

SPECIAL MONEY-\$AVING ISSUE!

American Woodworker®

THE BEST RESOURCE FOR YOU AND YOUR SHOP

#144, OCTOBER/NOVEMBER 2009

20 WAYS TO ORGANIZE YOUR WORKSHOP!

WEEKEND PROJECTS

- Walnut Coffee Table
- 1-hour Books in Wood

32 MONEY-SAVING WORKSHOP TIPS!

Don't Strip
That Finish
REPAIR IT!

16 VALUABLE TIPS FOR SHARPENING

Scanned by Johnny



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American Woodworker

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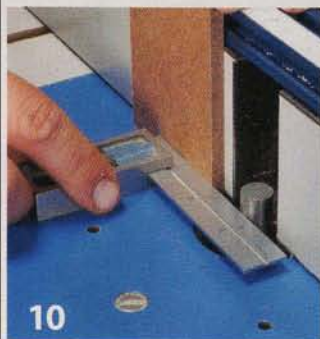
A radial arm saw brake works too well.



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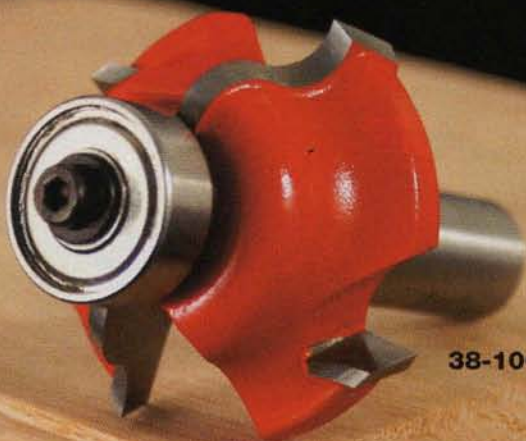
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What's The Secret To Flawless Edge Profiles With NO REWORK?

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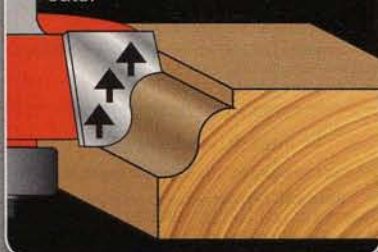
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Freud's New Quadra-Cut™ 4 Cutter Design

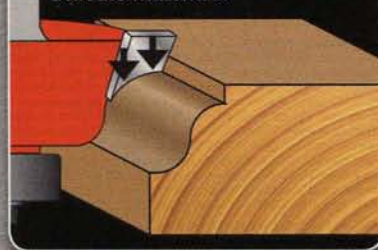


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- Table Top Classical Bold Bit
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- Rounding Over Bit, 1-1/2" Radius
- Raised Panel Bits



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From the Editor's Desk

And the Winner is...

ATTENDING WOODWORKING SHOWS is a great way to learn about woodworking and gain inspiration for your next project. It also provides an opportunity to meet other woodworkers and discuss design and technical questions. The experience is even better if you enter one of your projects in the show.

Here are a few of the winners from three of the shows that I've attended this year, but there were dozens of winners and lots of great pieces. You can view photos and descriptions of all the winning pieces and more, by visiting www.AmericanWoodworker.com/WWSHOWS. You'll also find links to photos from this year's Furniture Society Conference in Boone, NC, as well as photos of some amazing student work from Palomar College in Corona, California.

Keep the chips flying,

Randy Johnson

Randy Johnson



To view all of the winning pieces, visit:

www.AmericanWoodworker.com/WWSHOWS

Rocket Desk

by Craig Jentz
Ash and granite

- Winner of the Woodworking for Pleasure award.
- Northern Woods Exhibition, sponsored by the Minnesota Woodworkers Guild, Edina, Minnesota.



BAMON MORENO

Dresser

by Vallejo Herman
Walnut

- Winner of the Love of Wood and Honorable Mention awards.
- Contemporary furniture category.
- Design In Wood Exhibition, co-sponsored by the San Diego Fine Woodworking Association and the San Diego County Fair, Del Mar, California.



ANDREW PATTERSON

Drop Front Desk

by Daniel Graupmann
Walnut

- Second Place Winner at the Post-Secondary Level.
- Reproduction category; based on an 18th century German desk.
- Fresh Wood Student Competition, sponsored by AWFS 2009, Las Vegas, Nevada.



AWFS 2009

More On the Web at AmericanWoodworker.com



Hyper-Organized Shop

For more information about building the slat walls for these storage units, and photos of more units, go to www.AmericanWoodworker.com/HyperOrganizedShop



Walnut Coffee Table

To see a cherry coffee table with traditional joinery, go to www.AmericanWoodworker.com/CherryCoffeeTable

16 Tips for Sharpening

For articles on selecting waterstones, how to sharpen a chisel, and how to sharpen a scraper, go to www.AmericanWoodworker.com/Sharpening



Computer Armoire

For the complete story on making drawers with sliding dovetails, go to www.AmericanWoodworker.com/SlidingDovetails

Lumber Library

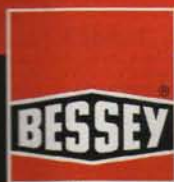
To post photos of wooden books you've made, and see other examples, go to www.AmericanWoodworker.com/WoodBooks



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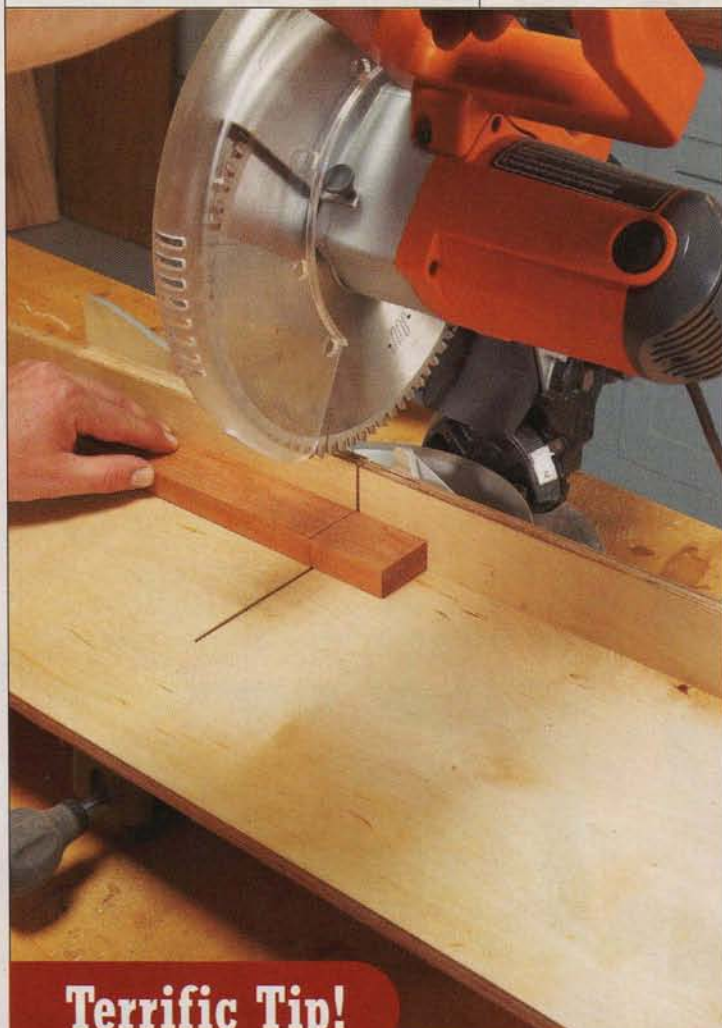
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Terrific Tip!

Zero-Clearance Miter Table

HERE'S A DIRT-SIMPLE but effective accessory for your miter saw. It eliminates tear-out, allows you to make precision cuts by aligning a pencil mark with the kerf, and provides room to screw or clamp a stop block anywhere along the fence.

Originally, I built this table for extra support when cutting long pieces. But it's such a great addition that now I leave it on my saw all the time.

You could use 3/4" stock, but I made my table from 1/2" plywood to minimize the decrease in my saw's crosscut capacity. It can be any length you want. For stability, make the bed about 3" wider than the maximum length of the saw's kerf.

Glue and screw the fence to the plywood bed at 90°. Screw the table's fence to the saw's fence, and you're set.

Mitch Palmer



Precision Fence Setting

I USE A SET OF SHOP-MADE gauge blocks to adjust my fence for cutting rabbets and tenon shoulders. The blocks are precise thicknesses and about 2" wide.

To set the fence, I insert a 1/2" spiral bit into the collet, upside down, and then tighten the collet by finger only. (A piece of 1/2" drill rod would work as well.) Why upside down? The bit's shank provides a smooth surface for the square to register against. Right-side up, a router bit is difficult to use because you must precisely rotate its cutting edge to the outermost point of its travel.

Next, I insert a gauge block between the fence and the square. Then I adjust the fence until the square is flat against the gauge block and touching the bit's shank. After turning the bit right-side up, I'm ready to go.

Joe Scharle

Terrific Tips Win Terrific Tools!



We'll give you \$100 for every original workshop tip we publish. One Terrific Tip is featured in each issue. The Terrific Tip winner receives a 12" Leigh Super Jig with VRS (Vacuum and Router Support), a \$239 value.

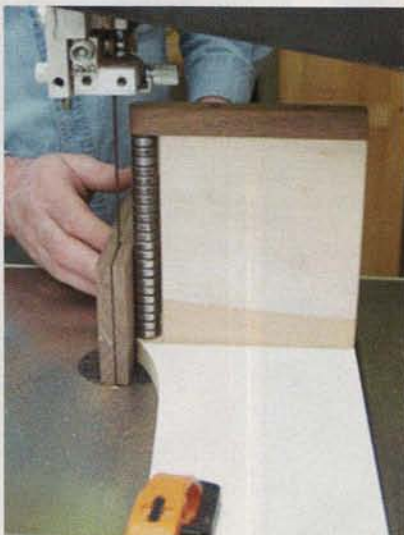
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Friction-Free Re-Saw Fence

RE-SAWING A BOARD IS TRICKY.

Most blades drift, so that you must angle the board to get a straight cut. Standard bandsaw fences can't be angled to compensate for drift, so many folks use a single-point fence instead, like this one. The point on my fence is a tall stack of machine bearings, which gives me effortless, resistance-free cutting.

To build the fence, you'll need a 5/16" steel rod, 5/16" i.d. bearings, 5/16" i.d. washers, a base 6" to 8" wide and as long as the depth of your saw's table, an upright (its height depends on your saw's capacity), and a hardwood cap to house the steel rod and hold the bearings in place. The steel rod and washers are available at any hardware store for a few bucks. (See Source below for bearings, or try an auto parts or surplus store; the



exact i.d. and o.d. of the bearings aren't particularly important.)

Drill a 5/16" hole at the base's point to house the steel rod's bottom end. Position the hole to allow the bearings to overhang the point by 1/8". Glue and screw the upright to the base, 1/8" behind the bearings.

Insert the rod in the base's hole and stack the bearings with a washer between each one. Insert the top end of the rod in the cap's hole, and then screw the cap to the upright, making sure it's positioned so that the bearing stack is square to the saw's table.

John English

Source: Tool Barn, www.toolbarn.com, (866) 597-3850, Replacement Router Bit Bearings, 5/16" i.d. x 7/8" o.d. x 9/32" thick, Amana Tool #47708, \$3.25 each.



XL Router Base

MY NEIGHBOR NEEDED AN EDGE ROUTED on a large oak table top. Having messed up my fair share of edges by accidentally tilting the router, I was a little nervous, but agreed to take on the job.

While removing my router from the router table, it occurred to me that the table's insert plate would give me the extra support necessary to keep the router from tilting. And it did!

Dean O. Travis



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Clamp Blocks Plus

BESSEY K-BLOCKS ARE GREAT for holding K-clamps in position for glue-ups, but they're also quite handy for other things. I milled hardwood strips the same dimensions as my K-clamps and use them to raise work pieces for stacked glue-ups. I also use the blocks and strips for pocket-hole assembly, so I don't have to hang a joint over the edge of my workbench to clamp it. Shop-made blocks like these, made in maple, would work just as well.

Serge Duclos



Slick Drawer Runners

ONE DAY, I REALLY GOT FED UP with the drawers in my desk at home. They're the old-fashioned kind, which ride on their wooden sides. The sides had become so worn that the drawers were always a pain to open and close. This day, they were particularly bad. I considered installing the side-mount ball bearing slides I had always dreamed about, but the cabinet's opening wasn't big enough to allow for them. I'd have to make new drawers, and I really wasn't up to it.

Feeling frustrated, I went to the kitchen to make a sandwich. I noticed that our cutting board was made from UHMW (Ultra High Molecular Weight) plastic, which is very slick and very durable. I quickly decided that this cutting board was worn out, and told my wife we should get a new one. Old cutting board in hand, I headed for my shop. First I cut down the drawer's height by 1/2", and then repositioned the front. Then, I countersunk and screwed on my new UHMW 1/2" x 1/2" runners. Now my only problem is that instead of working in my office, I just sit there sliding the drawers in and out.

Lou Bush



Tail Vise Extension

WHEN I INSTALLED MY TAIL VISE, I made the jaw protrude past the bench's front rail. Using dogs in the rail, I can securely clamp a board in a vertical position.

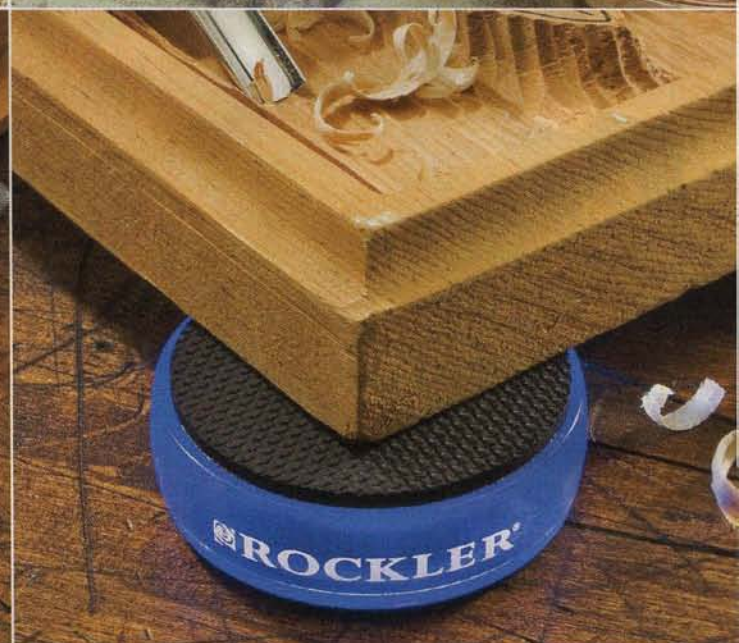
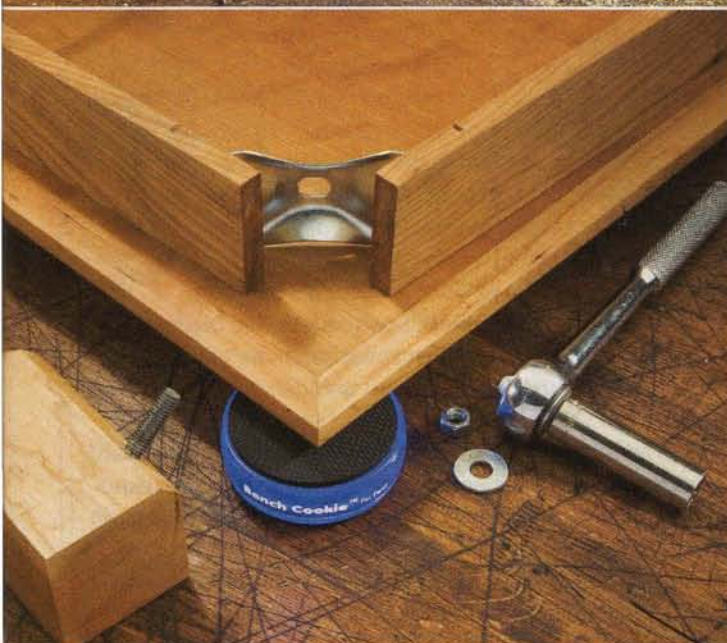
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New Hot Dog Saw

THE SAWSTOP PROFESSIONAL CABINET SAW brings the benefits and safety of the original SawStop Industrial Saw into a lower price range, making the hot dog (and finger) saving blade brake available to more users. The safety system is designed to stop the blade within 5 milliseconds of detecting contact with skin, the difference between a cut on the finger or losing a finger altogether.

The big differences between the Professional Cabinet Saw and the Industrial Cabinet Saw are size, power, weight and dust collection. The Professional's table is three inches shorter (27" on the cabinet saw versus 30" on the Industrial Saw). The Professional is powered by a 3 hp, 230-volt motor (versus 5 hp on the Industrial Saw). The Professional Cabinet Saw weighs less than the industrial version (449 lbs. with a 52" fence versus 685 lbs. for the industrial version). But it's still heavy enough to provide a solid base and low vibration.

The Professional Cabinet Saw's redesigned blade guard and blade shroud make dust collection more efficient, collecting up to 99% of the sawdust and debris, according to SawStop.

In addition to better dust collection, the new blade guard design features independent lateral sides to minimize exposure to the blade when it's tilted for bevel cuts. Both saws tilt left. The guard still retains a low profile to allow for cuts as narrow as 3/4". The saw comes with an easily adjustable riving knife to minimize kickback and provide protection during non-through cuts. This new guard design is also available as an upgrade accessory for the Industrial Cabinet Saw.

Gas-assisted blade height adjustment provides smooth movement when raising and lowering the blade. It also helps in making micro-adjustments.

The saw has a 3-1/8" maximum depth of cut at 90° and 2-1/4" at 45°. The maximum rip capacity right of the blade is 36" or 52", depending on the fence, and the maximum rip capacity left of the blade is 12". A separate brake cartridge is needed for dado cuts and is available from SawStop.

Source: SawStop, www.sawstop.com, (866) 729-7867, Professional Cabinet Saw with 36" fence, \$2,899; Professional Cabinet Saw with 52" fence, \$2,999.

Granite Lathe

STEEL CITY MADE A BIG SPLASH a few years ago with their granite-topped tablesaws—now they're using granite in lathes, too. Their newly updated 5-speed Midi-Lathe has a solid granite bed and headstock.

According to Steel City, granite won't warp and isn't affected by heat, cold or humidity, problems normally associated with traditional cast iron construction. Granite is also good at absorbing vibration because of its extra mass. This lathe weighs in at 161 lbs.; the older, cast iron version weighed only 72 lbs.

The lathe has a 12" swing over the bed and a span of 27" between centers. It's powered by a 1/2 hp motor. Switching the belt between pulleys gives speeds of 500, 1300, 2100, 2750 and 3600 rpm, which cover a wide range of turning



operations. Other features include a ball-bearing live center and a 6" tool rest.

The lathe is backed by Steel City's standard 5 year warranty on the machine parts; the granite components have a 10 year warranty.

Source: Steel City Tool Works, www.steelcitytoolworks.com, (877) 724-8665, 5 Speed Granite Mini-Lathe, #60170G, \$319.

New Type II Glue

GORILLA WOOD GLUE is a white Type II PVA glue. Wood glue is divided into three types based on strength and water-resistance: Type I is for indoor use where no water resistance is needed; Type II is for indoor and outdoor use and is water resistant; Type III is for outdoor projects and is waterproof.

As a Type II, Gorilla Wood Glue can be used for both indoor and outdoor projects. The glue sets quickly, with a clamp time of 20 minutes. It's a white liquid that dries to a light tan/khaki color, unlike most "yellow" glues. And of course it cleans up easily with water.

We found that the glue has a very tacky feel right out of the bottle, which helps prevent parts from slipping around. The tip is clear and stays relatively clog-free as long as you remember to close the bottle after using it. It's available in 8-oz. and 18-oz. sizes.

Source: Gorilla Glue, www.gorillatough.com, (800) 966-3458, Gorilla Wood Glue 8 oz., \$3.99; 18 oz., \$5.99.



Fast Forstner

THE MAXICUT FORSTNER BIT FROM COLT has two significant improvements. First, it has grooves machined in the cutting bevels. These grooves cut waste into chips rather than ribbons. This new design greatly decreases clogging and friction, which we found allows you to increase both the feed rate and r.p.m. of the bit. Second, the bit has two scoring spurs, which help make a cleaner hole.

Colt's extension shafts for these bits are simple to use. Rather than having to tighten the bit in the shaft with tiny Allen screws, you just insert the bit into the shaft and give it a twist. The unique shank design locks it in place.

Source: Colt, www.colt-tools.com, 1/2" - 2-1/4" MaxiCut Forstner Bits, \$27 - \$47; 3-1/2" - 10" RotaStop Extension, \$26 - \$34.

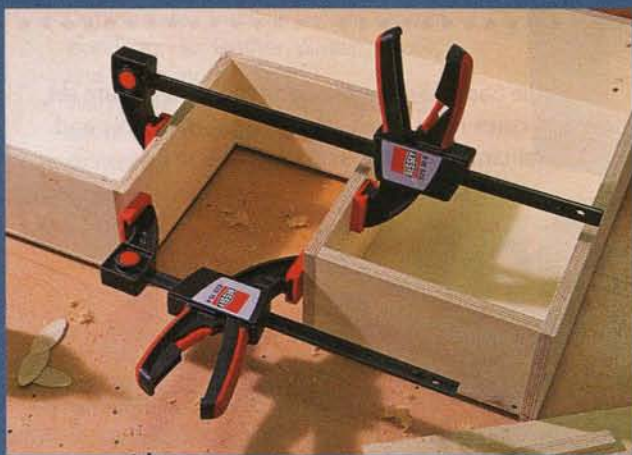
One-handed Happiness

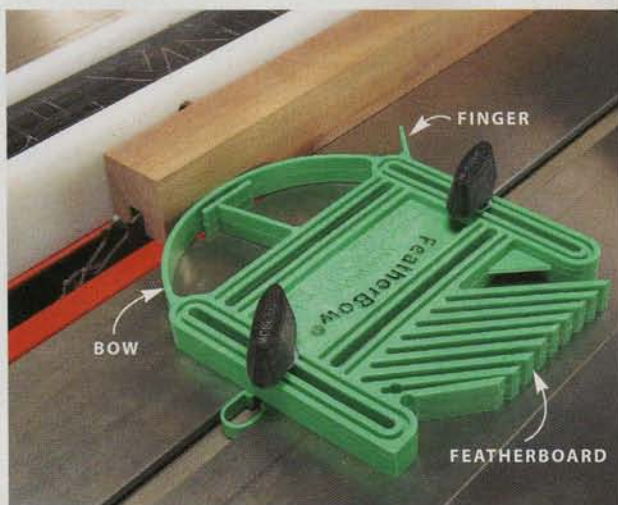
BESSEY HAS EXPANDED into the one-handed clamping market with the EZS Clamp. It's available in five sizes, with clamping capacities from 6" to 24".

The EZS can deliver plenty of pressure—up to 445 lbs., according to Bessey. It also has a removable and reversible foot, which changes the tool from a clamp to a spreader with just a touch of a button.

The clamping mechanism itself is relatively small, making the clamp lightweight and easy to maneuver with one hand.

Source: Bessey Tools, www.besseytools.com, (800) 828-1004, 6" - 24" EZS Clamps, \$19.99-\$32.99.





3 Featherboards In One

HERE'S A DIFFERENT KIND OF FEATHERBOARD. The FeatherBow has a single finger, multiple fingers, and a bow for holding thin and narrow stock tight against the fence of your tablesaw or router table. There's no question that a featherboard gives you a better cut, and keeps your hands out of harm's way, but some featherboards are easier to set up than others. This one is a breeze. It fits right into the miter gauge—you just tighten two knobs to lock it in place. That's pretty standard, but the big advantage to the Featherbow is setting the amount of pressure against the workpiece.

Using the bow side, you can easily set the pressure to 10 or 35 lbs. without a lot of trial and error. The bow affords less contact surface than the fingers, and therefore less friction, so the stock can be pushed through the blade easier. FeatherBow Junior, available separately, is designed to mount on the fence to hold down work, and has a single finger and a bow.

Source: FeatherBow, www.FeatherBow.com, (860) 209-5786, FeatherBow, \$22.95; FeatherBow Junior, \$7.45; FeatherBow Complete package, \$29.95.



Robust Spokeshave

LIKE OTHER HAND TOOLS, a spokeshave puts you closer in touch with the wood you're working. If your wood is green and straight-grained, the going is easy; if it's kiln-dried and curly, you may want a heftier tool than a standard spokeshave, and one that can be adjusted for a precision cut. You'd want the new Large Spokeshave from Veritas.

This spokeshave measures over 18" in length and weighs 1.3 lbs. Its blade is 2-5/8" wide, 1/8" thick, sits on a machined sole, and is clamped by a machined lever cap. All of these factors—size, mass and precision—add up to chatter-free cutting even under the toughest conditions.

As with most Veritas tools, this spokeshave is available with either an A2 or O1 tool steel blade. A2 steel holds an edge longer than O1 steel, but takes longer to sharpen. All new Veritas blades are lapped to a very high tolerance—a huge time saver.

Source: Lee Valley, www.leevalley.com, (800) 871-8158, Large Spokeshave, A2 Blade, 05P33.90, \$99; Large Spokeshave, O1 Blade, 05P33.91, \$99.

Handy Adhesive

WOOD PROJECTS REPAIR ADHESIVE from Liquid Nails is a PVA glue with a thick consistency—a "yellow" glue that won't run.

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The applicator's thin nozzle makes it easy to apply the glue in small quantities and in tight spaces.

The glue has a 15-minute open time, a 30-minute set time and cures in 24 hours. It's sandable, paintable and stainable and cleans up with water.

Source: Liquid Nails, www.liquidnails.com, (800) 634-0015, Wood Projects Repair Adhesive, \$3.59.



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Diamond Sharpening System

FULL-SIZED DIAMOND HONING STONES work fast, but they can be expensive. The new PSS Precision Sharpening System reduces that cost by using small, interchangeable diamond stones. The PSS also includes a built-in honing jig.

The PSS system is simple to use. It consists of two stout anodized aluminum extrusions: a base that registers the tool and a sliding carriage that holds the stones. To hone, you hold the tool on the base and slide the carriage back and forth over the tool's edge. The carriage rides on a dovetailed way, and the action is smooth and accurate. The carriage is reversible: one side is angled at 25°, the other at 30°. The stones are held in place by a magnet, so it's very easy to change grits on either side. The PSS can handle chisels down to 1/8" wide and plane blades up to 2-1/2" wide.

The PSS works best using a two-bevel system. With most tools, you'd use a power grinder to create a 25° bevel and the PSS to hone a short, 30° bevel. When the edge is dull, you can quickly retouch it on the PSS. (You could form the 25° bevel on the PSS, but it takes patience.) Combining speed and convenience, the PSS

would make a great addition to a job-site tool kit. It's also ideal for large tools that are too cumbersome to fit in a standard honing jig, such as a timber framer's slick.

