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JUNE 1998 #66

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COVER STORY PAGE 41



Page 50 Quick-change bits



Page 36 Steamy work for a super swing

Features

36 Porch Swing

Curved slats make this swing a comfortable classic
by Bruce McArthur

41 Perfect Picture Frames

Build them yourself for less
by Andy Rae

48 Using a Cutting List

Save time and materials with just a few sheets of paper
by Lonnie Bird

50 **SHOP TEST** Quick-Change Drill Drivers

Ten slick systems for sinking screws

54 Keepsake Cabinet

A magnetic latch is the key to this beautiful box
by Andy Rae

58 Shellac and Wax

A fast finish with a silky feel
by Ian J. Kirby and John Kelsey

62 Build a Fast-Action Vise

Soup up your bench with this ingenious wooden workhorse
by Jerry Beall

66 Scary Sharp!

Use sandpaper and glass to give your tools a super-keen edge
by Michael Dunbar

69 Lapstrake Canoe

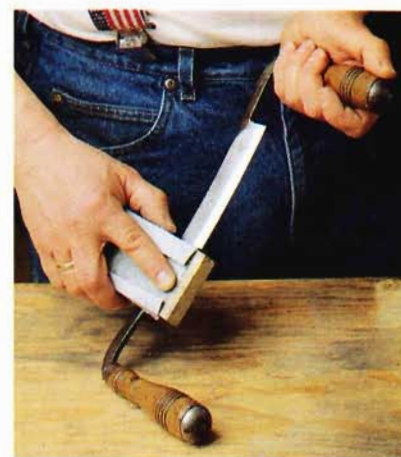
Witness the birth of a wooden boat
by Simon Watts



Page 48
Using a cutting list



Page 54
Keepsake cabinet



Page 66 Sharpening secrets

On the cover: Associate editor Andy Rae with a custom-made picture frame.

PHOTO BY JOHN HAMEL/RODALE IMAGES

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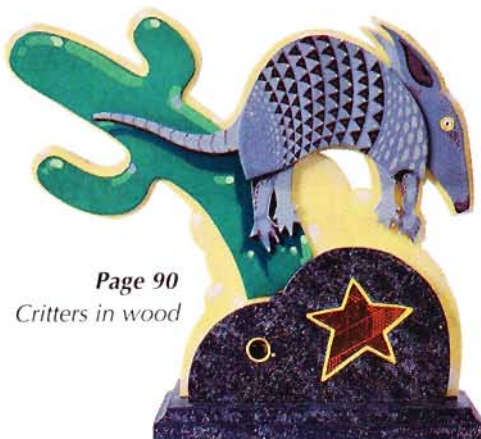
- 8 **A Word from the Editor**
Expect the unexpected
- 12 **Letters**
Promoting tablesaw safety
- 18 **Q&A**
Easy dentil moldings
- 26 **Offcuts**
Exquisite chisels
- 32 **Tech Tips**
Router dado jig
- 74 **Wood Facts**
White oak
- 78 **Just Finishing**
Danish oil
- 82 **Toolbox**
Speedy cabinet clamp
- 86 **Shop Test**
Excalibur Sliding Table Model SLT60
- 90 **Gallery**
The moving work of John Morgan
- 96 **Shop Solutions**
Miter saw stand



Page 26
Fold-up workbench



Page 84
Talking tape



Page 90
Critters in wood



Page 96
Portable miter saw stand

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EDITORIAL & ADVERTISING OFFICES
33 E. Minor St., Emmaus, PA 18098
Phone: (610) 967-5171 • FAX: (610) 967-7692

EDITOR & PUBLISHER David Sloan

EXECUTIVE EDITOR Tim Snyder

ASSOCIATE EDITORS

Paul Anthony, Dave Freedman, Andy Rae

PRODUCTS COORDINATOR Dave Sellers

PRODUCTION MANAGER Susannah Hogendorn

COPY EDITOR Kathy Dvorsky

WEST COAST EDITORS

Simon Watts, Sandor Nagyszalanczy

CONTRIBUTING EDITORS Lonnie Bird,

Stephen Blenk, Jim Cummins, Michael Dresdner,

Mike Dunbar, Frank Klausz

ONLINE HOST Jim Cummins

DESIGN SHOP Fred Matlack

ASSISTANT TO THE PUBLISHER Tracy Jones

OFFICE MANAGER LaVerne Walker

ART DIRECTOR Kitty Pierce Mace

ASSOCIATE ART DIRECTOR Melanie Powell

EXECUTIVE EDITOR, NEW VENTURES
Ellis Valentine

ADVERTISING DIRECTOR Don Schroder

NATIONAL ACCOUNTS MANAGERS

Henry Nagel, Jay Ricci

MARKETPLACE/CLASSIFIED Ian Tauber

DETROIT SALES REPRESENTATIVE Donald Hollinger

Rodale Press, Inc., 901 Wilshire Drive, Suite 300,

Troy, MI 48064, (248) 269-8880

AMERICAN WOODWORKER SHOW™ MANAGER

Jonathan I. Frank

ADVERTISING PRODUCTION MANAGER &

SHOW COORDINATOR Lisa Unruh

ADMINISTRATIVE ASSISTANT Betsy Horvath

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Expect the Unexpected

Woodworking wizardry is always on the menu

Remember Mr. Wizard? This 1960s TV personality sported industrial-strength glasses and a lab coat worn over button-down polyester. But if you ever wanted proof that appearances can be deceiving, Mr. Wizard (real name: Don Herbert) was it. Every Saturday, *Watch Mr. Wizard* delivered a fascinating and unexpected brand of science. You could always count on Herbert to conjure up something remarkable using the most common materials—household vinegar, mouse traps, copper pennies, tin foil, balloons, you name it.

This spirit of adventure—call it wizardry—is a big part of our mission at AMERICAN WOODWORKER. Like Mr. Wizard, we're always out to uncover the magic that can transform a very common raw material into something special.

This issue should keep you busy with some exciting transformation work. Just take a look at Jerry Beall's amazing quick-release vise (page 62). Beall puts a new twist on an old fixture, using four tiny, powerful magnets to control a ratchet-type mechanism. The latch on Andy Rae's keepsake cabinet (page 54) is also "powered" by hidden magnets. Check out this invisible and easy-to-install latch before you build your next case piece.

If spring has you hankering for an outdoor project, you won't want to miss Bruce McArthur's porch swing (page 36). The entire staff got excited when we began working with McArthur on the swing design. The steam-bent slats not only look great, they make this swing the most comfortable one you'll ever sit on. Reserve your best oak for this project.

I hope you'll also find some useful magic in our picture-framing feature. Professional picture framers charge a small fortune to transform a few pieces of molding into a finished frame. We'll show you how to do the work yourself and save plenty of money.

Finally, let me suggest that most woodworking adventures, big or small, begin with nothing more than paper and pencil. Lonnie Bird's advice on using a cutting list can help you work more efficiently and get exactly the right parts out of your lumber. After all, we want your woodworking wizardry to have the very best results. ▲

Tim Snyder
Executive editor

Safety Is Important

Woodworking can be dangerous. Safety equipment can greatly reduce your risk of injury; so can common sense and caution. Remember, if a procedure feels dangerous to you, don't try it—find a safe alternative. Your safety is your responsibility.

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Publisher

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Promoting Tablesaw Safety

My hat's off to you, your magazine, and especially to Dave Freedman, Ernie Conover, Bernie Maas, and Dr. Follette for their articles on tablesaw accidents in AW #64. This is the sort of gutsy writing that's missing from most U.S. magazines. Bravo!

I learned my woodworking from an old-time wooden boatbuilder who died with all of his fingers undamaged. "Tools are dangerous," he told me. "If they weren't dangerous, they wouldn't cut the wood." His simple method for avoiding injuries was constant attention to the job at hand. He taught me that safety is an attitude, saying, "You have to pay attention to what you're doing."

David Brown
Port Clinton, OH



Excellent issue (AW #64), especially on safety. It was long overdue. No number of articles will ever convince those who think that helmets, seat belts, and blade guards are for wimps, but it might very well have an effect on those who are new to the hobby/profession.

I don't have any horror stories for you. I already have an overhead blade guard and safety devices everywhere. The worst thing that ever happened to me was dropping a clamp on my toe.

A hobby should be fun. When there is potential risk, all safety precautions should be taken to keep it fun. If your magazine saves just one person's finger, hand, or eye, you can take satisfaction in knowing that you've done a great service for the woodworking community.

Ed Gottlieb

I was especially interested in your excellent article "Preventing Tablesaw Accidents." It was full of wisdom no woodworker could ignore.

But in Frank Pollaro's "Satinwood Box" article, I was concerned with the photo showing Frank separating the box top on his tablesaw. This is a very dangerous process. Once the bottom is cut free of the lid, it could kick back with such speed, there will be nothing between the blade and the operator's left hand. This happened to me, and I have a considerably narrowed first finger and thumb to show for my lapse.

A safer way is to make cuts around three sides of the box, then place spacers in the kerfs and tape the lid and base together before cutting the fourth side.

Jack Nichols
Kansas City, MO

"Board Hoarders" Anonymous



As a hard-core "board hoarder" with a growing collection of lumber, I consider your article on Andy Rooney in AW #63 to be the best I have ever read. Andy made me aware of what I should have known all along—that I get as much pleasure from that special roughsawn board as I ever could from something crafted from it. When I showed the article to my wife, she laughed because she recognized Andy's sentiment as my own. It didn't help her to understand me any better, but at least now she knows that I'm not alone. Incidentally, my next project is to frame and hang one of my walnut crotches, if I can just decide which one to part with...

Andy Pridham

Scrap Is Anything But



I found Tim Snyder's editorial, "It's Not Scrap," (AW #64) interesting. A very primitive method of disposing of scrap is to get a small woodburning stove and burn it. But I consider wood left over from various projects very valuable. I keep every

piece over 4 in. square in a trash can. When I need to get away from my stressful job, I dig into my cache of wood and build birdhouses, which I'll eventually sell to artists and craftspeople who paint and sell them. I'll use the income to buy equipment and supplies. Not bad for leftovers.

Jim Apistolas

How Much Veneer?



It's true that the U.S. and Canada produce about 3.5 billion sq. ft. of hardwood veneer per year (AW #65, page 28). That's enough to cover about 125 square miles. But it won't come close to covering both countries 17 times, as your Factoid suggests. I still enjoyed the issue.

Jerry Lappin

Thanks for pointing out our mistake. The veneer production statistic provided by the Hardwood Plywood and Veneer Association was accurate. We miscalculated the area of coverage.—Eds.

Super Skin Solution



I noticed cyanoacrylate glue among the first-aid kit items James Follette recommends in "Managing Tablesaw Accidents" (AW #64). How is superglue used to treat minor abrasions?

Rob Pinkall

James Follette replies: I first heard of using superglue in the medical literature to cover those nasty little skin cracks that can develop on fingers, especially in winter. Cyanoacrylates are (usually) nonallergenic and nontoxic, can be applied directly on the cut or abrasion, and do not sting. The covering lasts only a day or two, can be reapplied, and keeps the wound clean and pain-free. I tried some

STAY IN TOUCH! If you have comments, corrections or news to share, we want to hear from you.

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LETTERS

on my own fingertip when I removed a bit of skin with my benchtop belt sander not long ago. It worked great!

Eventually, many surgical incisions and accidental lacerations may be closed with a special type of superglue called *N-octyl cyanoacrylate*, which is currently undergoing clinical trials for this purpose.

Mortiser Moxie

In your benchtop mortiser review (AW #64), I was surprised to see that the Delta 14-650 ran at 1,725 rpm. I have a Delta 14-650 mortiser, but its motor runs at 3,400 rpm. What's the story here?

Jerry Schnese
Appleton, WI

According to a Delta spokesperson, earlier models of the 14-650 mortiser were equipped with 3,400 rpm motors. Delta switched to the 1,725-rpm motor—slowest of all the models we tested—in April 1997.—Eds.

More Wood Than Meets the Eye

Regarding your cartoon about the decline in forestland in the U.S. ("Offcuts," AW #63): The problem with simply hanging numbers out there without any comment is that readers may come to the conclusion that our forest situation is in some kind of desperate state.

This is hardly the case. We are doing pretty darned well as a society in main-

taining our forestland base. The same Forest Service data you cited shows that in 1992, we had more trees and more cubic feet of wood than we did in 1952. I think woodworkers can be assured that the forests in the U.S. are in good shape, and for the most part, under good management.

David Robinson
Stillwater, OK

MORE ON NORM

The article on Norm Abram's rolling shop cabinet (AW #64) drew quite a few requests for more information. For a catalog of plans and videos on New Yankee Workshop projects, phone 800-892-0110. Detailed plans of the cabinet (Item #NY4011) are available for \$10. For plans and a video showing Norm building the cabinet, ask for Item #NY4012. The cost is \$24.95 plus \$4.95 shipping and handling.—Eds.

Corrections

The drawing of the tablesaw coving setup in the "Sleigh Bed" article (AW #64, page 47) is incorrect. The clamp at the outfeed end of the fence should have been drawn on the other side of the fence.

In the section of "Preventing Tablesaw Accidents" entitled "Dadoing with the Rip Fence" (AW #64, page 65) there was a contradiction. The author recommends using polycarbonate such as Lexan—not Plexiglas, which is an acrylic—to make the guard.

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Easy Dentil Moldings

Q I need to make 90 linear ft. of dentil molding to top a roomful of built-in bookcases. Is there a jig to make this easier? How can I keep the fragile molding from breaking during handling?

Doug Weinstein
Boca Raton, FL

A I cut the dados in a wide board on my radial-arm saw, with the simple setup shown at right. Then I rip it to final thickness. This process yields cuts clean enough to paint without sanding.

Find a flat, square board that fits in the fence slot of your saw table. Cut two notches in the board, spaced wide enough to match the desired thickness of the dentil “teeth,” and deep enough to be flush with the tabletop. Rip a scrap stick to fit in the rightmost notch.

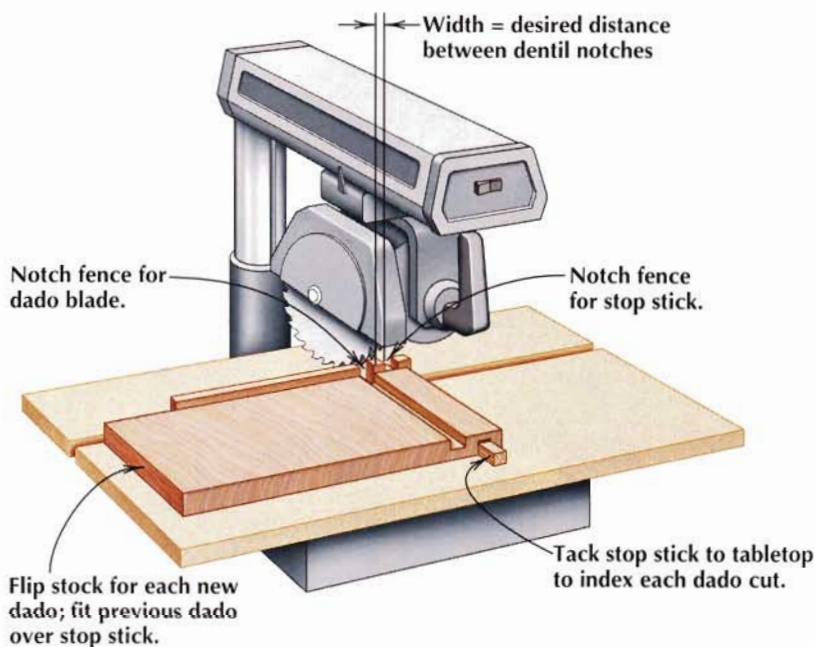
For my first dado, I butt the workpiece against the fence and the stick. Then I flip the board, fit the first dado over the stick, and cut the second dado. I continue this to the end of the board. As shown at right, my moldings are Chippendale style. For a traditional molding where all the teeth face the same way, don’t flip the board—just remove the stick, slide the board down, and reinsert the stick in the next dado.

For strength, I glue a thinner support board onto one side of the dadoed board and rip the two together. The support board forms a border on the upper half of the dentil molding, so you don’t have to brad through the dentil itself. A crown molding conceals the border.

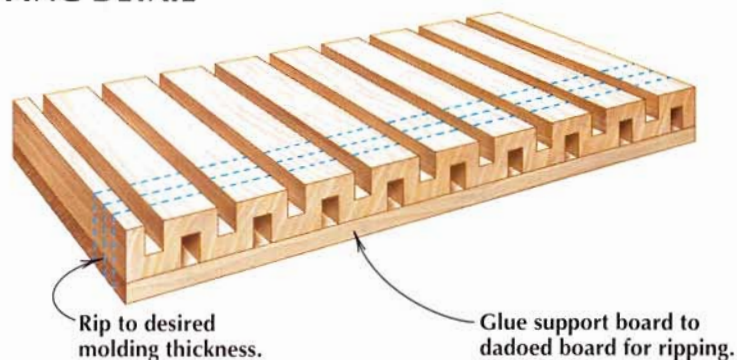
George Andersen
Wilton, NH

RADIAL SAW DENTIL MOLDING SETUP

The simple wooden fence has two notches—one for a stick that serves as an indexing stop, and one for your dado blade. Set your dado blade to the desired width of the dentil notches.



RIPPING DETAIL



Veneer: How Thick is Too Thick?

Q I enjoyed the article on resawing in AW #61, but it made me wonder: What can you do with 1/8-in.-thick veneers? Won’t such thick veneers move, causing glue failure?

Bob Wilkosz
Tampa, FL

A There are two types of veneering applications, and each has different thickness requirements. Note that each

case avoids glue failure in its own way.

First, you can use veneer over a solid wood core with the same grain direction as the veneer. This technique works for small inlays, matched drawer fronts, or bent lamination. For these applications, the core and the veneer can expand and contract, because there is no cross-grain conflict. Veneer of any thickness will work. But balanced construction—for instance, veneering both sides of a thin core—may help keep parts flat, especially when the parts are wide and thin.

Second, you can use veneer over a cross-grain or man-made core. In this case, the glue must be able to overpower the veneer’s ability to expand and contract. To meet this requirement, you can start out with veneer that’s 1/8 in. or thicker, but after surfacing the veneer must be 3/32 in. or thinner.

To avoid saw marks “telegraphing” through the veneer in this situation, level the face that will be glued. You can do this by hand, using a toothing plane and scrapers, or by machine, using a

thickness planer or sander. Do the final leveling of the face after you glue the veneer to the core, so it's held flat.

Will Neptune
Instructor
North Benner St. School
Boston, MA

Cutting Through

Q I applied dye stain and one coat of satin polyurethane to a cherry table. The stain went on fine, but when I wet-sanded the poly with 320-grit paper, the edges lost some stain. I went back over the sanded areas with more stain, but the stain won't take. What did I do wrong, and how can I fix it?

Scott Arnhem
Bismarck, ND

A The first step is to learn how to avoid cutting through in the future. Wet-sanding with so few coats of finish is risky. Next time, I'd use maroon Scotch-Brite, not sandpaper, to rough up the first coat—it won't cut

through as easily. Save the sandpaper for the second or third coat of poly.

If you do cut through, apply the dye to the worn area with a small sable brush. A brush leaves more dye on the surface than wiping does. If the dye still won't take, thicken it with gum arabic, a water-soluble resin available from common mail-order catalogs and art supply stores. Allow more drying time for the thickened dye—resin tends to hold water longer.

Michael Dresdner
Industrial finishing consultant and
AW contributor
Puyallup, WA

Throat Plates for Tall Blades

Q I want to make a wooden zero-clearance throat plate for my tablesaw, to minimize tearout and keep offcuts from falling into the saw. How should I cut the slot in the throat plate? I can't raise the saw blade into it, because I can't crank the blade low

enough for the plate to seat completely in its opening. And I know it's unsafe to lower work onto a spinning blade.

Derek Lyons
Millard, NE

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A One solution would be to cut the slot using a smaller-diameter blade with the same tooth width as the blade you'll regularly use. Otherwise, you'll have to shim the throat plate up in its recess until it clears the top of the blade.

You may be able to use your original metal throat plate as a shim, by retracting its height-adjustment screws. If this doesn't create enough of a recess in the tabletop to securely hold the new plate for cutting, put wood shims underneath the new plate.

In each of these cases, span the setup with a stout board clamped at both ends to your saw table. To cut the slot, raise the blade slowly into the new throat plate, staying out of the path of possible kickback.

Paul Anthony
AW Shop manager

Source for "Magic Wires"

Q I'm planning to build an entertainment center with pocket doors, like the one in AW #57. But I'm

having some trouble finding "magic wire" hardware. Can you help me to locate a source?

Ivan Klein
Carlisle, PA

A "Magic wires"—also called stealth clips, invisible wires, or wire supports—support vertical partitions or shelves, but aren't visible. Woodworker's Supply, Inc. (1108 N. Glenn Rd., Casper, WY 82601, 800-645-9292) sells them in two sizes. Part 826-021 is 7 $\frac{3}{4}$ in. long and costs \$1.35. Part 826-028 is 9 $\frac{3}{4}$ in. long and costs \$1.65.

Andy Rae
Associate editor of AW

Shoe-Polish Wax for Walnut

Q I'm finally building Lonnie Bird's lowboy from AW #38. He says he completed his lowboy with a thin coat of brown shoe polish. Paste or liquid?

