taking off about 1/32 in. Set the board on your tablesaw.

CONCAVE EDGE = OUTFEED TABLE SET TOO HIGH

CONCAVE EDGE

If the edge is concave, use your dial indicator to lower the outfeed table in .001-in. increments, as shown in Step 3. Keep adjusting until you can joint a straight edge.

Two other problems also indicate an outfeed table that's too high. 1. The board bumps into the leading edge of the table. 2. The cut always trails off to nothing as you joint an edge.

SNIPE = OUTFEED TABLE SET TOO LOW

SNIPE

Snipe at the trailing end of the board tells you to raise the outfeed table. The snipe shown above is quite large, but sometimes it's so small you can only feel it. Raise the table in .001-in. increments until you can't see, feel or hear any snipe. **AW**

by Richard Tendick

Quick-Change Chucks

One click in and one click out. These chucks make bit changing a snap.

Raise your hand if you hate swapping bits and drivers in a cordless drill. I sure do. When I'm putting in screws, I'm always going back and forth, tightening and loosening that darn chuck. Hey, I've even gone to the extreme of buying a second drill just to avoid this hassle. There's got to be a better, and cheaper, answer.

Let me introduce you to the new style of quick-change chuck. It's a simple device that fits into any drill and costs less than \$15. With one flick of the wrist, you can swap any hex-shank bit or driver in seconds.

I know, you're going to say you've already tried one of these chucks and the bit wobbled all over. I had one of those earlier models, too, and threw it away. But quick-change chucks have changed. To research this story, I went out and bought 12 different quick-change chucks—just about every one on the market. Two of the chucks are really terrific. They hold a bit so tightly that it hardly wiggles at all.

THE CHUCKS

The two chucks I like—MLCS Insty-Lok Quick-Change Chuck and Bosch Clic-Change Chuck—make it really easy to change bits (see Sources, page 43). With these models, you only need to use one hand. Sweet!

I don't know about you, but I like to keep one hand on my drill's handle when I'm switching from drilling to driving. My other hand is free to pick up a bit and pop it in. The chuck's barrel automatically snaps into position, locking the bit in place, and I'm ready to go.

To remove the bit, I just pull the barrel forward to the unlocked position. It clicks into place, and the bit's loose. I don't have to put the drill down, cradle it in my arm, squeeze it between my legs or go through any of the other contortions I had to do with other quick-change chucks that generally required two hands to use.



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—Christopher Schwarz,
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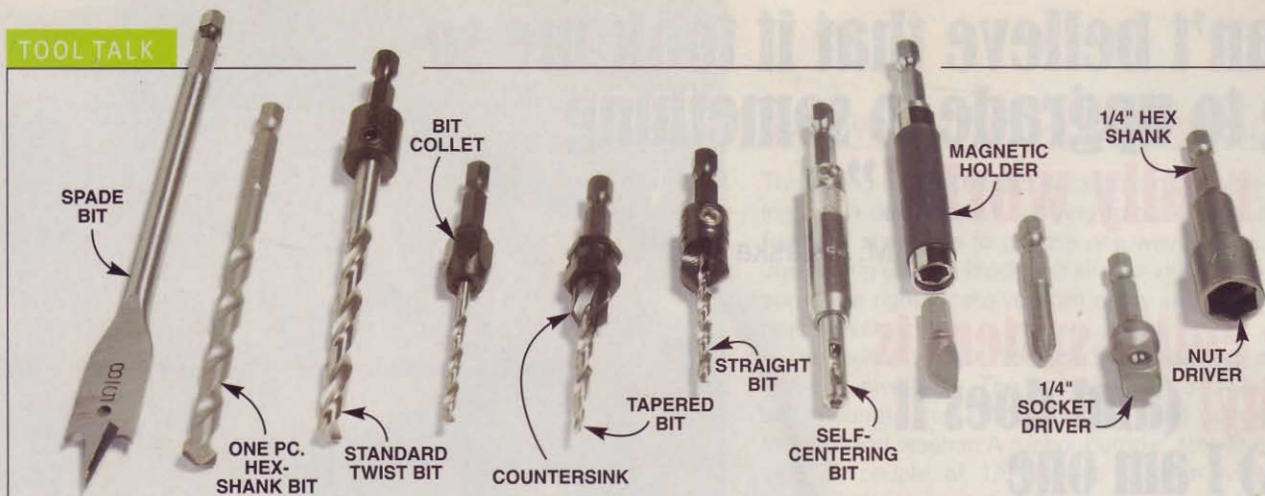
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BITS AND DRIVERS

Any bit or driver with a 1/4-in. hex shank can fit into a quick-change chuck, including twist bits, spade bits, countersink combination bits, self-centering bits, magnetic tip holders and nut drivers.

Twist bits for quick-change chucks come in two different styles. In the one-piece bit (about \$4 each), the shank is hex-shaped rather than round. (One advantage of a hex shank is that the bit isn't free to rotate in the chuck and develop nasty burrs.)

A fancier type involves a regular round-shank drill bit fitting into a router-like collet that has a hex shank. If you break or dull a bit, you stick a new one in the collet. Each collet costs about \$3, without the bit. Collets are available for many standard diameters but, unfortunately, not in every 1/64-in. increment.

The collet-type is slightly more expensive than a one-piece bit, but it's my favorite. I figure it'll pay for itself down the road. I usually keep on hand a half-dozen inexpensive twist bits of the same diameter. With the collet system, I always have a sharp bit ready to go.



HURRY-UP JOINERY

Plain old screwed-and-glued butt joints are one of the fastest, easiest ways to join boards together. The only thing that slows you down is going back and forth among three different bits and drivers, but the quick-change chuck really greases the skids. Bing, bang, done! I use a twist bit for the clearance hole in the outer board, a combination countersink bit with a stop collar for the pilot hole in the inner board and a square-drive tip to run in the screws. **AW**

SOURCES

MLCS

(800) 533-9298, www.mlcswoodworking.com
Insty-Lok Quick-Change Chuck, #9563, \$14

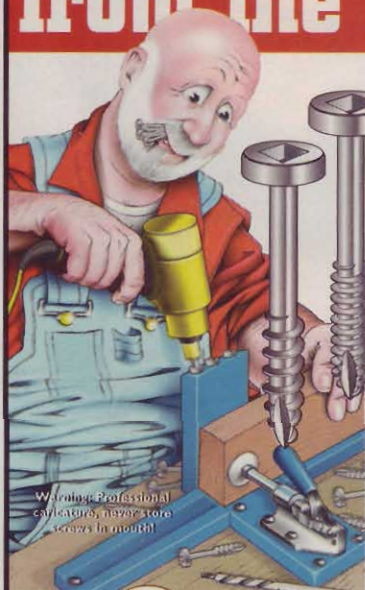
7 Corners Hardware

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Bosch Clic-Change Chuck #CC2100, \$13.

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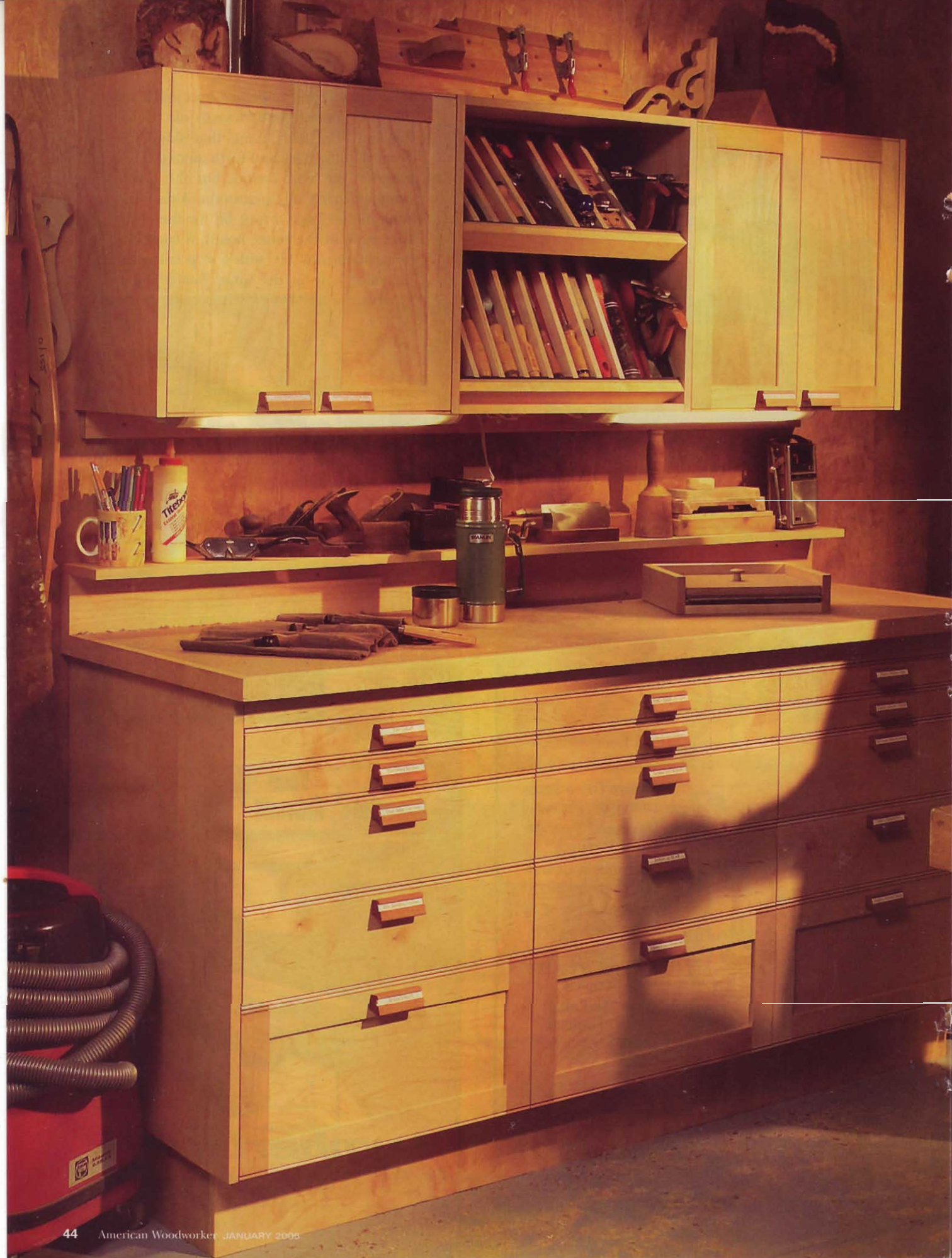


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by Bruce Kieffer

modular Shop Cabinets

Euro-style construction makes them easy to build, easy to customize.

In days gone by, apprentice cabinetmakers used to build their own tool chests. The chests were often works of art that both displayed the owner's level of craftsmanship and provided practical storage for tools. These modular shop cabinets function in much the same way. Designed for ample storage, they also form a stunning piece of cabinetry.

Make no mistake, though; these cabinets are firmly rooted in modern cabinetmaking techniques. They're built using the same modular construction system today's professionals prefer. After you've warmed up on these shop cabinets, you'll be ready to tackle making a whole kitchen full using the same technique.



These cabinets are built with box or modular construction: All the units are simply 2-ft.-wide butt-joined boxes. Because the boxes are all the same width, the drawers and doors are, too. This streamlines machining and assembly. Each box or cabinet is installed one at a time, allowing one person to build and install a run of cabinets of almost any length.

PROJECT REQUIREMENTS AT A GLANCE

Materials: 30 bd. ft. of 4/4 birch
5 bd. ft. of 5/4 cherry
Five sheets of 3/4-in. x 4-ft. x 8-ft. birch plywood
One sheet of 1/2-in. x 4-ft. x 8-ft. birch plywood
Three sheets of 1/4-in. x 4-ft. x 8-ft. birch plywood
Three sheets of 1/2-in. x 5-ft. x 5-ft. Baltic birch plywood
One sheet of 3/4-in. x 49-in. x 97-in. MDF
Two quarts of oil finish or varnish

Hardware:
15 pairs of drawer slides,
eight Euro/cup hinges, four
pneumatic door-closing
cushions, two 24-in. under-
cabinet lights

Total Cost:
\$1,100 for a 6-ft. run

Tools:

Edge-tape trimming tools, clothes iron, tablesaw with dado blade, router and router table, bandsaw, drill press, belt sander, finish sander, 18-gauge nail gun, 35-mm drill bit and level

FIGURE A Upper Doored Cabinet

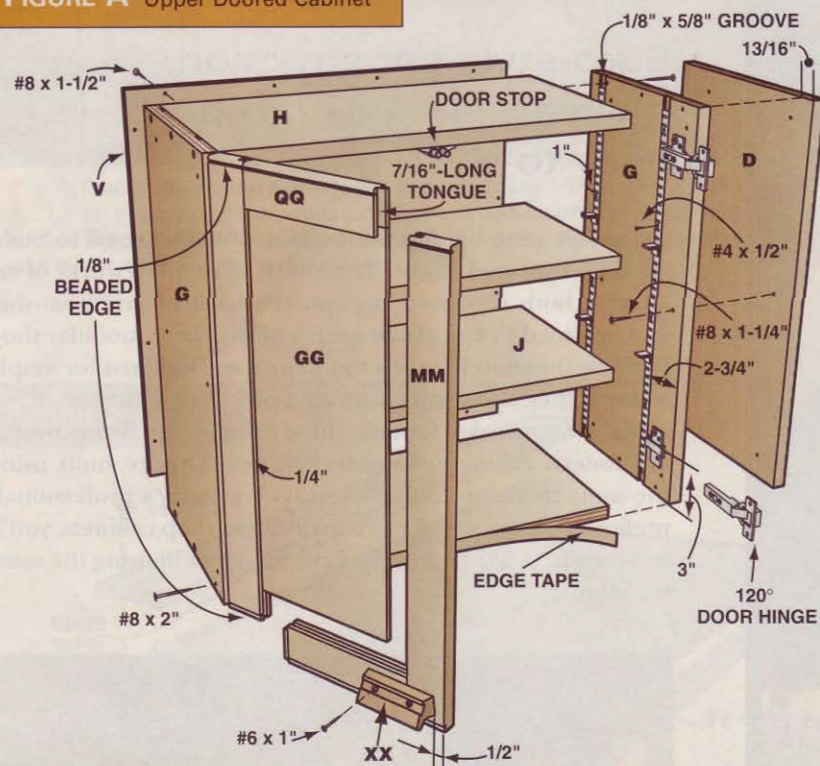
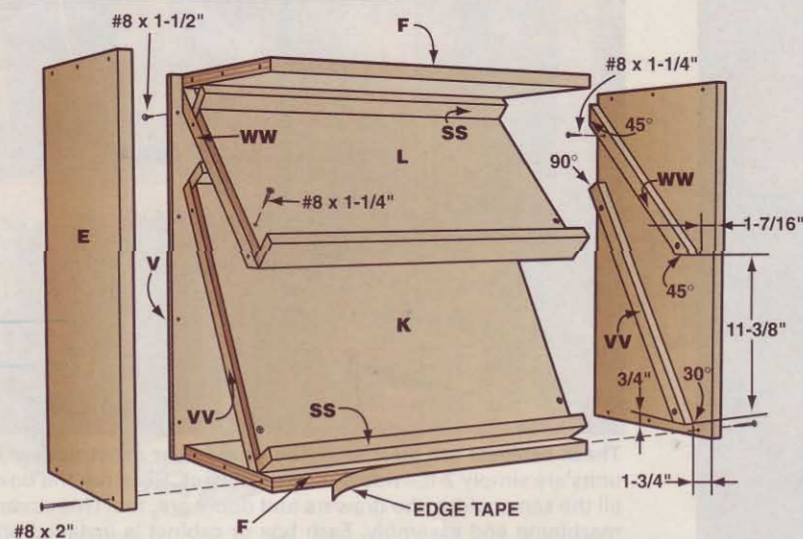


FIGURE B Upper Angled-Shelf Cabinet

Note: See "6 Storage Solutions," page 54, for an adjustable divider system for these shelves.



EXTRA FEATURES

These are "dream" shop cabinets, and to keep the dream alive, I've jammed them full of extra features:

- Fifteen full-extension drawers with 1-in. overtravel and a self-closing feature that takes over when the drawer is nearly closed (a welcome feature when you have your hands full).

- Angled shelves that put frequently used tools right at your fingertips.

- Shop-made handles that double as label holders.

- A worktop shelf that works like an elevated tool tray.

- A durable worktop that overhangs the lower cabinets to allow clamping to the surface.

