

GREAT New Tools for 2008!

Tool Review

3 New Power
Sharpeners
make the cut

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Professional Secrets for **Restoring an Antique Table**

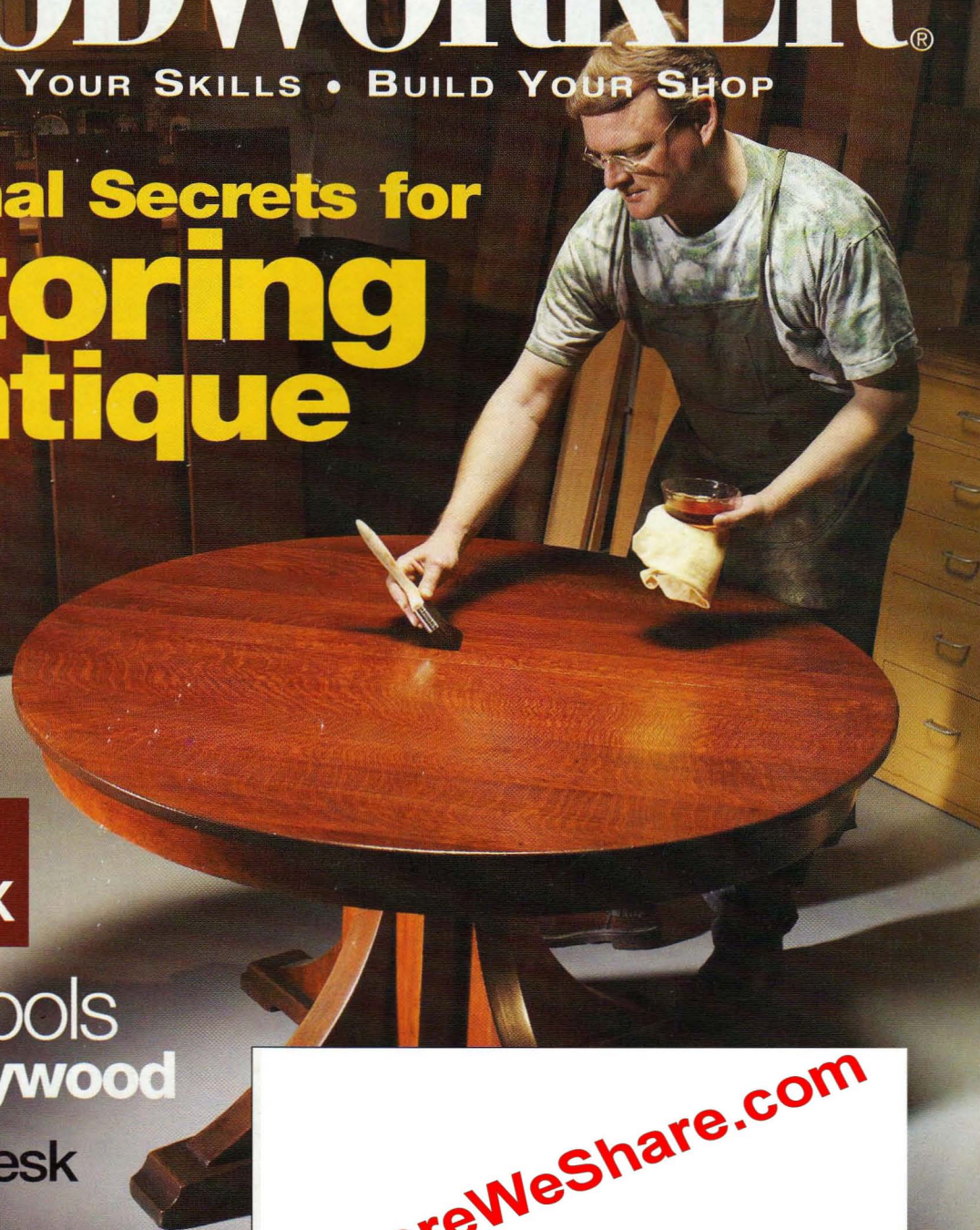
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Every Time**

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6 Steps to Tune
Your Bandsaw



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HOLIDAY SPECIALS NOV. 1st THROUGH DEC. 31st

THE 12" EXTREME SERIES TABLE SAW with RIVING KNIFE!



- Motor: 5 HP, 220V, single-phase
- Precision ground cast iron table
- Table size with extension: 30¹¹/₁₆" x 78¹³/₁₆"
- Arbor size: 5/8" & 1" • Arbor speed: 3600 RPM
- Max. dado width: 1"
- Max. depth of cut: 4" @ 90°, 2³/₄" @ 45°
- Max. rip capacity: 52"
- 3/8" x 3/4" T-slots & miter gauge
- Digital readout for bevel angle
- Cast iron trunnions
- Approx. shipping weight: 901 lbs.

**EXTREME
SERIES**

G0605X

REG. \$1995⁰⁰

SALE \$1895⁰⁰

also available

G0606X

7¹/₂ HP, 3-Phase **ONLY \$1995⁰⁰**

New!

2 HP, 10" HYBRID CABINET SAW

- Motor: 2 HP, 110V/220V, single-phase
- Precision ground cast iron table size: 27" x 39¹/₂" w/wings • Arbor: 5/8"
- Rip capacity: 30"
- Cutting capacity: 3" @ 90°, 2¹/₂" @ 45°
- Approx. shipping weight: 439 lbs.

G0478
ONLY
\$725⁰⁰



Features
Shop Fox
Aluma-Classic
Fence

10" LEFT-TILTING SUPER HEAVY-DUTY TABLE SAW

- Motor: 3 HP, 220V, single-phase, 3450 RPM
- Precision ground cast iron table size: 27" x 40¹/₈" w/wings • Arbor: 5/8"
- Cutting capacity: 8" L & 26" R of blade
- Max. depth of cut: 3" @ 90°, 2¹/₂" @ 45°
- Approx. shipping weight: 465 lbs.

G1023SL

REG. \$995⁰⁰

SALE \$895⁰⁰



Features
Shop Fox
Classic
Fence

15" PLANER/MOULDER

- Motor: 2¹/₂ HP, 110V, single-phase
- Table size: 15" x 16"
- Max. cutting height: 6"
- Max. cutting depth: 3/64"
- Min. stock thickness: 1/8"
- Min. stock length: 17"
- Feed rate: 11 FPM & 22 FPM
- Cutterhead dia.: 3¹/₂"
- Cutterhead speed: 5500 RPM
- Approx. shipping weight: 181 lbs.

FEATURES STURDY STAND,
CONVENIENT PRESET DEPTH
STOP & AMAZING BUILT-IN
DUST COLLECTION!

G0477

REG. \$725⁰⁰

SALE \$675⁰⁰



20" PLANER

- Motor: 5 HP, 220V, single-phase
- Table size: 20" x 55⁵/₈" w/extension
- Max. cutting height: 8"
- Min. stock thickness: 3/16"
- Min. stock length: 7¹/₂"
- Max. cutting depth: 1/8"
- Feed rate: 16 FPM & 20 FPM
- Cutterhead dia.: 3¹/₈"
- Cutterhead speed: 5000 RPM
- Approx. shipping weight: 920 lbs.

PRECISION GROUND
CAST IRON BED &
INFED OUTFEED
TABLES!

G0454

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\$1250⁰⁰



THE ULTIMATE 14" BANDSAW

- Motor: 1 HP, 110V/220V, single-phase, TEFC
- Precision ground cast iron table
- Cutting capacity/throat: 13¹/₂"
- Max. cutting height: 6"
- Blade size: 92¹/₂" - 93¹/₂" long (1/8" - 3/4" wide)
- Blade speeds: 1500 & 3200 FPM
- Approx. shipping weight: 198 lbs.

INCLUDES FENCE, MITER GAUGE,
3/4" BLADE & QUICK BLADE
RELEASE SYSTEM



G0555

REG. \$435⁰⁰

SALE \$395⁰⁰



14" INDUSTRIAL RE-SAW BANDSAW

- Motor: 1 HP, 110V/220V, single-phase, TEFC
- Precision ground cast iron table size: 14³/₁₆" x 19³/₄"
- Table tilt: 45° R & 8° L
- Cutting capacity/throat: 13¹/₂"
- Max. cutting height: 10"
- Blade size: 106" long (1/8" - 3/4" wide)
- Blade speed: 3000 FPM
- Approx. shipping weight: 279 lbs.

10"
CUTTING
HEIGHT!



G0457

ONLY \$825⁰⁰



17" HEAVY-DUTY BAND SAW

- Motor: 2 HP, 110V/220V, single-phase, TEFC
- Precision ground cast iron table
- Table tilt: 45° R & 10° L
- Cutting capacity/throat: 16¹/₄"
- Max. cutting height: 12"
- Blade size: 131¹/₂" long (1/8" - 1" wide)
- Blade speeds: 1700 FPM & 3500 FPM
- Approx. shipping weight: 342 lbs.



G0513

REG. \$850⁰⁰

SALE \$750⁰⁰



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6" JOINTER

- Motor: 1 HP, 110V, single-phase
- Precision ground cast iron table size: 6" x 46" • Cutterhead knives: 3
- Cutterhead speed: 4800 RPM
- Max. depth of cut: 1/8" • Cutterhead dia.: 2 1/2"
- Rabbeting capacity: 1/2"
- Approx. shipping weight: 270 lbs.

G0452
REG. \$355⁰⁰
SALE \$325⁰⁰

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PUSH BLOCKS
\$69
ANYWHERE IN
CONSUMER STATES



6" PARALLELOGRAM JOINTER

- Motor: 1 HP, 110V, single-phase
- Precision ground cast iron table size: 6" x 55 1/2" • Cutterhead knives: 4
- Cutterhead speed: 4850 RPM
- Max. depth of cut: 1/8" • Cutterhead dia.: 3"
- Rabbeting capacity: 1/2"
- Approx. shipping weight: 347 lbs.

G0604
REG. \$525⁰⁰
SALE \$495⁰⁰

\$89
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CONSUMER STATES

New!

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PUSH BLOCKS



8" x 76" JOINTER

- Motor: 3 HP, 220V, single-phase, TEFC
- Precision ground cast iron table
- Cutterhead knives: 4 HSS
- Cutterhead speed: 5350 RPM
- Max. depth of cut: 1/8" • Cutterhead dia.: 3 3/16"
- Max. rabbeting depth: 1/2"
- Approx. shipping weight: 597 lbs.

G0490
REG. \$795⁰⁰
SALE \$725⁰⁰

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**DELUXE CAST IRON
FENCE!**

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PUSH BLOCKS



8" x 75" JOINTER with SPIRAL CUTTERHEAD

- Motor: 2 HP, 110V/220V, single-phase, TEFC, 3450 RPM
- Precision ground cast iron table size: 75" x 9 1/4"
- Cutterhead speed: 5500 RPM
- Max. depth of cut: 1/8"
- Rabbeting capacity: 1/2"
- Approx. shipping weight: 558 lbs.

G0593
REG. \$1075⁰⁰
SALE \$925⁰⁰

\$139
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PUSH BLOCKS



OSCILLATING SPINDLE/12" DISC SANDER

- Motor: 1 HP, 110V, single-phase, TEFC
- Precision ground cast iron tables
- Oscillating table size: 14 1/2" sq.
- Disc table size: 17 3/4" x 10"
- Both tables tilt to 45°
- Spindle sizes: 1/4", 5/8", 1 1/2" & 2"
- Spindle oscillations: 60 SPM
- Spindle speed: 1725 RPM
- Stroke length: 1"
- Approx. shipping weight: 180 lbs.

G0529
REG. \$475⁰⁰
SALE \$450⁰⁰

**MADE IN
ISO 9001
FACTORY!**



18" OPEN-END DRUM SANDER

- Motor: 1 1/2 HP, 110V, single-phase
- Drum surface speed: 4000 FPM
- Feed rate: variable, 2-12 FPM
- Max. stock size: 4 1/2" x 36" W
- Min. board length: 6"
- Min. board thickness: 1/8"
- Conveyor belt size: 18" x 44 1/2"
- Drum size: 4"
- Approx. shipping weight: 350 lbs.

G0458
REG. \$850⁰⁰
SALE \$750⁰⁰

**INDEPENDENT
DUST
COLLECTION
W/ DUST BAG**



28" x 39" DOWNDRAFT SANDING TABLE

- Motor: 1/2 HP, 110V, single-phase, TEFC
- Table surface area: 28" x 37"
- Air suction capacity: 1600 CFM
- Impeller: 9 1/2" x 7", squirrel cage
- Filter size: 16" x 25" x 2"
- Prefilter size: 16" x 25" x 1"
- Filtration: 5 micron
- Two 110V outlets
- Power cord hanger
- Approx. shipping weight: 252 lbs.

H2936
REG. \$650⁰⁰
SALE \$575⁰⁰

\$89
ANYWHERE IN
CONSUMER STATES



2 HP, 2 STAGE CYCLONE DUST COLLECTOR

- Motor: 2HP, 220V, single-phase, TEFC Class "F"
- Amps: 12.5 • 60 Hertz cycle/3450 RPM
- Intake hole: 7"
- Impeller: 13 1/2" steel
- Max. static pressure: 10.4"
- Suction capacity: 1354 CFM @ 2.5" SP
- Filter surface area: 86 sq. ft.
- Filtration: 0.02-2 micron
- Collection drum: steel, 35 gal.
- Approx. shipping weight: 359 lbs.

G0440
REG. \$745⁰⁰
SALE \$675⁰⁰

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FACTORY!**

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OPTIONAL
STAND**



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\$69 ADDITIONAL SHIPPING



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- 40 Great New Tools for 2008**
21 products for improving your shop.
- 50 Restore An Antique Oak Table**
It needs new leaves and a new finish—no problem!
- 60 Tune Your Bandsaw**
6 adjustments yield better results.
- 66 Curly Maple Desk**
Make your own veneered panels to show off one of our most beautiful woods.
- 74 Pure & Simple Jewelry Box**
Clean lines let the wood speak for itself.
- 80 Tips for Edging**
8 methods for adding solid-wood edges to plywood.



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13
AMP

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Plunge
Base

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Circle No. 12

Departments

9 Question & Answer

Build a sled to plane big, rough boards, assemble a set of wood samples, and make a moisture-content tracking device.



12 Workshop Tips

Guide your drill with a V-block, glue a picture frame with triangular blocks, build a clamp rack from aluminum angle, make a straightedge guide with toggle clamps, store tools in eyeglass cases, turn your belt sander into a stationary edge sander, add a cam clamp to a crosscut sled, track sanding progress with chalk, and quickly build a light stand.

20 Tool Nut

Dozens of handmade screwdrivers and a compelling reason to buy two of everything.

22 ToolTalk

Power Sharpeners
Sandpaper-based machines have revolutionized sharpening.

30 School News

A shop teacher kick-starts a new program.

34 My Shop

I've kicked out the cows and moved into a barn.

36 Build Your Skills

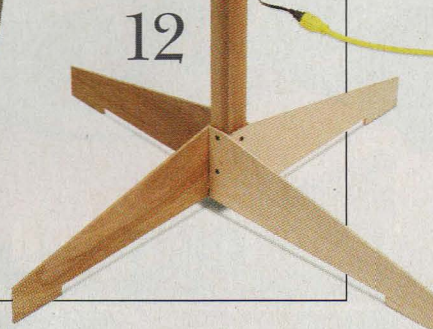
Adjustable Box Joint Jig
Make precise joints of any size.

90 Turning Wood

Skew Planing
How to use a skew chisel, step-by-step.

96 Oops!

What's wrong with storing Super Glue in your pocket?



22

5hp Pro 2000

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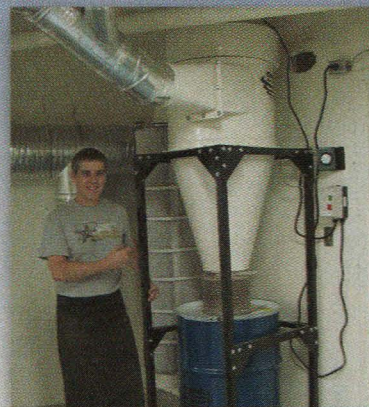
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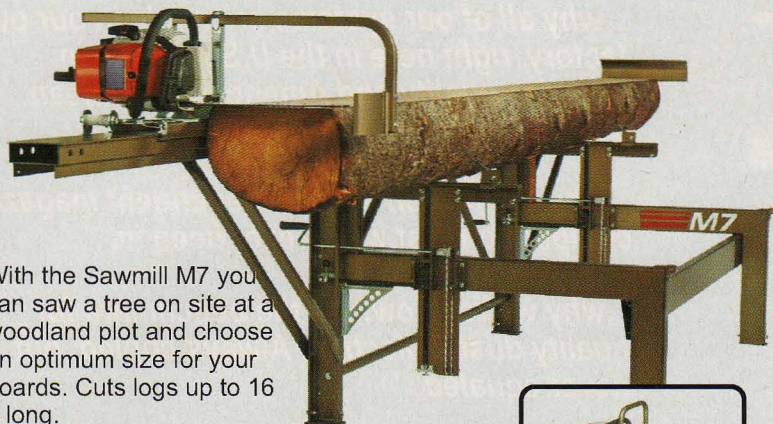


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Circle No. 139

AMERICAN WOODWORKER

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Contributing Editors: Jock Holmen, Seth Keller, Alan Lacer
Office Administrator: Shelly Jacobsen

ART & DESIGN

Creative Director: Vern Johnson
Photographer: Jason Zentner

Category President/Publisher: Roger Case
Associate Publisher/National Sales Manager: James Ford
Vice President/Production: Derek W. Corson
Production Manager: Dominic M. Taormina
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Systems Engineer: Denise Donnarumma
Circulation: Steve Pippin, Susan Sidler

ADVERTISING SALES

1285 Corporate Center Drive, Suite 180, Eagan, MN 55121
CHICAGO James Ford (219) 462-7211
Classified Advertising, The McNeill Group, Inc.
Classified Manager, Don Serfass (215) 321-9662, ext. 30

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EDITOR'S LETTER

Stocking Stuffers

This is one time of the year that having big feet (and socks!) pays off. And if you're looking for some tools to stuff in those socks, you're in luck: there are plenty of new woodworking toys to choose from. You'll find many of them covered in "Great New Tools for 2008," starting on page 40. We'll cover more great new tools in upcoming issues, but if you want the latest on new woodworking products, visit www.americanwoodworker.com/cooltools.

For a great gift project, check out Tom Adair's "Pure and Simple Jewelry Box" on page 74. It's the perfect showcase for those great-looking wood scraps you've been collecting. Tom's jewelry box goes together with simple joinery and has an attractive felt-lined interior.

On behalf of everyone at American Woodworker, I wish you and your family a joyous holiday season and a happy New Year. I hope you find time to make some sawdust, too!

Randy Johnson
rjohnson@americanwoodworker.com



American Woodworker JANUARY 2008 7

Set of Japanese Saws

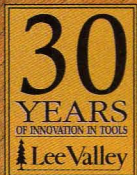
This set of detail saws – ryoba, dozuki, and keyhole – gives a range of capabilities, from dimensioning stock to cutting joints and working in confined areas. The ryoba, a combination rip and crosscut saw, has 26 tpi crosscut (0.022" kerf) on one edge and 13 tpi in ripping pattern (0.028" kerf) along the other. Its 47/8" long blade tapers from 23/16" wide at the toe to 17/8" next to the haft. The 28 tpi dozuki has ripping teeth with a small bevel at each tip to shear the wood fibers, making it equally adept at dovetails or tenon shoulders. Cutting a kerf of just 0.010", the blade is 43/4" long by 7/8" deep and has a rigid steel spine. The keyhole saw is for fine trimming in cabinetry or roughing work in carving. Only 1/2" deep at the handle, its 17 tpi crosscut pattern blade is tapered to access restricted spaces. Kerf width is 0.055". Stained paulownia handles. Made in Japan.



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Planer Sled

Q When I run a wide, rough board through my planer, it doesn't come out flat. What should I do?

A Build a sled. A planer sled is nothing more than a big board itself—but one that's very stiff and absolutely flat.

Planers aren't meant to make boards flat, though. They make boards thinner. If you run a warped board through a planer, it will come out warped, too. A little bit flatter, perhaps, but it won't have the same degree of flatness you would get from a jointer. It's better to joint the face of a board first, then run it through a planer.

But if you don't have a jointer, or your board is too wide for your jointer, you can still use your planer to flatten a board using a sled. Here's a good way to make one from inexpensive material.

Start with sheet stock that's somewhat flexible, such as 1/2 in. thick MDF. (Thicker material may not work because it's harder to force it flat.) Cut the MDF into four pieces about 12 in. wide and 48 in. long. Glue the pieces together on a surface you know is flat, such as a tablesaw or door (Photo 1). The result will be just what you need: a huge board that's both flat and stiff.

Screw a stop to one end to prevent your rough board from kicking back out of the planer (Photo 2). (Caution: don't screw from above. You should totally eliminate any chance that your planer knives could contact the stop's screws.) When you use your sled, the end with the stop should be the trailing end.

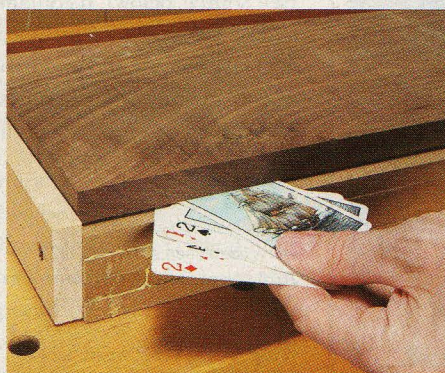
Place your rough board on the sled and place shims under areas of the board that don't touch the sled (Photo 3). It's essential that the board doesn't rock or bend as it's being planed. Then run both sled and rough board through the planer as if it was one huge piece of wood. Once one side of your rough board is flat, you can set aside the sled and run the other side through the planer.



1 Make a sled by gluing together pieces of 1/2 in. MDF placed on top of your tablesaw. Use bricks to force the MDF to lay flat and to apply clamping pressure.



2 Cut one end of the sled, then attach a stop block.



3 Place your wide board on the sled, then fill any gaps with shims, such as playing cards. The shims prevent the board from rocking or bending as it's planed.

Q Where can I find information on different American woods?

A The best place to start is to assemble a set of sample pieces. Pictures in books are fine, but if you really want to get to know a wood, you've got to hold it in

your hand to judge its color, texture, and hardness.

One of the most comprehensive sets available comes from the Wood Smart Co., which contains 46 domestic species (see Source, below). Here you'll find typical samples of just



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about every wood you'd want to consider for a woodworking project, from American elm to willow. Each piece is a generous 1/2-in. thick by 3-in. wide by 6-in. long, unfinished, and clearly labeled with the wood's common name, botanical name, specific gravity, and figures to calculate how much a flatsawn or a quartersawn board will shrink or swell. The 46 pieces come packed in a tailor-made cardboard box. A complete list of species is available on the website below.

If you want to know more facts and figures about these woods, the best source (and a terrific value) is *The Encyclopedia of Wood*, written and updated many times by the Forest Products Laboratory, a unit of the U.S. Forest Service (see Source, below). It contains almost 500 pages of technical data on domestic and imported woods, ranging from hardness to bending strength to decay resistance, and lots more.

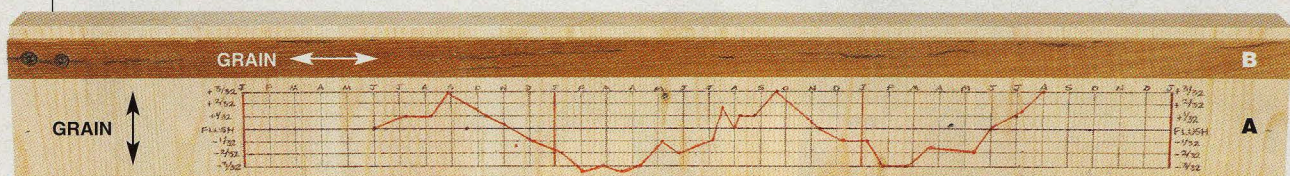
Source

Lie-Nielsen Toolworks,
www.lie-nielsen.com (800) 327-
2520, Wood Smart North American
Wood Collection, WS-1, \$130.
Amazon.com, *The Encyclopedia of
Wood*, by the U.S. Department of
Agriculture, \$14.

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Q I know the wood in my shop swells in summer and shrinks in winter, but how can I tell what point it's at?

COMPARE LENGTHS HERE



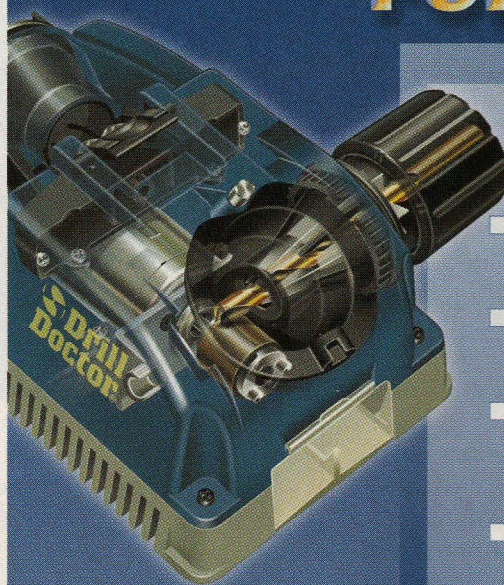
A When it comes time to fit drawers or make raised-panel doors, you have to know which direction your wood is going to move: bigger or smaller. The most precise method is to use a moisture meter, but you can make a simple tracking device that works just as well. It changes length with the seasons.

The device is composed of two pieces. Piece A is a board 1-in. thick, 3-in. wide, and 24-in. long. It's made from many pieces glued together whose grain runs the short way, as if it were cut from the end of a 24-in. wide table. This part expands in summer and contracts in winter. Piece B is a stick that's about 1/4-in. thick, 3/4-in. wide, and 24-in. long. Its grain runs the long way, so its length doesn't change. The thin stick is screwed at one end to the short-grain board.

To track wood movement, you compare the lengths of the two sticks. In summer, the tabletop-like board may be 1/8-in. longer than the thin stick. In winter, it may be 1/8-in. shorter.

You can keep a record of these differences right on the board. On the graph shown here, the vertical lines are months of the year, spread over three years. The horizontal lines record the difference in length between the two pieces.

ARE YOU READY FOR THIS?



Check all that apply:

- ☐ I have a collection of old dull drill bits I just can't throw away.
- ☐ I'd rather spend my money on new tools than on buying more drill bits.
- ☐ I know I should sharpen my drill bits, but I don't have time to become a sharpening expert.
- ☐ I want to drill clean, precise holes every time.
- ☐ I'm tired of searching through all of my used bits trying to find one sharp enough to use.

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edited by Tim Johnson



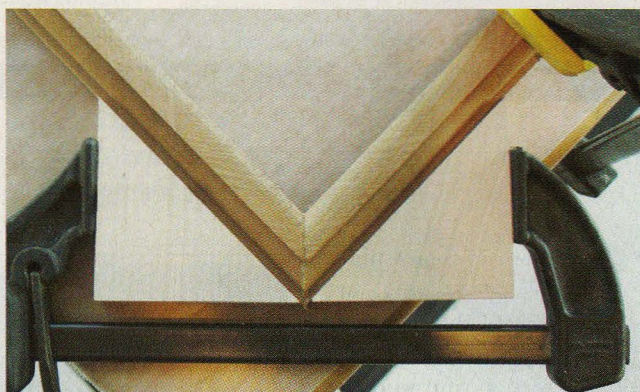
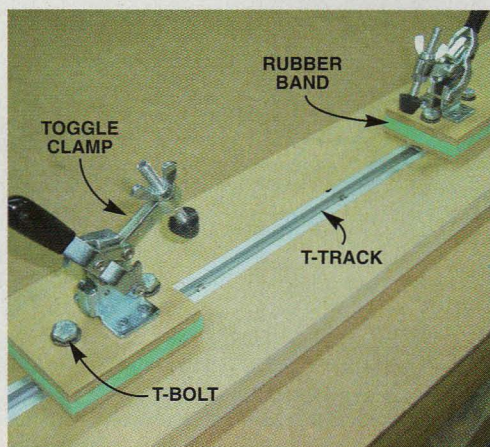
NO-SLIP GUIDE CLAMPS

Guide clamps make it easy to position a straightedge for sawing or routing, because they clamp to both ends of a workpiece (photo, above). I made my own, using a 5-in.-wide length of 3/4-in. MDF, aluminum T-track, T-bolts, toggle clamps and large rubber bands (photo, below).

First, cut a pair of 2-1/2-in. by 3-in. blocks from the MDF. Then rout or saw a groove in the remaining length and install the T-track. Drill two holes in each block and mount the T-bolts. Then attach the toggle clamps and install the rubber bands. That's it!

To use the guide clamp, tighten the T-bolts so when the blocks are installed in the T-track, they're held flush against the MDF base, but still slide easily. The action of the toggle clamps—and the rubber bands—will set everything securely in place.

Serge Duclos



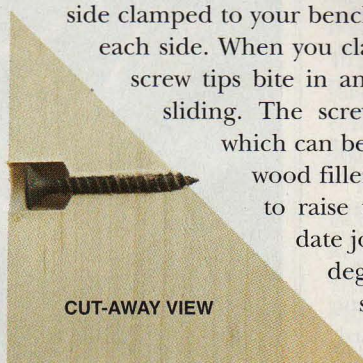
FRAME CLAMP

Two triangular maple blocks and a pair of sharp-tipped drywall screws are all you need to make corner clamp blocks for picture frames.

Drill and counterbore a hole for a drywall screw through one leg of each block, positioned so the screw's tip is centered in the hypotenuse (photo, below). Make sure the screw threads through the shank hole, so you can turn it in and out. For hard woods, extend the screws so their tips barely protrude; extend the tips a bit further for soft woods.

To use the blocks, assemble the joint, with one frame side clamped to your bench. Press a clamp block to each side. When you clamp across the joint, the screw tips bite in and keep the blocks from sliding. The screws leave small dimples, which can be easily taken care of with wood filler or a few drops of water to raise the grain. To accommodate joint angles other than 45 degrees, simply modify the shape of the blocks.

Rick Baird



ALUMINUM ANGLE CLAMP RACK

Instead of spending hours building an elaborate clamp storage system, I simply fastened a length of 2-in. by 3-in. aluminum angle to the wall. Aluminum angle is inexpensive, easy to install and it does not rust in my Florida workshop.

Fran Skwira



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— James Tolley, President, J&D Woodworks Inc., Black Hawk, SD



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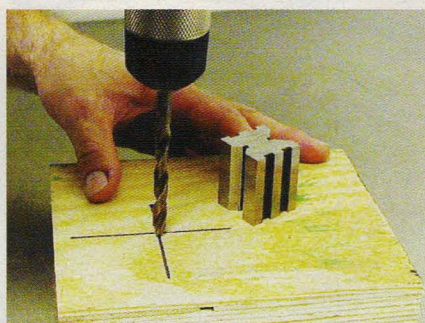
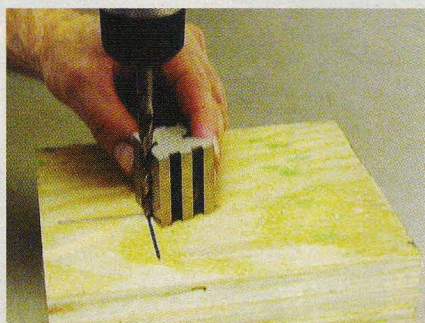
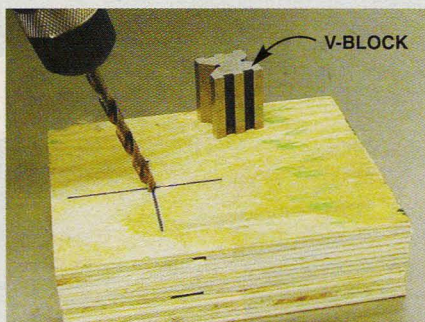
V-BLOCK DRILLING GUIDE

A machinist's V-block guarantees a square hole without obstructing your mark or limiting the length of your drill bit. Simply put your drill bit on the spot to be drilled (top photo), then slide the V-Block's notch up to the drill bit and cradle it (middle photo). Once the bit is square to the work, remove the block and drill (bottom photo).

I prefer this method to using a block of wood with a hole drilled through the center. The block obstructs your view of the drill point and limits drilling to one size hole.

V-blocks come in a variety of sizes and are easily obtained through on-line auctions or discount tool supply houses. You can also make your own out of wood or other material.

Barry Puklavage



SMALL TOOL CASES

Old glasses cases are great for protecting, containing and organizing small tools, scrapers and plane irons. I label the outside so I can see at a glance what's inside each case.