Bob Darlington
Sun City, AZ

A Wax is a traditional polish on top of shellac finishes, as explained on page 58. But ordinary paste wax can leave a white haze on dark woods such as walnut, so I use a dark wax. Some manufacturers make dark brown wax for furniture, but I prefer brown paste-type shoe polish. It wears well and matches walnut better than the furniture waxes I've tried. To make the wax easier to apply, I soften it by mixing in a small amount of mineral spirits. Be warned that most shoe polishes contain silicone, which can cause future refinishing problems.

Lonnie Bird
Woodworking instructor and
AW contributor
Rio Grande, OH

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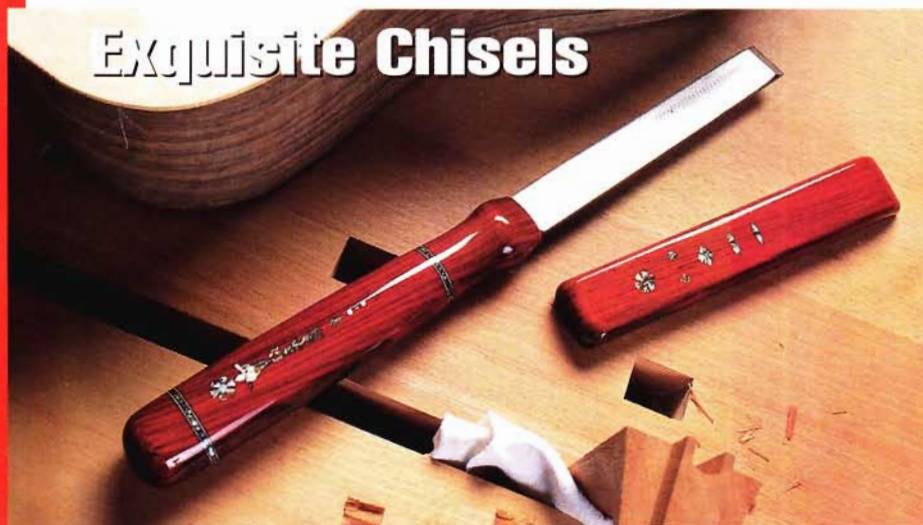
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offcuts

Bits and pieces of woodworking news

Exquisite Chisels



Incomparable parer. Tim Teel made this paring chisel and sheath from an old file, scrap rosewood, and mother-of-pearl inlay.

Making custom chisels has become a tradition among “neck fitters” at the Martin Guitar Co. in Nazareth, PA. These woodworkers need super-sharp chisels with long, thin blades and long handles for the precise paring work required to fit guitar necks to bodies. Martin employee Tim Teel has taken chiselmaking to an art, crafting exquisite versions from discarded files, rosewood offcuts, and spare mother-of-pearl pieces—all salvaged from scrap piles at the factory. (See photo, left.)

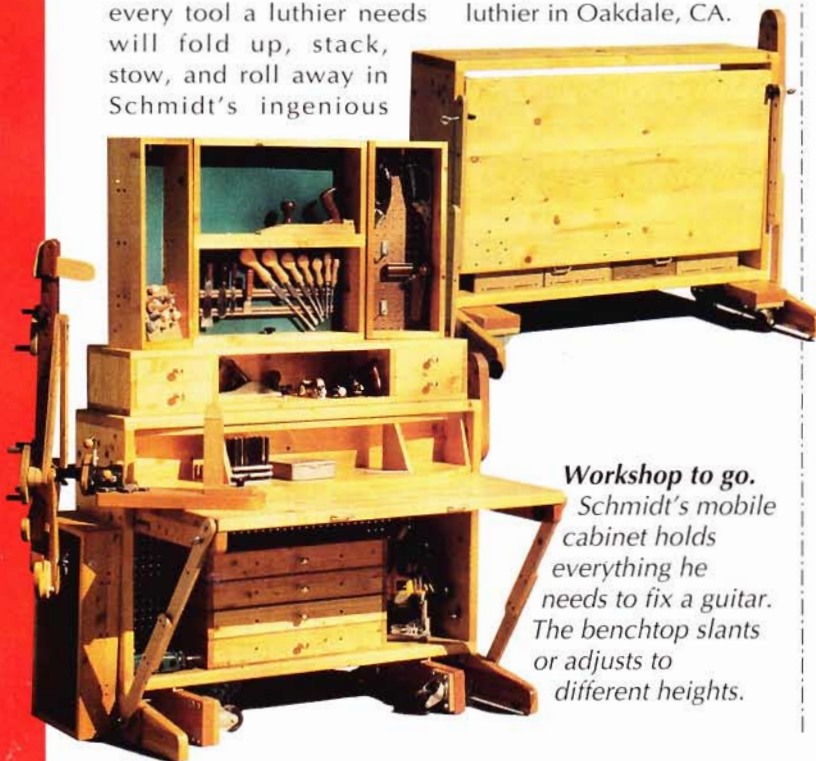
“Old files make great paring-chisel blades, because they’re harder than normal chisel steel, and they hold a sharp edge longer,” explains Teel. “I grind off the teeth, epoxy the tang into a handle, and grind the bevel on a wet wheel.” Because they’re more brittle than normal chisels, they shouldn’t be hit with a mallet, he adds.

PHOTO BY JOHN HAMEL

LUTHIER'S SHOP IN A BOX

Whenever Bill Schmidt gives guitar-repair demonstrations at luthier shows, he brings his own workshop. A benchtop and every tool a luthier needs will fold up, stack, stow, and roll away in Schmidt's ingenious

pine cabinet. And the whole shebang fits into the back of his pickup truck. Schmidt is a graphic designer and part-time luthier in Oakdale, CA.



Workshop to go. Schmidt's mobile cabinet holds everything he needs to fix a guitar. The benchtop slants or adjusts to different heights.

TOTEM POLE WORKSHOP

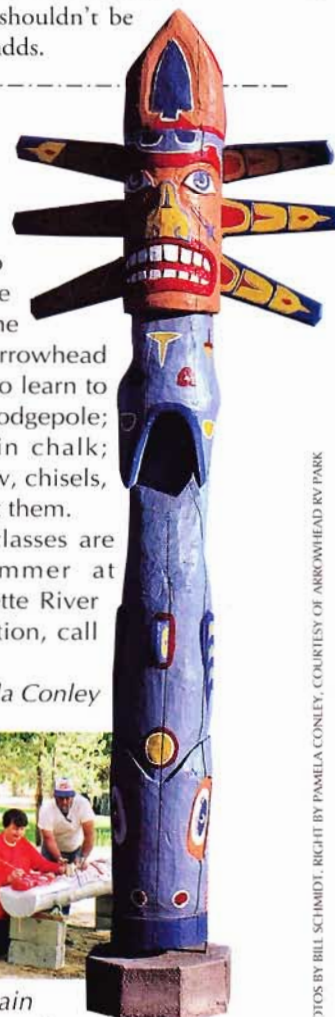
What wild animals or mythological creatures would you choose to symbolize your family? That's one of the challenges you'll face in the totem-pole carving class at the Arrowhead RV Park in Cascade, ID. You'll also learn to peel the bark from a 10-ft. pine lodgepole; outline your symbolic beings in chalk; carve their shapes with a chain saw, chisels, grinders, and sandpaper; and paint them.

Other woodcarving and craft classes are also offered during the summer at Arrowhead RV Park, on the Payette River north of Boise. For more information, call (208) 382-4534.

—Pamela Conley



Family project. Campers use a chain saw, chisels, grinders, sandpaper, and paint to create personal totem poles.



LEFT PHOTOS BY BILL SCHMIDT, RIGHT BY PAMELA CONLEY, COURTESY OF ARROWHEAD RV PARK

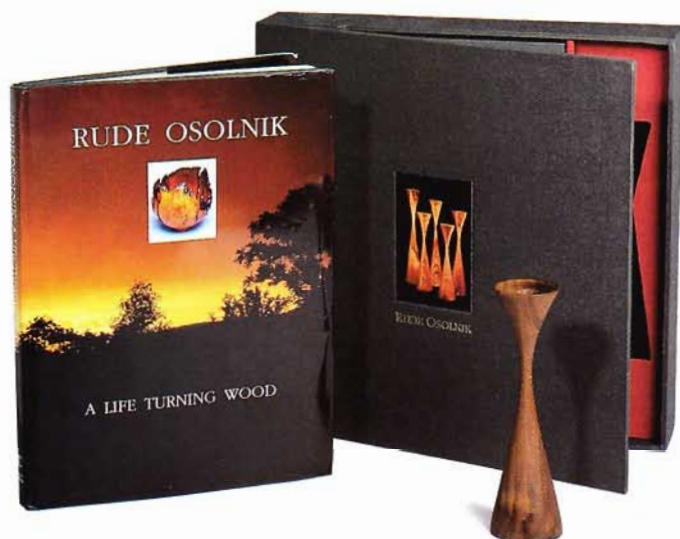
offcuts

A TURNING TREASURE

"There is a perfection deep in wood, and like all wood turners I love finding it and delivering it to the world." So writes 83-year-old master turner Rude Osolnik in the prologue to his new book, *Rude Osolnik: A Life Turning Wood* (Crescent Hill Books, 1997).

Mainly a biography, it includes color photos of his work and a chapter on his turning techniques.

The regular edition is \$40. A signed limited edition, accompanied by a candlestick Osolnik turned, is available for \$225. (See photo, below.) To order, call (800) 224-6708.

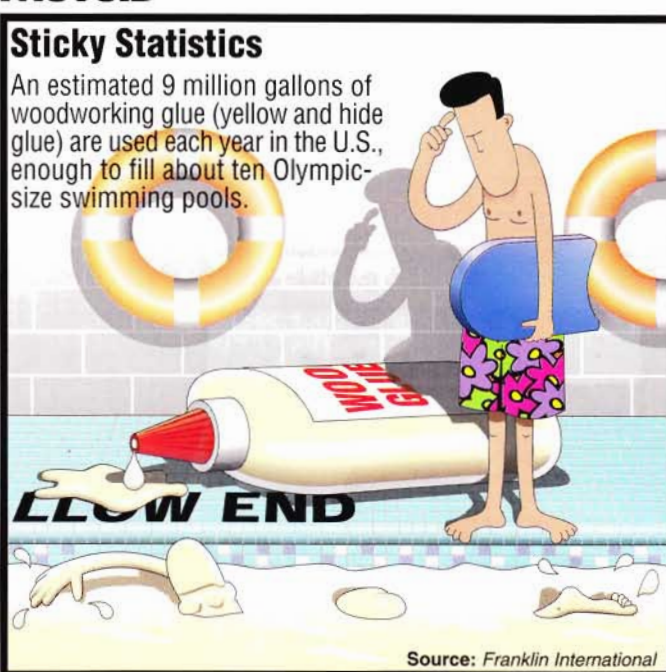


Inspiration. A limited edition of Rude Osolnik's book comes with a candlestick turned by the master himself.

FACTOID

Sticky Statistics

An estimated 9 million gallons of woodworking glue (yellow and hide glue) are used each year in the U.S., enough to fill about ten Olympic-size swimming pools.



Source: Franklin International

PHOTO BY JOHN HAMEL/RODALE IMAGES. ILLUSTRATION BY TREVOR JOHNSTON

JAPANESE TOOL MUSEUM

If you're interested in Japanese woodworking traditions—or just want to see some of the finest tools ever made—visit the Takenaka Carpentry Tools Museum in Kobe, Japan. The museum features some 10,000 woodworking tools from various historical periods going back to the Stone Age.

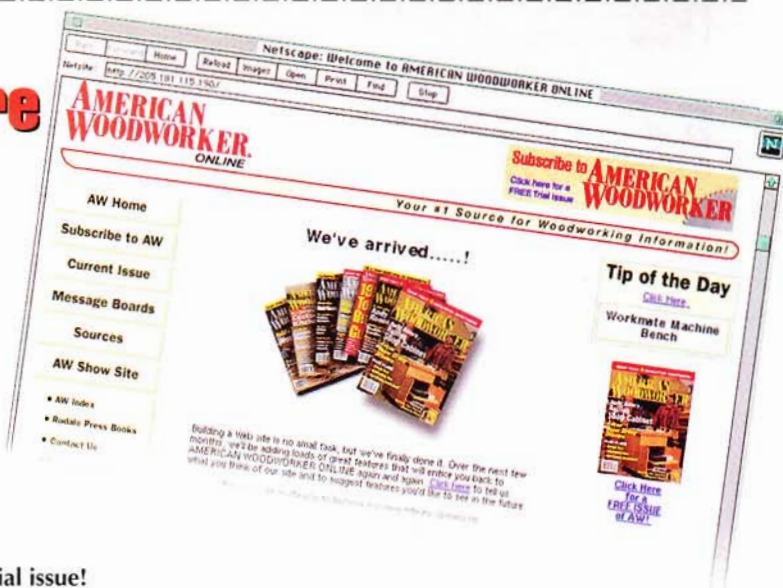
Exhibits at the museum are in English and other languages. The address is 18-25, 4-chome Nakayamatedori, Chuo-ku, Kobe, Japan; phone (078) 242-0216.

AW is on the Web!... not just on AOL anymore

AMERICAN WOODWORKER is now the only woodworking magazine with sites on both America Online (AOL) and the World Wide Web, bringing a world of great woodworking information to all Internet users. Here are just a few ways you can enjoy our new Web site:

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We can't tell you what's in store in coming months—only that you'll want to return to AW ONLINE again and again.



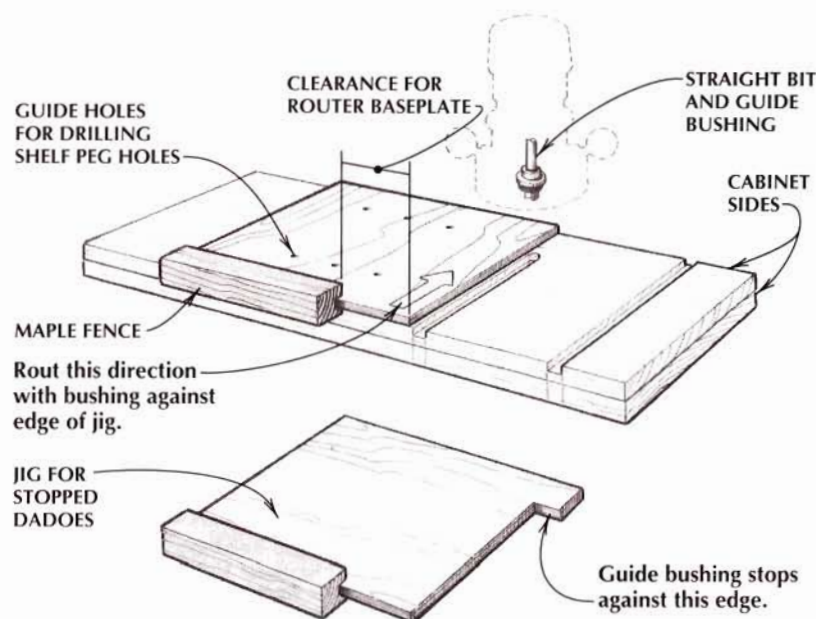
Router Dado Jig

Best tip of the issue

With this simple jig and a template guide bushing, you can rout stopped or through dados in the sides of a bookcase with perfect accuracy. You can also use the jig as a template to drill holes for shelf-support pegs. For accuracy, I always clamp the two case sides together and mark the dado locations on the front edges of both at the same time, allowing for the offset caused by the guide bushing.

I made my jig of 1/4-in. birch plywood with a maple fence that bears against the front edge of the case. When done with the right side, simply turn the jig over and use it on the left. I made a second jig for stopped dados as shown in the sketch.

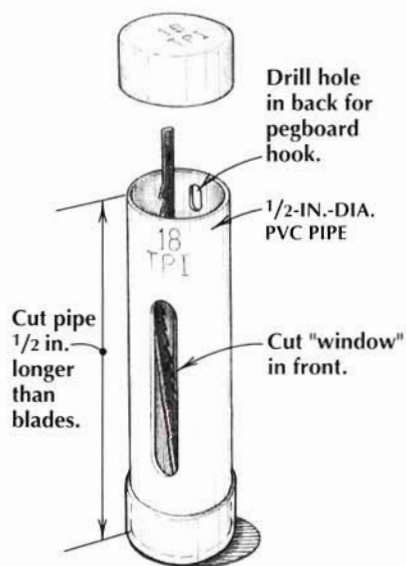
Paul Vander Woude
LaGrange, IL



Best tip wins \$200. Know a better way of doing something? Designed a clever jig? Send your original woodworking tips, along with a sketch or a snapshot to: "Tech Tips," AMERICAN WOODWORKER, 33 E. Minor St., Emmaus, PA 18098. We'll pay \$50 for each tip we publish and \$200 for the best tip of the issue.

Storing Scrollsaw Blades

To keep track of my different scrollsaw blades, I finally made a set of holders using white plastic pipe, which is easy



to mark with a felt-tip pen. I cut away the front to create a viewing "window," and then drilled an elongated hole in the back for hanging on pegboard. Cement the bottom cap but leave the top on loose.

Everett H. Van Patten
Salisbury, NC

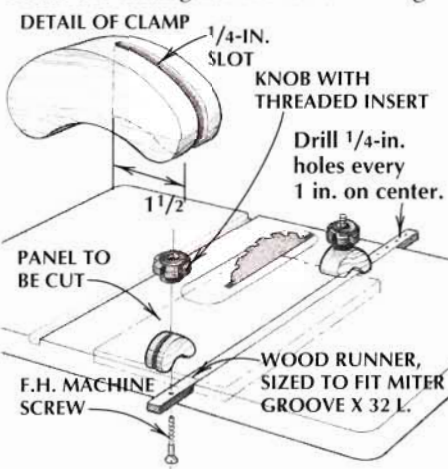
High Flyers

My new shop air cleaner works great, but I was never sure when to clean the filters. I have now taped colored wool streamers at the exhaust end and can tell at a glance the state of the filters by how high the "telltale" are flying: the closer to horizontal, the cleaner the filter.

Bart Nuss
Fisherville, KY

Sliding Panel Trimmer

I often need to rip or crosscut panels larger than the fence on my Sears tablesaw can accommodate. Using the miter gauge is too dangerous, so I devised this jig. I made the sliding runner from a straight

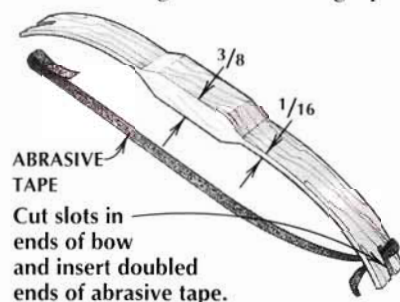


piece of oak to fit the miter slots in my saw table. I then drilled 1/4-in. holes in the runner, countersunk from below. Two plastic knobs and shop-made hardwood clamps complete the jig.

Steven Murphy
Berkeley, CA

Abrasive Bow

I make these miniature wooden bows to tension a thin strand of abrasive tape. The bows are great for cleaning up fret-

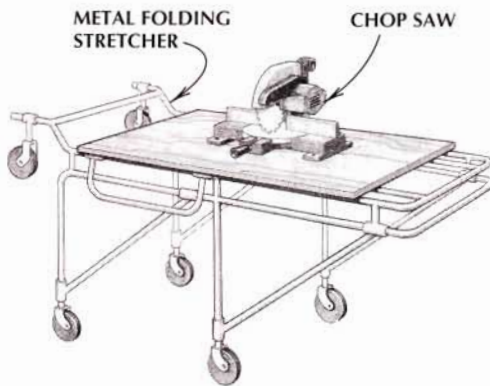


work on Chippendale mirrors and sanding awkward places. You can make the bow any size you need, but use a strong, springy wood such as hickory or ash. When the bow develops a permanent set in one direction, reverse the curve. I use Mitchell's abrasive tape (available from Klingspor, 800-228-0000).

Glenn Stout
Minneapolis, MN

Roll-Away Chop Saw Table

An old-style metal folding stretcher on wheels (called a "gurney") makes an excellent stand for a chop saw. It's the

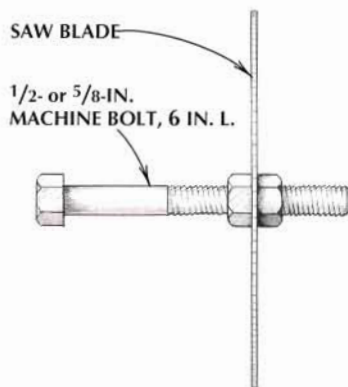


right height, it's readily movable, and it can be folded into a station wagon or pickup truck at the end of the day. I fitted a piece of 3/4-in. plywood across the rails of the gurney and set my chop saw directly on it.

Paul Couch
Windsor, Ontario

A Handle on Blade Cleaning

When cleaning gum and pitch off circular saw blades, insert a 1/2-in. or 5/8-in. machine bolt through the arbor hole as a

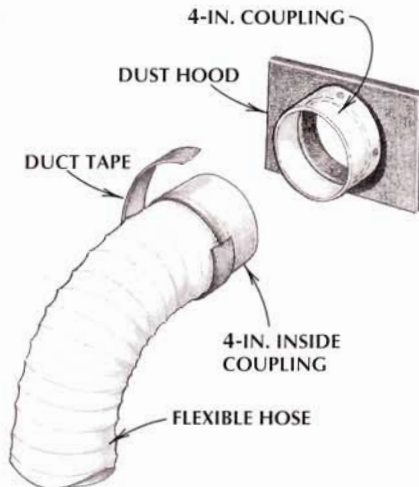


handle. Put the saw blade between two nuts and hand-tighten. You'll keep the mess off you and may avoid dropping a slippery blade.