SIMPLE MODULAR CONSTRUCTION

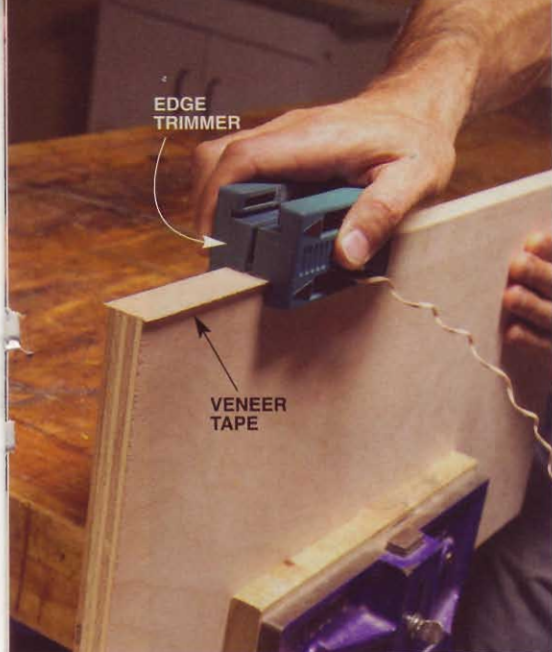
Modular construction allows one person to build and install this entire 6-ft. run of cabinets. These shop cabinets begin as a series of 2-ft.-wide modules or boxes that screw together. Simply add or subtract boxes for a cabinet run that suits your needs. Because all the boxes are the same width, making the doors and drawers is greatly simplified.

End panels cover the exposed sides of the boxes on the ends of a run. The end panels are extra deep, providing room to scribe the back edge to fit an uneven wall.

You can adjust the 39-in. worktop height by altering the base platform's height.

A standard kitchen has a 36-in.-high countertop with 16 in. clearance between it and 30-in.-tall upper cabinets. Because we raised the worktop height to 39 in. to be more comfortable for woodworking, we shortened the upper cabinets to 24 in. to keep their top shelves within reach.

The self-closing door hinges open 120 degrees and adjust in all directions. Pneumatic door-closing cushions work like magic to softly close the doors without



1 All the visible cabinet edges are covered with iron-on edge tape, which goes on fast and looks great. Trim the tape with a double-sided edge trimmer. Cut the tape ends flush to the plywood prior to trimming.



2 Cut grooves in the upper cabinet sides to house the metal shelf supports. When installed, the standards stand proud of the grooves by about 1/16 in.



3 Assemble the boxes using a support tube to hold the top and bottom steady. The support tube for the upper cabinets is just an 8 x 8 x 22-in. box. It's like having a second set of hands for assembly.

a bang. Nothing is too good for these shop cabinets.

BUILD THE BOXES

1. Cut all the upper and lower cabinet box parts (A through J). Apply birch iron-on edge tape to all the front edges (Photo 1). **Note:** Do not ease the taped edges before assembly or the joints between the shelves and the sides won't look tight.

2. Cut the shelf standard grooves in the two upper cabinets with doors (Fig. A, page 46; Photo 2). Finish-sand the inside of all the pieces that form the upper cabinet boxes.

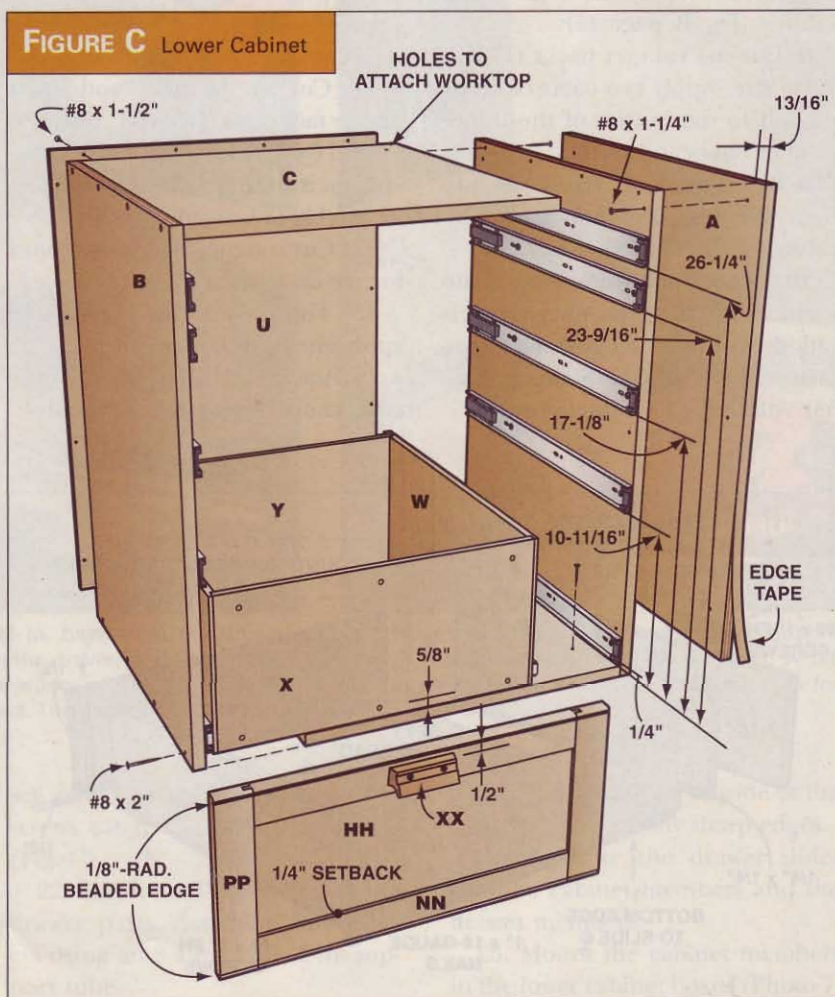
3. Drill and countersink pilot holes at the top and bottom of the upper and lower cabinet sides (Fig. A and C).

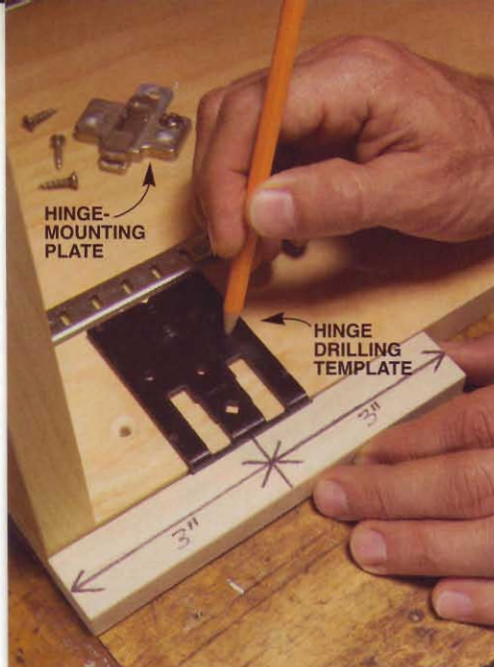
4. Assemble the three upper cabinet boxes (Photo 3).

5. Assemble the three lower cabinet boxes using a 30-in.-long support tube (Fig. C, right).

6. Ease the taped edges of the assembled boxes using sandpaper.

7. Cut the parts for the angled shelves (K, L, SS, VV and WW). Assemble the shelves. Then drill the screw holes in the shelf supports





4 Lay out holes for the hinge-mounting plates with a commercial template. Screw a 6-in.-long guide stick to the template to set the hinge plates 3 in. from the cabinet top and bottom.



5 To check the fit of the doors, first screw the cabinets together as they'll hang on the wall. Use 1/16-in.-thick spacers to set the gaps. Adjust the hinges and trim the doors (Photo 6) until all the gaps are even. Be sure to mark each door so you can remount them later in the correct order.

and mount them in the angled-shelf cabinet (Fig. B, page 46).

8. Cut the cabinet backs (U and V) to size. Apply two coats of oil or varnish to the insides of the upper cabinet boxes and backs.

9. Screw the shelf standards into their grooves, and then screw the cabinet backs to the boxes.

10. Mark hinge-mounting plate locations on the two upper cabinets with doors using a hinge-drilling template (Photo 4) (see Sources, page 53). Attach the mounting plates.

FRAME-AND-PANEL DOORS AND DRAWERS

11. Cut all the door and lower drawer face parts (GG, HH, MM, NN, PP and QQ). **Note:** The bottom drawer front is a frame and panel because it's too big to be made of solid wood.

12. Cut tongue-and-groove joints for the door and drawer frames.

13. Finish-sand the panels and apply one coat of oil or varnish.

14. Assemble the frames with glue and clamps, and check for square.

15. Drill the 35-mm cup-hinge holes on the door stiles and mount the hinges. Center the holes 3 in. from the top and bottom. The hole's edge should be set back 3/16 in. from the outside edge of the door stile.

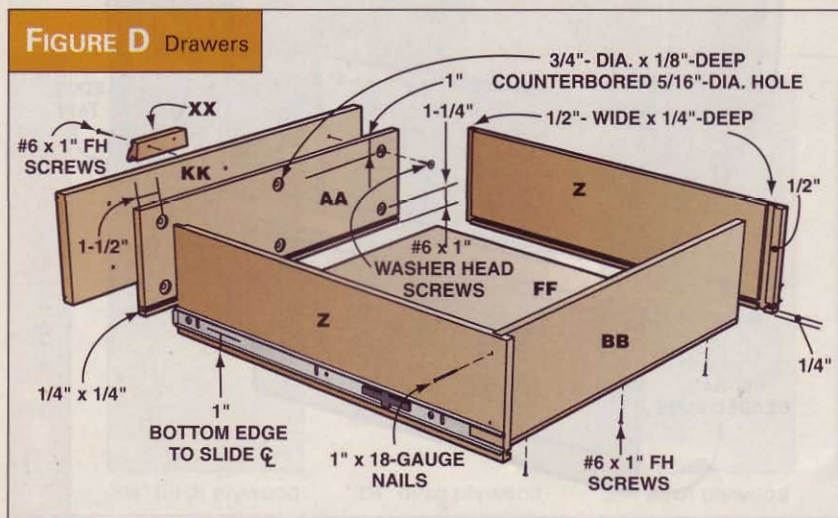
HANG AND FIT THE DOORS

16. Screw together the three upper boxes. Hang the doors on the assembled cabinets.

17. Make some 1/16-in.-thick spacers for fitting the doors and drawer faces (Photo 5).

18. Adjust the hinges and trim the edges of the doors until the gaps are even. If you're not comfortable using a hand plane to trim the doors, try a belt sander (Photo 6). No matter how you do the trimming, go slowly and check your progress often.

19. When you're done fitting the doors, remove the doors and hinges. Label each door on its top edge, so you hang it back in the right spot. Also label each hinge and its corresponding hole to avoid readjusting the hinges.





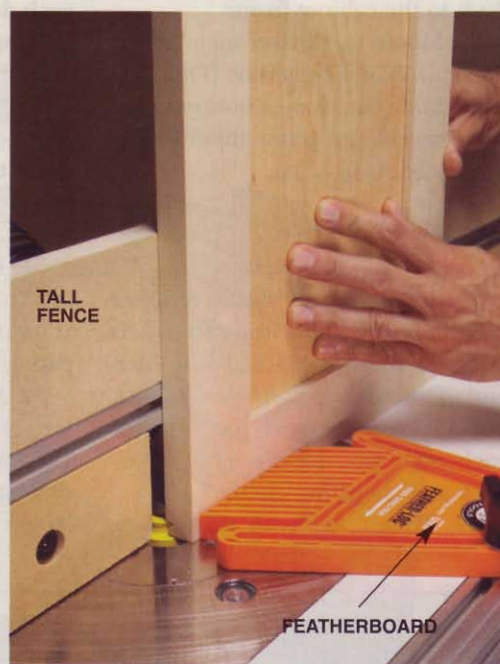
6 Some doors and drawer fronts may need a little trimming for a proper fit. Use a belt sander with a wide support board clamped to the face of the door so only the area to be trimmed is exposed. Squiggle pencil lines on the support board and sand until the lines start to disappear.



7 Use a support board to align the drawer slides as you screw them to the cabinets. Start at the top drawer slides and work your way across all three cabinets. Then, cut the support board shorter to set the slides for the next level of drawers, and so on down to the bottom set of drawers.



8 The drawer slides are mounted $\frac{3}{32}$ in. back from the drawer front to leave a little cushion between the drawer and the cabinet. A simple stick with a flat head screw works great as a setup jig. Adjust the screw until the setback is correct. Then butt the slide up to the screw head and screw it in place.



9 Rout a beaded edge on the top and bottom of the doors and the drawer fronts. A tall fence and a featherboard steady the door for a smoother cut.

MAKE AND INSTALL THE DRAWERS

20. Cut and machine the drawer box parts (W through FF).

21. Predrill holes in the drawer fronts (Fig. D, page 48). Make sure the holes in the lower drawers are

set close to the bottom so the screws catch the lower frame rails (Fig. C).

22. Finish-sand the inside of the drawer parts. Assemble the drawers using an 8 x 8 x 20-1/2-in. support tube.

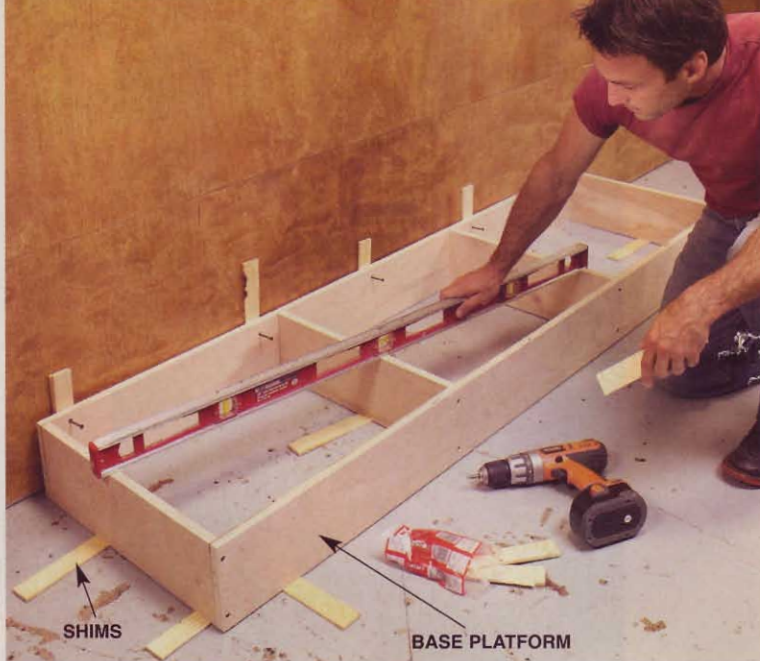
23. Finish-sand the outside of the drawers and ease any sharp edges.

24. Separate the drawer slides into the cabinet members and the drawer members.

25. Mount the cabinet members in the lower cabinet boxes (Photo 7;



10 Install a ledger strip on which you'll hang the cabinets. Position the cabinet on the ledger strip and drive #8 x 2-1/2-in. screws through the cabinet into the wall studs. Put screws near the top and bottom of the cabinet.



11 The lower cabinets are set on a separate base. Use shims to level the platform front to back and side to side. Screw the base to the wall and trim the shims.

Fig. C, page 47). They are mounted flush to the cabinet fronts.

26. Mount the drawer members to the drawers on a centerline (Photo 8).

27. Slide the drawer bottoms into the drawers and screw them to the drawer backs.

FIT THE DRAWER FACES

28. Screw together the three lower cabinet boxes. Mimic the end panels with scrap plywood tacked onto each end. The mock panels should stick out 13/16-in. beyond the front of each end. Lay the assembly on its back and check for square.

29. Trim and fit all the drawer

faces. Make sure to label the back of each drawer face so you get it in the right spot when you attach it to the drawers later.

30. When the drawer fronts are all aligned, dismantle the cabinet run down to the three boxes.

ADD FINAL DETAILS

31. Rout the beaded-edge profile on the doors and drawer faces (Photo 9). Ease the edges with sandpaper.

32. Make the worktop (T, TT and UU, Fig. F, page 52), backsplash (R), worktop shelf (S), base (M through Q, Fig. G, page 52) and ledger (RR).

33. Do any remaining finish-sanding and apply oil or varnish to the rest of the exposed cabinet parts.

34. Make the handles (see "Shop-Made Handles," page 51) and screw them to the doors and drawer faces.

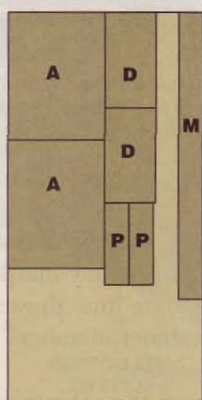
INSTALL THE CABINETS

35. When you hang cabinets, it's important that you drive the screws into wall studs. Locate the studs and transfer that information to the cabinets.

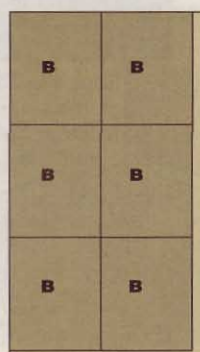
36. Start the installation by attaching the ledger to the wall so its top edge is 55 in. up from the floor. Make sure it's level.