The PSS will definitely make your tools sharp, but not extremely sharp. The PSS comes with two stones—coarse (60 micron) and medium (35 micron). You may also add extra-coarse (90 micron), fine (25 micron) and super-fine (9 micron) stones. The medium stone is roughly equivalent to a medium India oilstone or a 400 grit waterstone, which will produce an acceptably sharp edge for carpentry work. The extra-fine stone is roughly equivalent to a Soft Arkansas oilstone or a 2000 grit waterstone, which is OK for most cabinet work, but for more demanding jobs, you may want to finish the edge on a 4000 grit or higher waterstone. PSS says that the system's lateral action allows the stones to attain a finer edge than a conventional setup, where the abrading strokes go up and down the blade. Interesting idea!

Source: M. Power Tools, www.m-powertools.com, (613) 525-5037, PSS Precision Sharpening System, \$90; extra stones, about \$14 ea.

Light and Durable Drills

BOSCH HAS ADDED LIGHT-WEIGHT 14.4 volt and 18 volt Compact Tough drills to its lithium-ion cordless tool line. They're perfect for use in the shop. These drills have a durable all-metal gear train and a tough housing that absorbs impact. Bosch claims these drills will survive a 10-foot drop up to 20 times before failure occurs, so knocking one off of your workbench once or twice won't hurt anything but your pride.

Compact Tough drills feature a 20-position clutch and a 1/2" single-sleeve chuck. The 18-volt model we tested handled every task we threw at it, from driving screws to drilling holes. The drill was well balanced and the grip felt very good, even after using it for long periods.

Source: Bosch, www.boschtools.com, (877) 267-2499, 14.4-volt Compact Tough drill, 36614-02, \$179; 18-volt Compact Tough drill, 36618-02, \$199.



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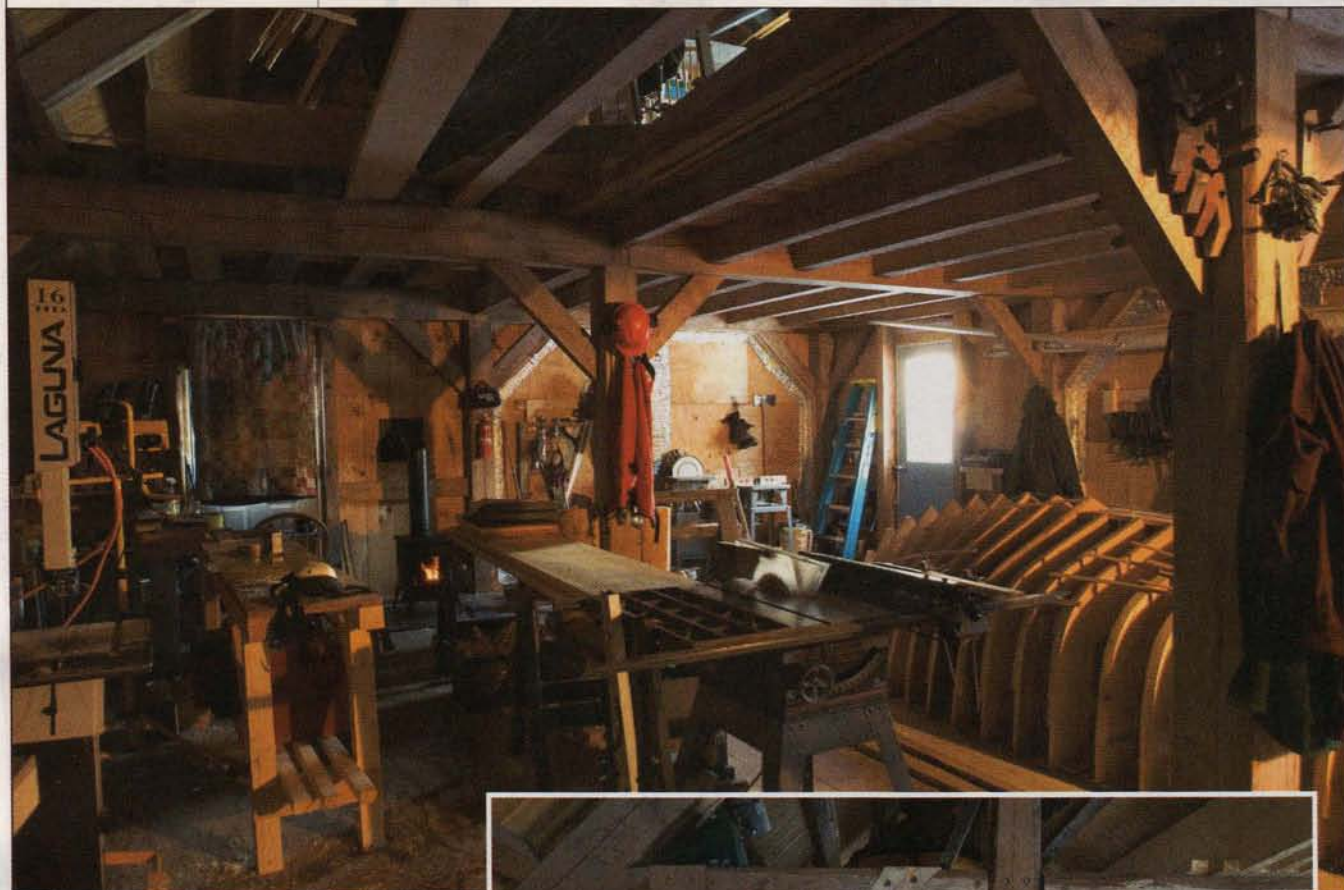
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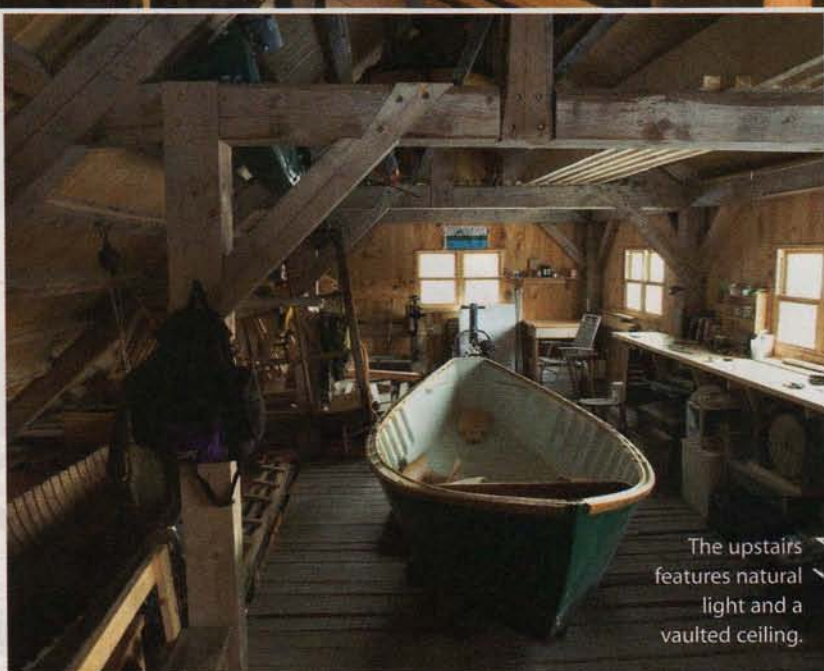


Boatbuilder's Shop

THE IMPETUS FOR BUILDING my shop was to satisfy a passion that my late brother Glen and I had for building boats. After occupying his garage and my sister's storage space, we knew we needed a dedicated shop.

The building, which overlooks the St. John River Valley in St. David, Maine, is a 24' x 34' post-and-beam saltbox that was designed by my companion Darlene's brother, Dave Coltart. Its main beams and rafters are 8x10s and its posts are 8x8 spruce—in boat builder's lingo, "her scantlings are massive!" Roof purlins, joists, girts, and braces are 4x6s and 4x8s. Two fully insulated, 12' double doors open for access, light and ventilation.

The timbers were logged off our property and sent to a local sawyer, who cut them while Dave marked out



The upstairs features natural light and a vaulted ceiling.

the mortises and tenons. We formed and poured a foundation resting on solid ledge, then constructed the deck and began raising the frame. Unfortunately, Dave was diagnosed with cancer during the construction, so I had to finish the job myself,

learning this gifted artist's version of post-and-beam joinery on the fly.

My main work table is a small workbench, a simple mortise and tenon job fashioned out of yellow birch that was harvested along with the timbers. Loaded tool boxes across

its lower stretcher add a little ballast and stability. The space beneath the stairwell

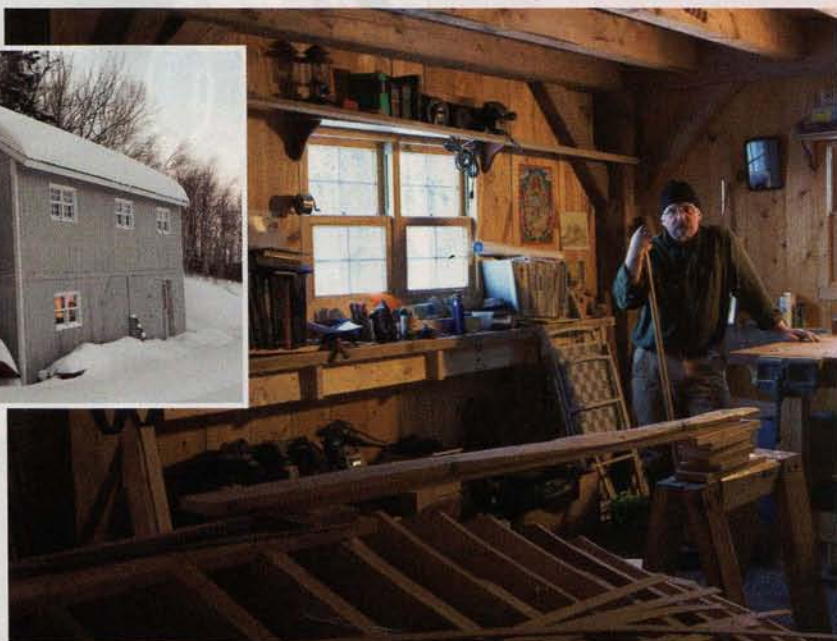
works well for my large home-made layout table. The out-feed tables for the bandsaw and tablesaw double as extra workbenches. All of my tools can be moved out of the way as space is needed. Half the first floor is currently occupied by a mold for a Haven 12-1/2 sailboat that's a few years and many thousands of dollars away from completion. Upstairs, a 16' spruce-planked mast table fills most of the east wall, and at the northeast corner is Darlene's loading table. She's a Civil War re-enactor with Company B, 20th Maine, and loads cartridges for her musket on it.



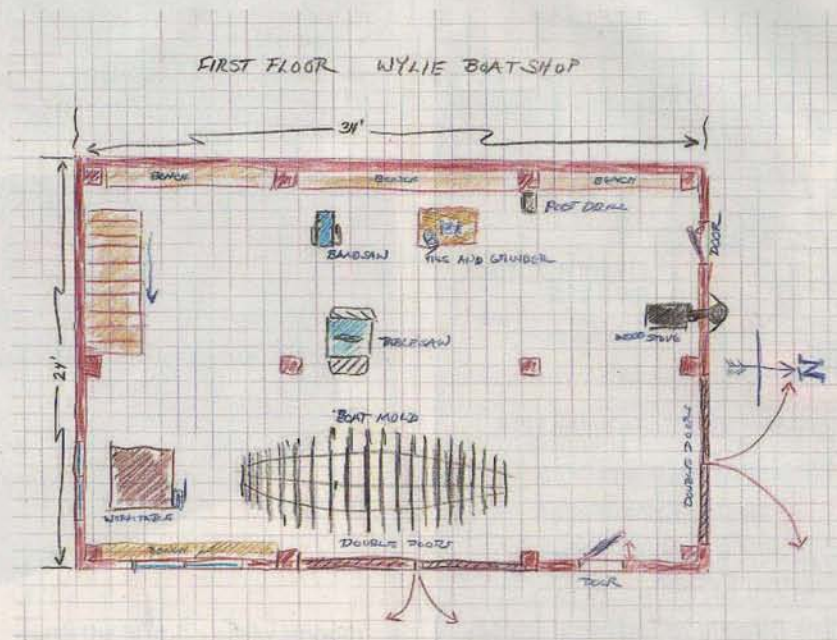
Around the shop you'll see a cluttered assortment of boat building, logging and blacksmithing tools. Some of them are useful and some will be donated to a logging museum, once I write the grant applications to get one built. (I earn most of my keep by consultation and grant writing for local communities.) It's an understatement to say I prefer older tools, but one major exception is my Laguna HD16 bandsaw. Even though its newness seems out of place, I haven't experienced a second of buyer's remorse since it arrived.

As in every shop, some things still need improvement. There are only three outlet boxes, dust collection is minimal and lighting is whatever's handy: portable halogens, drop lights and morning sunlight. Heat comes from a small Vermont Castings woodstove that keeps the shop at a comfortable Yankee working temp in the 50-60° F. range. We keep the stove stoked by harvesting the more than fifty acres of Acadian forest in the back yard.

David Wylie
St. David, Maine



"It's easy to wax philosophical about my shop," says Dave Wylie. "But let's just say that I'm not interested in being anywhere else."



Tell Us About Your Shop

Send us photos of your shop, a layout drawing, and a description of what makes your shop interesting. Tell us what you make in it and what makes your shop important to you. If "My Shop" features your shop, you'll receive \$100.

E-mail your entry to myshop@americanwoodworker.com with digital photos attached. Or mail your description with

prints or digital photos on a disc to My Shop, American Woodworker, 1285 Corporate Center Drive, Suite 180, Eagan, MN 55121. Please include your phone number. Submissions cannot be returned and become our property upon acceptance and payment. We may edit submissions and use them in all print and electronic media.

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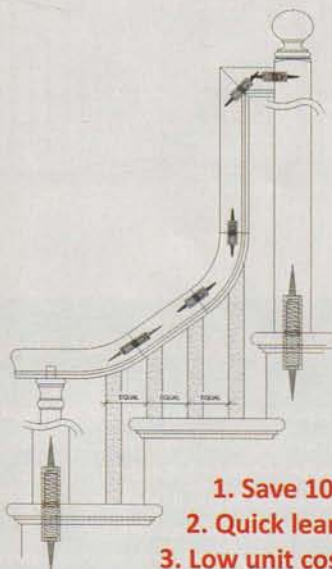
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The New Delta Unisaw



By Andrew Zoellner
and Tim Johnson

MENTION THE WORD "UNISAW," and just about every woodworker knows what you're talking about. Delta's iconic tablesaw has built a unique legacy by providing reliable performance in countless woodworking shops for over seventy years.

So it's not surprising that Delta's approach to making improvements has been thorough—redesigning the Unisaw took six years. Having lived with the new Unisaw in our shop for some time now, we can say it was definitely

worth the wait. It's a silky smooth operator with user-friendly controls and plenty of power. Not only does the new Unisaw live up to its heritage, it also includes a number of notable changes that will pay dividends every time you use it.

A sound platform

The Unisaw's reputation is based on performance and durability. The new Unisaw honors that tradition with American-made materials and a five-

year warranty. According to Delta, 95% of the Unisaw's components—virtually everything but the screws—are currently manufactured and machined in the USA.

Power is supplied by a 3 hp or 5 hp Marathon motor. The motor is mounted on a newly designed one-piece cast iron trunnion. The saw's cabinet is made of heavy-gauge steel and it sits on a cast iron base—this saw weighs nearly 500 lbs. The new Unisaw is equipped with a Biesmeyer fence, a 10" Delta premium saw blade, and an extension table that includes a handy storage drawer.

A bigger saw table

The saw's table has been lengthened where it counts, in front of the blade. The new Unisaw provides 15" of front-



The new Unisaw's table is significantly longer in front of the blade, a boon to both ripping and crosscutting operations.



The riving knife reduces the likelihood of a kickback. It sits below the blade, so you don't have to remove it for non-through cuts, and it travels with the blade during adjustments, so it's always perfectly positioned.



Installing the blade guard assembly takes only seconds. First, pull the release lever to raise the riving knife (1). Then snap in the anti-kickback pawls (2). Hook the guard assembly on the riving knife (3) and lock it in place (4).

end support, compared to about 12" on a typical 10" tablesaw. In addition to expanding crosscut capacity, the extra length provides more room for setting up a crosscut, and more support for ripping long boards.

A riving knife

To comply with the revised voluntary industry standard (UL 987), the Unisaw is equipped with a riving knife. Like the splitter that it replaces, a riving knife keeps boards from pinching the blade and kicking back during a cut. The Unisaw's riving knife offers two major advantages over a splitter. First, it raises and lowers with the blade, so it's always perfectly positioned. Second, it can be positioned slightly lower than the blade, so it doesn't have to be removed whenever you want to cut a groove or other type of non-through cut.

The only time you'll have to remove the riving knife—a simple task on this saw—is to install a dado set or other smaller-diameter blades. A riving knife for thin kerf blades is also available from Delta.

User-friendly blade guard

The redesigned blade guard mechanism also meets all the requirements of the revised standard. It attaches to the riving knife and takes ten seconds or less to remove and reinstall—a great safety feature that leaves few excuses for leaving the blade exposed for any through cut. Ditto for the anti-kickback pawls. The guard's open-front design allows you to see the blade to set up the cut, but it also allows some chips and dust to get tossed back toward the operator. For increased visibility during set-up, each guard wing locks easily in an upright position.

While making a cut, both guard wings remain flat on the workpiece, whether the blade is positioned at 90° or tilted to any angle. For additional protection, the wings are designed to drop down to the table as soon as possible after the board passes. This maximizes protection at the front of the blade, where it's most warranted, but it leaves the back of the blade partially exposed. So, as with all tablesaws

and all blade guard systems, you must always use common sense and follow safe operating procedures.

Easy blade changes

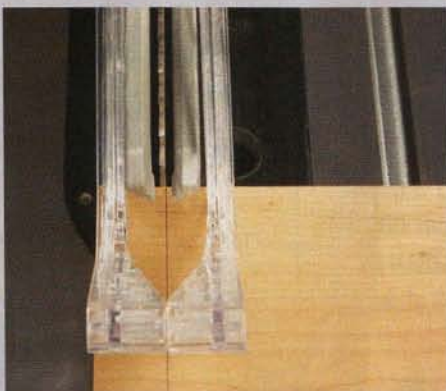
The new Unisaw's generous 5" wide throat opening, an easily accessible arbor lock, and a massive arbor wrench make blade changes easy. Most notably, the arbor nut and flange washer are a single assembly, a terrific little innovation that virtually eliminates the aggravation of dropping the arbor nut into the bottom of the cabinet. This assembly has been available from Delta as an upgrade for a while; it's great to see it on the new Unisaw.

We've been getting very good results with the new Unisaw's factory installed premium blade. This blade features a 50-tooth ATB-R design with sub-micrograin carbide teeth that are generously sized for multiple sharpenings.

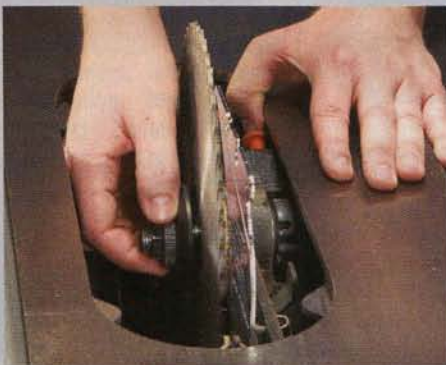
Up-front controls

The front-mounted blade-tilt hand wheel is probably the new Unisaw's most obvious change, and it makes blade-tilt adjustments much easier.

The blade guard's open-front design provides a clear view of the blade, so you can align cuts precisely.



An extra-wide throat opening, an arbor lock and a one-piece arbor nut/flange washer assembly combine with a large easy-to-grip arbor wrench to facilitate blade changes.



The miter gauge has nine detents and a spring-loaded override lever that allows the gauge head to swivel freely. Release the override, and it holds the head in any position, so it doesn't move when you tighten the handle.



Both blade adjustment hand wheels are up front, along with a redesigned bevel scale and both bevel stop adjustments.

Both hand wheels operate smoothly. They're geared for fine adjustments and they feature soft-grip handles and large lock wheels.

The speedometer-like bevel scale is large enough to allow making adjustments in increments as small as $1/4^\circ$, and it's enclosed, so the pointer can't get bent out of adjustment. The adjustment bolts for the 90° and 45° stops are conveniently located on the front of the cabinet, to the left and right of the bevel gauge.

The large off button on the magnetic controls works from nearly any angle, which is great for those times when your knee or thigh becomes an extra hand. The controls can be locked out permanently, by padlocking, or temporarily (for blade changes and such), by inserting an Allen wrench.

Miter gauge

The miter gauge bar is equipped with adjustment screws, so you can dial in a perfect fit in the saw's miter slots. The gauge itself features nine detents (at 90° , 30° , 45° , 60° and 75°), a spring-loaded detent override lever and a

soft-grip handle.

To adjust the gauge, you loosen the handle, depress the override lever and go. Releasing the override lever locks the gauge in any position on the bar, so it won't move when you tighten the handle. The detents can be adjusted by moving the metal plates on the bottom of the gauge (each plate has three detents). When you need to fudge the numbers, the override lever is successful down to increments of about 1° . To make more precise adjustments, you'll have to loosen the plates.

Fence

All new Unisaws are equipped with Biesemeyer fences. The 3 hp saw is available with either a 36" fence or a 52" fence; the 5 hp saw comes with a 52" fence. The fence tube is made of 14-gauge extruded aluminum and is really tough, according to Delta, despite being surprisingly light in weight. The fence scale is easy to read and adjust, with see-through pointers and hairline indicators on both sides. The cam lock soft-grip handle snaps positively into place, and once it's

there, it doesn't move. When you reposition the fence, a magnet holds the handle up and out of the way. The fence faces are replaceable, although you have to remove the laminate overlays to access the mounting screws.

Dust collection

The new Unisaw is equipped with a 5" diameter main dust port, which allows better dust collection than most other 10" saws, because it allows connecting the saw to 5" dia. pipe. (A 5" to 4" reducer is included with the saw to interface with 4" systems already in place.) The saw's blade shroud routs directly to the main dust port, which also includes openings to collect dust from the saw cabinet. The cabinet itself is completely enclosed and the motor cover and front entry doors are gasketed.

Source: Delta, (800) 223-7278, www.deltaportercable.com, 3 hp Unisaw with 36" Fence, 36-L336, \$2,875; 3 hp Unisaw with 52" Fence, 36-L352, \$2,999; 5 hp Unisaw with 52" Fence, 36-L552, \$3,199.

One Serious Bandsaw

A FEW YEARS BACK, I found this bandsaw in someone's barn, in very poor shape. It was laying on its side in the mud, with the table broken in half. But what a beauty!

I moved it to my shop with a backhoe, welded the table back together, restored all the hardware, and repainted everything. I also added doors in front of the wheels—as it was originally built, it didn't have any doors at all.

This bandsaw was made by London, Berry & Orton (the Atlantic Tool Works) of Philadelphia in 1897. It was sold by Chas. A. Strelinger & Co., of Detroit, whose nameplate covers the original manufacturer's.

The huge wheels on this saw measure 36" dia., and the blade is 17-1/2' long. Originally, the saw was powered by a belt from a line shaft; the 3hp electric motor was added later. And if you are wondering, yes, it runs fine! In fact, it's quieter than my 14" bandsaw.

Jim Bugg



Zeda's Nails

YEARS AGO, I MADE A CORNER CUPBOARD

from black walnut. I thought the wood was magnificent, but a can of rusty cut nails I used in building it proved to be far more interesting, taking me on an unexpected journey into my past.

My father gave me these nails, saying that they were left over from the demolition of my grandpap Zeda's tool shed. As a boy, I loved opening the shed's door, seeing Zeda's old and weathered gardening tools, and smelling the peculiar aroma of mother earth subtly sea-

soned with old fertilizer and stagnant air. Through all kinds of weather, Zeda would spend hours gardening, tinkering, or idling away the time with visitors. He loved it when his grandchildren came by for a visit. Sometimes he'd break from his daily routine and dazzle us with a riddle or trick until we thought he was larger than life.

When I built the cupboard, I spent over an hour straightening

those nails. After driving the final nail into the cupboard's back boards, I paused for a nostalgic moment. Suddenly, I felt the lives, histories and souls of three generations of my family converge.

The cupboard still stands proudly in my dining room. Its real meaning lies not in its external beauty, but in the living history provided by a handful of hidden cut nails. This cupboard's genuine character, as is often the case with people we know and love, lies comfortably and deep within.