Andy Olerud
Driggs, ID

Quick Dust Hookup

Instead of hooking all my machines to a dust collection system with the nuisance of opening and closing blast gates, I just

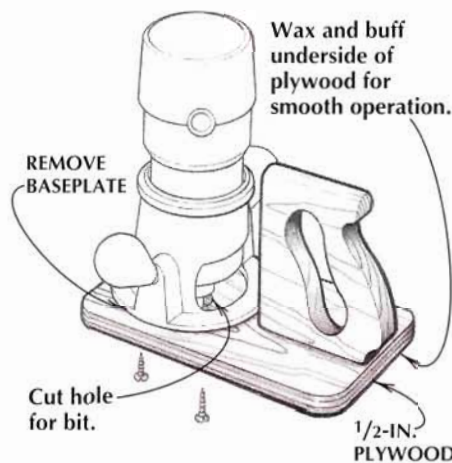


connect the machine in use. A 4-in. PVC coupling cut in half works well because the slight taper fits over the coupling on the 4-in. flexible collector hose. To connect or disconnect takes only a moment.

David Petersen
Austin, TX

Getting a Handle on the Router

I have modified all my routers by adding an elongated baseplate with a substantial wooden handle attached. Now I can hold the machine firmly and

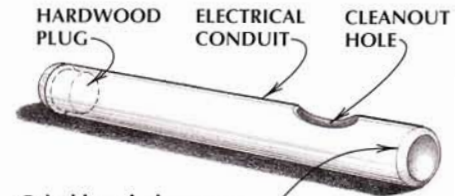


there is no danger of accidentally tipping the router over the edge of the workpiece. I made the base from 1/2-in. birch plywood, and the hardwood handles are sized to fit my hand comfortably.

Russell Strand
Spring Lake, NC

Hole Puncher

I use a short length of electrical conduit to make punches when cutting discs of leather, plastic, paper, etc. I first grind a



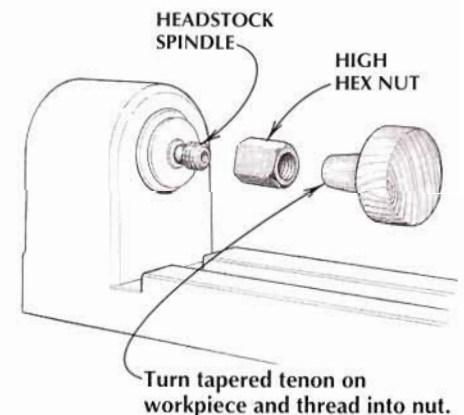
Grind bevel, then remove inside burr with file or slipstone.

beveled cutting edge and then a cleanout hole as shown. Insert a tapered hardwood plug in the opposite end to prevent mushrooming the pipe wall when striking it with a hammer.

Allen Weiss
Fresh Meadows, NY

Nuts to Jam Chucks

Conventional lathe jam chucks seldom hold the work securely and also tie up expensive faceplates. An alternative is



to buy some "high hex nuts" to fit the headstock spindle of your lathe. These special nuts (available from Barnhill Bolt Co., 505-884-1808) are 1 1/16 in. long, so they can accept a slightly tapered wooden tenon. Specify the spindle size of your headstock and the number of threads per inch.

David Leard
Mobile, AL

Handy Cases

If you use a 5-in. orbital sander, the plastic cases for 5 1/4-in. computer floppy discs make ideal storage for sanding discs. You can even arrange color coding for specific grits. Larger computer stores carry the cases at a cost of about \$3 for a set of five.

Ken Teller
Portsmouth, VA



Swing *into* Spring

Curved slats make this porch swing a comfortable classic

by Bruce McArthur

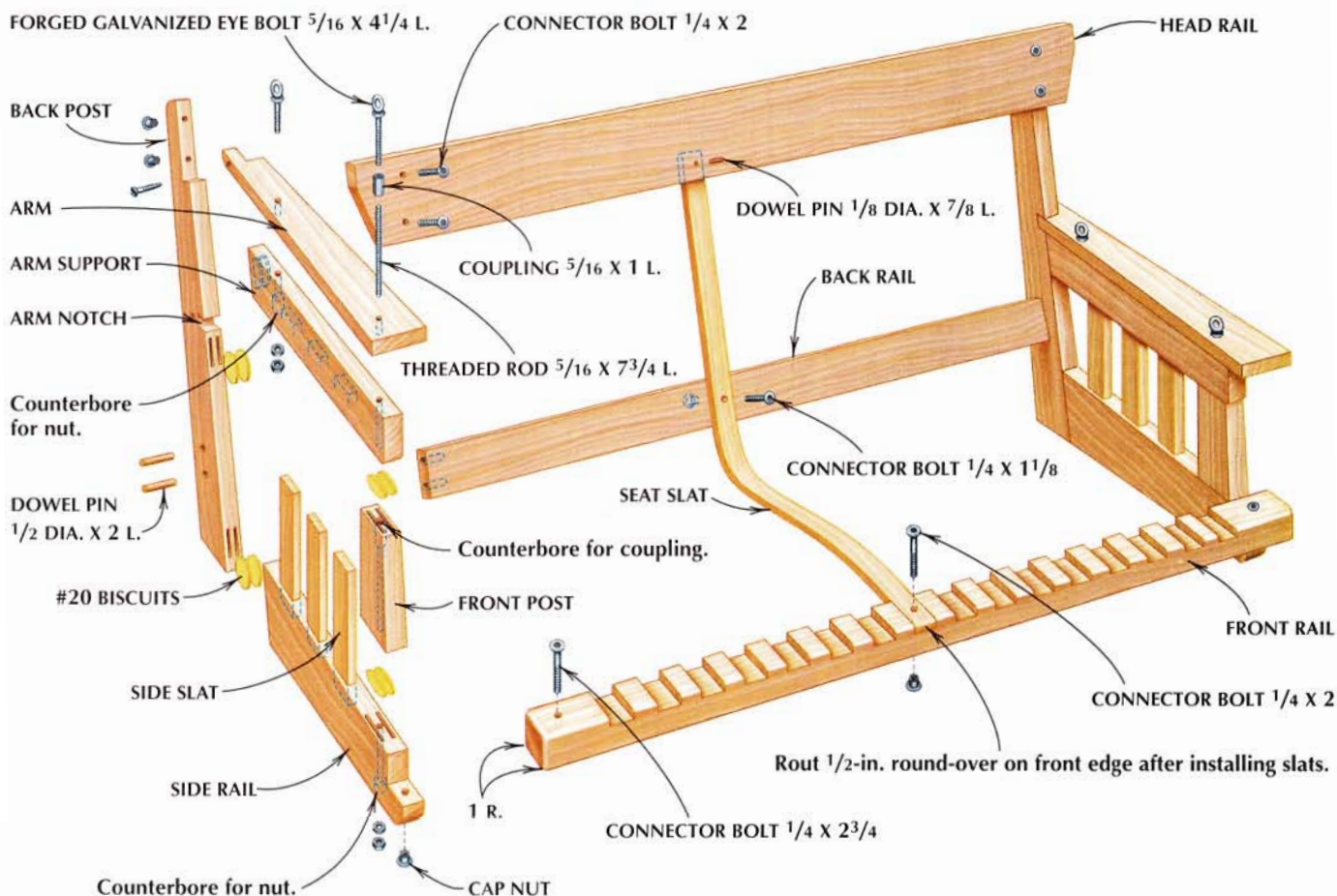
Enjoyable work. Here's a project that will provide years of pleasure and relaxation when it's done.

I discovered an old porch swing at an auction several years ago. It was covered with dust and had too many missing or broken parts to be usable. But I was intrigued by the swing's curved seat slats—a feature I had never seen before. I decided to bring the swing home to my shop and designed my own version. The new swing has been a big hit. After making a swing for each of my three kids and one for me and my wife, I found myself in the business of building these wonderful hanging chairs.

PHOTO BY JOHN HAMEL/RODALE IMAGES

FIG. 1: PORCH SWING

Made from white oak, this outdoor chair has steam-bent slats with just the right curve and flex for hours of sitting comfort. Dowels, biscuits, and connector bolts make the joinery simple and fast.



With its curved, steam-bent slats, the swing is comfortable enough for hours of swaying in the breeze. And since the parts are made from white oak, the swing will hold up for years in the elements. Other suitable hardwoods would be teak or mahogany.

Don't let the angles of the chair scare you: The swing is simple to build thanks to easily made joints that rely on through dowels, plate-joinery biscuits, and metal connector bolts. Steam-bent seat slats provide the greatest challenge, but selecting the proper stock for steaming ensures success, as I'll explain later.

Mill All the Parts

Figs. 1 and 2 give you all the necessary details for making the swing. Start by milling all the square parts to size—side slats, head rail, back rail, and front rail. Hold off on the seat slats for now. Then make cardboard or plywood templates

for the back post, the arm, the arm support, and the side rail. Use the templates to trace the outlines of these parts onto your stock. For accuracy, use a miter saw to cut the ends of the mitered workpieces, then use the bandsaw to cut the curves. You can lay out the forward slope on the two front posts with a ruler or straightedge, then saw these angles on the bandsaw. Clean up any saw marks with a belt sander or a sharp hand plane, but avoid belt-sanding sections where joints will mate.

Bend the Slats

Once all the stock is dimensioned, I like to start with the seat slats. This is the trickiest part of the job because of the tight bend needed in the lower curve of each slat. (See Fig. 2.) To minimize breakage, select straight-grained stock, and make a few extra slats just in case. I try to saw the slats from riftsawn stock.

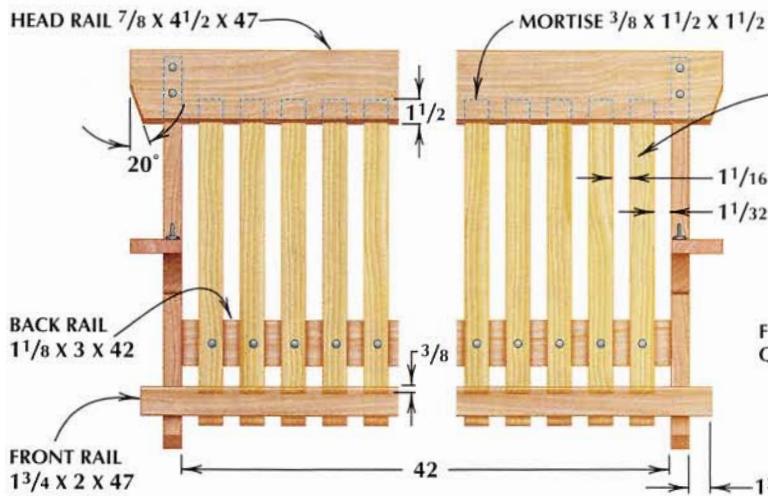
Avoid quartersawn wood because the prominent ray flecks in quartersawn oak tend to lift over time and could possibly snag a sitter. Cut your stock oversize in length—to about 42 in. You'll fit them to the chair during assembly.

I use a homemade steam box, powered by a bottle of propane, to saturate the slats with moisture and make them pliable. Let the slats steam for about a half hour, then remove them one at a time and quickly place them in your bending jig. I have two bending jigs so I can bend all the slats for one swing in one steaming session. Be sure to wear heavy gloves to protect your hands from the heat. (See photos, page 39.) My bending jig is made from plywood, with wood blocks and dowels at key bending locations. (For more on steam boxes, bending jigs, and steam-bending techniques, see AW #43 and #44.) Let the stock dry for a couple of days before removing it from the jig.

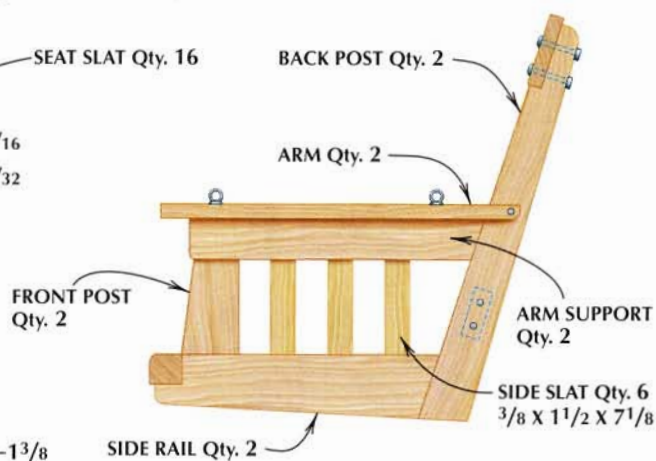
FIG. 2: SWING DIMENSIONS

Start the construction process by milling all the square parts to the dimensions shown. Make templates for the angled parts and trace the template outlines onto the stock. Saw out the angles with a miter saw and on the bandsaw.

FRONT



SIDE

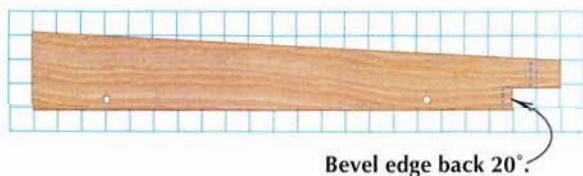


SWING PARTS

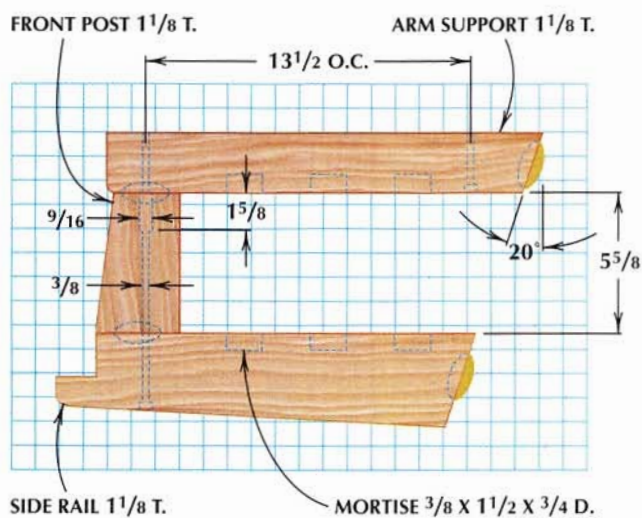
1 SQUARE = 1 IN.

ARM

$\frac{7}{8}$ T.

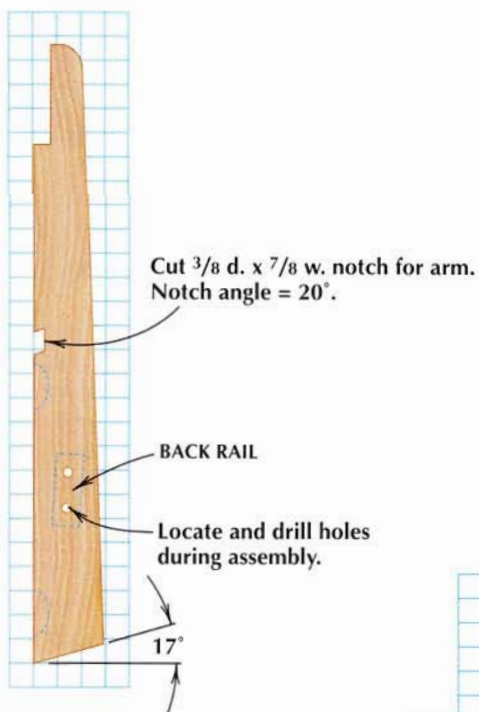


SIDE ASSEMBLY



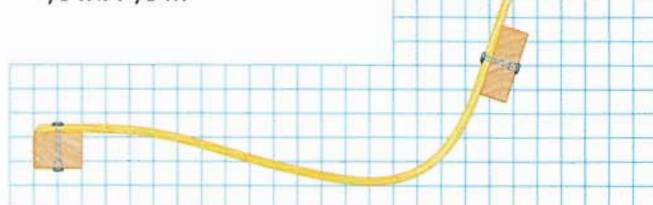
BACK POST

$1\frac{1}{8}$ T.

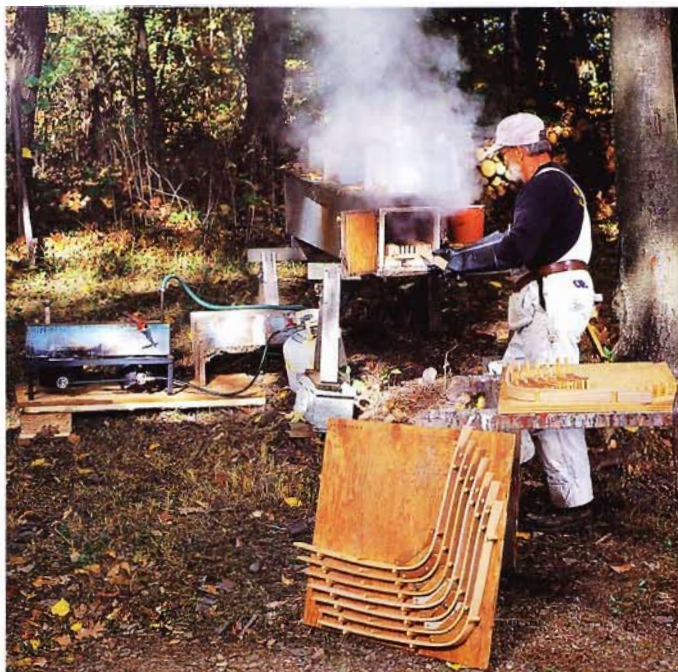


SEAT SLAT

$\frac{3}{8}$ T. x $1\frac{1}{2}$ W.



Note: Start with rough length of 42 in. before bending to shape.



Steam and bend. Gloved for protection, the author pulls out a hot seat slat from the steam box (left). Working quickly, he bends the hot piece between dowels and wood blocks in his bending jig (right).

Cut the Dadoes and Mortises

With all the parts cut to size and the seat slats bent to shape, you can begin cutting the seat joints. I start by sawing the $\frac{3}{8}$ -in.-deep dadoes in the front rail on the tablesaw, then I use these dadoes to lay out the mortises in the head rail. (See Fig. 2.) I use a Delta hollow-chisel mortiser (see AW #64) to cut the mortises in the head rail as well as the mortises in the arm support and side rail for the side slats. If you don't have a mortiser, plunge-rout the mortises and square up the ends with a chisel.

Biscuits Make Fast Joints

I use a pair of #20 biscuits at every angled joint. (See Fig. 1.) When laying out the biscuit slots on the arm support, front post, and side rail, be sure to leave $\frac{3}{8}$ in. between the slots to allow room for the threaded rod.

Drill for the Hanging Hardware

Once you've completed the joinery, it's time to drill the side assembly parts for the eye bolts, couplings, and threaded rods. These metal connections not only provide a secure method of attaching chain with which to hang the swing, they also work with the biscuits to hold the side assemblies securely together. (See Figs. 1 and 2.)

For superior strength, I use forged, galvanized eye bolts for the hanging

hardware. You'll need four bolts, $\frac{5}{16}$ in. by $4\frac{1}{4}$ in. long (available from hardware stores and home centers, or by mail from Jamestown Distributors, 800-423-0030). Use a hacksaw to shorten two of the bolts to $3\frac{1}{4}$ in. for the rear of the arms. (See Fig. 2.) Couplings and threaded rod complete the hardware package.

Begin by dry-assembling each side assembly, then mark the arm for the eye bolt locations. (See Fig. 2.) Now transfer your marks to the arm support, front post, and side rail. Disassemble the parts, then drill all the holes except those in the front posts on the drill press.

I drill each front post by hand, drilling from both ends of the stock until the holes meet in the middle. To keep each hole parallel with the arm, clamp a wide piece of scrap in front of the post, and let the drill bit guide itself against the scrap. (See photo, right.) I begin the hole with a $\frac{3}{16}$ -in. by 6-in.-long twist bit (available at most hardware stores or home centers), then finish up by counterboring for the coupling with a $\frac{9}{16}$ -in. twist bit and drilling through for the threaded rod with a $\frac{3}{8}$ -in. twist bit.

Assemble the Swing in Stages

Assembling the swing is best done in three stages. Start by gluing up the side assemblies, then join these assemblies to the back, head, and front rails. The seat slats go in last.

Before gluing up the side assemblies, prepare the hardware by screwing each threaded rod and eye bolt into its respective coupling. You may need to use a wrench and locking pliers to turn the eye bolt into the coupling, since the threads on many of the bolts I've used are slightly miscut. However, I've never had a problem once the bolt is secured in the coupling. Thread each eye bolt halfway into the coupling, then install the threaded rod into the remaining half.

Now, install the side slats into the side rail and insert biscuits into the slots at the top and bottom of the front post.



Drill it straight. McArthur uses a wide scrap board to keep his drill bit parallel to the stock as he drills the deep hole in the front post.



Clamp the sides. Pull together each side assembly with pipe clamps. A wedge-shaped scrap board provides parallel purchase for the clamp heads, and a third clamp keeps parts from slipping.

You can glue the biscuits if you prefer, but I don't bother: The bolt assembly will pull these front joints tight. Next, slip the bolt assembly through the arm, arm support, front post, and side rail, and draw the wood parts tight with a nut and washer. Spread glue into the remaining biscuit slots, and then assemble the entire side assembly. (See photo, above.)