John Rustan

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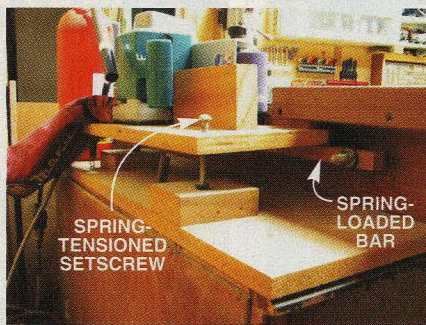
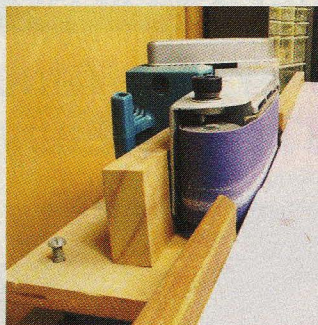
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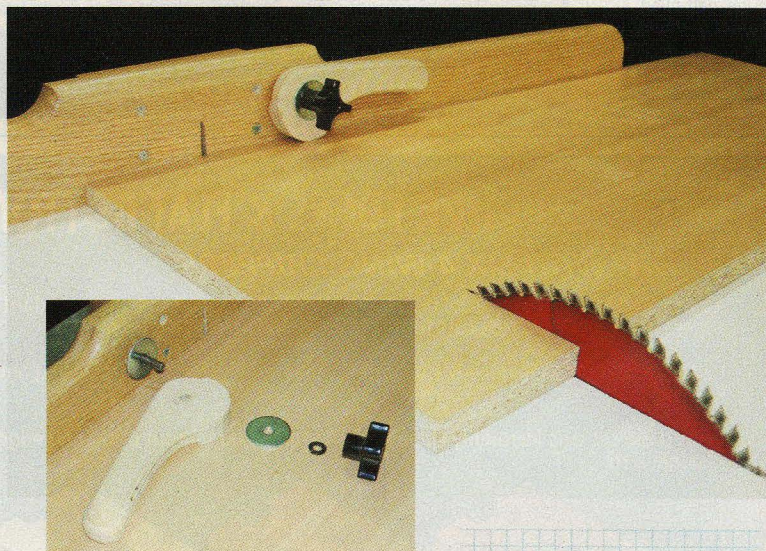
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LOW-TECH EDGE SANDER

Positioned on a platform adjacent to a table and fence, my belt sander doubles as an edge sander. Front and rear blocks, shaped-to-fit, hold the sander in place on the platform. The platform is fastened to a spring-loaded bar, so I can adjust the depth of cut by turning the wingnuts at each end. Compression springs on the bolts keep the bar under tension. By turning the spring-tensioned setscrews on the back of the platform, I can also adjust the sander's pitch, so it always sands perpendicular edges.

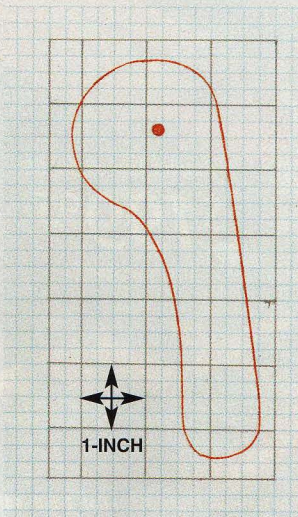
Miles Clay



CROSSCUT SLED CAM CLAMP

I use a sled for crosscutting 3/4-in. melamine and plywood panels up to 24 inches wide. These panels can be hard to hold in position while making a cut, so I installed a cam lever that securely locks the panel to the bed. The radius of the cam increases from 1-1/8-in. to 1-3/8-in. Now I can keep both hands on the sled and concentrate on making smooth cuts.

Yves Lacombe



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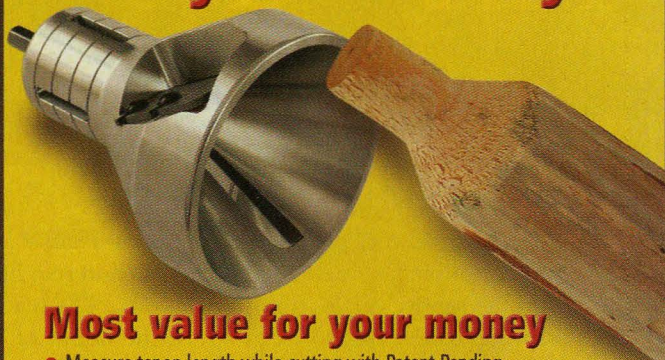
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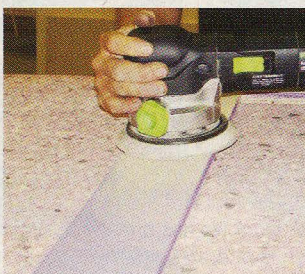
SANDING CHALK

I'm making and installing approx. 5000-bd.ft. of hard maple trim. Keeping track of what I've already sanded is difficult, so before sanding, I rub artists non-oil pastel chalks (available at artist supply stores for about \$5 for a box of 50) onto the wood and into the grain with a dry staining sponge. Then I simply sand until all the chalk is gone. In addition to showing what has and has not been sanded, the chalk makes blemishes and sanding marks stand out.

Non-oil pastel chalk is a powder that doesn't stick to wood. If any chalk remains in the pores after sanding, I simply dampen the surface with water. This raises the chalk to the surface, so it sands off easily.

I use dark-color chalk on light-colored woods and light-color chalk on dark wood.

Tim Jones



TEN-MINUTE LIGHT STAND

I got tired of jury-rigging extra light for finishing, so I built this light stand from a 4-ft. length of 2x2 and 1/4-in. plywood. The legs measure 6-in. by 17-in. and include 1/2-in. by 3-1/2-in. feet. The post aligns with the bottoms of the leg cutouts, so it doesn't touch the floor. Each leg simply butts against the previously attached leg. The light clamps anywhere on the post, so I can direct light wherever it's needed. It's been so useful, I wish I'd taken ten minutes to build it ten years ago.

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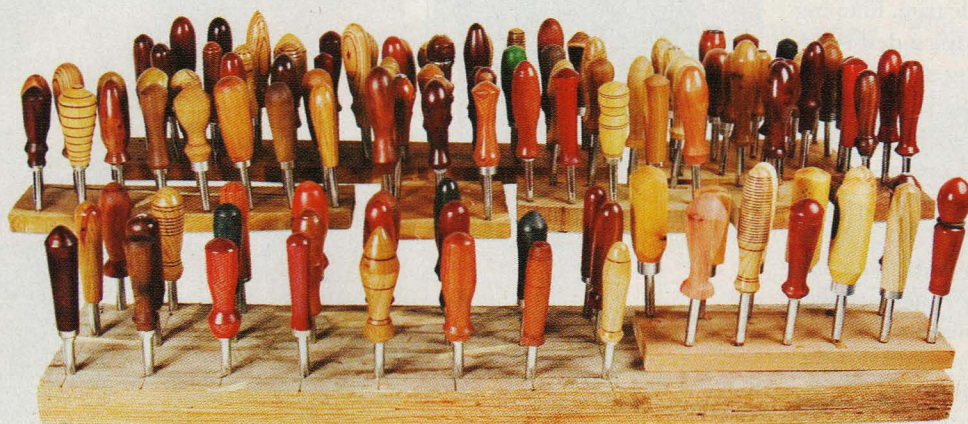
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SCREWDRIVER MANIA

I've made over 600 screwdrivers. Does that get me into the Tool Nut club?

It all started with a handle I turned for a file. I enjoyed this work so much that I started making handles for other tools, too. Now I specialize in screwdrivers. I'll buy a bunch of plastic-handled tools, remove their handles, and make new ones. Forty species later, I can't seem to stop.

Screwdrivers make great calling cards or gifts. One friend uses one of my screwdrivers for adjusting his snowboard. Another keeps his in the tool kit for a remote-control airplane. My wife stores one with her sewing machine, and my daughter has one in her dorm room.

I've tried several finishes, but the best finish is one that can't be bought. It's the oil from someone's hands, which shows that the tool I made is well-loved and often used.

Tim Heil



TWO ARE BETTER THAN ONE

I've found a clever way to justify buying two miter saws: it makes good economic sense.

Here's my reasoning. About twenty years ago, I hesitated to spend \$300 on my first miter saw. But I also realized that I would gladly pay \$15 a year to rent the saw for 20 years. Hmm. That works out to be about the same price, so I bought the saw.

Years later, I still loved the saw, but became frustrated with constantly swinging it right and left and adjusting it each time to make perfect miters. Following my former math, I said to myself, I'd be willing to pay \$10 a year for, say, 10 years to rent a second saw. Okay, why don't I just buy a second saw for \$100? And so I did.

I've applied the same principle to other tools. I've got two tablesaws, for example. The second one is a \$100 benchtop saw, but now I don't have to undo a precisely positioned setup on my main saw. Can you imagine how many times I use this second saw for the equivalent of only \$10 a year? I also have a backup benchtop drill press and a dedicated router for my router table.

Thanks to that mathematical thought twenty years ago, I now spend less time swapping setups and more time working wood.

Serge Duclos



Are you a Tool Nut, too? You'll get the new Leatherman Charge AL aerospace aluminum multi-tool if we publish your story. Send your tale to toolnut@american-woodworker.com, or mail it to American Woodworker, 1285 Corporate Center Drive, Suite 180, Eagan, MN 55121.

Please include digital photos of your tool if possible. For more on the Charge AL, visit www.leatherman.com





Horton Brasses

A manufacturer of fine brass hardware, Horton Brasses was founded in 1936 by Frank A. Horton and is now operated by the fourth generation of the Horton family. The elder Mr. Horton was a diesinker by training, originally creating dies and punches for silverware, and later transferring his experience to furniture hardware. All hardware in this suite is finished in Horton antique brass.

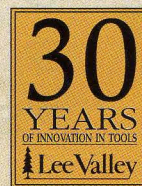
Our selection includes **Sheraton knobs** with decorative backplates (from \$5.80 to \$7.30), finely detailed **Hepplewhite-style pulls** (from \$8.40 to \$9.40 each), pressed brass plate **keyhole escutcheons** with decorative or plain borders (from \$2.20 to \$2.50), and stamped brass **bed bolt covers** (from \$3.40 to \$4.50).



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If you haven't heard the word, there's been a quiet revolution in sharpening: abrasive discs. The idea is very simple. You take a round piece of PSA sandpaper, stick it onto a flat disc, and spin the disc with an electric motor. Hold a tool against the disc and suddenly you're removing metal at a pretty good clip—much faster than by hand. From set-up to keen edge, sharpening a dull tool usually takes less than 5 minutes.

Coarse abrasive discs are a good substitute for a grinder—you can take out a nick or renew an old bevel very fast. Fine abrasive discs can produce an edge equivalent to one made on a 4000 grit or higher waterstone, which is sharp enough for just about anybody.

Three machines employ this technology: the Work Sharp WS3000 (\$199), the Veritas Mk.II (\$359), and the Lap-Sharp LS-200 (\$595). Each one is easy to set up and operate. If you've been confounded by all the details of using stones and a honing jig, these machines are a welcome relief. You'll be sharpening like a pro in just a few minutes. I tested these machines with a top-of-the-line Lie-Nielsen smoothing plane, and found that each one is capable of producing a very fine edge, one that can make .002-in. thick shavings in the toughest woods, such as birdseye maple, quartersawn white oak and crotch walnut.

The only downside to this method of sharpening is that the discs wear out. How much sandpaper will you need? Sharpening tasks vary

Power Sharpeners

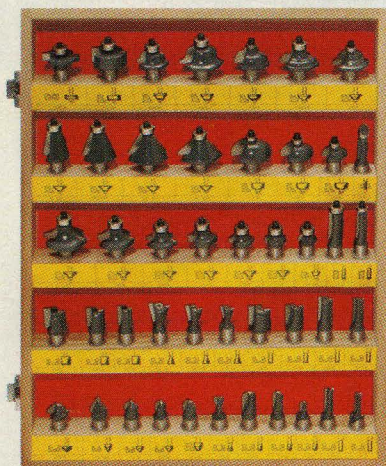
**3 SANDPAPER-BASED
MACHINES MAKE
SHARPENING EASIER
THAN EVER.**

so much that it's impossible to say, but each disc should see you through at least six sharpening sessions, and probably many more.

Price and versatility vary widely among these machines. As detailed in the next pages, the more expensive the unit, the greater variety of tools it can sharpen. For more money, you also get a higher level of precision and a wider range of sharpening angles. Read on for a closer look at each model.

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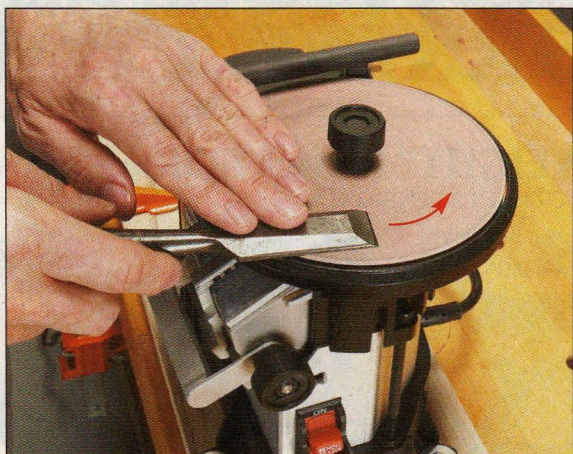
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WORK SHARP WS3000 \$199



1 The Work Sharp's discs have sandpaper adhered to both sides. To prepare a blade for sharpening, flatten and smooth its back on the disc's top side.



2 Sharpen the blade's bevel by sliding the tool up against the bottom of the disc. The tool rest tilts to four angles: 20-, 25-, 30- and 35-degrees.



3 Carving tools are easy to sharpen freehand using a slotted disc (see inset) and slotted sandpaper. Holding a tool under the machine, you can see its bevel through the spinning disc.

The Work Sharp WS3000 delivers the goods for the lowest price. It's a clever piece of engineering: on this machine, you can lap, grind, and hone most chisels, plane irons and carving tools. There is a width limit, however. The built-in tool rest (Photo 2) only accommodates blades up to 2 in. wide (the size of a No. 4 or No. 5 plane blade). It's possible to free-hand grind and hone wider blades on top of the machine, but this requires skill and practice.

The Work Sharp spins its 6-in. dia. discs at 580 rpm. That's much slower than a grinder, but you must still guard against overheating an edge.

This machine does a pretty good job lapping the back of a tool (Photo 1). You'll get the back plenty smooth, but it is a challenge to make it absolutely flat because you're placing it on a spinning surface.

Grinding and honing the bevel requires a novel technique (Photo 2). To avoid overheating, Work Sharp recommends that you quickly plunge and withdraw the tool so it contacts the abrasive for less than one second at a time. This works OK, but you should check for overheating once in a while and quench the tool as needed.

Forming two bevels is the most efficient way to make a sharp edge with the Work Sharp. On a chisel, for example, you should use coarse paper to grind the entire bevel, down to the tip, at 25 degrees. When you switch to fine paper, you should bump down the tool rest one notch to 30 degrees to make a microbevel. In general, it's easy to sharpen chisels up to 1 in. wide. Larger chisels and plane irons require more finesse, primarily because of the disc's small diameter.

The Work Sharp comes with a big bonus: a slotted wheel for sharpening carving tools (Photo 3). If you ink your tool's bevel, you can easily see where the sandpaper is cutting. This helps you to maintain a consistent, straight bevel.

A wide range of abrasives are available, from 80-grit ceramic oxide for hogging off large amounts of metal to super-fine 6000 grit aluminum oxide for putting on a final polish.

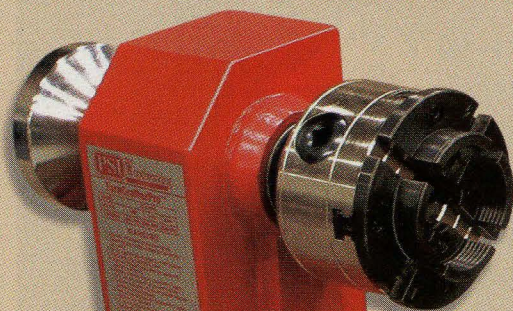
The Work Sharp WS2000 (\$146) is a simpler version of the WS3000. Its tool rest is fixed at 25 degrees (you can't use a two-bevel sharpening method) and can only handle tools up to 1-5/8 in. wide (the size of a standard block-plane blade). The machine comes with only one wheel, which is slotted, and standard and slotted abrasives.

Source

Professional Tool Manufacturing, www.worksharptools.com
(800) 597-6170, WS3000, \$199; WS2000, \$146.

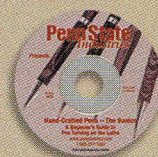
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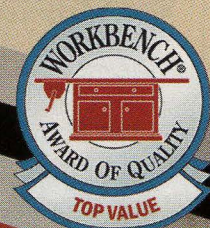
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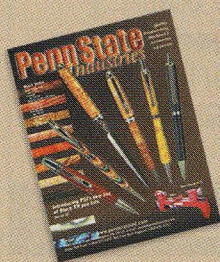
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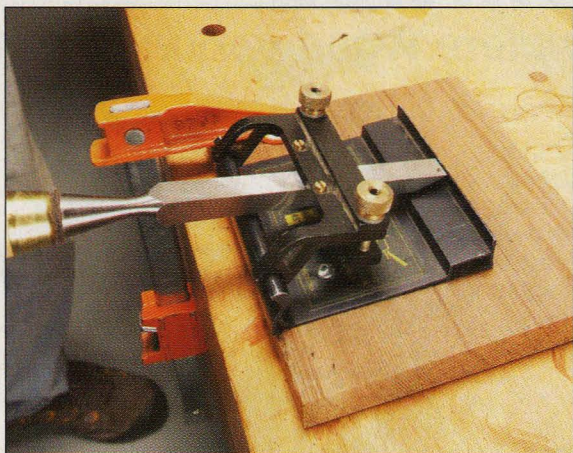


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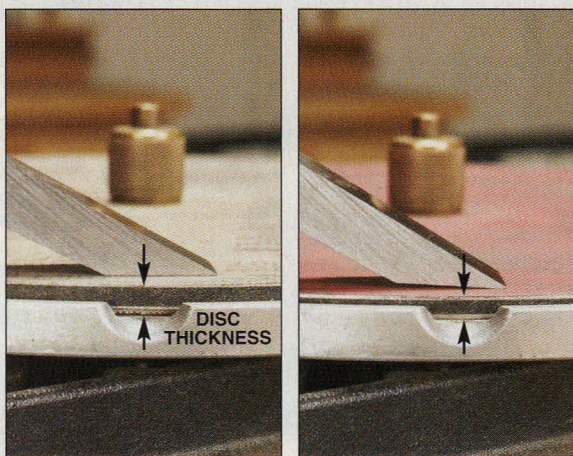


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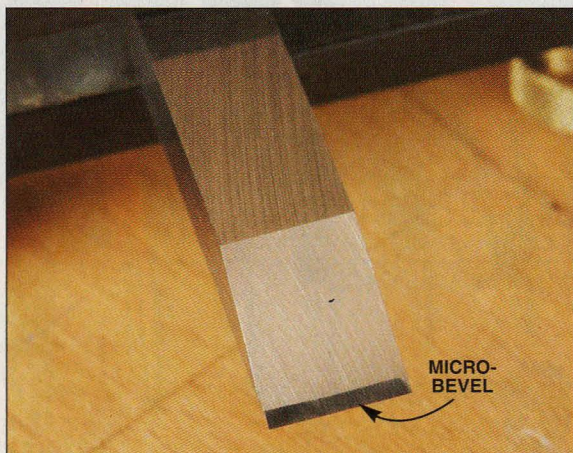
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1 Creating a microbevel is the essence of the Mk.II. To begin, clamp your tool in a blade holder and set its projection using a simple jig. Next, place the holder on the machine's guide bar.



2 On this machine, coarse sandpaper is adhered to a thick disc (left); fine sandpaper to a thin disc (right). Switching from a coarse to a fine disc automatically increases the honing angle by 1 degree.



3 The result is an instant microbevel that's extremely sharp. This two-bevel system is very efficient; you only use the finest abrasives where you need them: right at the tip.

VERITAS Mk.II \$359



Sharpening doesn't get much easier than this. The Mk.II does a superb job of grinding and honing just about every chisel and plane blade you'll ever use. As for lapping, the Mk.II is good for initial work, but not well-suited for making a back absolutely flat because its disc rotates too fast. You can also sharpen carving gouges and V-tools on the Mk.II, although you won't have the benefit of a guide.

The Mk.II turns its discs at 650 rpm. The discs have an 8 in. dia., as opposed to 6 in. on the Work Sharp. A larger disc enables the Mk. II to perform better than the Work Sharp on 2-in. and wider plane blades. (The Mk. II can hold blades up to 2-3/8-in. wide, the size of a No. 7 plane blade.) The larger disc also enables you to remove metal more quickly, because it's moving faster at the outer edge. However, you must be more careful in monitoring heat buildup.

Setup for the Mk.II is very easy. First, you adjust the guide-bar post up or down to create any bevel from 15 to 45 degrees, in 5-degree increments. A detent at each position ensures repeatability. Next, you place your tool in a holder, set the holder in a jig, push the tool forward until its end contacts the jig's lip, and tighten the holder's clamp (Photo 1). (There's a second, shorter lip for butt chisels and spokeshave blades.) You're ready to go.

If you've got a very dull edge, start with the coarse disc. Place the tool holder on the guide bar and lower the tool's edge toward the spinning disc. Unlike the Work Sharp, the Mk. II's disc rotates clockwise, towards the tool's edge. That's disconcerting at first, but has the benefit of producing a minimal wire edge. Keep the tool on the disc for a few seconds, then remove it and check its temperature. You'll probably have to quench now and then to cool it off. It's very hard to overheat a tool, but not impossible. Once you've created a wire edge, stop the machine and switch to the fine disc.

Switching discs automatically increases the honing angle by 1 degree (Photo 2). This means the fine abrasives only work where they're needed: right at the tool's tip. The result is an extremely sharp micro-bevel, produced as fast as possible (Photo 3).

Source

Lee Valley, www.leevalley.com (800) 871-8158, Mk.II Sharpening System, 05M31.01, \$359.

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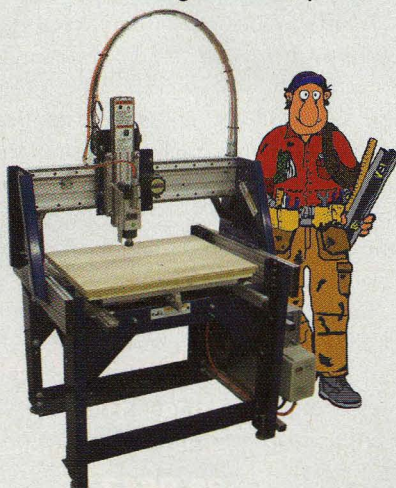
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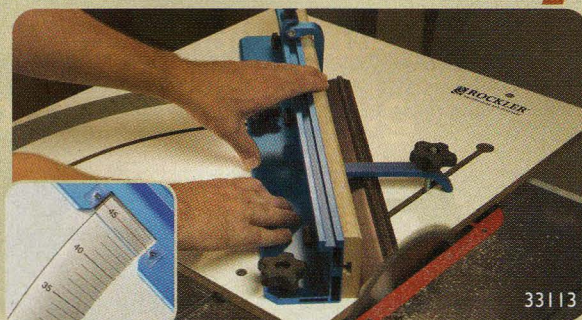
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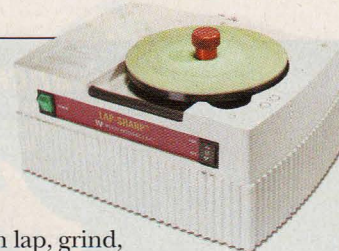
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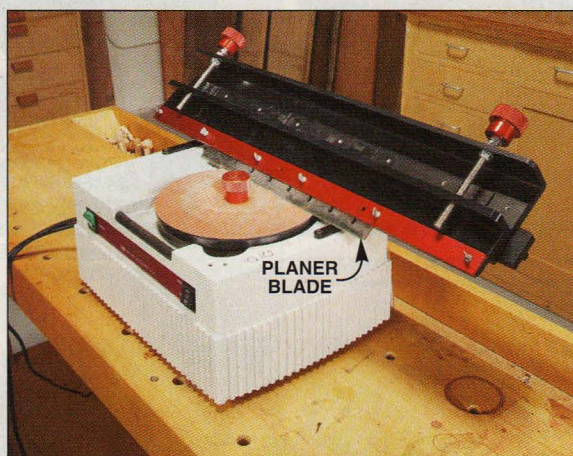
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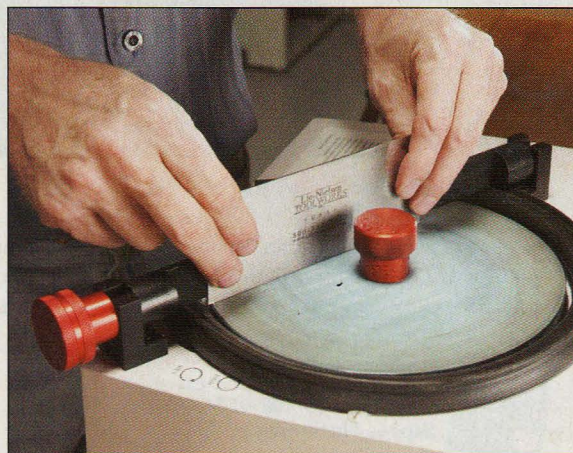
LAP-SHARP LS-200 \$595



1 You can use water to keep the cutting edge cool on the Lap-Sharp, unlike the other two machines. The Lap-Sharp's disc turns slower, too, so it's almost impossible to overheat an edge.



2 You can sharpen planer and jointer knives on the Lap-Sharp with an accessory sliding jig (\$250). A jig for turning and carving tools is also available (\$120).



3 Scrapers are easy to sharpen using the auxiliary tool support set to 45 or 90 degrees. You'll quickly get a flawless edge, ready for burnishing.

This machine does it all. You can lap, grind, and hone chisels, plane blades, scrapers, carving tools, turning tools and even jointer and planer knives to the sharpest edge possible on any machine. The basic Lap-Sharp doesn't come with guides for holding these tools, however—they're available as separate accessories.

The Lap-Sharp differs from the other machines: it uses water with the finer abrasives. Sprayed or dripped on the discs, water cools a tool's edge and carries away sharpening debris (Photo 1). For purists, cooling with water is a big deal. Makers and users of high-end Japanese tools contend that heating a tool while dry-grinding or honing decreases its ability to hold an edge. We all know that dramatically overheating a tool, to the point that the metal changes color, causes this effect. These folks contend this damage occurs at lower temperatures, too. While no one to our knowledge has scientifically tested this theory, it's hard to ignore years of experience. Some independent experts in the field of testing edge tools believe this degradation occurs with Western tools as well.

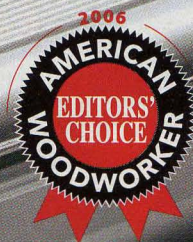
The Lap-Sharp is a beautiful piece of engineering, well thought out. To help lapping, you use a foot pedal to turn on the machine. This allows you to precisely position the tool before the disc starts spinning. The result is a flatter surface than one you can make using the other power sharpeners. The Lap-Sharp's 8-in. dia. discs spin at about 200 rpm, much slower than other machines. It will go clockwise or counterclockwise. The discs are color-coded; each one holds a single grit on one side. A wide variety of grits and types of sandpaper are available, each tailored for specific applications. In general, these are higher-quality abrasives than those used by other machines. They last longer and have a more uniform grit.

The basic Lap-Sharp is designed for freehand sharpening. That's fine if you sharpen your tools using just one bevel. But if you prefer two bevels or a microbevel to speed up the sharpening process, you're better off using the Lap-Sharp tool support and tool holder (\$80). The tool holder is OK, but Lap-Sharp will soon introduce a more sophisticated model that promises to be easier to set up.

An enhanced Lap-Sharp LS-600VS (\$1,295) offers variable speed (from 100 to 600 rpm) and soft start. A higher speed reduces the amount of time it takes to sharpen jointer and planer blades. Soft start helps make lapping and honing even more precise.

Source

Wood Artistry, www.woodartistry.com (707) 473-0593, Lap-Sharp LS-200, \$595; LS-600VS, \$1,295.



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Re-Starting Woodshop

by Jonathan Schwartz

When I was a college student, I worked at a cabinet shop. The shop's owner was a gifted craftsman, but he knew very little math. After I taught him basic right-triangle trigonometry, he was amazed how easy it was to calculate angles for the complex custom cabinets that he built.

Today my job as a math teacher at Colfax High School in Colfax, California is just the opposite. When I started teaching in 1995, my trigonometry classes were filled with college-bound students that could not calculate fractions or read a tape measure. Watching them struggle with basic math made me realize that they didn't understand how numbers work. That's when it occurred to me that students can learn only so much in a traditional classroom with books and a whiteboard; real learning also occurs when they work with their hands.

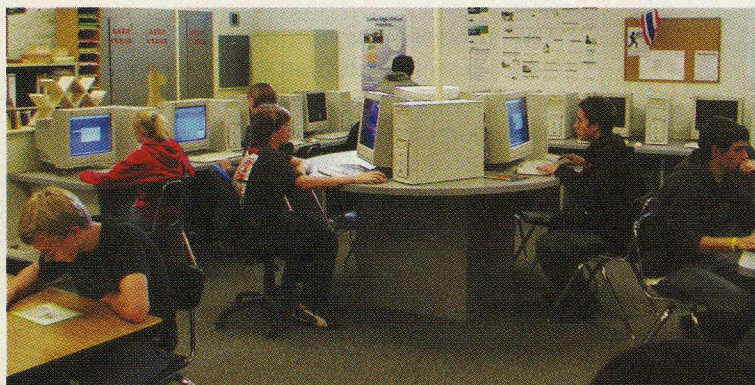
I thought about classes I'd taken that taught hands-on skills—woodshop, in particular. In woodshop, I used numbers and calculations to design and build projects. I learned the

importance of correct measurements as well as the significance of miscalculation. Woodshop, I realized, combined hands-on learning with math. For this reason, I decided to re-introduce woodshop to Colfax High School.

When Colfax High School opened in 1963, its woodshop was state-of-the art. In those days, vocational programs were highly valued and received a considerable amount of financial and administrative support. Colfax's woodshop program was excellent for more than 30 years. But then the teacher retired, and shortly thereafter, the woodshop program was put on hold, because of cost, lack of a qualified instructor and the perception that vocational skills classes were no longer relevant.

Restarting the woodshop program has taken a lot of energy and the better part of a decade. Many tools and

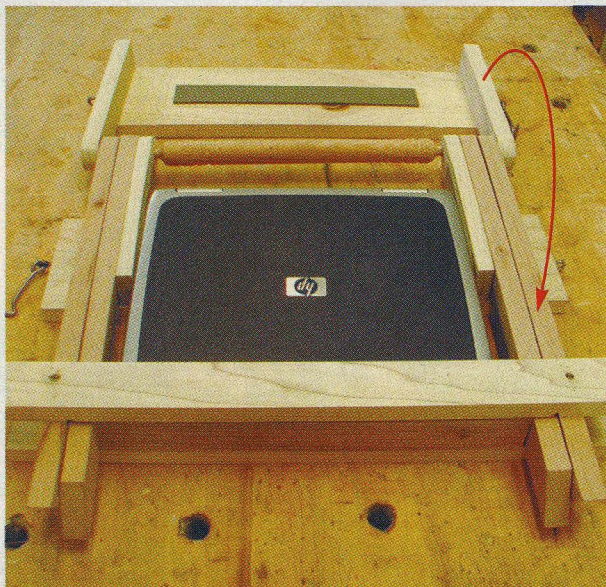
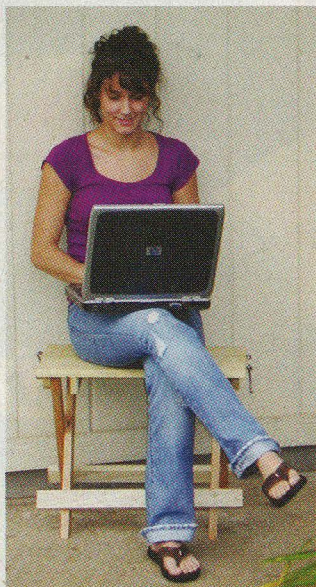
Math teacher Jonathan Schwartz spent nearly a decade writing grants and refurbishing and replacing the old machinery while re-starting Colfax High School's woodshop program, which had been mothballed in 1998.



Woodshop students use AutoCAD programs to design their projects. Colfax's woodshop has its own computer lab, which is adjacent to the shop.



Why doesn't it fit? Instructor Jonathan Schwartz has found that students develop problem-solving skills by designing and building projects.



Grant money has played an important role in revitalizing Colfax High School's woodshop program. Jonathan's portable Laptop and Bottom stool was awarded a design-and-build grant from the Lemelson-MIT invention program that helped to fund additional woodshop tool purchases.

The stool (far left photo) folds and locks to securely hold the laptop for carrying (left photo).

machines had disappeared from the shop and fewer than half of those that remained were in working order. The persistent lack of funding and the lingering belief that manual skills are secondary in the computer age made the task more difficult.

My big break came when I discovered that federal, state and private grant money was available to fund technology. This was the jump-start I needed to get woodshop back into the curriculum. With my school district's

help, I applied for a federal, state-administered grant to establish a program called EAST (Environmental and Spatial Technology), a projects-based technology class. The intent of EAST was to motivate students academically by engaging them in projects—exactly what a woodshop does. The grant proposed having students design projects on the computer with AutoCAD and then build them next door in the woodshop. The funds from the grant allowed us to rebuild the shop, purchase computers and install a computer lab right next door (top photo).