37. Set the first upper cabinet in

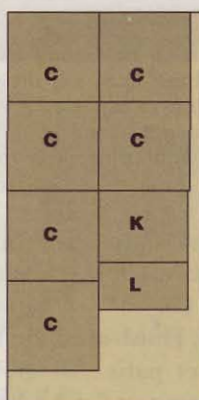
FIGURE E Plywood Cutting Diagram



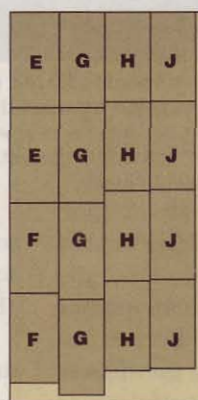
3/4" birch plywood



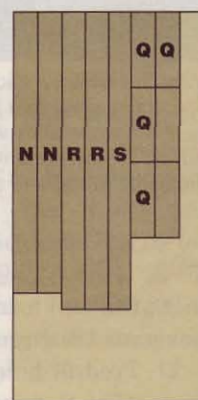
3/4" birch plywood



3/4" birch plywood



3/4" birch plywood



3/4" birch plywood

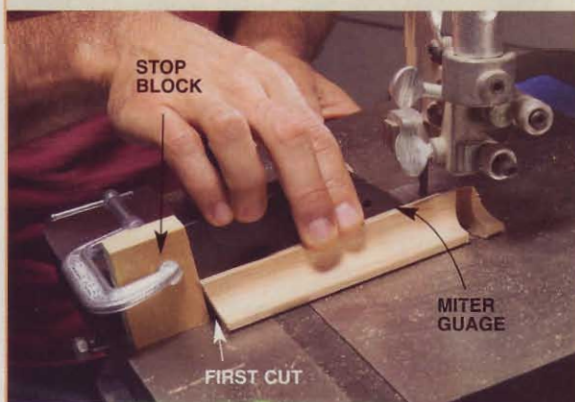
SHOP-MADE HANDLES

These shop-made handles add a striking visual element to any cabinet. The handles are as easy to make as they are good-looking, and they'll save you money. The slotted fronts allow you to label each drawer's contents. You can adapt the design to suit more formal cabinets by simply dropping the dovetailed cardholder slot.

1. Cut 16 ft. of handle stock (XX). This is nearly twice what you need, but it gives you plenty of extra for testing your router setups.

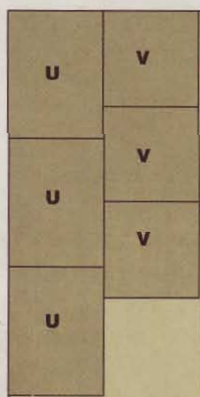
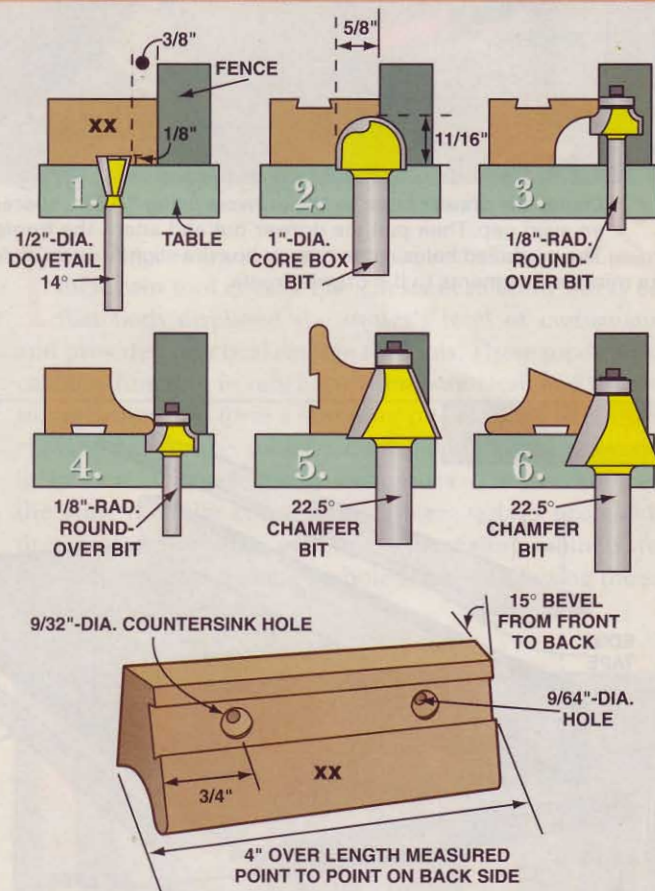
2. Shape the handle stock following the steps shown in the figure, at right.

3. Cut the handles to length on your bandsaw with the table set at 15 degrees. The first end is cut with the stock face down (label slot on the table) and top edge forward.

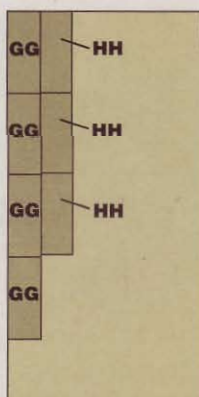


The second cut (see photo, above) is made with the label slot still on the table but the top edge against the miter gauge.

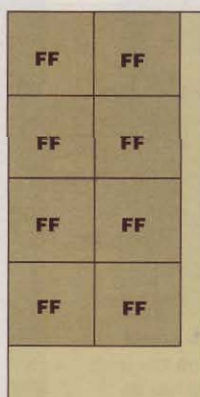
4. Drill the countersink holes and the pilot holes on a drill press with a fence.



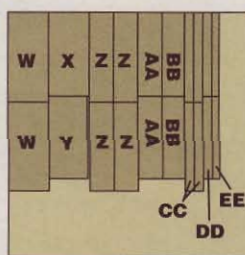
1/2" birch plywood



1/4" birch plywood



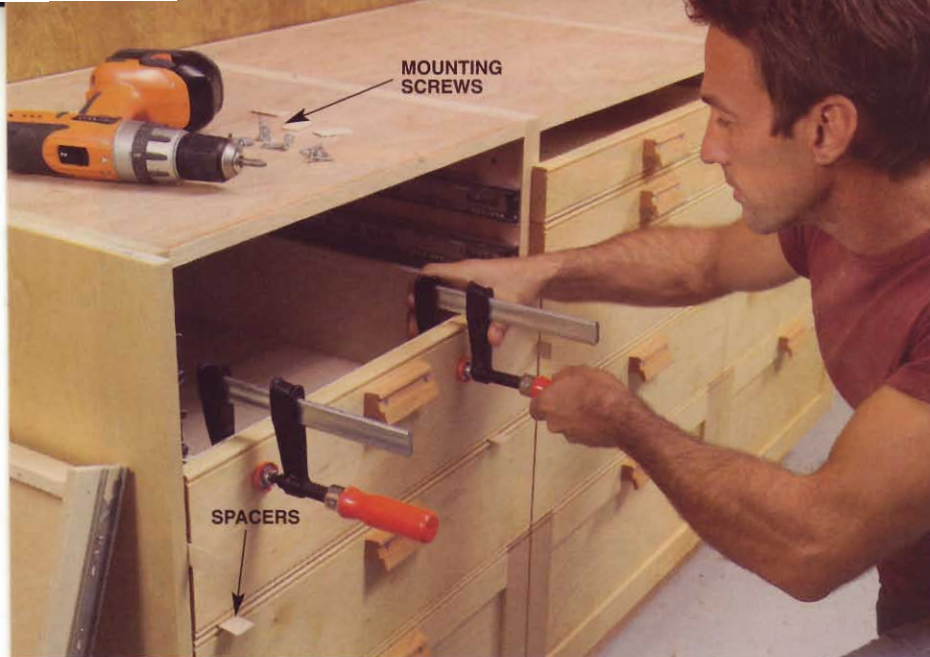
Two 1/4" birch plywood



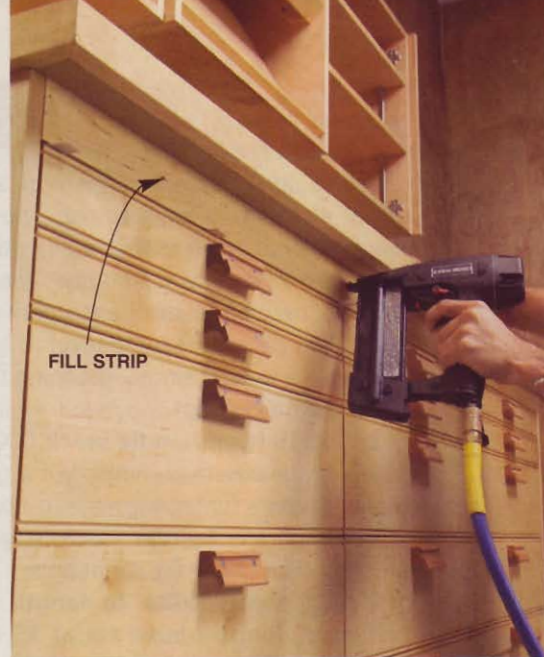
Three 1/2" Baltic birch



3/4" MDF

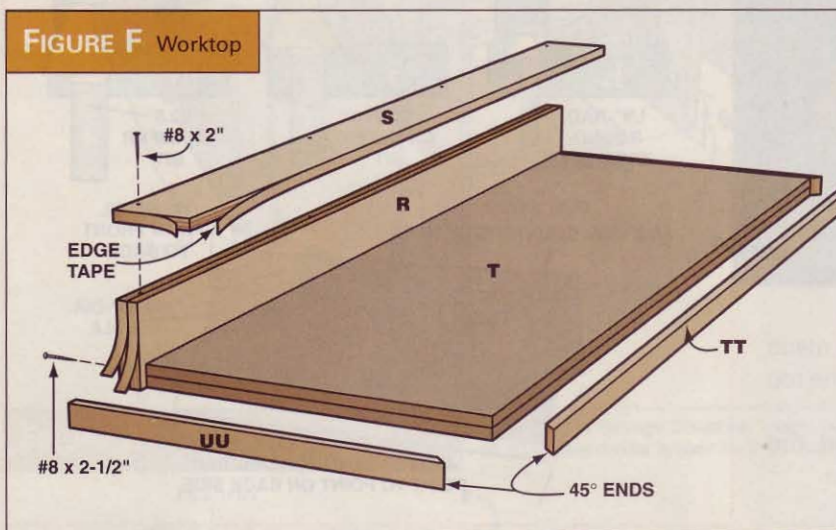


12 Clamp the drawer faces to the drawers using 1/16-in. spacers to maintain an even gap. Then pull the drawer out and attach the fronts with screws. The predrilled holes in the drawer box are slightly oversize to allow you to make minor adjustments to the drawer fronts.



13 Nail the fill strip in place. The drawers do not go all the way to the top of the cabinet because the overhanging worktop would prevent access to the back of the top drawer.

FIGURE F Worktop



place on the ledger and screw it to the wall (Photo 10). Attach the other two cabinets and install the angled shelves (Fig. B, page 46).

38. Scribe the upper end panels so their back edges fit tightly to the wall and the front edges protrude 13/16 in. from the cabinet face. Then screw them in place.

39. Level the base and screw it to the wall (Photo 11). Scribe the base fascia parts to the floor and wall and screw them in place. Set the lower cabinet boxes on the base, screw them together and then to the wall. Scribe and attach the end panels.

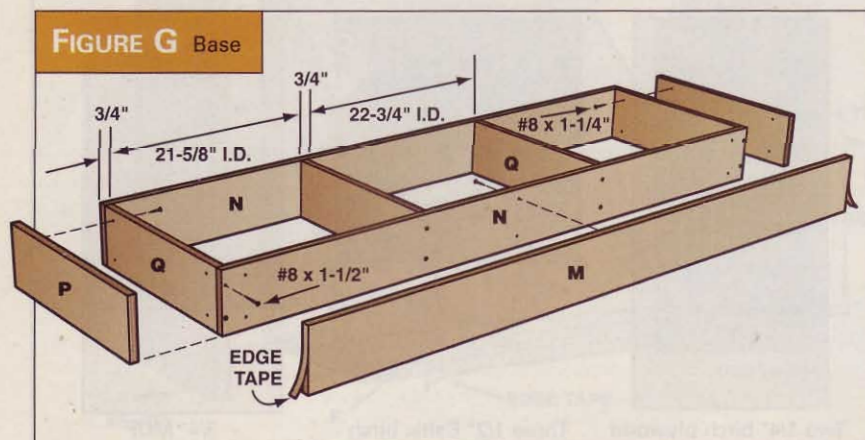
40. Working from the bottom up, insert each drawer and attach its drawer face (Photo 12).

41. Attach the backsplash to the worktop, then the worktop to the lower cabinets. Scribe the worktop shelf to the back wall if necessary, and screw it to the top of the backsplash.

42. Install the shelves and rehang the doors on the upper cabinets. Cut and install the fill strip (JJ) to the lower cabinets (Photo 13).

42. Finally, mount two 24-in. under-cabinet lights on the upper cabinets to light the worktop. **AW**

FIGURE G Base



CUTTING LIST

Overall Dimension: 73" W x 78-3/4" H x 26-1/4" D

	Part	Cabinet Section	Part Name	Qty.	Dimensions
3/4" birch plywood	A	Lower cabinets	End panels	2	3/4" x 24-1/4" x 31-1/2"
	B	Lower cabinets	Sides	6	3/4" x 22-1/2" x 31-1/2"
	C	Lower cabinets	Tops and bottoms	6	3/4" x 22-1/2" x 22"
	D	Upper cabinets	End panels	2	3/4" x 13-1/16" x 23-1/2"
	E	Upper angled-shelf cabinet	Sides	2	3/4" x 12-1/16" x 23-1/2"
	F	Upper angled-shelf cabinet	Top and bottom	2	3/4" x 12-1/16" x 22"
	G	Upper doored cabinets	Sides	4	3/4" x 11-1/4" x 23-1/2"
	H	Upper doored cabinets	Tops and bottoms	4	3/4" x 11-1/4" x 22"
	J	Upper doored cabinets	Shelves	4	3/4" x 11-1/8" x 21-7/8"
	K	Upper angled-shelf cabinet	Bottom shelf	1	3/4" x 22" x 17-1/2"
	L	Upper angled-shelf cabinet	Top shelf	1	3/4" x 22" x 11-1/2"
	M	Base	Front fascia	1	3/4" x 6-1/2" x 70-1/2"
	N	Base	Front & back	2	3/4" x 6" x 69"
	P	Base	End fascia	2	3/4" x 6-1/2" x 20"
	Q	Base	Cross supports	4	3/4" x 6" x 18-1/2"
	R	Worktop	Backsplash	2	3/4" x 5-3/4" x 73"
	S	Worktop	Shelf	1	3/4" x 5-1/2" x 73"
3/4" MDF	T	Worktop	Worktop	2	3/4" x 24" x 71-1/2"
1/2" birch plywood	U	Lower cabinets	Backs	3	1/2" x 23-1/2" x 31-1/2"
	V	Upper cabinets	Backs	3	1/2" x 23-1/2" x 23-1/2"
1/2" Baltic birch plywood	W	Drawer	Sides	6	1/2" x 10" x 22"
	X	Drawer	Fronts	3	1/2" x 10" x 20-1/2"
	Y	Drawer	Backs	3	1/2" x 9-1/2" x 20-1/2"
	Z	Drawer	Sides	12	1/2" x 6" x 22"
	AA	Drawer	Fronts	6	1/2" x 6" x 20-1/2"
	BB	Drawer	Backs	6	1/2" x 5-1/2" x 20-1/2"
	CC	Drawer	Sides	12	1/2" x 2-1/4" x 22"
	DD	Drawer	Fronts	6	1/2" x 2-1/4" x 20-1/2"
1/4" birch plywood	EE	Drawer	Backs	6	1/2" x 1-3/4" x 20-1/2"
	FF	Drawer	Bottoms	15	1/4" x 21-1/4" x 20-1/2"
3/4" birch	GG	Door	Panels	4	1/4" x 8-3/16" x 20-1/8"
	HH	Drawer	Panels	3	1/4" x 7-3/4" x 19-15/16"
	JJ	Lower cabinets	Fill strip	1	13/16" x 2-1/16" x 70-1/2"
	KK	Drawer	Faces	6	3/4" x 6-3/8" x 23-3/8"
	LL	Drawer	Faces	6	3/4" x 2-5/8" x 23-3/8"
	MM	Door	Stiles	8	3/4" x 2-1/8" x 23-1/2"
	NN	Drawer	Rails	6	3/4" x 2-1/8" x 20"
	PP	Drawer	Stiles	6	3/4" x 2-1/8" x 11-1/8"
	QQ	Door	Rails	8	3/4" x 2-1/8" x 8-1/4"
	RR	Upper cabinets	Ledger	1	3/4" x 2" x 70-1/2"
	SS	Upper angled-shelf cabinet	Shelf edging	4	3/4" x 2" x 22"
	TT	Worktop	Edging	1	3/4" x 1-1/2" x 73"
	UU	Worktop	Edging	2	3/4" x 1-1/2" x 24-3/4"
	VV	Upper angled-shelf cabinet	Shelf supports	2	3/4" x 1" x 18-15/16"
	WW	Upper angled-shelf cabinet	Shelf supports	2	3/4" x 1" x 15"
1" cherry	XX	Handles	Handles	19	15/16" x 1-9/16" x 4"

* includes 1/2" scribe allowance

Sources

Woodworker's Hardware
 (800) 383-0130, www.wwhardware.com
 Full-extension 22-in. drawer slides with 1-in. overtravel, KV8419 B22, \$13 ea.
 Blum self-closing 120-degree clip hinges, B071T5550, \$2 ea.
 Blum frameless 0-mm clip-hinge mounting plates, B175H710, \$1
 Hinge mounting-plate drilling template, B065.5300, \$5
 Blumotion insert for doors, B970.1002, \$3 ea.
 Blumotion face-frame double adapter plate,

B970.6701, \$1 ea.
 White birch preglued iron-on edge tape, 7/8 in. x 250 ft., ET078 PB, \$38
 Zinc-plated steel shelf standards, 5/8 in. x 24 in., KV0255 ZC 24, \$1 ea.
 Zinc-plated shelf support clips, KV0256 ZC, \$2 for a bag of 20.