With both sides assembled, you're ready to join them to the rails. A large benchtop or the shop floor is ideal for this operation. With a pipe clamp holding the back rail in rough position between the sides, install the head rail and the front rail to the sides by drilling through holes for the connector bolts (available from The Woodworkers' Store, 800-279-4441). The large-diameter heads on these bolts and caps allow you to install them without washers, and their slim profile means countersinking is unnecessary. Buy the bolts in the sizes shown in Fig. 1, then use a hacksaw or bolt cutters to shorten them to the correct length for the seat rail and head rail. Use a hex wrench to cinch the bolts tightly into their cap nuts.

Once you've installed the head and front rails, you can secure the back rail permanently. Slip one end of a seat slat up into a head rail mortise near the cen-

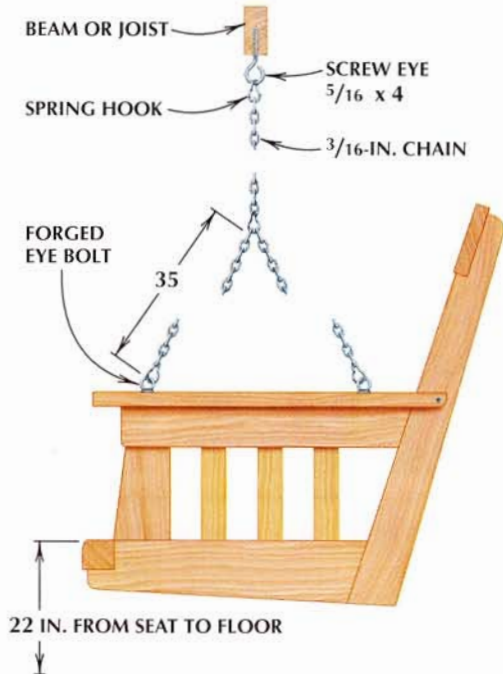
ter of the swing and lay the opposite end in the corresponding dado in the seat rail. Then adjust the angle of the back rail until it rests evenly across the back of the slat. Mark and drill through each back post and into the rail for a pair of dowels. Spread glue on the dowels and drive them into the holes, then saw or pare any protruding dowels flush to the posts.

The final assembly procedure is to secure the seat slats. Fit all the slats into the head rail mortises, then mark each slat where it contacts the back rail and where it overhangs the seat rail. Remove all the slats, cut them to finished length, and drill holes for the connector bolts. Reinstall all the slats and drill through them into the front and back rails. Then spread glue into the mortises and into the dadoes and secure the slats with the bolts. Pin all the slats in their head-rail mortises with $\frac{1}{8}$ -in.-dia. hardwood dowels.

With all the slats in place, use a router and a $\frac{1}{2}$ -in. round-over bit to soften the front edge of the seat for a more comfortable feel. Then remove any sharp edges with sandpaper. I finish my swings by brushing on a couple coats of exterior-grade polyurethane. This gives the wood a satiny feel and offers good protection against dirt, wear, and sunlight.

FIG. 3: HANGING SYSTEM

Hang the swing from a sturdy beam or ceiling joist with chain attached to each arm. Adjust the length of the vertical chain until the seat height is 22 in. from the floor. Spring hooks allow for easy installation and disassembly.



Hang It

As with any project worth its salt, the best part comes last: hanging the swing. I use $\frac{3}{16}$ -in. "proof coil" chain rated for an 800-lb. load, commonly available at hardware stores or home centers. You'll need two 35-in. lengths to secure to the arm bolts, and two lengths for connecting the arm chains to a screw eye anchored in a beam or joist. Adjust the length of the vertical chain until the front of the seat is about 22 in. from the floor. (See Fig. 3.) I recommend using spring hooks to connect the various lengths of chain together. These self-closing connectors are easy to operate, and they allow you to remove the swing without tools should you need to move it or store it during wintry weather.

When your swing is hung it should tilt backward slightly, providing a comfortable angle for you and your loved one to while away the hours. ▲



BRUCE MCARTHUR is a designer, woodworker, and proud grandfather of 13. He lives in northeastern PA.



Picture this. With a few simple tools and supplies, you can make a wide variety of beautiful picture frames from the woods of your choice.

Perfect Picture Frames

Build them yourself for less

by Andy Rae

Picture frames display and protect our favorite photos, paintings, and artwork. Whether hung on a wall or perched on a shelf, framed images enrich any room, preserve nostalgic moments, and express our individuality.

But it's expensive to have your pictures or artwork framed. If you've had any work done lately at your local frame shop, you're familiar with this brand of sticker shock. The good news is that woodworkers make great picture framers. Like professional framers, we know how to make precise angled cuts and assemble mitered frames. But there's more to picture framing than miter joints and molding. In this article, we'll

take you all the way through the picture-framing process, beginning with initial design decisions and continuing through framemaking, matting, mounting, and hanging.

The nice thing about picture framing is that you can choose your level of involvement. You can do everything from start to finish, or you can focus on making the frame, and then pay a frame shop to do the rest. No matter what part of the job you tackle, the tools and techniques discussed here will help you to get first-class results and save plenty of money in the process.

Andy Rae is an associate editor of AW.

STEP 1

Designing the Frame

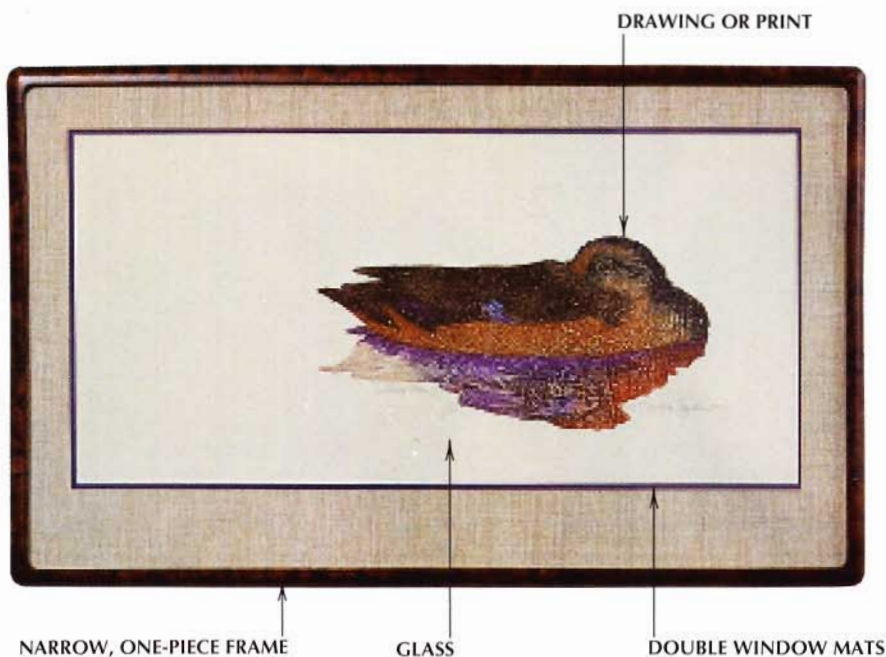
The scale, complexity, and color of a picture frame really depend on the artwork to be displayed. Keep in mind the advice of gallery owner Frank Bianco: "The artwork is the star; the frame is the supporting cast."

Prints, photos, posters, and other "flat" art usually look best when they're surrounded by a "window mat" border and displayed in a simple, narrow frame that includes a protective layer of glass. (See top photo.)

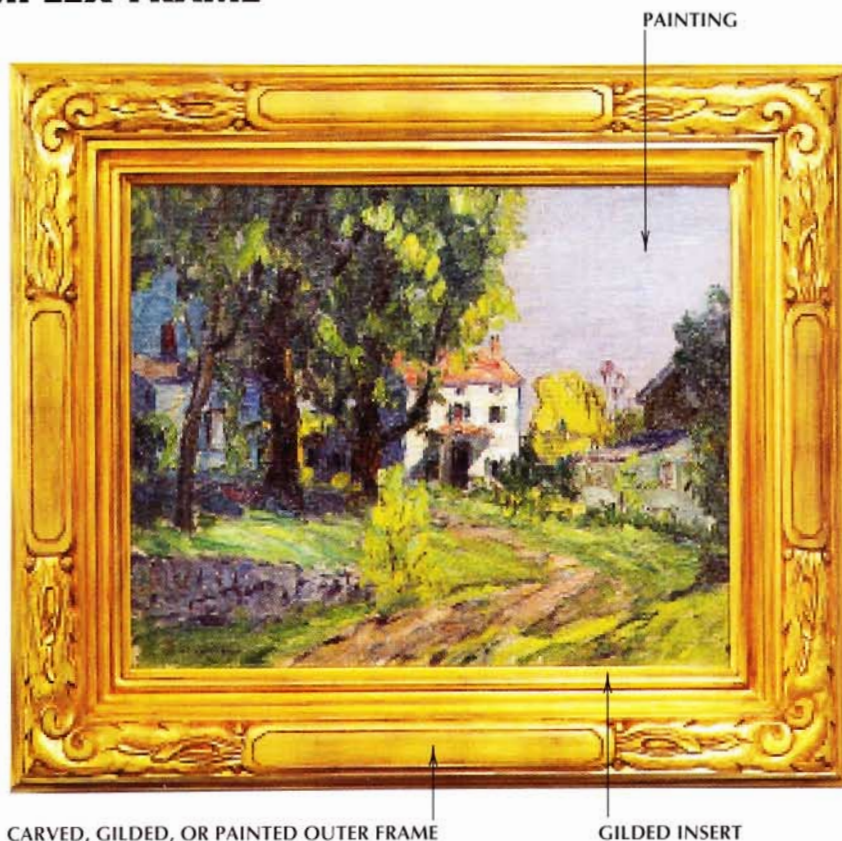
Oil paintings and other textured or three-dimensional art are frequently framed without glass. This type of artwork usually looks better surrounded by wider and more complex borders. (See bottom photo.) Here is where ornately carved frames, gilding, and other specialty finishes come into play.

To design a picture frame, consider all the ingredients that will show in the finished work: the art itself, the size of the mat board border that surrounds the art, the molding used to make the frame, and (if applicable) the glass that covers and protects the artwork and matting.

SIMPLE FRAME



COMPLEX FRAME



Choosing the Molding

The possibilities are vast when it comes to moldings for picture frames. As shown below, molding profiles range from small and basic to broad and ornate. You can even combine two or more profiles to create a built-up molding.

A wide variety of picture frame molding is available

from mail-order suppliers. (See Sources.) But you can also make your own using the router table, shaper, or table-saw. Making molding is a great way to save money and use offcut material. You can also use exotic or figured wood to create molding profiles that are more dramatic than commercial versions.

The only critical dimension in a molding profile is the width and depth of the rabbet. Minimum rabbet width should be $\frac{1}{4}$ in. Minimum depth should be $\frac{1}{2}$ in. To calculate the required depth, determine the finished thickness of the materials that go into the frame, then add $\frac{1}{8}$ in. for the fasteners.

(See "Mounting Strategies," page 47.)

Professional framers prefer to prefinish their moldings before they are cut and assembled. If you're adding splines or wooden plugs, you'll want to finish after assembly. Factory-made moldings are available in prefinished and unfinished versions.

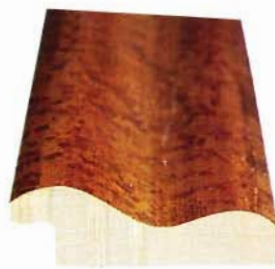
SIMPLE FRAME



HALF ROUND



CLAMSHELL



COLONIAL REVERSE



CLAMSHELL WITH BEVEL



OGEE



HOGARTH



SCOOP AND BEAD
WITH PANEL



SCOOP WITH
ROUND BACK

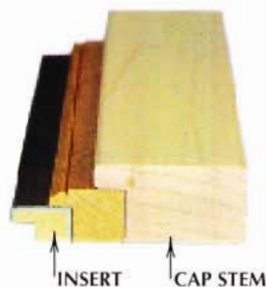


BOX
CAP STEM



SWAN
CAP STEM

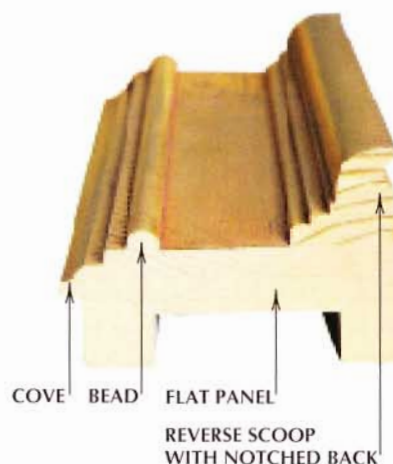
BUILT-UP MOLDINGS



INSERT CAP STEM



LINER WHISTLE



COVE BEAD FLAT PANEL
REVERSE SCOOP
WITH NOTCHED BACK

STEP 3

Mitering and Trimming

Though other types of joints can be used on picture frames, miter joints usually look and work the best. And tight-fitting miters are crucial. To get them, you need a precise way to cut the miters and (if necessary) trim a cut to improve its fit. There are several options for cutting and trimming, from shop-made jigs to machines costing \$200 and up. (See below.)

When mitering and trimming frame members, first make sure that the cutting angle is exactly half the total angle of the completed joint. Test the angle by assembling a sample joint, and check the joint with a reliable square. Then fine-tune the fit if necessary. Second, make sure matching pieces (such as two opposite sides) are identical in length.

CUTTING MITERS—CHOOSE YOUR TOOL



HANDSAW AND MITER BOX

One way to get smooth, precise, hand-sawn miters is to use a top-quality miter box like this compound-cutting model from Jorgensen. A hold-down clamp keeps the workpiece from shifting as you saw. Prices start under \$100.



CHOP SAW

A power miter saw fitted with a top-quality blade will give you glass-smooth miter cuts. Prices start around \$160. Test and (if necessary) fine-tune the miter angle by making the test cuts in scrap stock.

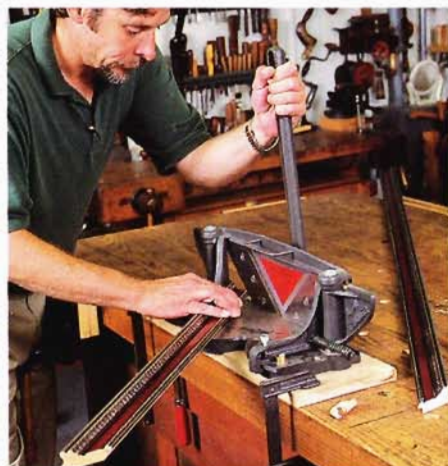


TABLESAW JIG

Designed to ride in the tabletop's miter grooves, this jig has two fences that form an exact 90° angle and run into the blade at 45°. Use each fence to cut complementary miters. Make sure to cut with a top-quality cutoff blade.

TRIMMING FOR FIT

The final fit of a miter joint often calls for some microsurgery—super-fine trimming to get the joint exactly right.



MITER TRIMMER

This tool relies on a single fixed knife that trims a rough-cut miter into a glass-smooth surface. Slicing action makes trimmers an excellent choice when cutting delicate painted or gilded stock, since there's little danger of tearout.



DISC SANDER

Use a 120-grit or finer disc, and guide the workpiece with a miter gauge or jig to maintain the correct sanding angle. Use a light touch and keep the stock moving to produce a dead-flat surface without burning.



SHOOTING JIG

You can shave a miter to trim its length with a simple 45° shooting jig and a block plane. Make sure the plane iron is razor-sharp and adjusted for a light cut. Plane "downhill" on the grain to avoid tearout.

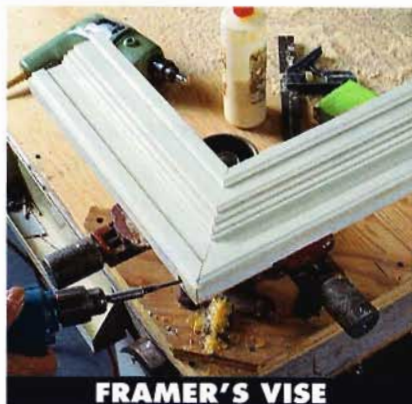
STEP 4

Joining and Reinforcing the Frame

A reliable method of clamping miter joints is important when assembling a frame, and there are a variety of clamping systems to choose from. But you can't count on glue alone

to hold mitered joints together, so some form of reinforcement is needed. Different clamps and joint reinforcement strategies are shown below. See Sources for product information.

CLAMPING THE CORNERS



FRAMER'S VISE

You can glue and nail or screw the miters in one shot using a picture-framer's vise, which leaves the corners of the frame exposed for installing fasteners. Framer's vises are available from Lee Valley and cost around \$50 each.



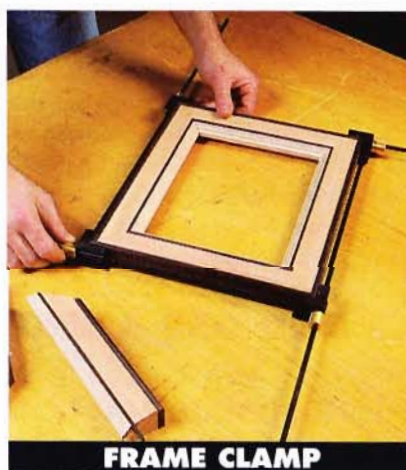
CORNER CLAMP

The Multi Angle Clamp from Gross Stabil "pre-tensions" each corner joint, spreading clamping pressure along the entire joint line. The two fences can be adjusted for clamping odd-angled corners. List price: \$150.



BAND CLAMP

A band clamp can handle odd-shaped frames, and has the advantage of clamping all four corners at once with the turn of a screwdriver or a wrench. Metal corner blocks direct clamping pressure and protect the band from glue. This band-and-block rig costs around \$15.



FRAME CLAMP

This rod-and-block device from Lee Valley clamps all four corners of a rectangular frame at once. Quick-adjust nuts on threaded rods exert clamping pressure on L-shaped corner blocks. Price: \$25.

REINFORCING THE JOINT

Glued miters need reinforcing for strength. The easiest method is to use finish nails or screws. When reinforcing with nails, always drill pilot holes in the frame and "cross-nail" the joint by driving a nail from each side across the joint. On wider frames, reinforce with counterbored screws or another pair of nails. Fill holes with wood putty or wooden plugs. Biscuits and feathers are also good for reinforcing joints.



Biscuits at the corners. This jig makes it easy to slot miters. An adjustable fence holds the frame member at 45°; the biscuit joiner's base is screwed down for stability. For details on making this jig, see AW #47.



Sawing slots. This 45° cradle jig lets you cut slots for exposed, wooden feathers. (See lead photo, page 41.) Glue feathers in the slots, orienting the grain across the joint, then plane them flush.

STEP 5

Filling the Frame

How to mat the artwork, install it in the frame, and hang the picture

by Jay Sultan

This is the final stretch in picture framing. It's as important as the framemaking described previously.

As shown in the drawings opposite, artwork that won't be installed under glass (like an oil painting done on canvas) is easy to install in a completed frame. Metal Z-clips connect the picture frame to the canvas stretcher. Another option is a metal canvas clip, which snaps in place between the rabbet and the stretcher. (See Sources.) Below, I'll describe how to treat flat art under glass.

How to Mat the Art

The mat board used to create borders for flat art comes in sheets of different sizes,

grades, and colors. The best grade of mat is four-ply, acid-free rag board, available from art supply stores.

Determine the width of the mat border you'd like around your art. A slightly wider bottom border often looks best. If you're unsure about border proportions, stop by an art gallery or frame shop and see how similar-size art is matted. Remember, the mat's overall size determines the size of your frame.

Next, choose the color of the mat. Mats can be neutral in tone, or you can choose a colored mat to accent some of the colors in the art itself. Another option is to double-mat the art—place a second window mat underneath the



Cutting system. A mat-cutting system holds the mat firmly while you slice a beveled opening with a mat cutter. Prices start at around \$50.

top mat. The thin border of this secondary mat adds depth and visual contrast.

Cutting the mat to its outside dimensions is easy; just guide a sharp utility knife or X-Acto knife against a straightedge. But it's much trickier to cut the beveled inner opening. If you plan to do a lot of mat cutting, it's smart to invest in a mat-cutting system. (See photo, above.) Basic mat-cutting systems consist of a knife

holder that angles the blade at 45°, and an adjustable rail that holds the mat and guides the cutter. (See Sources.)

It's also possible to make your own cutter from a block of wood, and use a wood or metal straightedge for cutting beveled windows. (See sidebar, below.)