The class is purposefully titled "Design and Construction" to include both academic and hands-on experience—and to make it sound more appealing to parents. An instant hit with students, the class always has a waiting list. It draws an interesting mix of students. Some are from my pre-calculus class and on their way to becoming engineers; others are on vocational tracks to work in cabinet shops or as carpenters. We even have a class shirt. On the front it pictures a kid working on a computer, with the title "Design and Construction." But on the back, under a skull and crossbones (crossed hammers, actually), it says "aka Woodshop."

Finding Funding

Many funding opportunities are available for school woodshop programs, including federal, state, foundation and private grants. Search the Internet to find them, or partner with your school board, as I did, or contact municipal, county or state governmental representatives for help. Many government and private organizations recognize the value of woodshop classes and want to put money into promising programs. In my experience, providers care most that the money will be used to teach students hands-on skills, so be sure to clearly explain that aspect in your application. Before you apply for a grant, it's important to know how it's targeted. For example, if you teach in a suburban school, it's a waste of time to apply for a grant targeted for an inner-city school.

Our program has also benefited from several product-design grants from the Lemelson-MIT program, which supports invention and innovation. The most recent grant was to develop a folding wooden stool that doubles as a laptop case—it's named the Laptop and Bottom (bottom photos, page 31). In addition to funding the projects, the MIT grants allowed us to buy additional tools for the woodshop. We even entered the Laptop and Bottom prototype in the Staples Invention Contest (a national contest sponsored by the office supply company).

After the class had been operating for a couple years, the county's Regional Occupation Program (www.49erROP.com) offered to help with funding, recognizing it as a valuable career technical education program. (California and other states are beginning to acknowledge the relevance of shop classes and are starting to make more money available through state grants and regional occupation programs.)

Currently, I'm trying to get funding from a local lumber company to buy a small lumber mill. I have access to logs, because I operate a part-time tree

A Natural Progression to...



service in the summer. At the start of the school year, the students and I would mill the logs; the following year we'd use that wood for our projects. The goal is to teach students academically by involving them with a project from start to finish—with hands-on experience, of course.

I've learned that teaching woodshop is harder work than teaching math. The students are more demanding, the stress level is much higher (imagine thirty 15-year-olds working in a room full of power saws), and keeping the machinery running is a full-time job. However, teaching woodshop is the most rewarding thing I have ever done. I see the kids learning at rates I have never seen before. Every new batch of woodshop students reminds me of the importance of hands-on practical learning and reinforces my opinion that woodshop (or any manual-arts class) is essential for every student.



Jonathan Schwartz graduated from U.C. Davis and after traveling around the world as an outdoor guide, started a contracting business. After five years, he returned to education. Jonathan attained a Masters in Math Education from Harvard in 1995 and has been teaching math at Colfax High School in California ever since. His woodshop "Design and Construction" class is now in its third year. According to Jonathan, the secret to teaching innovation and creativity is to have kids look at complex problems and come up with solutions. "It's hard for students to come up with a solution unless they are able to build it and see if it works or not—and build it again if it does not work."

Tell us about a dynamic woodworking school or vibrant teaching program. What makes it work? Point out notable teaching strategies and student accomplishments. Explain how the program excites students about woodworking and tell us how it helps them develop woodworking skills. Whether the program operates in a public school, community center or a private workshop, we want to hear about its success. E-mail your story to schoolnews@americanwoodworker.com.

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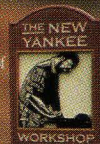
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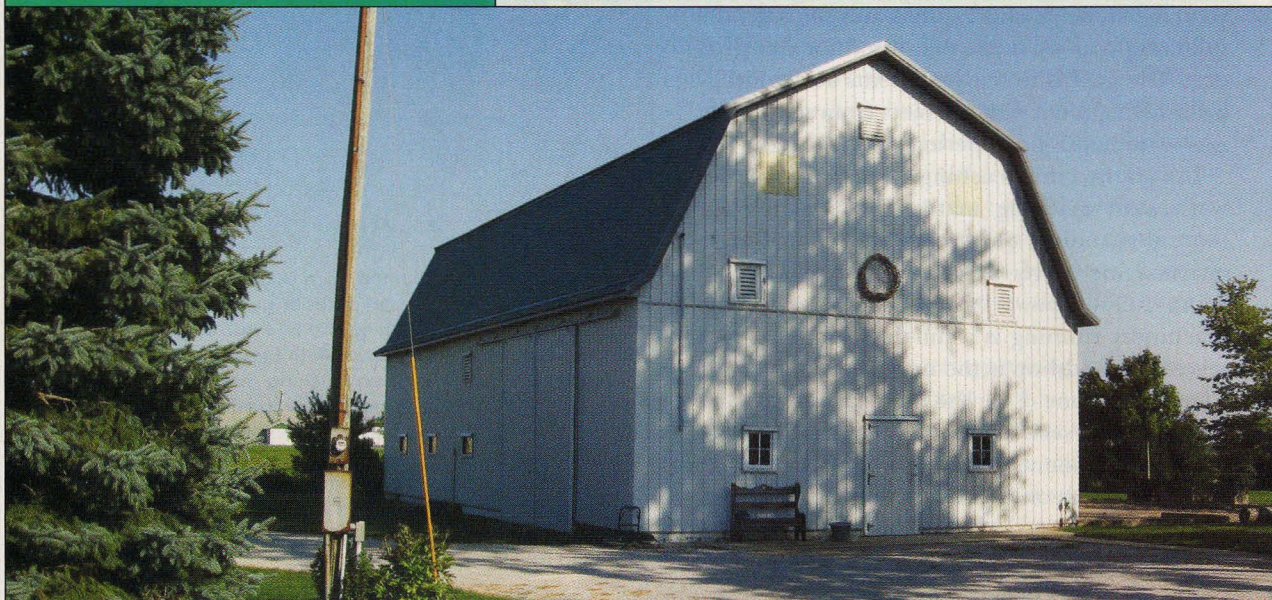
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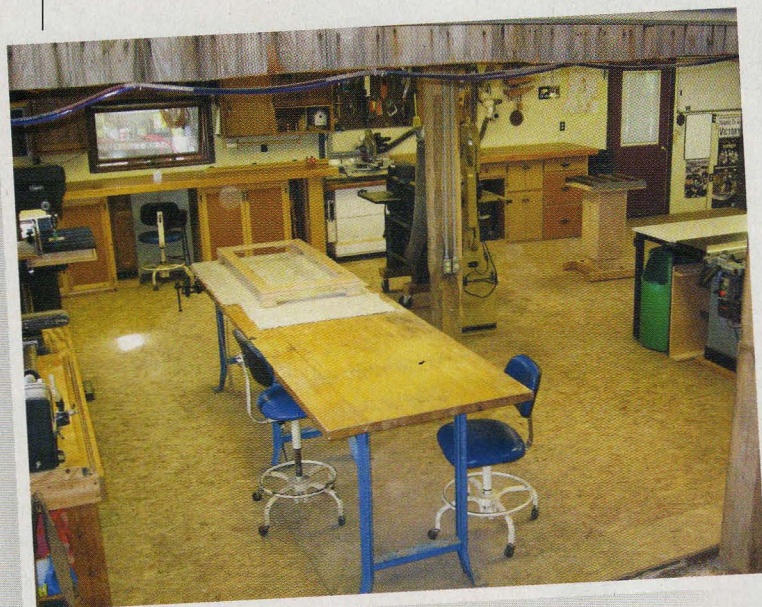
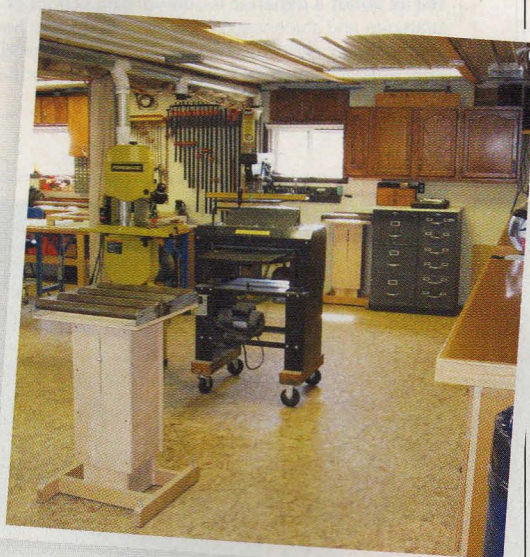




Old Barn Shop

Having been raised on a farm, I have genuine fondness for old post-and-beam barns and great respect for the master craftsmen who built them. As such, there was no question my shop would be located in the 100-year-old gambrel-roof barn on our 2-1/2 acre micro farm in the heart of Indiana.

Before building the shop, I spent three years restoring the barn. I tried to maintain as much of the barn's patina while sticking to the farmer's code of "function before



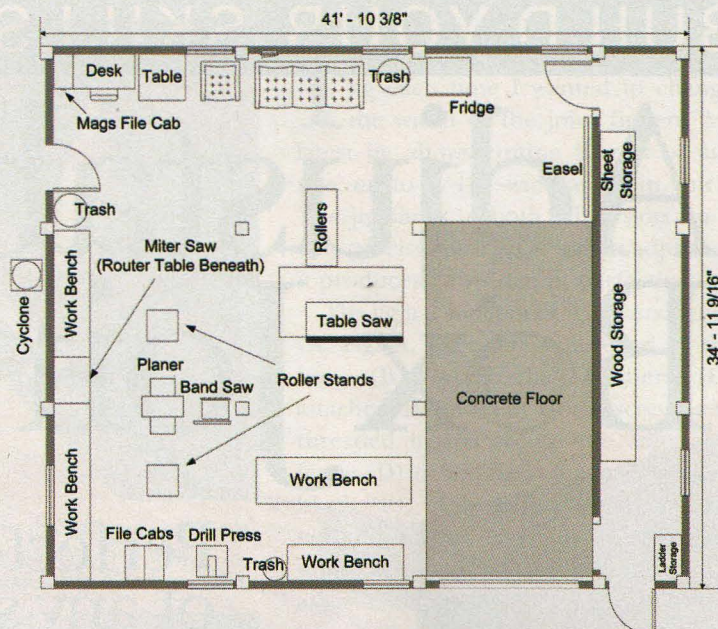
form." Probably due to this code (and my tightwad engineering background), all lights, fixtures, benches, cabinets, siding, doors and even the paint are salvaged items. My woodworking tools are the only items I purchased new.

My 34-ft. by 40-ft. shop has 200-amp service and is heated with an LP forced-air furnace located in the hay mow. The ductwork for the furnace and dust collection system runs through the ceiling, with drops scattered throughout the shop. I designed and built a cyclone separator, which is located in another bay of

the barn. The exhaust gets filtered and returned to the shop beneath the raised floor. This keeps the mass of the concrete sub-floor warm and radiant in the winter and vented in the summer.

With Halloween parties, graduation receptions, and basketball games in the hay mow, this old barn has become more than just a home for my workshop: it's the social center of our family. I like to think the craftsmen and farmers of yesteryear would be pleased that a piece of Indiana's vanishing landscape has been given new life.

*Steve Keller
Galveston, IN*

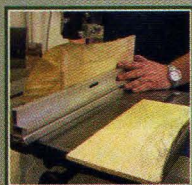


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E-mail your entry to myshop@americanwoodworker.com with digital photos attached. Or mail your description with prints or digital photos on a disc to **My Shop, American Woodworker, 1285 Corporate Center Drive, Suite 180, Eagan, MN 55121**. Please include your phone number. Submissions cannot be returned and become our property on acceptance and payment. We may edit submissions and use them in all print and electronic media.

American Woodworker JANUARY 2008 35



12" Re-Saw Capacity



Double Bearing
Blade Guides



Quick Release Fence
with Drift Adjustment



YOU CAN BUILD IT TOO

18" BANDSAW • MODEL 10-345

The RIKON 10-345 18" Bandsaw now features a 2.5 HP motor, 2-Speeds, 12" re-saw capacity and one of the largest work surfaces in the industry.



Double Stacked
Bearings



Solid Cast
Table Trunnion

2 SPEEDS



Easiest
Quick Release

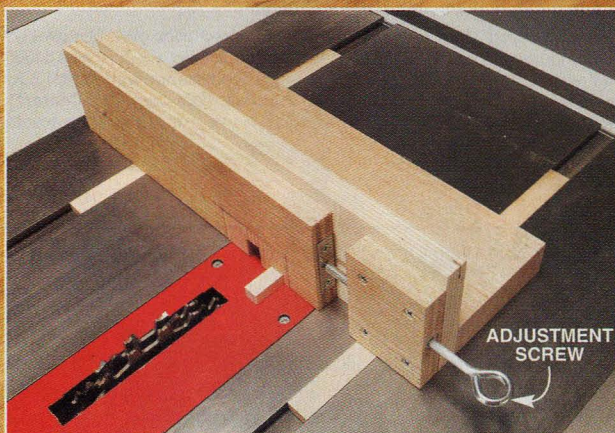
RIKON

www.rikontools.com 877-884-5167



Adjustable Box Joint Jig

Perfect box joints of any size every time



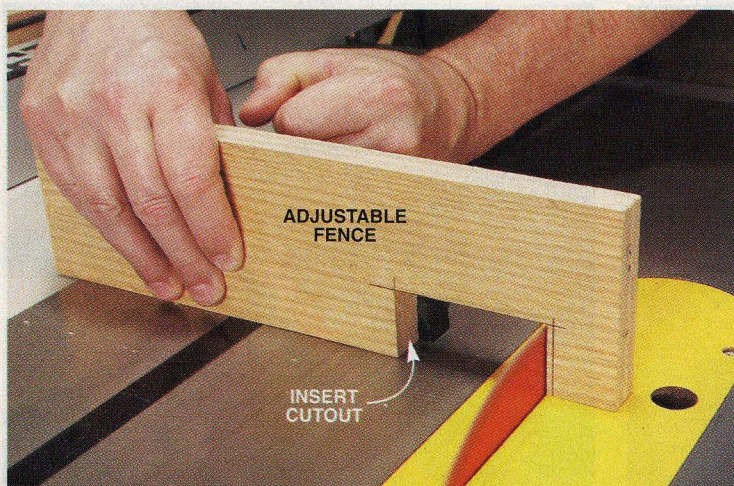
For precise cutting, the jig rides in both miter slots, just like a crosscut sled. For safety, the jig's thick, wide base houses the blade. An adjustment screw makes it easy to dial in joints that fit perfectly.



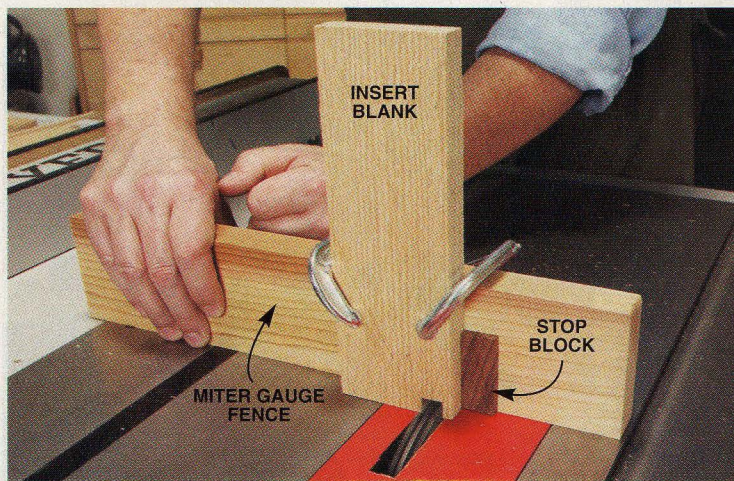
Removable inserts allow cutting box joints of any size. I make inserts in multiples, so I can install a new insert whenever I change the blade's height for different wood thicknesses. This method eliminates tearout.



1 Start by squaring the base to the blade. Shim the runners so they're flush with the table and apply glue. Position the base and add weight to secure the joints. Install screws later, after the glue has dried.



2 Saw the insert cutout in the adjustable fence by making numerous adjacent cuts. The opening is too tall to cut with a dado set.



3 Cut the inserts from a long blank that's been ripped to fit the adjustable fence's opening. First, cut a notch for the register block, using a fence with a glued-on stop block for positioning. Cut the insert to final length on your miter saw and the blank is ready to go again.

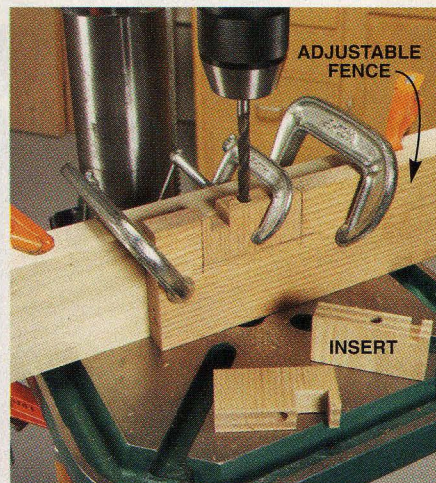
I got tired of making a new box joint jig each time I wanted to change the width of the joint fingers. My latest jig allows cutting fingers of any size, up to 3/4-in.-wide and 1-in.-thick. The jig slides in both miter slots, so it cuts precisely, and it's easy to adjust, so it produces joints that fit perfectly.

The jig has two fences. The fixed fence (A, Fig. A, page 39) is fastened to the base (B), which has runners (C) attached (Photo 1). Thumbscrews and threaded inserts secure the adjustable fence (D) to the fixed fence. A support block (E), glued and screwed on one end of the fixed fence, holds the adjustment screw. To make minute fence adjustments while fitting a joint, I simply loosen the thumbscrews and turn the adjustment screw.

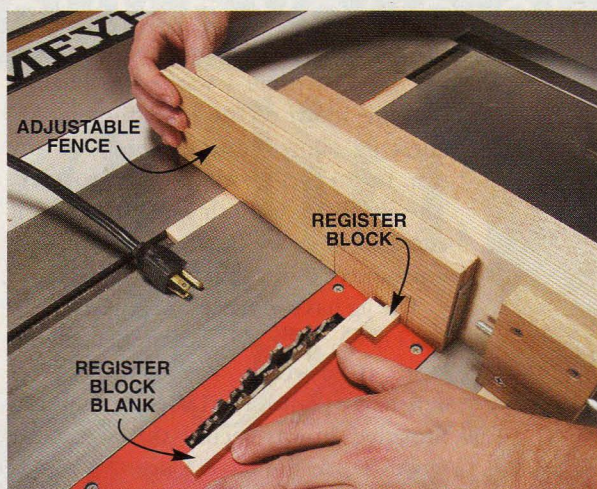
The adjustable fence has a cutout (Photo 2) that houses replaceable inserts (F). These inserts are notched for register blocks (G) that allow cutting box joint fingers of different widths. For example, an insert with a 1/2-in.-wide register block creates 1/2-in.-wide fingers. I always make these blocks shorter in height than width, to make it easier to install and remove the workpieces.

To make the inserts, notch the end of

Caution: You have to remove your saw's blade guard to use this jig. Be careful, keep your hands away from the blade!



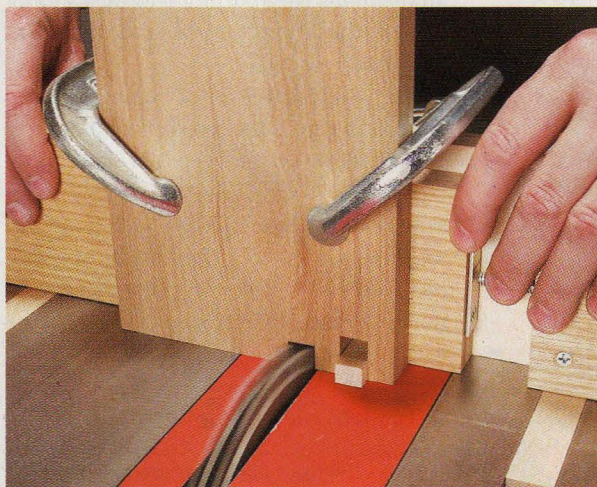
4 Drill holes for the locator dowel by installing each insert in the adjustable fence. Drill through the inserts into the fence, so the holes align.



5 Use the register block blank to set up the jig. Separate the blade and the insert's register block by the width of the blank. Lock the adjustable fence in position.



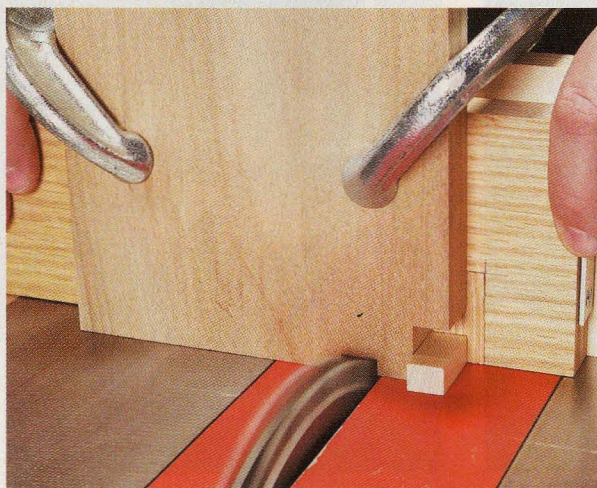
6 Cut the first socket with the workpiece butted against the register block. This cut creates the first finger. The blade's height must match the thickness of the workpiece.



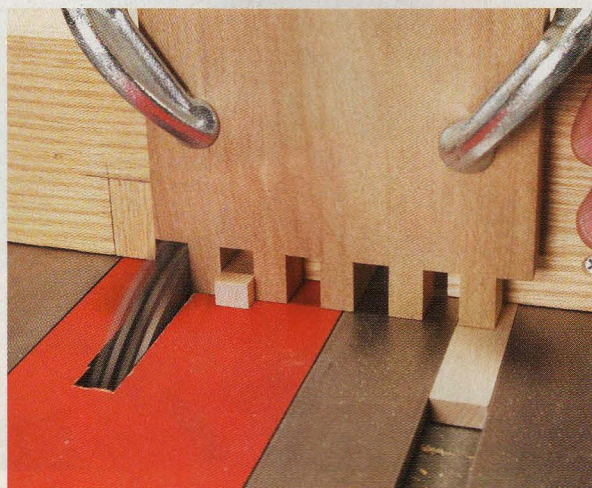
7 Cut the second socket after mounting the workpiece on the register block, using the first socket. Repeat the process to cut the rest of the sockets.



8 Use the register block blank to position the second workpiece. This piece has to begin with a socket for the joint to fit together.



9 Butt the socket's shoulder against the register block to cut the second socket. This step creates the first finger.



10 Cut the remaining sockets by using each previously-cut socket to mount the workpiece.



11 Test-fit the joint. If the fit is too loose, widen the fingers. Turn the jig's adjustment screw to increase the distance between the blade and the register block. If the joint is too tight, shrink the fingers.

a length of plywood (the same material as the adjustable fence) that's been ripped to fit the cutout (Photo 3). The width of the notch determines the width of the box joint's fingers. To allow cutting the whole range of box joint finger widths, the inserts' notches must always start 1/4-in from the edge, so use a stop block to index them.

After cutting the notches, crosscut each insert to the exact height of the adjustable fence's cutout. Then install each insert in the cutout to drill the hole for the locator dowel (H and Photo 4). Don't glue the dowel in the fence: then you can use the hole to guide your setup when it's time to drill more inserts.

Make register blocks for the inserts by planing 12-in. lengths of maple to exactly fit the dadoes. Cut 2-in. pieces from each 12-in. length and glue them into the finger inserts. Save 7-in. lengths of each size for setup (Photo 5). Now you can whip out box joints like they're going out of style (Photos 6 to 11).

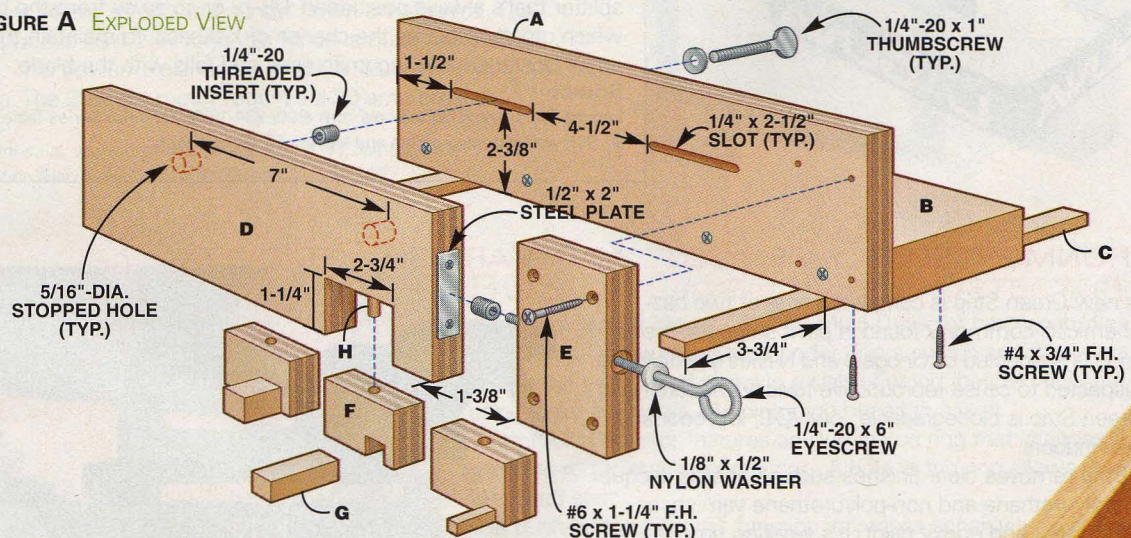
ADAPT THIS JIG TO FIT YOUR SAW

Miter slot and blade locations vary between saws, so you'll probably have to tweak my jig to fit. On my Delta saw, the blade isn't centered between the miter slots. If your saw's blade is centered between the slots, you'll have to reposition the insert cutout on the adjustable fence.

Correctly locating the cutout is important; otherwise the jig's

adjustment screw might not work with all the inserts you make. With the jig installed on the saw over the retracted blade, position the adjustable fence blank 1-3/8-in. away from the support block. Then locate the cutout on the fence blank so it's centered over the blade. Similarly, locate the threaded inserts so they're centered in the fixed fence's slots.

FIGURE A EXPLODED VIEW



Part	Name	Material	Dimensions
A	Fixed Fence	Baltic birch plywood	3/4" x 4" x 15"
B	Base	Poplar	1-1/4" x 4" x 15"
C	Runner*	Hard maple	5/16" x 3/4" x 12"
D	Adjustable Fence	Baltic birch plywood	3/4" x 3-1/2" x 12"
E	Support Block	Baltic birch plywood	3/4" x 2-1/2" x 3-1/2"
F	Replaceable Insert	Baltic birch plywood	3/4" x 1-1/4" x 2-3/4"
G	Register Blocks	Hard maple	3/16" x 1/4" x 1-3/4" 3/8" x 1/2" x 1-3/4" 1/2" x 3/4" x 1-3/4"
H	Locator Dowel	Hardwood	5/16"-dia. x 2"

*Two required. **Block's width determines joint fingers' width.

Well-Equipped Shop

Great New



LAGUNA PLATINUM CABINET SAW

While a contractor's-style saw can get the job done, you can't beat a genuine cabinet saw for accuracy, power, and durability. Laguna's new entry in the field features a left-tilting blade, a riving knife, a trunnion system that raises and lowers the blade on dove-tailed ways, a T-square fence, 50-in. rip capacity and a 3-hp, 220-volt motor.

Riving knives have long been standard equipment on European saws, and will soon be required on saws sold in the U.S. To this we say: it's about time. A riving knife is a great safety feature. It's a splitter that's always positioned 1/8-in. or so away from the blade, which greatly reduces the chance of kickback. To maintain that small clearance, a riving knife rises and falls with the blade.

Source

Laguna Tools, www.lagunatools.com (800) 234-1976, Platinum Series Tablesaw, \$1,995 with extension table and leaves, \$1,595 without.

ENVIRONMENTALLY SAFE PAINT AND VARNISH REMOVER

Jasco's new Green Strip is completely free of two hazardous chemicals commonly found in paint strippers: methylene chloride (a suspected carcinogen) and N-Methylpyrrolidone (NMP, suspected to cause reproductive toxicity). According to Jasco, Green Strip is biodegradable, low VOC, low-odor and safe to use indoors.

Green Strip removes clear finishes such as shellac, lacquer and both polyurethane and non-polyurethane varnish, as well as both latex and epoxy paint. It's working time ranges from 15 minutes to an hour, depending on the nature of the finish, the number of layers, the air temperature and relative humidity.

Green Strip's gel consistency clings to vertical and carved surfaces and stays wet during the course of its working time, to minimize the need for recoating. It's even available in a trigger-spray bottle, to simplify covering hard-to-brush surfaces.

Source

Homax Products, Inc., www.homaxproducts.com (800) 729-9029, Jasco Green Strip, \$13 per 22-oz. trigger spray bottle, \$25 per half-gallon, \$17 per quart.



Products for 2008

GRIZZLY JOINTER/PLANER

Put together a 12-in. planer and a 12-in. jointer and what have you got? A two-in-one combination machine that's perfect for a small shop.

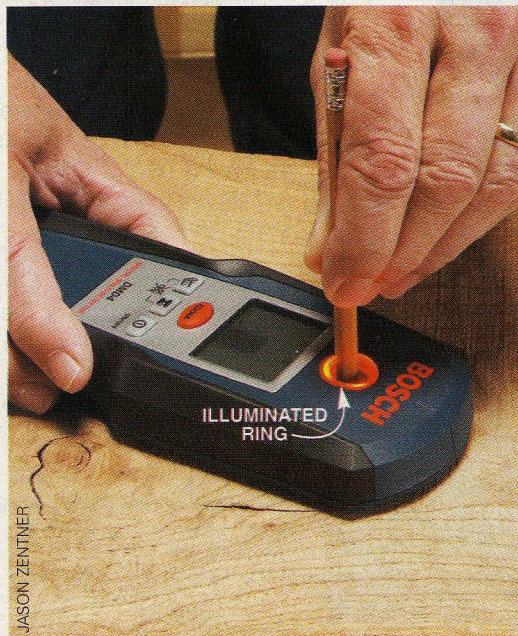
European woodworkers have long been enthusiastic about these compact machines, but they haven't made much of an inroad in the U.S. Grizzly is about to change that, for two reasons: low price and a spiral carbide-insert cutterhead.

A spiral cutterhead can produce an incredibly smooth surface in the toughest woods. Best of all, it doesn't take forever to change knives. When they get dull, you just rotate all of the small, square knives one-quarter turn. If one gets nicked, you loosen it and turn it.

The G0634 comes with a 5-hp motor and sells for \$2,295. (A less expensive version, the G0633, has a standard 3-knife cutterhead and sells for \$1,795.) It weighs 672 lbs., which means it contains plenty of cast iron to cut down on vibration. The jointer's bed is 59-1/2 in. long. Its fence is quite tall, at 5-7/8 in. high. This powerful planer can make a 12-in. wide cut, 1/8-in. deep. The 220-volt motor requires a 30-amp breaker.

Source

Grizzly Industrial, www.grizzly.com (800) 523-4777, Jointer/Planer Combination Machines, G0633, \$1,795; G0634, \$2,295.



BOSCH DIGITAL MULTI-DETECTOR

The new Bosch Model DMD4K Multi-Detector has capabilities that go way beyond the average stud finder. Flip a switch and this versatile tool will detect embedded metal in a slab of wood (before your saw does) or pin-point live wires and plumbing buried in a wall.

The Multi-Detector features an illuminated ring that changes from green to red to indicate detection. A hole in the ring allows you to mark the exact spot.

A push-button "Zoom" function increases sensitivity to find small nails, locate the exact center of a stud, or distinguish between close objects, such as side-by-side studs. The Multi-Detector can find ferrous and non-ferrous metals, wood or metal studs, and live wires.

Other features include:

- Metal detection up to 4-in.-deep, even in concrete.
- On-board pencil storage accepts standard pencils.
- Audible detection signal easily switches on and off.
- Ergonomic soft-grip for sure grip and comfort.
- Autocalibration in metal mode allows you to start scanning at any location.

Source

Bosch, www.boschtools.com, Bosch Model DMD4K Multi-Detector, \$100, Includes: Carry case with belt loop, 9V battery, 2 marking pencils

Great New Products for 2008



BLACK-MAX SANDING DISCS LAST AND LAST

If you like getting bang for your buck, or just hate changing sanding discs, check out Woodworker's Supply's new Black-Max 5-in.-dia. ceramic sanding discs. They cost about a buck apiece—almost three times more than a conventional aluminum-oxide disc—but they last up to five times longer, according to the manufacturer. So you could save fifty cents every time you spend a buck on a Black-Max disc. And you'll save time by not stopping nearly as often to change discs.

Why the long service life? Ceramic abrasive grains stay sharp longer than aluminum oxide. They also stay cooler, so sanding doesn't generate enough heat to clog the disc with sap. In addition, Black-Mac discs have an anti-static coating, so they don't clog with wood dust. Their flexible J-weight cloth backing is heavy enough to last as long as the ceramic grit.

Black-Max discs are available in 80, 100 and 120-grit sizes, with hook-and-loop or PSA backing. Solid, 5-hole and 8-hole versions are available.

Source
Woodworker's Supply,
www.woodworker.com (800) 645-9292,
Black-Max Ceramic Sanding Discs, #148-503,
5" 5-hole PSA 120J, \$10 per pkg of 10; #148-
490, 5" 5-hole H&L 120J, \$10.50 per pkg of
10. Other grit sizes and hole configurations
are available.