Lee Valley & Veritas
 (800) 871-8158, www.leevalley.com
 Edge-tape edge trimmer, 99K40.01, \$14.

Woodworker's Supply
 (800) 645-9292, www.woodworker.com
 Freud adjustable 1-3/4-in.-dia. tongue-and-groove router bit set, 111-317, \$65
 Beaded edge bit, 1/8 in. rad., 820-410, \$34
 Dovetail bit, 1/2 in. dia. x 14 degrees, 819-396, \$7
 Core box bit, 1 in. dia., 819-354, \$14
 Chamfer bit, 1-1/4 in. dia. x 22.5 degrees, 115-571, \$30
 Round-over bit, 1/8 in. rad., 110-129, \$15
 Carbide boring bit, 35mm, 147-962, \$31.

6 STORAGE SOLUTIONS you can build into any cabinet

by Bruce Kieffer

1. SANDPAPER ROLL STORAGE

2. EYE-LEVEL
BIT STORAGE

4. SWING-OUT
BIT RACK

5. SANDPAPER
STORAGE

3. EASY-ADJUST
DRAWER DIVIDERS

6. HARDWARE BINS

1. SANDPAPER ROLL STORAGE

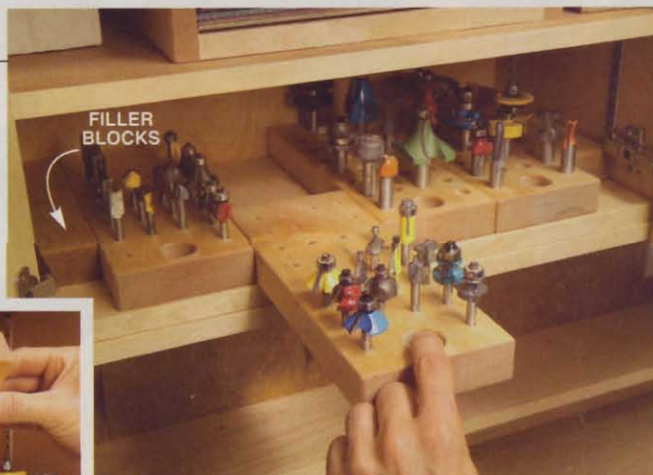
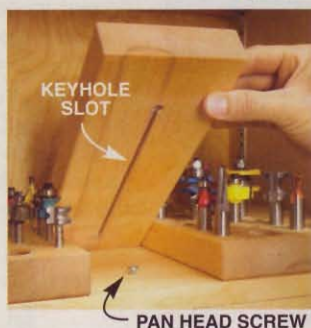
I use pressure-sensitive-adhesive (PSA) sanding discs. For easy access, I like to get them out of their packages and lined up by grit. I hang my rolls of sanding discs on horizontally supported dowels so I can quickly grab the right grit without looking at the back side of a disc.



2. EYE-LEVEL BIT STORAGE

Lots of folks store router bits in wood blocks. I turned mine into pull-out blocks mounted at the bottom of my upper cabinets. The shelves pull out and hang at eye level while you find the bit you need. Each pull-out block slides on a pan head screw captured in a routed keyhole slot on the bottom of the block (see inset). If you want to remove the block and take your bits to where you're working, just lift the block off the screw and go.

Rout the stopped keyhole slot in the center of each block. Drill a 1-in.-dia. x 1/2-in.-deep finger hole in the front of each pull-out block. On this cabinet, I use filler blocks to maintain clearance for the door hinges.



Source

MLCS, (800) 533-9298, www.mlcswoodworking.com
Carbide-tipped keyhole-cutting bit,
3/8-in.-dia. x 1/4-in. shank, #5438, \$9.

3. EASY-ADJUST DRAWER DIVIDERS

I've tried lots of different drawer dividers over the years, but none comes close to this system. Its beauty lies in its flexibility. As my storage needs change, so can my dividers—in an instant! These dividers are friction-fit against strips of 1/4-in.-thick closed-cell foam.

To make the foam inserts, cut pieces of 1/4-in.-thick fiberboard to fit across your drawer. Use spray adhesive to adhere 1/4-in.-thick closed-cell foam to the fiberboard. Then set the dividers into your drawer, measuring the distance you need between them. The best way to fit the dividers is to start long and slowly trim their lengths until they fit snugly.

Sources

A-1 Foam, (952) 253-1972

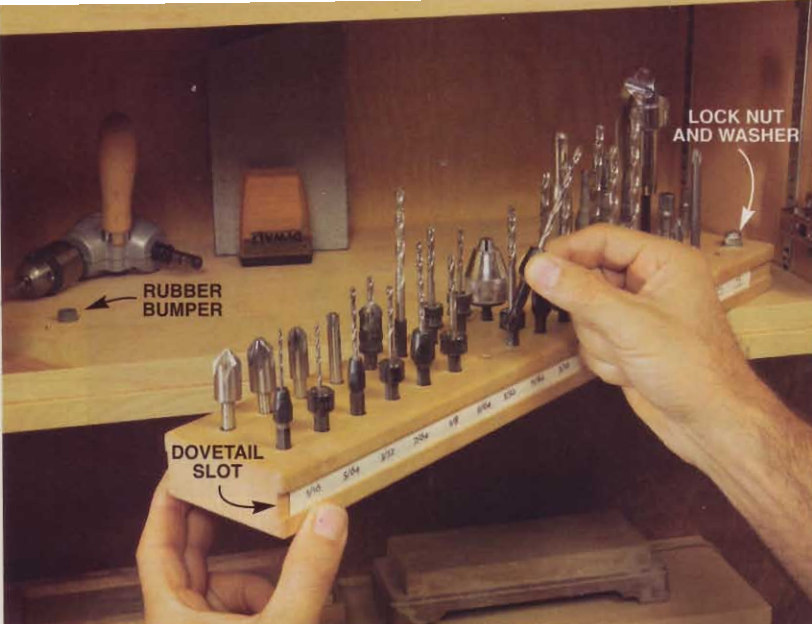
Dynaflex closed-cell foam, 1/4 in. thick, charcoal color,
#XL2000, \$1 per sq. ft.

K-grip foam and fabric spray adhesive, 13.25 oz., #701, \$11.

Sears, (800) 349-4358, www.sears.com

Craftsman drawer liners, mesh roll, 21-3/4 in. x 256-1/2 in.,
#65190, \$30 per roll.





4. SWING-OUT DRILL BIT RACK

This swing-out drill bit rack means no more peering into a dark cabinet or trying to reach over a forest of sharp bits to get the one way in back. Just swing out the block and all your drill accessories are right where you can easily and safely reach them.

The rack is 1-1/4 in. thick by 3 in. wide with a 17/64-in. pivot hole. The rack pivots on a 1/4-in. bolt mounted through the bottom shelf with a lock nut and washer. A rubber bumper acts as a stop. A couple of 1/8-in.-deep x 1/2-in.-wide dovetail slots are routed on the front and back edges of the rack to hold labels.



5. SANDPAPER STORAGE

Stored loose in a drawer, my sheet sandpaper curls like a potato chip, making it difficult to handle. This simple sandpaper storage tray solves the problem. The tray keeps an assortment of grits flat and ready for use. The lid is made from MDF, which is heavy enough to keep the sandpaper flat. Attach a grab knob to the center of the lid.



6. THE RIGHT SCREW RIGHT AT YOUR FINGERTIPS

Nothing is more annoying than fumbling through odd-sized, tattered cardboard screw boxes, paper bags or, worse yet, old coffee cans. These translucent plastic boxes, which cost less than a buck apiece, make organizing screws a snap. I use two sizes of lidded boxes and one size of unlidded boxes. I place fasteners I use often into the unlidded bins. Those I use less often go into the lidded boxes; a label stuck to each lid makes it easy to identify what's in the box.

Sources

United States Plastic Corp., (800) 809-4217, www.usplastic.com
 42-dram translucent Flex-A-Top Box,
 2-1/8 in. x 2-1/8 in. x 2-5/8 in., #201203, \$0.32 ea.
 104-dram translucent Flex-A-Top Box,
 4-7/32 in. x 1-23/32 in. x 4-5/8 in., #201204, \$0.78 ea.
 Bin cups for shelf bins, 3-1/4 in. x 2 in. x 3 in.,
 #52299, \$0.28 ea. **AW**



craftsman frame

by Jock and Susan Holmen

Pegged half-lap joints are the cabinetmaker's way to build a beautiful frame.

Picture frames are pretty easy to make, except when it comes to putting the pieces together. Getting four mitered corners perfectly cut and glued can drive you batty! This frame uses a simpler approach—the half-lap, a traditional furniture maker’s joint. It’s very easy to make on the tablesaw and resembles a much more complicated mortise-and-tenon joint.

If you’ve never made a picture frame or lap joint before, this is a great project to start with. And it’s easy to make a whole bunch of these frames at the same time. We’ll show you an optional goof-proof sled that helps make cutting dozens of joints simple, safe and accurate.

Our frame is teak, a wood whose rich golden color beautifully complements most photos or artwork. Using quartersawn white oak would also look striking. This is a traditional Arts and Crafts-style frame, and quartered oak was the preferred wood of that era. If you’ve got some 8/4 (2-in.) wood, you can make top-grade quartersawn pieces for this frame by ripping the board at an angle (see “Make Your Own Quartersawn Lumber,” page 63).

We’ve sized the frame to fit precut matte and glass available at many craft stores, so you don’t have to cut your own. The matte is 11 x 14 in. and fits an 8 x 10-in. photo.

You’ll need a stacking dado set for your tablesaw to make the lap joints. (A wobble-type dado set won’t work

because it doesn’t cut a flat bottom.) You’ll also need a rabbeting bit for your router table (Photo 8). We recommend using a brad-point drill bit for the pegs that go into the frame’s corners (see Sources, page 65). This bit makes a cleaner entry hole than a standard twist bit.

The uprights, or stiles (A, Fig. A, below), of this frame are 5/8 in. thick. The cross pieces, or rails (B), are 3/4 in. thick. If you don’t have a planer to thin down pieces to 5/8 in., that’s not a problem. The pieces are so narrow that you can make them the right thickness on your tablesaw. Just stand some 3/4-in. pieces on edge and rip them to 5/8 in.

Begin by cutting the stiles and rails to final width and length (see Cutting List, below). At the same time, make two extra stiles and two extra rails from an inexpensive wood to use as test pieces when you cut the joints.

PROJECT REQUIREMENTS AT A GLANCE

Tools:

Tablesaw, planer, jointer, router table, drill press, flush-cut saw, chisel, mallet, 1/4-in. drill bit, 1/4-in. rabbeting router bit.

Materials:

2 bd. ft. of hardwood lumber, one 1/4-in. walnut dowel rod.

Cost per picture frame:

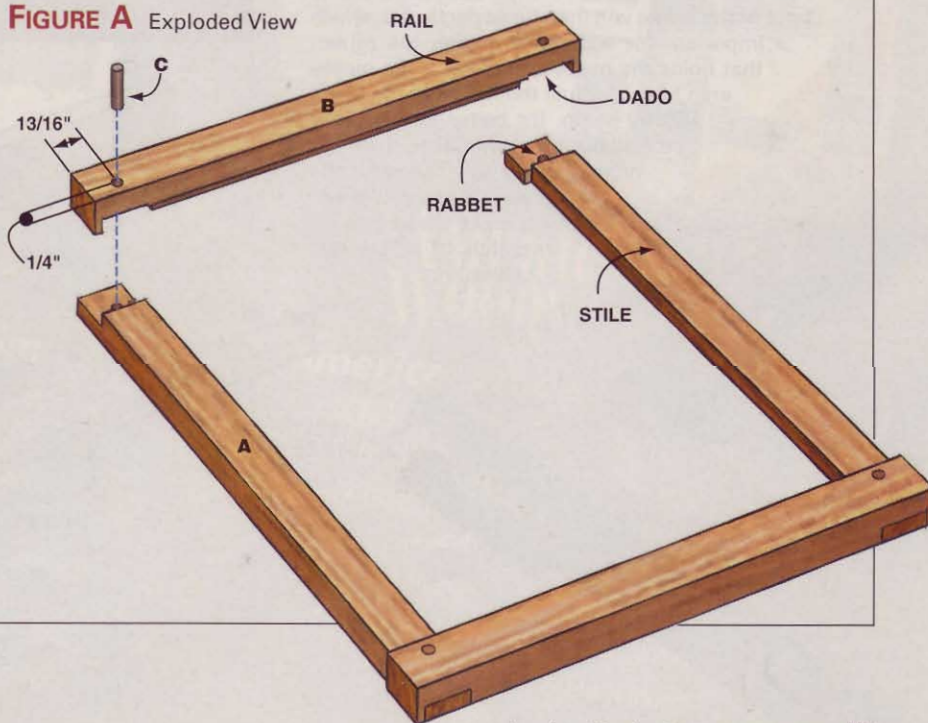
Under \$10.

CUTTING LIST

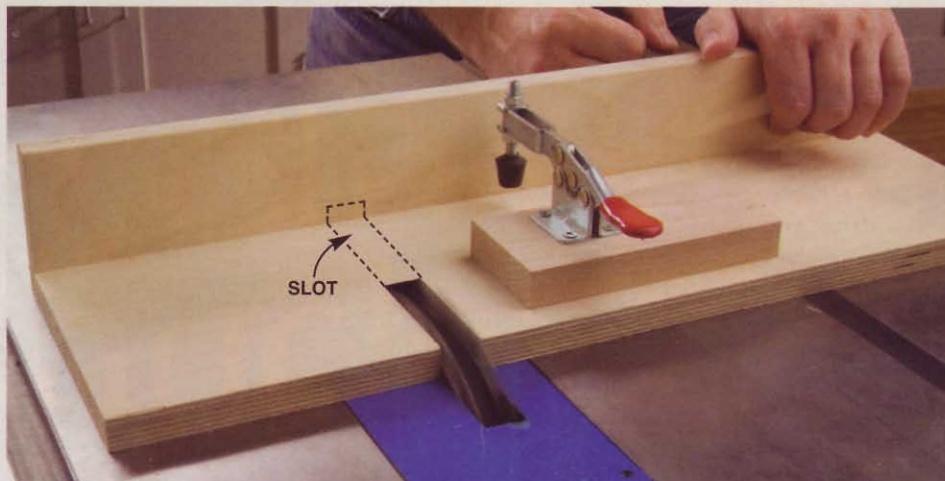
Overall dimensions:
3/4" x 13-5/16" x 16-1/16"

Part	Name	Qty.	Dimensions
A	Stile	2	5/8" x 1-1/8" x 16-1/16"
B	Rail	2	3/4" x 1-1/4" x 13-5/16"
C	Peg	4	1/4" dia. x 3/4" long

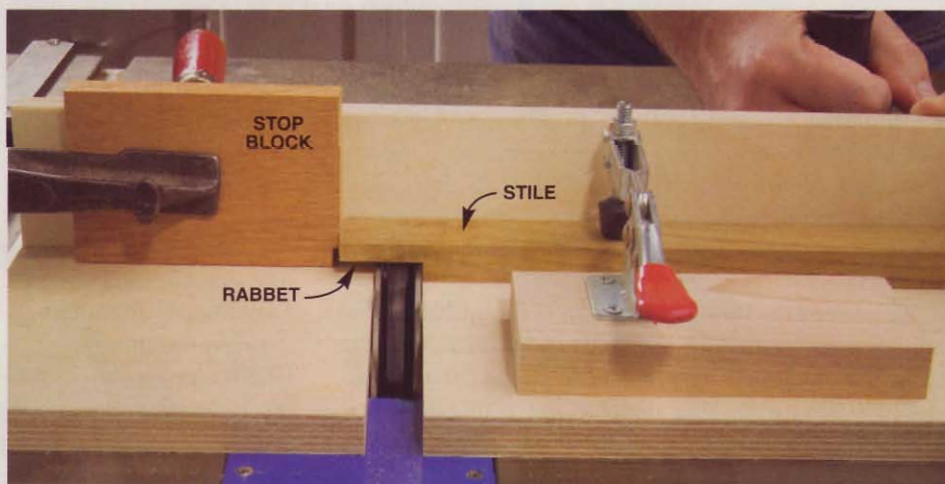
FIGURE A Exploded View



1 Build a sled to cut the half-lap joints (Fig. B, below). You could simply use a fence on your miter gauge, but this sled is more accurate, is safer and always delivers consistent results. Install a 3/4-in. dado set in your saw and raise the blade 1/8 in. above the sled. Cut a slot through the sled's base and you're ready to go.