Don Midway

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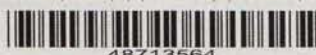
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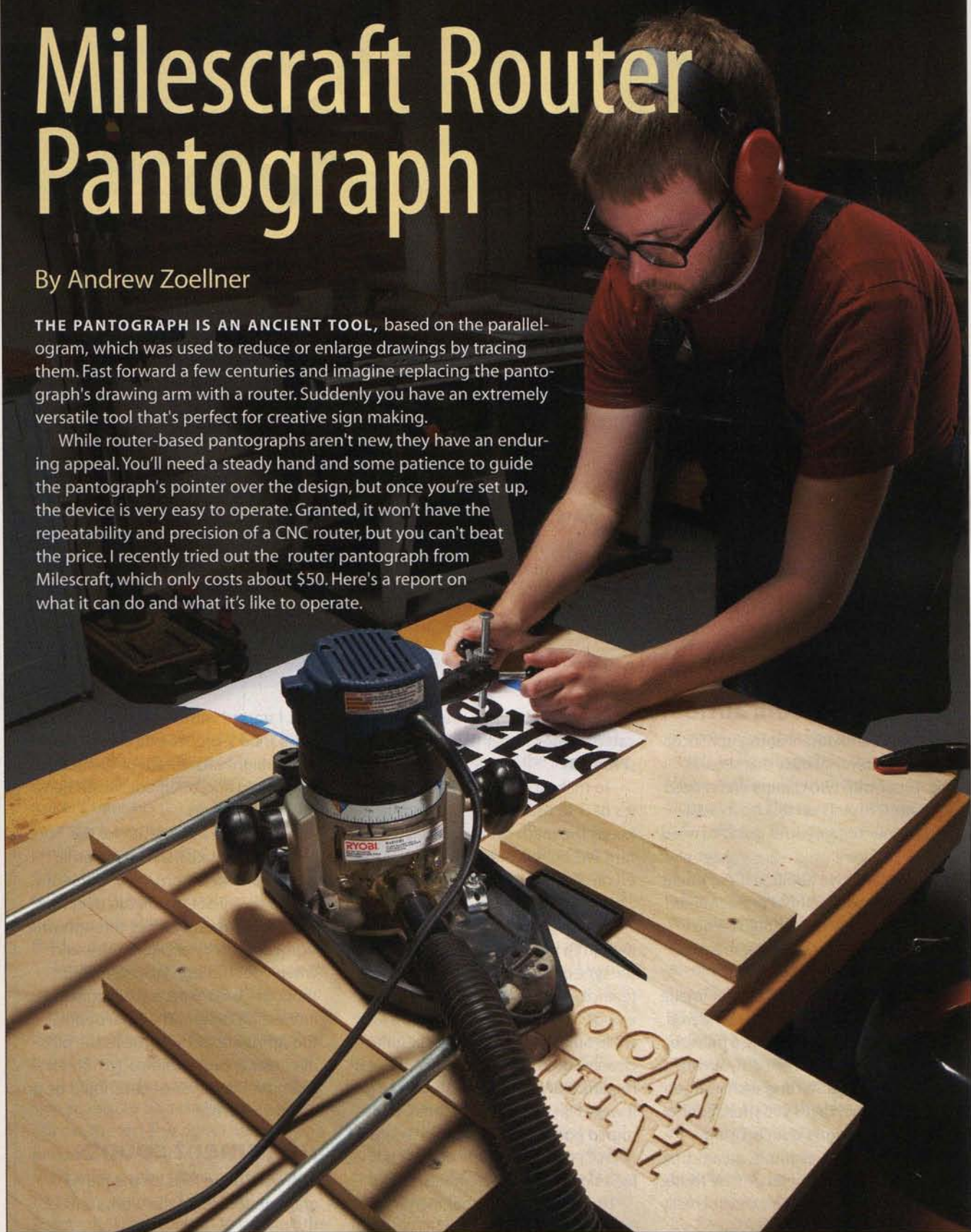


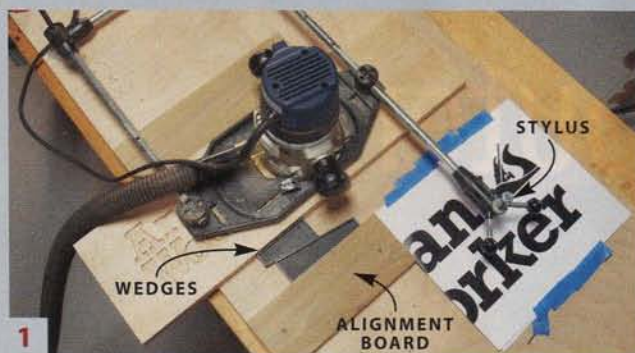
Milescraft Router Pantograph

By Andrew Zoellner

THE PANTOGRAPH IS AN ANCIENT TOOL, based on the parallelogram, which was used to reduce or enlarge drawings by tracing them. Fast forward a few centuries and imagine replacing the pantograph's drawing arm with a router. Suddenly you have an extremely versatile tool that's perfect for creative sign making.

While router-based pantographs aren't new, they have an enduring appeal. You'll need a steady hand and some patience to guide the pantograph's pointer over the design, but once you're set up, the device is very easy to operate. Granted, it won't have the repeatability and precision of a CNC router, but you can't beat the price. I recently tried out the router pantograph from Milescraft, which only costs about \$50. Here's a report on what it can do and what it's like to operate.





1

A pantograph is a simple device. The sign is wedged between two alignment boards. The stylus is connected to a pivoting frame that carries the router. The router copies your movements.



3

In addition to letters, you can copy drawings and images—anything that you can print out from a computer or draw freehand.



2

The Miescraft pantograph is primarily designed for making signs and plaques. You can trace anything on a printed page and reduce it by 40, 50 or 60%.



4

The pantograph can make a sign that's quite large. Begin by taping together individual sheets of paper to create the full pattern.

It's simple—well, almost

The Miescraft Router Pantograph incorporates a universal base that secures the router with two clamps, and is sized to fit most routers up to 3 hp. In addition to your router, you're going to need a work surface (I used a 2' x 4' sheet of plywood) and two additional alignment boards (**Photo 1**) to hold the signboard in place. These boards should be no thicker than your sign, so the router's base doesn't bump into them.

The pantograph reduces your image by 40, 50 or 60% (**Photo 2**). I wondered why it wasn't set up to make a full-size copy, but I discovered the answer when I started to use it. Starting with a larger image on paper gives you more control over routing a sign's details. Using a 50% reduction, for example, means that when you move the stylus 1", the router only moves 1/2". Pin-point control really

comes in handy when routing complicated images, rather than just letters (**Photo 3**).

To make a sign of a particular size, it's best to use the 50% setting. It keeps the math simple, since your pattern will be twice the size of your routed design.

What wood? What bit?

It wasn't a big surprise, but I found that the type of wood I used made a big difference in the sign's quality. Some woods, like fir, chipped out quite a lot, while others, such as maple, cut quite cleanly. I used MDF for practice. While it required very little physical effort to rout, it wasn't an ideal material. Small, non-routed portions of letters (like the inside of an O) tended to chip out. MDF is fine for a sign with large elements, though.

I had a lot of fun experimenting with

bits. I started with a 1/4" straight bit, but I also tried V-groove bits, core box bits and straight bits of various diameters. All worked fine, but made very different-looking signs.

Setting the right depth for the router bit is crucial. Like many other woodworking lessons, I found this out the hard way. Set the bit too deep, and you end up routing holes through your sign. I did this by accident once, and when I got through kicking myself, I thought—this might actually make an interesting design! The ideal depth, though, is about the same as the bit's diameter. If you're using a 1/8" bit, for example, the depth-of-cut should be no more than 1/8".

Alignment counts

There are three rods on the pantograph that contact the work surface:



5

To rout a wide sign, you'll need to reposition your board and pattern after every few letters. To make the change, stop at a corner of a letter and turn off the router.



6

Next, remove the wedges that hold the sign in place. Move the router and sign together, to the left, by sliding them along the top alignment board. The stylus follows along.



7

Wedge the sign in place again, then move the pattern so the corner of the letter you selected falls under the new position of the stylus. Keep the sign and pattern parallel to each other.



8

After routing, spray paint the entire sign. Then run the board through a planer or over a jointer to remove the paint from the board's surface. This really makes the lettering stand out.

the stylus, a fixed pivot and a moving pivot (**Photo 1**). You'll need to adjust the height of all three bolts so that the router's base sits flat on the sign. If all your signs are the same thickness—no problem, it's a one-shot deal. If your signs vary in thickness, you'll need to adjust these bolts each time. In addition, the router needs to be in line with the fixed pivot point and the stylus.

While these alignments don't have to be spot-on for the pantograph to work, accuracy does make a difference. The better the alignment, the truer your final product will be to the original image.

Centering the words or image on a sign proved to be a challenge. To be honest, the first few signs I made were a bit lopsided, with unequal margins. I fixed them on the tablesaw, by taking a bit off one edge and one side. Eventually, I found it best to position the

sign so the router begins in the sign's center, and then center the paper pattern under the stylus.

Be creative!

Don't hesitate to tackle a sign that's larger than an 8-1/2" x 11" sheet of paper. The Miles Craft pantograph is versatile enough to handle a sign of virtually any size. I tried making a long sign, for example, by taping together two 11" x 17" sheets of paper (**Photo 4**). It took a while to figure out how to shift the paper image and sign as I went along, but it worked just fine (**Photos 5-7**).

Materials for making paper patterns are everywhere: magazines, newspapers, clip art, computer fonts—even your own sketches. Kid's coloring books, which are full of simple, oversize line drawings, are a gold mine. Whatever the source, the trick is

to remember that the image you trace needs to be larger than the final sign. While a plain old routed piece of wood doesn't look like much, when you add paint (**Photo 8**), it can look great!

The bottom line

After a couple of trial runs, I felt pretty confident using the pantograph. I got it; it's a simple mechanical device, not an electronic black box. You'll probably start out copying just a few words, as I did, but I bet you'll soon want to tackle intricate designs—they're definitely more fun. Sure, you'll never be as fast or as precise as a CNC, but a sign that shows the hand of the maker is fine by me.

Source: Miles Craft, www.milescraft.com, (847) 683-9200, 3D Pantograph, #1298, \$49.99.

REPAIR A WATER-DAMAGED FINISH

Work miracles on wood with oxalic acid.

By Kevin Southwick



WATERING A POTTED PLANT CAN BE DISASTROUS if the plant lives on top of something made out of wood. We've all seen the white spots and black rings that can result when water seeps through the pot. And if you've ever tried to sand out these marks, you know it's a tough job that can leave telltale depressions on the surface. Fortunately, in many cases, this type of damage can be almost magically undone by treating the wood's surface with oxalic acid.

Oxalic acid removes the gray color from oxidized wood, without changing the wood's natural color. That's why it's commonly used as the active ingredient in deck cleaners, and why restorers use it to remove gray or black water stains on furniture (see "Oxalic Acid Undoes Rust," below, right). Oxalic acid is also used in some household cleaning products for removing hard water stains, and it has many industrial uses as well. Although it is found as a natural ingredient in some vegetables (spinach and rhubarb), oxalic acid is quite toxic if ingested in concentrated form.

Identify the stains

Every finish repair job is unique, of course, so the first step is to thoroughly examine the problem. The chest lid shown here has both whitish marks (also called blushing or bloom), and dark gray and black discolorations. White marks are usually in the finish; dark discolorations from water indicate more significant damage, because they're down in the wood.

To help formulate a plan to repair this finish, I dampened the entire lid with mineral spirits (paint thinner). This testing method is useful anytime you want to look closely at either old dry finish or bare wood. The look of the paint thinner-dampened surface is similar to how it would look if shellac or a clear oil based finish were applied. In this case, dampening the surface makes the whitish marks temporarily dis-

Start by thoroughly cleaning the surface. First, wipe it down with mineral spirits, to remove polish and other crud that's greasy or waxy. Mineral spirits also shows what the damaged areas will look like with a clear finish applied.



When the mineral spirits has evaporated, complete the cleaning process by wiping the surface with soap and water, using a soft cloth, to remove water-soluble residue. Allow the surface to dry completely.



Sand lightly, using fine paper, a soft block and very little pressure. Although the goal is to remove the raised grain from the damaged area, it's important to sand the entire surface to maintain consistency.



Oxalic Acid Undoes Rust

Oxalic acid works a specific type of chemical magic by removing dark water stains from wood. These stains result when water containing iron and other minerals gets into wood. The discoloration that occurs is similar to rust. As shown here, oxalic acid is strong enough to dissolve the rust from an old plane iron, but it has little or no effect on the non-oxidized steel. (This plane iron soaked overnight in a saturated solution of oxalic acid.)

Oxalic acid is uniquely different from the other two bleaches occasionally used in wood finishing and refinishing, because neither chlorine bleach nor two-part bleach will significantly affect water stains or rust. Chlorine bleach is good for removing or lightening dyes (as it does in the laundry). Two-part bleach will lighten the color of just about anything it can soak into. Part A is sodium hydroxide (lye); Part B is hydrogen peroxide (which is also used to lighten hair color).



Mix a saturated solution of oxalic acid in a non-metal container. Add a spoonful at a time to the water and stir, until a layer of non-dissolved oxalic acid remains at the bottom.



Wipe on the oxalic acid solution. Leave it on the surface for about five minutes to achieve the maximum effect. Then wipe off the excess and let the surface dry thoroughly. The effect can be almost instantaneous.



Flood the surface with water repeatedly, to remove any remaining oxalic acid crystals.



Dampen the surface with mineral spirits to test the results. Here, the whitish bluish areas virtually disappear and the black marks are 99.9% gone. The repair is complete; it's time to re-build the finish.



In this case, the finish is blonde shellac, the same finish as the original. Adding a waterproof finish over the shellac could help to prevent future damage. Moving the plant may be a better option.



appear (they reappear when the mineral spirits evaporates). That means a coat or two of finish is all that's needed to take care of the white marks. (This is a stroke of luck; if the white marks hadn't disappeared, additional repair steps would be necessary to remove them, and that's a topic for another story.)

Now I can focus on the black rings. The mineral spirits test shows that they get darker, and that makes them good candidates for treatment with oxalic acid. If the oxalic acid works, I won't have to aggressively sand the entire lid. Not only would sanding remove the remaining intact finish (80%, in this case), it would also lighten the lid's aged cherry color, so it would no longer match the rest of the chest that it belongs to.

Treat the stains

Every step of this treatment should be done consistently to the entire surface, not just the damaged area. The procedure involves flooding the surface with water. Fortunately, the damage shown here is on solid wood—using this treatment on a veneered surface can be risky.

The first step is a thorough cleaning, using two different cleaners. Mineral spirits removes greasy residue, such as old wax or polish (Photo 1). Mild dish soap and water removes any water-soluble crud (Photo 2). Neither of these processes will damage an intact finish.

The grain is raised very slightly in the water-damaged area, so a little sanding with 400 grit paper is necessary (Photo 3). This step should take about one minute.

Mix up a saturated solution of oxalic acid by adding the crystals to a jar of warm water with a plastic spoon (Photo 4). Do not use any metal containers or utensils—the acid could react with the metal. Add crystals a spoonful at a time and stir until no more will dissolve into the water. I always use a saturated solution, so that I have a maximum-strength problem solver.

Wearing gloves and eye protection, use a rag or sponge to saturate the entire surface being treated, not just the dark spots (Photo 5). Keep the surface

wet for about five minutes to allow for the maximum effect. Then wipe off the excess and let the surface dry completely. You may see the effect immediately as you apply the acid, or the spots may disappear gradually, as the acid dries. If a second application of acid is necessary, wait to apply it until the first application has thoroughly dried, or it won't work. If two or three applications do not remove the stain completely, more acid is not likely to help. You'll have to live with the remaining discoloration or resort to sanding to remove it. However, do not sand until you have thoroughly rinsed the surface—breathing dust that contains oxalic acid is extremely unpleasant and potentially hazardous.

When you've completed the oxalic applications, it's imperative to thoroughly rinse the treated surface with lots of clean water, to flush away any acid that remains on the wood (**Photo 6**). Flood the surface several times and dry it with a clean cloth or paper towel each time. Let the surface dry between each flooding.

Attempting to "neutralize" the acid that remains on the surface with a mild alkali such as baking soda, borax or ammonia is a cleansing option that is frequently mentioned as an alternative to rinsing. However, I have never seen any accurate formulas that would make this chemical balancing act a practical possibility. Besides, I know that thorough rinsing works.

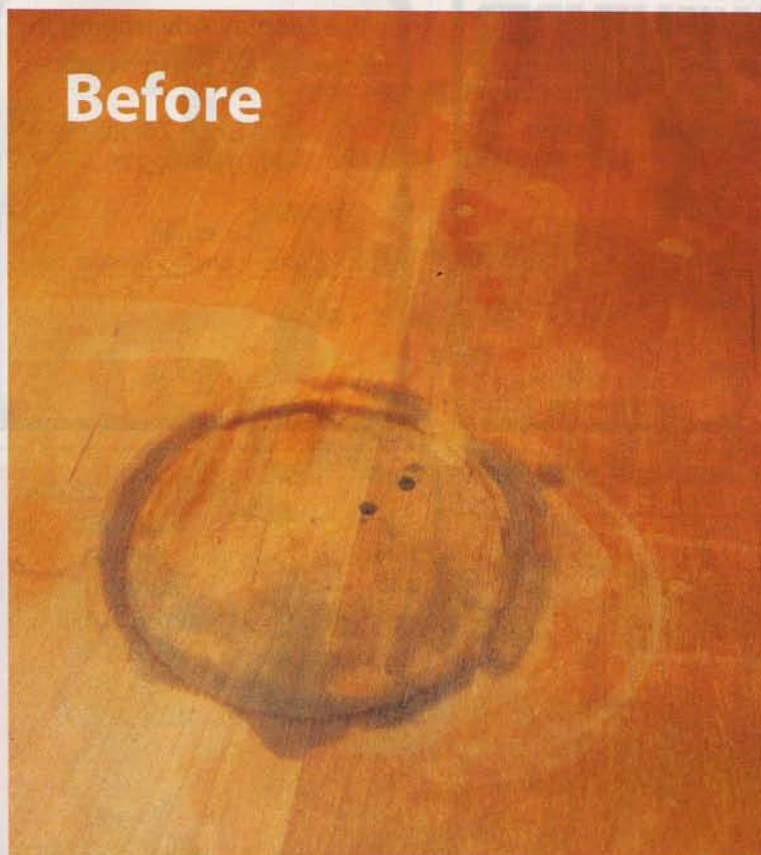
After the lid has thoroughly dried, don a respirator and lightly sand the entire surface with 400 grit paper, to cut back any grain raised by the oxalic treatments. Test the surface again with mineral spirits, to gauge the results (**Photo 7**). The test on this lid indicates that the surface is ready for finishing (**Photo 8**).



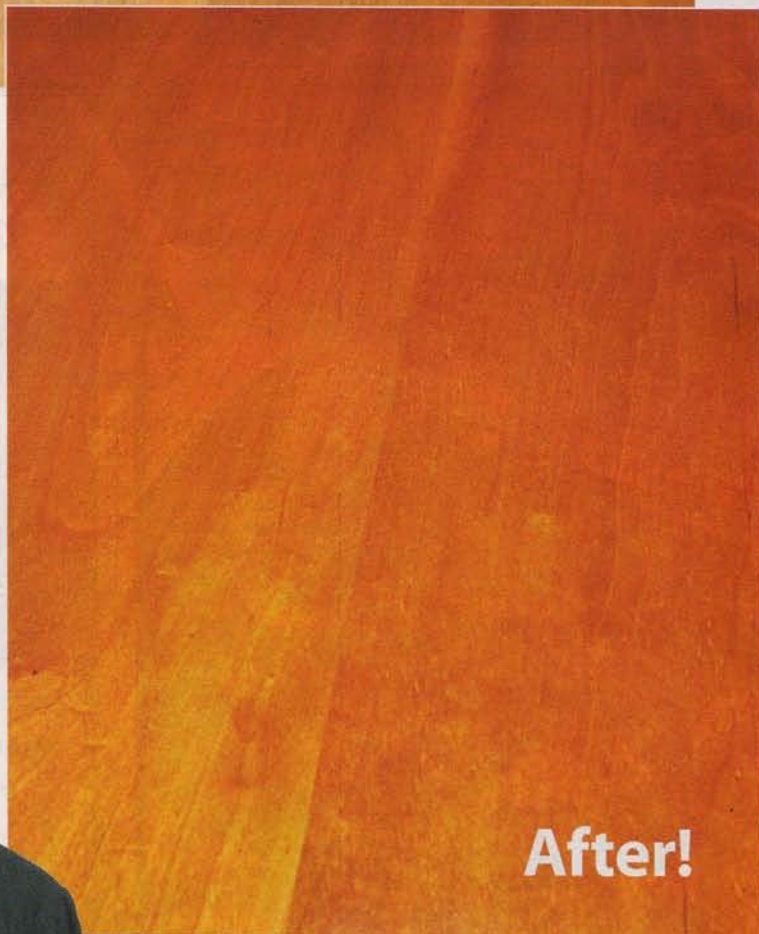
Kevin Southwick is a wood finishing specialist and furniture restorer/conservator in Minneapolis, MN.



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Robert Tupper



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Margaret Scally

Drill Bits for Pennies

I'VE ALWAYS HAD BAD LUCK WITH really small drill bits—if I don't break them, I lose them. I've stopped buying new ones, and now clip the heads off finish nails and use the nails as bits. Smooth nails—not galvanized—work best. To improve its cutting ability, file or grind the end of the nail to a chisel point.

H.R. McDermid





Thrifty Tips Special!

New Road for Old Drivers

I USE LOTS OF PHILLIPS-HEAD SHEETROCK SCREWS, which are made of hardened steel. They're tough on

bits. A worn-out bit can't be renewed, so I reshape it to fit a slotted screw using a small diameter sanding drum. I place the bit in a magnetic holder and slide the holder into a wooden block that has a kerf cut in one end. Tightening a screw squeezes the ends of the block around the holder. Using the block, I can precisely position the bit in order to grind perfectly parallel sides.

Simon Watts



Paint-stick Files

WHEN YOU NEXT BUY PAINT, ask for a few free stirring sticks. Glue sandpaper to them and soon you'll have a complete set of woodworking "files". They're very handy because you can make the files as coarse or fine as you need.

Nelson H. Rittenhouse



Budget Spring Clamp

THIS LIGHT-DUTY CLAMP IS IDEAL for small parts, and easy to make by the dozen. All you need are a couple of wood scraps, a rubber band, and a short piece of dowel rod. You can vary the pressure by changing the position of the dowel or the rubber band and how many times you wrap it.

Jim Tite

Bar Clamp Holdfast

A BAR CLAMP MAKES AN EXCELLENT bench holdfast. Just grind the end of the clamp so the sliding jaw can be slipped off the bar. Drill holes in the bench at convenient intervals, push the bar through one of the holes, and reinstall the sliding jaw. You can put the handle above or below the bench—whichever is more convenient.

D.E. Brumfield



Corner Molding Vise Pads

I'VE FOUND THAT SECTIONS of 1" corner molding are ideal for padding the jaws of a machinist's vise. You can buy adhesive-backed magnetic strips at a craft supply store to hold the pads in place. Alternatively, you can just cut up refrigerator magnets and glue them onto the molding. When the pads get chewed up, it takes only a minute and a few cents to replace them.

Craig Bentzley

Thrifty Tips Special!



Venetian Blind Trick

WHEN GLUING PLASTIC LAMINATE to a substrate, lots of folks use sticks or dowels to support the laminate. Supports allow you to perfectly position the laminate, since it can't be shifted once it contacts the glue. I use old mini-blinds, curved side down. Mini-blinds are easy to pull out and easy to clean.

J.A. Wilson



Contoured Sanding Block

TO SAND A LOT OF MOLDING, glue 80-grit sandpaper to several inches of the molding. Rub a block of Styrofoam on the sandpaper until the block conforms to the molding's contour. Glue sandpaper to the block, then sand the molding.

This method works best on large cove moldings; small rounds or hollows can lose their definition if sanded with a large block and coarse paper.

Tebor Narom



Cheap Spring Clamps

TO MAKE DOZENS OF SPRING CLAMPS for pennies, saw 2"-3" dia. PVC pipe into rings an inch or so wide. Cut the rings open on the bandsaw. Angle each cut to give the clamp a little bite. These clamps provide about 8 lbs. of pressure when opened about an inch. They may not be as convenient as one-handed spring clamps, but since you'll get more than a hundred from a 10' length, at least the price is right.

Tom Whalen



Thrifty Tips Special!

Keep Your Tires Clean

BANDSAW BLADES MAY NOT TRACK RIGHT if pitch and sawdust build up on the saw's rubber tires. I've found that soft bristle brushes are ideal for keeping the tires clean. Using steel corner brackets, mount one near the upper wheel and one near the lower wheel. The brushes also remove static electricity, which can cause problems in very dry climates.

Donald Kinnaman



Shop-Made Edging Clamp

EDGING CLAMPS ARE VERY USEFUL, but they're a bit pricey. I prefer to make my own. Face-glue two pieces of 3/4" plywood together and then bandsaw the "U" shape. Drill holes for the three 5/16" T-nuts, and then make up the 5/16" clamp screws using 5/16" threaded rod, 5/16" jam nuts, and plastic or rubber caps from the hardware store's plumbing department.

Eric Worden



Sawdust Catcher

AFTER YEARS OF SWEEPING under my contractor's saw, I finally devised a way to directly collect most of the sawdust in a large plastic trash bag. The bag is held by a 1/2" MDF frame. I drilled holes in the frame for machine bolts, and corresponding holes in my saw's base, then epoxied the bolts in the base's holes. The bag wraps around the frame, which is attached to the base with wing nuts.

Stephen Drummer

Thrifty Tips Special!



Spring Clamp for Miters

SPRING CLAMPS ARE EASILY CONVERTED to miter clamps by adding swivel jaws. Remove the vinyl tips, then hacksaw a 1/2" long slot down the center of the metal jaws. Use needle-nose vise-grips to fold down the two halves of each jaw, and then drill a hole for a small bolt or rivet.

To make the swivel jaws, snap off two pieces, 3/4" - 1" long, from an old hacksaw blade. Drill holes through their centers and fasten them between your spring clamp's folded tips. For extra holding power, double the blades at each tip. Make sure the teeth point towards the clamp's mouth for maximum gripping power.

Bert Herrick

Bargain Screw Lube

A TOILET BOWL FLOOR GASKET is an excellent lubricant for screws—it's much more slippery than paraffin, soap, or all of the other materials I've tried. It's very soft, so all you have to do to coat a screw is to push it into the ring. One gasket lasts for years. You'll find them in hardware stores and home centers.

Robert Behm



Recycle Old Gloves

HERE'S A SIMPLE WAY TO PROTECT YOUR CHISELS from getting nicked and rusty while they're rattling around in your toolbox. Just cut the fingers off some old leather work gloves. Poke holes with an awl at the open end and thread a drawstring through them. Slide the chisel's blade into the finger, then close it tight with the drawstring.

To keep the chisel rust-free, drizzle a little 3-in-1 oil into the finger. The oil will soak into the leather. Wipe the chisels with a clean cloth before use so the oil doesn't get on the wood.

Daniel Losinger



Make Your Own Foam Brushes

YES, FOAM BRUSHES ARE CHEAP, but they can be even cheaper! A roll of foam rubber weather seal can make hundreds of disposable brushes for just pennies apiece. Cut off the length you want, peel the paper backing off the adhesive, and press the foam onto a wood tongue depressor or Popsicle stick.

G.F. Hinderholz



Thrifty Tips Special!



Squaring a Square

IF YOUR OLD CARPENTER'S SQUARE isn't precisely square, don't throw it away. You can adjust its angle using a hammer and a center punch.

First, check to see which way it's off. Lay the tongue along the edge of a board and draw a line against the blade. Then flip the square and repeat. If the lines coincide, your square is accurate. If they don't, punch near the outside corner to reduce the angle; punch near the inside corner to increase it.

Hugh Lineback



Deadbolt Bench Stop

FOR A QUICK AND SIMPLE BENCH STOP, I mounted a sliding bolt taken from an old door to the end of my workbench. In the locked position, the bolt stays put; in the unlocked position, it's completely out of the way.

Darryl Thomas



Auto Salvage Glue Spreader

TO SPREAD GLUE RAPIDLY and uniformly over a large area, use an old windshield wiper. You'll find a lifetime supply at any auto salvage yard.

Arthur Elson



PHOTO BY CONTRIBUTOR

Junkyard Scroll Saw Easy Chair

DRAWN BY ITS CHROME TRACTOR SEAT, I rescued an old exercise machine from the dump and re-engineered it for scroll sawing.