QUICK-DRYING GORILLA GLUE

If you need a super-strong waterproof glue that will cure in 30 to 60 minutes, here you go. Gorilla Glue's new Quick Cure Formula will speed along your project by setting up much faster than the original Gorilla Glue formula, while still allowing you to bond such varied materials as wood, stone, metal, ceramics, glass and more.

In addition, Quick Cure dries white,

making a less-visible glue line in light-colored woods such as pine and maple.

Quick Cure is also available in a new type of container, called a Precision Glue Pen, which allows you to put a few drops of glue just where you need it. You can also use the pen to get into tight spaces.

Source
Gorilla Glue, www.gorillaglu.com
(800) 966-3458, Gorilla Glue Quick
Cure Formula, \$5 for a 2 oz. bottle;
\$4 for a .75 oz. glue pen.



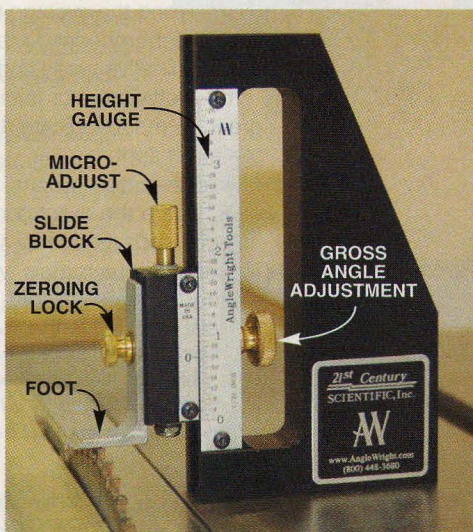
FAST ACCURATE HEIGHT ADJUSTMENTS

The Angle Wright is a precision instrument that helps you make quick and accurate height adjustments of router bits, jointer knives and table saw blades. Made in the USA of anodized aluminum and steel, it features recessed brass adjustment knobs that allow the tool to be used flat on its side or in an upright position. The height gauge measures up to 3-1/4-in. in 1/32-in. graduations. The zero line ("0") on the slide block acts as a pointer. The micro-adjust knob is calibrated so that one-quarter turn equals 1/128-in. For ultra smooth operation, the slide block is dovetailed into hand-lapped ways in the body. The gauge's steel foot is 1/2-in.-wide, so you don't have to locate top dead center on your saw blade to obtain accurate measurements.

Simply position the Angle Wright approximately where the table saw's blade reaches it's highest point. Gently rocking the blade as you lower the foot.

Decimal and metric scales are also available in 0.025-in. and 1-mm. graduations. They both use vernier scales on the slide bar that permit readings to 0.001 inches.

Source
21st Century Scientific, (800) 448-3680, www.anglewright.com, Angle Wright, \$135



GRANITE-TOPPED TABLESAW

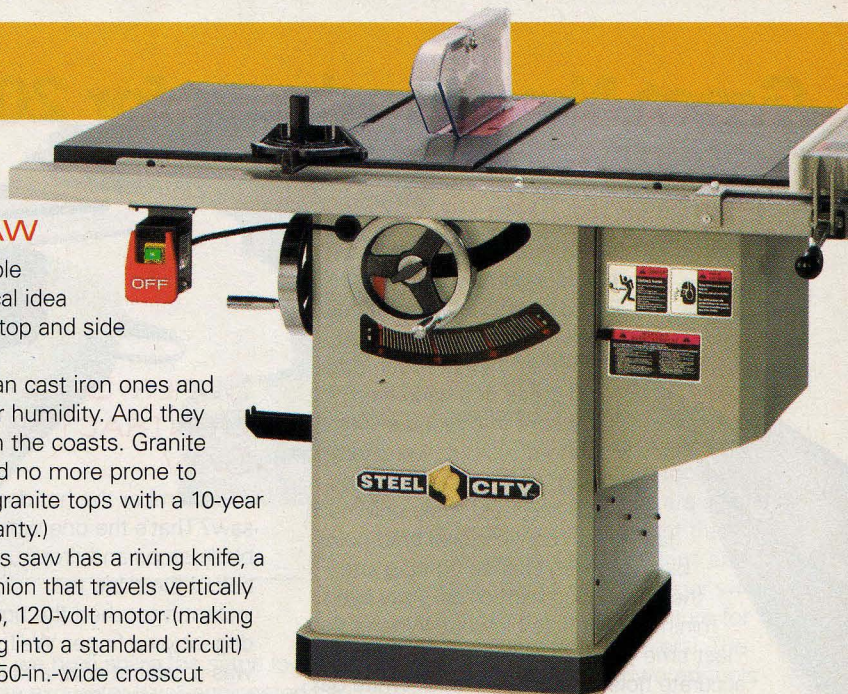
Just when you think you've seen every possible improvement to a table saw, here comes a radical idea from Steel City: a saw with a 2-in.-thick granite top and side extension. Granite?!

Steel City says their granite tops are flatter than cast iron ones and won't warp. They aren't affected by heat, cold or humidity. And they won't rust: good news for those of you living on the coasts. Granite is maintenance-free, according to Steel City, and no more prone to chipping than cast iron. Steel City backs up its granite tops with a 10-year warranty (the rest of the saw has a 5-year warranty.)

For innovation, Steel City didn't stop there. This saw has a riving knife, a quick-change blade guard, and a new-style trunnion that travels vertically on dovetailed ways. It's available with a 1-3/4-hp, 120-volt motor (making it one of the few cabinet saws that you can plug into a standard circuit) or a 3-hp, 220-volt motor, and either a 30-in. or 50-in.-wide crosscut capacity.

Source

Steel City Tool Works, www.steelcitytoolworks.com (877) 728-6651, 10" Riving Knife Cabinet Saw, 35900G, 1-3/4-hp, 30" rails, \$1,175; 35905G, 3-hp, 30" rails, \$1,275; 35910G, 1-3/4-hp, 50" rails, \$1,275; 3591G, 3-hp, 50" rails, \$1,375.



NEW FEIN MULTIMASTER

No doubt you've seen the Fein MultiMaster before—a tool with an oscillating head and lots of attachments for sanding, sawing and scraping. It just got better.

The new MultiMaster has a new tool-free system that's much more convenient to use for changing attachments. Just open the clamping lever on top of the tool to remove an accessory, pop in a new one, and you're ready to go back to work in 5 to 10 seconds. The new MultiMaster is also more powerful than older models and comes with a wider range of accessories in four different kits.

For woodworkers, Fein has added a new HSS saw blade, 3-9/16-in. dia., that's perfect for hardwoods and laminates. It turns the MultiMaster into an oscillating saw that can get you out of a jam in tight places. Fein has also designed a new bench-mounted jig for stationary applications. It allows you to position the MultiMaster at multiple angles, and should be a boon to any woodworker filing or sanding small parts.

Source

Fein, www.feinus.com (800) 441-9878, MultiMaster sets from \$199 to \$399.



WS3000



WS2000

JASON ZENTNER

SHARP EDGES-FAST

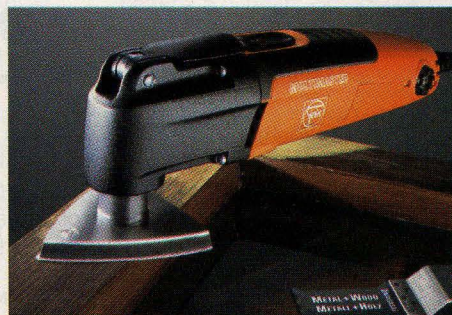
Raise your hand if you've ever had a difficult time sharpening chisels, plane irons, or carving tools. Okay, that's just about everyone.

Now take a close look at these amazing new machines from Professional Tool Manufacturing—they'll sharpen any one of these tools in just a couple minutes, with no fuss at all. You don't have to become an expert to get a sharp edge. Open up the box, and you'll get great results right away.

Both machines use replaceable sandpaper discs. With a coarse grit, you can grind a whole new bevel; with a fine grit, you can hone an edge that's sharp enough to plane birdseye maple without tearout. The Work Sharp WS3000 (\$199) has more features than the Work Sharp WS2000 (\$149), but either machine would make a useful addition to a serious woodworking shop. For a closer look at how these machines work and the differences between them, see our review on page 24.

Source

Professional Tool Manufacturing, www.worksharptools.com (800) 597-6170, Work Sharp WS3000, \$199; Work Sharp WS2000, \$146.



Great New Products for 2008

PRECISION DRILLING TOOLS



It's time to kiss your old brad point bits goodbye. Colt's new Five Star HSS brad point bits drill virtually flawless holes, whether they're mounted in a drill press or a hand-held drill. They bore into wood effortlessly, without tearout, wandering or grabbing, even at steep angles (up to 25 degrees). They drill much faster than conventional brad point bits, they don't cause burning and they don't clog with chips. They even minimize exit hole blowout. When's the last time you freehand-drilled a clean, accurate hole through 2-in.-thick white oak at a 25-degree angle without having the bit wander, or having to stop halfway through to retract the bit because it jammed with chips? A Five Star bit drills that hole in less time—and more easily—than it takes to read the description.

Five Star bits are manufactured in Germany. According to Colt, they're the sharpest and longest-lasting wood drills available and can drill perfect holes in all types of wood, as well as hard man-made materials such as particle-board and plastic.

Source:

Woodcraft, www.woodcraft.com (800) 225-1153, Colt Five Star HSS Brad Point Bits, 3/16" to 1/2" sizes, #146667- #146687, \$5 to \$23 each; 5-bit set, 3/16", 1/4", 5/16", 3/8" and 1/2" sizes, #146971, \$50.

SUPER-SAFE CONTRACTOR'S SAW



Remember the hot dog saw? That's the one whose blade stops and drops below the table the instant it touched the hot dog—or your finger. Well, that was a cabinet saw, and now the same company, SawStop, is introducing a contractor's-style saw. As you'd expect, it costs much less than their cabinet saw.

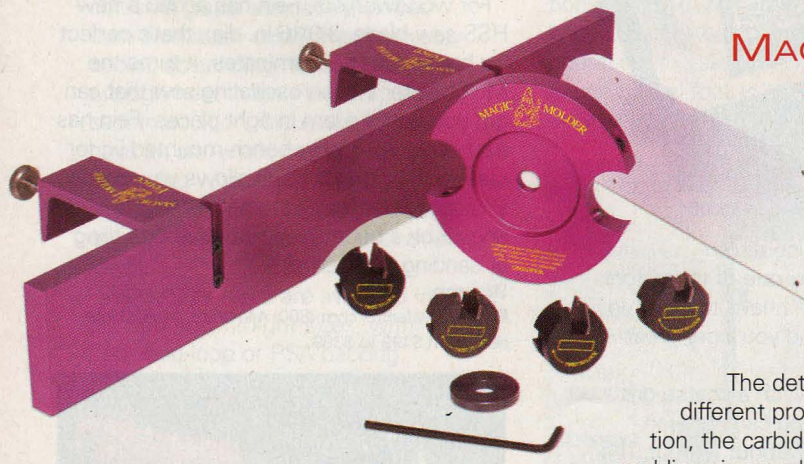
The contractor's saw will use the same highly engineered blade-stopping technology as the cabinet saw. We think it's the best safety feature to be introduced in years. But will it be a good saw, otherwise? We've been using the cabinet-saw version for three years now in our own shop—it's our main saw—and we think it's a terrific machine. We've tested the brake mechanism (yes, it works as advertised!) and tried out every feature. It's as good or better than any other cabinet saw on the market. We haven't seen the contractor's saw yet, but SawStop says "it will be the best contractor's saw made." Judging by their track record, we think you can take that to the bank.

SawStop says that their contractor's saws will be available in the spring of 2008, and should cost about \$1,500.

Source

SawStop, www.sawstop.com (866) 570-3200, 10" Contractor's Saw, about \$1,500.

MAGIC MOLDER WINS SEQUOIA AWARD



The Magic Molder, a molding head for table saws, won the Sequoia New Product Award for leadership in ergonomics and safety at the 2007 Association of Woodworking & Furnishings Suppliers (AWFS) fair. The Molder accommodates detail plugs with carbide-tipped profiles and integral anti-kickback, chip-limiting design.

The detail plugs install easily and lock securely. Eighty-three different profiles are available. Used separately or in combination, the carbide-tipped plugs allow creating an amazing variety of moldings in wood, MDF and solid-surface materials. The operator's

manual includes full-size drawings of all the detail plugs. It also features fourteen pages of diagrams showing how to create complex moldings by combining various detail plugs. These diagrams cover all the basic set-ups, including tilting the head or using the Magic Molder Fence (available separately).

The Molder is available separately or packaged with two or four sets of plugs (each set includes a pair of plugs). All 83 plug sets are available individually. An industrial 4-plug version of the Molder is also available.

Source

LRH Enterprises, www.LRHent.com (800) 423-2544, Magic Molder alone, \$107; Plug sets \$99 per pair; Starter Set: Magic Molder + 2 plug sets, \$265; Advanced Starter Set: Magic Molder + 4 plug set, \$416; Magic Molder Fence, #MM-F, \$166.



AFFORDABLE LITHIUM-ION TOOLS

Ryobi's new 18-volt lithium-ion tools stand out—by their bright green color and by their prices. Lithium-ion power is revolutionizing battery-powered tools, because LI batteries are significantly lighter in weight than NiCad or NiMH batteries and they hold a charge longer when not in use (a great feature for weekend woodworkers). The downside of LI-powered tools has been cost—until now.

Ryobi's LI Tools are an extension—and an upgrade—of their One+ System, which features a variety of 18-volt cordless tools that all use the same NiCad battery pack configuration. Ryobi's new LI batteries can be used in all the tools that are part of this system. Likewise, the One+ NiCad batteries can be used in the new LI Tools.

Ryobi's Lithium Battery Upgrade Kit (\$99) is perfect for any woodworker who already has several Ryobi One+ tools but wants the advantages of a lithium-ion battery. This upgrade kit includes an 18-volt, 2.4-Ah lithium-ion battery and a dual-chemistry charger (it charges all One+ LI and NiCad batteries).

Ryobi's 2-piece Lithium Power Drill Kit (\$159, shown above) includes an 18-volt drill and a high-intensity swivel-head flash light along with the LI battery and dual-chemistry charger. The 4-piece Lithium Power Tool Kit (\$259) adds a second 18-volt LI battery, a 5-1/2-in. circular saw and a variable-speed reciprocating saw.

Source

Ryobi, Inc., www.ryobitools.com (800) 525-2579, Lithium Battery Upgrade Kit, P123, \$99; 2-Piece Lithium Power Drill Kit, P813, \$159; 4-piece Lithium Power Tool Kit, P843, \$259.

ADJUSTABLE SQUARE

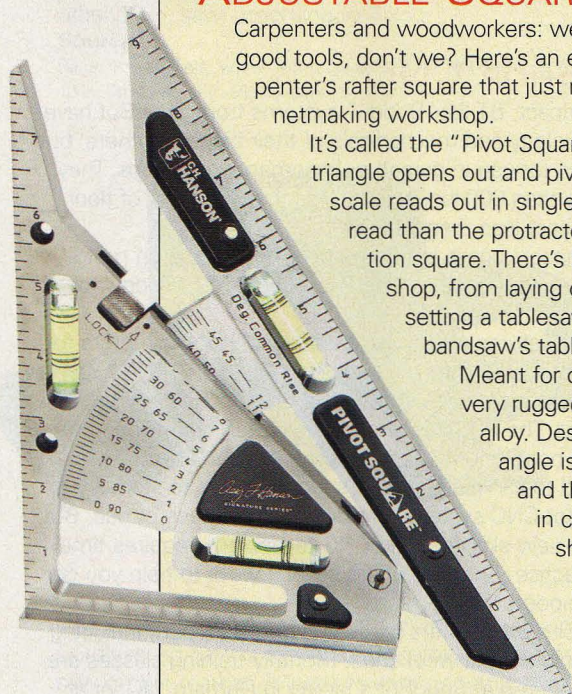
Carpenters and woodworkers: we both share the same love of good tools, don't we? Here's an exquisitely well-engineered carpenter's rafter square that just might find a home in your cabinetmaking workshop.

It's called the "Pivot Square" because the long side of the triangle opens out and pivots from 45 to 90 degrees. The scale reads out in single degrees, and is a lot easier to read than the protractor head that goes on a combination square. There's lots of ways it can be used in a shop, from laying out angled cuts on plywood to setting a tablesaw's miter gauge to tilting a bandsaw's table.

Meant for outdoor use, this layout tool is very ruggedly built from solid aluminum alloy. Designed for precise work, its right angle is accurate to within 1/20-degree, and the pivot point has no slop. Just in case you need to build a new shop, it comes with an excellent guide to roof construction and framing.

Source

C. H. Hanson, www.chhanson.com (800) 827-3398, Pivot Square, \$85.



CORRAL TABLESAW DUST

Tablesaws are notorious for spewing fine dust everywhere. This dust isn't just a nuisance; it's hazardous to breathe. The Dust Cutter, a fabric bag that easily fastens underneath most benchtop and contractor-style saws (up to 17-in. by 20-in. in size), corrals up to 90 percent of that dust, according to the manufacturer.

The Dust Cutter's bag has a dust collection port that accommodates both 2-1/2-in. and 1-1/4-in. hoses. It also has a zippered bottom, so it can funnel dust directly into a waste receptacle positioned underneath. Plug the collection port and zip the zipper to collect dust in the bag.

Source

Keen Products, www.keen-products.com (401) 783-3813, Dust Cutter, \$40



Great New Products for 2008

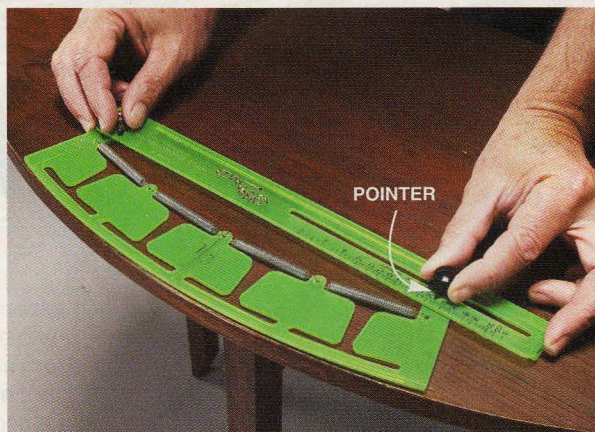
MATH FREE ARC GEOMETRY

The ACU-ARC Adjustable Ruler excels at determining the radius of existing curves for duplicating parts or dimensioning drawings. Just slide the pointer to match the curve and then read the radius in inches under the pointer. The 12-in. ruled edge adjusts easily to draw curves of any radius from 6-3/4-in. to 200-in. (17-cm. to 500-cm. in the metric model). It can also find centerlines and center points of curves.

The Acu-Arc is made in the USA of a rugged new plastic material that's both flexible and durable. The bridge-like design allows the edge to bend, yet hold a firm edge. It's a perfect example of Yankee ingenuity.

Source

Hoyle Products, Inc., www.hoylegrips.com (800) 345-1950, Acu-Arc Adjustable ruler – inches or metric, \$45.



JASON ZENTNER

SMALL SHOP CNC

The new, compact, BT 32 “Buddy” systems from ShopBot have the same technology and mechanicals of their bigger brothers, but are scaled down for use in garage or basement workshops. They weigh in at less than 600-lbs. occupy less than 16-sq.-ft. of floor space and can cost less than \$4,000.

The new compacts come in two models, depending on motor and drive system configuration: the PRSalpha BT32 “Buddy” or PRSstandard BT32 “Buddy”.

The PRSalpha features advanced closed-loop stepper motors for fast, reliable positioning.

The PRSstandard uses slower and thus less expensive stepper motors. The PRSstandard is ideal when high-speed positioning is not a priority. The PRSstandard can always be upgraded to a PRSalpha, so it's a great place to start.

ShopBot CNC systems are designed for ease of use. But, like any new skill, learning CNC technology requires time and practice. ShopBot offers several ways to help you get up to speed.

For starters there's free customer support, including nights and weekends. Monthly training classes are offered at ShopBot's facility in Durham, NC, or at your own shop. There's also the ShopBot Jamboree: an annual gathering of Shopbotters from around the world. Attendees learn about new products, software and better ways to increase profits.

If that's not enough, you can attend Camp ShopBot. These informal regional gatherings are a perfect setting for ShopBot owners (or wannabees) to meet and learn from other Shopbotters.

ShopBot also hosts an online forum, www.talkshopbot.com. It's a virtual meeting place for Shopbotters to connect.

The PRSstandard compact CNC, \$4,000, includes CAD/CAM software and a Windows-based, full-feature control software.

Source

ShopBot, www.shopbottools.com (919) 680-4800, PRS Standard Compact CNC, \$4,000.



RIKON SLIDING TABLESAW

A crosscut sled is a great addition to any table saw, but often it isn't large enough to handle big pieces. That's when you dream about a saw with a sliding table, such as this one from Rikon.

The Rikon 10-110 10-in., 3-hp cabinet saw retails for about \$1,999. Its sliding table travels 49 in., more than enough to crosscut a full 4x8 sheet. The sliding table's miter gauge pivots 45 degrees both ways. On the right side of the blade, the fence can be slid far enough to rip stock up to 58 in. wide. That extra capacity is perfect for 5 ft. x 5 ft. sheets of Baltic Birch. Speaking of extras, this saw can handle a dado set up to 29/32-in. thick (that's just over 7/8 in.), a larger capacity than any other 10-in. saw, according to Rikon.

Source

Rikon Power Tools, www.rikontools.com (877) 884-5167, 10-110 10-in. Tablesaw with sliding table, \$1,999.



POWERFUL, LIGHTWEIGHT CORDLESS JIGSAW

At just 6.1 pounds, Makita's BJV180 LXT Lithium-Ion Cordless Jig Saw is the lightest professional-grade jig-saw on the market. It features an ergonomically designed soft grip handle with a two-finger variable speed trigger switch that just feels right in the hand. To help light your way, a high-output LED illuminates the line of cut. Choose from four cut settings (3 orbital and one straight) for fast, efficient cutting in all applications. The BJV180 comes with a tool-free blade change system.

The BJV180 Jig Saw adds to the already extensive Makita LXT Series built around the 3.0 Ah 18V LXT Lithium-Ion battery. The BJV180 Kit includes: 2- batteries plus a Rapid Optimum Charger that charges a battery in just 25 minutes.

The BJV180 can be purchased as the saw and blade only for those who already own one of the 18-V LXT Series tools.

Source

Makita, www.makitatools.com (800)-4-MAKITA, BJV180 LXT Lithium-Ion Cordless Jig Saw, \$450, includes: blade set (1 each: B-10, B-13, B-22), cover plate, anti-splintering device, hex wrench, 2 ea. LXT Lithium-Ion (3.0Ah) battery; Rapid Optimum Charger; case.

ROLL-AROUND CYCLONE

Oneida's Portable XXP020100, is the only dual-cyclonic roll-around collector on the market. This collector is perfect for workshops with height and space constraints or shops that need the flexibility and mobility not offered by a central dust collection system. The Portable stands 64-in. tall with a foot-print of 4-ft. by 20-in. The collector has a 6-in.-dia. inlet and includes two high-efficiency cyclones, a 2-1/2-hp, 230-volt, 11.5-amp Baldor Motor, two high efficiency spun-bond filters that capture 99.9-percent of test material from 0.2 to 2 microns, crank style filter cleaners, 15-feet of 5-in.-dia. flex hose and twin drums for easy handling. The Portable requires minimal assembly and no wiring. You'll be up and running in under an hour.

Performance statistics: 780 CFM with 15' of 5" flexhose, 6-1/2 Inches W/C Static Pressure, 76 dBA @ 10'. The Portable is made in the USA.

Source

Oneida Air Systems, www.oneida-air.com (800) 732-4065, The Portable, #XXP020100, \$1200.



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NO. 849

E•Z Pocket Hole Jig Kit

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Kit Includes

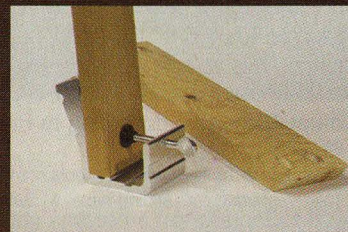
- 1 Pocket Hole Jig with Clamp
- 3/8" Step Drill Bit & Drill Stop with Hex Wrench
- 3 Drill Stops: 1/4", 5/16" 3/8" & Hex Wrench
- 6" Steel Square Drive Bit
- Square Drive Screws
- Free Project Plans Included

Smart Design

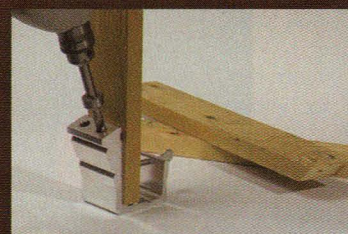
- Heavy duty aluminum extrusion & hardened steel drill bushings
- Built to be portable or bench mounted, and designed with a built-in clamping system

Three Types of Pocket Hole Joints

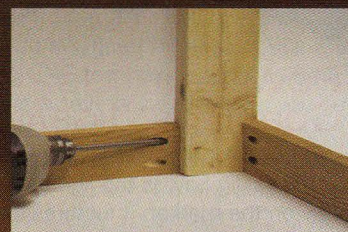
- Flush, Corner & Angle



Clamp wood in jig



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Assemble angle joints

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Kit Includes

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- 3 Brad Point Drill Bits:
1/4", 5/16", & 3/8"
- 3 Drill Stops: 1/4", 5/16"
3/8" & Hex Wrench

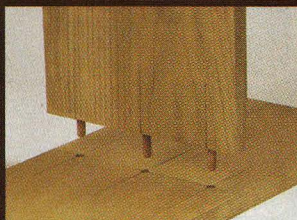
E-Z as 1-2-3

3 Types of Dowel Joints

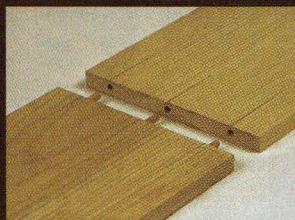
- Edge-to-Edge
- Right Angle
- Edge-to-Surface



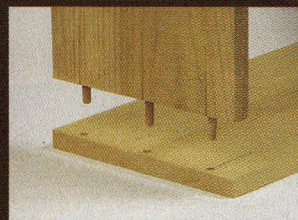
Pre-aligned drill stops for
5/8", 3/4", & 1" stock



Edge-to-surface joint



Edge-to-edge joint



Right angle joint

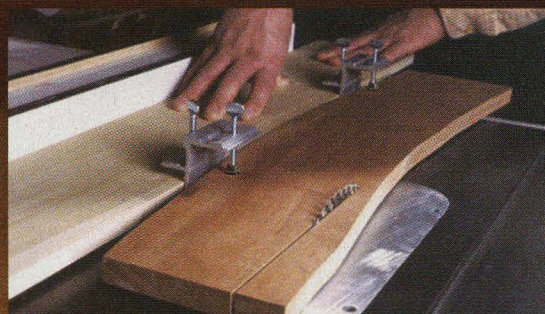


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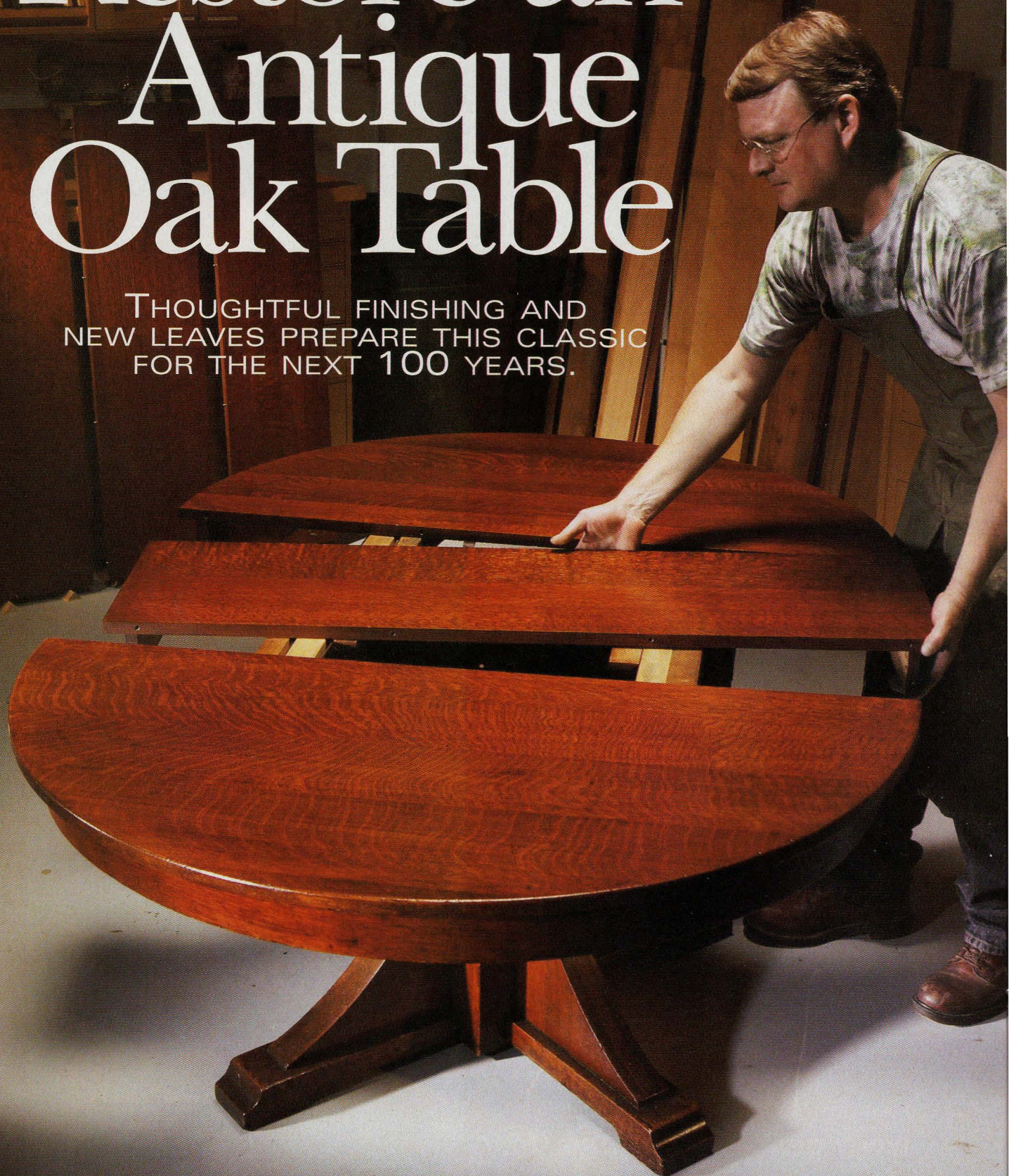
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Restore an Antique Oak Table

THOUGHTFUL FINISHING AND
NEW LEAVES PREPARE THIS CLASSIC
FOR THE NEXT 100 YEARS.



by Kevin Southwick

This old table looks like a prime candidate for refinishing.

Strip off the old finish, sand out all the dings and scratches, spray on a catalyzed lacquer finish and it would look brand new.

But in my opinion, doing this would rob the table of its history. Lovers of antique furniture value an original finish in part because of the witness it bears. In its present condition this table does that – it tells a story 100 years old. But let's face it. As it is, the table is an eyesore.

That's the conundrum of working with antique furniture. In some cases, the original finish adds real historic, aesthetic, and monetary value. But in pieces like this, saving all of the original finish makes no sense; the poor condition of the top's finish is actually a detriment.

Sentencing these pieces to the stripper's tank, the first step in most refinishing today, isn't always the best approach, either. I believe that most owners of antique furniture want to be good stewards of their pieces, which includes maintaining the furniture for future generations. Sometimes that means preserving the original finish; sometimes it means refinishing. In the case of this old table, it means a little of both.

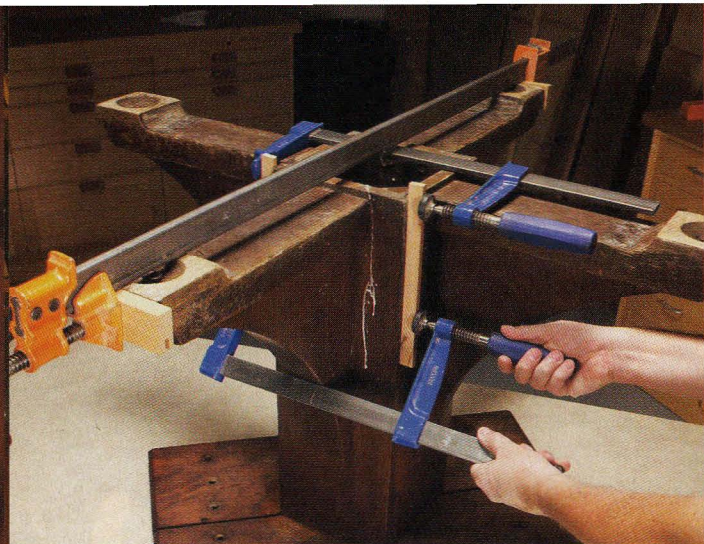


The pedestal's original shellac finish is dirty and has worn away in areas near the floor. But overall, it's in good condition for its age and can be restored without stripping.



The top's original shellac finish is so heavily worn and badly damaged that it can't be restored. The original leaves are missing, too, so new ones have to be built. One challenge is to replicate the pedestal's restored finish. Another challenge is to make new leaves that match the old top.