Once you've cut the mat, you can "hinge" the art to the back of the window mat with tape—paper, linen, or any other type of acid-free tape

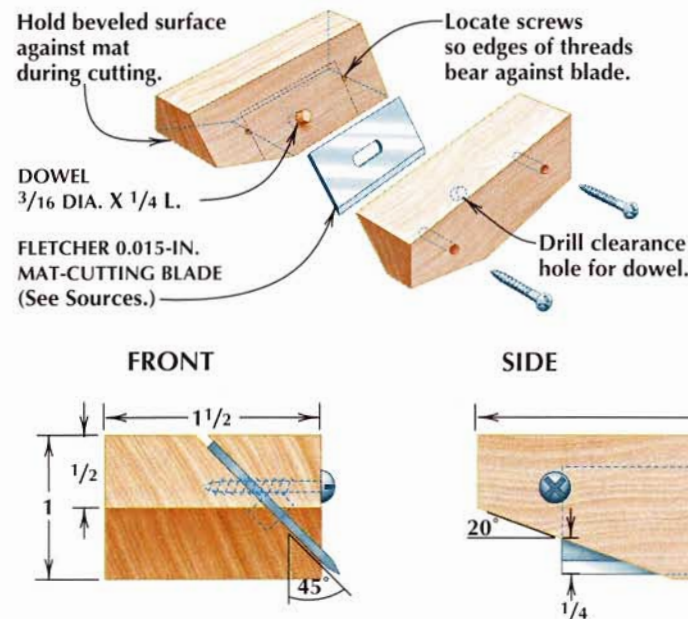
HOW TO MAKE AND USE A MAT CUTTER

You can make your own mat cutter with a few hardwood scraps and a mat-cutting knife, as shown in the drawing. The knife I use is a Fletcher 0.015 in. "Super Keen," which comes with an elongated hole in the blade and a razor-sharp edge.

To cut a mat, lay out the opening on the back side of the mat. Start the cut slightly before one corner and rotate the blade into the mat. The point of the blade should emerge on the face side of the mat exactly in the corner. Practice on some scrap first to get a feel for the cut. Pull the cutter toward you in a single, fluid motion. Cut slightly past the opposite corner, so the beveled cut stops exactly on the corner on the face side. —J.S.

HOMEMADE MAT CUTTER

Use a close-grained wood such as hard maple. Rip the 45° bevel on the tablesaw, then screw the parted blocks back together and saw the 20° bevel on the bandsaw. A dowel pin glued in the thicker block and two screws hold the blade firmly in position.



Inexpensive cutter. Sultan's simple mat cutter uses scrap-wood and a mat-cutting blade to cut the bevel in the mat.

(available at art supply stores). Avoid masking tape; it can stain or damage the art.

To attach the art, position it over the opening on the back of the window mat, then apply a strip of tape at the top of the art near each corner.

To keep the mat board and the art flat, place a stiff board behind the artwork. Use a piece of acid-free polystyrene foam-core board, which comes in 1/4-in. or thicker sheets. Avoid hardboard, MDF, or cardboard, since particles from these materials can migrate to the artwork.

Cutting the glass is next. For most frames, regular single-strength (3/32-in.-thick) window glass is a good choice.

Glass should be sized to allow 1/8 in. of space between the rabbet and the edge of the glass. You can have a glass shop cut the glass, or do the job yourself, using a glass cutter. (See Sources.)

Installing the Art

Check that all the artwork, or "sandwich," components are free of any dust or debris. Clean off any smudges on the glass with glass cleaner, then place the glass on top of the mat and art and check again. The glass will highlight any debris. When everything is clean, turn the sandwich over and lay it glass-side-first into the rabbet of the frame.



Screws and wire. Wrap wire around a pan-head screw and install the screw into a countersunk hole in the back of the frame.

To secure the sandwich, you can drive framer's points, brads, or glazier's points into the sides of the rabbet. Triangular glazier's points, available at hardware stores, can be pushed into the rabbet with the blunt end of a putty knife. Framer's points hold best, but you'll need a special installation tool for them. (See Sources.)

A dust cover of kraft paper will seal the frame to keep out dust. Cut the paper to rough size, stick it to the back of the frame with double-sided tape, then trim the excess with a utility knife.

Hanging the Picture

To ensure proper weight distribution and the correct tilt of the frame on the wall, hanging hardware should be installed one-third of the way down from the top of the frame. A pair of screw eyes is standard fare. Wrap plastic-coated braided wire around the screw eyes, then nail a picture hanger in the wall and hang the wire on the hanger. For heavy frames, add a third screw eye at the bottom of the frame in the center, and wrap the wire through all three eyes.

For a closer fit to the wall, you can use wire and mirror hangers, which have pivoting rings that don't protrude as much as screw eyes.

Another option for heavy frames is to install screws and wire. Drill two shallow holes with a Forstner bit. Then wrap the wire around the two pan-head screws and install the screws flush to the surface. (See photo, left.)

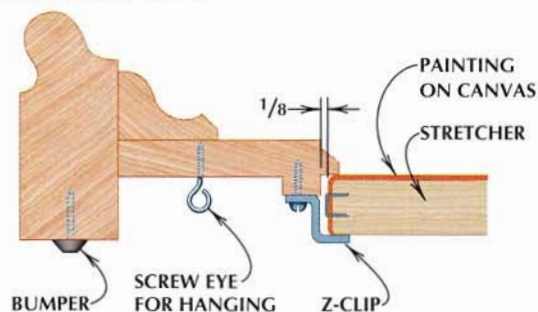
To get the right tilt of the frame on the wall and to prevent scratches, attach a pair of rubber or plastic bumpers at the bottom corners on the back of the frame. ▲

JAY SULTAN frames pictures in northern Georgia.

MOUNTING STRATEGIES

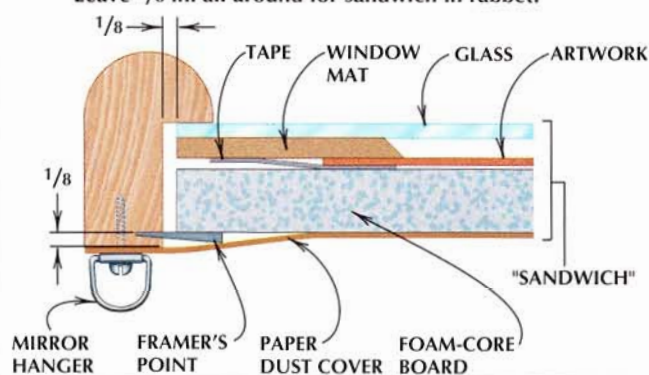
Installing the artwork calls for different strategies, depending on the type of art. Generally, paintings on wooden stretchers can be installed with metal clips. "Flat art" such as prints, drawings, and other works on paper require a "sandwich" inside the frame, with glass as a protective layer.

STRETCHER ART



FLAT ART

Leave 1/8 in. all around for sandwich in rabbet.



SOURCES

Unfinished, prefinished, or pre-cut moldings:

The American Frame Corp.
(800) 537-0944 Circle #617
Azuelas Woods
(800) 522-1976 Circle #618
Daniel Smith
(206) 223-9599 Circle #619
Graphik Dimensions
(800) 221-0262 Circle #620
Larson Mouldings
(317) 823-4679 Circle #621
United Manufacturers Supplies (800) 645-7260 Circle #622

Clamps, trimmers, and vises:

Garrett Wade
(800) 871-8158 Circle #623
Gross Stabil
(800) 671-0838 Circle #624
Lee Valley
(800) 871-8158 Circle #625
Pootatuck Corp.
(802) 674-5984 Circle #626
Woodcraft Supply
(800) 225-1153 Circle #627

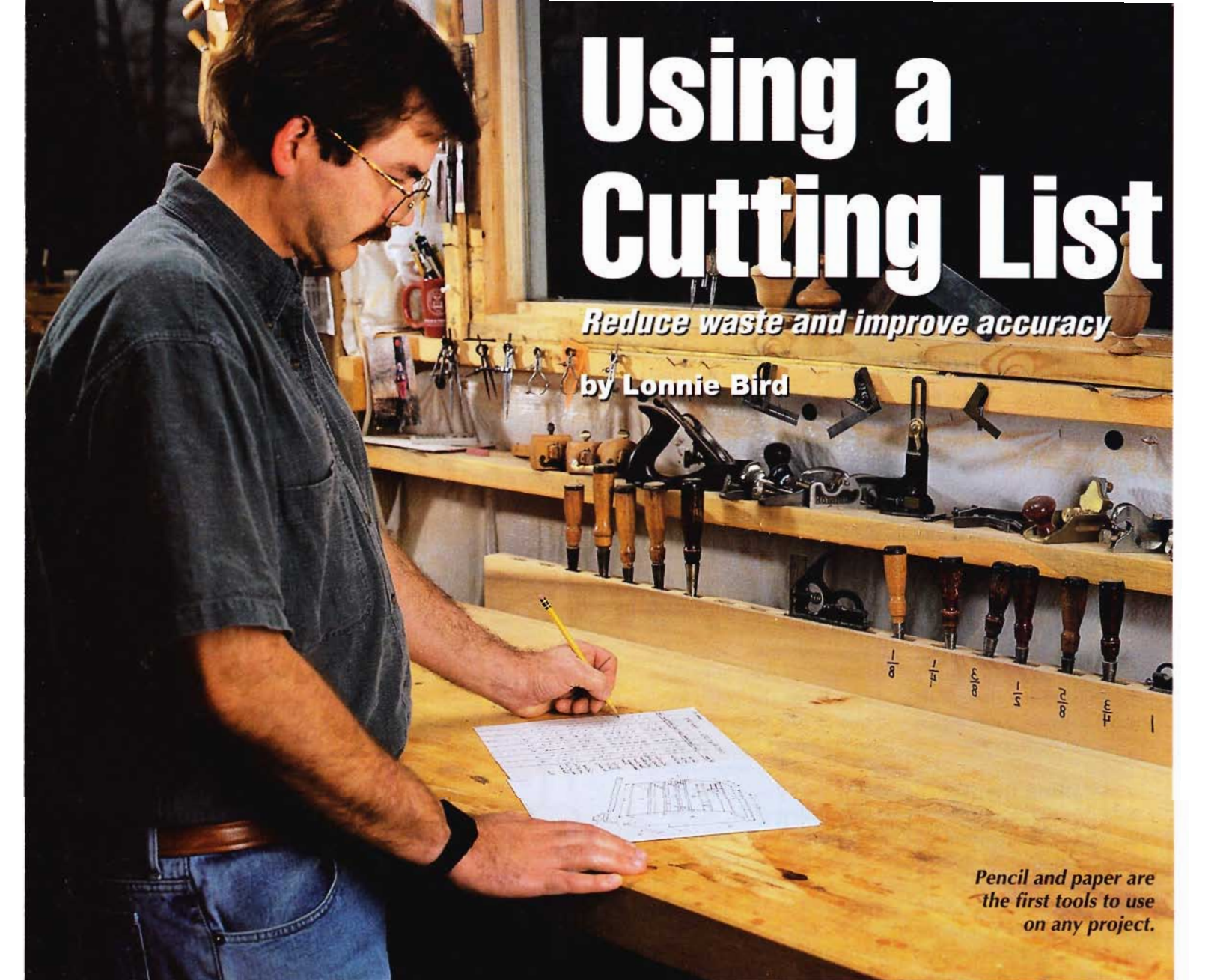
Mat-cutting systems, glass cutters, framer's points, and other framing supplies:

Constantine's
(800) 223-8087 Circle #628
Graphik Dimensions
(800) 221-0262 Circle #620
Lee Valley
(800) 871-8158 Circle #625
United Manufacturers Supplies
(800) 645-7260 Circle #622
Daniel Smith
(206) 223-9599 Circle #619
Woodcraft Supply
(800) 225-1153 Circle #627

Books

Home Book of Picture Framing by Kenn Oberrecht, 1988;
The Picture Framing Course by Pete Bingham, 1997, Stackpole Books, Mechanicsburg, PA

Picture Framing Basics by Hugh Foster, 1997, Sterling Publishing, New York, NY

A man with glasses and a mustache, wearing a blue button-down shirt and jeans, is standing at a wooden workbench in a workshop. He is holding a yellow pencil and writing on a piece of paper that has a technical drawing on it. The workbench is cluttered with various tools, including chisels, planes, and a hand saw. The background shows more tools hanging on a wall.

Using a Cutting List

Reduce waste and improve accuracy

by Lonnie Bird

Pencil and paper are the first tools to use on any project.

Nothing ruins your day like cutting several boards too short because you misread a cluttered project drawing. Or accidentally cutting secondary parts from a board that should have been reserved for use as a prominent frame member.

You can avoid these kinds of mistakes—and make your overall production process more efficient—by relying on a well-organized list of parts, which I call a cutting list. The primary function of a cutting list is to give you the quantities and accurate dimensions of all the parts. But it does much more than that. It also organizes the project into subassemblies, orders your work flow, and tracks the status of each part—whether the stock is selected, milled to rough size, or cut to

final dimensions. And if you need to go out and buy lumber, the cutting list can serve as your shopping list. A cutting list is especially important for a complex project with many parts, but it's useful for the smallest project as well.

Accurate Drawings Come First

Putting the list together is relatively easy once you've got accurate dimensioned drawings of the project you intend to build. If I'm building a complex project, I first sketch the entire piece and give it overall dimensions. I then divide the project into major assemblies, and draw "exploded" views of them on separate sheets of paper. For example, when I planned the slant-front Chippendale

desk shown on the opposite page, I divided it into two major assemblies: the base unit (without drawers) and the upper cabinet. On a third sheet I sketched the base unit's 14 drawers and all the little parts of the desk interior.

These drawings should show your joinery, so you can calculate final dimensions accurately for the cutting list. The only parts that get approximate rather than final dimensions at this point are the drawers, doors, and slant top—their exact sizes depend on the finished openings in the desk and cabinet.

Organizing the Cutting List

I make a separate cutting list for each major assembly. But before I start writing it, I mentally organize each assembly into

subassemblies, and then think about the order in which I'll build them. For the Chippendale desk, I start with the main building components: sides, top, and bottom of the case. I group those parts together at the top of my cutting list.

Grouping parts together in this way reminds me to mill them together. Then I can cut their common dimensions without changing settings on my saw, which ensures precise joinery.

As I continue to develop the cutting list, I group together short parts that can be cut from one board, or parts with a mate, such as left and right drawer fronts.

On the cutting list, I give each part in the project a name and an "A" to "Z" label. I also note the quantity needed and three dimensions. If you are using more than one kind of wood, you may want to add a column for the species of each part.

I also provide columns for making three check marks: one after selecting or purchasing the stock, another after milling the part to rough dimensions, and the third after cutting to final dimensions. I never mill the stock to final dimensions right away. Instead, I give the wood a last chance to move before I take it to final size and do any joinery work.

If I have trouble interpreting a part's final dimensions from the drawing, it sometimes helps to make another sketch of the subassembly from a different perspective, or zoom in on the area in question and detail it further on paper. In some cases I even mock up the subassembly with scrap and measure directly from the mock-up.

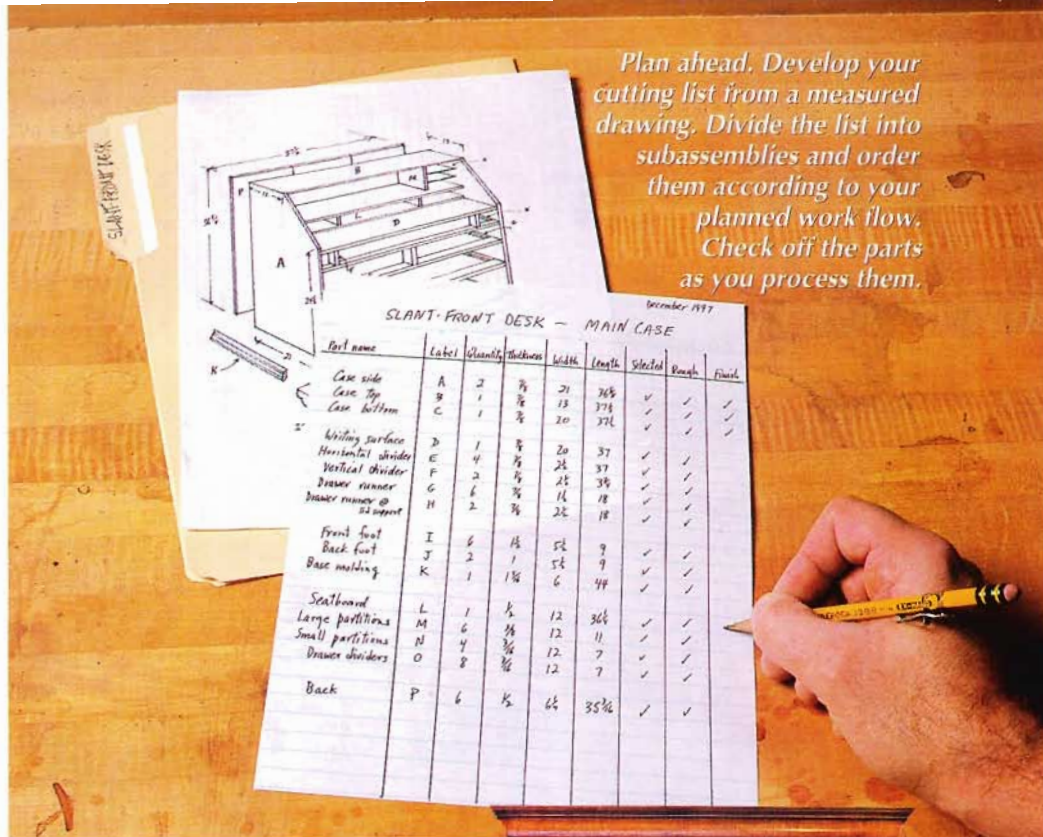
I always double-check the cutting list against the drawing to make sure that the calculations are correct and I haven't overlooked anything.

I list the hardware for a project separately. It's a good idea to have your hardware on hand before starting the project, so there are no surprises later.

Using the Cutting List

With cutting list in hand, I search my lumber pile first for boards that I can use for the project. I look for wide, figured boards first for show surfaces such as case sides, door panels, and drawer fronts. I match up the boards for color and figure, mark them with a lumber crayon or chalk, set them aside, and put check marks in the cutting list's "Selected" column. Then I select stock for the less prominent components.

If I need to go buy more lumber, I sometimes make a separate shopping



Plan ahead. Develop your cutting list from a measured drawing. Divide the list into subassemblies and order them according to your planned work flow. Check off the parts as you process them.

list based on the parts that aren't checked off on the cutting list. Then I divide the shopping list into two parts:

- Boards for show surfaces, with the final dimensions of the individual parts.
- Boards from which I can cut many secondary "no-show" parts such as dividers and drawer sides.

I mill all the stock to rough dimension first. Here's my rule of thumb: Add 1 in. to the each part's final length, $\frac{1}{2}$ in. to the width, and $\frac{1}{4}$ in. to the thickness. I make a second check mark as I rough out each part.

When I'm ready to start building, I mill to final dimensions only the stock I need for the first subassembly, and make the third check mark for those parts.

When the first subassembly—in this case, the desk case—is glued up, I go down the list to the next group of parts, mill them to final dimensions and check them off the list, and proceed with joinery and assembly. In this way, the cutting list helps guide the project until all the subassemblies are complete.

I usually store a project's drawings, notes, and cutting list together in a filing cabinet. When I get my next commission for the same project, it's all there, waiting to help me once again. ▲

LONNIE BIRD is a contributing editor to AW. He teaches woodworking at the University of Rio Grande in Ohio.



Premium results from precious materials. The author's finished Chippendale desk, with the slant-front writing surface open.

Drill-and-Drive Accessories

Ten gadgets for sinking screws fast

DRILL

a pilot hole and countersink
in one step



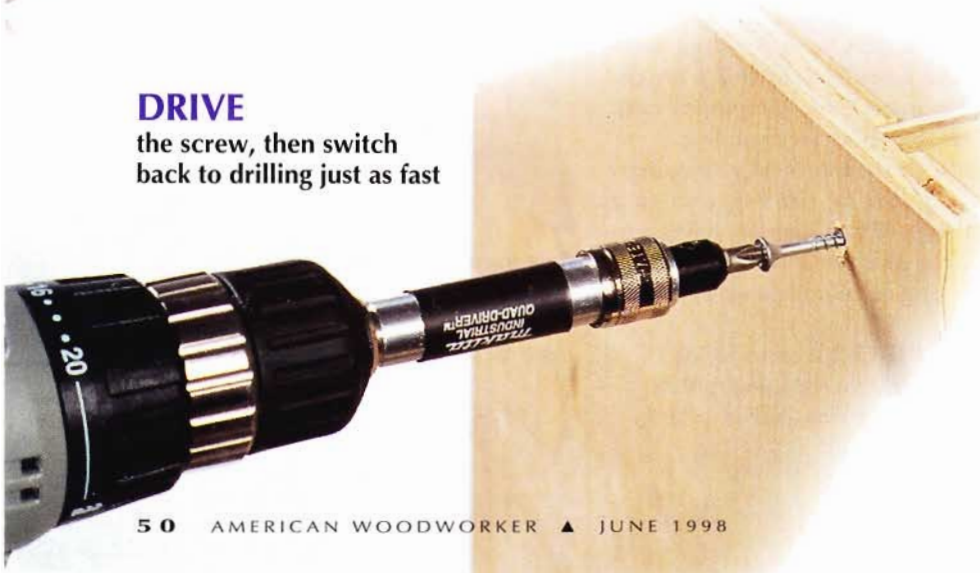
SWITCH

to a screwdriver bit
in a few seconds



DRIVE

the screw, then switch
back to drilling just as fast



To screw two pieces of wood together properly, you often need to drill a pilot hole, shank-clearance hole, countersink, and counterbore. If you're driving a lot of screws, you'll want to chuck a screwdriver bit in your drill and power them in. But the incessant chucking, unchucking, and rechunking can put you in a foul mood. Even using two or three drills, variously outfitted with pilot, counter-sink, and driver bits, can get tedious.

Quick-change drill-and-drive accessories take the hassle out of sinking screws. They allow you to chuck one tool in your drill, then alternate very quickly between a pilot-countersink bit and a driver bit. The switch from one bit to the other takes just a few seconds. (See photos, left.)