After completely disassembling the machine (and storing away the handlebars, pedals, gears and motor for future projects), I added a custom-made saw-support table and repositioned the seat. Both the table and seat adjust to suit the operator.

To really trick out my new tool, I added a task light, a footrest, and a foot-operated power switch. Now scroll sawing is almost as fun as riding a Harley.

Joe Johns

Thrifty Tips Special!



Low-Tech Alignment Tool

THIS SIMPLE JIG enables you to quickly and accurately align your saw's blade with a miter slot. Perfect alignment helps prevents kickback and burned cuts. You can also use the jig to align your fence with a miter slot.

First, make a 12" long runner that fits snug in the slot. Position a block of wood on the runner 1/2" away from the blade and glue or fasten the block to the runner. Screw a round-head brass screw into the end of the block facing the blade.

To check your blade, unplug the saw and color one tooth with a marker. Rotate the blade so this tooth sits just above the front of the throat plate. Back out the screw until it just touches the tooth. Rotate the blade so the marked tooth sits at the back of the throat plate and check the distance between the screw and the tooth. If the screw just touches the blade, alignment is correct. If not, you'll need to loosen and adjust the saw's top or trunnions.

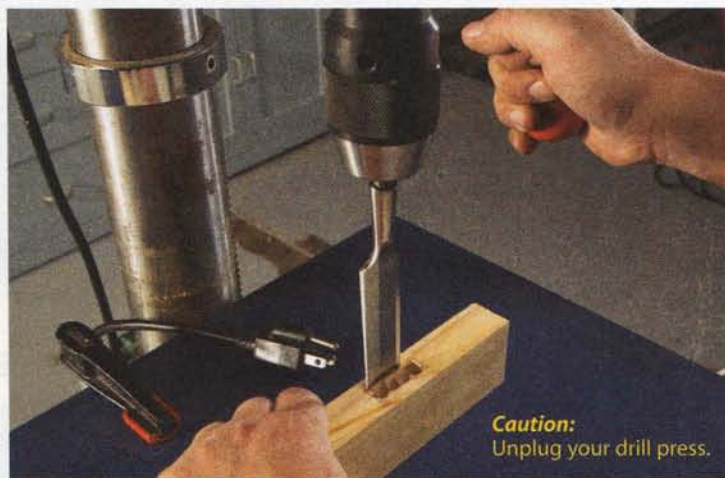
Jeff Fagan



Steamer for Small Parts

TO STEAM SMALL PIECES OF WOOD, I made a plywood cover for my electric kettle with a 2-1/2" hole drilled in the center. A piece of perforated rubber shelf liner over the hole creates a gasket around the PVC pipe, keeps the parts from falling through, and allows steam to flow into the pipe. Tie a length of string to the end of the parts you're steaming so you don't burn your fingers trying to get them out of the pipe. Also, be careful not to let the water level get too low or you'll ruin the kettle's heating element.

Guy Bush



No Mortising Attachment, No Problem

HERE'S A CHEAP, TIME-HONORED WAY to clear the waste out of mortises after drilling. Buy a plastic handled chisel (they're only about five bucks) and twist off the handle with a pipe wrench, exposing the chisel's tang.

Unplug your drill press, and tighten the chisel's tang into the chuck. Line up your part and start paring the mortise. Don't try to take all the waste at one time. This design is similar to very old mortising machines, before hollow chisels with a bit inside were used.

Jack McGary



Thrifty Tips Special!



Plane Blade Chisel

WHEN I NEEDED A VERY WIDE CHISEL for accurately paring some dovetails, I just removed the blade from a plane and added a handle to it. This massive chisel proved to be so easy to control that I use it for many other jobs, too.

Make the handle from 1/2" thick stock. Round the sides and top edge and chamfer the bottom edge of each piece. Fasten the two halves with 1" long 1/4-20 machine screws and square nuts. Chop square recesses for the nuts so they sit flush with the surface.

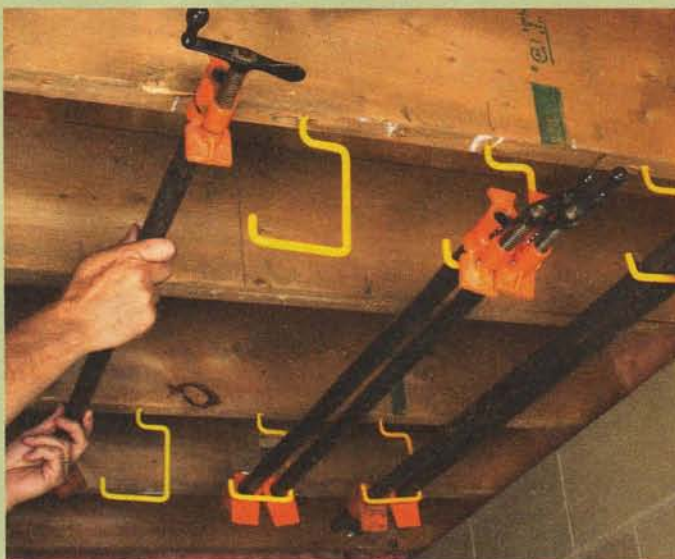


Tom Caspar

Clamp Hangers

CLAMPS HUNG ON THE WALL are space hogs. I'm always on the lookout for more efficient storage schemes in my all-too-small shop. At the hardware store the other day, I came upon these storage hooks for ladders and a light came on. The store clerk thought I was a little deranged when I plopped a dozen or so hooks on the counter. "Gotta lotta ladders to store?" he asked. "Yup," I replied. I knew what I was doing. For about a dollar apiece, I had instant overhead clamp storage. Few things in life are this simple. My hooks freed up enough wall space to hang a cabinet for my portable power tools.

Shelly Jacobson

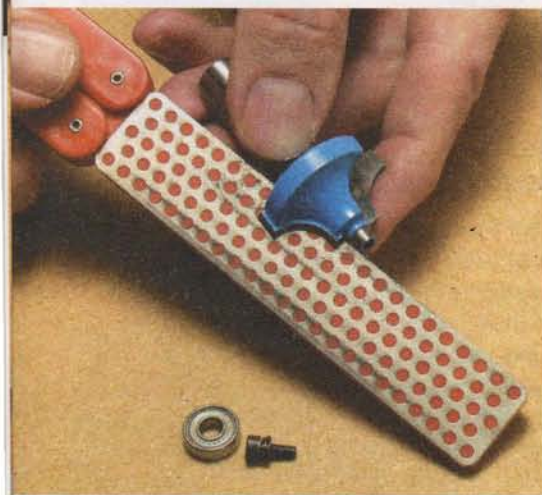


Sharpen Your Bits

INSTEAD OF REPLACING a dull carbide router bit, re-sharpen it. All you'll need is a good commercial resin cleaner and a couple of diamond paddles. Before sharpening, inspect the edge. If it's rounded over or lightly nicked, take the bit to a pro. Most bits can be professionally sharpened for under \$10.

To sharpen the bit yourself, first clean it to remove the pitch and resin build-up. Next, hone the bit with diamond paddles lubricated with water. Use a medium (325 grit) paddle for a somewhat dull bit and a fine (600 grit) paddle for final honing and routine touch-up. Lap the flat face of the bit (not the profile). Four to six passes should do it.

Sources: Rockler, www.rockler.com, (800) 279-4441, 16 oz. Pitch and Resin Remover, #39146, \$10.59; DMT, www.dmtsharp.com, (800) 666-4368, Double Sided Diafold Diamond Whetstone, 325 and 600 grit, #FWFC, \$42.





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Corbels



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Feet



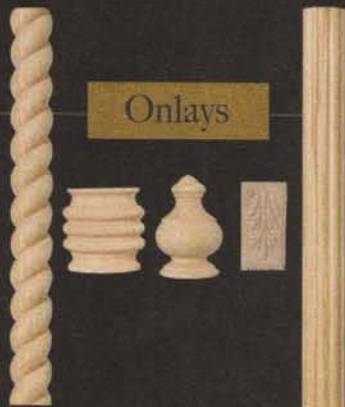
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Island Posts and Table Legs



Designs for the Hyper-Organized Shop

20 projects for putting more tools in less space. By Jock Holmen

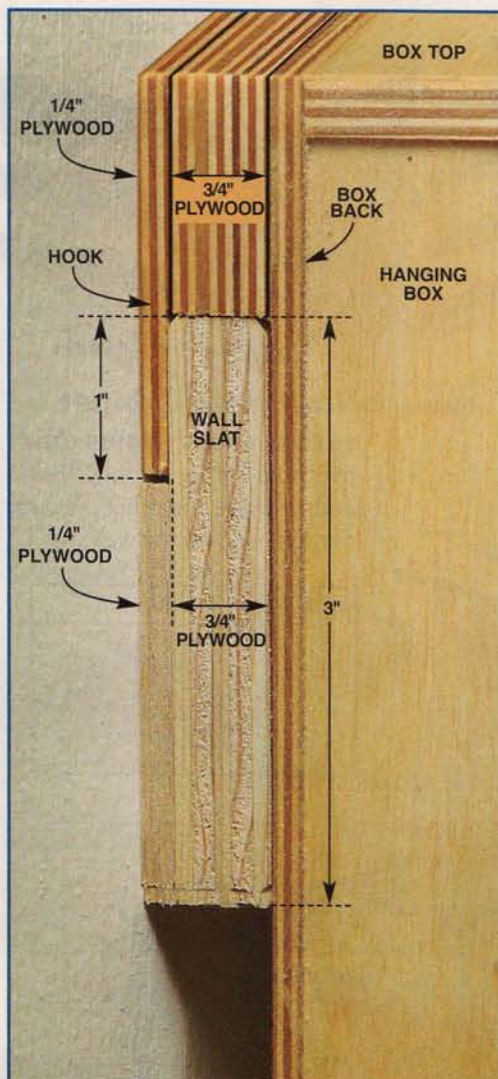


THREE YEARS AGO, I WROTE ABOUT a storage system that revolutionized my cluttered shop (see "Hyperorganize Your Shop, AW #125, November 2006, page 44). That article

gave you a general idea of what I built, but it didn't contain any specific plans for the system's components. Lots of woodworkers asked for more details, so I've put together cutting lists for

many of the units. You can find larger photos of these pieces and other components, plus the original article, at www.AmericanWoodworker.com/HyperOrganizedShop.

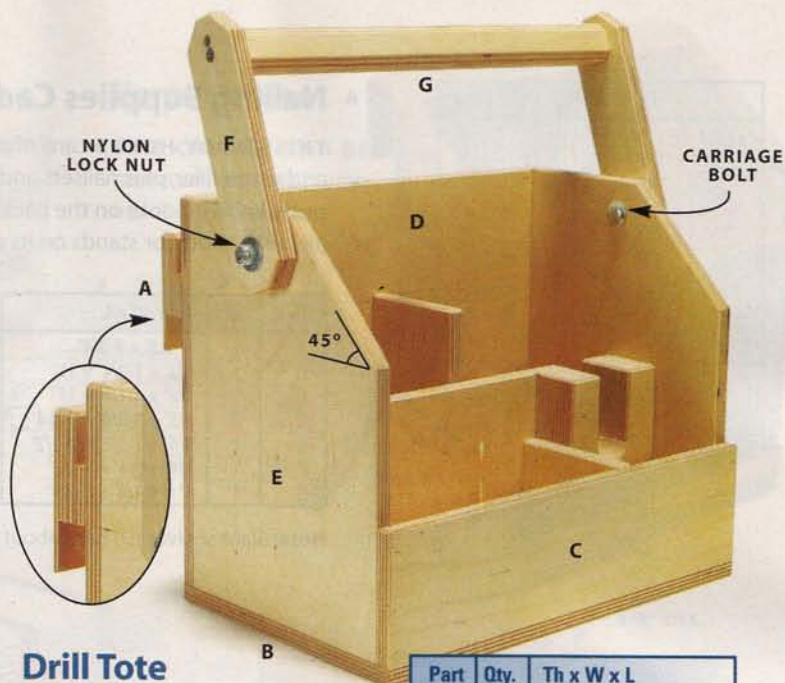
—Jock Holmen



How it works

Every unit hangs on a simple hook-and-slat system. The hooks are composed of two pieces of multiply birch plywood, glued together, as are the slats. After gluing the slats, shave $1/32$ " off the inside face of the $3/4$ " plywood piece using a router table or dado set. Removing this material allows the hooks to drop into the slats without binding.

All of these units are built from multiply plywood of various thicknesses. Make the 1" thick parts by gluing together two pieces of plywood. Some units are nailed and glued together; those that need more strength are screwed and glued.

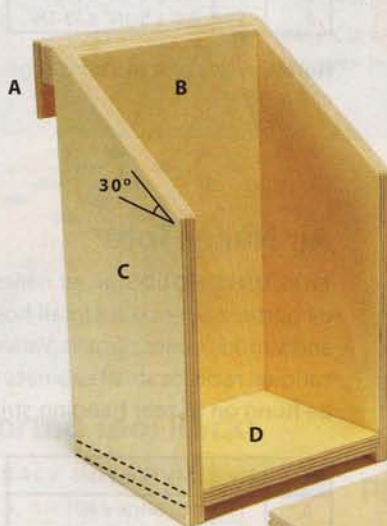


Drill Tote

THIS PORTABLE UNIT holds a cordless drill and related supplies. Various caddies, racks or small cabinets may be hung on its rear, double-sided hanging strip.

Part	Qty.	Th x W x L
A	1	1" x 3-1/4" x 13-1/4"
B	1	1/2" x 8-1/2" x 13-1/4"
C	1	1/2" x 3-1/2" x 13-1/4"
D	1	1/2" x 10-1/2" x 13-1/4"
E	2	1/2" x 7-1/2" x 10-1/2"
F	2	1/2" x 2" x 7"
G	1	1" x 1-1/4" x 13-1/2"

Notes: Cut inner parts to fit your drill, battery, charger and drill bit indexes; cut handle into octagonal shape; place $1/8$ " spacers between box and handle.

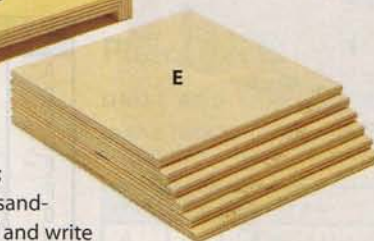


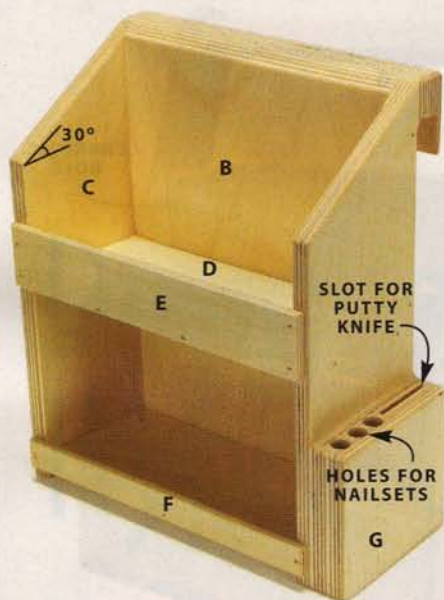
Sander Caddy

THIS UNIT HOLDS various sheets or discs of sandpaper, separated by spacers. Place the sander on top of the spacers to keep the paper flat.

Part	Qty.	Th x W x L
A	1	1" x 2" x 6-1/2"
B	1	1/2" x 5-1/2" x 11"
C	2	1/2" x 6" x 11"
D	1	1/2" x 5-1/2" x 5-1/2"
E	6	1/4" x 5-7/16" x 6-1/2"

Notes: Install D at a slant to prevent tipping; reduce the size of each sandpaper spacer (E) by $1/4$ " and write grit numbers on their stepped edges.



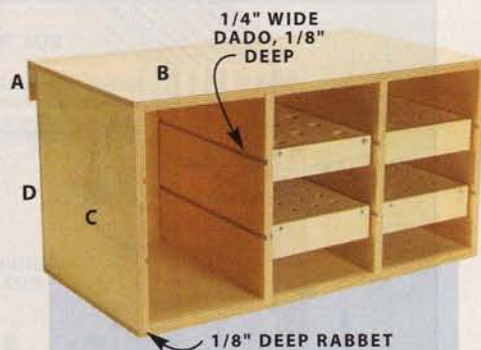


A Nailing Supplies Caddy

THIS CADDY HOLDS cans of putty and wood filler, plus nailsets and a putty knife. It hooks on the back of the air nailer caddy, or stands on its own.

Part	Qty.	Th x W x L
A	1	1" x 2" x 8-3/4"
B	1	1/2" x 7-3/4" x 11"
C	2	1/2" x 4-1/4" x 11"
D	2	1/2" x 3-3/4" x 7-3/4"
E	1	1/4" x 1-1/2" x 8-1/2"
F	1	1/4" x 3/4" x 8-1/2"
G	1	1" x 4-1/4" x 3-3/4"

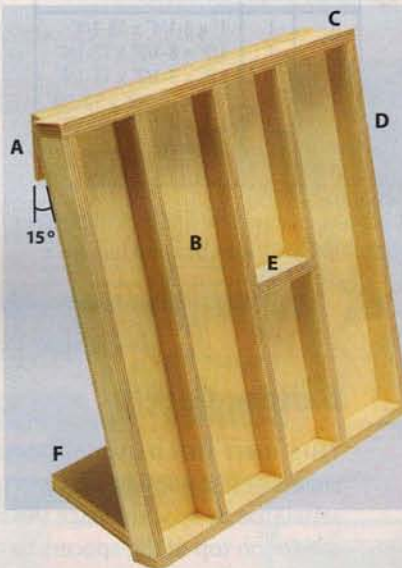
Note: Slant shelves (D) back about 5°.



Router Bit Cabinet

THE PULLOUTS IN THIS UNIT may hold 1/4" or 1/2" bits. The ends of these and other pullouts may be hung on the wall slats.

Part	Qty.	Th x W x L
A	1	1" x 2" x 19-3/4"
B	2	1/2" x 9-3/4" x 19-3/4"
C	4	1/2" x 9-3/4" x 9-3/4"
D	1	1/4" x 10-1/2" x 19-3/4"
E	6	1/2" x 6-3/16" x 8-1/2"
F	12	1/2" x 1-3/4" x 5-11/16"

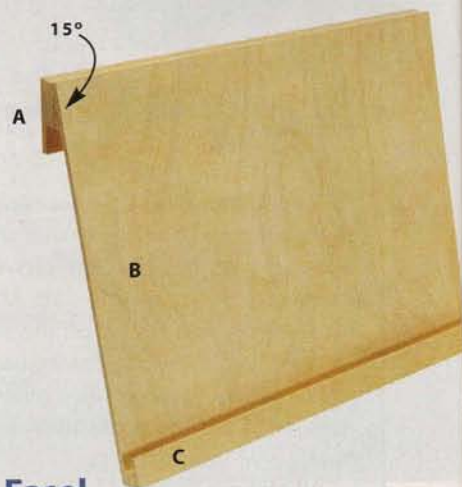


Plane Rack

THIS RACK HOLDS low-angle and standard-angle block planes, plus a smooth plane and two jack planes.

Part	Qty.	Th x W x L
A	1	1" x 2-1/2" x 13-1/4"
B	1	1/4" x 14" x 16"
C	2	1/2" x 1-1/4" x 14"
D	5	1/2" x 1-1/4" x 15"
E	1	1/2" x 1-1/4" x 2-3/4"
F	1	3/4" x 5-1/4" x 13-1/4"

Note: Cut face of A and front edge of F at 15°

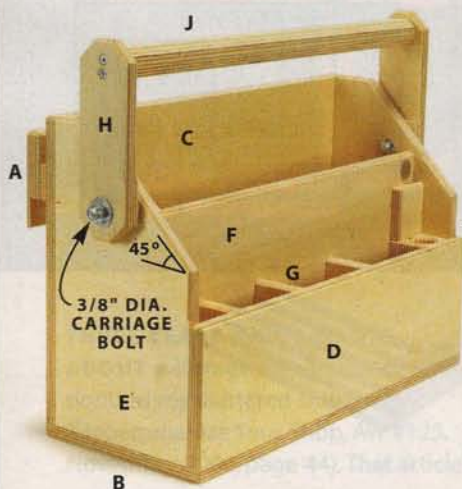


Easel

PLACE YOUR PLANS HERE.

Part	Qty.	Th x W x L
A	1	1" x 2-3/8" x 16"
B	1	1/4" x 16" x 12-1/2"
C	1	3/4" x 1" x 16"

Note: Cut face of A at 15° angle.

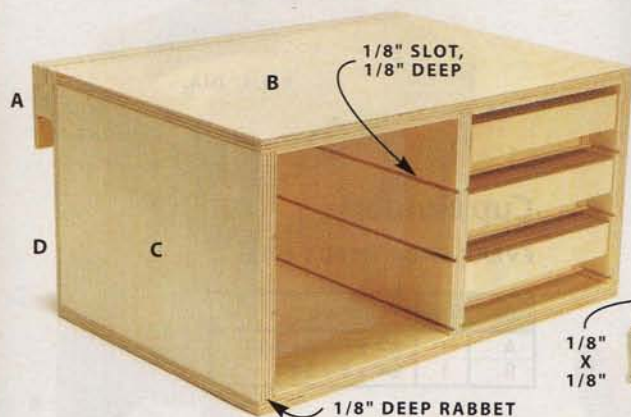


Air Nailer Tote

THIS UNIT HOLDS an air nailer, an oil bottle, a wrench, a pigtail hose and various boxes of nails. Various caddies, racks or small cabinets may be hung on its rear hanging strip.

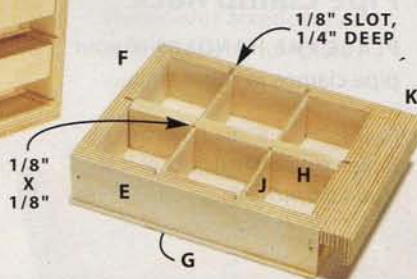
Part	Qty.	Th x W x L
A	1	1" x 3-1/8" x 16"
B	1	1/2" x 6-1/2" x 16"
C	1	1/2" x 10" x 16"
D	1	1/2" x 4-1/2" x 16"
E	2	1/2" x 5-1/2" x 10"
F	1	1/2" x 7-1/2" x 15"
G	3	1-3/4" x 4-1/4"
H	2	1/2" x 2" x 6"
J	1	1" x 1-1/8" x 16-1/4"

Note: Cut handle (J) as octagon; place 1/8" spacers between handle and box.



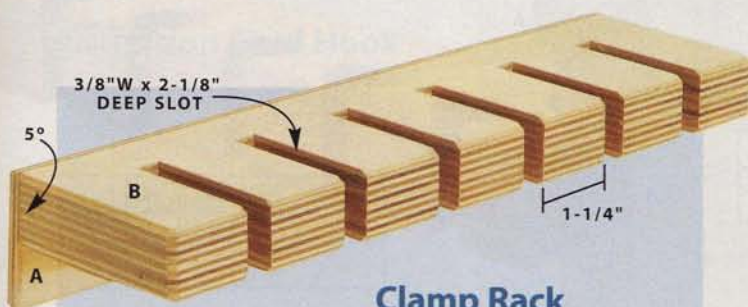
Parts Cabinet

THIS CABINET CAN BE made any size, with any number of drawers.



Part	Qty.	Th x W x L
A	1	1" x 2-1/2" x 13-1/2"
B	2	1/2" x 8-1/2" x 13-1/2"
C	3	1/2" x 6-1/8" x 8-1/2"
D	1	1/4" x 6-7/8" x 13-1/2"
E	2	1/2" x 1-5/8" x 7-1/2"
F	2	1/2" x 1-5/8" x 5"
G	1	1/8" x 6-1/4" x 7-1/2"
H	1	1/2" x 1-1/2" x 7"
J	4	1/8" x 1-1/2" x 2-5/8"
K	1	1" x 1" x 6"

Notes: Qty. of drawer parts E-K are for one drawer; divider (H) has 1/4" long tenons on both ends.

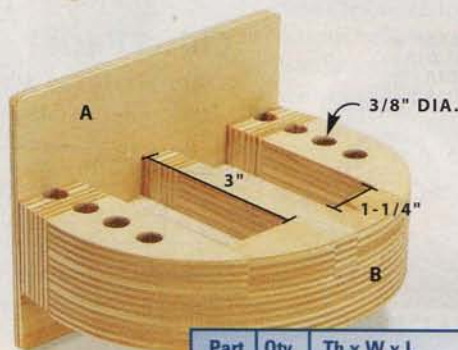


Clamp Rack

THIS RACK is designed to hold F-style clamps.

Note: Cut back of B at 5°.

Part	Qty.	Th x W x L
A	1	1/4" x 2" x 11"
B	1	1" x 3" x 11"

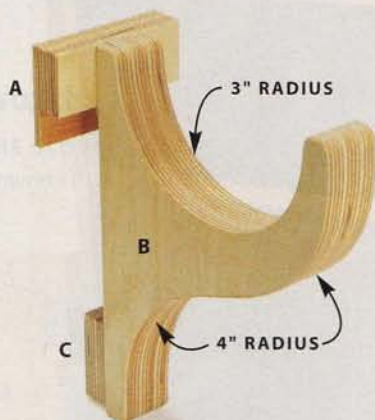


Part	Qty.	Th x W x L
A	1	1/4" x 3-1/2" x 5-1/2"
B	1	1-1/2" x 4" x 5-1/2"

Pencil and Tape Holder

THIS RACK can hang on the drill, air nailer and router totes.

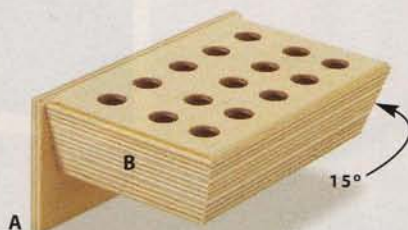
Notes: Cut recess for tape by dadoing B, then glue filler piece in front of dado.



Air Hose Hook

KEEP THAT COIL FREE OF TANGLES.

Part	Qty.	Th x W x L
A	1	1" x 2-1/2" x 3-3/4"
B	2	1-1/2" x 7-5/8" x 10"
C	1	1" x 1-1/4" x 2-1/4"

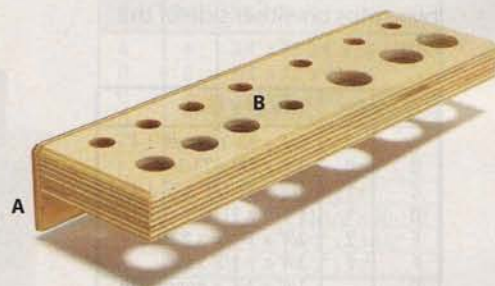


Assorted Tool Rack

THIS RACK HOLDS LONG TOOLS, such as an awl, that need extra-deep holes for support.