EDITOR: TIM JOHNSON



1 The first step is to make repairs. Carefully protect the old finish by removing glue squeeze-out promptly and gently, using a dampened cloth. Here I'm gluing a crack in the pedestal's center post.



2 Gently clean the finish with steel wool and mineral spirits to remove old furniture polish, wax and grease. The new finish coats won't adhere properly if these contaminants remain on the surface.



3 Scrub the surface with mild dish soap to remove water-soluble dirt and grime. A round sash brush (see Sources, page 58) is gentler than an abrasive pad and gets into corners and crevices more effectively. Wipe frequently with a cotton cloth so the surface doesn't stay wet for long periods.

DEVISE A PLAN

My goal is to retain as much of this table's original condition as possible, while restoring its viability for everyday use. To plan the restoration, I have to analyze the table's current condition. The first step is to determine the nature of the original finish. Simple tests show that it dissolves quickly in alcohol and contains most of the color. Based on these qualities and the table's age, my educated guess is that the original finish is tinted shellac.

Next, I want to find examples of the original finish that are still in good condition. Protected areas are the best place to look. On this table, the pedestal's original finish is dirty and oxidized, but it's 90-percent intact and definitely restorable (top photo, page 51). The same is true of the finish on the top's apron.

The top itself, on the other hand, poses numerous challenges (middle and bottom photos, page 51). Its original finish is beyond repair, and unfortunately, I've determined that most of the original color will be lost when the finish is removed. Areas on the top where the finish has been long-gone are likely to be discolored. On the other hand, the wood surface contains character marks from 100 years of use that I want to save: pockmarks, nicks and scratches will help the new finish look authentic. And not surprisingly, the original leaves are missing.

Here's my restoration plan. First, I'll bring back the rich color and depth of the pedestal's original tinted shellac finish. Then I'll use its restored appearance to guide my work on the top.

By working gently and carefully while I remove the top's deteriorated finish, I'll leave as much of the old patina and original wood surface as I can. I'll treat the top chemically, if necessary, to minimize discoloration. I'll build new leaves using quartersawn white oak, the same species of wood as the top, so they'll have similar figure and texture. Then I'll create a new finish that will match the restored finish on the pedestal. This new finish will have greater resistance to heat and water than the original shellac finish, so it will stand up to daily use for years to come. I'll tweak the color of this finish to make the new leaves match the 100-year-old top.

RESTORE THE PEDESTAL

The pedestal requires minor repair (Photo 1). I usually complete repairs before I restore a finish. Cleaning the old finish is a two-step process (Photos 2 and 3). Next, replace the missing color with glaze (Photo 4). Make your own glaze by mixing artists oil color in glaz-



4 Color the areas of missing finish with glaze. Make your own glaze by mixing artists oil color in glazing medium (see Sources, page 58). Brush on the glaze and then wipe it to blend with the existing finish.



6 Sand with 400-grit paper to smooth the shellac. By scuffing the surface, this step also prepares the pedestal for the topcoat.

ing medium (see "Recipes," page 58). When the glaze is thoroughly dry, rejuvenate the old shellac by brushing on two coats of fresh dewaxed shellac (Photo 5 and Sources, page 58). Wait 45 minutes between coats; sanding isn't necessary. Let the second coat dry thoroughly. Then sand lightly (Photo 6). Remove all the sanding dust and touch up spots of missing finish or sand-through with a touch-up pen (Photo 7 and Sources, page 58). Use the same procedure to restore the finish on the apron.

The final step, topcoating with polyurethane, is optional (Photo 8). For purists, polyurethane compromises the original finish. For others, it helps to make the pedestal's appearance match the top.



5 Brush on two coats of fresh dewaxed shellac to rejuvenate the original shellac finish and form a level coat that's thick enough to sand. This process restores the original color and richness.



7 Color sand-throughs with a touch-up pen. The color soaks into raw wood, but wipes off finished areas. Even with careful sanding, sand-throughs are almost inevitable.



8 Apply two coats of satin polyurethane. This step is optional, because the restored shellac finish is durable enough for the pedestal. Polyurethane gives the pedestal a sheen that will match the new finish planned for the top.



9 Building new leaves is the first step in restoring the top. Glue the leaf blanks together, using boards similar in width and figure to the boards on the tabletop.



10 Stack the leaf blanks on the table to locate the alignment pins. Extend these marks across the top face of each blank to locate the pin holes on the opposite edge.

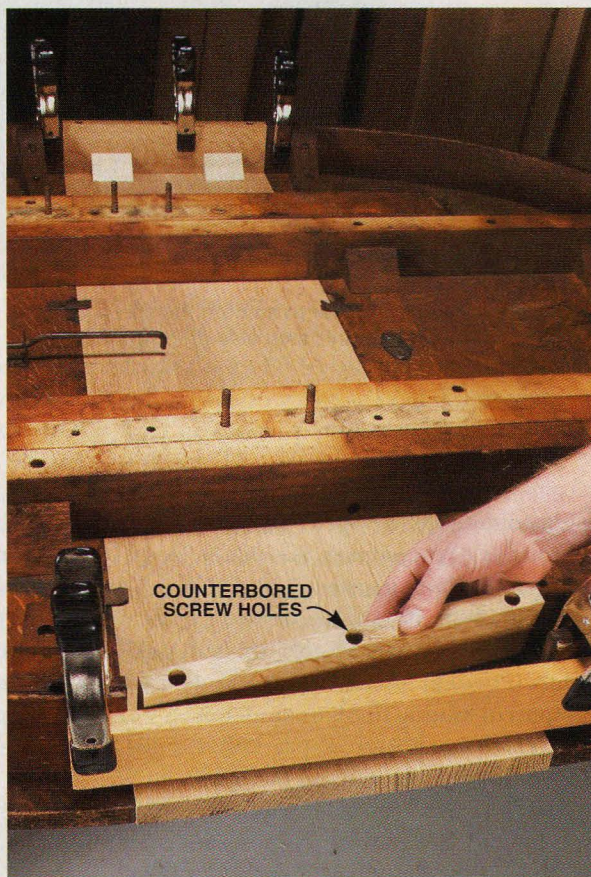


11 Install each leaf blank in the top to mark it for cutting to length.

BUILD THE LEAVES

This table expands to 96 inches, allowing the addition of four 12-in.-wide leaves. The new leaves must be the same thickness as the top after they've been finish-sanded. The best strategy is to glue the leaves together about 1/8-in. oversize in thickness and at least one inch oversize in length (Photo 9). Plane them again after gluing, allowing enough material to sand them to final thickness.

To fit in the table, the leaves' pins and holes must align with the original ones in the top (Photo 10). Determine the original pins' vertical location on the edge; usually they're centered between the top and bottom faces. Drill the pin holes in the leaves, using a doweling jig, and install the pins (see Sources, page 58). Cut the leaves to final length (Photo 11). Install the leaf aprons after drilling counterbored holes for the mounting screws (Photo 12). Center each apron on the leaf; the aprons are 1/16-in. shorter than the leaf's width, to allow seasonal movement without binding.



12 Install the leaf aprons with the top upside down. Clamp a board to the table aprons to ensure the leaf apron is flush. Center the apron on the leaf, clamp it in position and fasten it with screws and glue blocks.



13 Remove the top's old finish. Cover the top with cloth cut to fit, and saturate its surface with alcohol. Cover the saturated cloth with plastic, tape the edges and let it sit until the old finish has liquefied.

REMOVE THE TOP'S OLD FINISH

Because the old finish is shellac, I can use a simple technique that minimizes the use of solvents (Photo 13). It also preserves as much of the original patina and character as possible. Cut an old cotton sheet to fit the top. Position each piece and then saturate them with alcohol, using a small squirt bottle to distribute the alcohol evenly (alcohol has low toxicity, but it is highly flammable, so be careful). Use only enough alcohol to wet the cloth. Excess alcohol just makes a mess—adding more later is always an option. Cover the saturated cloth with plastic to keep the alcohol from evaporating.

After about fifteen minutes, peel back one end of the plastic and cloth. You should see liquefied shellac (if you don't, just re-cover the surface and wait a bit longer). The trick here is to expose about 12-in. of the top at a time. Begin removing finish with a plastic putty knife (Photo 14). The only residue from this process is the old shellac, which is non-toxic. When most of the finish is gone, gently scrub with a nylon pad dampened in alcohol (Photo 15). Squirt on more alcohol as needed. Then rinse with a clean cloth and alcohol. When the first area is clean, peel back another 12-in. or so and continue.

After you've completed half of the table, examine the surface under good light and wash with alcohol as needed. Then give it a final overall rinse and scrub with alcohol and clean rags—this should produce a very consistent surface. Repeat the process on the other half of the top.

Wash both halves of the top with mild dish soap and water (Photo 16). The surfaces should be consistently porous. Spots where water "beads up" instead of soaking may indicate residual finish, as may spots where the surface remains light-colored. When the top is evenly porous, rinse it off and let it dry.



14 Fold back the covering in stages to remove the finish. This method simultaneously divides the job into manageable sections and keeps all of the old finish liquefied.



15 Remove the remaining shellac. Add more alcohol as necessary, to keep the surface wet. A gray-colored nylon abrasive pad won't scratch the wood surface.



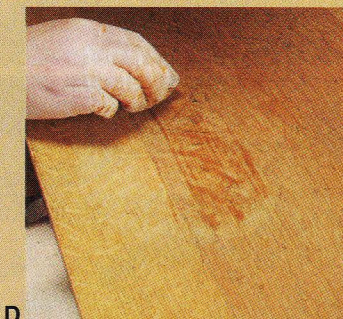
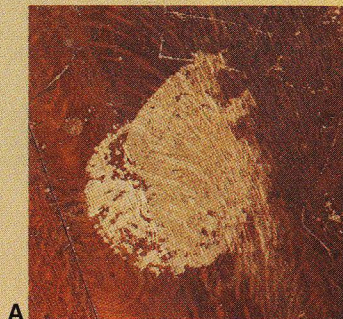
16 Gently scrub the stripped surface with mild dish soap and water. This step removes water-soluble dirt and crime that has lodged in areas where the finish has failed.

DEALING WITH DISCOLORATION

Areas where an original finish has been completely lost (Photo A) can show significant discoloration after the remaining finish is removed (Photo B). Minimizing this discoloration requires additional steps. Brush the top with a solution of oxalic acid (Photo C) to remove the gray color that resulted from the unfinished area's long-term exposure to air and water. The effect is often almost immediately noticeable, while the surface is still damp. This treatment also removes unsightly black water spots from the rest of the top.

Oxalic acid crystals are available at hardware and paint stores. Mix one ounce of crystals in a pint of hot water. Brush the solution on the surface and let it dry. If necessary, apply the solution a second time. Rinse the surface thoroughly with a solution of vinegar and water and let it dry. Oxalic acid is poisonous, so don't sniff the crystals and wear gloves when you apply the solution and when you rinse.

If the discoloration has not completely disappeared, blend it in by applying dye that matches the color of the surrounding wood (Photo D). Complete the job by adding additional layers of color, using dye and glaze, (Photo E).



DECIDE ABOUT SANDING

Examine the surfaces to determine if sanding is necessary. Many pieces need little or none at all. Whether or not you sand depends on your restoration goals. Sanding may remove grayed areas and other unsightly marks. But sanding may also eliminate character marks you want to save. The danger is that sanding a little can lead to sanding a lot. Focusing on an imperfection can cause a problem area to become larger.

This top showed several grayed spots where finish had been missing, so I decided to try removing them with light sanding. I used 180-grit paper on a felt block to minimize the effect on the character marks. The results were a wash—neither the character marks nor the gray spots disappeared.

When grayish discolorations persist, I use oxalic acid. Oxalic acid is bleach that only changes the color of oxidized (grayed or blackened) wood (see "Dealing with Discoloration," at left).

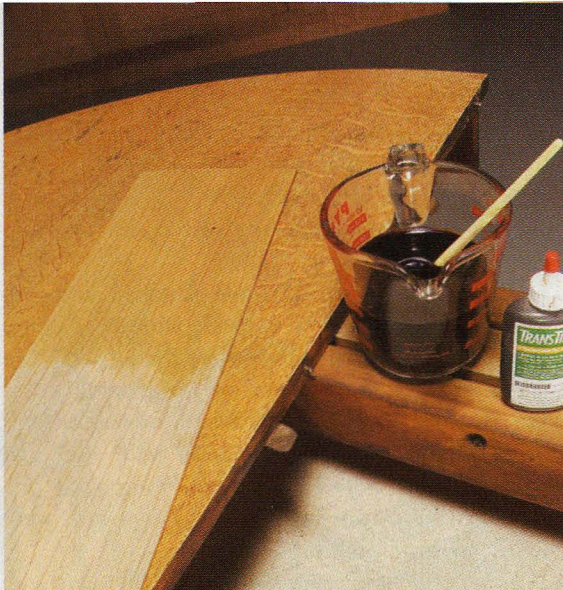
MATCH NEW WOOD TO OLD

Matching the new leaves to the old top requires only one step: adding color. As white oak ages, it acquires warm yellow and tan tones ("golden oak" wood stains are usually variations of this color). Water-soluble dye is the best choice for this step. It colors more uniformly than stain and doesn't seal the wood. Using a test board, mix dye to match the color of the top (Photo 17 and "Recipes," page 58). Then dye all the leaves to give them that "golden oak" glow. Every color-matching situation is different, of course, so you may need to adjust my recipe or create your own. You may even have to use different-colored dyes.

CREATE THE NEW FINISH

I used a multi-step process to create a new finish that matches the appearance of the pedestal's restored finish. By adding color gradually, this process provides maximum flexibility and control, so I could zero in on an accurate color match. I made test boards for every step and compared the color of each step with the pedestal, to make sure I stayed on track (see "Test Boards Record the Finish", page 57). As the dyed leaves have the same golden-tan color as the top, they can be finished at the same time.

A close look at the pedestal's deep, rich color reveals varying shades of dark tones. To give the top and leaves the same appearance, the color must be applied in layers. First, dye the surfaces to match the lightest shade of the pedestal's dark color (Photo 18). Then apply a glaze mixed to match the darker shades (Photo 19). Make your own glaze by mixing artists oil color in glazing medium (see Sources,



17 Use dye to tint the new oak leaves to match the top's aged color. Test the color on a sample board made from the same lumber as the leaves.



18 Recreate the original dark color in stages. First, apply dark brown dye. Now that the leaves have the same aged color as the top, you can use the same process on them.



19 Deepen the color with glaze applied directly onto the dyed surface. Glaze is artists oil color thinned for wiping. Brush the glaze on, then wipe it off.

TEST BOARDS RECORD THE FINISH



The secret to matching the pedestal's restored finish on both the new leaves and the old top lies in creating test boards for each step of the new finish. The test boards must be the same wood as the leaves, so they match in appearance and quality. They must also be prepped and sanded in exactly the same way as the leaves.

Each test board should be large enough to allow both testing and creating a reliable sample (one that clearly shows what the finish will look like on a large surface). Conserve lumber by resawing. For this table, I resawed a 5-ft. by 6-in.-wide board (2-1/2-bd.ft.) to create 10 lineal feet of test boards.

The test boards are sequential, so each one tests only one layer of finish. I always compare the color of each step with the pedestal, to make sure I stay on track. I also create one large "storyboard" for reference. It shows all the steps on the front and has all the recipes marked on the back.

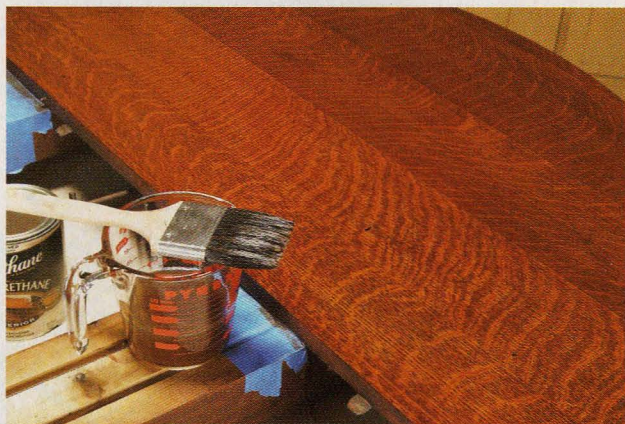




20 Minimize color differences by applying a second coat of glaze to light-colored boards after the first coat has thoroughly dried.



21 Brush on a coat of amber dewaxed shellac. This step is key to matching the top to the pedestal, because the pedestal's original finish coats are amber shellac.



22 Add durability by applying topcoats of polyurethane. Polyurethane provides better resistance to heat and moisture than shellac does.

below). If some boards appear lighter in color, apply a second coat of glaze (Photo 20). The final coloring step, two coats of amber shellac (2-lb. cut), adds tone that's essential to re-creating the aged look and color (Photo 21).

The final steps are the same as on the pedestal. First, apply one coat of dewaxed shellac to assure that the polyurethane topcoats adhere. Sand this surface with 400 grit paper by hand, using a soft block. Next, apply two coats of oil-based satin polyurethane (Photo 22). Sand with 400 grit between coats. When the finish is thoroughly dry, gently rub with the surface with #0000 steel wool and soapy water to remove dust nibs.

Now the table is ready for another 100 years!

RECIPES

Touch-up glaze for the pedestal's original dark color

Mix burnt umber, Vandyke brown and ivory-black artists oil colors in glaze medium

Sand-through Colors

Sharpie touch-up markers for medium and dark woods

Ground color for leaves

TransTint dye concentrate: 30 drops golden brown dissolved in 3/4-cup water

Medium tones for top and leaves

TransTint dye concentrate: 50 drops dark walnut, 50 drops dark Mission brown and 80 drops red mahogany dissolved in 3/4-cup water

Dark tones for top and leaves

Mix burnt umber, burnt sienna and ivory black artists oil color in glaze medium

Sources

Woodcraft Supply, www.woodcraft.com, (800) 225-1153, Economy Doweling Jig, #811564, \$50; Steel Table Pins, #27A30, \$6 per pack of 10 (need 16 pins for 4 leaves); TransTint Liquid Dye Concentrate: golden brown, #128482, dark walnut, #128485, dark mission brown, #128486, red mahogany, #828382, \$17 per 2-oz. bottle; SealCoat (2-lb. cut liquid dewaxed shellac), #823195, \$10 per quart; Amber Shellac (3-lb. cut), #140701, \$12 per qt. **Dick Blick Art Materials**, www.dickblick.com, (800) 828-4548, Round Sash Brush, #06342-1016, 42-mm-dia., \$17; Windsor & Newton Artists Oil Color, burnt umber, #00461-8053, Vandyke brown, #00461-8313, burnt sienna, #00461-8043, ivory black, #00461-2253, \$5 per 37-ml. tube; Liquin Glazing Medium, #00445-1004, \$10 per 250-ml. bottle; Sharpie Touch-Up Markers, #21398-1039, pkg. of 3, light, medium and dark, \$4.

Kevin Southwick is a wood finishing specialist and teacher in Minneapolis, MN. His shop, Southwick Furniture Conservation, offers conservation, restoration, custom wood finishing and consultation to furniture makers, cabinet shops, and homeowners. Kevin has studied with Don Williams, Senior Furniture Conservator at the Smithsonian Institution and he currently volunteers in the conservation lab at the Minnesota Historical Society.

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My 5th generation Belgian gem broker specializes in finding colored diamonds with a certain size, shape, color and clarity—he doesn't trade in what is available on the local market. During our visit, he proudly displayed a brilliant round-cut Canary diamond, explaining that natural yellow color diamonds are 10,000 times more rare than their brilliant white, colorless counterparts. He said this fine Canary Yellow gemstone, framed by two white diamonds, should retail for a minimum of \$10,000. As my broker admired this treasure, I decided now was the time for a little amusement.

As he glanced away, I placed a similarly colored lab-created yellow DiamondAura ring next to the natural mined diamond.

My broker thought he was seeing double. After close examination, he was astonished—the faultless, lab-created oval-cut DiamondAura was so visually similar in almost every way! He started to wonder about the future of the diamond business.

We were inspired by it's radiant color.

Influenced by the ultra-rare Canary diamond, we went to the gemological laboratory to craft this extraordinary jewelry using lab-created DiamondAura. Our DiamondAuras use rare minerals heated to over 5000 degrees in very expensive state-of-the-art lab equipment to create DiamondAura. The ring features an oval-cut canary DiamondAura set in the center with two oval-cut white DiamondAuras on either side, for a total carat weight of over 5.5 carats. The band is .925 sterling

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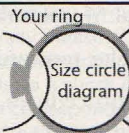
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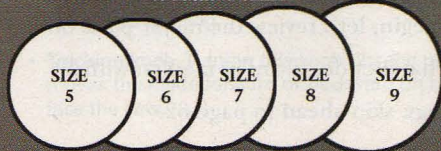
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WOMEN'S SIZES



Tune Your Bandsaw

by Mark Duginske

6 adjustments
deliver professional
results.

I love bandsaws, even though they have a reputation as troublesome tools. I suppose that's why I like them, because I enjoy investigating woodworking machinery. I've tinkered with dozens of 14-in. bandsaws, trying to understand how they work and how they should be set up. Here's what I've concluded: most bandsaws benefit from a tune-up.

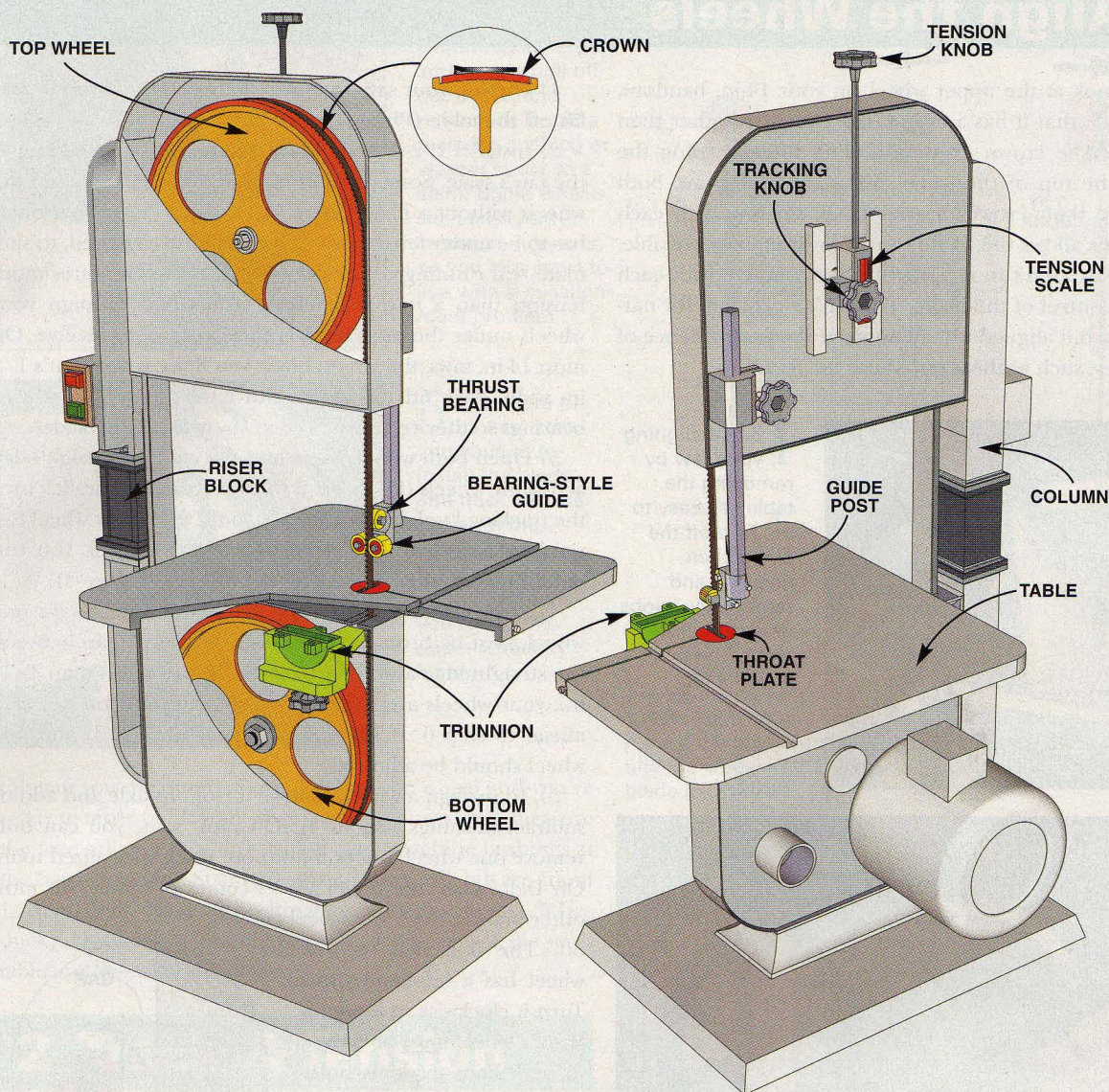
In the next pages, I'll show you six procedures to improve your saw's performance. I'll demonstrate these steps on a standard cast-iron 14-in. saw, but they apply to just about any type of bandsaw. Once you complete your inspection of your own saw and correct any problems (or learn to live with your saw's limitations), I'll show you how to adjust it for a typical blade.

The alignment procedures we'll perform are a one-shot deal. You shouldn't have to re-check your saw again. The tensioning, tracking, and guide-adjustment procedures must be followed every time you change blades, however.

Before we begin, let's review the major parts of the saw and what they do. If you're familiar with all this terminology, skip ahead to page 62.



A Visual Guide to Your Bandsaw

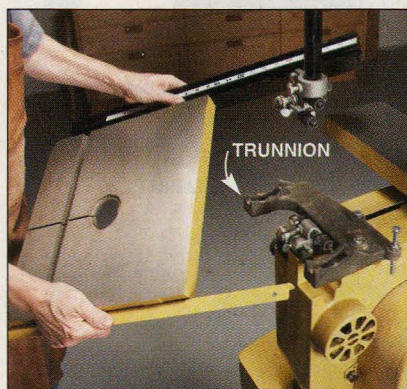


Two wheels and a blade. Those are the essential parts of a bandsaw, but of course there are many more. Here's a guide to the parts you'll be handling or adjusting when you tune up your saw.

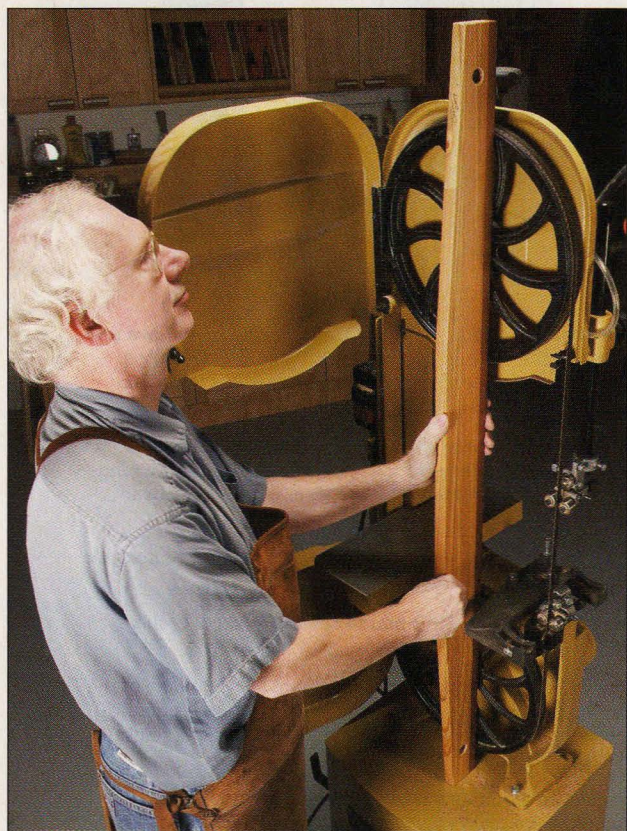
- **Wheel.** Both top and bottom wheels are covered with a piece of rubber or other material called a tire. The tires on most 14-in. saws have a slightly convex surface, or crown. The crown forces the blade to the center of the wheel.
- **Tension knob.** Turning this knob raises or lowers the upper wheel. Raising the wheel tightens the blade, increasing the blade's tension. Lowering the wheel allows you to remove the blade.
- **Tension scale.** This indicator gives you a rough idea of the blade's tension. It doesn't actually measure tension, though. It shows you the amount of compression in the spring located behind the scale, which acts as a shock absorber for the wheels. Numbers on the scale correspond to a blade's width. Wide blades require more tension than narrow blades. Minor variations in the length of a blade don't affect the scale's reading.
- **Tracking knob.** Turning this knob tilts the upper wheel. This moves the blade forward or backward on the wheel, as you face the saw.
- **Thrust bearing.** There are two thrust bearings: one above and one below the table. When you're cutting, thrust bearings stop the blade's rearward deflection. They rotate to reduce friction.
- **Guide.** There's a pair of guides above and below the table. They prevent the blade from deflecting sideways or twisting as you cut. Some guides are fixed blocks; others are bearings, which rotate.
- **Guide post.** This bar adjusts up and down in order to position the guide assembly close to the workpiece.
- **Throat plate.** Remove this part to see the position of the lower guides.
- **Column.** Cast-iron bandsaws have a joint in the middle of the column. The joint allows you to extend the column's height by inserting a riser block, which increases the saw's height capacity by 6 in.
- **Trunnion.** Two trunnion assemblies, one in front and one in back, allow the table to tilt. Each assembly has two mating halves: a convex part attached to the table and a concave part attached to the saw's frame. A knob under each trunnion assembly tightens the table in position.

1. Align the Wheels

If you look at the upper wheel on your 14-in. bandsaw, you'll notice that it has a crown: the center is higher than the edges. The crown exerts a pulling force, moving the blade to the top of the wheel. In a well-tuned saw, both wheels and their crowns are coplanar (in line with each other). This allows the blade to run as straight as possible. If the wheels aren't in alignment, they compete with each other for control of the blade. This isn't a problem for narrow blades, but aligned wheels improve the performance of wide blades, such as those you'd use for resawing.



1 Begin aligning your saw by removing the table. It's easy to do. Take off the blade, then unscrew and remove the knobs under the trunnions. The table just lifts off.



2 The first alignment check is to see if the saw's wheels are coplanar (lying in the same plane). Tension the blade, then place a long straightedge across both wheels. Tilt the top wheel so that it's parallel with the bottom wheel.

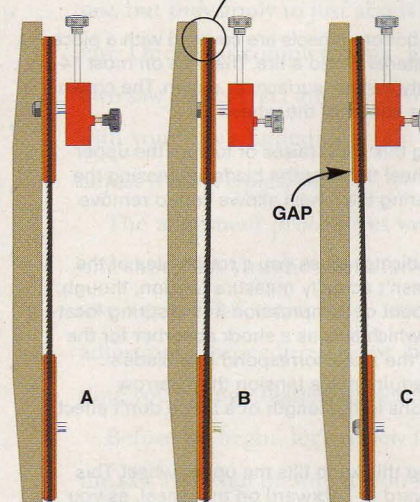
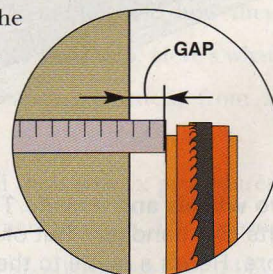
1) Unplug your saw. Remove the blade, then unbolt and lift off the table (Photo 1).

2) Install a 1/2-in. wide blade and tension it according to the saw's scale. Some authorities skip this step and align the wheels without a blade. That isn't correct, because the saw has to be under tension when the wheels are aligned, to simulate real running conditions. A wider blade requires more tension than a narrow blade, and it's best to align your wheels under the most tension they're likely to receive. On most 14-in. saws, the largest blade you'll use is one that's 1/2 in. wide. Back off the upper and lower guides and thrust bearings so they're at least 1/8-in. away from the blade.

3) Open both wheel covers and place a long straightedge across the wheels (Photo 2). If the wheels aren't parallel, turn the tracking knob behind the saw to tilt the upper wheel forward or backward. Once the wheels are parallel, you can determine whether or not they're coplanar (Figure 3).

4) If the wheels are not coplanar, determine how far one wheel must be brought forward. Measure the gap between the straightedge and the wheel. If the gap is less than 1/32 in., your wheels are sufficiently coplanar and you can skip ahead to step 6. If the gap is greater than 1/32 in., one wheel should be adjusted.

5) To re-align a wheel, remove it from its axle and add or subtract bushings (Photo 4). On most saws, you can only remove one wheel, not both, without using specialized tools. On Delta saws, the upper wheel comes off easily; on most other brands, the lower wheel comes off. The bolt that secures the wheel has a left-hand thread. Turn it clockwise to loosen it. If your wheel must be moved in, and there are some bushings behind it, simply remove one or two, corresponding to



3 Here's what you may find using the straightedge test. In A, the straightedge touches at four points. The wheels are coplanar, and you're all set. In B, the wheels are parallel, but don't lie in the same plane. Measure the gap behind the straightedge. In C, the top wheel must be tilted before you can determine whether the wheels are coplanar.



4 The fix for wheels that are out of alignment isn't hard. You simply pull off one wheel and remove or install a machine bushing or washer to act as a shim. Some wheels can't easily be removed, however, so you may have to live with a misalignment problem.