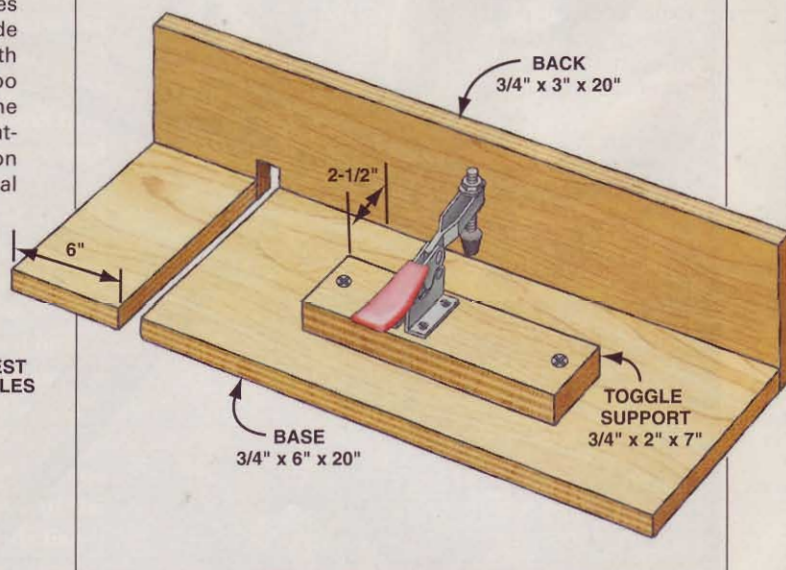
2 Cut a rabbet on one end of each of your spare stiles (Fig. C, page 61). Your goal is to remove exactly half the thickness. Clamp the stop block so the length of the rabbet matches the width of a rail. Two passes are necessary to cut the full rabbet.

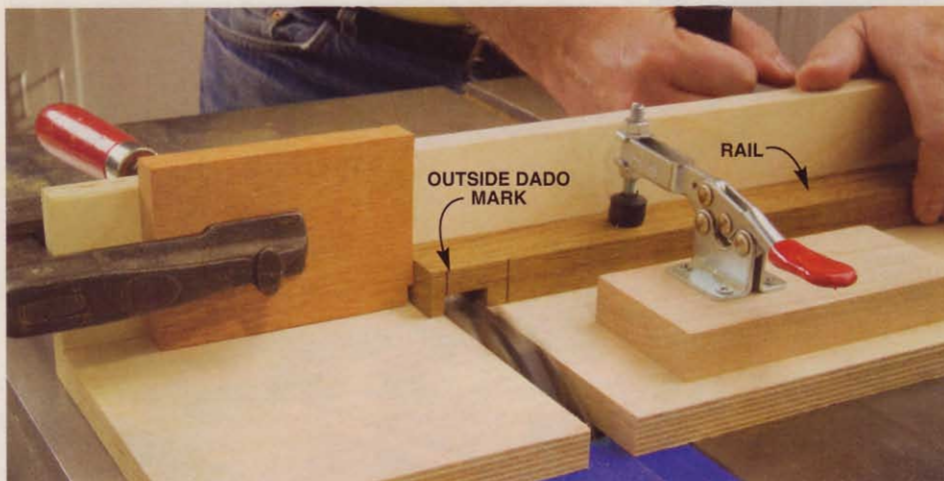


3 Test the fit until the two test pieces are flush. The back of the frame will then be perfectly flat, which is important for accurately cutting the rabbet that holds the matte and glass. If the pieces aren't flush, adjust the height of the blade and try again. It's better to start with the blade too low rather than too high, because you can recut the same pieces. When you're satisfied, make these cuts on the ends of all the real stiles.

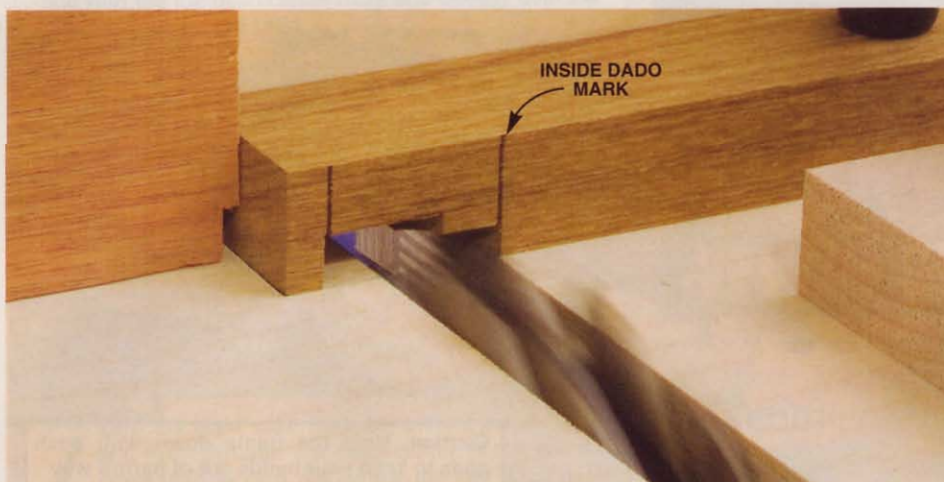


FIGURE B Dado Sled



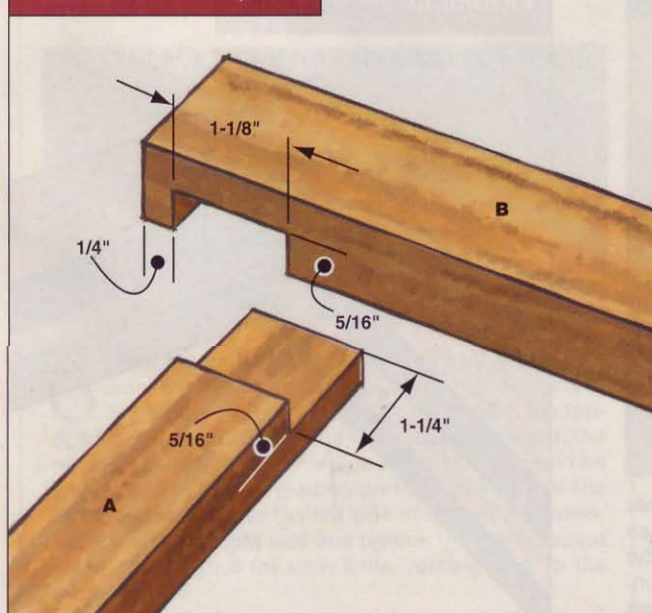


4
Cut the first half of the dados in all the rails with the blade at the same height as in Step 2. The full dado requires two overlapping cuts. You'll clamp the stop block in a different position for each cut. For the first cut, mark the dado on a test rail. Line up the outside mark with the right-hand cut in the sled.



5
Cut the second half of the dado only in a test piece. Move the stop block so the inside dado mark lines up with the left-hand cut in the sled.

FIGURE C Half-Lap Joint



6
Test fit one corner. Your goal is to have the two pieces slip by each other to make a tight fit without requiring any force. If the joint is too tight, move the stop block and recut the test piece. If the joint is too loose, make the dado narrower by adding a piece or two of tape to the stop block's end. Try the new setting out on the second test piece. When you're satisfied with the fit, continue cutting the actual rails. Sand all the pieces to 150 grit. Slightly round all the edges with sandpaper.



7 **Glue the frame** together. You don't need much glue or clamping pressure. Spring clamps work fine, so you don't have to worry about marring freshly sanded surfaces. Remove any squeezed-out glue with a sharp stick before the glue hardens. Wipe off the stick's glue on a damp rag as you go.



8 **Rout a rabbet** all the way around the frame's back (Figure D). Use a rabbeting bit with a ball-bearing pilot. The pilot rides on the inside of the frame to control the depth of cut. Make this cut in two passes. Raise the router bit so the first cut is 1/4 in. high; then raise the bit so the second cut is 3/8 in. high.



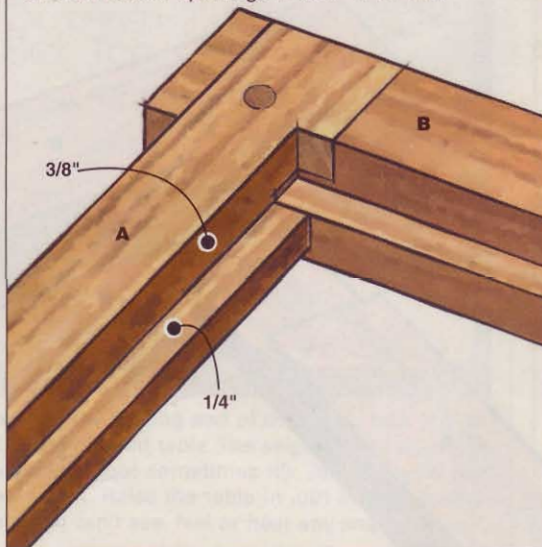
Caution: Hold the frame down with push pads to keep your hands out of harm's way.



9 **Square the rabbet's corners** using a wide chisel. Cut across the grain first, then with the grain, then across again, and so on, taking small cuts to avoid splintering the wood. When the rabbet is complete, order the glass. It should be 1/16 in. smaller than the opening. To be on the safe side, your best bet is to give the frame to the glass cutter. (Precut 11 x 14-in. glass to fit the frame is also widely available.)

FIGURE D Rabbet

Overall rabbet opening: 11-1/16" x 14-1/16"



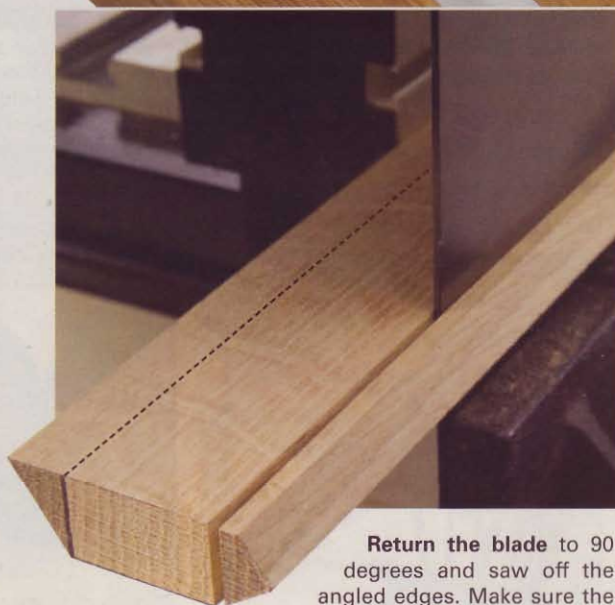
Make your own Quartersawn Lumber

If you've got some spare 8/4 (2-in.) lumber lying around your shop, it's easy to transform it into stunning quartersawn wood for your picture frame. Quartersawn figure in almost every wood is really something special, and quite different from species to species. Even an ordinary piece of thick oak, maple or cherry has a surprise waiting within it.

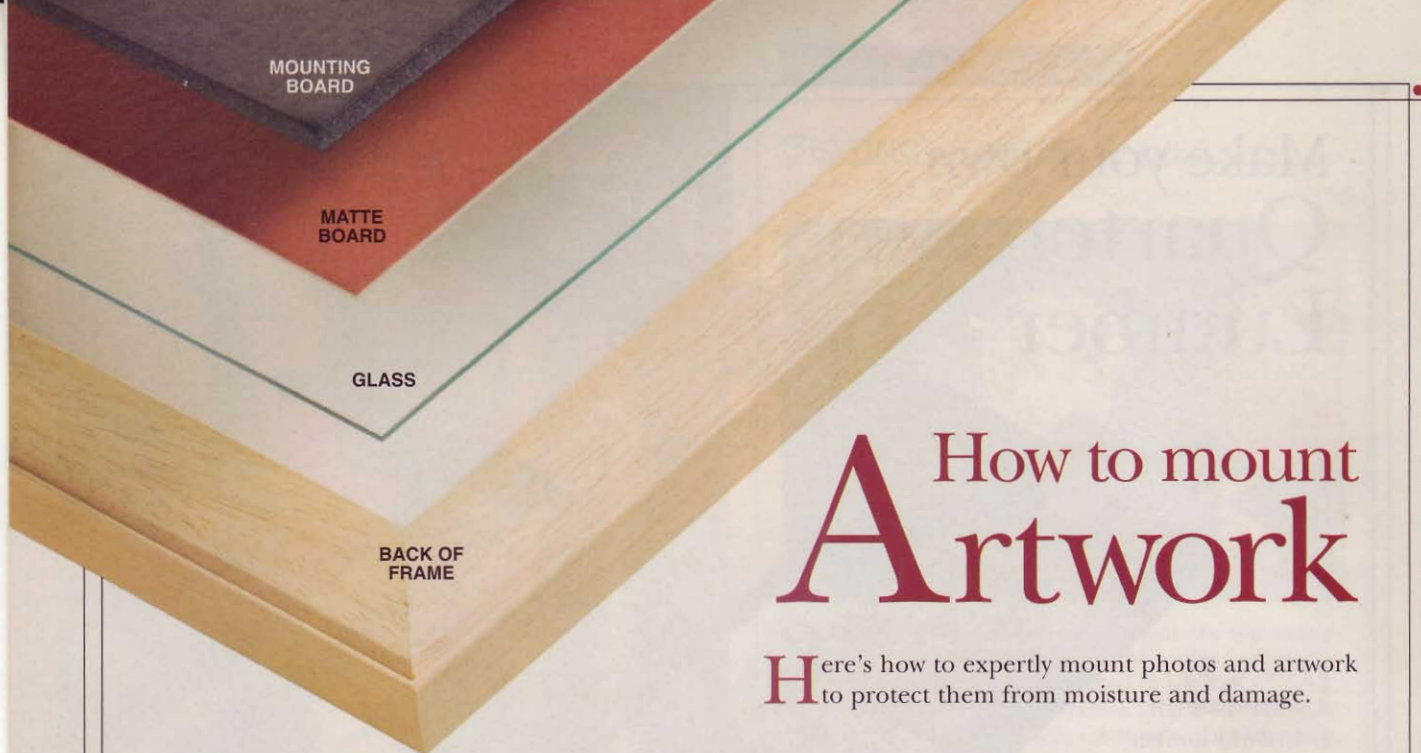


Mark both ends of a milled 8/4 board with a series of parallel lines that run at right angles to the growth rings. Tilt the blade to match the angle of the first cut—just eyeball it. Move the fence and make the second cut at the same angle.

Next, turn the board around and repeat the same procedure for the other outside edge. Continue to work your way from the outside in, so the last cuts you make are for the center pieces, where your drawn lines are almost vertical.



Return the blade to 90 degrees and saw off the angled edges. Make sure the edge that runs along the fence has the point facing up. If it faces down, it could get trapped underneath the fence. Run the pieces through the planer, and you're ready to make a very special picture frame.

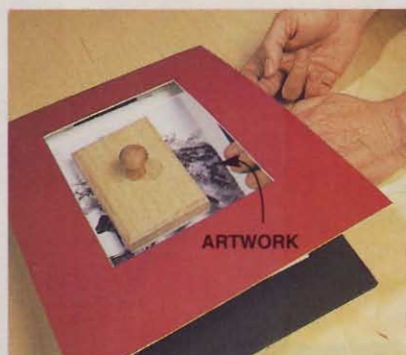


How to mount Artwork

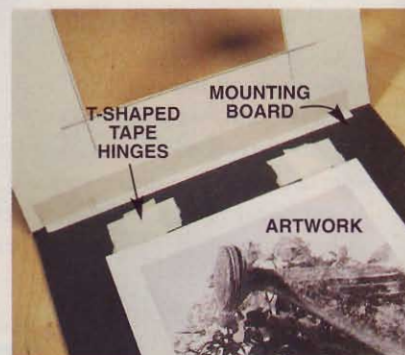
Here's how to expertly mount photos and artwork to protect them from moisture and damage.



1 Hinge the matte to a mounting board (a solid piece of acid-free matte or foam core board). Butt the top edges together and secure them with acid-free mounting tape (see Sources, page 65).



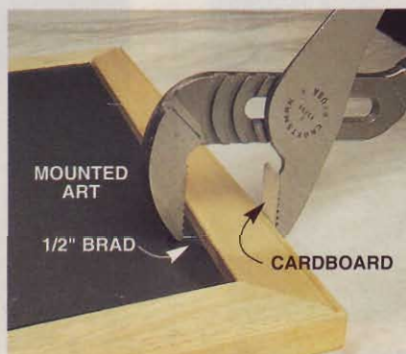
2 Position the artwork in the matte's opening. Keep the artwork from shifting by weighing it down with a block of wood that has acid-free matte board glued to its bottom.



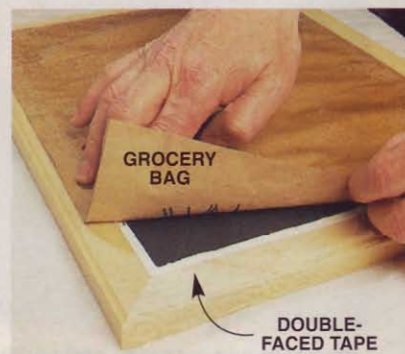
3 Mount the art to the mounting board using T-shaped hinges, which allow the artwork to expand and contract, staying wrinkle-free. Fasten the tape sticky-side up on the back side of the artwork, at the top corners only. Place a second piece of tape, sticky-side down, as close to the artwork as possible.