Part	Qty.	Th x W x L
A	1	1/4" x 2-1/2" x 5-1/2"
B	1	1-1/2" x 3-3/8" x 5-1/2"

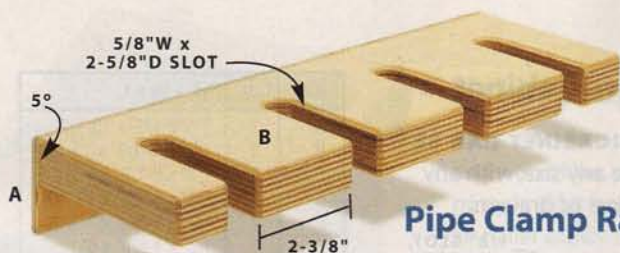
Note: Cut three sides of B at 15°.



Pliers Rack

DRILL AND SPACE the holes in this rack to fit your tools.

Part	Qty.	Th x W x L
A	1	1/4" x 2" x 11-1/2"
B	1	1" x 3" x 11-1/2"

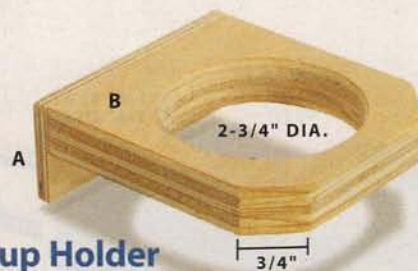


Pipe Clamp Rack

PLACE THE HANDLES of your pipe clamps in these slots.

Notes: Drill 5/8" dia. holes first in B, then cut slots; cut back of B at 5° to tip B upwards.

Part	Qty.	Th x W x L
A	1	1/4" x 2" x 12"
B	1	1" x 4" x 12"



Cup Holder

EVERY SHOP NEEDS ONE!

Part	Qty.	Th x W x L
A	1	1/4" x 1-1/2" x 3-3/4"
B	1	3/4" x 4" x 3-3/4"

3 HOLES:
1-1/8" DIA.
3/4" DIA.
5/8" DIA.

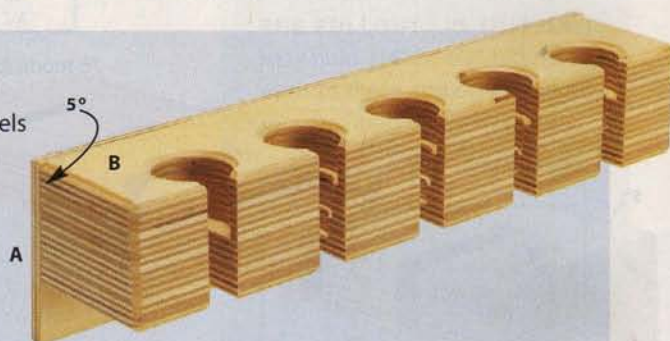


Chisel Rack

STEPPED HOLES accommodate chisels with ferrules of different diameters.

Part	Qty.	Th x W x L
A	1	1/4" x 3" x 11"
B	1	2" x 2-1/4" x 11"

Notes: Cut back of A at 5°; drill stepped holes in B, then cut notches.



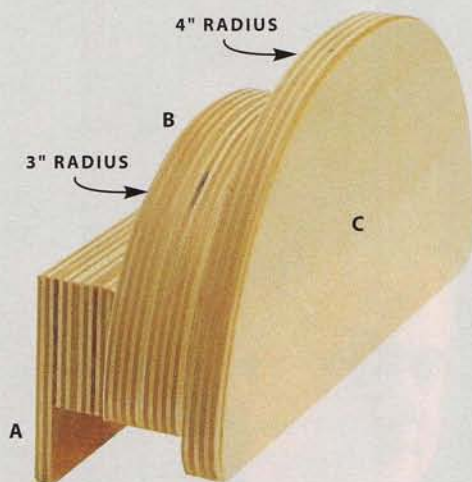
Rolling Cart

THE SLOTTED RUNNERS inside the cabinet hold removable perf-board panels, which are stored in the Workbench Cabinet. Racks, cabinets and caddies may be hung on the two strips on either side of the cart.

Part	Qty.	Th x W x L
A	2	3/4" x 23-3/4" x 28-1/4"
B	3	3/4" x 22" x 23-1/4"
C	1	1/2" x 22-1/2" x 28-1/4"
D	1	1-1/2" x 21-1/2" x 23-1/2"
E	2	3/4" x 1-1/2" x 23-1/2"
F	2	3/4" x 1-1/2" x 23"
G	—	1/4" x 3/4" x approx. 10'
H	4	3/4" x 3-1/2" x 24"
J	4	1/4" x 2-1/2" x 24"

Notes: The sub-top, shelf, and bottom (B) are let into 1/4" deep dadoes and rabbets in the sides (A); the back (C) is let into rabbets; the top (D) is composed of two pieces of 3/4" MDF glued together; purchase the tracks (K) with 1/4" wide grooves at a home center.





Extension Cord Hook

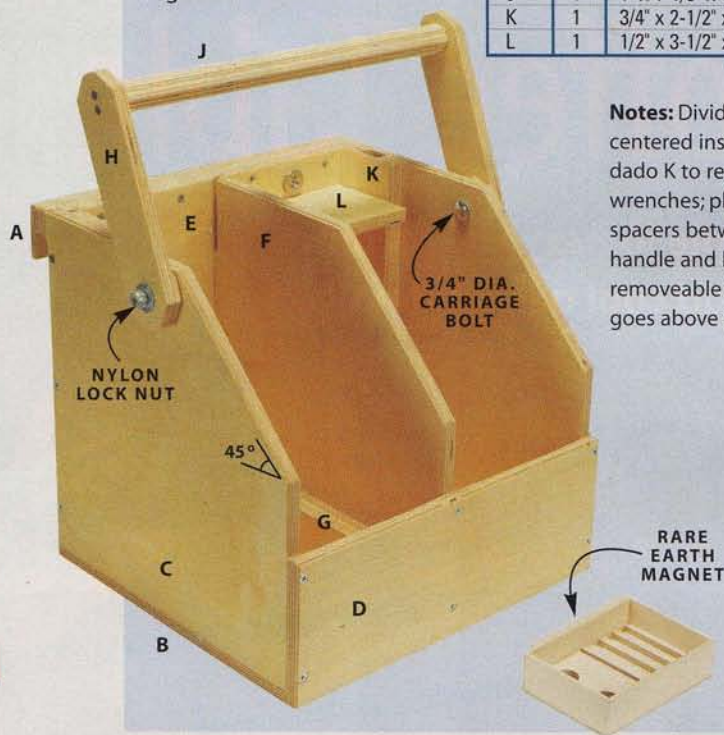
THERE'S PLENTY of room for a long cord.

Part	Qty.	Th x W x L
A	1	1" x 2-1/2" x 5-1/4"
B	1	1-1/2" x 3-1/8" x 6"
C	1	1/2" x 4-1/8" x 8"

Router Tote

THIS UNIT HOLDS a plunge base and a standard base Porter-Cable router, plus an edge guide, wrenches and template guides.

Part	Qty.	Th x W x L
A	1	1" x 2" x 13-1/2"
B	1	1/2" x 12" x 13-1/2"
C	2	1/2" x 12" x 12"
D	1	1/2" x 5" x 13-1/2"
E	1	1/2" x 12" x 12-1/2"
F	1	1/2" x 11-1/2" x 12"
G	2	1" x 2" x 9"
H	2	1/2" x 2" x 7-3/4"
J	1	1" x 1-1/8" x 13-5/8"
K	1	3/4" x 2-1/2" x 12"
L	1	1/2" x 3-1/2" x 5-3/8"



Notes: Divider (F) is centered inside case; dado K to receive wrenches; place 1/8" spacers between handle and box; the removable tray goes above part L.

Here's a complete system for storing all your essential tools.

Workbench Cabinet

THE SLOTTED RUNNERS in this cabinet hold removeable perf-board panels. Drawers may be added to the upper cavities.



Part	Qty.	Th x W x L
A	4	3/4" x 23-3/4" x 34-1/2"
B	8	3/4" x 22" x 23-1/4"
C	2	3/4" x 4" x 23"
D	2	1/2" x 22-1/2" x 34-1/2"
E	—	1/4" x 3/4" x approx. 26"
F	4	3/4" x 3-1/2" x 24"
G	4	1/4" x 2-1/2" x 24"
H	1	1-1/2" x 23-1/2" x 70-1/2"
J	2	3/4" x 1-1/2" x 23-1/2"
K	2	3/4" x 1-1/2" x 72"

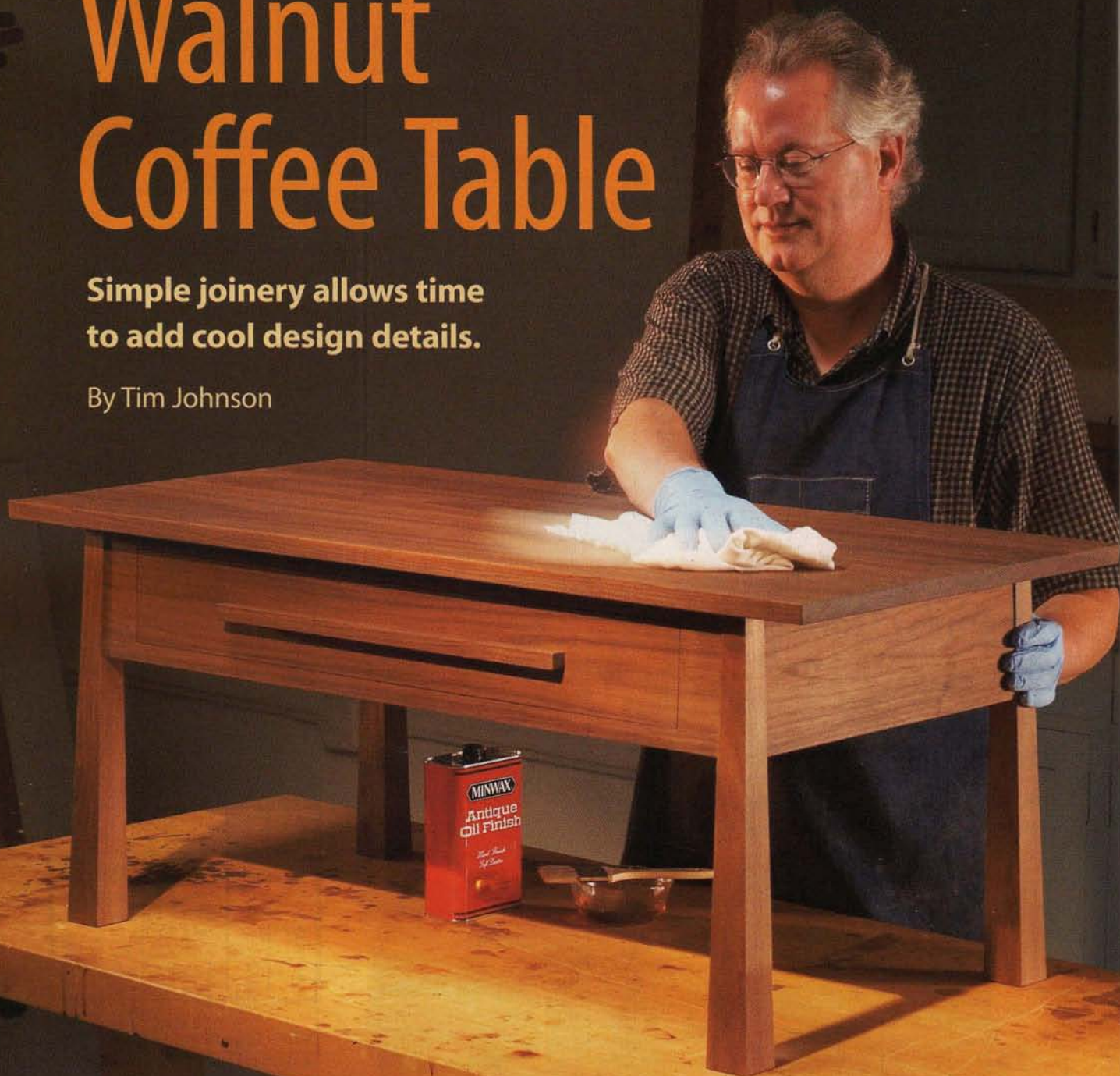
Notes: The sub-top, shelf, and bottom (B) are let into 1/4" deep dados and rabbets in the sides (A); the kicker (C) is solid wood; the back (C) is let into rabbets; the top (D) is composed of two pieces of 3/4" MDF glued together; purchase the tracks with 1/4" wide grooves at a home center.

Weekend Project

Walnut Coffee Table

Simple joinery allows time to add cool design details.

By Tim Johnson



For a coffee table with traditional joinery, go to:

www.AmericanWoodworker.com/CherryCoffeeTable



I LIKE TRADITIONAL JOINERY, and I enjoy working with hand tools. But I also like completing a project without having it drag on because the joinery is labor intensive. This table has all the earmarks of a traditional heirloom: beautiful hardwood, classic proportions and solid construction. And you can build it in a weekend.

What's the secret? Instead of using traditional joinery to assemble the parts, I used pocket screws, a contemporary joint-making method. I discovered pocket screw joinery years ago, while designing a coffee table project that featured haunched mortise-and-tenon joints, web frame structure, and dovetailed drawers (AW #92, February, 2002, page 48, or on the web at www.AmericanWoodworker.com/CherryCoffeeTable). To work out the design details for that table, I built a prototype using pocket screws. The prototype went together amazingly fast, and it was solid as a rock. The table you see here descends directly from that discovery.

Pocket screw joinery is definitely blue collar: It won't win any aesthetic awards, but it does a good job with minimal fuss. If you can fit a butt joint, you can master this method. Butt joints, of course, are notoriously weak; pocket screws effectively reinforce them. To give pocket hole joinery a go, you'll need a pocket screw jig, a specialized drill bit and pocket screws (see Sources, page 57).

Playing with tradition

The table's design continues the play on tradition. The tapered legs are turned upside down and inside out from their traditional pose (Fig. A, page 54). And rather than standing at 90°, the aprons follow the slope of the legs. Thanks to pocket screw joinery, these changes present only minimal building challenges—basically, the apron edges and some of the joint surfaces have to be beveled to fit, and the front ends of the drawer sides have to be cut at an angle, so the drawer front



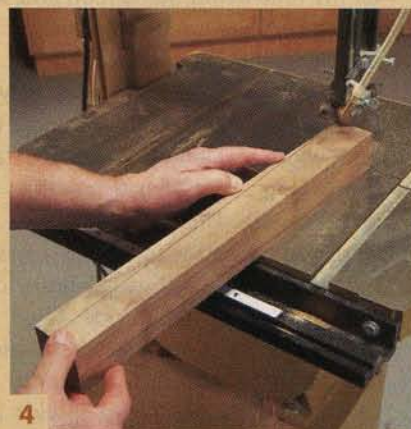
1 Use your best-looking boards for the top. You can save money by using #1 Common lumber for this project, because all of the pieces are relatively short and narrow.



2 Make the drawer and its frame from a single oversize board. First, rip the board into three pieces. Next, crosscut the middle piece to create the drawer front. Locate the drawer ends by marking from a centerline.



3 Glue the pieces back together, using the centerline for alignment and the unglued drawer front as a spacer. Set this assembly aside—you'll rip it to width later, along with the other aprons.



4 Saw tapers on two adjacent sides of each leg. Remove the saw marks by sanding, jointing or hand planing.



5 Tilt the tablesaw blade to match the leg's taper. All the beveled cuts in this project are made at this angle.



6 **Bevel both edges** when you rip the aprons to width. Both bevels must slope in the same direction, so bevel one edge with the board front-face up and the other edge with the board front-face down.



7 **Assemble the legs and aprons** with pocket screw joinery. A pocket screw jig positions the workpiece and guides the drill bit, which automatically drills a counterbored shank hole.



8 **Fasten the aprons** so they follow the slope of the tapered legs. Use spacers to create the 1/8" setback. Make sure the top edges are flush. Reinforce the joints with glue.

slopes to match the frame that surrounds it. Incidentally, the drawer front and frame are cut from a single board, so the grain flows continuously—a traditional building technique that's too good—and too simple—to ignore.

This table requires only 25 bd. ft. of primary wood and 9 bd. ft. of secondary wood, so building it won't cost an arm and a leg (see Cutting List, page 57). Both amounts include a generous amount of waste, so you may do with even less. Also, all of the pieces are short and/or narrow, so you might not have to buy top-grade lumber, either. You can glue up 4/4 stock for the legs if 8/4 stock isn't available.

Friday evening

(Okay, it's gonna be a long weekend.)

1. If you're working with rough-sawn lumber, mill all your boards to thickness. Then decide how each board will be used.

2. Choose the best boards for the top (Part A, Fig. B, opposite, and **Photo 1**). Cut them slightly oversize in length and joint the edges square. When you glue these boards together, make sure their faces are flush, to minimize sanding. Remove all squeezed-out glue before it hardens. Leave the top clamped up overnight.

3. If you're gluing up the leg stock, do it now.

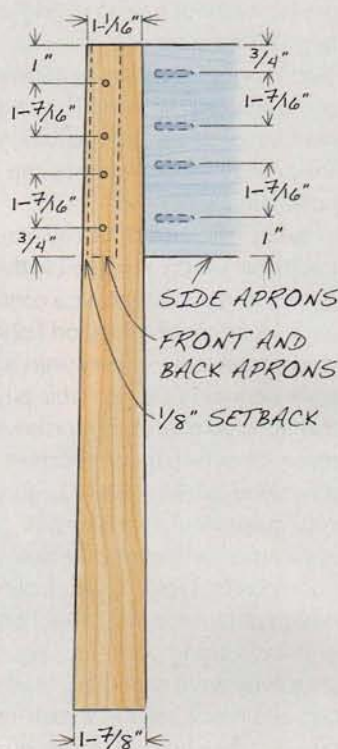
Saturday morning

4. Unclamp the top and set it aside for the time being. Stand it on end, so air can circulate freely all around, or raise it on stickers if you store it flat.

5. Make the front apron assembly (B1-B4) from a board that's oversize in both width and length (**Photo 2**). Start by marking a centerline across the board's width. First, rip a 1" wide length, to create the top rail (B1). Reset the fence and rip a 4" wide length, to create the piece that includes the drawer front and end spacers (B2 and B3). The offcut from this second rip, which must also be at least 1" wide, is the bottom rail (B4).

6. Crosscut the middle piece to create the drawer front. Measure from

Fig. A Leg and Apron Details



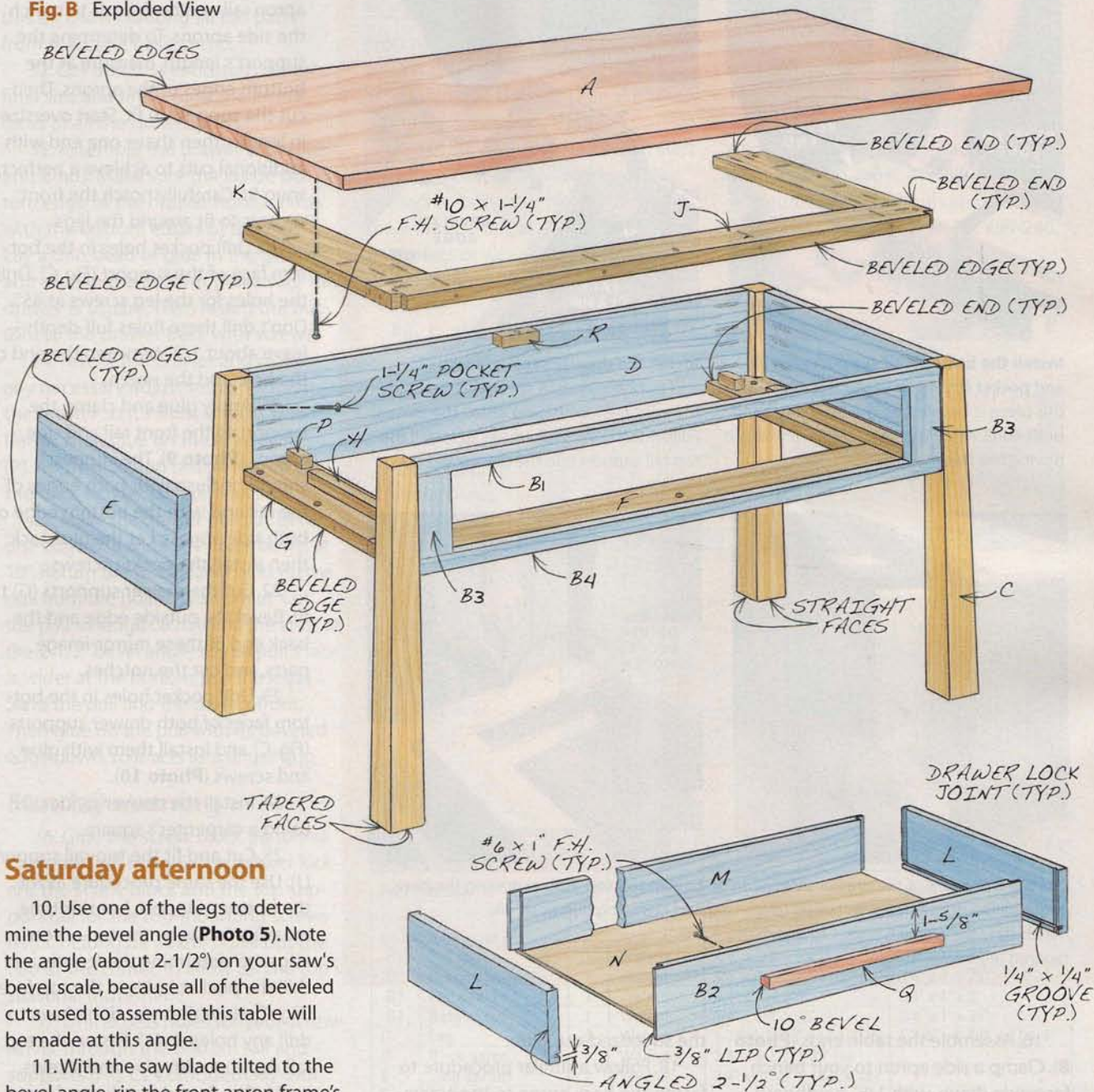
the centerline to locate both ends. Then make each cut on the outside edge of the line. The two offcuts become the end spacers.

7. Create the front apron frame by gluing the board back together with the unglued drawer front trapped inside (**Photo 3**). Use the centerline to locate the drawer front and rails, and snug the end spacers against the drawer front ends. Use waxed paper to keep the drawer front from getting stuck by squeezed-out glue. Make sure the rail and spacer faces are flush at the glue joints. Set this assembly aside until the glue dries.

8. Mill the leg blanks (C) square, cut them to final length, and pencil full-length tapers on two adjacent sides. Mark the inside corner on both ends of the blank—it's the only corner that will remain untouched and square after the tapers are cut.

9. Saw each taper on the waste side of the layout line (**Photo 4**). Remove the saw marks using a hand plane, a jointer, or by sanding.

Fig. B Exploded View



Saturday afternoon

10. Use one of the legs to determine the bevel angle (**Photo 5**). Note the angle (about $2\frac{1}{2}^\circ$) on your saw's bevel scale, because all of the beveled cuts used to assemble this table will be made at this angle.

11. With the saw blade tilted to the bevel angle, rip the front apron frame's top rail to final width— $\frac{3}{4}$ ", measured on its back face. Make sure this bevel slopes toward the frame's front face. Keep the drawer front installed during the cut, to stabilize the assembly.

12. Rip the top edges of the back and side aprons (D and E) at the same angle. Again, make sure each bevel slopes toward the front face.

13. Bevel-rip the front apron frame and all three aprons to final width. On all of these pieces, the top and bottom bevels must slope in the same direction (**Photo 6**). The $5\frac{1}{2}$ " final width

given in the Cutting List is approximate; the key is to set the fence so that the back face of the apron frame's bottom rail ends up exactly $\frac{3}{4}$ " wide. (Keep the drawer front installed when you make the cut.) Once you've ripped the apron frame to final width, use the same fence setting to bevel-rip remaining three aprons.

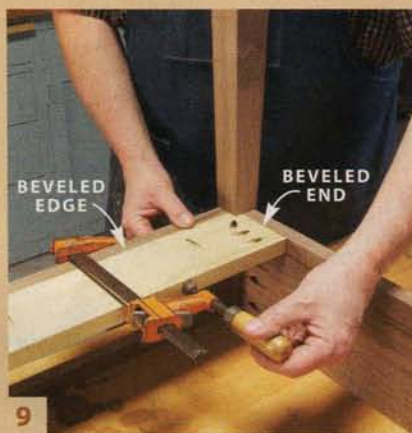
14. Crosscut all the aprons to final length. Measure from the centerline to locate the ends of the front apron frame and keep the drawer front

installed while you make the cuts. Make sure that each pair of aprons are identical in length.

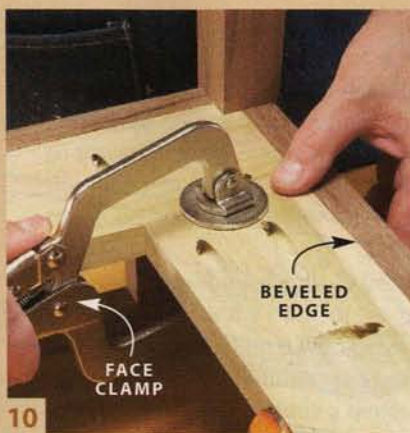
Saturday evening

(You're having too much fun to go out, right?)

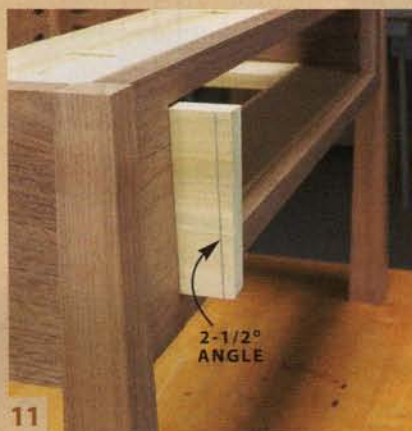
15. Drill pocket screw holes in the aprons (**Photo 7**). Stagger the holes so they're higher on the side aprons than on the front and back aprons (Fig. A). Then the screws won't collide when you fasten the legs.



9 Install the bottom rail support with glue and pocket screws. To fit the sloping rails, this piece is beveled on the front edge and both ends. Allow the glue to tack-set before driving the screws.



10 Install the drawer supports with glue and pocket screws. A special clamp holds the joint flush while you install the screws. Follow the same procedures to install the top rail support and the drawer kickers.



11 Cut the front end of the drawer sides at an angle, so the drawer front will slope to match the apron, which slopes to match the tapered leg.



12 Fasten the top after centering the base and clamping it in position.

16. Assemble the table ends (**Photo 8**). Clamp a side apron to your bench face-side down, with 1/8" hardboard spacers underneath. Position the legs as shown in the photo, with a square face butted against the apron and the adjacent tapered face on the bench.