5 To prepare for the next step you have to re-install the blade and track it in the center of the wheel. Slowly bring the blade up to tension as you rotate the upper wheel by hand.

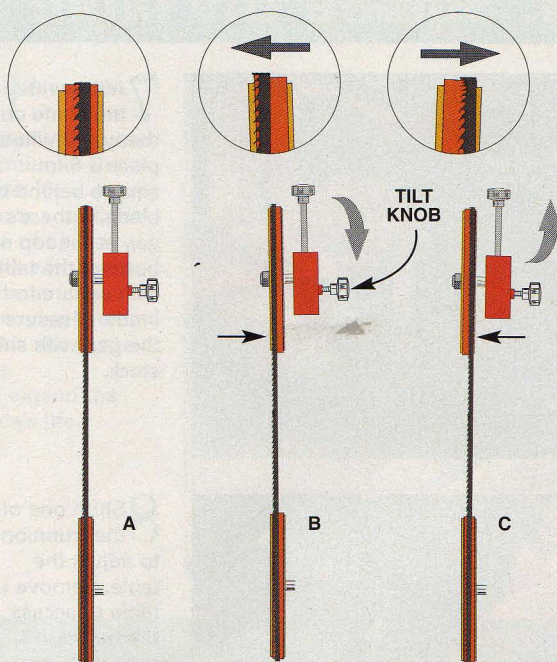
the gap you measured above. Replace the wheel and you're ready to move on. If your wheel must be moved out, measure the axle's diameter and purchase a few machine bushings at the hardware store. Standard washers work OK, but are about 1/16 in. thick. Machine bushings are thinner (about 1/32 in. thick). Once you've put the wheel back on, replace the saw's table and re-install the blade.

2. Track & Tension

Before moving on to the next step, your blade must be adjusted to run in the center of the wheels. This is called tracking, and it's a procedure you follow each time you change blades. The correct method is to steadily increase tension while you track your blade, so you'll make both the tracking and tensioning adjustments at the same time.

6) Unplug the saw. To begin, the blade should be under very little or no tension. Rotate the upper wheel by hand and slowly increase tension (Photo 5). After a few revolutions, note where the blade sits on the upper wheel. Adjust the tracking knob to move the blade in or out (Figure 6) as you continue to rotate the wheel. Keep rotating the wheel and adjusting the tracking knob until the blade is under full tension and tracking in the middle of the wheel.

7) Check the blade's tracking under power. Close the wheel covers and plug in the saw. Turn the saw on for a second and then turn it off again. Open the top door and see if the blade still tracks in the wheel's center. If it does not, make a minor change in the tracking knob's position, and check again.



6 Adjust the tracking knob to center the blade (A). Turning the knob counterclockwise (B) tilts the upper wheel and moves the blade forward. Turning the knob clockwise (C) tilts the wheel in the opposite direction and moves the blade backward.

The Tension Squabble

I wouldn't be a bit surprised if you're confused about blade tension. A lot of misleading information has been published about it, and I'd like to set the record straight.

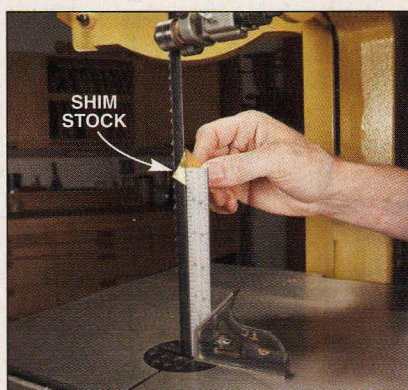
Some folks claim that the tension gauge on your 14-in. saw is erroneous and that using its indicated settings doesn't deliver enough tension. They would have you replace an old spring with a new one, replace a standard spring with a more powerful one, or purchase an aftermarket tension gauge to substitute for the one on the saw. None of this is necessary.

First, old springs don't wear out, and don't need to be replaced. Second, most springs provide adequate tension. The exception would be a spring that is fully compressed at its highest tension setting. This spring should be replaced with a more powerful one. Third, the scale on your saw may not be perfect, but as a rough indicator, it's adequate for the purpose. According to my measurements using the best aftermarket tension gauge available, these scales are accurate enough.

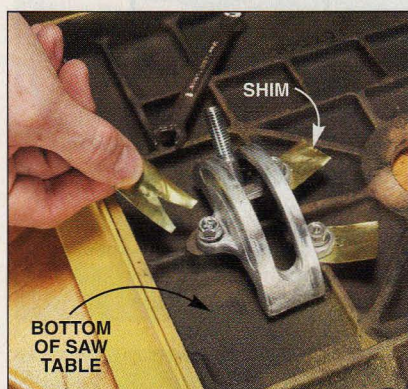
For most work, you'll get good results with the tension gauge set at the mark corresponding to the blade's thickness. But if the blade isn't sharp, or the workpiece is especially thick, increase the tension one mark. In any case, no saw will perform well unless it's tuned up first.

— Mark Duginske

3. Square the Table



7 After centering the blade on the upper wheel, place a 6-in. square behind the blade. If there's a gap at the top or bottom, the table isn't square to the blade. Measure the gap with shim stock.



8 Shim one of the trunnions to adjust the table. Remove the table to access the trunnion's mounting screws. To start, insert shims that are the same thickness as the gap you measured above, in Photo 7.

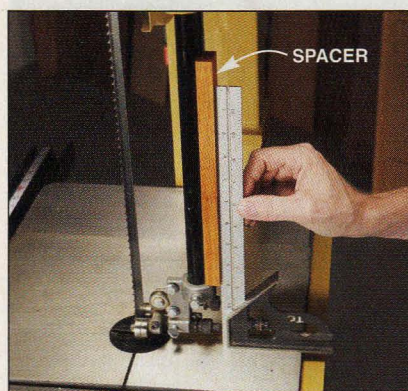
It's easy to understand why your bandsaw table should be set at 90 degrees to the side of the blade, but did you ever check whether it was also square to the back of the blade? This is important for advanced joinery techniques such as cutting tenons or dovetails. It will also help in the next alignment check, squaring the guidepost.

8) Raise the guidepost as high as it will go. Remove the throat-plate if it sits proud of the table (it should be exactly even, or, better yet, a little low in front and high in back). Loosen the trunnion bolts and tilt the table side to side until it rests solidly on its 90-degree stop (the stop is usually a bolt located under the table's left side). Tighten the trunnion bolts.

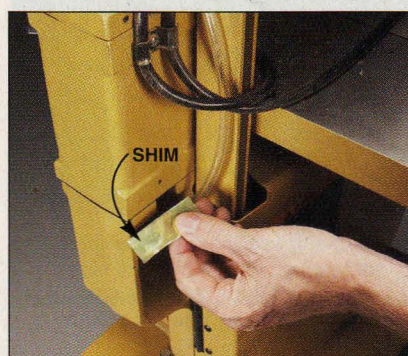
9) Place an accurate square alongside the blade. If the table isn't square, adjust the stop.

10) Place the square behind the blade (Photo 7). If the table isn't square in this axis, shim the front or back trunnion (Photo 8). You can use any hard material for shims, including a cut-up soda can. This can be tedious, but it's not difficult. The screws that fasten the trunnion to the table may be hard to access. If so, remove the table from the saw. You will lose the trunnion's position when you loosen all of its screws (it must align properly with the lower trunnion), but the correct position isn't hard to regain. After inserting the shims, loosely tighten the screws and return the table to the saw. Tighten the trunnion bolt, which will pull the upper trunnion into position, then tighten the trunnion screws.

4. Adjust the Guide Post



9 The third alignment check is to see if the guide post is square to the table, front-to-back and side-to-side. Place a wood spacer between your square and the guidepost to get an accurate reading.



10 Align your guide post by shimming the saw's column. Loosen the bolt between the saw's upper and lower sections. Place shims in the joint to tilt the column and guide post.

On a well-tuned saw, the guide post runs parallel to the blade. When you raise or lower the guidepost to accommodate material of different thickness, the blade guides and thrust bearing are always in the correct position relative to the blade. If the guide post doesn't run parallel to the blade, you'll have to readjust the positions of the side guides and thrust bearing each time you move the guidepost up or down to saw wood of different thickness. That's a situation you can live with, but you don't have to.

11) To check your guide post, the blade must be tracked and tensioned, and the table must be square to the blade. There are two ways to proceed. The easiest method is to lower the guidepost as far as it will go and plane a short stick, of minimum thickness, to fit between the post and a 12-in. square (Photo 9). Or you can remove the lower guide assembly from the guide post and place the square directly against the guidepost.

12) To re-align the guide post, you must tilt the entire upper casting of the saw. First, remove the blade. Next, loosen the bolt that connects the saw's upper and lower sections. Place brass shim material in the joint to tilt the guide post front-to-back or side-to-side (Photo 10). It takes trial and error to find shims of the correct thickness. Tighten the joint before checking the guide post. Once the guide post is square, go back to the start of the alignment checks (Step 1) and check that the wheels are still sufficiently coplanar.

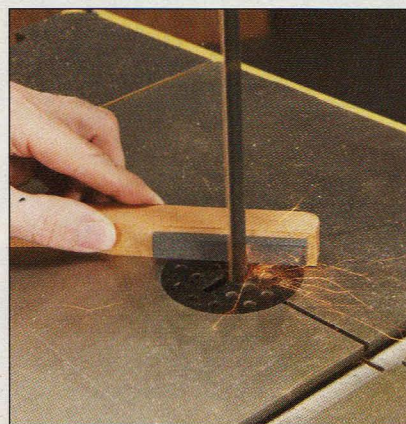
5. Round the Blade

This is an optional step, but it increases the life of your blade and thrust bearings. The rounder the back, the less likely the blade will crack. The stone also smoothes over the welded portion of the blade, so it can't scar the thrust bearings.

13) Round the back with a stone (Photo 11 and Source, below). It will take about five minutes. Begin with the corners, then round the rest of the blade's back.

Rounding the blade protects the thrust bearings.

11 Now that your saw is aligned, turn your attention to the blade. It's a good idea to round the back of a new blade with a dry oilstone. Removing the back's sharp corners will extend the blade's life.



Caution: This operation causes sparks. Disconnect your dust collection system from the bandsaw.

6. Adjust the Guides

Many of the procedures above are one-time only adjustments, but every time you put a new blade in your saw you'll have to reset the guides and thrust bearings. Here's how to do it right.

14) Back off the thrust bearings above and below the table. Adjust the side guides, above and below the table, so they don't touch the blade. Track the blade in the center of the upper wheel.

15) Position the guide assembly about 1/4-in. above your workpiece. Adjust both thrust bearings so they're about .015-in. behind the blade (Photo 12). That's equivalent to four thicknesses of a dollar bill, or four pieces of standard weight (20 lb.) printer paper. Whatever system of measurement you use, it's important that both bearings sit an equal distance behind the blade.

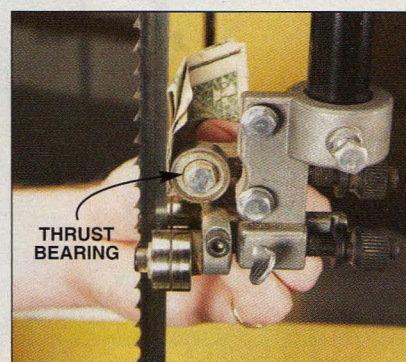
16) Adjust the side guides forward or backward until their leading edge is about .015-in. behind the blade's gullet (Photo 13). Be sure to adjust the guides below the table, too. When you cut, the blade will bend backwards and ride against the thrust bearings, but the blade's teeth shouldn't contact the side guides. The narrower the blade, the more care you should invest in getting this setup just right.

17) Adjust each set of side guides close to the blade (Photo 14). The gap should be very small, but not so close that the blade contacts the guides when it's not cutting wood. If you have bearing guides, rather than blocks, make sure that the guides are rotated in such a way that their high points are directly opposite one another. The lower guides on some saws are hard to access. You may find that tilting the table makes them easier to get to through the throat-plate opening.

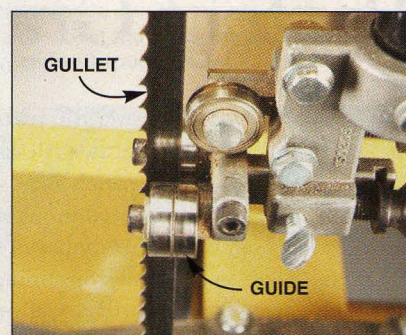
Source

Highland Hardware, www.highlandhardware.com (888) 500-4466, Blade Rounding Stone, 086031, \$12.

12 Adjust the upper and lower thrust bearings about .015 in. behind the blade. That's equivalent to the thickness of a dollar bill folded twice, making four layers. Remove the guard to make this measurement easier to see.



13 Adjust the forward position of the upper and lower guides. The front edge of the guides should be slightly behind the bottom of the blade's gullet.



14 Adjust the clearance between each guide and the blade. The gap should be about .004-in., which is the same as the thickness of a dollar bill. You're all set to saw.



Curly Maple Desk

by Bruce Kieffer



Shop-Made Veneer Panels Guarantee Perfect Grain Match.

I've built a lot of desks over the years, but this one is my favorite. The uncomplicated design really helps the book-matched curly-maple panels stand out.

All the panels were veneered in my shop except the top, which was custom ordered. Compared to store bought plywood, veneering can be time consuming and expensive but the results make it well worth the effort. Veneering allows me to choose the best materials and create the exact look I'm after.

The large top would have been a challenge to veneer so I had it custom made (see "Sources" p.72). The top is quarter-sawn maple veneer because I did not want figured wood on the top. I ordered the top unsanded. That left the veneer as thick as possible and reduced the chance of cutting through when sanding the walnut edging flush.

I tweaked the desk design so it could be used as a computer desk as well. For example, the pencil drawers are at the top

of the drawer stacks, not in the knee-hole. This frees up space for a keyboard tray if desired. Also, the second drawer in the stack is sized specifically for CD's. All you need to do for a full-fledged computer desk is add a few wire grommets in the top.

The large drawer at the bottom is designed for hanging files. I make my file hanging tracks from lengths of aluminum angle. They look good, function well and don't cost a lot. All the drawer boxes are dovetailed solid birch. The drawer slides are side-mounted full extension with 1-in. of over-travel.

CONSTRUCTION NOTES

The cutting list gives finished dimensions. Many of the parts need to be oversized to allow for trimming after assembly, so plan accordingly.

Some of the maple edgings are attached to their cores prior to veneering, and some after. The edging on the top of the drawer case panels (D, E and N) and all of the drawer

face edgings (L, M, P, Q and R) are under the veneer. The drawer case front and rear edgings (F & EE) are attached after the cores are veneered.

When you assemble the drawer faces you'll notice they are a bit oversize. This is intentional. I prefer to fine-tune the fit of the drawer faces after the cases are assembled. I use my edge sander to do the trimming but a well-tuned hand plane works well, too.

The veneers on each drawer stack are made from one long bookmatched sheet. This makes the grain continuous from top to bottom. The good news is it makes the desk look great. The bad news is if you goof one component you'll need to remake all four. But fear not, follow the step-by-step technique and you'll be fine.

VENEERING

If you've never veneered before, it helps to think of veneer as super thin boards. Unlike a thick board, the grain pattern barely changes from one slice to the next. That's why veneer is catalogued and sold in the sequence it came off the log. Lay down consecutive veneers side-by-side and flip over ever other one to create a bookmatched pattern. Each strip is the mirror image of the one next to it. It follows that a bookmatched panel always consists of an even number of veneers.

I use the caul and crossbeam method to press the veneer to the MDF cores. Cauls are scrap 3/4" thick MDF or particle-board used to evenly spread clamp pressure. Crossbeams are roughly 2 x 4 sized boards with a curve on one edge. The crossbeams apply sufficient pressure in the middle first to push the glue to the outside edges of the core. This is critical. Trapping excess glue in the center of a panel means doing it all over. To determine the correct radius of the crossbeam curve, start with the center of one edge 1/2-in. taller than the ends. Test the radius by clamping two crossbeams together curve to curve. You should be able to clamp the two boards tight. If you can't, reduce the curve.

I like to use Titebond's Extend wood glue for veneering. I thin it about 5% with water to make it flow out better. Plastic resin glues or slow setting veneer glues are good alternatives but a little trickier to work with.

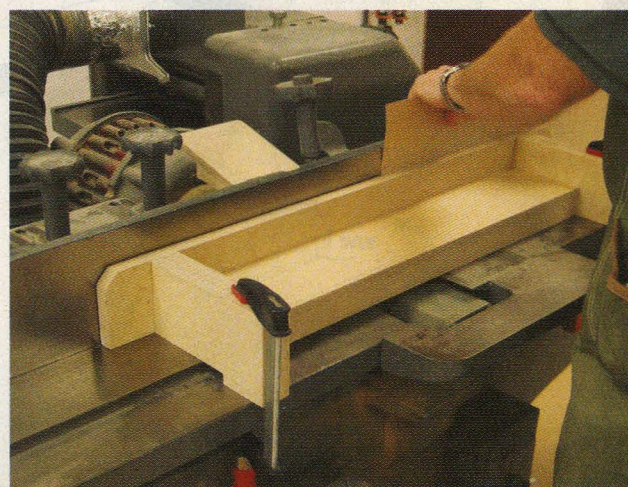
It's essential to build balanced panels when veneering. In other words, when you veneer one side of a core, you need to veneer the other side as well. If you don't, you're sure to get a warped panel. It's also important to apply both veneers at the same time. You can use a less expensive veneer on the backside of a panel where it doesn't show.

MAKE THE VENEERED PANELS

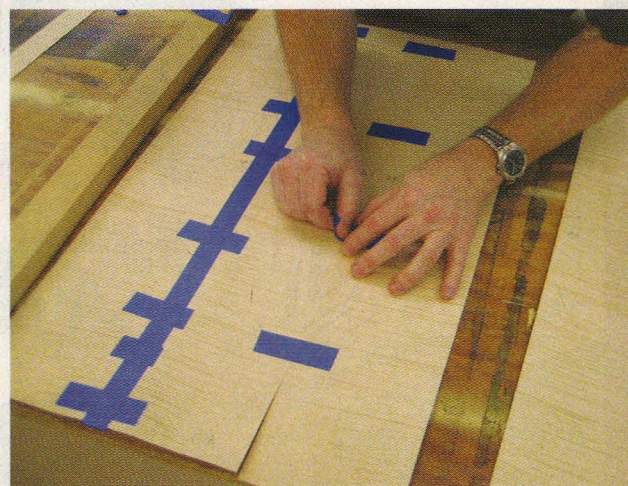
1. Cut the MDF cores (A-C and G-K) and edging strips (D-E and L-R).
2. Glue edging to the top of the case sides and case backs. Trim the ends and sand flush.



1 Cut the veneers to length and width using a veneer saw and a straight edge guide. You can stack several pieces of veneer together and cut them all at once.

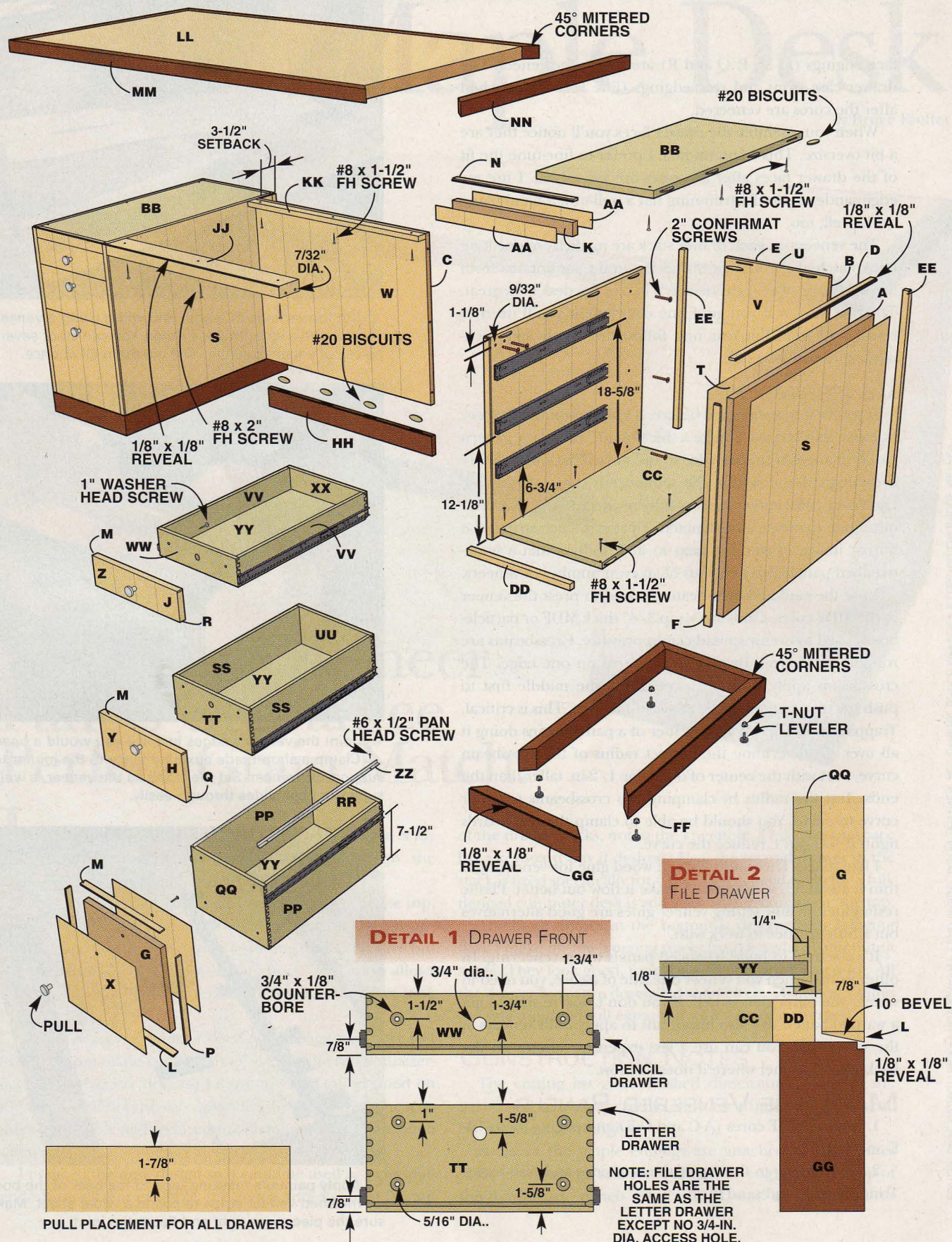


2 Joint the veneer's edges just like you would a board. Clamp a shop-made auxiliary fence to the jointer to support the veneer. Set the fence so the veneer is well supported but slides through easily.



3 Apply painter's masking tape to the back of the bookmatched veneer strips to create a wider sheet. Make sure the pieces are tight and flat at the joint.

FIG. A EXPLODED VIEW



3. Glue the edging on the drawer faces and case fronts. To minimize exposed end grain, glue the edging on the bottom first, then the sides and finally the tops. Sand flush.

4. Cut the lengths and widths of the veneer pieces (S through AA) for the cores (Photo 1). Make them a bit over-size to allow for trimming and joining. You want your glued together sheets to end up about 1" wider and 1" longer than their cores.

5. Layout the veneer strips in a bookmatched pattern.

6. The veneers are joined into sheets by edge gluing them together, much like you would regular lumber. First, joint the edges of the veneers on the jointer (Photo 2). An alternate method involves clamping the veneer to a straight edge board and using a router with a flush trim bit.

7. Lay the veneer pieces face down, pull the bookmatched edges together, and temporarily join them with masking tape (Photo 3).

8. Flip the joined sheets over and apply gummed veneer tape on the face side the joint (Photo 4).

9. Lay a piece of 3/4-in. MDF over the sheet so it dries flat.

10. Lay the sheet with the veneer tape down on a worktable. Remove the blue masking tape.

11. Open the joints to apply glue (Photo 5). Lay the sheet flat again to close the joints and place sticks aside the joints to hold them down as the glue dries. When the glue is partially cured, use a paint scraper and gently remove any excess glue. Set the sticks on top again and let the glue completely cure.

12. Gather everything you need to glue the veneer sheets to their cores: crossbeams, cauls, newspaper or craft paper, veneer sheets, core, lots of clamps and glue.

13. Use a narrow paint roller to apply a moderate coat of glue to one side of the core (Photo 6). Don't over do it. You should be able to see through the glue to the core. You can gauge how much glue is enough when the clamps are set. If a little glue oozes out at the edges, you hit the mark. Gobs of glue means you need to cut back a bit. No squeeze out and you're in danger of starving the joint. Do not apply glue to the veneer.

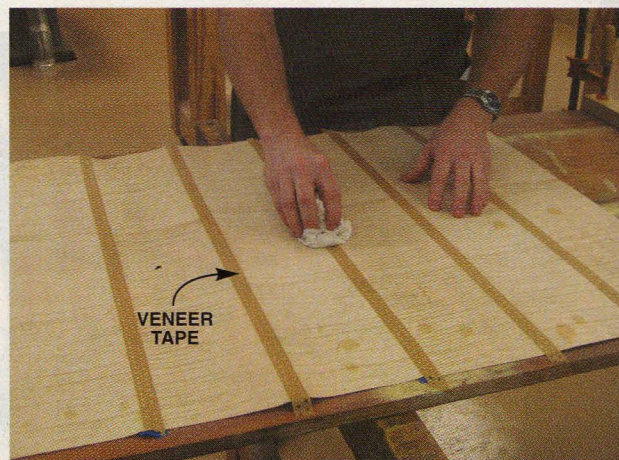
14. Lay the veneer sheet on the glue veneer tape side up. You'll scrape and sand the veneer tape off later.

15. Flip the panel over and veneer the other side. Cover the veneers with paper and place the panel between the cauls. Add the crossbeams and clamps (Photo 7).

16. When you start clamping, you put crossbeams on top and bottom in the center first and clamp their ends. Add the other crossbeams to the right and left of center, and then clamp around the outside edge. This will push any excess glue out from the center to the edges.

17. Let the glue dry 24 hours before removing the clamps.

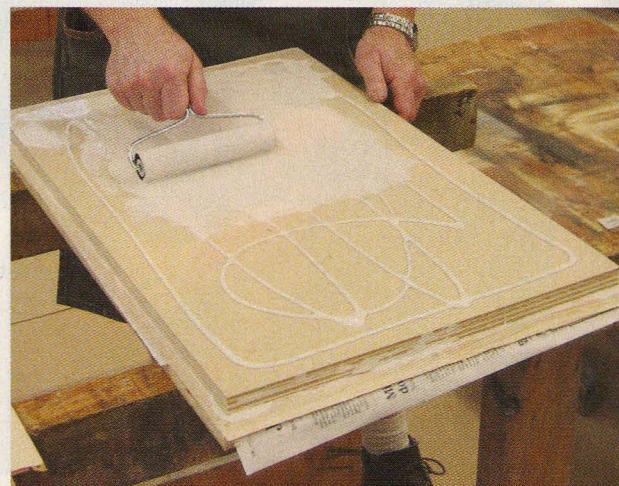
18. Flush trim the overhanging veneer edges (Photo 8). Scrap off any dried glue on the edges and flush trim again.



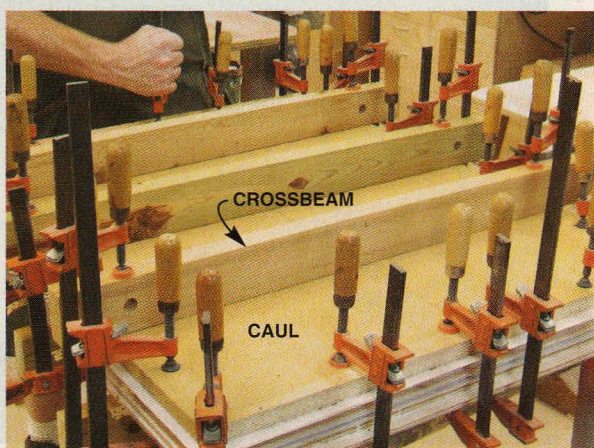
4 Flip the sheet over and apply veneer tape over the joints on the face side. Veneer tape is water activated. Dip pre-cut lengths of tape into a bucket of warm water. Apply the tape, then dab off the excess water with a paper towel.



5 Flip the sheet over again and remove the blue tape. Apply glue to the joints. Using a small tip on the glue bottle makes this task easier. Lay the sheet flat until the glue dries.



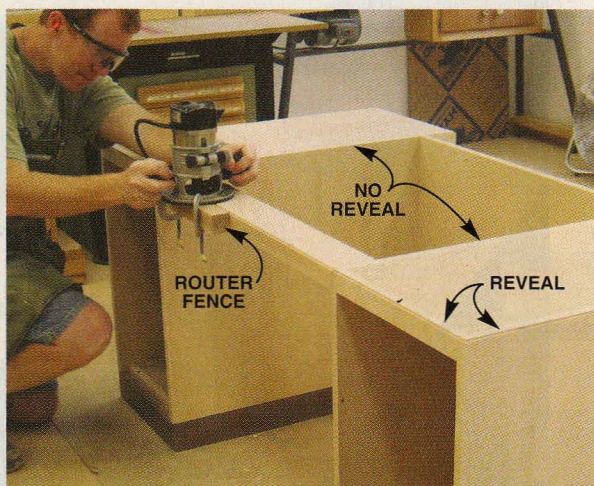
6 Apply slow-set wood glue to the panel core with a paint roller. I thin the glue about 5% with water to make it flow easier. Add a bit more glue around the edges to make sure they are well secured.



7 Cauls and crossbeams on top and bottom distribute the clamping pressure evenly across the veneer panel. Make sure you have enough clamps on hand before you start.



8 Remove the overhanging veneer edges with a laminate trimmer and a flush trim bit. Back cut the corners to avoid tear out.



9 Rout the 1/8-in. x 1/8-in. reveal around the top outside edges of the assembled desk, but not the modesty panel. There's no reveal inside the kneehole. The small reveal creates a shadow line that visually separates the desk components.

19. Attach the front edging strips (F) to the fronts of the veneered case sides.

20. The procedure for gluing the drawer face and case front veneer sheets to their cores is a bit different. I find it's best to glue all three drawer faces (G, H, J) and the case front (K) at once on a single veneer sheet. Lay 3/8-in. x 3/8-in. x 16-in. spacer sticks between the faces to hold them parallel with each other. Make sure the center joint on the sheets is aligned with the center of each drawer face. That keeps the drawer knob holes centered on the joint.

21. Pull the spacer sticks out immediately after clamping. When the glue has dried overnight, draw lines across the center of each gap in the drawer stack and separate on the band saw.

ASSEMBLE THE DRAWER CASES

22. Cut the case tops and bottoms (BB and CC), and the edgings (DD, F). Glue the edgings to the case parts.

23. Layout and cut the biscuit grooves and screw holes in the drawer case components as shown in Fig. A. The screw holes used to attach the front support (JJ) are set down 1-1/8-in. to keep them clear of the case tops.

24. Cut the rear corners (EE) equal to the thickness of veneered case sides and backs. Glue them to the case backs. Assemble the case sides, tops, and bottoms. Glue the assembled case fronts to the case tops. Then, attach the backs.

MAKE THE BASES

25. Cut the base parts (FF and GG) to match the assembled cases.

26. Drill counterbore and clearance holes for the T-nuts that hold the adjustable feet. Then, assemble the bases with glue.

27. Cut the modesty panel base (HH) the same thickness as the modesty panel.

28. Rout 1/8-in. x 1/8-in. reveals (rabbets) on the tops of the bases and the top of the modesty panel base, both front and back.

ASSEMBLE THE DESK

29. Cut the supports for the desk front and modesty panel (JJ and KK). Cut biscuit slots in the modesty panel. Glue the support and base to the modesty panel.

30. Screw the bases to the drawer cases.

31. Dry clamp the front support and modesty panel between the drawer cases. Make sure everything is aligned and drill 7/32-in. diameter pilot holes for the confirmat screws.

32. Rout the 1/8-in. x 1/8-in. reveals around the top (Photo 9). There is no top reveal on the modesty panel, and none on the top of the desk cases inside the knee opening. With the fence we used, you won't be able to rout the top

reveals on the top of the case sides in front of the modesty panel until the desk is disassembled. For now, mark the end point of those reveals.

MAKE THE TOP

33. Measure the width and length of the assembled desk. Adjust the dimensions of the top components (LL, MM and NN) so the top fits the desk. Assemble the top (Photo 10).

34. Screw the top in place and check the fit. Then, disassemble the desk and complete the top reveals on the sides.

MAKE AND MOUNT THE DRAWERS

35. Cut the drawer parts (PP through YY). Note the dimensions given are for a jig that cuts 5/16-in. deep sockets for dovetails spaced 7/8-in. apart. Adjust the dimensions for your jig. I leave the drawer bottoms 1-in. wide for now.

36. Rout the drawer dovetails and cut the drawer bottom grooves in the drawer box fronts and sides.

37. Drill the 3/4-in. dia. x 1/8-in. deep counterbore holes and the 5/16-in. dia. through holes in the drawer box fronts for the screws that attach the drawer faces (Fig. A. Det. 1) These holes have a little play so the drawer faces can be adjusted a bit.

38. Drill the knob holes in the drawer faces. Drill a 3/4-in. dia. hole in the letter and pencil drawer fronts for accessing the knob screw.