We tested ten drill-and-drive accessories, ranging in price from \$10 to \$16. We used them to sink all kinds of screws in various thicknesses of softwood, hardwood, and plywood. Our findings appear below and in each "Comments" section.

Sizes and Sources

You can buy most drill-and-drive accessories in individual sizes—that is, intended for one particular size screw. Many are also sold in sets that handle three to five common screw sizes. They're available in hardware stores, home centers, and woodworking catalogs.

Craftsman, Insty-Bit, and Snappy offer a wide variety of hex-shank accessories, including socket drivers, nut setters, and shelf-pin drill guides. In this Shop Test, we're focusing strictly on accessories designed for drilling pilot holes and driving screws. In our tests, we included self-centering (Vix-type) drill bits, which are handy for drilling screw holes for hinges and other hardware.

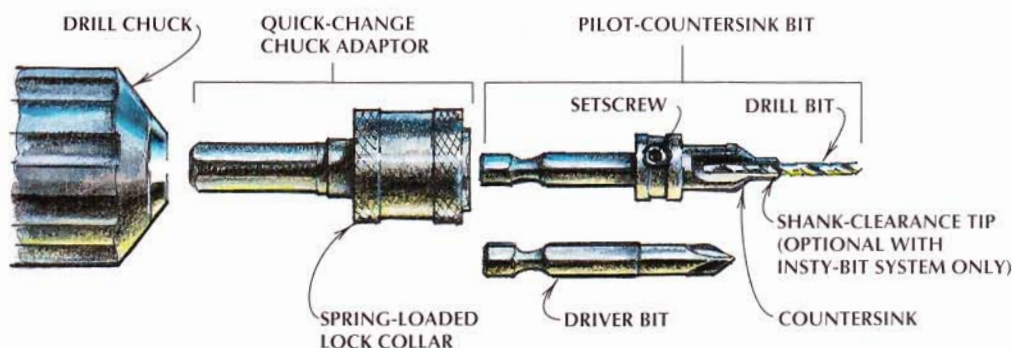
Three Different Systems

There are three types of drill-and-drive accessories. We call them the chuck-adaptor system, the drill-flip-drive system, and the removable-sleeve system. The drawings on the following pages show how each system works. Below each drawing, the different models in that category are shown and described.

On all drill-and-drive models, you can adjust the length of the pilot bit by loosening a setscrew with an allen wrench. The pilot bits are standard twist-drill bits, and you can replace

CHUCK-ADAPTOR SYSTEMS

Pull back the spring-loaded lock collar on the quick-change chuck adaptor, insert the pilot-countersink bit, and release the collar to lock the bit in place. After drilling, operate the lock collar in the same way, and replace the pilot-countersink bit with the driver bit.



COMMENTS

The chuck-adaptor systems require two hands to switch between drill and drive, so you have to set down the drill or hold it under your arm. Also, you must completely remove one bit when the other is in use, so you risk dropping it, stepping on it, or losing it.

INSTY-BIT

Quick-Change Countersink Series

(888) 467-8924 Circle #608



SIZES: Pilot-countersink bits for #4, #6, #8, #10, and #12 screws—\$6 each; must buy Quick-Change Chuck separately—\$12.

SET: Five pilot-countersink bits listed above with Quick-Change Chuck—\$37.

OPTIONAL ACCESSORIES: Brad-point pilot-countersink bits, self-centering drill bits (for installing hardware), wide range of hex-shank drill bits.

COMMENTS: You can buy pilot-countersink bits that bore shank-clearance holes (for standard wood screws) or bits that don't (for production screws). This is one of the most versatile drill-and-drive products. But the flimsy plastic storage case that comes with the set won't last long in the shop.

SNAPPY

QuickClick System

(800) 334-7472 Circle #609



SIZES: Pilot-countersink bits for #4, #6, #8, #10, and #12 screws—each \$6; must buy Quick Chuck adaptor separately—\$10; driver bits not provided (available at hardware stores).

SET: Five pilot-countersink bits in sizes listed above with allen wrench (Quick Chuck adaptor not included)—\$25.

OPTIONAL ACCESSORIES: Self-centering drill bits (five sizes) and shelf-pin drill guides (two sizes); wide range of hex-shank twist-drill bits.

COMMENTS: Drill-bit diameters, not screw sizes, are marked on the pilot-countersink bits—but they're hard to read. The set comes with a chart giving recommended drill diameters for various screw sizes, for both hardwood and softwood. You don't get a storage case or driver bits with the set.

them when they get dull or break. All models permit the use of interchangeable screwdriver bits for Phillips, slot, and square-drive screw heads. None of the bits we tested come with depth stops to limit the depth of the countersink and counterbore.

Shank Clearance for Wood Screws

When you drive a standard wood screw, or if you're sinking a production screw in thick hardwood, you may need a shank-clearance hole in the top workpiece. Only three of the products we tested are equipped to drill shank-clearance holes: Insty-Bit Quick-Change Countersink Series, Insty-Bit Insty Drive, and Vermont American Drill and Drive. Even on those three, however, the depth of the clearance hole can't be adjusted. So even though drill-and-drive accessories allow

super-fast changeovers, they aren't the best tools to use when you need to drill pilot and shank-clearance holes to precise diameters and lengths.

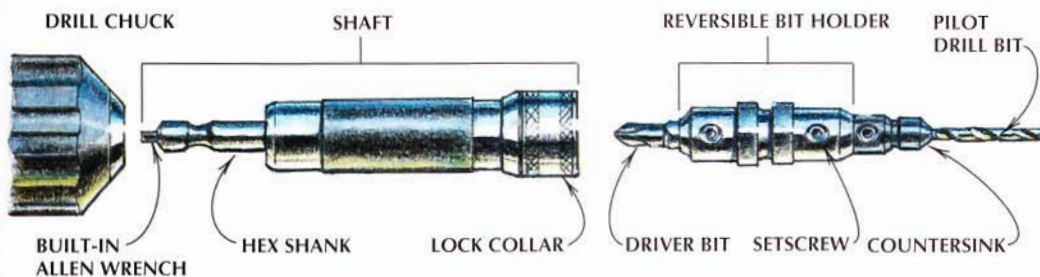
Recommendations

These gadgets are time savers for assembling shop furniture, making jigs, and doing home-improvement and installation work where precision drilling isn't an issue.

We most enjoyed using the four drill-flip-drive systems (see page 52) for two reasons. First, you switch between drill and drive by reversing the bit holder. You don't have to set down or pocket a component when it's not in use, so there's no chance of losing it. And second, the shaft has a handy allen wrench built into its hex shank. Among the four drill-flip-drive systems, the Makita Quad-Driver is the least expensive model at \$11. ▲

DRILL-FLIP-DRIVE SYSTEMS

Chuck the shaft in the drill. Insert the driver end of the bit holder in the shaft, and snap the shaft's lock collar back to lock the bit holder in place. After drilling, snap the lock collar forward to release the bit holder. Flip the bit holder around, insert the drill end into the shaft, and lock it in place. The pilot bits have flats on their shafts to provide a more secure bearing surface for the setscrew.



COMMENTS

The drill-flip-drive systems require only one hand to switch between drill and drive (you can hold the drill with one hand and change bits with the other). Because you reverse the bit holder, you never have to set aside a component—so you can't lose a bit when it's not in use.

BLACK & DECKER

Home Screwdriving Kit

(800) 762-6672 Circle #610



SIZES: Pilot-countersink bits for #6, #8, and #10 screws—each \$15 (includes shaft).

SET: 4-in-1 Drill and Driver System includes #6, #8, and #10 pilot-countersink bits and shaft—\$20.

COMMENTS: The set comes with a storage case. Screw sizes are marked on the case interior but not on the bits. Only Phillips driver bits are provided.

CRAFTSMAN

Speed-Lok Quick Flip Drill and Driver Set

See your local Sears store. Circle #611



SIZES: Pilot-countersink bits for #6, #8, #10, and #12 screws—each \$16 (includes shaft).

SET: Includes four sizes listed above and shaft—\$20.

OPTIONAL ACCESSORIES: Self-centering drill bits (for installing hardware); quick-change chuck adaptor that accepts a wide range of hex-shank drill bits.

COMMENTS: Individual sizes come with both Phillips and slot drive bits. The set comes with storage case, but only the Phillips drive bit. Screw sizes are marked on the pilot-countersink bits.

DEWALT

Magnetic Drill and Drive System

(800) 433-9258 Circle #612



SIZES: Pilot-countersink bits for #6, #8, #10, and #12 screws—\$15 each (including shaft).

SET: Includes #6, #8, and #10 bits and shaft—\$30.

OPTIONAL ACCESSORIES: Self-centering drill bits (for installing hardware).

COMMENTS: The set comes in a storage case, with Phillips driver bits only. Screw sizes are marked on both the case and the pilot-countersink bits. Newer models do not feature shank-clearance tips.

MAKITA

Quad-Driver

(800) 462-5482 Circle #613



SIZES: Pilot-countersink bits for #6, #8, #10, and #12 screws—each \$11 (including shaft).

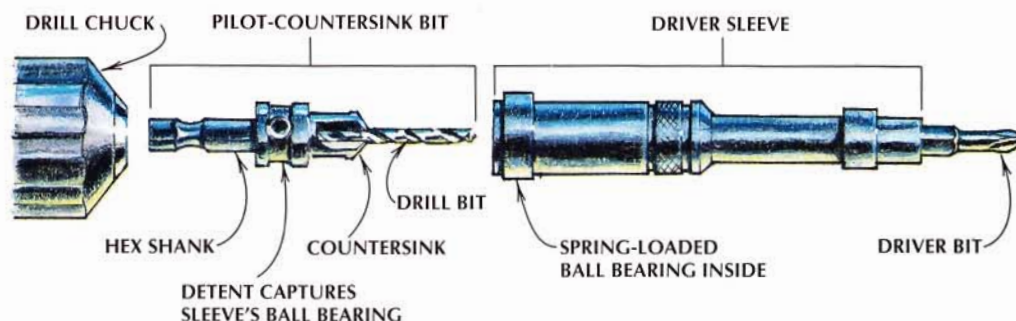
SET: Four screw sizes, including #6, #8, #10, and #12, with shaft—\$35.

OPTIONAL ACCESSORIES: Self-centering drill bits (for installing hardware).

COMMENTS: The set comes with a storage case and replacement drill bits in all four sizes—but Phillips driver bits only. Sizes are embossed on the case interior, not marked on the pilot-countersink bits. Newer models do not feature shank-clearance tips.

REMOVABLE-SLEEVE SYSTEMS

Chuck the pilot-countersink bit in the drill. After drilling, slip the driver sleeve over the pilot-countersink bit. A spring-loaded ball bearing in the sleeve clicks into a detent in the pilot-countersink bit to hold the driver sleeve in place while you drive the screw. The sleeve slips off easily for drilling again. The Chuck-Mate model is an exception: Chuck the driver bit into the drill. The pilot-countersink bit is at the end of the sleeve that slips over the driver bit.



COMMENTS

The removable-sleeve systems require only one hand to switch between drill and drive. You must completely remove one bit when the other is in use, so you may drop it, step on it, or lose it.

CHUCK-MATE

Drill-N-Drive

Available at hardware stores, home centers, and woodworking catalogs *Circle #614*



SIZES: Pilot-countersink bits for #3, #4, #5, #6, #7, #8, #9, #10, and #12 screws—each \$13 (includes driver bit).

OPTIONAL ACCESSORIES: Pilot-countersink bits with tapered drill bits; self-centering drill bits (for installing hardware).

COMMENTS: In our tests, the pilot bits occasionally got stuck in hardwood when we tried to withdraw them, causing the drill sleeve to separate from the drill. That's because the lock collar keeps the sleeve over the driver bit by friction only—an aggravating feature. Screw sizes are marked on the lock rings. Allen wrench is not included. The drive bits are Phillips and square-drive (not slot).

INSTY-BIT

Insty-Drive

(888) 467-8924 *Circle #608*



SIZES: Pilot-countersink bits for #4, #6, #8, #10, and #12 screws—\$16 each, including driver sleeve.

SET: Includes five pilot-countersink sizes listed above with allen wrench—\$11; must purchase Insty-Drive extension sleeve (\$11) and driver bits separately.

OPTIONAL ACCESSORIES: Brad-point pilot bits.

COMMENTS: You can buy pilot-countersink bits that bore shank-clearance holes (for standard wood screws) or bits that don't (for production screws), making this one of the most versatile drill-and-drive products.

RONAN

DrillMaster Set

(800) 879-7582 *Circle #615*



SIZES: Not available individually.

SET: Includes pilot-countersink bits for #6, #8, #9, and #10 screws—\$17 (including driver sleeve).

COMMENTS: Screw sizes are marked on the pilot-countersink bits. The set comes without a storage case or an allen wrench, and with Phillips driver bits only. The brass hex coupler nut is small, and prone to getting lost.

VERMONT AMERICAN

Drill and Drive

(800) 742-3869 *Circle #616*



SIZES: Pilot-countersink bits for #6, #8, and #10 screws—each \$10 (driver sleeve included).

SET: Includes three pilot-countersink sizes listed above and driver sleeve—\$20.

COMMENTS: The pilot-countersink bit includes a shank-clearance tip for standard wood screws. Screw sizes are marked on individual pilot-countersink bits, but each comes with a Phillips driver bit only. The set comes with both Phillips and slot driver bits, but without a storage case.

Keepsake Cabinet

A magnetic latch is the key to this beautiful box

by Andy Rae

Autumn wedding bells were ringing, and I had to come up with an appropriate gift—fast. My good friend Paul was finally ready to tie the knot, and I wanted to give him and his soon-to-be wife Kathleen something special to mark the occasion. Something precious. What better than a small cabinet that could hold keepsakes or valuables? Prized wood, careful proportions, and attention to detail would add to the exquisiteness of the gift. The resulting mahogany cabinet with book-matched maple panels shown here was a hit with the newlyweds. With its dovetailed corners, gently rounded door rails, and hand-carved ebony pull, the cabinet is a cut above your typical bridal-registry item. And I discovered a magical way to keep the door closed by relying on the attraction of rare-earth magnets.

Construction Notes

The drawing opposite gives you all the necessary construction info to build the cabinet. To help with the more involved aspects of construction, a few notes are in order. But first, some advice about prepping the stock.

Because of the cabinet's diminutive size, small inconsistencies in stock preparation can show up as glaring errors later when you assemble the parts. To ensure success, check that your cutters are sharp and take the time to accurately set saw blades, jointer fences, and the like. Then mill your stock flat, straight, and square.

Dovetail the top, sides, and bottom. I like to hand-cut the dovetails that join the case parts. With only four small corner joints, it's faster to cut them by hand with a dovetail saw and chisels. If you prefer, you can use a router jig to do the job, but I find that the setup time is about equal to the time it takes to saw dovetails by hand.



Whether you hand-cut or rout the dovetails, be sure to lay out the half-tails on the sides to allow for the 1/4-in.-wide groove at the back of the cabinet and also for the extra 3/16-in. width where the sides extend beyond the front of the cabinet. (See drawing.)

Groove the top and sides. Once you've dry-fitted the dovetails, cut the grooves for the back panel on the table-saw. You won't need to groove the bottom: it's 1/2 in. narrower than the top so you can slide the back panel past it and into the grooves in the sides and top during assembly.

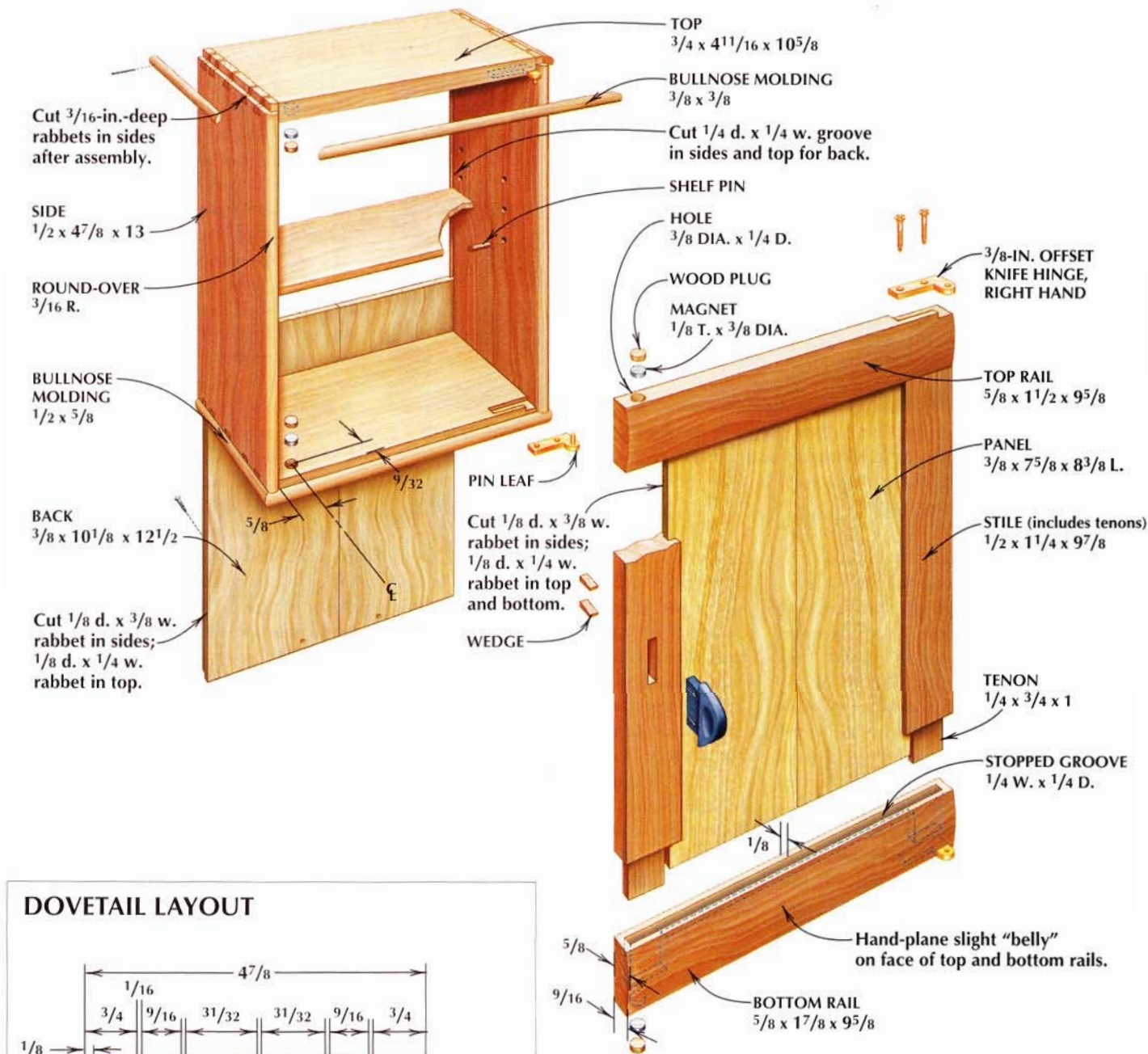
Magnets make the catch. Rare-earth magnets concealed beneath mahogany plugs in the door and the cabinet keep

Small delight. This delicate mahogany and maple cabinet is a miniature treasure box for precious cargo.

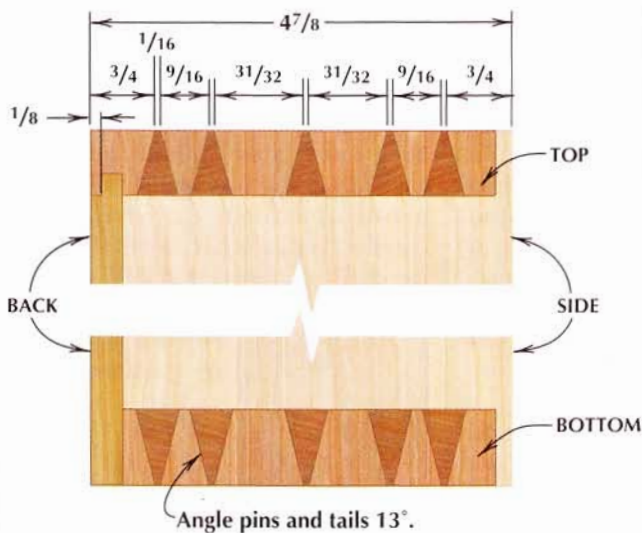


SMALL CABINET

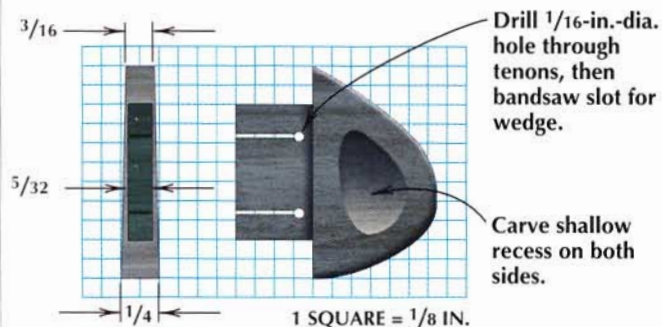
This diminutive cabinet is joined on all four corners with through dovetails, which are then rabbeted to accept bullnose moldings. Offset knife hinges allow the door to open 120° past the extended case sides. Rare-earth magnets in the door and cabinet pull the door closed by magnetic attraction.