17. Apply glue to both ends of the apron. Snug the legs against the apron and clamp them to the bench, making sure the top of the leg is flush with the beveled top edge of the apron. Then gently clamp the legs to the apron. Allow the glue to tack-set (5 to 10 minutes). Then install the 1-1/4" fine thread, washer head pocket screws. Unclamp the assembly and remove

the squeezed-out glue.

18. Follow a similar procedure to fasten the back apron to the assembled ends. Before you install the pocket screws, make sure each assembled end is square to the back apron. Repeat the process to fasten the front apron frame.

Sunday morning

(Option #1: Go to church; #2: Play golf; #3: Sleep in.)

Sunday afternoon

19. Complete the table base. Cut and fit the bottom rail support (F). Bevel its front edge to match the front

apron rail and both ends to match the side aprons. To determine the support's length, measure at the bottom edges of the aprons. Then cut the support to fit. Start oversize in length; then shave one end with additional cuts to achieve a perfect, snug fit. Carefully notch the front corners to fit around the legs.

20. Drill pocket holes in the bottom face of the support (**Fig. C**). Drill the holes for the leg screws at 45°. Don't drill these holes full-depth—leave about 1/2" between the end of the hole and the notch.

21. Apply glue and clamp the support to the front rail and side aprons (**Photo 9**). The support should be flush with both edges of the rail and with the bottom edge of both side aprons. Let the glue tack; then install the pocket screws.

22. Cut the drawer supports (G) to fit. Bevel the outside edge and the back end of these mirror-image parts, and cut the notches.

23. Drill pocket holes in the bottom faces of both drawer supports (**Fig. C**) and install them with glue and screws (**Photo 10**).

24. Install the drawer guides, (H) using a carpenter's square.

25. Cut and fit the top rail support (J). Use the same procedure as for the bottom support, but this time, measure between the top apron edges to determine the length, and drill the pocket holes in the top face (**Fig. C**). Note that you don't have to drill any holes at 45°. Fasten the top rail support with glue and screws.

26. Cut, fit and install the drawer kickers (K and **Fig. C**).

27. Cut the drawer front (B2) and drawer sides (L) to final width.

28. Cut the front ends of the drawer sides at the bevel angle (**Photo 11**).

29. Saw or rout grooves to house the bottom in all three pieces.

30. Cut the drawer back (M) to final width. Then cut the drawer front and back to final length, 1/16" shorter than the opening in the frame.

31. Create the drawer joints. I used a drawer lock bit (see Sources). Used in a router table with a fence,

this bit allows routing all the parts from the same basic setup.

32. Cut the drawer bottom (N) to final size and finish sand the inside faces of all the drawer parts.

33. Assemble the drawer with glue and brads. Make sure the inside bottom edge of the drawer front is flush with the bottom edges of the sides. Lay a thin bead of glue in the grooves and slide in the bottom. Make sure the drawer is square. Then fasten the bottom to the drawer back with screws.

34. Test fit the drawer and make any necessary adjustments. Position the drawer so it's front is flush with the frame. Then glue on the drawer stops (P). Apply glue and butt one stop to the back end of each drawer side.

35. Make the drawer pull (Q). Bevel one edge of a wide 3/4" thick board at 10°. Return the blade to 90° and rip the pull from the board as an offcut. Cut the pull to length. (I mitered the ends at the 2-1/2° bevel angle, so the pull's face is wider at the bottom, like the legs.) Sand the pull and the drawer front. Then glue on the pull with its beveled edge down, so it acts as a finger grip.

Sunday evening

36. Glue the screw block (R) to the back rail. Drill holes in the drawer kickers, the screw block and the top support rail for the top-mounting screws (Fig. C). Elongate all the holes but the two at the center, to allow for the top's seasonal movement.

37. Drill access holes for your screwdriver through the bottom rail and supports (Fig. C). Coincidentally (not intentionally), the outside access holes align with the diagonal screw pockets.

38. Rough sand both sides of the top, to level both surfaces.

39. Cut the top to final dimensions. I beveled both the edges and ends at 2-1/2°, but this time, the bevels slope in at the bottom.

40. Fasten the top to the base (Photo 12). Mark centerlines on the bottom of the top and inside the base. Then use the lines to automatically center the base on the top.

41. Clamp the base to the top. Then install the screws.

Next weekend

(You can build this table in a weekend; I didn't say you could finish it, too.)

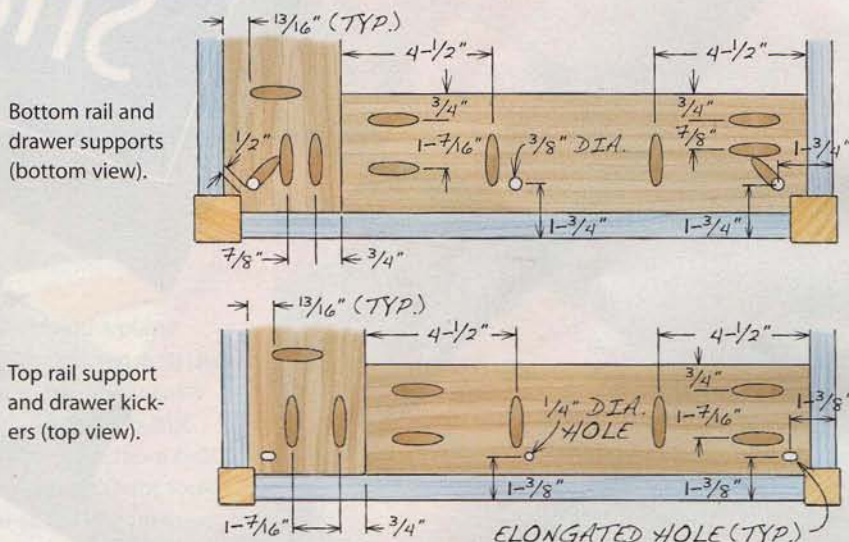
42. Remove the top. Then finish-sand the top and the base.

43. Apply your favorite finish. I started with a coat of SealCoat (dewaxed shellac) to bring out the rich color of the walnut. Then, as this table is likely to get lots of wear, I brushed on two coats of polyurethane.

SOURCES

- ◆ Kreg Tool Company, www.kregtool.com, (800) 447-8638, Pocket Screw Jig, #K4, \$99.99 (includes jig, stepped drill bit with stop collar and 6" square drive bit); Face Clamp with 3" Reach, #KHC-Premium, \$21.99.
- ◆ Freud, www.freudtools.com, (800) 334-4107, 2" Drawer Lock Bit, #99-240, \$39.99.

Fig. C Drilling Guide



CUTTING LIST

Overall Dimensions: 18" H x 21" W x 42" L

Part	Name	Qty.	Material	Dimensions	Blank Size
A	Top	1	Walnut	3/4" x 21" x 42"	
B1-B4	Front apron assembly	1	Walnut	3/4" x 5-1/2" x 33" (a)	3/4" x 6-1/4" x 35"
B1	Top rail	1	Walnut	3/4" x 3/4" x 33" (b)	3/4" x 1" x 35"
B2	Drawer front	1	Walnut	3/4" x 3-7/8" x 28-15/16"	3/4" x 4" x 29"
B3	End spacer	2	Walnut	3/4" x 4" x 2"	3/4" x 4" x 3"
B4	Bottom rail	1	Walnut	3/4" x 3/4" x 33" (b)	3/4" x 1" x 35"
C	Leg	4	Walnut	1-7/8" x 1-7/8" x 17-1/4" (c)	1-7/8" x 1-7/8" x 17-1/4"
D	Back apron	1	Walnut	3/4" x 5-1/2" x 33" (a)	
E	Side apron	2	Walnut	3/4" x 5-1/2" x 16-3/8" (a)	
F	Bottom rail support	1	Poplar		3/4" x 3-1/2" x 35" (d)
G	Drawer support	2	Poplar		3/4" x 3-1/2" x 15" (e)
H	Drawer guide	2	Poplar	1/2" x 3/4" x 14"	
J	Top rail support	1	Poplar		3/4" x 3-1/2" x 35" (d)
K	Drawer kicker	2	Poplar		3/4" x 3-1/4" x 15" (e)
L	Drawer side	2	Poplar	3/4" x 3-7/8" x 15-1/4" (f)	
M	Drawer back	1	Poplar	3/4" x 3-1/4" x 28-15/16"	
N	Drawer bottom	1	Hardboard	1/4" x 15-1/2" x 28"	
P	Drawer stops	2	Poplar	3/4" x 3/4" x 1"	
Q	Drawer pull	1	Walnut	3/4" x 5/8" x 18" (g)	
R	Screw block	1	Poplar	3/4" x 1-1/4" x 3"	

(a) Both edges are beveled.

(b) The width is as measured on the back face (the blade is tilted for this cut).

(c) The two outside faces taper to 1-1/16" at top.

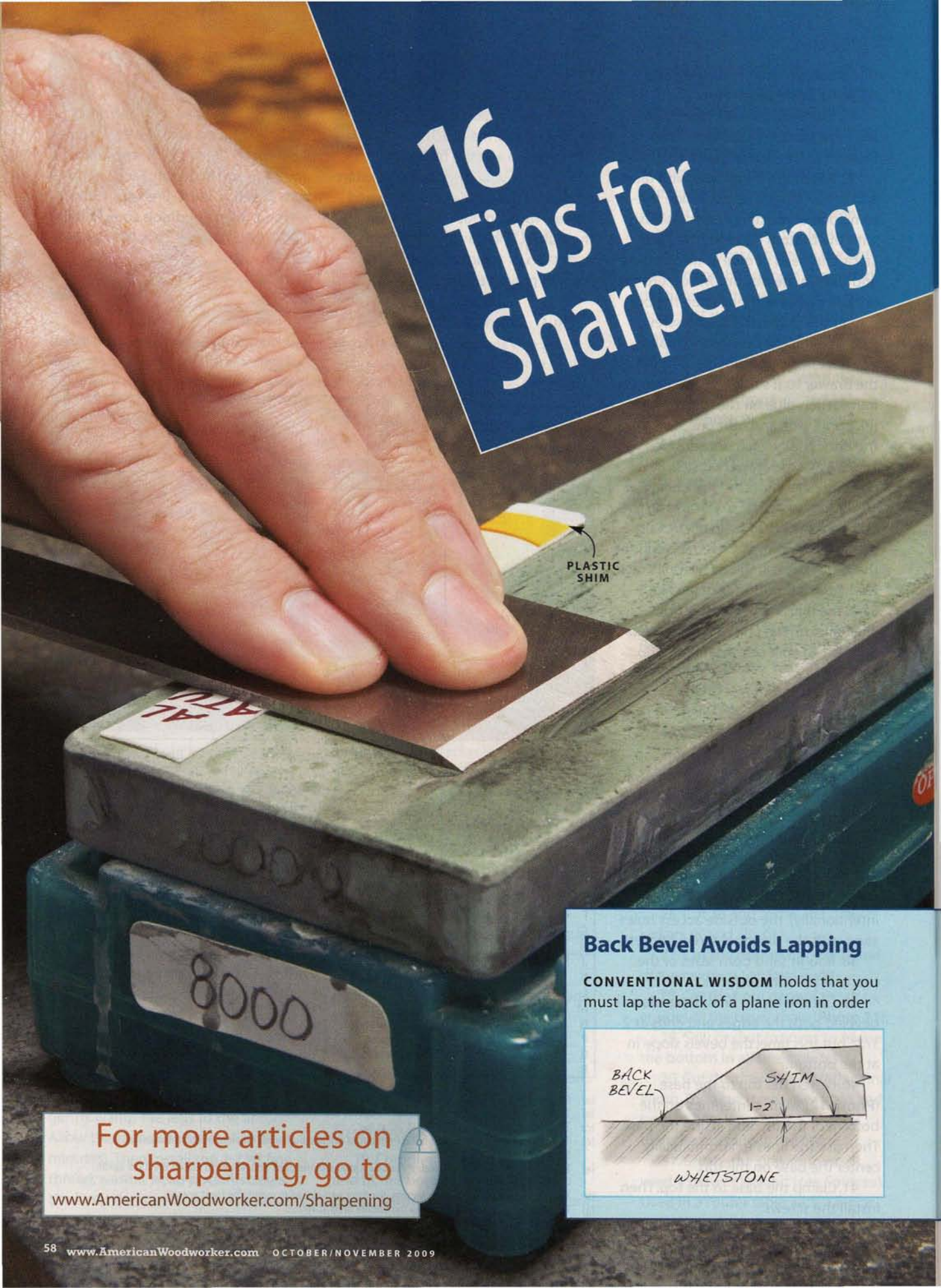
(d) The front edge slopes to match the front apron rail and both ends slope to match the side aprons. Cut the length to fit.

(e) The outside edge slopes to match the side apron and the back end slopes to match the back apron. Cut the length to fit.

(f) The length is measured at the bottom; the front end slopes to match the front apron.

(g) The front edge is 5/8" wide; bevel the bottom face at 10°.

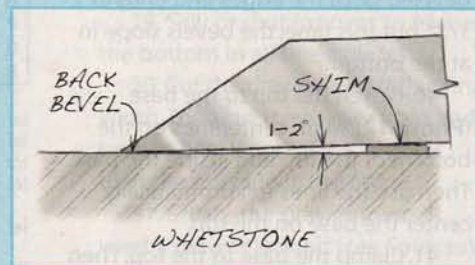
16 Tips for Sharpening



PLASTIC SHIM

Back Bevel Avoids Lapping

CONVENTIONAL WISDOM holds that you must lap the back of a plane iron in order



For more articles on sharpening, go to

www.AmericanWoodworker.com/Sharpening

Understanding the "Why" is just as important as the "How".

By Tom Caspar

HAND TOOLS ARE A PLEASURE TO USE—if they're sharp. Once you have a sharp tool in your hands, you'll begin to realize why some woodworkers are so passionate about old ways of working wood. Slow is beautiful, after all.

I've been a hand tool enthusiast for years, and I can honestly say that learning how to sharpen a tool is just as important as learning how to handle it. It's not something you master right away; sharpening is a skill that requires

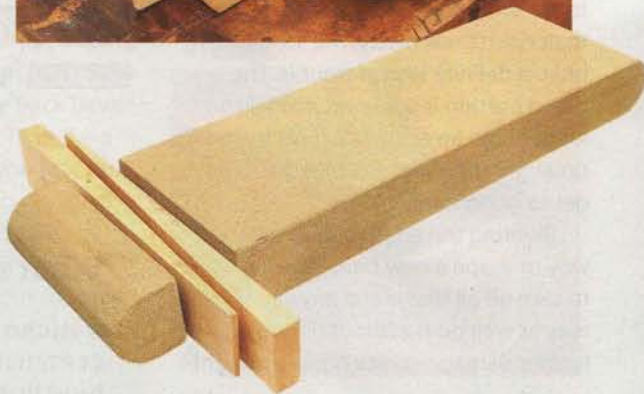
patience, practice, and persistence. This story is for folks who already know a bit about sharpening, and are ready to move on to the next level.

Sanding Belt Lapping Jig

YOU CAN CHEW UP A LOT of sandpaper flattening a plane iron, a large chisel or the bottom of a plane. It makes sense to use paper that lasts a long time—like a sanding belt. But, if you cut a belt to lay open, it won't sit flat, because its backing is too stiff.

To overcome this problem, I devised a jig that stretches a belt very tight. I only use it with coarse grits—60, 80, and 100—for tools that need a lot of flattening. The jig is double-sided, of course, so you'll use the whole belt. It won't slip when you're flattening, because the abrasive on the bottom grips your workbench.

I made this jig for the 6x48 belts that go on my combination disc/belt sander, but it could be any size. The body consists of three 3/4" MDF pieces laminated together. After gluing, flatten the faces by rubbing the blank on sheets of sandpaper taped to the top of a tablesaw. Round the ends by making 45° cuts on both ends of the blank, then soften the sharp corners with a file. Cut off the short end and make opposing wedges to pull the belt tight.



to get a keen edge. Well, it ain't necessarily so. There is an alternative: skip the lapping and substitute a back bevel.

The process is quite simple. When it's time to remove the wire edge formed by honing the bevel, place a thin object, such as a piece of plastic or a 6" stainless steel rule, along one side of your finest stone. Rest the blade on this shim when you remove the wire edge. The shim elevates the blade just enough to form a back

bevel of only a few degrees.

There are a few provisos, though:

- The back of your blade still has to be relatively flat, so that there are no gaps under the chip breaker.
- A few strokes on the finest stone should do the job. There's no point in making this a large bevel, as long as it goes across the full width of the blade. Once you form a back bevel, you'll have to continue following this method each time you hone.
- In order to maintain a constant

angle, always place your shim and the blade on the same places on the stone.

• A back bevel raises the effective cutting angle of your plane. This helps reduce tearout, but it also makes the plane a little harder to push.

Credit for popularizing this technique properly goes to David Charlesworth, a well-known English cabinetmaker.

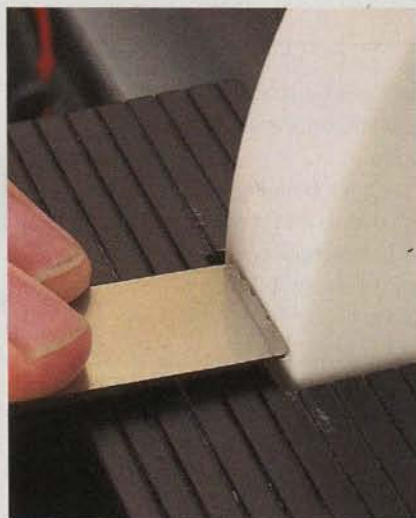
Blunt A Nicked Edge

IF YOUR CHISEL GETS A SERIOUS NICK OR DING, you'll have to grind away a lot of metal to renew the edge. The best strategy for doing this is to adjust your grinder's tool rest to 90° and blunt your tool like a screwdriver. Once you've ground past the damage, reset the tool rest at the appropriate grinding angle and have at it.

Consider this as an insurance policy. You're much less likely to overheat and draw the temper out of a blunt edge than an acute edge.

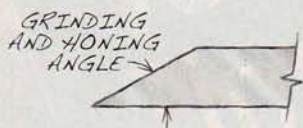
Overheating an edge is all too easy to do when you're removing a lot of material. It's not pretty. The steel turns blue—a definite sign of trouble. The blue portion is softened, and will no longer hold an edge. You have to continue grinding past the blue area to get to good steel again.

Blunting the edge is just a different way to shape a new bevel. You'll have to take off all that metal anyway, so you may as well do it without risking any further damage—a nick is bad enough!



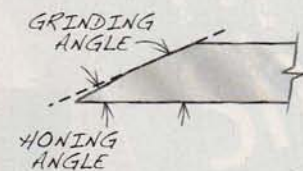
What's What With Bevels

SO WE'RE ALL ON THE SAME PAGE, here's a visual guide to 5 types of bevels that are used on chisels and plane blades.



Single bevel

A blade with a single bevel is ground and honed at the same angle.



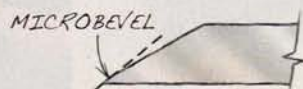
Double bevel

A blade with a double bevel is ground at a lower angle and honed at a higher angle. The difference between the ground bevel and the honed bevel is usually 5°.



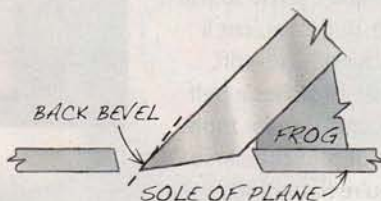
Hollow ground bevel

A hollow ground bevel is made on a grinding wheel, which creates a concave shape.



Microbevel

A microbevel is a very short bevel that is one or two degrees steeper than the honing bevel. The blade may have a single bevel or a double bevel.



Back bevel

A back bevel is an optional type of microbevel for a plane blade.

What's the Deal with Microbevels?

A MICROBEVEL SOUNDS LIKE A PRETTY SOPHISTICATED CONCEPT, but the idea is really quite simple. A microbevel is just a very short bevel that's honed at a slightly steeper angle than the rest of a tool's bevel. You create it in the last stage of the honing process, using your finest stone.

Why bother? Well, a microbevel has two significant benefits. First, it gives you an extremely sharp edge with a minimum amount of effort. When you're honing on your finest stone, each stroke doesn't remove a whole lot of steel. There's no point in making the whole bevel as smooth and shiny as possible, so it makes sense to concentrate your efforts right at the business end, where it counts. And that's what happens when you raise the honing angle a degree or two.

A microbevel also makes your edge last a bit longer. Think of your blade as a wedge. A thin wedge is going to dull quicker than a thick wedge, right? A 35° edge, for example, will stay sharp longer than a 25° edge. So any increase in a bevel's angle helps an edge stay sharp, even if it's only a degree or two.





A Bargain Honing Jig, and How To Improve It

WHEN I FIRST LEARNED HOW TO SHARPEN, I bought a very simple and inexpensive honing jig made in England by Eclipse. Today, the same jig is widely available under many different brand names and often costs less than \$15. It works quite well—I've used mine for years—but I've made a few small refinements to it. The jig's body is aluminum, so it's very easy to modify using a file or disc sander.

The jig has two positions for clamping tools: an upper ledge for plane irons and a lower pair of V-shaped grooves for chisels. To set the honing angle, you measure the distance from the tip of the blade to the body of the jig. Here's what you can do to make this good jig even better:

- **Flatten its face.** For accurate and repeatable projection measurements, the two front faces of the jig must be square and even with each other. The easiest way to flatten the faces is by placing the jig on a disc sander's worktable and gently pushing it into the disc (**Photo 1**).

- **Widen the chisel slots.** Many chisels don't fit very well in the V-shaped grooves because their sides are too thick. Clamp the jig in a vise and use the edge of a 6" or 8" mill bastard file to widen the grooves to fit your tools (**Photo 2**).

- **Make a projection jig.** You don't need a ruler to measure a tool's projection—use a stepped wooden jig instead (**Photo 3**). It's more convenient, more accurate, and easily repeatable. I use a single 30mm (about 1-3/16") projection for most chisels and plane irons. This creates a 30° bevel on a chisel and a 35° bevel on a plane iron.

- **Add a microbevel setting.** I added a second side to the projection jig that is 2mm (about 1/16") shorter than the first side, which increases the bevel angle by about 1°. To sharpen an edge, I use the normal 30mm projection on medium and fine stones (side #1), then reset the projection to 28mm (side #2) and hone on a superfine stone.

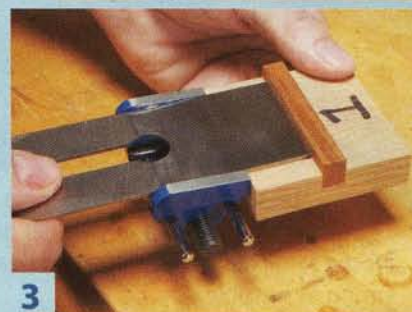
- **Form a back-bevel ramp.** Adding a back bevel to a plane iron makes the iron easier to sharpen (see *Back Bevel Avoids Lapping*, page 58). To make a back bevel using this jig, you just turn the jig over and rest its top on your stone (**Photo 4**). Unaltered, the jig produces a back bevel that's quite steep, so I used a disc sander to grind down the top of the jig, sloping from front to back.



1



2



3



4

Angles to Remember

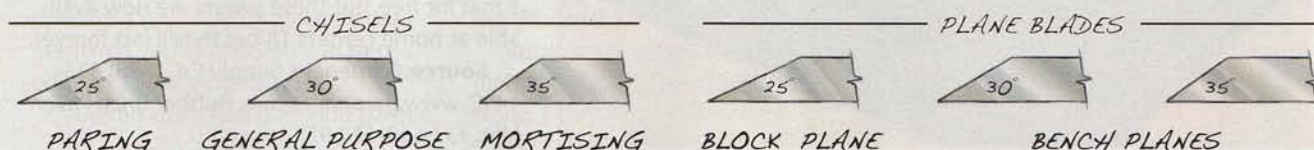
TO KEEP THINGS SIMPLE, burn these three numbers in your memory banks: 25°, 30° and 35°. These are the three most commonly used angles when grinding and honing chisels and plane blades.

If you prefer to grind and hone your tools with a single bevel, just remember one number for each type of tool.

If you prefer a double bevel, make the grinding angle 5° less than the honing angle. A general purpose chis-

el, for example, is ground at 25° and honed at 30°.

The most widely used honing angle for a bench plane's blade is 30°. I prefer 35°, because a steeper edge lasts longer.



The Hollow-Ground Bevel: What's the Big Deal?

THE NAME "HOLLOW-GROUND BEVEL" has been widely misused. I'd like to set the record straight as to what a hollow-ground bevel is, what it's good for, and when to avoid it. It's simply a concave bevel—the natural result of using a grinding wheel. The wheel is convex, of course, so it always creates a bevel that's concave.

A tool with a hollow-ground bevel is easier to sharpen by hand, without the use of a jig. The biggest problem with honing by hand is holding the tool at the correct angle with every stroke. A hollow-ground bevel helps you find and maintain that angle, so there's no wasted effort.

With a hollow grind, you simply rock the tool up and down until it locks in place, resting on the bevel's heel and toe. Two points of support make the difference—it would be much harder to feel the correct angle if the bevel were flat, rather than concave.

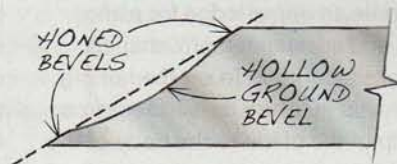
That's why we have arches in our feet—they make balancing easier.

I often sharpen chisels by hand, without a jig, simply because it's so easy. Ditto for plow plane and rabbeting plane irons that are awkward or impossible to hold in a jig. I do use a jig for honing standard-thickness bench plane irons, though. Even with a hollow grind, their bevels are too narrow for me to maintain that correct angle with every pass on the stone.

So when is a hollow-ground bevel not appropriate? Japanese tools and Western mortising chisels should not be hollow ground. Ideally,

Japanese tools should be ground with a flat bevel, to maximize support of the tip. The steel of Japanese tools can be brittle; without adequate support, a tip could fracture.

Mortising chisels should be flat ground, too, or made slightly convex, for the same reason. To withstand heavy blows, their tips need to be as strong as possible.



Waterstone Mat

WHEN I SWITCHED FROM OILSTONES to waterstones back in the Paleozoic era, I thought that I could say goodbye to making a big mess while sharpening. Well, not exactly. Waterstones are messy, too, when you keep their surfaces flooded with water—as you should.

I've been looking for the best method of containing the mess for years, and modern technology has finally delivered: a rubber garden paver. It's about 16" square, 3/4" thick, and made from recycled tires. Water beads up on it, and best of all, the surface is a bit rough and sticky, so stones stay put. You don't need a holder or clamps or anything—just your stones and the mat.