4 Install clean glass. The best way to keep fingerprints, dirt and lint off the matte and glass is to wear darkroom gloves. Install the artwork, mounting board and matte.



5 Secure the assembly with brads or glazier's points. The safest way to push in the brads is by using a pair of adjustable pliers.



6 Protect the artwork from dust and insects by sealing the back of the frame with a paper dust shield. A grocery bag or kraft paper works fine. After installing the paper, dampen it with a sponge. The paper will shrink as it dries, leaving a tight, wrinkle-free dust shield.



10 **Drill a hole** all the way through each corner of the frame using a brad-point bit. Glue 1/4-in. dowels into each hole. Use a contrasting wood to emphasize this accent (see Sources, below). Small dowels vary in diameter, so it's a good idea to drill a test hole first. You may need to switch to a slightly undersize bit to get a good fit. The brad point bit I used comes in 1/64-in. sizes (see Sources).

Sources

Groff & Groff Lumber Co.
(800) 342-0001, www.groffslumber.com
4/4 teak, \$16 per bd. ft.

The Wood & Shop Inc.
(314) 731-2761, www.woodnshop.com
1/4-in.-dia. x 36-in. walnut dowel, #221077, \$2.

Lee Valley Tools Ltd.
(800) 871-8158, www.leevalley.com
Veritas flush-cut saw, single edge, #05K34.01, \$15
1/4-in. brad-point drill bit, #07J02.16, \$4.

Woodworker's Hardware
(800) 383-0130, www.wwhardware.com
CMT 1/2-in.-shank rabbeting router bit set, #CMT835.501.11, \$44.

PENCO Graphic Supply Inc.
(800) 967-7367, www.artsuppliesonline.com
Acid-free matte board, 32 x 40-in. sheets, \$12 to \$19
Gummed frame/hinge-sealing tape, #LI533-0751, \$10
Darkroom gloves, #PGS, \$1 per pair.



11 **Cut off the dowels** with a flush-cut saw. Hold the blade down against the frame, press into the dowel and saw slowly. A good flush-cut saw shouldn't leave any saw marks on your frame, but it's a good idea to practice first on the back of the frame. Only a minimum of cleanup sanding is necessary. Finish the frame with shellac or varnish.



12 **Fit the glass, matte, photo or art** into the frame and secure with fasteners. For more information on installing these materials, see "How To Mount Artwork," page 64. Attach hangers or eye hooks and wire onto the back of the frame. **AW**

Tips for Mastering FEATHER

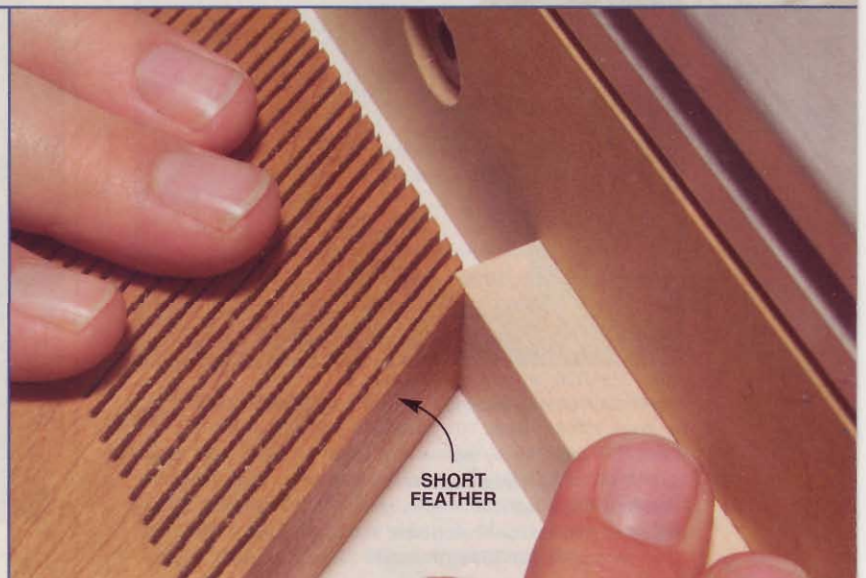
Featherboards are like having an extra set of hands in the shop, going where no fingers ever should.

The featherboard gets its name from the rows of flexible “fingers” that act like a bird’s feather and give way in one direction only. They help ensure safety and accuracy, because they keep consistent pressure on stock where it’s needed most, close to the cut. They’re indispensable for eliminating bumps on a molded edge or uneven bottoms in rabbets and dados.

Shop-made featherboards are often superior to commercial ones, because they can be custom fit to your machines and they cost next to nothing. All the featherboards in this article were made from the type of scrap lumber and plywood that can be found in any shop.

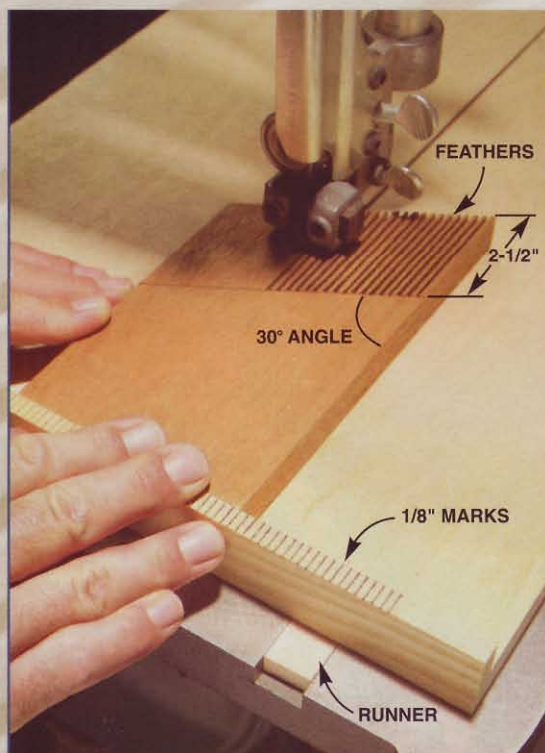
PERFECT PRESSURE EVERY TIME ►

Positioning a featherboard can be a pain. Too close to the fence or table and the squeeze is so tight you can barely feed the stock. Too loose and you’ve lost effectiveness. Try taking about 1/8 in. off the first feather. Set that end against the stock you plan to machine and clamp the featherboard parallel to the table’s fence. The pressure should automatically be just right.



BOARDS

EDITOR: DAVE MUNKITTRICK • ART DIRECTION: VERN JOHNSON • PHOTOGRAPHY: RAMON MORENO • ILLUSTRATION: FRANK RHORBACH



◀ FEATHERBOARDS MADE EASY

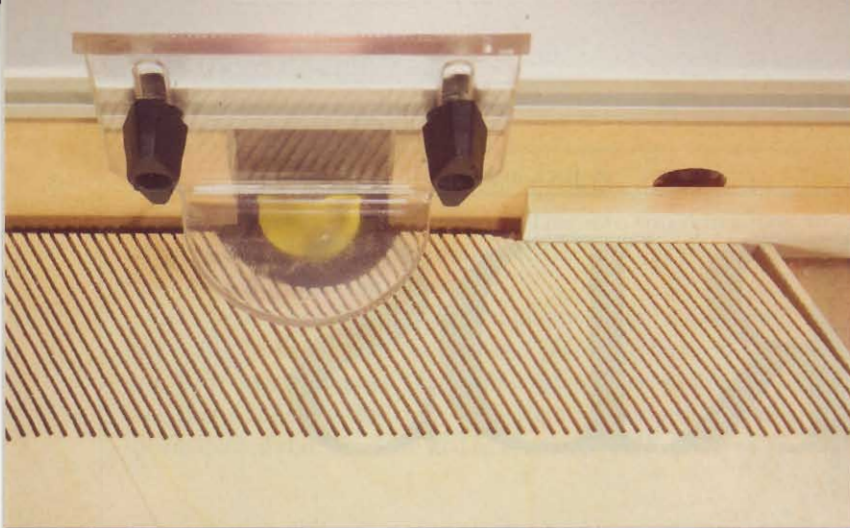
The safest way to make featherboards is on the bandsaw using a simple sled with a miter slot runner. Cut a 30-degree angle on one end of the featherboard blank first. Mark a parallel line about 2-1/2 in. from the angled end. Set the blank on the sled and make the first cut from the end to the line. Then, slide the featherboard over to the next mark to make the second cut and continue across the board's width.

A feather length of about 2-1/2 in. with cuts made every 1/8 in. provides the right balance between flexibility (for firm pressure without being too stiff) and strength (so the feathers won't snap off) for most hardwoods or multi-ply birch. Increase the feather spacing to 3/16-in. when you are using softer woods, such as pine or basswood, or regular hardwood plywood. You can always fine-tune the length and spacing to suit your own needs.

TALL SUPPORT FOR TALL STOCK ▶

A tall featherboard can apply pressure against the entire height of the fence. It's especially useful for holding tall, narrow stock—for instance, a door panel—against a fence. Just glue some scraps to create a block that is as tall as your fence is. Then, cut the feathers on your bandsaw sled.





◀ BIT-BRIDGING FEATHERBOARD

This wraparound featherboard produces chatter-free moldings, because it provides continuous pressure ahead of and behind the cutter. Cut a 2-in. arc in the end of the blank before you cut the feathers.

GUARANTEED SQUARE EDGES ▶

Jointing an absolutely square edge on a wide board can be tricky for someone new to the jointer. The least little tip away from the fence and you'll have to start over. This paddle-style featherboard can bridge your jointer's guard while keeping your stock pushed firmly against the fence. The paddle featherboard is easy to make and is just as useful on a tablesaw or router table (Fig. A, below).

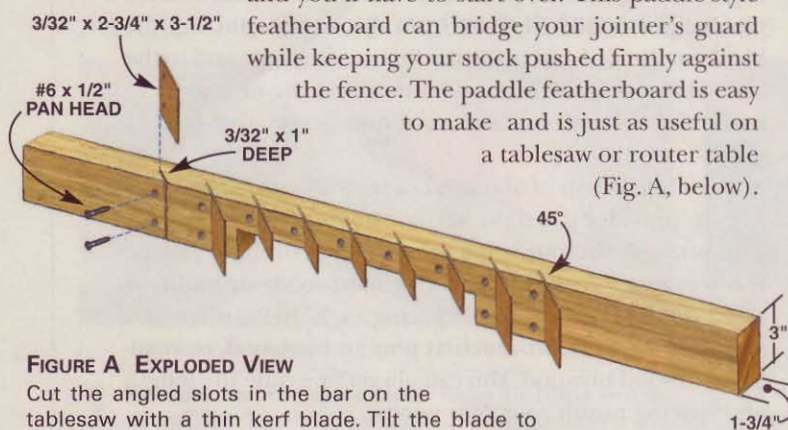
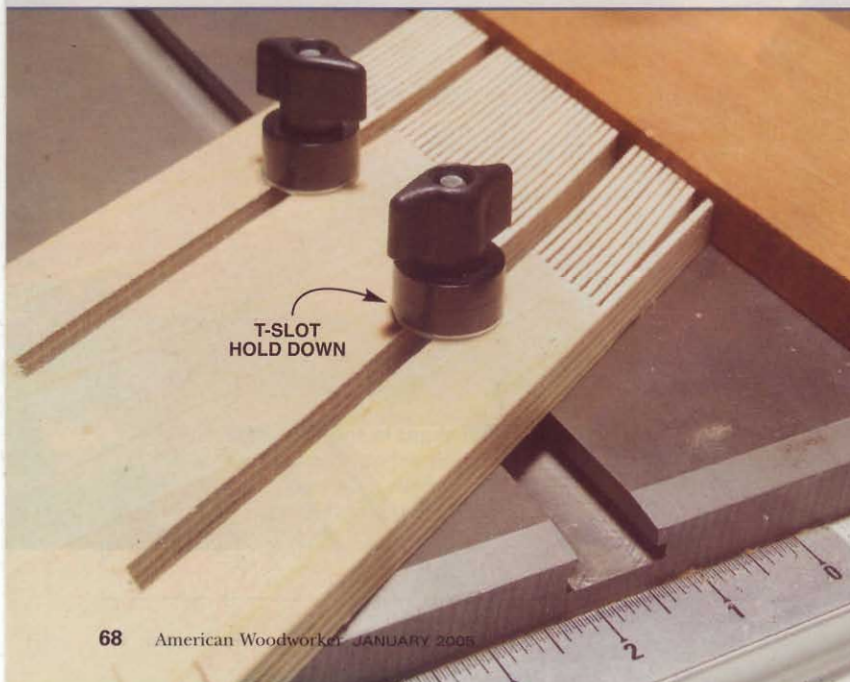


FIGURE A EXPLODED VIEW

Cut the angled slots in the bar on the tablesaw with a thin kerf blade. Tilt the blade to 45 degrees and use your miter gauge to guide the bar. Plane paddle stock to fit the slots. Each paddle is screwed into place. This allows you to replace broken paddles or use longer, more flexible ones.

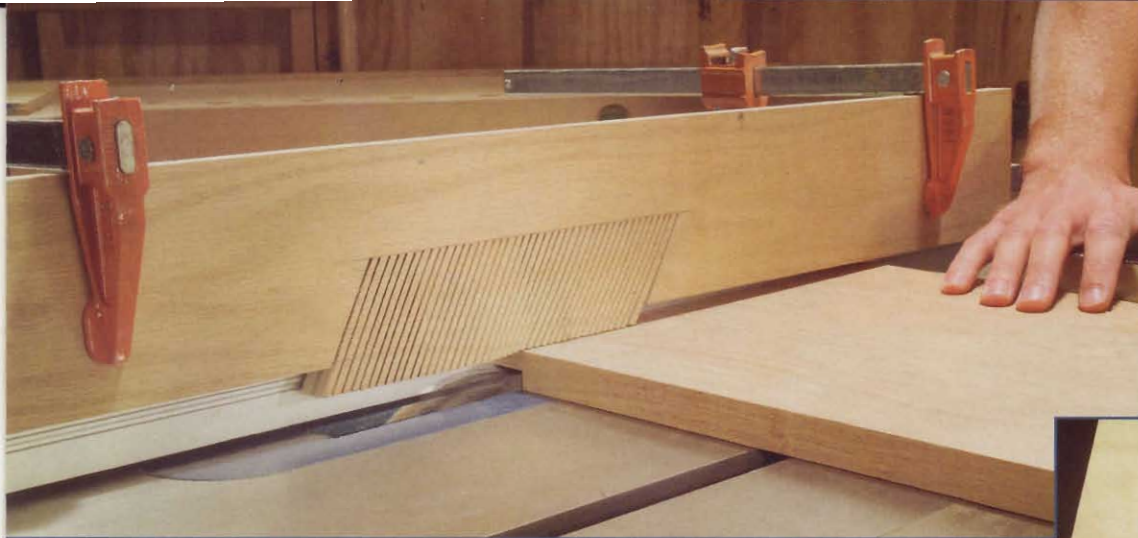


◀ QUICK, EASY FEATHERBOARD FASTENERS

Clamping a featherboard on a tablesaw can be a hassle. T-track fasteners allow you to quickly and easily position a featherboard just ahead of the blade for rip cuts. To make this style of featherboard, cut deep slots for the T-track fasteners as you cut the feathers on your bandsaw.