39. Assemble the drawers (Photo 11). Use the drawer bottom to square the drawer. When the glue dries, remove the drawer bottom and trim to final width.

40. Bevel the bottom edges of the file drawer faces 10 degrees (Fig A. Det. 2).

41. Final fit the drawer faces (Photo 12).

42. Mount the drawer slides to the drawers and cases (Photo 13).

43. Align and clamp the drawer face in position. Then, slide the drawer out and screw on the drawer face (Photo 14). Not having the drawer bottom in place is a real benefit here.

FINISHING

44. Disassemble everything and finish sand. Be careful sanding the veneer. It's very thin and easy to sand through.

45. Apply your favorite finish. I had my desk professionally finished with sprayed on catalyzed varnish. A brush-on polyurethane is also good choice.

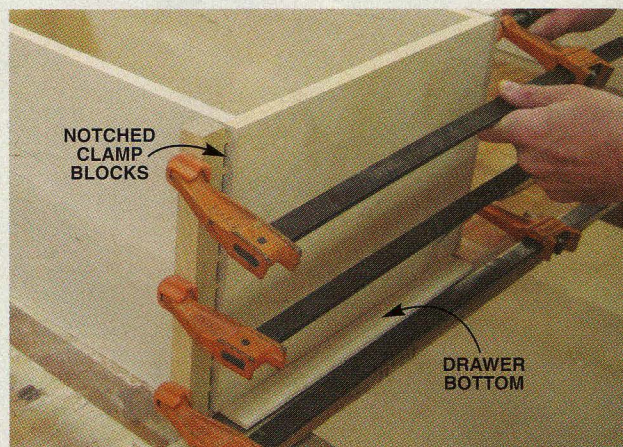
46. Slide the drawer bottoms in place and staple or screw them to the drawer backs.

47. Fabricate and attach the file supports (ZZ) from aluminum angle. Use #0000 steel wool to clean up the aluminum.

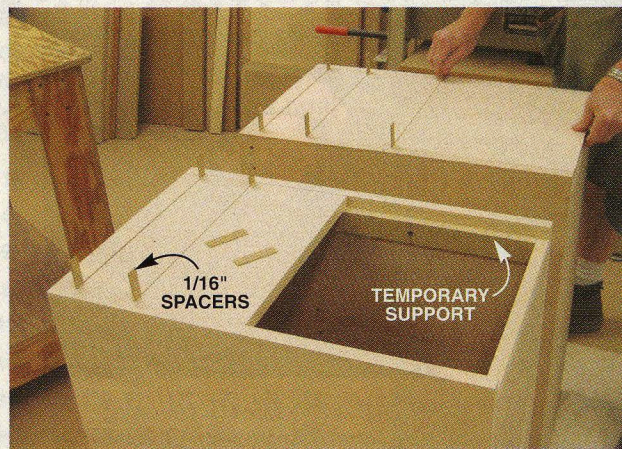
48. Hammer the T-nuts into the bases and insert the levelers, and then reassemble everything.



10 Glue the walnut edging to the top panel. The edging is mitered so it's best to apply one piece at a time and fine-tune the fit as you go. Make sure the edging stays perfectly flush with the top.



11 Glue and clamp the drawers together. Notched clamp blocks push the side dovetails into the dovetail sockets. The drawer bottom is temporarily slid in place to square up the drawer.



12 Trim and fit the drawer faces in the drawer case openings. Use 1/16-in. spacers to set the gap. Temporary supports hold the drawer fronts in position.



13 Use spacers to position the drawer slides in the cabinets. An 18-5/8-in. spacer sets the pencil drawer slides, a 12-1/8-in. for the letter drawer slides, and a 6-3/4-in. one for the file drawer slides.



14 Screw the drawer faces to the drawers. Do the file and pencil drawers first, then remove the file drawer and do the letter drawer. Use your 1/16-in. spacers again to align the drawer faces.



Bruce Kieffer is a freelance woodworking author, technical illustrator, and custom furniture builder. You can see a collection of his work from the past 30-years on his website, www.kcfi.biz.

CUTTING LIST

Overall Dimensions: 32" D x 63" W x 29" H

Part	Name	Qty.	Material	Th x W x L
A	Case Side	4	MDF	3/4" x 24-1/4" x 31"
B	Case Back	2	MDF	3/4" x 24-1/4" x 14"
C	Modesty Panel	1	MDF	3/4" x 24-1/2" x 32"
D	Edging - Case Side Top	4	Maple	1/4" x 3/4" x 31"
E	Edging - Case Back Top	2	Maple	1/4" x 3/4" x 14"
F	Edging - Case Side Front	4	Maple	1/4" x 3/4" x 24-1/2"
G	File Drawer Face	2	MDF	3/4" x 12-3/8" x 13-5/8"
H	Letter Drawer Face	2	MDF	3/4" x 6-1/8" x 13-5/8"
J	Pencil Drawer Face	2	MDF	3/4" x 3-3/8" x 13-5/8"
K	Front of Case	2	MDF	3/4" x 1-5/16" x 14"
L	Edging - Drawer Front Bottom	12	Maple	3/16" x 3/4" x 13-5/8"
M	Edging - Drawer Front Top	12	Maple	3/16" x 3/4" x 14"
N	Edging - Case Front Top	2	Maple	3/16" x 3/4" x 14"
P	Edging - File Drawer Face Side	4	Maple	3/16" x 3/4" x 12-9/16"
Q	Edging - Letter Drawer Face Side	4	Maple	3/16" x 3/4" x 6-5/16"
R	Edging - Pencil Drawer Face Side	4	Maple	3/16" x 3/4" x 3-9/16"
S	Case Side Outside	4	Curly Maple*	31-1/4" x 24-1/2"
T	Case Side Inside	4	Maple*	31-1/4" x 24-1/2"
U	Case Back Outside	2	Curly Maple*	14" x 24-1/2"
V	Case Back Inside	2	Maple*	14" x 24-1/2"
W	Modesty Panel Face	2	Curly Maple*	32" x 24-1/2"
X	File Drawer Face	2	Curly Maple*	14" x 12-3/4"
Y	Letter Drawer Face	4	Curly Maple*	14" x 6-1/2"
Z	Pencil Drawer Face	4	Curly Maple*	14" x 3-3/4"
AA	Case Front Face	4	Curly Maple*	1-1/2" x 14"
BB	Case Top	2	Birch Plywood	3/4" x 14" x 30-1/2"
CC	Case Bottom	2	Birch Plywood	3/4" x 14" x 29-5/8"
DD	Edging - Case Bottom Front	2	Maple	3/4" x 3/4" x 14"
EE	Rear Corner	4	Maple	13/16" x 13/16" x 24-1/2"
FF	Base Side	4	Walnut	1-1/2" x 3" x 32"
GG	Base End	4	Walnut	1-1/2" x 3" x 15-1/2"
HH	Base - Modesty Panel	1	Walnut	13/16" x 3" x 32"
JJ	Support - Front	1	Maple	1-1/2" x 3-1/2" x 32"
KK	Support - Modesty Panel	1	Maple	3/4" x 1-1/2" x 32"
LL	Top	1	Quartered Maple Panel †	1-1/2" x 29" x 59"
MM	Top Edging	2	Walnut	1-1/2" x 1-1/2" x 63"
NN	Top Edging	2	Walnut	1-1/2" x 1-1/2" x 32"
PP	File Drawer Side	4	Multi-Ply Birch	1/2" x 9-5/8" x 21-5/8"
QQ	File Drawer Front	2	Multi-Ply Birch	1/2" x 9-5/8" x 13"
RR	File Drawer Back	2	Multi-Ply Birch	1/2" x 9-1/16" x 13"
SS	Letter Drawer Side	4	Multi-Ply Birch	1/2" x 6-1/8" x 21-5/8"
TT	Letter Drawer Front	2	Multi-Ply Birch	1/2" x 6-1/8" x 13"
UU	Letter Drawer Back	2	Multi-Ply Birch	1/2" x 5-9/16" x 13"
VV	Pencil Drawer Side	4	Multi-Ply Birch	1/2" x 3-1/2" x 21-5/8"
WW	Pencil Drawer Front	2	Multi-Ply Birch	1/2" x 3-1/2" x 13"
XX	Pencil Drawer Back	2	Multi-Ply Birch	1/2" x 2-15/16" x 13"
YY	Drawer Bottom	6	Birch Plywood	1/4" x 21-3/4" x 12-1/2"
ZZ	Hanging File Support	4	Aluminum L	1/2" x 1/2" x 22"

* veneer stock - cut over size and trim flush

† custom ordered

Sources:

Berkshire Veneer Co., Inc., www.berkshireveneer.com (877) 836-3379, Curly Maple Veneer - Herringbone match, \$1/sq. ft.

Saunders Wood Specialties, Inc., www.saunderswood.com (715) 762-3916, Unsanded Quartered Maple Veneer on MDF, \$120.

Woodworker's Hardware, www.wwhardware.com (800) 383-0130, Full Extension Drawer Slides with 1" Overtravel, #KV8405 B22 EB, \$15 each; Nylon Base Levelers, #HB33 232, \$1 each; Teenuts, SCT1420, \$1 each.

Rockler, www.rockler.com (800) 279-4441, Bronze Cylinder Head Confrimat Screws, #30601, \$2 each; Titebond Extend Wood Glue, 38449, \$20; Veneer Saw, #43901, \$11.

Three Holed Gummed Veneer Tape, #49858, \$9.

Mockett, www.mockett.com (800) 523-1269, Satin Nickel Button Pulls, #DP112A, \$4 each. Local Hardware Store, 2- 1/2" x 1/2" x 48" Aluminum Angle, \$4 each.

"As a professional restorer of antique and classic watches for major museums, I recently reviewed the movement and individual parts of the Stauer Noire watch. The assembly and the precision of the mechanical movement are excellent."

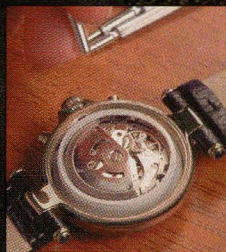
—George Thomas
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In the early 1930's watch manufacturers took a clue from Henry Ford's favorite quote concerning his automobiles, "You can have any color as long as it is black." Black dialed watches became the rage especially with pilots and race drivers. Of course, since the black dial went well with a black tuxedo, the adventurer's black dial watch easily moved from the airplane hangar to dancing at the nightclub. Now, Stauer brings back the "Noire", a design based on an elegant timepiece built in 1936. Black dialed, complex automatics from the 1930's have recently hit new heights at auction. One was sold for in excess of \$600,000. We thought that you might like to have an affordable version that will be much more accurate than the original.

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Pure & Simple Jewelry Box by Tom Adair



Great-looking wood and brightly-colored felt are a hit with my customers.

I'm hooked on making jewelry boxes—to sell. I'm retired, so I don't live on the income, but making dozens of boxes keeps me in the shop, where I like to be.

I sell my boxes at local craft shows. Let me share with you four secrets to making a sale. First, I use wood with strong character—locally-grown, when possible. Second, I line all my boxes with felt. (This feature really appeals to the ladies). Third, my design is very simple, which keeps my prices low. These small jewelry boxes sell from \$65 to \$95, depending on the wood. Fourth, I always include a little story about the wood and where it came from.

MAKE THE SIDES AND LID

1) I use lots of low-grade lumber from a variety of sources. What I'm looking for is bold figure; it's OK if the boards are short or thin, because one box doesn't require much material. If the figure runs at a slant, I use a sled with toggle clamps to make a straight cut (Photo 1).

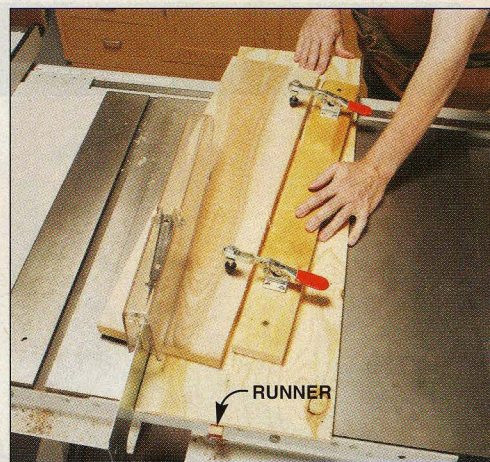
2) I make boxes in a variety of sizes, depending on what the wood allows. These plans are for a relatively small box, but all my boxes have 7/16-in. sides and 1/2-in. lids. Most lids (A, Fig. A, p. 76) are glued from two or more pieces. I plane this wood to 9/16 in., glue it together, then take the lid down to 1/2 in. using a drum sander.

3) The sides (B and C) must be straight and flat in order to make accurate miters. Mill this wood to 1/2-in. thick and 1/4 in. over the final width. Let it sit for a few days, then joint the face sides again and plane and rip the pieces to final dimensions.

4) Cut miters using a crosscut blade (Photo 2). I get the best results on my contractor's saw by standing the pieces on edge. I use a premium miter gauge that does not wobble in the saw's miter slot, but I've found that two standard miter gauges, fastened to the subfence, are just as stable.

5) Saw grooves for the bottom (D) (Photo 3 and Fig. A). Set the fence 1/8 in. from the blade and saw each

1 I use scrounged wood to make my boxes, so I don't mind wasting a bit to get the figure I want. I use a jig with a runner to rip boards so their grain patterns run parallel to the edge.

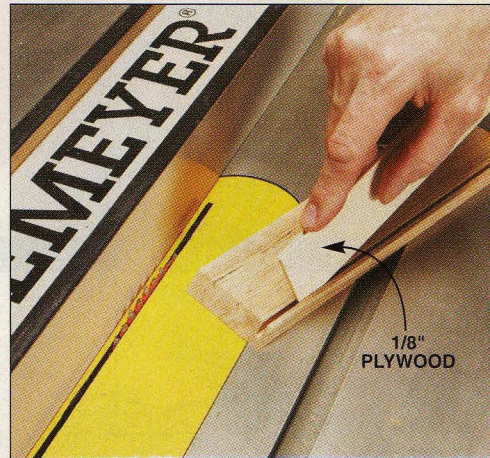


2 Miter the sides. Clamp the pieces to the subfence and use a stop block to cut them the same length. Fastening two miter gauges to the subfence eliminates wobble as you cut.



Caution: You must remove your blade guard for this cut.

3 Saw grooves to receive a 1/8-in. plywood bottom. The fit can't be tight, or the box will be too hard to assemble. Shift the fence about 1/64 in. to widen the groove until the fit is just right.



4 Cut biscuit slots in the miters. Build a 45-degree fixture to hold the pieces. Locate the slots just below the miter's inside edge by raising the plate joiner on shims nailed to the fixture.

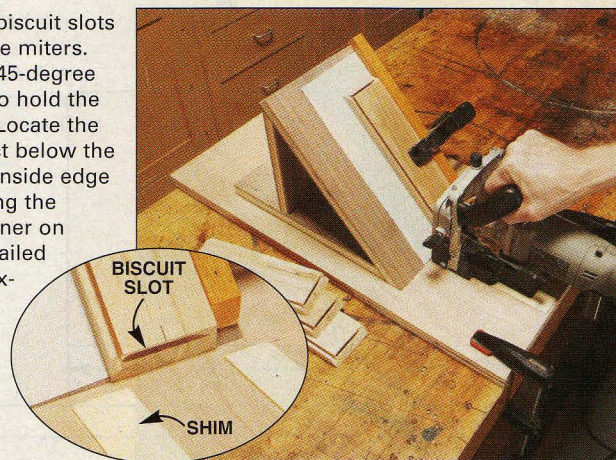


FIGURE A EXPLODED VIEW

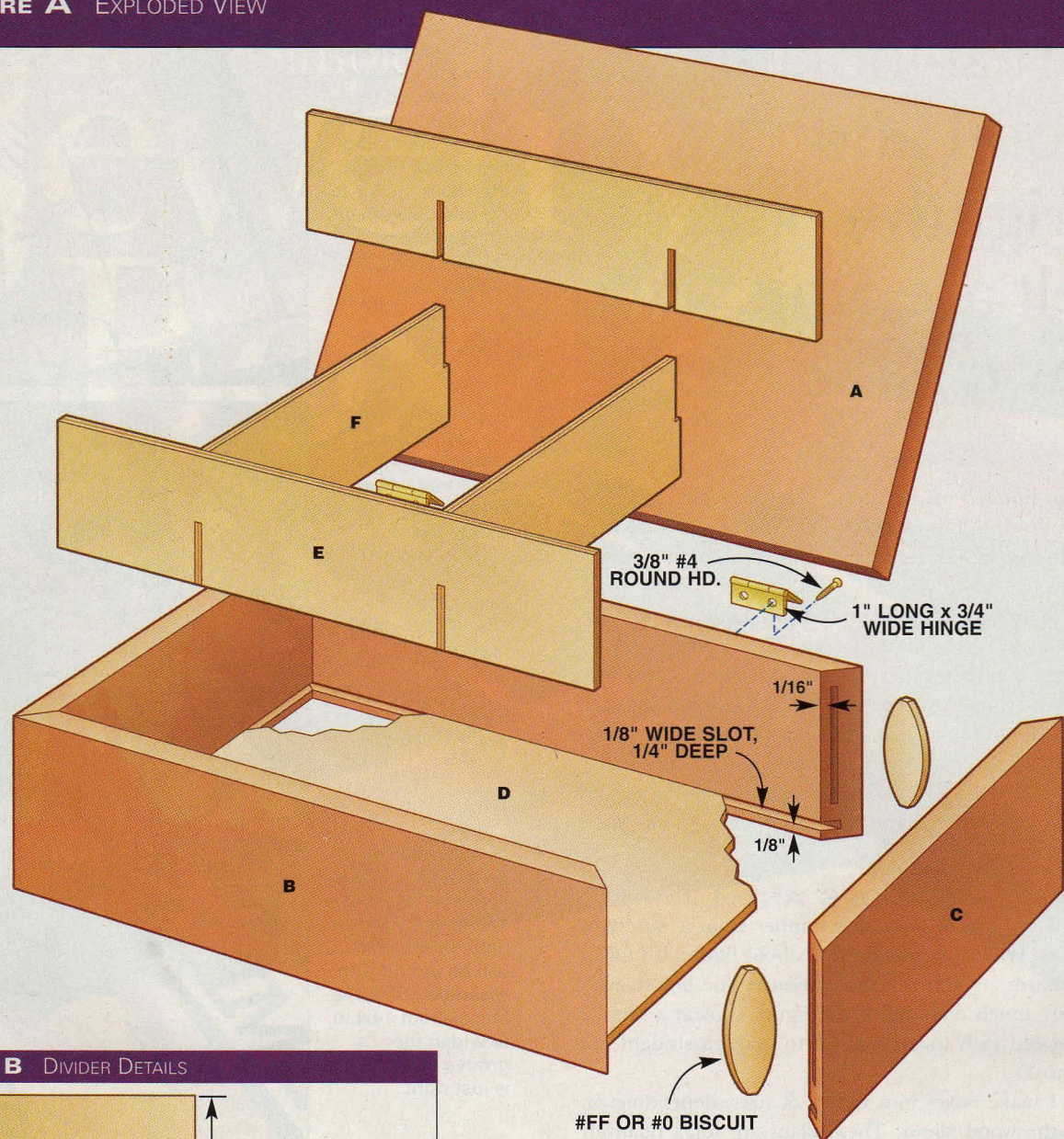
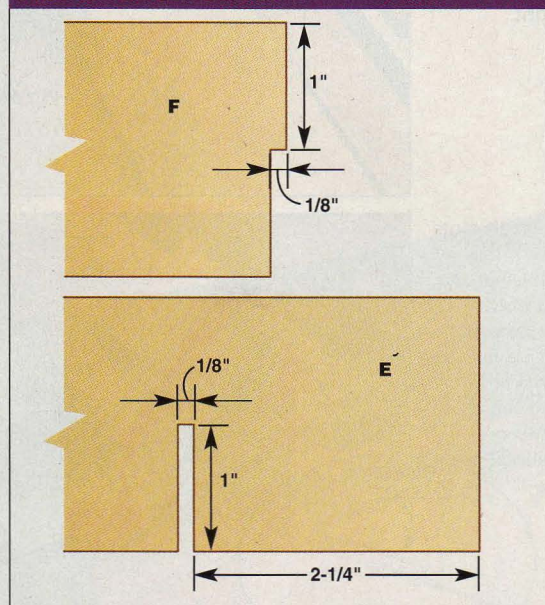


FIG. B DIVIDER DETAILS



CUTTING LIST Overall Dimensions: 3" H x 10-1/4" W x 7-7/8" D

Part	Name	Qty.	Th x W x L
A	Lid	1	1/2" x 7-7/8" x 10-1/4"
B	Front, back	2	7/16" x 2-1/2" x 10"
C	Side	2	7/16" x 2-1/2" x 7-5/8"
D	Bottom	1	1/8" x 7-3/16" x 9-9/16"
E	Long divider	2	1/8" x 2" x 9"
F	Short divider	2	1/8" x 2" x 6-1/2"

piece once, then move the fence about 1/64-in. farther from the blade and make a second pass. The plywood for the bottom should easily slip into the groove.

6) I use a fixture to cut biscuit slots (Photo 4). I use special FF biscuits, which are very small, because there's more leeway in locating the slots. Only a few plate joiners can make slots this size, however, so I've experimented with #0 biscuits. They work fine, but the slots have to be precisely located and the sides can't be less than 7/16-in. thick. In fact, it would be better if they were about 1/32-in. thicker. For making #0 slots using my Porter-Cable plate joiner, I nail 1/16-in. thick shims to the jig. This places the slot 1/16-in. below the miter's inside corner. Experiment with scrap wood before you cut slots in the real pieces. The last thing you want to see are slots going all the way through the sides—and it's mighty close!

GLUE THE BOX

7) Cut the bottom to size. I use 1/8-in. thick plywood for making the bottom and dividers (E and F). This plywood is only available at craft and hobby stores, but 1/8 in. hardboard would be OK, too. When you figure out the bottom's exact size, leave 1/32 in. of play all the way around, so the miters are sure to draw up tight. I use my crosscut blade to saw this thin plywood for a smooth, vibration-free cut. Sand the plywood's edges to make them easier to insert into the grooves.

8) Apply glue to all the miters and slots and clamp the box together (Photo 5). I like rubber tubing because it's inexpensive. You can get it at a medical supply or sporting goods store. Tie the knot beforehand, to make a loop that stretches taut around the box. One good thing about tubing: glue won't stick to it.

9) After the glue is dry, sand the outside faces and top edges. Round over the corners so they aren't sharp. Spray or brush a finish on the box and lid. Finish both sides of the lid, but only the outsides and top edges of the box.

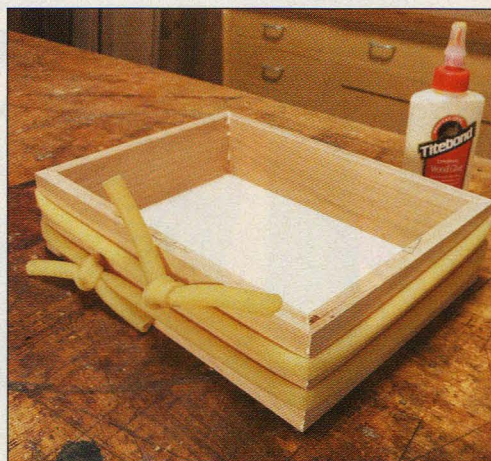
ADD FELT LINING

10) Cut a piece of felt, with notches, so its center section exactly fits inside the box. Scissors work better than a knife. Dribble some glue on the box's bottom. Use a wooden spatula with a tapered end to spread the glue (Photo 6). Make sure the glue is spread thin, or it will soak through the felt.

11) Place the felt inside the box (Photo 7). Smooth it out on the bottom, making sure the cut corners line up correctly. Then glue the sides, one at a time. A pointed stick with rounded edges is an invaluable tool for smoothing the felt near each corner.

12) Cut the excess felt flush (Photo 8). The cutting tool has to be extremely sharp, so I use a double-sided razor blade.

5 Glue the box using rubber tubing or a band clamp to pull the miters tight. After the glue is dry, sand the sides and their top edges, then apply a finish. You don't have to sand or finish inside the box.



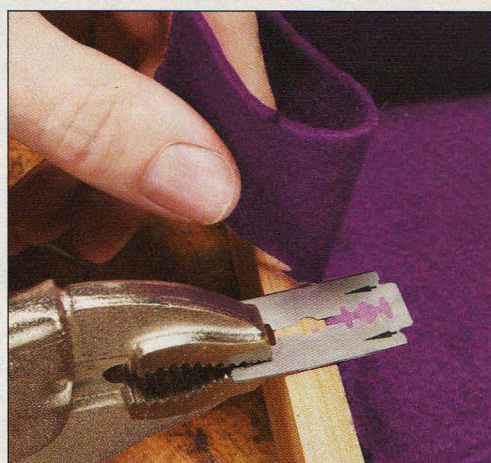
6 Spread a thin layer of glue over the bottom in order to attach a felt lining. Yellow glue works fine; liquid hide glue, as shown here, gives you a little more working time.

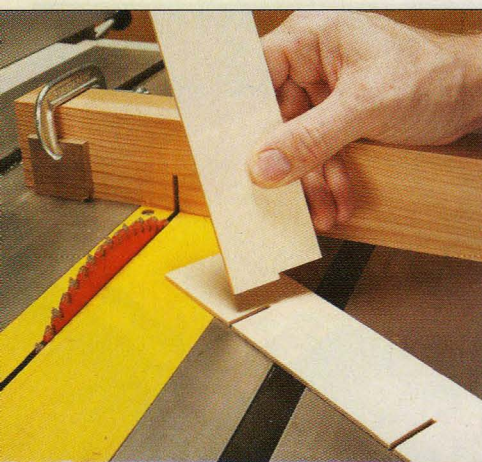


7 Place a piece of felt inside the box. Push down on the felt with a rounded wood stick to smooth it out. Then apply glue to the sides and smooth out each flap using the stick's point to get into the corners.



8 Trim off the excess felt using a double-sided razor blade held in a Vise-Grip.





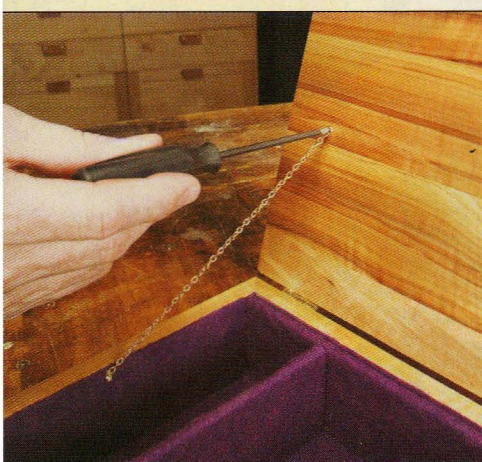
9 Cut notches in the dividers to make bridle joints. Using 1/8-in. plywood for the dividers, the notches are one saw-kerf wide. If that's too tight, insert a piece of paper next to the stop block in order to widen the notches.



10 Glue and wrap felt around the dividers. Cut around the notches so the dividers butt tight against each other.



11 Install hinges on the box, then mark screw holes for the lid. Place four pieces of paper between the box and lid so the lid won't bind as it closes.



12 Install a chain to hold open the lid. When I make a lid, I look for wood with beautiful figure on both sides. I think a box should look terrific both open and closed.

MAKE THE DIVIDERS

13) Cut the dividers to width and length. It's important that their lengths are just right to make a snug fit. Cut the notches on the short dividers first (Fig. B). Make these by placing a stop block right next to the blade. Move the stop block and cut notches in the long dividers (Photo 9).

14) Glue felt on the dividers, wrapping it around the dividers' top edges. Trim off the excess and cut around each notch (Photo 10). Assemble the dividers and insert them into the box. The assembly should fit tight, but not so tight that you'd have to hammer it in place.

Clean lines let the wood speak for itself.



ADD THE LID

15) Screw hinges to the box. I keep things simple: they're mounted right on top of the back. These hinges use delicate brass screws, so be sure to pre-drill the holes. Place four pieces of paper on top of the box. Place the lid on the box, flush with the back. Mark the screw holes with a felt-tip pen or awl (Photo 11). Pre-drill holes in the lid and attach it to the hinges.

16) Install a chain. On this box, it's about 6-1/2 in. long. Locate the screw on the box's side 3-3/4 in. from the inside edge of the back, 1/4 in. down from the top edge. Stretch the chain tight and lean back the lid a few degrees past vertical to locate the other screw. This screw should be 1-1/4 in. away from the lid's edge so the chain falls inside the box as it's closed.

17) Add self-adhesive round felt feet under each corner of the box.

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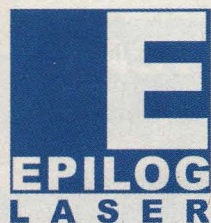


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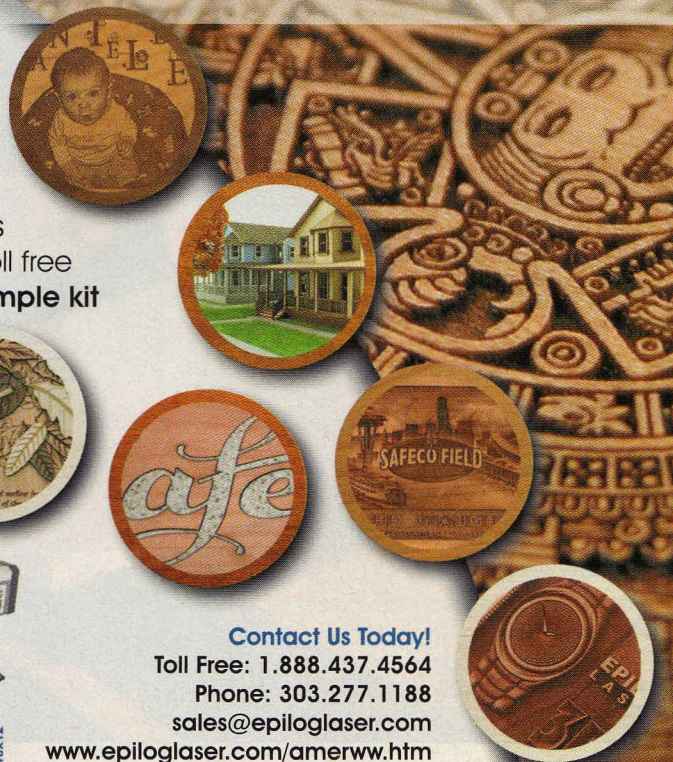
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Tips for

As modern cabinetmakers, we've become so accustomed to using veneered sheet stock it's hard to imagine building cabinets without it. Sheet stock saves time, money and valuable trees.

The veneer can be wood or a man-made material like melamine. The substrate or core for the sheet stock is most often made of MDF, plywood or particle board. The catch to building with sheet stock is covering up and protecting the unattractive and fragile edges. A hardwood strip glued onto the sheet stock edge is typically how this is done. The hardwood edge not only looks good, it protects the edges from damage.

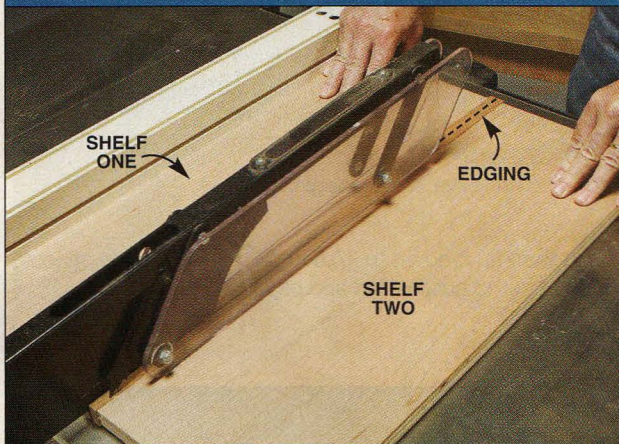
The trick has always been to quickly and efficiently apply the edging and then trim it flush to the ultra thin veneer. What follows is a set of tried and true tips, used by pros, to get the job done.



Edging

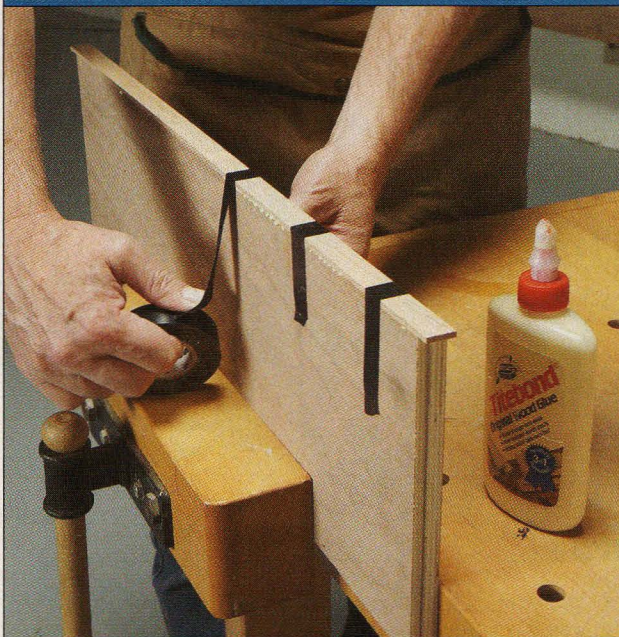
by Dave Munkittrick

TWO FOR ONE EDGING



Speed up edging shelves and cabinet parts by gluing them up in pairs. It takes fewer clamps and less setup time. Glue an extra wide strip of hardwood between two pieces of plywood. Don't forget to add the thickness of a saw blade to the hardwood strip. The plywood should be about 1/2-in. oversize in length and width. Glue and clamp the sandwich together. The plywood acts like clamping cauls to apply even pressure along the full length of the joint. After the glue dries, rip it down the middle and trim the ends square and flush.