Similar material is used for floor underlayment for gyms, so you may be able to scrounge a mat for free, but these pavers are now available at home centers. I'll bet they'll last forever.

Source: Gardener's Supply Co., (888) 833-1412, www.gardeners.com, Rubber Brick Paver Mat, #37-563, \$12.95.

Waterstone Maintenance

WATERSTONES ARE RENOWNED FOR CUTTING FAST, but many require regular maintenance to stay flat. This is no small thing—a flat surface is essential for producing a straight edge and to properly remove a wire edge.

Flattening is a must-do, routine chore. How often do you have to do it? Well, ideally you'd flatten a stone each time before you use it, but that may strike you as being obsessive. Flattening after a half-dozen uses is probably more realistic. But consider this: the longer you let it go, the more dished-out a stone may become and the more work you have to do to make it flat again.

The easiest and least expensive way to flatten a waterstone is to rub it on a piece of 220 grit wet/dry sandpaper mounted on a piece of 1/4" glass. The best source for this sandpaper is an automotive supply shop. Pick up a handful of sheets, because each one is only good for two or three uses.

When you flatten, use lots of water to keep the paper from loading. You



don't have to adhere the paper to the glass—the water will cause the paper to stick by itself.

If you really want to get the job done in a hurry, lap your stones on a

fine diamond stone under running water in a utility sink. You'll be done before you know it. If you're really nuts about this, like I am, build a support so you don't have to lean over too far.

Hone Scrapers with Diamonds



A LOT OF FOLKS USE A STONE to put the final edge on a scraper before turning its hook, but I prefer to use a diamond paddle. It cuts faster than most stones and obviously won't develop a rut, which is always a danger when you continually run the edge of a scraper on a stone.

I use an extra-fine diamond paddle,

which is roughly equivalent to a soft Arkansas oilstone or a 1000 grit waterstone. While the diamond can't make a scraper's edge quite as sharp as a very fine stone, the edge is good enough for all but the most demanding work. I lubricate the paddle with some 3-In-One oil to float away the metal debris, so it won't clog the paddle.

To hone the scraper's edge, I position the scraper in a vise so that it's level with a small stick. Resting the paddle on the stick ensures that the scraper's edge will be exactly 90° (**Photo 1**). I also use the paddle to remove the wire edge formed by honing (**Photo 2**).

Source: EZE-LAP, www.eze-lap.com, (800) 843-4815, Super Fine Diamond Hone, \$4.95.





Dress Those Wheels

IF YOUR GRINDER SHAKES AND VIBRATES, chances are that the wheels aren't round. Sure, they're more or less round, but they have to be perfectly round for your machine to run smoothly. For truing a wheel, you need a wheel dresser.

If your wheels are full of metal particles and have a glazed surface, you've got another problem. All that metal makes the wheel cut slower and build up heat faster—a surefire recipe for drawing the temper from a tool. To renew a wheel's surface, you need a wheel dresser.

You get the picture. A wheel dresser is a must-have accessory for any grinder. It removes material from the face of a grinding wheel the same way that a turning gouge shapes a spindle. As it cuts into the wheel, a dresser removes the high spots, making the wheel truly round. At the same time, it renews the surface by exposing fresh abrasive.

Before you dress your wheels, it's a good idea to mark them all around with a pencil so you know when all the high spots are gone. To mark a wheel, rotate it by hand and hold a pencil against it.

There's more than one type of wheel dresser, but my favorite is a T-shaped tool with a diamond face. To use it, adjust the tool rest to 90°, turn on the grinder, and gently hold the dresser against the wheel. It's that easy. You'll be amazed at the difference it makes.

Source: Woodcraft Supply, www.woodcraft.com, (800) 225-1153, Diamond Tip Wheel Dresser, #124670, \$14.99.



Accurate Paring Requires A Flat Back

IS THE BACK OF YOUR CHISEL REALLY FLAT? For accurate paring, it has to be as flat as flat can be, for at least 2" to 3". Even though your chisel may look like it's OK, it probably needs to be lapped to make it truly flat.

Lapping consists of two stages: flattening and polishing. First, you flatten the back by rubbing it hard on sandpaper that's adhered to a flat surface. I've used a 1/4" thick piece of glass, the cast iron wing of a tablesaw, or the bed of a jointer, but my favorite lapping surface is an inexpensive granite surface plate (see Source, below).

Start with 220 grit paper. Take a few strokes and examine the back. If it's really bad, begin lapping in earnest with 80 grit paper. On most chisels, I start with 120 grit. If the back is pretty good, stick with the 220 grit.

On your first grit, keep sanding until the scratches go all the way from corner to corner and 2" to 3" up the length of the back. This completes the flattening stage.

In the next stage, polish the back with finer and finer grits. A complete sequence is 80, 120, 180, 220, and 320 grit paper. (You can go even further, and save wear on your stones, by using 15 micron and 5 micron 3M PSA-backed Microfinishing paper. See Sources, below.)

When you switch to a finer grit, lap in a different direction, so the scratches make a different pattern. Keep lapping on each grit until the scratches made by the previous grit disappear.

Once you've finished with 320 grit, continue lapping on your stones—assuming they're flat.

For abrasives, I prefer 3M's PSA Gold, which is available in discs or rolls at auto supply stores. It cuts faster than any other paper commonly available and doesn't require a sprayed-on adhesive.

Sources: Grizzly Industrial, www.grizzly.com, (800) 523-4777, 2" x 9" x 12" Granite Plate, G9649, \$19.95.

Lee Valley, www.leevalley.com, (800) 871-8158, 3M Micro-Abrasives, 15 micron, 54K93.02, \$2.60 per sheet; 5 micron, 54K94.02, \$3.40 per sheet.

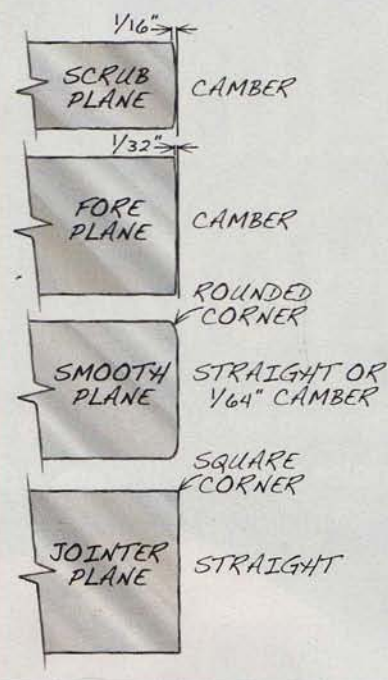
Plane Blade Lapping Jig

LAPPING THE BACK OF A PLANE BLADE can be a lot of work. My fingers have often complained very loudly, so I've tried many ways to hold the blade comfortably. I've used a magnet, made a holder from a chunk of wood with a shallow dado in it, and worn gardener's gloves—the kind that have rubber bumps all over them. Each method worked OK, but I finally decided that the sharpening world needs another jig.



This one really does the trick. It allows you to put a lot of pressure right on top of the blade, without tipping it, and that extra pressure makes lapping go much faster. The blade is fastened directly to the jig; the knob is elevated on a stack of nylon washers to give you a roomier grip (see Source, below). The knob is threaded and fastened to the jig with a 5/16" flat head machine bolt.

Source: Woodcraft Supply, www.woodcraft.com, (800) 225-1153, Five-Star Knob, 5/16"-18, #142224, \$1.39; T-Style Knob, 5/16"-18, #142226, \$1.19.



4 Blade Profiles

HERE'S A QUICK GUIDE on how to sharpen the blades of four major types of bench planes.

Scrub plane. This tool is used to hog off lots of wood, fast. Its blade has a large camber, which is created on a grinder. (No honing is necessary.) The amount of camber depends on the wood's hardness and whether it's green or dry. A 1/16" curve will take off shavings up to 1/16" thick, just right for kiln-dried hardwoods.

Fore plane. This plane is used to level a large surface. (A fore plane is a 5, 5-1/2, or 6 in the Stanley series.) Its blade has a smaller camber, made on a grinder. This camber is honed.

Smooth plane. A smoother finishes off a surface. Its blade has a very slight camber or none at all. The blade's corners are rounded to prevent them from digging into the surface and leaving a series of steps. This rounding is best done on a grinder. The camber is created by honing only, not on the grinder.

Jointer plane. A jointer is often used to flatten surfaces that will be glued together. Its blade has no camber—it's dead straight across. Block planes are sharpened with a straight profile, too.

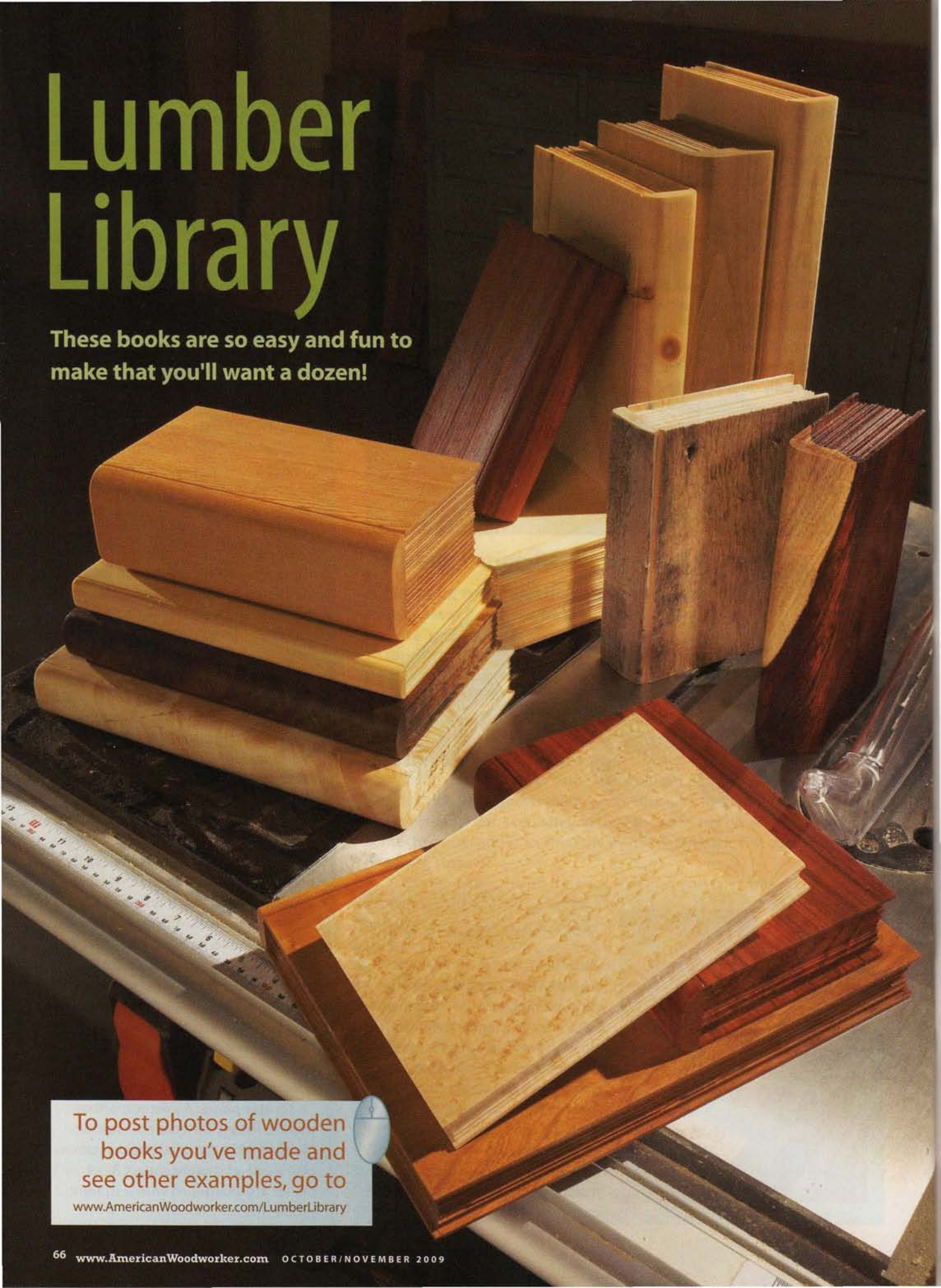


Vacuum Lapping Dust

THE BEST WAY TO KEEP YOUR SANDPAPER CLEAN when lapping is to vacuum it. Sandpaper is much less efficient when it clogs up with swarf (a machinist's term for metal debris). Removing the swarf every few strokes makes a tedious chore go faster. Cleaning the sandpaper with a stiff brush or an eraser works so-so, but a vacuum removes everything, almost instantly, with no mess.

Lumber Library

These books are so easy and fun to make that you'll want a dozen!



To post photos of wooden books you've made and see other examples, go to www.AmericanWoodworker.com/LumberLibrary

By Jock Holmen

IF YOU CAN'T STAND THROWING AWAY good wood, you've probably got a stack of short boards that are just waiting to become—who knows what? I've turned my stack into a library of wood samples, which can be shelved just like real books.

My wooden books are ideal for showing customers and friends what different kinds of wood look like, and how a wood's figure varies depending on how boards are cut. Having made the books years ago, I also now have a record of how a wood's natural color changes with time and exposure.

To make a book, start by milling a blank foursquare. If you're using rough lumber, start with a blank that's at least 12" long, for safety when jointing and planing. The blank can be any thickness, but I've found that books 1" thick or more look best. For your first book, a milled 2x6 is just right.

Begin by rounding over one long side of the blank (**Photo 1**). For books that are 3/4" to 1-1/4" thick, use a 1/4" radius bit; for books 1-1/2" to 2" thick, use a 1/2" bit; for thicker books, use a 1" bit.

Rip the spine from the body of the book (**Photo 2**). Make the cut 1/16" below the base of the roundover. Mark the two pieces so you can correctly reassemble them later.

Saw the book's outer pages (**Photo 3**). An ATB (Alternate Top Bevel) style blade gives the best look. I recommend that you use a zero-clearance fence for maximum support. Raise the blade to make a cut 3/16" deep and position the fence 1/8" from the blade. To minimize tearout, make the first cut with the book upright, leading with the spine side. Next, make a second cut on the long side. Then stand the book upright again, and make a third cut on the remaining short side. Turn the book around, and repeat these three cuts.

To cut the inner pages, raise or lower the blade a bit, move the fence 1/64" less than the blade's kerf, and repeat these cuts in the same order. Continue to make a series of similar



1 Round over one side of a squared-up blank, to duplicate the look of a book's spine.

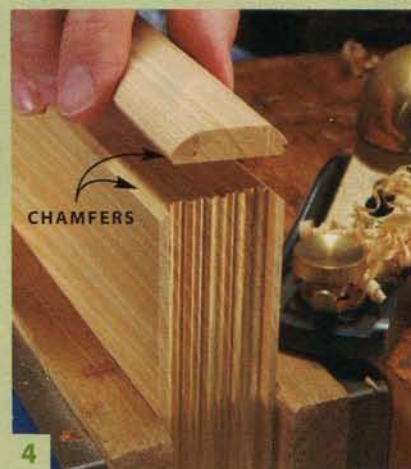


2 Rip the blank to separate the spine from the body of the book.



3 Simulate a book's pages by sawing three sides of the blank. Vary the height and width of the cuts.

Caution: Use a push pad to support the work and to keep your fingers away from the blade.



4 Chamfer the edges of the spine and body with a block plane.

cuts, changing the blade's height and the fence's position by different amounts each time, until all the pages are formed.

Make a reveal between the spine and body by chamfering the mating edges of both parts (**Photo 4**). Spread glue on the joint (use a small amount so there's no squeeze-out to clean up) and bind the book with rubber bands (**Photo 5**). Apply a finish—or not—and it's ready for the shelf. 



5 Glue the spine back to the body. Use rubber bands as clamps to avoid marring the book.

Jock Holmen

is a carver from Burnsville, Minnesota.



Computer Armoire

Build an updated American classic from bargain-priced plywood and poplar.

By Jeff Corns

MY WIFE AND I ENJOY ANTIQUE COUNTRY FURNITURE. It's usually a bargain, but we've been unable to find a piece that would hold all of our computer gear. I'm a professional cabinetmaker, so naturally my wife said, "Honey, can't you make one?"

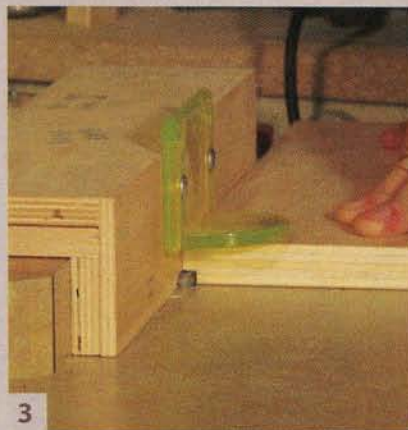
Back in the day, practical-minded country cabinetmakers often used a variety of plain woods in one piece of furniture to save time and money. They'd paint or stain their work to give the different woods a uniform look. I adopted the same strategy with this cabinet—the sides and top are birch plywood, while the face frame, doors and moldings are made from yellow poplar. Red paint ties everything together.

I designed this case like a TV cabinet—with pocket doors that slide into the case, out of the way. The keyboard and mouse sit on a generously-sized shelf that slides in and out; the printer sits on a shelf above the monitor. The lower half has a large open space for the computer's tower, plus drawers to hold documents, cords and all the other stuff we seem to accumulate.

For a big piece, this armoire is pretty inexpensive. The pocket door hardware is pricey, though. If you want to cut costs, you could use standard hinges instead, and make shelves to hold your gear. With pocket doors, you have to build a free-standing unit that slides into the cabinet (**Photo 10**).



This cabinet is basically a big plywood box with a face frame on its front. Groove the face frame's stiles to fit the sides. This joint makes it easier to glue on the face frame later on.



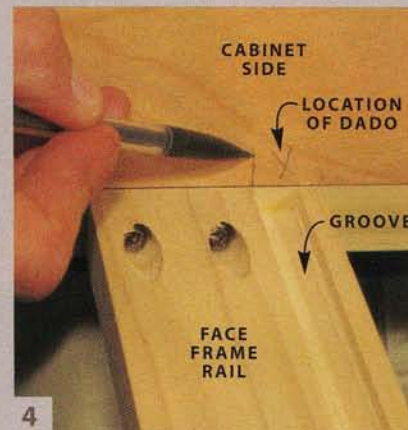
Rabbet the cabinet's plywood sides to receive the face frame. This joint ensures that the sides and face frame are flush. Test your setup on a scrap piece before cutting the actual pieces.



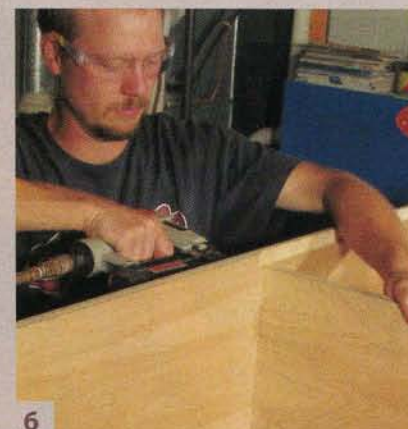
Cut the dado in the cabinet's side on the tablesaw. Use the same setting for the opposite side of the cabinet. Cut additional dados for the top and bottom shelves.



Join the face frame with pocket screws. They're plenty strong for this job, which is simply to hold the face frame together before gluing it to the cabinet.



Place one side of the cabinet on the face frame. Make a mark opposite the groove in the frame's middle rail to locate the dado that receives the middle shelf.



Place one side onto the face frame, without glue. Insert the middle shelf into the side's dado, and glue and nail the shelf to the side. Install the other two shelves, then attach the other side.



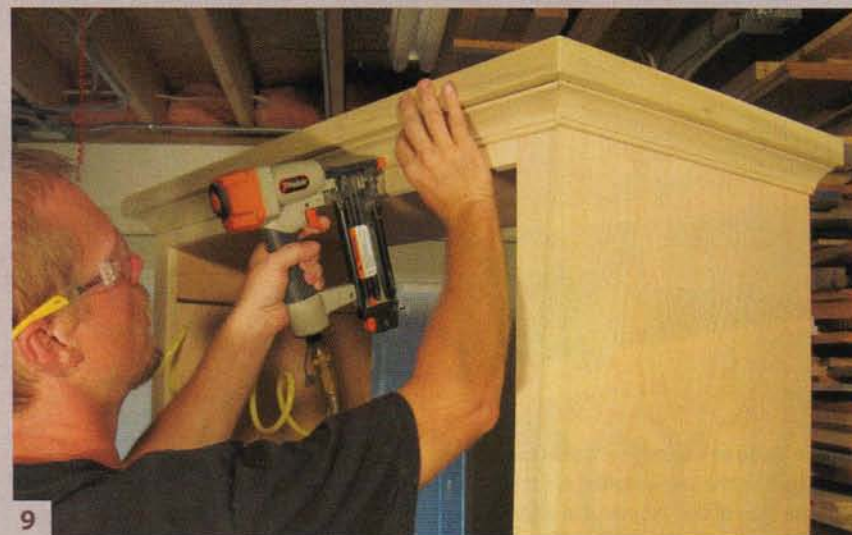
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Glue the face frame to the cabinet, using plenty of clamps. You could nail the face frame instead, but holes in the cabinet's front are unsightly, even if they're filled.



8

Add a square molding around the cabinet's waist. The molding makes the cabinet look like it's two separate units, so it doesn't seem so huge.



9

Add an overhanging top to the cabinet, then nail a crown molding underneath it.

Make the face frame

1. Mill the face frame stiles and rails (A1 - A4; Fig. C). Drill pocket holes at the ends of the rails. Cut grooves in the stiles to receive the cabinet's sides (**Photo 1**). The exact location of these grooves depends on the precise thickness of your plywood. It's best if the face frame ends up 1/32" or so proud of the plywood, so you don't have to sand into the plywood's veneer to even the joint later.

2. Cut grooves in the rails to receive the cabinet's subtop and shelves (B2, B3 and B4; Fig. B). Cut tapers on the bottom end of the face frame's stiles. Mark the location of the rails on the stiles, then assemble the face frame with pocket screws (**Photo 2**).

Make the sides and shelves

3. Cut the sides (B1) to final dimension. Make sure they're square and exactly the same size. Rout a rabbet along the sides' front edges to receive the face frame (**Photo 3** and Fig. C).

4. Place each of the sides on the face frame. Mark the location of the grooves in the face frame's rails onto the sides (**Photo 4**).

5. Dado the sides to receive the shelves (**Photo 5** and Fig. F). Rout a rabbet along the back edge of the sides to receive the back pieces (B20, B21). These pieces only cover the upper half of the cabinet, so stop the rabbet at the dado for the middle shelf.

6. Rout a rabbet (Fig. A) along the front edges of the sub-top, center shelf and the bottom. These rabbets fit in the face frame's grooves. Notch the front ends of each piece to clear the back of the face frame.

7. Cut feet on the bottom of each side. Note that the front foot is narrower than the back foot. Adding the face frame will make both feet the same size.

8. Cut a notch in the back of the center shelf, towards the left side (Fig. A), for wires between your computer and any hardware you may store in the armoire's lower section.

Assembly

9. Lay the face frame inside up on a large worktable or on a pair of sawhorses. Place one of the sides into the face frame, without glue. Glue and nail the sub-top, center shelf, and bottom—one at a time—into the side (**Photo 6**). After all three pieces are in place, glue and nail the other side. Glue and screw the left divider for the lower section (B5) in place. It's OK for these screws to show—you won't see them once the keyboard shelf goes in. Glue and clamp edging (B6) on this divider to cover its plywood edge. Glue and nail a block (B22) under the bottom for support.

10. Flip over the entire unit and remove the face frame. Have all your clamps ready, then glue and clamp the face frame (**Photo 7**).

Add the trim and top

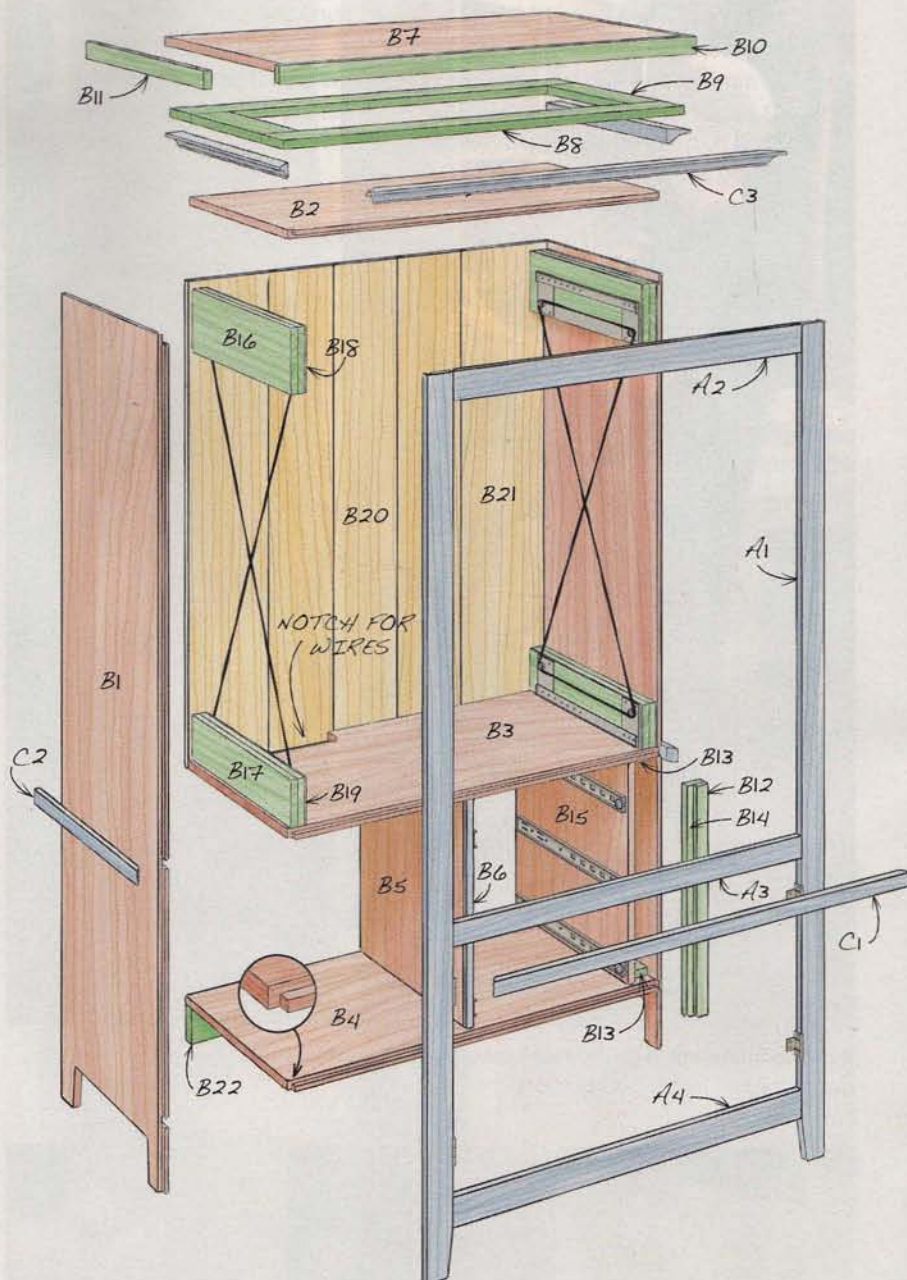
11. Make the waist molding (C1, C2) and fasten it to the cabinet (**Photo 8**). I screwed the molding from the inside, but you could nail it from the outside.