DOVETAIL LAYOUT



PULL DETAIL





Rabbeting the dovetails. The author cuts a ledge for the bullnose molding by running the assembled cabinet past a dado blade. The cabinet and the scrap board on which it rides bear against the saw fence. A backup block keeps the work square to the blade.

the door closed without any visible hardware. (See drawing.) I got the idea from Jerry Beall, an inventive woodworker who showed me how it works. (See Beall's wooden vise, page 62.) By orienting each magnet so it attracts an opposite magnet, the door pulls itself closed with a gentle push from your hand. I used $\frac{3}{8}$ -in.-dia. magnets from Lee Valley (800-267-8767). These slim, $\frac{1}{8}$ -in.-thick magnets have great pulling power.

Before you glue up the case, drill $\frac{3}{8}$ -in.-dia. by $\frac{1}{4}$ -in.-deep holes in the

top and bottom for the magnets and the wood plugs that hide them. Use a Forstner bit to provide a flat-bottomed hole for each magnet.

Mortise for the hinges. I used offset knife hinges on this small case because they provide a jewelry-like quality to the project. Another benefit is that offset knife hinges allow the door to swing open past the extended sides of the case. Before gluing up the case, you need to mortise for the hinge plates in the top and bottom, as well as drill the shelf-pin holes in the sides. There are a couple of tricks that make installing knife hinges easier. (See sidebar, opposite.)

Rabbet the corners. Once you've glued up the case, you're ready to rabbet the corners. The rabbets strengthen the connection between the bullnose molding and the cabinet. I cut them on the tablesaw after gluing up the case. Make a sled from MDF or plywood to carry the work, then set the height of your dado blade so you'll cut a $\frac{3}{16}$ -in.-deep rabbet. (See photo, above.) Make sure to rabbet the front of the cabinet where the sides project beyond the top and bottom. (See drawing.)

Cut the door joinery. Traditional mortise-and-tenon joinery holds the door frame together. I routed the mortises with a $\frac{1}{4}$ -in.-dia. spiral upcut bit. Then I cut the tenons to fit the mortises,

using a dado blade on the tablesaw. Saw or rout the grooves for the door panel, and then rabbet the back side of the panel to fit the grooves.

Curve the door rails. Once the door joinery is complete, you can round over the two door rails. Mark out the curves on the rails' end grain, and draw or gauge the $\frac{9}{16}$ -in. thickness along the edges of the rails. Hand-plane the curves, following the lines to check your progress and to see that your curves are fair. A block plane or a small bench plane makes shaping the curves fast and satisfying.

Install the magnets. Once the door is hung it's time to install the magnets. Transfer the centerline of the holes you've drilled in the cabinet to the bottom and top of the door, remove the door from its hinges, and drill the holes in the door.

Now, mark each pair of magnets with a black felt-tip pen so you'll remember to orient them correctly. Place a drop of epoxy or cyanoacrylate (CA) glue in each hole and press the magnet into the glue. Reinstall the hinges and make sure that the door closes properly. If your holes are centered over each other, the magnets will align with each other and pull the door flush to the face of the cabinet's top and bottom edges.

Finish up by gluing wooden plugs into the holes. Align the grain of the plugs with the grain of the cabinet and door, and pare them flush. If you're careful with the grain orientation and achieve a snug fit, the plugs will "disappear" to the casual observer. Your friends will wonder what kind of magic is holding the door in place.

Add keyholes for hanging. This small cabinet looks great sitting on top of a bureau or on a shelf, but I like it best when it's hung on a wall. I gave the newlyweds the option to hang the cabinet by routing a pair of keyholes in the back panel for two #10 pan-head screws. I used a carbide-tipped keyhole bit, available from Jesada Tools (800-531-5559). ▲



Keyed for hanging. $\frac{5}{16}$ -in.-deep keyhole slots in the cabinet back give you the option of hanging the cabinet on the wall.



ANDY RAE
is an associate editor
of AW.

INSTALLING KNIFE HINGES

Knife hinges are elegant and inconspicuous, and their action is delightfully smooth. You can buy straight hinges for use with overlay doors, or offset hinges for inset doors, such as those I used for the door in my small cabinet. (See main article.)

Unlike some commercial hinges where the two leaves are riveted to a pin, I prefer Brusso hinges (available from Woodcraft, 800-225-1153). Each solid brass hinge consists of two separate leaves, making layout and installation easier. You mortise the pin leaf into the top and bottom of the case; the pinless leaves are mortised into the door.

The procedure I use for installing knife hinges is as follows: Lay out the pin leaves on the dry-assembled case, then disassemble the case and cut the mortises. Next, glue up the case, fit the door to the case opening, and lay out and mortise for the door hinges. Then install the hinges and hang the door.

Lay out the pin leaves flush to the sides of the cabinet; lay out the pinless leaves so they overhang the door by $\frac{1}{32}$ in. (See drawing, right.) This tiny clearance ensures that the door won't bind. Since the sides of my cabinet project beyond the top and bottom, I lay out the pinless leaves flush with the back of the door. This keeps the knuckle almost flush with the front edge of the cabinet's side for good looks, while providing a generous 120° door opening.

Mark the outlines of each pin leaf with a sharp pencil, then rout freehand to the exact thickness of the leaf, staying within the marked lines. The procedure is the same for routing the mortises in the door. (See photo, right.) Then pare the case mortises to the exact size of the hinge; you'll stop short on the door mortises as I'll explain below. (See photo, far right.)

Now glue up the cabinet and fit the door to the case, leaving $\frac{1}{32}$ in. of clearance around the door. Lay out each door mortise and rout and chisel the mortises as before, but leave the length of each mortise a hair short. Screw the pin leaves into the case, press the door leaves onto the pin leaves, and slide the door between the leaves. Install a single screw in each door leaf and check the fit of the door. Make adjustments by removing the door and lengthening one or both mortises with a chisel. When the door hangs evenly, drive in the final screws. —A.R.



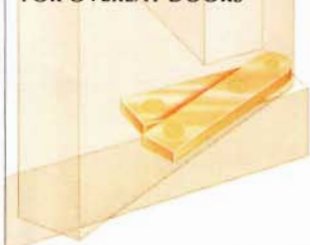
Knife precision.
This brass offset knife hinge allows for a smooth, 120° door opening.

Choose your knife.

Two-piece knife hinges come in two styles: straight and offset.

With offset hinges, use "left" or "right hand," depending on door swing.

STRAIGHT HINGE FOR OVERLAY DOORS

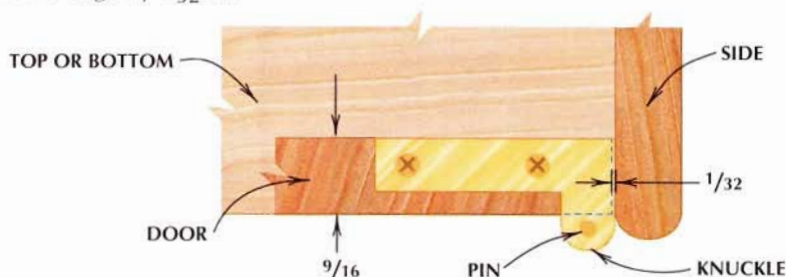


OFFSET HINGE FOR INSET DOORS (RIGHT HAND)



HINGE LAYOUT

Lay out the pin leaf on the cabinet's top and bottom, flush to the sides of the cabinet. For clearance, lay out the pinless leaf on the door so it overhangs the door's edge by $\frac{1}{32}$ in.



Mortise to the precise depth. Using a straight bit, mortise to the depth of the leaf's thickness by routing freehand inside the marked lines. A scrap block prevents the router from tipping.



Chisel to the line. After routing, pare the walls of the mortise by hand with a razor-sharp chisel. Hold the chisel vertically, and take light, slicing cuts until you reach the layout lines.

Shellac and Wax

A fast finish with a silky feel

by Ian J. Kirby

Beeswax applied over a light coat of shellac is one of the traditional finishes of the Arts and Crafts movement, and it's the finish I've preferred to use all my working life. It's quick and easy, it gives you a beautiful wood surface, and it ages gracefully.

In the Arts and Crafts tradition, I take great care in selecting wood for a piece of furniture. I don't use stain because my aim is to retain the color of the wood I've worked hard to compose. Beeswax over shellac intensifies the natural color without changing it. And it doesn't interfere with the texture—it feels like you're touching the wood itself, not a coating of plastic.

The beeswax, more so than the shellac, also gives wood a satiny luster. The main purpose of the shellac is to form a barrier that holds the wax up on the surface.

Arts and Crafts tradition. Kirby rubs a final coat of beeswax on this rosewood and ebony buffet.

PHOTOS BY JOHN KELSEY. ILLUSTRATIONS BY IAN J. KIRBY



Without the shellac, the first couple coats of wax will sink down into the grain, especially on open-grain woods, and it'll take a couple extra applications of the wax to form the luster you're after.

An Overall Strategy

Because shellac and wax are both so easy to apply and they dry so fast—five to 10 minutes for shellac and five minutes for wax—you can finish selected surfaces of all parts of a project before assembly, with hardly a break in the continuity of your work. You can finish right on the workbench, without any special apparatus or dedicated finishing space.

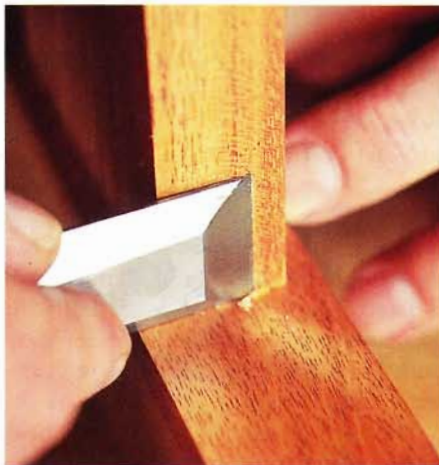
My strong preference is to finish straight from the plane whenever possible. Some woods are difficult and have to be sanded, but whether finishing from the plane or the sanding block, the problem is the same: After assembly, you can no longer get a straight run at many of the complex surfaces—for example, raised panels and the inside edges of their frames. No surface will ever be as clean as it is the moment you finish smooth-planing or finish-sanding, and the longer the wood waits unfinished, the more dirt, scratches, and dings it collects. This is why it makes so much sense to finish as you go along.

As a bonus, you'll find that you can leave glue squeeze-out to harden where it is because it won't soak into the finished wood near the joints, and a chisel picks it right off the wax without a trace. (See photo, above.) The shellac-and-beeswax combination is thus more than a finish—it's part of a time-tested and extremely efficient assembling and finishing routine. (See drawings, right.)

Finish, Then Build

Most furniture projects go together as a series of subassemblies. When I'm ready to begin gluing together the pieces of a subassembly, my finishing routine is as follows: First prepare the wood surfaces that will afterward be hard to reach, then sweep off the bench, get out the jars of shellac and wax, rag on the finish, put away the finish jars, and get on with the assembly.

I finish the remaining surfaces of the subassemblies before putting the entire project together. By the time I've finished assembling all the parts, there's a good base finish on all sides of every piece of wood. All I have left to do is polish on a few more applications of wax, and I'm ready to deliver the piece.



Less mess. A chisel lifts dried glue off the shellac-and-wax finished surface of this leg-and-rail subassembly, leaving no trace.

Mixing Shellac

The ingredients of a shellac-and-beeswax finish are easy to manage in the shop. You can mix both finishes yourself, so you're in control of their composition. They keep well, and they're not messy.

Shellac is a resin created by insects that is harvested, refined, and then sold as a commodity on the world market. Although you can buy shellac as a canned liquid, you're better off making your own by purchasing flakes and dissolving them in denatured alcohol. Start with pure blond, double-blond or superblond shellac flakes (available from woodworking catalogs and finishing supply houses), because this makes the lightest-color finish with the least effect on the natural color of the wood.

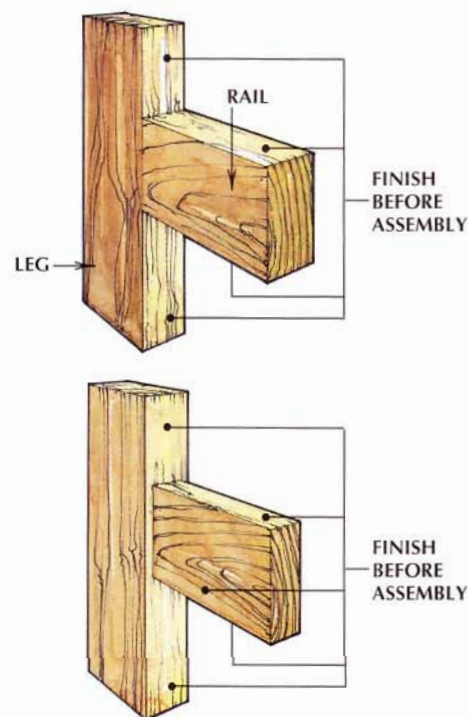
The ratio of flakes to alcohol is called the "cut" of the shellac—1 lb. of flakes to 1 gallon of denatured alcohol would be a 1-lb. cut.

You need a wide-mouth jar of at least 1-quart capacity. You probably don't want to mix shellac in gallon quantities, so scale down to the size jar you have. To mix a quart of 1-lb. cut, weigh out four ounces of flakes and pour about a pint of denatured alcohol into the jar. Dump the flakes into the alcohol and stir the mix with a stick, then set it aside overnight to let the flakes dissolve. (See photos, page 60.) Then add more alcohol until you get the viscosity you want, stir well, and you're ready to go. The exact cut is not critical, and I usually add a little extra alcohol. When it's right, the shellac will look like pale sherry or apple juice and have about the same consistency too. (See bottom photo, page 60.)

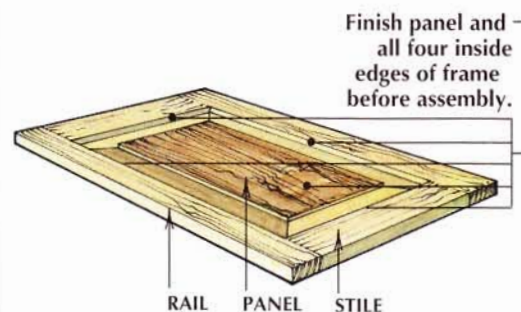
WHICH SURFACES TO FINISH BEFORE ASSEMBLY

Before you glue up each subassembly, shellac and wax all the surfaces that will be hard to reach afterward. Here are three examples showing which surfaces to finish before gluing them together. Avoid getting finish on areas that will be glued.

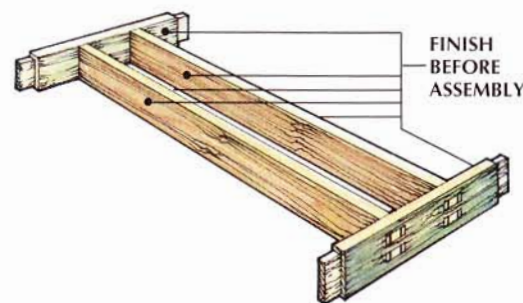
LEG-AND-RAIL ASSEMBLIES



FRAME-AND-PANEL ASSEMBLY



STRETCHER ASSEMBLY



MIXING SHELLAC



Ingredients. Weigh the shellac flakes and pour them into the denatured alcohol.



Stir and let it sit. Stir the mixture, and let it completely dissolve overnight.



Consistency. Add alcohol until the shellac runs off a brush like apple juice.

The shelf life of homemade shellac varies from a few months to more than a year, depending on the quality of the product you use and the conditions of storage. Keep it in a glass container with a tight lid, in a cool dry spot, to make it last. Store-bought liquid shellac in a can typically has a shelf life of about a year. To test whether a batch of shellac is fresh, apply it to a sanded piece of scrap with a rag. If it's still tacky after ten minutes, it's time to mix or buy a new batch.

The shellac jar in the photos is a new, wide-mouth canning jar from a kitchen store. It won't be long before the sides of the jar accumulate a coating of semi-hard shellac dribbles. This gunk, which the old-time "shiners," or finishers, called *jam*, is perfect for plugging up small defects in the wood.

Mixing Beeswax

Beeswax is another insect product, in this case from the honeycomb that bees build in their hives. Like shellac, beeswax comes to market in many grades and colors. You can use a prepared beeswax mixture, such as Briwax (also available from woodworking catalogs and finishing supply houses). But most such mixes contain a variety of waxes and solvents, and it's hard to find out just what the ingredients are. If you do use a commercial wax, choose the lightest-colored preparation you can find.

To mix your own wax, it would be easiest to start with bleached, granulated beeswax, but that's become hard to find. The alternative is to start with a block of wax (available from Woodcraft, 800-225-1153), which you then pare with a knife into flakes—the smaller the flakes, the quicker it'll dissolve. Some people like to make a harder wax by adding carnauba, though I don't think it's worth the trouble because the main benefit of wax is that it's slick, not hard.

The best container for wax is a wide-mouth ceramic crock. Saturate the wax in pure turpentine, stir it in well, and leave it overnight to dissolve. Then stir it some more. You want to end up with a mixture the consistency of soft butter. (See bottom left photo, opposite page.) If it's too stiff, add more pure turps. If it's too thin, leave the lid off the wax pot so some of the solvent can evaporate.

Preparing the Surface

The most important thing in preparing the wood surface for finishing is to make it smooth (remove mill marks,

scratches, dirt, and dings) without distorting the flatness, squareness, and uniform thickness that are so important to good furniture. If you sand a hollow where a ding was, the finish will expose the deviation.

If the wood can be planed, then that's the quickest and most effective preparation. The plane leaves a lustrous surface that can't be improved. If you can't achieve a perfect surface straight from the plane, then you will have to sand. Where you start depends on the surface, but you should progress to 320 grit, or even 400 on dense, close-grain woods like maple. Sand with a cork block to help maintain flatness, and don't skip grits, or you'll leave scratches in the wood. Then brush away the dust.

Applying Shellac

The shellac coat must not be heavy, and you never apply a second coat because that would just dissolve the first coat and make a sticky mess.

You can brush the shellac onto the wood, or you can apply it with a clean cotton "mop" or rag. A rag will give you more control over the shellac than a brush will. (See top left photo, opposite page.) The brush deposits a lot more liquid, so it's harder to keep the shellac off the joints, which is essential to avoid interfering with the glue. Just wipe the shellac onto the wood, up to the edge of the area to be glued, and leave it alone to dry.

The shellac will raise the grain of the wood, leaving the surface covered with minute bumps, or "nibs," that feel rough to the touch. Don't be dismayed by the roughness. As soon as it dries, de-nib the surface by sanding with a worn piece of very fine sandpaper—the finest grit that you used earlier to prepare the surface. Thread the paper between your fingers (see top right photo, opposite page) and work lightly over the shellacked surfaces. You'll probably think you're sanding all the shellac off the wood, but don't worry about it. Enough will remain in the surface to do its job. Whatever you do, don't try to put more shellac onto the wood. When you're finished sanding, brush all the dust off the wood.

Options for White Woods

On white woods, such as holly, sycamore, hickory, ash, and maple, even superblond shellac may shift the color too far to yellow. If you are trying to

APPLYING AND SMOOTHING SHELLAC



Careful. Wipe the shellac onto the wood, but don't let it run into the joint.



De-nib. Shellac will raise the wood grain slightly. Smooth the dried surface with worn sandpaper.

retain as much whiteness as possible, you can substitute some diluted sanding sealer for the shellac. Put it on and let it dry, then sand the surface thoroughly, to the point where you think that you have removed every trace of it. Sanding sealer takes much longer to dry, and you must sand it thoroughly, rather than just enough to de-nib it like shellac.

On a tight wood like maple or holly, another way to avoid any yellowing is to just skip the shellac (or sealer) and go straight to wax. You'll have to apply a couple extra coats of it, but the reward is that beeswax intensifies the natural color of the wood.

Applying Beeswax

Use a lint-free cotton rag to dip a bit of wax out of the crock, and rub it into the surface of the wood. Apply the wax sparingly and work it in until there's no free wax visible. (See bottom right photo.) Conclude by wiping the pad over the surface of the wood with the grain, then leave it to dry until the turpentine evaporates, which may take five minutes. Then buff the wood with a clean rag, and get on with preparing for the next stage in assembly.

After assembly, you'll plane or sand the surfaces that are still unfinished, making sure all adjoining faces are rectified, or flush. (See drawings, page 59.) When you shellac these surfaces, use a rag for maximum control, so you don't get too much shellac on the already-waxed surfaces. But if you do overlap, simply wipe the shellac off the wax, and it won't cause any problem.

Next time you have the wax out on the bench, rub some more into the first coat you applied, let it dry, and buff some more. And so on. Ultimately you'll want to apply four or five coats of wax, with a day or more in between each. You'll be able to see, and feel, the continuous improvement in the surface.

Repairing Beeswax

Even though you apply and buff the wax in multiple coats, only an infinitesimally thin coating remains. Beeswax might not seem like such a durable finish, but because it is so slick, it resists physical abrasion very well; and unlike film finishes, it can't crack, flake, peel, or scrape off the wood. It also resists water, but it has no resistance to liquids

that contain alcohol. It's not the finish to use for a bartop.

To repair a wax finish, or to clean up a surface with too much wax on it, dampen a clean, lint-free rag with pure turpentine, and rub. You'll find that the wax quickly levels out. It's normal to rewax about twice a year, and if you do, the surface will just keep getting better and better. ▲



IAN J. KIRBY

is a furniture designer and teacher with studios in Connecticut.