EASY EDGE CLAMPS



Thin edging doesn't require heavy clamp pressure to get a tight joint. A few pieces of electrician's tape stretched over the edge provide the right amount of clamping pressure and helps center the edging on the sheet stock. It's a quick and easy way to apply thin edging.

SKIP THE SANDER



Plane the edging flush with the veneer. It's quicker than sanding and there's a lot less chance of cutting through the thin veneer. Ride the heel of the plane on the veneer and set the blade for a thin shaving, especially when you get close to the veneer surface. Even if you hit the veneer, it rarely cuts through. All that's left is a little finish sanding with some fine grit paper.

HIDE THE EDGING

Here are three ways to disguise the glue line between the sheet stock and the edging. First, make the edging just thick enough to accommodate a chamfer or roundover router bit profile. Flush the edging to the veneer before routing the profile.

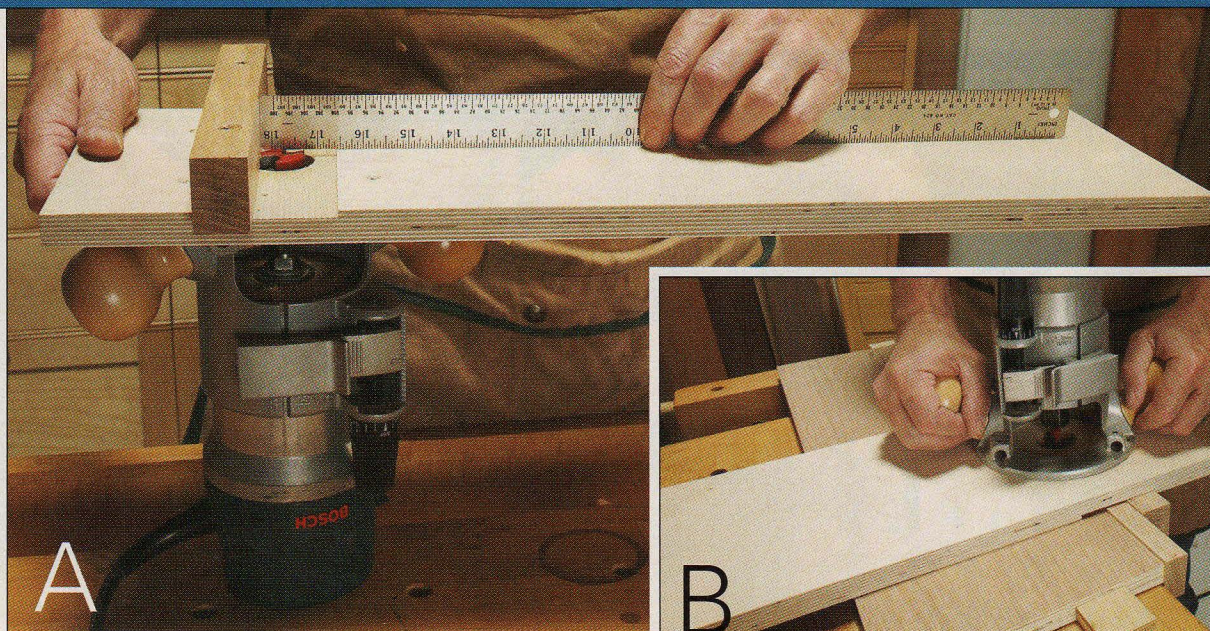
1. For the chamfer cut, set the bit to cut the full thickness of the edge back to the glue line.
2. For the roundover, make the edging slightly thicker than the radius. The curve should begin right next to the glue line.
3. The third method is to glue on the hardwood edging, trim it flush then rip it down to 1/16-in. thickness. A little sanding on all three edging styles is all it takes to blend the transition from veneer to solid wood and obscure the glue line.

CHAMFER

ROUND OVER

THIN STRIP

PRECISION FLUSH-TRIM JIG



Some pieces, like a tall bookcase side, are just too big to trim on a router table. This jig will flush cut edging on any size piece, large or small. You can use any size straight cutting bit, but I recommend a wide mortising bit.

The jig is just a 10-in. x 24-in. piece of 3/4-in. plywood with a 1-in. dado cut about 8-in. from one end. Drill a 1/8-in. x 1-in. hole through the middle of the dado for the bit to protrude. Attach the router and add a fence so it just barely

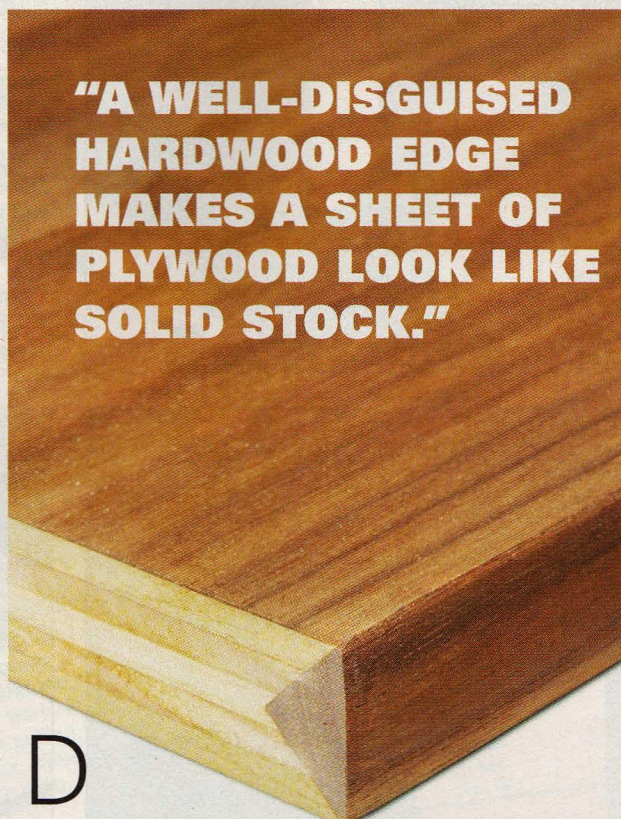
overlaps the bit's cutting radius. The bit will ever so slightly cut into the fence.

To set up the jig, lower the router bit until it is flush with the bottom (Photo A). Turn the router on and run the fence along the edging to trim flush (Photo B). The long base on the jig counterbalances the router and the fence guides the cut.

2-PIECE EDGE BANDING BITS

A well-disguised hardwood edge makes a sheet of plywood look like solid stock. Router bits designed to create an almost invisible joint do just that. It's a two part setup. The first bit cuts the deep v-groove in the plywood (Photo A). The second bit cuts the mating profile in the hardwood (Photo B)). It's best to work with a wide piece of hardwood.

Cut all the V-grooves first. Then set the bit for the hardwood edge. Cut the matching profile on both edges of the hardwood and glue the shelves and hardwood together (Photo C). After the glue dries, rip the shelves free. The visible part of the hardwood edge should only be about 1/16-in. thick. (Photo D)



**"A WELL-DISGUISED
HARDWOOD EDGE
MAKES A SHEET OF
PLYWOOD LOOK LIKE
SOLID STOCK."**

Source:
Tools Today, www.Toolstoday.com (888)-699-3939; 2-Piece Edge
Banding Bit, #554, \$112.

FLUSH CUT ON A ROUTER TABLE

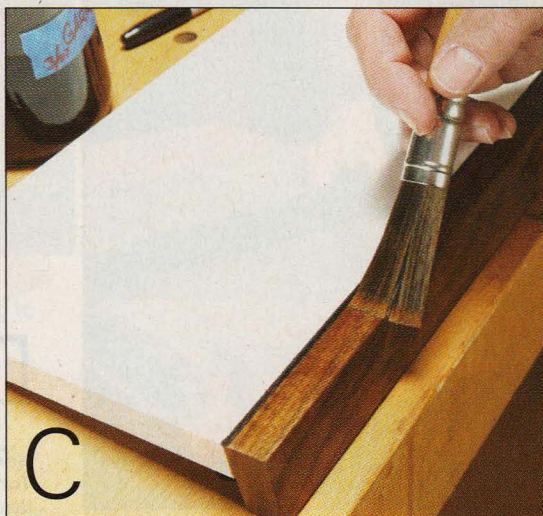
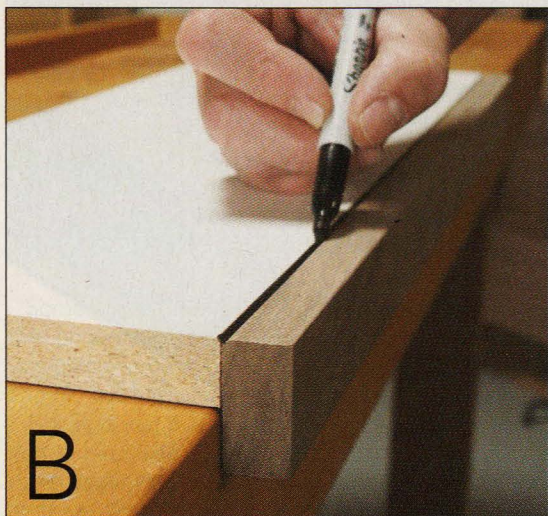
Flush up the edging on your sheet stock using a tall fence for support on your router table. The best fence material is melamine because it has a slick surface. Simply screw the melamine to your existing fence. Leave a gap at the bottom tall enough to accommodate the edging. Set the fence so it's flush with the bearing on your flush trim bit. The fence stabilizes the sheet stock as it's held on edge. You can zip through a stack of shelves in no time with this production shop technique.

USE A FLUSH TRIM V-GROOVE BIT FOR MELAMINE

Edging melamine with hardwood is about as tricky as it gets. To sand, plane or finish the edge without messing up the melamine is next to impossible. Masking off the melamine is a time consuming pain. One way to overcome these problems is to use a flush trim V-groove bit. Simply set the bit so the V-groove is centered on the glue line (Photo A) and rout. Then color the groove with a black Sharpie (Photo B) to create a physical and visual border between the edge and the melamine. The point of a Sharpie fits perfectly in the groove. The slight gap between the melamine and the hardwood edge make sanding and applying finish a snap (Photo C).

Source:

Toolstoday, www.Toolstoday.com (888)-699-3939,
Flush Trim "V" Groove Bit, #47160, \$26.



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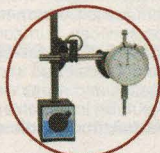
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Skew Planing

The skew is one of the most useful tools in the turner's arsenal. This article will get you on the right path towards mastering this tricky but versatile tool. A lot of us start out trying the skew without a clue how to use it. The result is often a nasty dig-in that leads most people to retire their skew to a drawer someplace. There, the secrets and abilities of the skew lay dormant and undiscovered. It's not a surprising phenomenon because the skew has a steep learning curve with lots of subtlety. To add to the problem, there's just not much instruction around on how to use the skew.



I have been teaching students how to master the skew for decades. I always start with skew planing as the fundamental skew cut. Once you master this cut, you will be well on your way to confident use of the tool. I'll first show you how to practice the cut. Plan on working a number of practice pieces before tackling actual projects. In future articles we will build on this foundation and look at other more advanced skew cuts.

APPLICATIONS

The number one application for the planing cut is spindle work where the grain of the wood is parallel to the bed of the lathe. Planing cuts are used to create cylinders, tapers and shallow concave or convex cuts. After practice with planing cuts, I encourage my students to make their own tool handles using a skew. It's a great first project to hone your new skew planing skills.

THE RIGHT SKEW

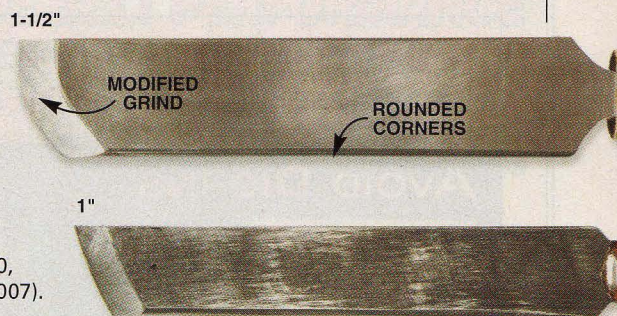
A wide skew is best for planing cuts (Photo 1). It's extremely important that the skew be very sharp. The degree of control with this tool is in direct proportion to the degree of sharpness. Be sure that the corners behind the cutting edge are softened or rounded over all the way back to the ferrule. This allows the tool to glide across the tool rest with a smooth motion.

The modified grind that I favor (curved edge for the lower two-thirds, straight across for the upper third) has one huge advantage for the planing cut: if you maintain the cut in the curved section you will almost always avoid a dig-in. Also, a curved edge cuts cleaner in woods that tend to chip. For more on how to tune-up your skew chisel, see "Reshaping The Skew Chisel," p. 40, AW #127, March 2007.

PREPARE THE LATHE

The next step is to prepare the lathe itself. I strongly recommend using a cup drive rather than the spur center that came with your lathe (Photo 2). Finally, check the tool rest and file out any nicks

1 I prefer a large 1-1/2-in. or 1-in. skew for planing. The modified grind on the large skew makes the tool easier to use (see "Reshaping The Skew Chisel," p. 40, AW #127, March 2007).



2 Replace your headstock's spur drive with a cup drive. A catch is inevitable when you're learning. A cup drive slips like a clutch to minimize a catch; a spur drive holds fast to the wood and aggravates a catch.



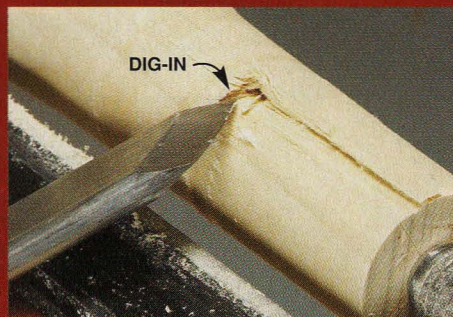
3 Start your practice cuts about 1-in. from the cylinder's right end. Cut with the tool's lower half, or short point, leading the cut. Rest the skew on one of its rounded corners—not flat on the tool rest. Rub the bevel on the cylinder, then gently lift the handle until the edge cuts into the wood without losing contact with the bevel. Slowly advance the tool to the left.



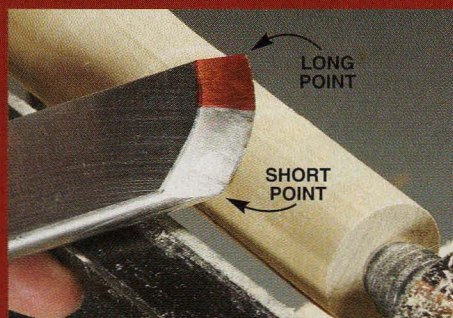
4 Practice planing in the opposite direction. Reverse your hands or shift your body around. Experiment with your front hand either below or on top of the tool.

TYPICAL PROBLEMS AND HOW TO AVOID THEM

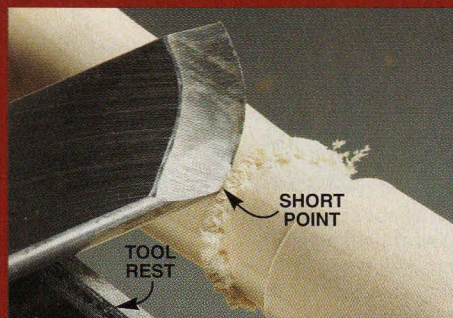
AVOID DIG-INS



5 A dig-in can be dramatic, especially when using a spur drive on dry hardwood. You'll get a dig-in if the unsupported trailing edge or long point of the tool catches and is pulled down into the wood.



6 Avoid dig-ins by using the lower 2/3 of your tool, starting just above the short point. Stay away from the red zone indicated above.



7 The short point can safely enter the cut because it is supported by the tool rest. It's sometimes used to cut up to a detail although it tends to fray the fibers a bit.

“Once you master the planing cut, you will be well on your way to confident use of the skew.”

or dents with a mill file. Finish prepping the tool rest by rubbing on a little paraffin wax. Now your skew can glide effortlessly across the rest as it cuts.

PRACTICE MAKES PERFECT

Start with a 2" x 2" x 8" square blank mounted between centers. I suggest a softer wood like yellow poplar or red alder that's straight grained and free of knots. Cut-up 2 x 4's will do in a pinch. Just be sure to cut out the knots.

Always wear a full faceshield. With the lathe set to a moderate speed (900 to 1400 rpm) use a spindle-roughing gouge to create a cylinder. In time you will enjoy roughing short pieces like this by planing with the skew.

Start your practice cuts with the skew at the right end of the cylinder (Photo 3). Slowly advance the tool to the left until you reach the edge of the wood. Turn off the lathe and admire the quality of the cut surface. Develop your skill by cutting both directions on the cylinder (Photo 4). Also, be sure to always cut “downhill” (larger to smaller diameters) when there is a variation in diameter.

TYPICAL PROBLEMS WITH PLANING CUTS

DIG-INS

This is perhaps the most feared problem as it does considerable damage to the wood and to your nerves. A dramatic dig-in often causes new turners to reject the skew as having a mind of its own and a vicious one at that. As a consequence they miss out on all the skew has to offer the serious turner. A dig-in always happens when the unsupported portion of the tool (the long point or trailing edge) is pulled into the wood (Photo 5).

To avoid dig-ins, use a large skew and stay within the lower two-thirds of the edge (Photo 6). Even if you cut with the short point or leading edge of the skew, it won't dig-in (Photo 7).

RUN-BACKS

Run-back, aka screw threading or spiraling, is one of the most common problems students have when learning to

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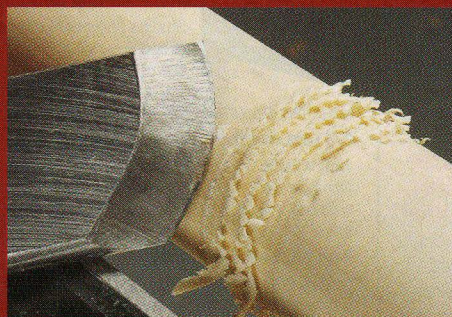
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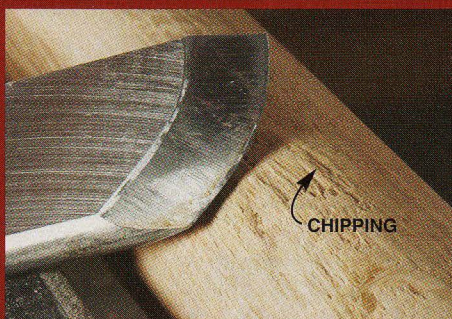
TYPICAL PROBLEMS AND HOW TO AVOID THEM

ELIMINATE RUN-BACK



8 Run-backs are caused by a loss of bevel support below the cutting edge. The solution is to feel the bevel contact the wood before the cut is made. Then maintain that feel throughout the cut.

MINIMIZE CHIPPING



9 Chips are a serious flaw that requires major sanding to fix. To avoid chipping, steepen the cutting angle for more of a shearing cut and slow the feed rate. Also, be sure to use a sharp tool.

REDUCE RIBBING



10 Ribbing is a series of ridges caused by vibrating stock. To dampen vibration, support the stock with your hand. Set the tool rest close to the work and use your thumb to press down on the tool.



11 If you are uncomfortable with backing the wood with your hand, try to keep firm downward pressure on the tool. This helps to eliminate ribbing from a bouncing tool.

plane with the skew (Photo 8). The cause is simple but subtle: loss of bevel support below the cutting edge. It can occur at anytime: when you first contact the wood, midway in a cut or at the conclusion of the cut. The solution is to keep the bevel in contact with the wood at all times.

CHIPPING

Just like using a hand plane or running a board over a jointer, chipping or tear-out can be a significant problem when planing with a skew (Photo 9). Some woods are naturally more “chippy”—such as red oak or figured woods. Borrow techniques from the hand plane user: change direction and “skew” the skew chisel by moving it from a 45 degree angle to the axis of the lathe to 60 or 75 degrees.

Anyone who has used a jointer knows that a slow feed rate reduces chipping. In highly figured woods I sometimes advance the tool at a crawl—but end with little or no chip out.

RIBBING

When you hear an odd humming noise and notice the wood has a corrugated or washboard appearance, you have encountered “ribbing.” Slight ribbing can be sanded away easily. Deep ribbing is a major flaw that often happens on long narrow stock. Usually the cause can be traced to the tool bouncing in and out of the cut or the wood flexing. A dull tool contributes to both causes, so keep the skew sharp. To steady the flexing wood, many professionals use a hand on the backside of the wood (Photo 10). If you are not comfortable with this approach, try an overhand grip while applying downward pressure to the tool rest (Photo 11). Remember—practice makes perfect.

Alan Lacer is a professional turner living in Hudson, Wisconsin. His web site, www.alanlacer.com, has a number of articles, skew chisel videos, woodturning tools and accessories (such as skews, diamond hones, and cup centers).

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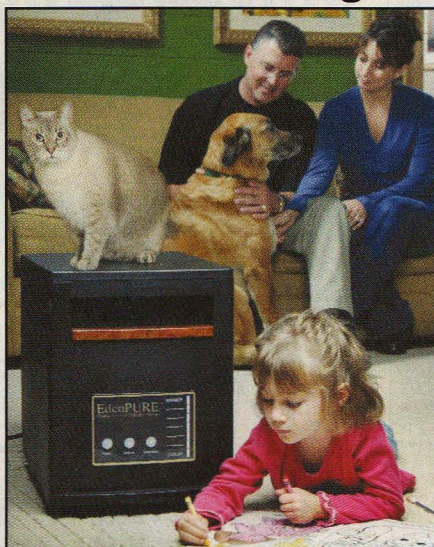
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After a great deal of research and development, very efficient infrared heat chambers were developed that utilize three unique patented solid copper heat exchangers in one EdenPURE® heater.

Q. How can a person cut their heating bill by up to 50% with the EdenPURE®?

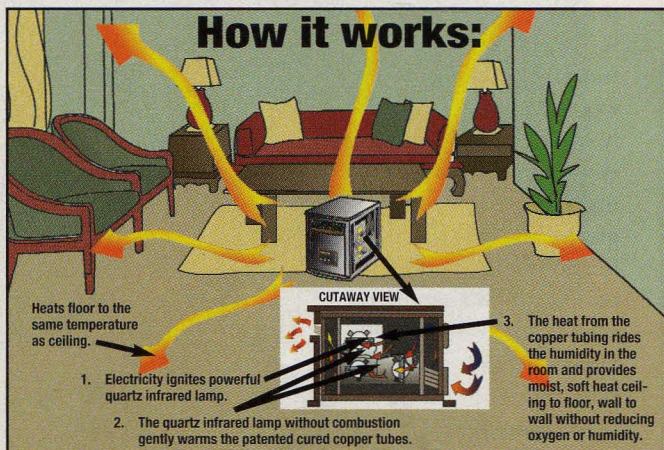
A. The EdenPURE® will heat a room in minutes. Therefore, you can turn the

heat down in your house to as low as 50 degrees, but the room you are occupying, which has the EdenPURE®, will be warm and comfortable. The EdenPURE® is portable. When you move to another room, it will quickly heat that room also. This can drastically cut heating bills, in some instances, by up to 50%.

The EdenPURE® heater is now greatly improved. The EdenPURE® comes in 2 models. Model 500-XL heats a room up to 300 square feet and Model 1000-XL heats a room up to 1,000 square feet.

End of interview.

Readers who wish can obtain the EdenPURE® Quartz Infrared Portable Heater at a \$75 discount if they order in the next 10 days. Please see the Special Reader's Discount Coupon on this page. For those readers ordering after 10 days from the date of this publication, we reserve the right to either accept or reject order requests at the discounted price.



New Model Improvements

1) The XL runs very much quieter. This type of super efficient fan system produces what is termed white noise which blends into a home atmosphere and becomes virtually inaudible. You now have to put your ear next to the heater to hear it operate. In addition to quieter the new fan blades are able to generate higher pressure air flow which pushes the warmer air out further into the room.

2) The XL heats better. The XL thermostat has been vastly improved so that it operates within a tighter range of degrees. The previous model used a mechanical thermostat which could produce a 6 degree variance in heat. This could be uncomfortable especially for the more heat sensitive elderly. The XL's electronic

thermostat does not only eliminate the problems of a mechanical thermostat, but it is set to a much tighter tolerance. This will promote an extremely more comfortable even stable heat.

3) The 1000-XL features digital controls. It has a simple 3 large button remote control which turns the unit on, and you set the control level that you want which reads out on the front of the unit. It also has a remote control so you can adjust the comfort level without getting up.

4) The 500-XL has a single on/off switch and adjustable digital thermostat.

5) The XL is much more reliable. The thermostat and electronics are all solid state and the infrared bulbs are greatly improved to last for a very long time.

SPECIAL READER'S DISCOUNT COUPON

The price of the EdenPURE® Model 500-XL is \$372 plus \$17 shipping for a total of \$389 delivered. The Model 1000-XL is \$472 plus \$27 shipping and handling for a total of \$499 delivered. People reading this publication get a \$75 discount with this coupon and pay only \$297 delivered for the Model 500-XL and \$397 delivered for the Model 1000-XL if you order within 10 days. The EdenPURE® comes in the decorator color of black with burled wood accent which goes with any decor. There is a strict limit of 3 units at the discount price - no exceptions please.

Check below which model and number you want:

- ☐ Model 500, number _____
☐ Model 1000, number _____

• To order by phone, call TOLL FREE 1-800-588-5608 Ext. EPH4960. Place your order by using your credit card. Operators are on duty Monday - Friday 6am - 3am, Saturday 7am - 12 Midnight and Sunday 7am - 11pm, EST.

• To order by mail, by check or credit card, fill out and mail in this coupon.

This product carries a 60-day satisfaction guarantee. If you are not totally satisfied, your purchase price will be refunded. No questions asked. There is also a one year warranty.

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Check below to get discount:

- ☐ I am ordering within 10 days of the date of this publication, therefore I get a \$75 discount and my price is only \$297 for Model 500-XL and \$397 for Model 1000-XL delivered.
☐ I am ordering past 10 days of the date of this publication, therefore I pay shipping and handling and full price totaling \$389 for Model 500-XL and \$499 for Model 1000-XL.

Enclosed is \$_____ in: ☐ Cash ☐ Check ☐ Money Order

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☐ VISA ☐ MasterCard ☐ Am. Exp./Optima ☐ Discover/Novus

Account No. _____ Exp. Date _____ / _____

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MAIL TO: BioTech Research Dept. EPH4960, 7800 Whipple Ave. N.W., Canton, OH 44767

SUPER GLUED

After making a small repair with Super Glue, I put the tube in my pocket and forgot about it. Later, when I saw the tube's cap sitting on my workbench, I instinctively reached into my pocket—and discovered that my pants were securely glued to my thigh! I headed to the bathroom and grabbed a razor blade to free myself. Hearing the commotion, my wife came to help. But when she saw my predicament, she just burst out laughing. Fortunately, with delicate slicing, I was able to complete the task. If something else had gotten glued, it could have been much worse!

Jim McMichael



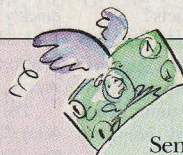
DIMENSIONAL DEMENTIA

After double-checking my cutting list for the bunk bed I was building, I cut all the lumber to final width and length. But when I started assembly, I discovered a problem: every piece that was supposed to be 39 inches long was 36 inches long instead. A quick calculation verified what I already knew: I had cut about \$100 worth of 8/4 maple boards 3 inches too short.

I checked my cutting list: I had correctly written "39 inches" as the length for those pieces, but just below, I had also written "36 inches." Was I thinking about adding tenons or making the bed narrower? I have no idea.

When little things go wrong in the shop (bump my head, smack my finger, drop a box of screws, etc.) I can handle it. But when this happened, I just went upstairs and stared mindlessly at the TV.

Raymond Ladouceur



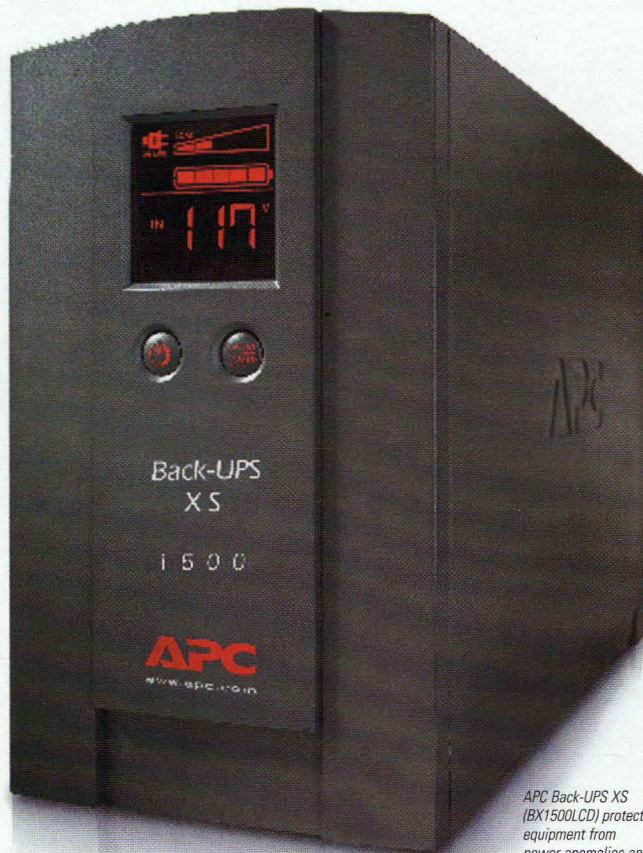
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Smart-UPS® 1000

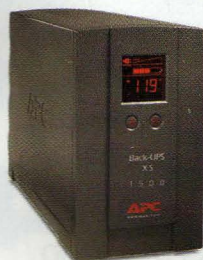


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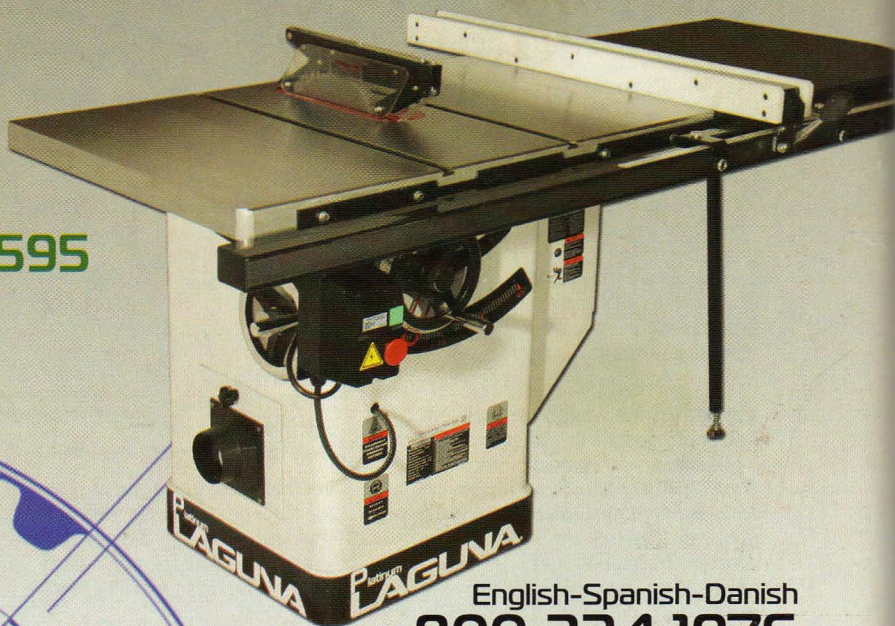
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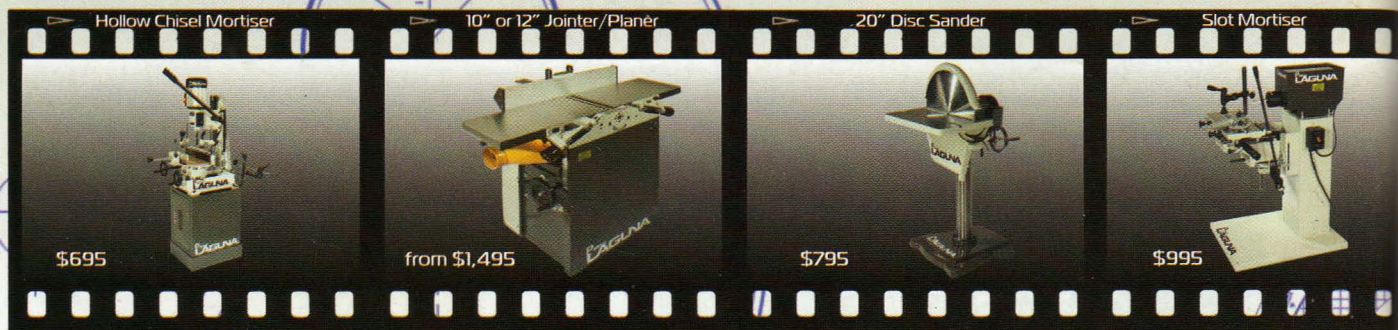
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