Source

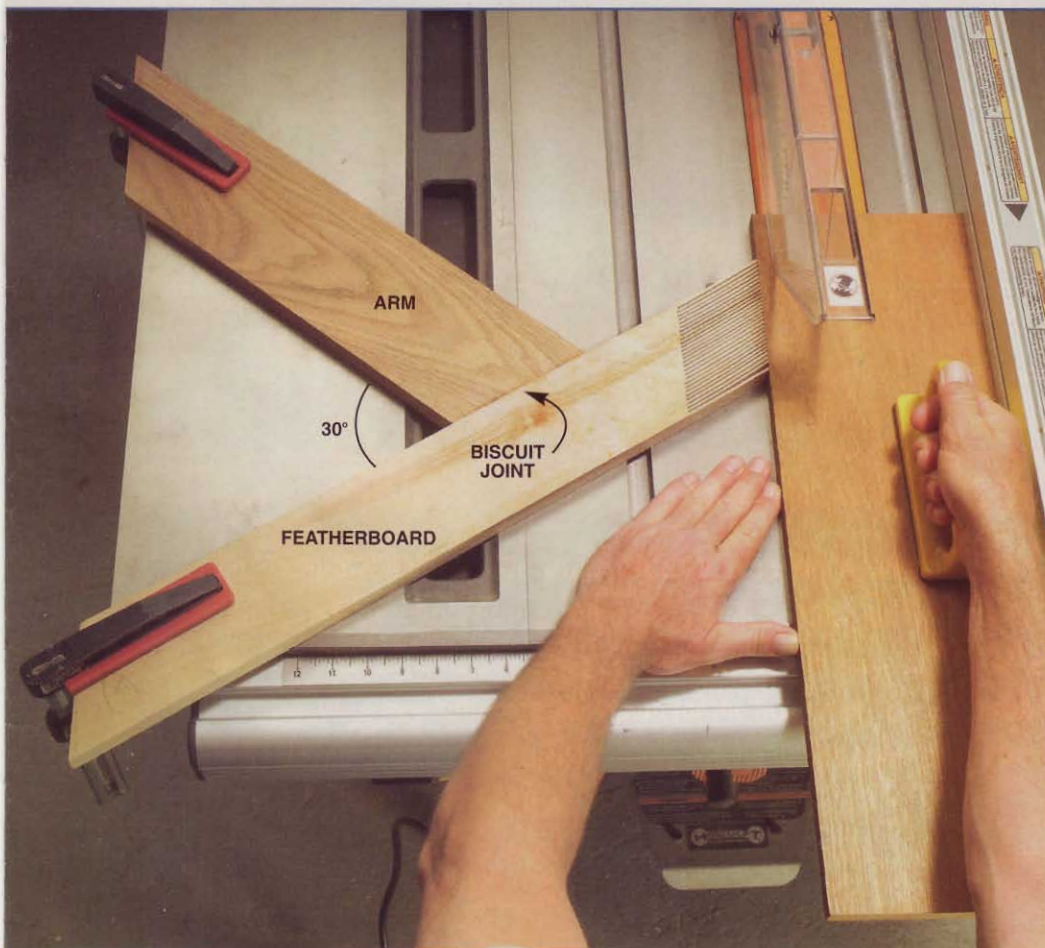
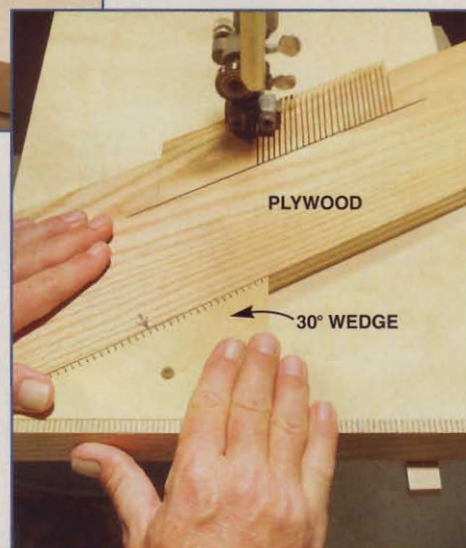
Woodcraft, 800-225-1153, www.woodcraft.com
Trax Miter T-Slot Fixture Kit, #143239, \$6.



▲ SHORT-FENCE FEATHERBOARD ►►►

Sometimes you want a featherboard to apply pressure right over the blade, as when you're cutting a rabbet. But clamping a long, narrow featherboard onto a short fence can give you fits. This long plywood featherboard is just the ticket. It clamps easily onto the squat tablesaw fence because the clamps are far removed from the feathers and the blade.

Most featherboards are made with the feathers parallel to the grain, but this one requires the feathers to be cut across the grain. Be sure to make it from plywood or your cross-grained featherboard will start to look like my 8-year-old's smile—lots of missing teeth. To cut these feathers, use the same sled as you do for the parallel-grain boards, but add a 30-degree wedge.



◀ LONG-REACH FEATHERBOARD

A long arm on a featherboard takes the hassle out of clamping it on a tablesaw. Featherboards need to be secured at two points to prevent pivoting. Securing a single featherboard across a tablesaw's large expanse can be difficult, if not impossible. The solution is to biscuit an arm at a 30-degree angle to the featherboard. Position the featherboard just in front of the blade for rip cuts. **AW**



Tool Review

Backyard Sawmills

From \$90 to \$6,000, there's a machine for anyone who has ever dreamed of making lumber.

by Randy Johnson

We all love wood, whether it's a wide clear board or a gnarly slab with wild grain. That's why sawing our own lumber crosses the minds of most woodworkers. It might be inspired by the sight of a big tree blown down by a storm, a custom tabletop made from only one or two slabs of unusual wood or the thought of free wood. Whatever reason, the idea of do-it-yourself lumber making holds a certain amount of intrigue for most of us.

ART DIRECTION: DAVID SIMPSON • PHOTOGRAPHY: SHAWN NEILSEN, UNLESS NOTED



Yielding to my own curiosity about lumber making, I checked out nine sawmills ranging in size from very small to medium. The mills fall into two broad groups: handheld and frame-mounted.



Now here's a board to brag about! At 2-1/4 in. thick by 20 in. wide by 9 ft. long, this white oak board has exciting tabletop possibilities.

TWO TYPES OF MILLS

HANDHELD

Most handheld mills fit into the trunk of a car and are easy to carry into the forest or to wherever you plan to cut your lumber. They range in weight from 7 to 45 lbs. and in price from \$90 to \$1,600—excluding a chainsaw, which they all use. I used a Huskavarna 385XP (\$800) for power. It's has about 85 cc. You can get by with a smaller chainsaw, but it may test your patience.

Handheld mills have the distinct advantage of being lightweight and extremely portable.



Granberg Mini Mill II

FRAME-MOUNTED

Frame-mounted mills stand on the ground. They weigh from 85 to 1,900 lbs. and must be towed or hauled in a trailer or pickup truck. They range in price from \$2,000 to \$5,700 for an entry-level machine.

Compared with handheld mills, frame-mounted mills work faster, require less muscle to operate and will generally make straighter, smoother cuts.



PHOTO: MANUFACTURER

Cook's MP-32 shown with optional trailer package

GRANBERG INTERNATIONAL MINI MILL II

The Mini Mill II attaches directly to the chainsaw bar with two bolts. The mill follows a metal guide strip that you screw onto a 2x6 guide board. The mill comes with six 2-ft. sections of guide strips, but you can purchase more. The guide board mounts to the log with two nails at each end and must be reattached for each cut. The upside to attaching the guide board each time is that each cut will be as straight as the guide board. I found the vertical operating position surprisingly comfortable, because you do almost all the pushing with your arms and legs rather than your back. I raised the log on a pair of supports to keep the tip of the chainsaw bar from hitting the ground. I made this 8-in. x 8-in. x 8-ft. oak beam in about 20 minutes.

Cost: \$90, without chainsaw.

Weight: 7 lbs., without chainsaw.

Maximum log diameter: Chainsaw bar length minus 2 to 4 in.

Maximum cutting width: Chainsaw bar length minus 2 to 4 in.

Maximum cutting thickness: Unlimited.

Maximum cutting length: Unlimited.

Recommended chainsaw: 56 cc or larger.

(866) 233-6499, www.granberg.com



MY FAVORITE HANDHELD MILL

PRO: Very comfortable milling position.

CON: Reattaching guide board for each cut.

PATRICK HUNTER



LOGOSOL TIMBERJIG

The Timberjig attaches to the same two bolts that hold the chain bar to the saw. It uses a guide board only for squaring the log. After that, the jig's guide fence follows the cut surface of the log. The mill's horizontal position allows you to saw a log on the ground without risk of hitting the ground. Or you can raise the log to waist height and saw it without bending over.

Cost: \$165, without chainsaw.

Weight: 11 lbs., without chainsaw.

Maximum log diameter: Length of chainsaw bar minus 2 in.

Maximum cutting width: Length of chainsaw bar minus 2 in.

Maximum cutting thickness: 9 in.

Maximum cutting length: Unlimited.

Recommended chainsaw: 56 cc or larger.

(877) 564-6765, www.logosol.com



The MK-III rides on two 2x4s for the first squaring cuts. The 2x4s are connected to each other with T-track at both ends. The T-track permits the 2x4s to be adjusted for wide or narrow logs.

GRANBERG INTERNATIONAL ALASKAN MK-III MILL

The Alaskan MK-III Mill comes in five lengths, from the 24-in. model shown here to a lanky 56-in. model for *really* big logs. The mill attaches to both ends of the chainsaw bar. Dual guide bars provide a wider, more stable guide system than those on other handheld mills. You must be careful, however, not to let the mill tip or ride up while sawing or you will produce an uneven cut, which will affect all future cuts. Pushing the saw through the log requires a good amount of back muscle and cutting a lot of lumber with this mill will give you a serious workout.

Cost: \$185 to \$245, without chainsaw.

Weight: 16 to 21 lbs., without chainsaw.

Maximum log diameter: 21 to 53 in.

Maximum cutting width: 21 to 53 in.

Maximum cutting thickness: 13 in.

Maximum cutting length: Unlimited.

Recommended chainsaw: 65 cc or larger.

(866) 233-6499, www.granberg.com



After the log is squared, the guide bars ride directly on the surface of the log for all future cuts. The guide bars clamp to vertical supports and are adjustable to control the cut's thickness.



The Ripsaw uses an extruded-aluminum beam as a guide to square the log. This sturdy, straight guide system is the best among those for all the handheld mills I tried. The adjustable mounting brackets make it very easy to level the beam on the log or square it with a previous cut.



It takes less effort to push the Ripsaw mill through a log than it does a chainsaw mill, because the Ripsaw's bandsaw blade takes only a 1/16-in. kerf. Wedges screwed to the ramp stand keep the log from rolling during sawing.

SOUTHEASTERN INDUSTRIAL RESOURCES RIPSAW

The Ripsaw handheld bandsaw mill uses a chainsaw engine for power. Its thin 1/16-in. kerf makes the mill much easier than a chainsaw mill to push through a log. You must still be careful not to rock or tip the saw while cutting, because each consecutive cut will be no better than the one before it. Practice and steady hands will limit the problem. If an uneven cut does occur, it's best to reattach the guide beam and reestablish a straight, flat cut. The Ripsaw comes with two 63-in. guide-beam sections. Additional sections can be purchased.

Cost: \$1,589, without chainsaw.

Weight: 45 lbs., without chainsaw.

Maximum log diameter: 20 in.

Maximum cutting width: 14 in.

Maximum cutting thickness: 9 in.

Maximum cutting length: Unlimited.

Recommended chainsaw: 56 cc or larger.

(256) 728-3070, www.ripsaw.com

LOGOSOL M7 WOODWORKER'S MILL

The M7 Woodworker's Mill uses a chainsaw mounted to a guide beam to cut lumber. The log is raised by a crank-and-ratchet system and cut at waist level, a very comfortable arrangement. The mill is easily transported on a small trailer or in a pickup bed. Setting up the mill at a new location takes less than 15 minutes; you simply set the mill in place, shim the feet to remove any rocking, and attach the ramps to the frame and the chainsaw to the guide rail. Roll the log up the ramps, and you're ready to go.

Cost: \$1,995 without chainsaw.

Weight: 85 lbs., without chainsaw or wood ramps.

Maximum log diameter: 36 in.

Maximum cutting width: Length of chain bar.

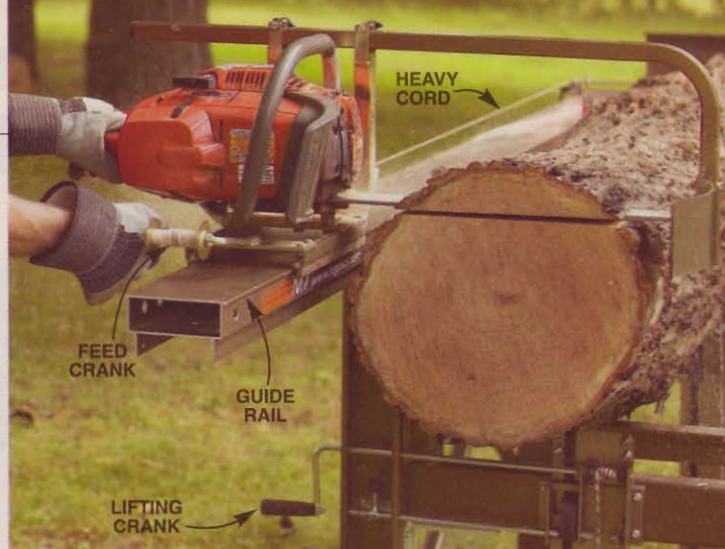
Maximum cutting thickness: 16 in.

Maximum cutting length: 99 in.

Recommended chainsaw: 65 cc or larger.

(877) 564-6765, www.logosol.com

The M7 Woodworker's Mill uses long wood ramps to raise the log onto the mill. You provide the wood for the ramps and Logosol provides the hardware to attach them. A cant hook is used to roll a log up the ramps and a 2x4 works as a stop behind the log. Metal rods insert into a series of holes to provide an extra measure of safety. The ramps have a low slope, so rolling a log up is not difficult.



The chainsaw runs on a guide rail and is fed through the log by turning a crank that winds up a heavy cord attached to the far end of the rail. This straightforward system is easy to use and produces consistently straight, flat boards. The sawn surface is surprisingly smooth for a chainsaw cut and about the same quality as the roughsawn boards from a commercial circular sawmill.



MY FAVORITE FRAME-MOUNTED MILL

PROS: Lightweight, easy to operate, makes consistently flat cuts.

CONS: Slower than frame-mounted bandsaw mills, has a 1/4-in. thick kerf.

FRAME-MOUNTED BANDSAW MILLS

Frame-mounted bandsaw mills form a huge group. More than 30 brands are on the market. Many are designed for the full-time lumber maker and can cost \$30,000 or more. However, a few entry-level machines fall in the \$2,700 to \$6,000 range. Adding a trailer package and a larger engine, plus shipping, will increase this price

tag by at least \$1,000. If you plan to saw more than a few dozen logs a year, though, you should probably consider buying one. A frame-mounted bandsaw mill works much faster than a chainsaw mill and its thinner kerf means an extra board or two out of each log. Here are four representative machines.

MANUFACTURER



NORWOOD LUMBERLITE

The LumberLite rides on angle irons mounted to wood beams. You can make this guide system as long as you like. A trailer package is not available for the LumberLite, but this compact machine can be hauled on a utility trailer or in the back of a pickup truck.

Cost: Starts at \$2,595 with a 6-hp pull-start gas engine.
Weight: 500 lbs.
Maximum log diameter: 24 in.
Maximum cutting width: 17 in.

Maximum cutting thickness: 24 in.
Maximum cutting length: 8 ft.
(800) 567-0404
www.norwoodindustries.com



WOOD-MIZER LT 15

The LT 15's optional log ramps have spring-loaded antiroll stops to prevent a log from rolling backward. They work great. A trailer package, larger engine, bolt-on bed extensions and other options are available.

Cost: Starts at \$5,350 with a 13-hp recoil-start gas engine.
Weight: 830 lbs.
Maximum log diameter: 28 in.

Maximum cutting width: 23 in.
Maximum cutting thickness: 10 in.
Maximum cutting length: 11 ft.
(800) 553-0182, www.woodmizer.com

MANUFACTURER



COOK'S SAW MFG. MP-32

The MP-32 uses a sturdy 3-in. x 6-in. welded rectangular steel frame. The optional trailer package allows the saw to be operated at waist height for easy board removal. The mill can be ordered with a cutting length up to 26 ft. and still remain portable or an unlimited length for a stationary installation. A larger engine, loading ramps and other options are available.

Cost: Starts at \$5,495 with a 8-1/2-hp pull-start gas engine.
Weight: 1,900 lbs.
Maximum log diameter: 32 in.

Maximum cutting width: 24 in.
Maximum cutting thickness: 16 in.
Maximum cutting length: 12 ft.
(800) 473-4804, www.cooksaw.com

MANUFACTURER



TIMBERKING 1220

The TimberKing 1220 uses a four-post cutting head design for extra support. The one-piece welded frame and saw head have a durable baked-on powder-coated finish. A trailer package, larger engine, bed extensions and other options are available.

Cost: Starts at \$5,695 with a 15-hp electric-start gas engine.
Weight: 1,000 lbs.
Maximum log diameter: 29 in.

Maximum cutting width: 29 in.
Maximum cutting thickness: 18 in.
Maximum cutting length: 12 ft.
(800) 942-4406, www.timberking.com

There are three reasons to make your own lumber. One, to make your own unique lumber. Two, to save money. Three, for the fun of it.

Milling your own lumber for its unique figure or grain is one of the best reasons to do it yourself. Equipped with a sawmill, you will be able to cut boards exactly the way you want them, whether that means extra thick or extra wide, and you can produce lumber that's not available from any lumberyard.

Saving money on lumber is possible, especially if you have a good source of inexpensive or free saw logs. However, you will have the cost of the sawmill, related tools and your time to consider. For common species, you may find it tough to compete with the price of lumber from commercial mills. For less common species of wood or special cuts, I found I came out ahead.

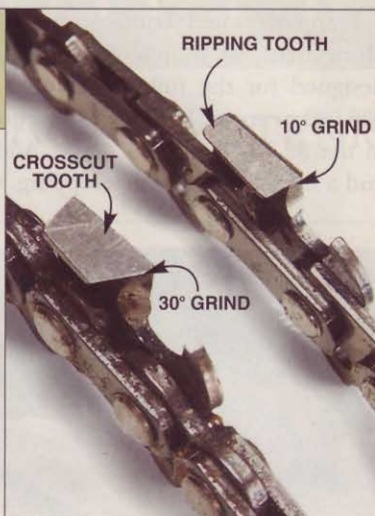
As for the fun of sawing, I found lumber making very enjoyable. It's exciting to slice open a new log and see what's inside. It is, however, hard physical work. Consider this: A 16-in.-dia. by 8-ft.-long hardwood log weighs about 700 pounds. That's a lot of weight to roll around. It's best to partner with a friend and use a pair of cant hooks to roll the logs—or better yet, use a tractor to move them. Your back will thank you.