12. Cut the top (B7) to size. Add blocking (B8, B9) around the edges to double the top's thickness. Miter and glue the poplar edging (B10, B11) to the top's fronts and sides. Screw the top to the cabinet. You won't see these screws once the computer shelving unit goes in. Add the crown molding (C3, **Photo 9**). I made my molding on the table saw (Fig. E), but you can use a commercial crown molding. If you do, you may have to adjust the top's size.

Add blocking

13. The lower right side of the case must be built up to allow the drawers to clear the doors. First, screw blocking (B12) behind the right face frame stile. If you'll be using door hinges that wrap around the stile, as I did, you'll have to notch part of this piece to accommodate the hinges. Make and install some additional blocking (B13), a stile (B14), and the right divider (B15).

Fig. A Exploded View of Case





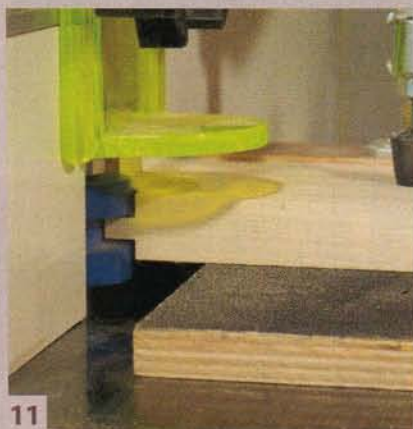
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Build an inner box to go inside the cabinet. There must be 2 in. of clearance on either side of the box for the pocket doors.

14. Add blocking (B16 - B19) on the inside of the cabinet for the pocket door hardware. The total thickness of these built-up blocks is about 1-3/4", but determine their exact thickness by measuring your case. Once in place, the blocking's surfaces should be set back 1/32" lower than the inside edge of the face frame. Flush is OK, too, but the blocking should not be proud of the face frame.

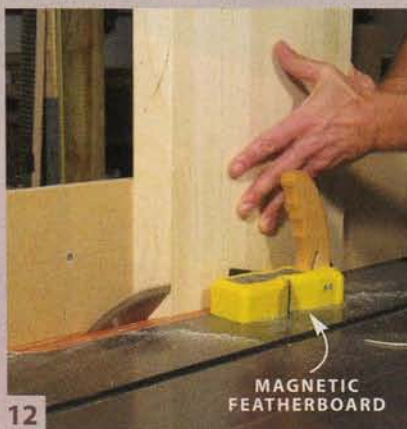
Build the computer shelving unit

15. Check the inside dimensions of your cabinet before building the computer shelving unit. The unit must be 4" narrower than the face frame opening, giving 2" of clearance on each side for the pocket doors. The unit's height should be 1/4" less than the distance between the center shelf and the top of the face frame, to allow you to slide it in. Cut the plywood parts (E1 - E6; Fig. H). Glue, clamp and trim the edging (E7 - E10). Glue and screw the unit together. Nail the divider (E5) from underneath—screws will show here. Drill 5 mm holes for the shelf pins. Cut the shelf (E6) and



11

Make the frame-and-panel doors after the cabinet is assembled. Mill the doors' stiles and rails, then cut the joints using a tongue-and-groove set.



12

Bevel the edges of the door panels to fit the grooves in the stiles and rails. Use a tall fence, a zero-clearance insert and a featherboard to make a clean, safe cut.



13

Glue the doors together, then drill holes in the doors to receive Euro-style pocket-door hinges. Use a fence to ensure that all the holes are set back the same distance.

glue and clamp on a poplar front (E10). Cut the keyboard shelf (E11) and glue and clamp on its front and back edging (E12).

16. Stain and finish the unit and the inside of the armoire. Put the drawer slides onto the keyboard shelf and inside the unit. Place the unit in the cabinet (**Photo 10**), center it, and mark its location. Remove the unit and drill six holes through the center shelf in order to fasten the unit in place later on.

Build the back, drawers and doors

17. Mill the back pieces (B20 and B21; Fig. K). Cut rabbets on the edges that overlap to create shiplap joints. Stain and finish the pieces, then fasten them to the case.

18. Build the drawers (D1-D4; Fig. J). Make them 1" narrower than the width of the opening, to allow for two 1/2" drawer slides. Use any type of joinery you wish; I used sliding dovetails (go to www.AmericanWoodworker.com/SlidingDovetailDrawers, for more information). Stain and finish the drawers.

19. Mill the door stiles and rails (F1, F2, F3; Fig. D) and machine them with a tongue-and-groove router bit set (**Photo 11** and Fig. G).

20. Glue up the door panels (F4, F5) and plane them to final thickness. Saw a bevel on their faces (**Photo 12** and Fig. G), then lay the panels flat on the saw and cut 1/16" fillets next to the bevels. Paint the bevels and the back of the panels before assembling the doors.

21. Glue the doors together. Be careful not to get glue onto the panels. I use rubber Space Balls inside the grooves to prevent the panels from rattling (see Sources).

22. Trim the doors so they have a 1/8" gap around the entire opening.

23. Install the pocket door hardware and drill holes in the doors for the hinges (**Photo 13**).

Paint

24. Now for the fun part. Apply two coats of paint on the entire cabinet—this will blend together the birch plywood and poplar parts (**Photo 14**).

SOURCES

◆ Woodworker's Hardware, woodworkershardware.com, (800) 383-0130, 1" Maple unfinished wood knob, #A00932, \$1.07 ea.; Double Roller Latches, LA191 AC, \$1.25; Full Wrap, Ball Tip Hinges, A03175TB ORB, Oil Rubbed Bronze, \$2.60

ea.; 18" KV Full Extension Drawer Slides, KV8400 B18, \$13 per set; 16" Full Extension Drawer Slide with Hold Out Feature, KV8414 B16, \$16; 5mm Spoon shelf supports, THB6144 Nickel, \$3; 1/4" Space Balls, #SB260P, \$4/100.

◆ Hafele, www.hafele.com, (800) 423-3531, Pocket Door Slides, 408.24.324, \$190; 35 mm Hinge packs, 408.24.020, \$12 per pack.

◆ Olde Century Paint, www.oldecentury-colors.com, (574) 654-8894, #2017 Barn Red acrylic latex paint, \$17 qt. (2 qt. required).



Paint the cabinet. Paint allows you to use inexpensive materials, and you don't have to worry about matching grain. Plus, paint can really brighten a room!



Fig. B Plan View of Face Frame

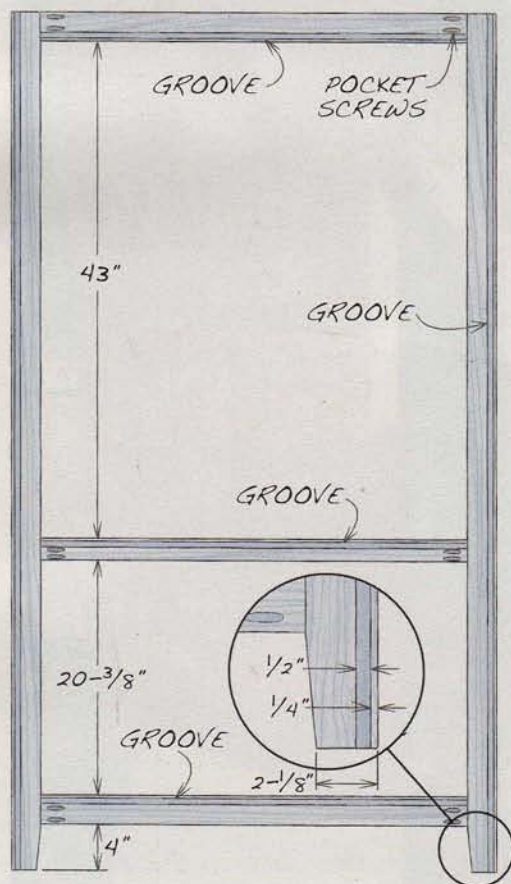


Fig. C Face Frame and Side Joint

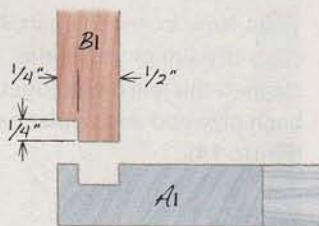


Fig. E Crown Molding

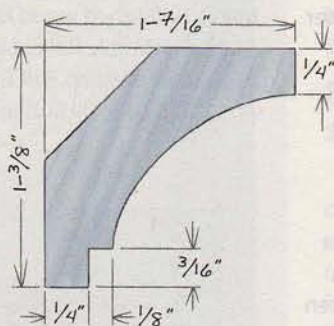


Fig. F Plan View of Cabinet Side

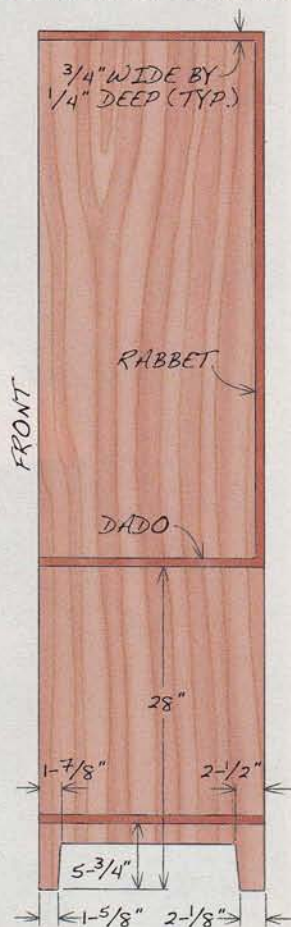


Fig. D Exploded View of Doors

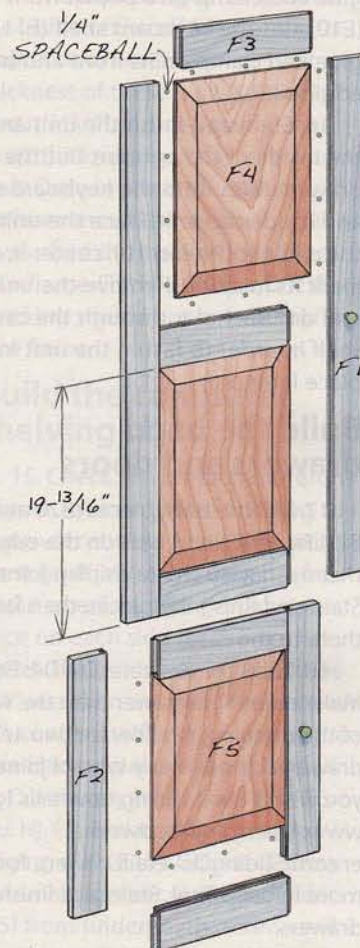
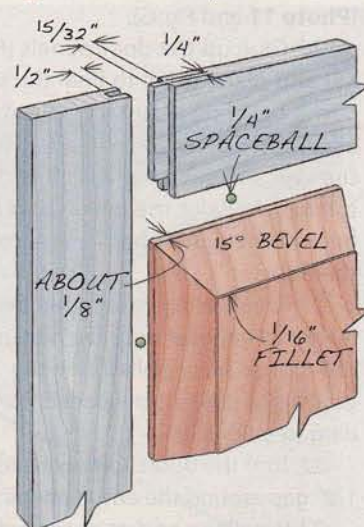


Fig. G Door Joinery



For complete how-to on making drawers with sliding dovetails, go to
www.AmericanWoodworker.com/SlidingDovetailDrawers



Shopping List

- 3 sheets 3/4" Birch Plywood
- Yellow poplar: 1@1x8x10, 1@1x4x10, 9@1x4x8
- 4 wooden knobs
- 2 pr. 18" pocket door hardware kits
- 3 pr. 18" full extension drawer slides
- 1 pr. 16" keyboard slides
- 2 pr. no-mortise door hinges
- 2 double roller catches
- 4 shelf pins
- 2 qts. paint

Fig. H Exploded View of Computer Shelving Unit

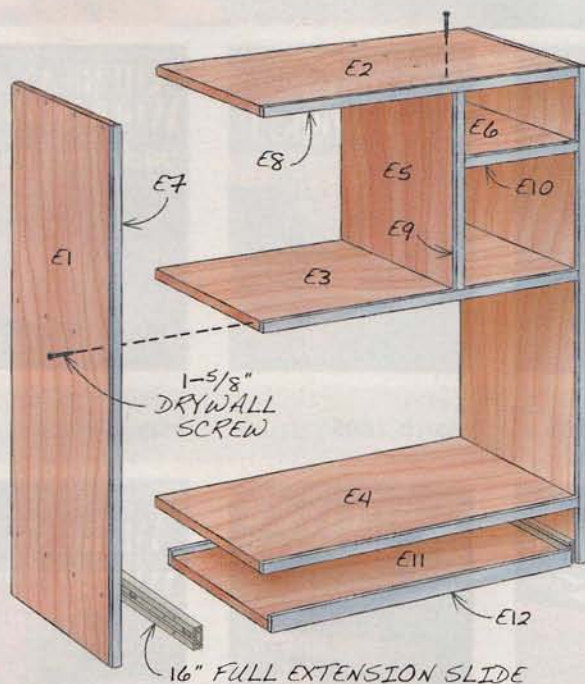


Fig. J Exploded View of Drawers

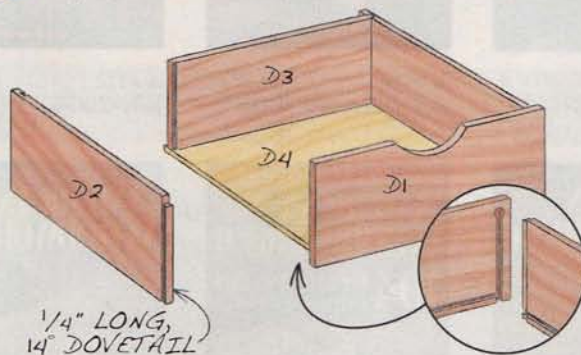


Fig. K Back



CUTTING LIST

Overall Dimensions:
75-3/4" H x 42" W x 20" D

Part	Name	Qty.	Material	TH x W x L
Face Frame				
A1	Stile	2	Poplar	3/4" x 2-1/2" x 74-1/4"
A2	Top rail	1	Poplar	3/4" x 2-1/2" x 37"
A3	Center rail	1	Poplar	3/4" x 1-7/8" x 37"
A4	Bot rail	1	Poplar	3/4" x 2-1/2" x 37"
Case				
B1	Side	2	Birch ply	3/4" x 19-1/2" x 74-1/4"
B2	Sub-top	1	Birch ply	3/4" x 18-3/4" x 41"
B3	Center shelf	1	Birch ply	3/4" x 18-3/4" x 41"
B4	Bottom	1	Birch ply	3/4" x 19-1/2" x 41"
B5	Left divider	1	Birch ply	3/4" x 18-5/8" x 21-1/2"
B6	Divider edging	1	Poplar	3/8" x 3/4" x 21-1/2"
B7	Top	1	Birch ply	3/4" x 21-3/8" x 44-5/8"
B8	Top blocking	2	Birch ply	3/4" x 4" x 44-5/8"
B9	Top blocking	2	Birch ply	3/4" x 4" x 13-3/8"
B10	Front edging	1	Poplar	3/4" x 1-1/2" x 47" (a)
B11	Side edging	2	Poplar	3/4" x 1-1/2" x 23" (a)
B12	Blocking	1	Poplar	3/8" x 1-3/4" x 22" (b)
B13	Blocking	2	Birch ply	3/4" x 2-1/8" x 18-1/4"
B14	Stile	1	Poplar	3/4" x 2-7/8" x 21-1/2"
B15	Right divider	1	Birch ply	3/4" x 18-1/4" x 21-1/2"
B16	Blocking	4	Birch ply	3/4" x 6-1/2" x 18-1/4" (c)
B17	Blocking	4	Birch ply	3/4" x 4-1/2" x 18-1/4" (c)
B18	Blocking	2	Birch ply	1/4" x 6-1/2" x 18-1/4" (c)
B19	Blocking	2	Birch ply	1/4" x 4-1/2" x 18-1/4" (c)
B20	Back	3	Knotty pine	3/4" x 9-1/4" x 46-1/2"
B21	Back	2	Knotty pine	3/4" x 7-1/2" x 46-1/2"
B22	Support block	1	Birch ply	3/4" x 5-3/4" x 40-1/2"
Molding				
C1	Front band	1	Poplar	3/4" x 1-1/2" x 45" (d)
C2	Side band	2	Poplar	3/4" x 1-1/2" x 21" (d)
C3	Crown	1	Poplar	3/4" x 1-7/8" x 96" (e)
Drawers				
D1	Front	3	Baltic Birch	1/2" x 6-1/8" x 17"
D2	Side	6	Baltic Birch	1/2" x 6-1/8" x 17-3/4"
D3	Back	3	Baltic Birch	1/2" x 5-1/2" x 15-7/8"
D4	Bottom	3	Birch ply	1/4" x 15-27/32" x 17-1/2"
Computer Shelving Unit				
E1	Side	2	Birch ply	3/4" x 16-7/8" x 42-3/4"
E2	Top	1	Birch ply	3/4" x 16-7/8" x 31-1/4"
E3	Middle	1	Birch ply	3/4" x 16-7/8" x 31-1/4"
E4	Bottom	1	Birch ply	3/4" x 16-7/8" x 31-1/4"
E5	Divider	1	Birch ply	3/4" x 16-7/8" x 16-1/4"
E6	Shelf	1	Birch ply	3/4" x 16-7/8" x 11-3/4"
E7	Edging	2	Poplar	3/8" x 3/4" x 42-3/4"
E8	Edging	3	Poplar	3/8" x 3/4" x 31-1/4"
E9	Edging	1	Poplar	3/8" x 3/4" x 16-1/4"
E10	Edging	1	Poplar	3/8" x 3/4" x 11-3/4"
E11	Keyboard Shelf	1	Birch ply	3/4" x 15-1/4" x 30-1/4"
E12	Edging	2	Poplar	3/8" x 1-1/8" x 30-1/4"
Doors				
F1	Stile	4	Poplar	3/4" x 3-1/8" x 42-7/8"
F2	Stile	4	Poplar	3/4" x 3-1/8" x 20-1/4"
F3	Rail	10	Poplar	3/4" x 3-1/8" x 13-1/8"
F4	Panel	4	Poplar	5/8" x 12-3/4" x 16-3/4" (f)
F5	Panel	2	Poplar	5/8" x 12-3/4" x 14-5/8" (f)

Notes

- Cut to fit top
- Cut to clear hinges
- Pocket door blocking should be flush with face frame
- Cut to fit cabinet
- Lineal inches
- Glue up from several pieces

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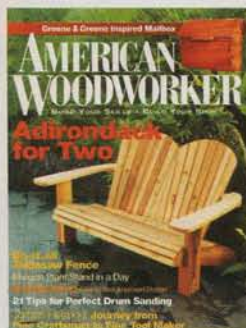
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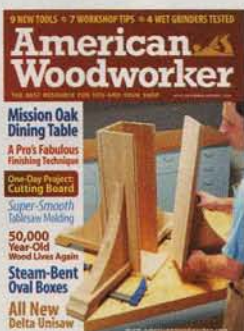
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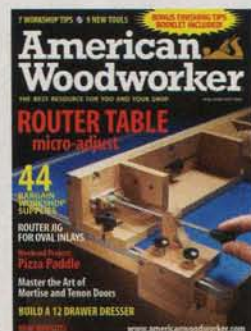
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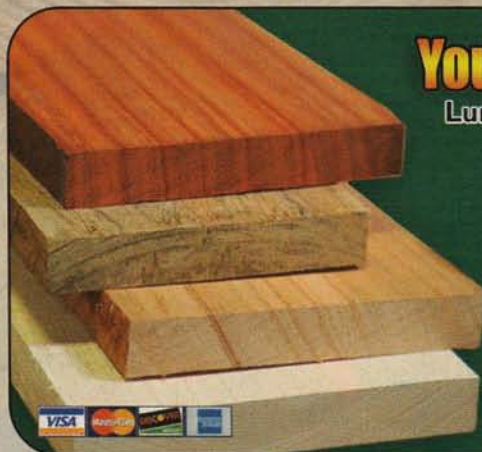
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Oops!

Crazy Mistakes Woodworkers Make



Disc Break

BACK WHEN I BOUGHT MY radial arm saw, onboard braking systems didn't exist. But I'm a gadget freak, so a few years later, I bought an electronic brake and mounted it on top of the saw. The brake worked by converting the AC input to DC, essentially turning the saw motor into a big magnet to stop the blade. The stop rate was adjustable—I set it to stop the blade as quickly as possible. The device worked beautifully, stopping the blade almost instantly.

Later, I purchased a 10" steel sanding disc to use on the saw. This disc was threaded in the opposite direction of the saw's rotation, so during operation, it would continuously tighten itself on the threaded arbor shaft.

I mounted the disc and installed a small support table that I'd built to hold the workpiece in position for sanding. The set-up worked great ... until I finished sanding and hit the brake. The saw came to an abrupt stop, but the disc kept spinning,

right off the arbor shaft. I jumped out of the way as it sailed off the saw table and sparked its way across the basement floor. Needless to say, I haven't used the brake to stop my sanding disc since.

Tom Biesterfeld

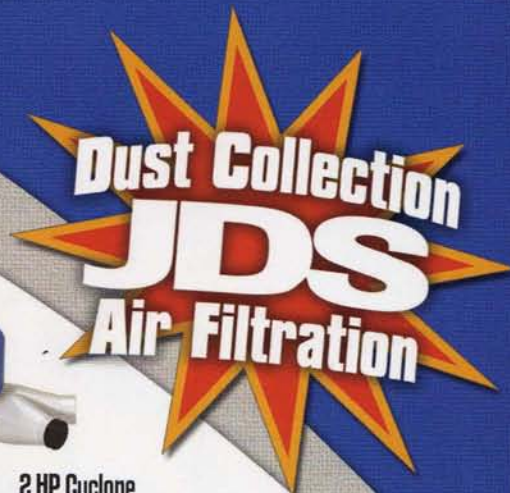
Gift Gaf

MY COUSIN'S WEDDING was a few months away when I decided a hand-made jewelry box would make a great wedding gift. I bought a new router bit and created some interesting textures for the sides. The top was hand-carved purpleheart. As a finishing touch, I had the local engraver laser in the names, "Sean and Cathy," along with their wedding date. The problem? My brother pointed out that my cousin's fiancée spells her name with a "K."

Eamonn Kearney

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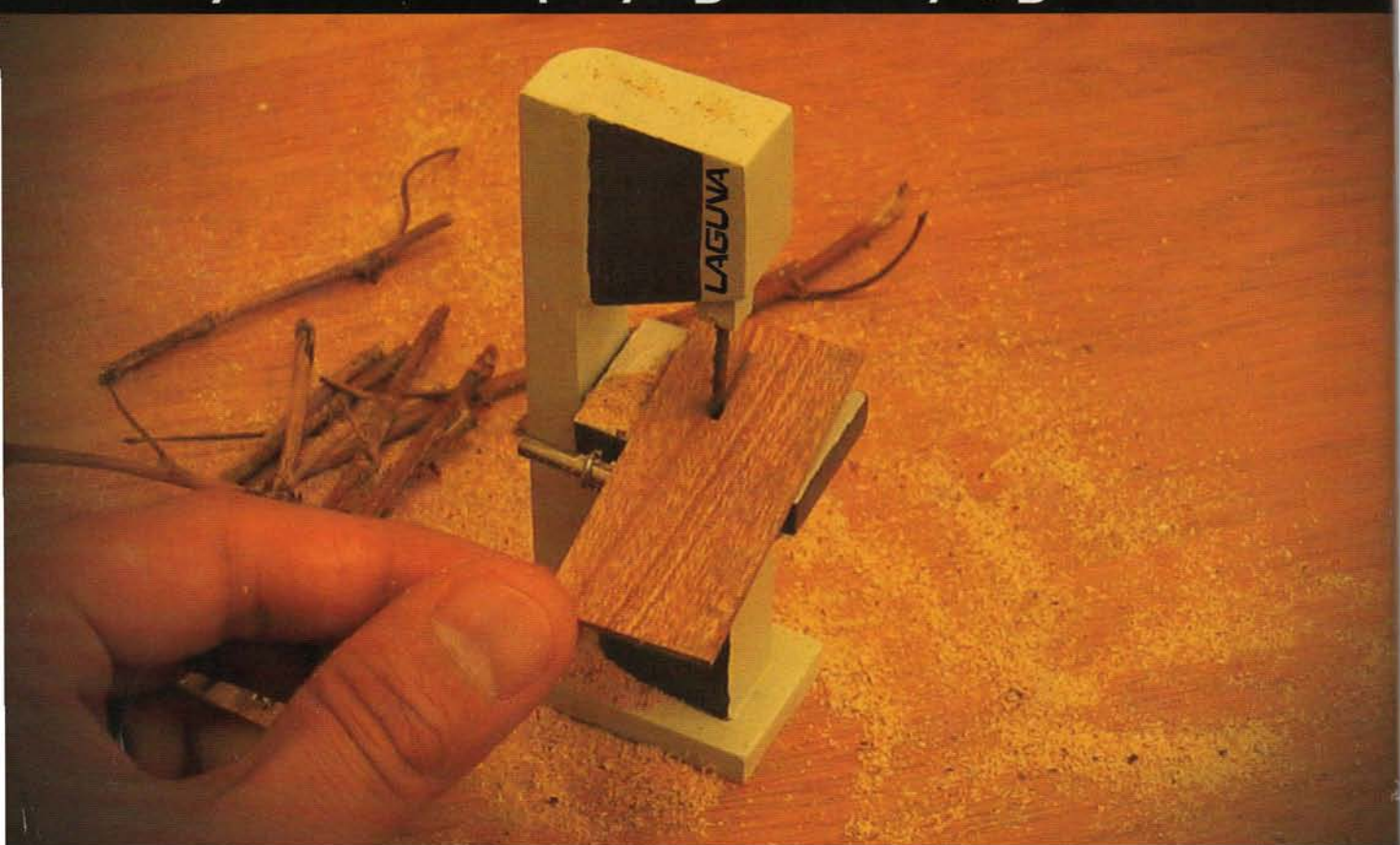


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