You should also consider that working with a chainsaw, logs and related sawmill equipment can be very dangerous. Make sure to use all the recommended safety gear, which includes chainsaw chaps and protection for your head, eyes, face, ears, hands and feet. **AW**

After your lumber is sawn, you need to store and dry it properly. For information on building your own lumber-drying kiln, see "Dry Your Own Wood," **AW** #94, June 2002, pages 42–55.

RIPPING CHAINS CUT BETTER

Using a chainsaw to make lumber requires a special ripping chain. The teeth of a ripping chain are filed at a 10-degree cutting angle, whereas a standard crosscut chain has teeth filed at 30 degrees. Ripping saw chain is available through most chainsaw retailers, as well as from Logosol and Granberg International.



FOR MORE INFORMATION

Sawmilling for Woodworkers by Charlie Griffin and Rob Bjorklund. Available from Logosol, (877) 564-6765, \$30.

Harvesting Urban Timber by Sam Sherrill. Available from Logosol, (877) 564-6765, \$26.

Independent Sawmill and Woodlot Management magazine. A yearly subscription of eight issues, available by phone, (888) 762-8476, \$25.

edited by David Olson

VERTICAL LUMBER ORGANIZER

Before I installed this vertical storage rack, my lumber was hard to manage and a house-keeping nightmare. I could never find the piece I wanted, and removing a board from the back of the stack was sure to cause trouble. Finally, after a major board slide, I decided to take action.

I drilled holes and installed 1-in.-dia. dowels in a 2x4 that I anchored to the wall. Mounting it diagonally allows me to separate my boards by length. Eye screws and chains help to secure them. A raised exterior-grade plywood shelf keeps the boards off the floor, so they don't absorb moisture from the concrete.

Richard Helander

EDITOR: TIM JOHNSON • ART DIRECTION: RICK DUPRE • PHOTOGRAPHY: RAMON MORENO, UNLESS OTHERWISE INDICATED

HIDEAWAY BIN FOR SHORT STOCK

I don't like to throw wood away; offcuts and other short boards work great for small projects, jigs and shop fixtures. But until I built this mobile cart, my shop was littered with piles of these useful treasures, because I didn't have a good way to store them. Now they're out of the way, yet easily accessible. **AW**

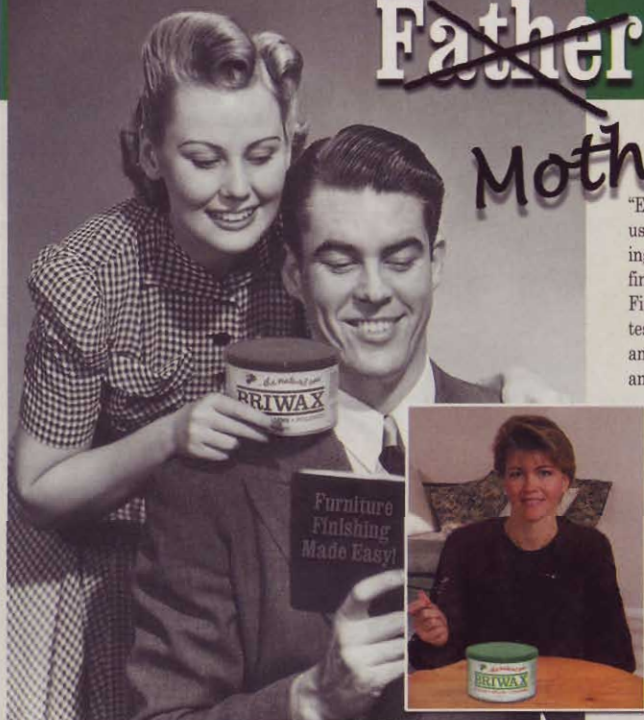
Keith Tucker

3/4" CONDUIT

NONSWIVEL CASTERS

If you have an original Small Shop Tip, send it to us with a sketch or photo. If we print it, you'll get \$100! Send to **Small Shop Tips, American Woodworker, 2915 Commers Drive, Suite 700, Eagan, MN 55121** or e-mail to smallshoptips@readersdigest.com. Submissions can't be returned and become our property upon acceptance and payment. We may edit submissions, and use them in all print and electronic media.

~~Father knows best!~~ Mother knew



"Even though Father knew best most of the time, Mother introduced him to BRIWAX. She had used it for years to polish her furnishings long before Father ever started building and finishing what are now my antiques. Like Father, I too, am a "Do-It-Yourselfer." I use BRIWAX to finish all my unfinished wood projects, for faux finishing, marble refurbishing, and more. Finishing or refurbishing of wood flooring and cabinets are made simple with BRIWAX's time-tested blend of the finest beeswax and selected Carnauba waxes. Because it cleans, polishes, and protects in one easy application, BRIWAX is also great for granite, plaster, stucco, concrete and untreated metals. Now with seven shades from which to choose, Mother would be jealous!"

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- * Wood Paneling
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- * Concrete
- * Marble & Granite
- * Untreated Metals
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- * Stucco
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Now Available in Clear & 7 Great Colors:



For Information on BRIWAX:
www.briwax.com or Call: 1-800-5BRIWAX





Special

edited by Tim Johnson

MEET MR. MISCUE

I've learned woodworking by trial and error. OK, lots of errors. I've cut boards too short and mounted doors upside down. I've recoated finishes too soon and failed to clamp glue-ups soon enough. I've cut dovetails that slope backward and routed mortises in the wrong place. I've torn out with my router, gouged with my belt sander and chattered with my lathe. I've wandered with my bandsaw, sniped with my planer and kicked-back with my tablesaw.

You might say I've done it all—wrong. But over the years, my mistakes have been good teachers. They've taught me the importance of using proper woodworking techniques, wearing safety gear, keeping my tools in top condition and avoiding distractions when I'm in my shop. And thanks to my mistakes, I've also learned the joy of making good repairs!

Tim "Oops!" Johnson



FELINE-BASED FINISH

After reading that burnishing lathe-turned objects with wood shavings leaves a lustrous, silky smooth finish, I decided to try it on the goblet I had turned the day before. I returned to my basement shop, reached down and grabbed a handful of shavings from the pile that had accumulated at the base of the lathe.

I started the lathe and pressed the shavings against the spinning goblet. What a great technique! But then I noticed an awful smell. I removed my hand and sniffed the shavings. Phew! Evidently, our cat had used the pile of shavings as a litter box—I'd polished my goblet with essence of cat pee!

Bill Esposito



ART DIRECTION: EVANGELINE EKBERG • ILLUSTRATION: STEVE BJÖRKMAN



Top 10

Grouses of Woodworker Spouses

Woodworkers aren't perfect housemates. We make lots of dust and noise and occupy a large amount of space. Actions that seem perfectly reasonable to us may be considered annoying habits by our companions. When we asked woodworker spouses to air their frustrations, the response was overwhelming; our ears are still burning. Here are their 10 most frequently voiced complaints.

10 There's never room for my car in the garage.

9 He keeps bringing home pieces of wood that he's found, like stray animals. But he never uses them, so our house features an unusual "woodpiles everywhere" décor.

8 He spends hours scouring antique shops for old tools, and I'm tired of being dragged along and staring at dingy knick-knacks, worn-out furniture and salt and pepper shaker collections.

7 Nails and screws left in pockets make an ungodly racket when they go through the washing machine and dryer.

6 A problem in the shop casts a gloomy pall over the entire house.

5 His "good" woodworking tools are off-limits for the rest of us, but he can't bear to buy "homeowner-grade" replacements, so there simply aren't any tools in the utility drawer.

4 He's oblivious to the sawdust trail he leaves throughout the house.

3 The outline of his tape measure gets worn into the back pocket of his jeans, so people are always staring at his butt!

2 My hair is wet, I'm late for work and my hair dryer has disappeared from the bathroom. If he has borrowed it again to remove old glue, I'll aliphatic his hide!

And the **No. 1** grouse of the woodworker spouse:

He keeps saying he's going to build things, but all he does is buy tools.



STEALTH WOODWORKING

While browsing through woodworking magazines at a local bookstore, I spotted plans for a project that really excited me. Since I didn't want to purchase the whole magazine for only one set of plans, I secretly made sketches.

Back in my shop, I started building, but I soon got stuck. My hastily drawn sketches didn't make sense. So I made a return trip to the store and furtively drafted a new set of sketches. Back on the project, however, I got stumped again. And again!

On my fourth trip to the bookstore, having wasted a couple weekends and several pieces of lumber, I couldn't find the magazine. It had been replaced on the rack by a new issue. Argh! I had to back-order the old issue (and wait for it) before I could finish my project. It ended up costing more than buying the issue in the first place!

Robert J. Collins



Spouses! Have we left your grouses off the list? Tell us about them! If we print your grouse, you'll get \$100! At the very least, you'll feel better after venting your frustrations! Send your grouses to **Spouses' Grouses, American Woodworker**, 2915 Commers Drive, Suite 700, Eagan, MN 55121 or e-mail to oops@readersdigest.com. Submissions can't be returned and become the magazine's property upon acceptance and payment. We may edit submissions and use them in all print and electronic media.



DEATH SPIRAL

A woodworking pal of mine (who wishes to be anonymous) received a commission to build and install a spiral staircase, a project he'd never previously attempted.

First, he built a scale model to work out the construction details and fine-tune his design. Then he tackled the full-size staircase, installing steps and balusters around the center upright. He spent hours working from a ladder. Luckily, his shop has 12-ft. ceilings.

He built an enormous box to steam-bend the rail and skirt board pieces. All available hands helped to bend the steaming hot pieces around the frame and clamp them in place.

Unfortunately, the ensuing celebration quickly turned into a suicide watch when someone mentioned to my pal that the model and his just-completed stairway spiraled in opposite directions.

Dave Munkittrick



CIRCULAR-SAW SPIN DOCTOR

My new neighbor swore he had plenty of carpentry experience as he set up to build a deck behind his house. I noticed the blade on his brand-new circular saw was very dark and burned, so I offered him a new one, which he accepted and installed.

As he began to cut, I couldn't help but notice the billowing smoke and the difficulty he was having. When I asked if there was a problem, he responded that the wood was just too hard for his saw.

When I looked closer, I realized that he must have fibbed about his previous carpentry experience. He had installed the new blade backward, so it was scraping the wood and burning instead of cutting. This blade was now as scorched and worthless as his original one.

When I pointed out his mistake, he admitted his rookie-woodworker status and responded jokingly, "Doesn't this saw have a reverse switch?"

Dave Patane

If you have a woodworking blunder you're willing to share, sent it to us. You'll receive \$100 for each one we print. Sent to **AW Oops!**, American Woodworker, 2915 Commers Drive, Suite 700, Eagan, MN 55121, or e-mail to oops@readersdigest.com. Submissions can't be returned and become our property upon acceptance and payment. We may edit submissions and use them in all print and electronic media.

SLAP SHOT

When I was a kid, I decided to make my own hockey stick in my dad's workshop. I drew the shape on a 2x12 board and cut it out on the band-saw. At 2-in., the stick was too thick, so I decided to resaw it. Brilliant! I'd get two perfectly sized sticks out of the deal. With the fence set, I laid the stick handle flat on the saw table and fed the stick's blade end into the saw. When I woke up, I was flat on my back, and my jaw felt as though I'd been kicked by a horse. The saw had grabbed the cantilevered stick blade and slammed it down to the table. Consequently, the handle flew up and nailed me right in the chin. It was a knockout!

Vern Johnson

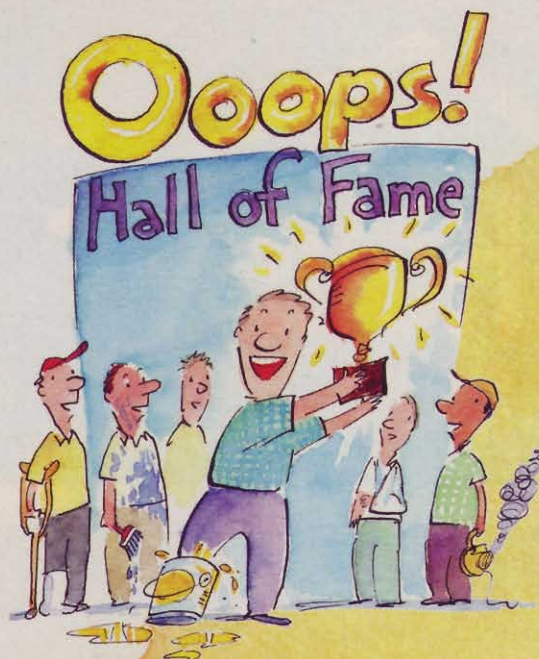


WHY WOODWORKERS WEAR PINK UNDERWEAR

After spending the day sanding a mahogany armoire, my husband threw his sweaty, mahogany-dust-caked T-shirt into the laundry with the rest of his whites. Naturally, all of his underwear came out pink.

Janet "Mrs. Oops!" Johnson





Some woodworking blunders have been made so often and by so many that they're classics. You're probably familiar with most of them—through firsthand experience! Here are 10 classic gaffes, up close and (maybe too) personal.

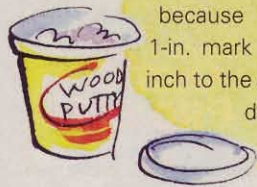
10 Classic Woodworking Goofs

1 THE TOO-SHORT BOARD

Rats! My straightedge isn't long enough to measure the length of this important cut, and I can't depend on the hook end of my tape measure to be precise. Hmm—I've got it! I'll measure from the 1-in. mark on the tape.

What a great solution—my cutline was dead on the mark and my saw cut is nice and square. And my perfectly cut piece fits...argh! It's too short, an inch to short!

My beautiful board is useless because I measured from the 1-in. mark and forgot to add that inch to the overall length. If only I'd double-checked the actual length I'd marked before I cut.



2 THE STRESS-RELIEVED TOP

Hey! Why is the top of my table cracked? The darn thing is only six months old. When I built it last summer, I decided the best way to keep the top from warping was to glue and screw it securely to the base—I guess that was a bad idea. I should have used those metal tabletop fasteners instead.

3 GHASTLY STAINING RESULTS

Yes! I've completed my project! I'm glad I chose white pine. It makes my shop smell great, it's easy to work with and it'll look great after a coat of this walnut stain. Aaakk! Where did those horrible dark blotches come from? I guess should have read the directions on the can. I had no idea that I was supposed to seal the wood before staining.

4 THE NO-GO JOINT

Hmm, these mortise-and-tenon joints are tight, but they go together if I push hard enough. Glue should help, 'cause it'll make things slippery.

What? Now the joints won't go together at all. I didn't realize that wood glue could cause enough swelling to affect the way joints fit. I'll need a hammer to get these to go. Oh no! I had to whack pretty hard and now I've split the mortises. What a mess.

5 SPLIT ENDS

Wow! These drywall screws are great. They drive through wood like nobody's business and they're so thin, I don't even need to drill pilot holes. They'll be perfect for strengthening this corner butt joint.

Boy, was I wrong! I just split both boards—the edge of one and the end grain on the other. I guess I should have drilled pilot holes, after all.

6 BLOWN AWAY

I've rough-sawn the arch into this white oak blank, affixed a routing template and chucked a flush-trim bit into my router. Now to smooth the curve.... Yeow! My router's spitting chunks of wood!

What happened? A little more than halfway around the arch, the bit started tearing out the wood—the last half-inch of the blank ripped off completely. I forgot that when you rout an arch, you rout against the grain half of the time. I should have smoothed the arch with a sanding drum mounted in my drill press.

7 LEANING BOOKCASE OF PISA

Nothing can go wrong, I thought while gluing my bookcase together, because all of the shelves are dadoed into the uprights.

But now, with the bookcase standing against the wall, I've tried squinting, cocking my head and swaying back and forth. Nothing helps—my bookcase definitely lists. I should have made sure the case was square during my glue-up, by measuring the diagonals.

8 TWO LEFTS AREN'T RIGHT

I've routed hinge mortises in the cabinet and both doors of my project. The left door fits beautifully and the right door fits...upside down! Oh, my gosh, I routed the mortises on the wrong edge of the door.

I should have laid the doors side by side and marked the outer stiles before I routed. It's a good thing I didn't predrill holes for the knobs!

9 COUNTERSUNK!

Ah! These screws protrude just less than 3/4 in. through the countersunk pilot holes I've drilled in the web frame. They'll be perfect for fastening the top to this chest of drawers. Oh-oh, they're going in a little deeper than I expected. Ack! They've gone all the way through the top! I guess I made those countersinks too deep.

10 THE SURREALISTIC FINISH

When I brushed polyurethane on my armoire, it sure didn't seem like I was putting on too much. But now, a half hour later, the finish sags like the distorted pocket watches in Salvador Dali's famous paintings. **AW**

THE FLOOR IS OPEN...

Was your Hall-of-Fame-worthy woodworking blunder overlooked? Write-ins are accepted! You'll receive \$100 for each one we print. Send your nominations to **AW Oops!**, American Woodworker, 2915 Commers Drive, Suite 700, Eagan, MN 55121, or e-mail oops@readersdigest.com. Submissions can't be returned and become AW's property upon acceptance and payment. We may edit submissions and use them in all print and electronic media.