MIXING AND APPLYING BEESWAX



Like butter. Stir turpentine into the beeswax until you get the consistency of soft butter.

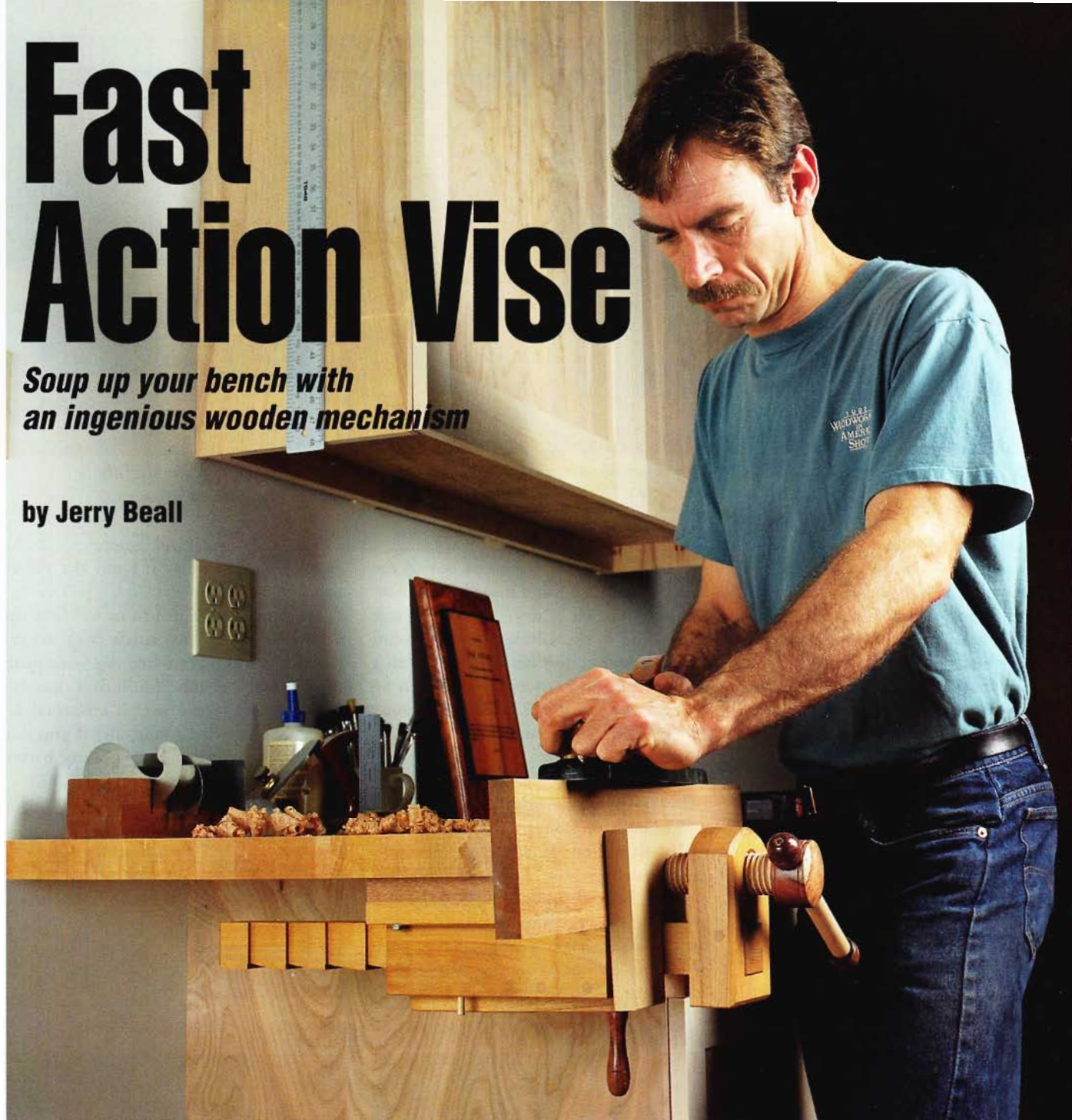


Polish. Apply beeswax over the shellac, let it dry, then buff it vigorously with a clean cloth.

Fast Action Vise

Soup up your bench with an ingenious wooden mechanism

by Jerry Beall



Easy to use. A quick throw of the lever on the underside of the vise releases or locks the vise. The magnetic mechanism is simple, foolproof, and easy to fashion.

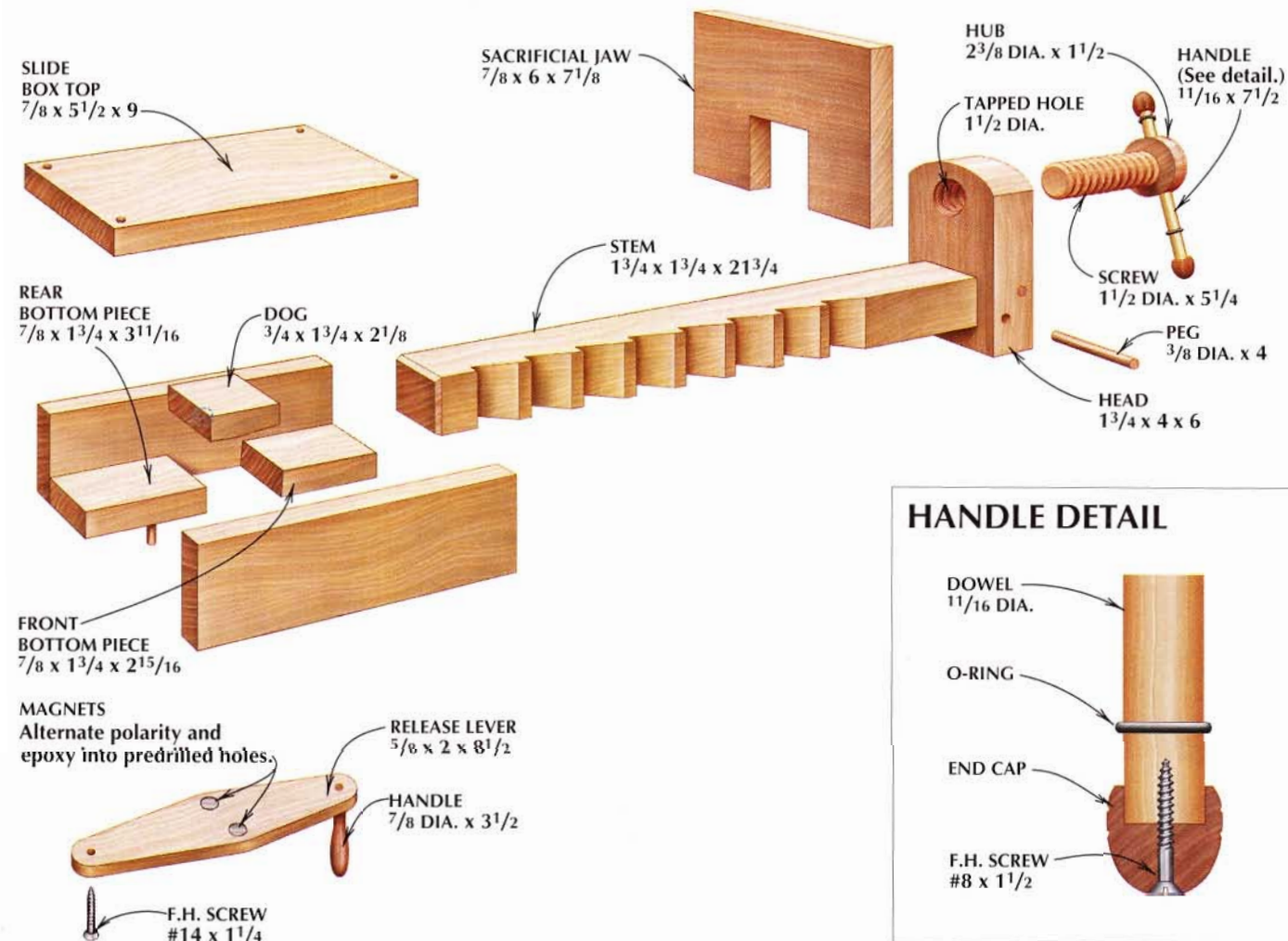
Do you remember playing with magnets as a kid? I certainly do. It was fun and fascinating to take a pair of magnets and fool around with their polarity, watching them spin about in response to mysterious attractive and repellent forces.

My wooden vise relies on the magic of magnets to “power” its quick-release mechanism. Throw the lever on the underside of the vise one way and the vise can pull open to accommodate stock up to 12½ in. wide. Throw the lever in the opposite direction, and a hidden, magnetically activated dog engages the nearest shoulder in the vise stem. This locks the vise head position so you can screw the workpiece fast. The mechanism even has a ratchet feature: In “locked” mode, you can close up the vise to clamp narrower work. Release the stem and head assembly, pull it free, and you can reposition it to work in vertical clamping mode.

PHOTOS BY JOHN HAMELROD/DALE IMAGES

FIG. 1: WOODEN QUICK-RELEASE VISE

The completed vise consists of two subassemblies. The slide box is mounted beneath the workbench top, and contains the quick-release mechanism—a magnet-activated dog that pops up to lock vise position and pulls down to release it. (See main text.) The stem, head, and screw assembly moves in and out of the square channel of the slide box. The workpiece is clamped between the edge of the benchtop and a sacrificial jaw.



My vise is as quick and easy to adjust as any factory-made model would be, but it's not designed to apply the extreme clamping pressure you'd be able to achieve with a metal version. In this article, I'll show you how to build your own model.

How the Magnetic Mechanism Works

The vise consists of two assemblies. The slide box is mounted underneath the benchtop, and contains the magnetic mechanism. The movable part of the vise is the stem, head, and screw assembly. The stem moves back and forth inside the slide box. It's notched to engage the magnetically activated dog that fits in a cutout on the underside of the slide box.

The dog in the slide box is a simple wooden rectangle with a single magnet epoxied into a hole on its underside. Acting on this single magnet are two magnets in the release lever that's screwed to the slide box. One of these magnets is oriented to attract the dog magnet; the other is oriented to repel it. (See Fig. 2.) Move the lever to one side and the dog is pulled down, allowing the stem to move freely in and out. Shift the lever and the other magnet's reverse polarity pushes the dog up, where it can engage the notched stem. You can push the stem inward because the ramped surfaces of the notches force the dog downward. But thanks to the strong repellent force of the magnets, the dog will pop up and lock against the nearest notch shoulder as soon as you start to

pull the stem outward—that's the ratchet action I mentioned earlier.

If you want to make a vise like mine, start off with some clear, dry hardwood. I choose beech for the stem, head, and slide box, but hard maple, birch, and ash are also good choices. I turned the hub, handle ends caps, and ratchet lever handle from bubinga.

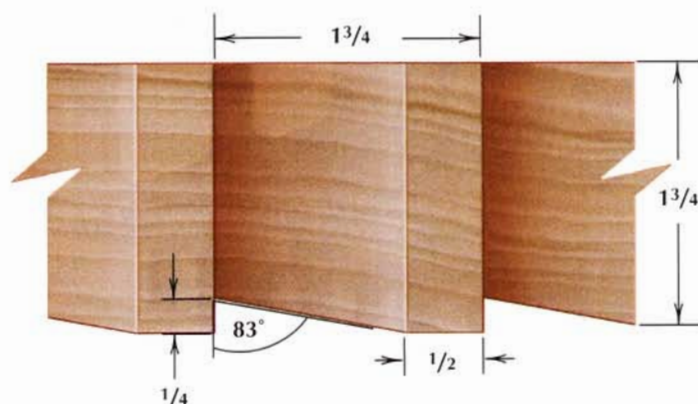
Making the Stem

The stem starts out as a blank that's square in section (1 3/4 in. on a side) and 21 3/4 in. long. Mark the shoulder lines for the notches at 1 3/4-in. intervals, starting 8 in. from the front, or head, end. If you want to be able to use the vise vertically as well as horizontally, extend these layout lines across an adjacent side.

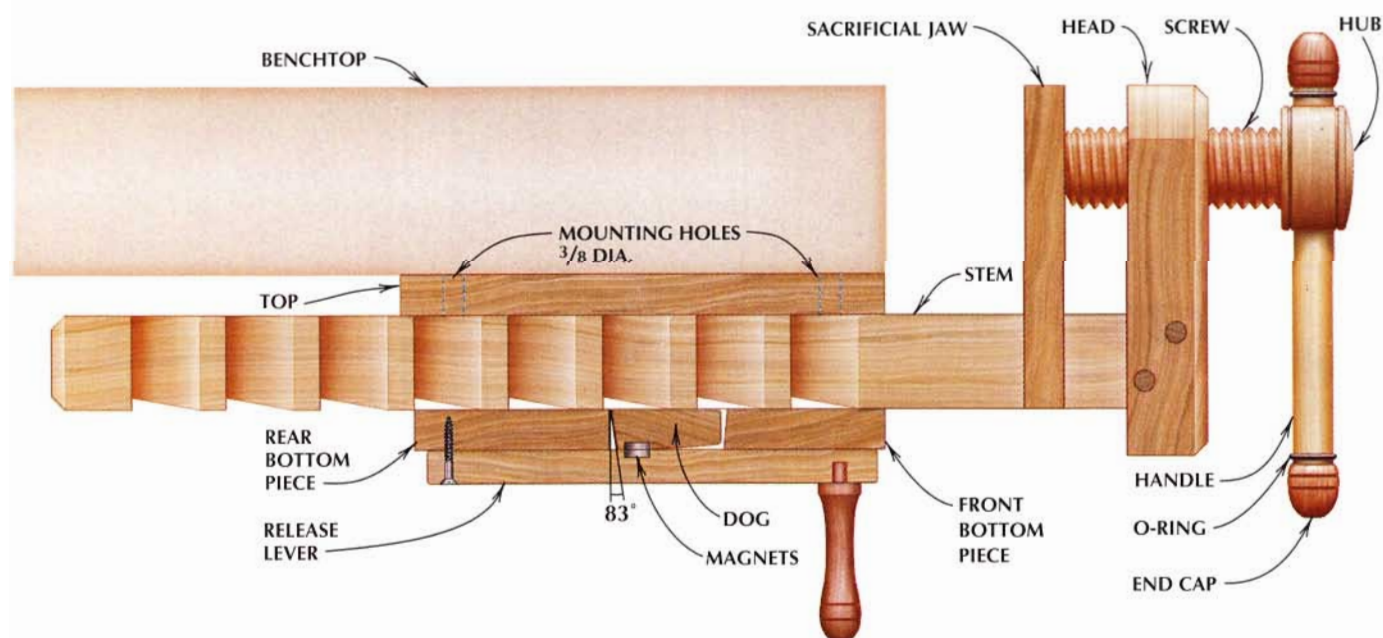
FIG. 2: ELEVATIONS AND OPERATION

Side, bottom, and end views show how the three magnets are located—one in the dog, two in the release lever. Pivoting the release lever against a limiting dowel positions one of the two release lever magnets directly under the dog magnet, so the dog can be either pulled down (allowing the stem to move freely) or forced up (locking against the nearest stem shoulder). As shown below, make 83° cuts (7° off square) for the stem notches, and for end cuts in the front bottom piece and dog. Round over the opposite end of the dog to help it move up and down easily. Epoxy the magnets in predrilled holes, so that they sit just below the wood surface.

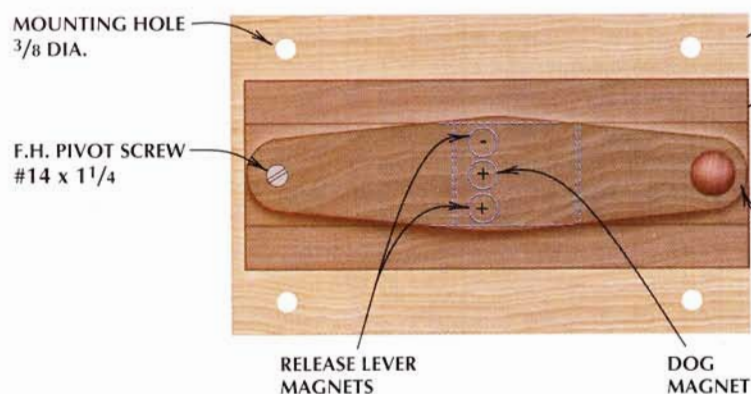
NOTCH DETAIL



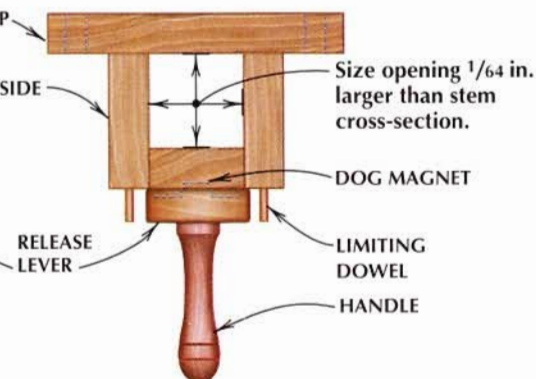
SIDE VIEW



BOTTOM VIEW



END VIEW



Cut the notch shoulders on the table-saw, with the blade raised $\frac{1}{4}$ in. above the table and set for a 7° bevel. After cutting all the shoulders, mark the ramp, or long, angled cuts. Take care to leave a $\frac{1}{2}$ -in.-wide land, or flat, area next to each shoulder cut. (See Fig. 2.) Cut the ramps on the bandsaw. Each cut will create a slim triangle of waste. Clean up the notches with chisels and files, followed by 120-grit sandpaper.

Note: If you're making several vises, you might want to build a router jig for notching the stem, like I did. My jig is basically an open-ended wooden box (like the slide box) that the stem blank can be clamped in. The router base rides on a 7° platform built into one side of the box, making it easy to rout ramps that are smooth and precise.

Making the Head

The head of the vise needs two holes—one square (for the stem) and one round (for the screw). Lay out these openings as shown in Fig. 2, then cut the square through mortise to match the cross-section of the stem. For the screw hole, follow the directions that came with your threading tools. Wood threaders are available from Woodcraft Supply (800-225-1153) and from The Beall Tool Company (800-331-4718). My threader requires a $1\frac{3}{8}$ -in.-dia. hole for a $1\frac{1}{2}$ -in. tap.

Lay out the arc at the top of the head, then cut it and sand it smooth. Glue the stem into the head and pin it with a pair of $\frac{3}{8}$ -in.-dia. pegs. As shown in Fig. 1, each peg should extend through the stem and the full width of the head.

Turned Parts

The screw, hub, and handle are made from turned parts. To make the screw, turn a $1\frac{1}{2}$ -in.-dia., $5\frac{1}{4}$ -in.-long cylinder. Cut threads to within $1\frac{1}{8}$ in. of one end. The unthreaded end gets glued into a hole in the hub blank, which you can cut roughly larger than its finished dimensions. After gluing the screw and hub assembly together, mount it on your lathe and turn the hub to its finished size. Before taking the assembly off the lathe, round the end of the screw slightly. This will help the vise to clamp tightly on pieces that are not evenly shaped.

Set up the hub in a V-block holder on your drill press, and bore a centered, $\frac{3}{4}$ -in.-dia. hole for the handle all the way through the hub. The handle diameter should be about $1\frac{1}{16}$ in. so that it can

RARE-EARTH MAGNETS

The magnets we played with as kids are quite a bit different from the small, super-powerful magnets used to make this vise. The new versions are called "rare-earth" magnets because of the rare-earth elements—samarium and neodymium—used in their manufacture. The magnet-making process starts by compacting a finely milled powder in an electromagnetic alignment field. Then the material is sintered and heat treated to achieve full density and optimize magnetic properties. Final shaping of the magnet is done by grinding with diamond abrasives.



Powerful mini-magnets. These rare-earth magnets have enough pulling and repelling power to operate the ratchet action of the vise.

Unlike conventional magnets, the rare-earth versions are very resistant to being demagnetized. And they become even stronger when backed up with iron or steel. These high-tech magnets have helped manufacturers pack more power into increasingly compact cordless tools. But creative cabinetmakers have also found ways to use them in their work. (See page 54.) You can buy the magnets from Lee Valley Tools (800-871-8158). One note of caution: Take extra care when handling rare-earth magnets; they're very brittle and will break easily.

move freely in its hole. Finish up this part of the project by installing O-rings and end caps as indicated in Fig. 1. These rubber rings do a good job of absorbing the shock of the handle slipping back and forth in its hole. You'll find a selection of O-rings at most hardware stores.

The Slide Box

The slide box does just what its name implies: It provides a square channel for the vise stem, allowing it to slide in and out, and to lock in place. The slide box mounts to the underside of the workbench by means of lag screws or bolts that extend through four $\frac{3}{8}$ -in.-dia. holes. (See drawings.) When mounting the finished vise, you may need to shim it to get the top of the vise head level with the top of the bench.

The parts of the slide box are easy to make and assemble. Side, bottom, and top pieces can be joined together with glue and screws. When assembling the box, take care with its interior dimensions. The stem needs to slide smoothly inside the box, but with a minimum of play. I recommend adding $\frac{1}{64}$ in. to the finished cross-section of the stem to arrive at the interior dimensions of the box. Try this trick for a good fit: Build the box right around the stem using business cards as spacers.

When fitting the two bottom pieces, leave a $2\frac{1}{8}$ -in. gap for the dog. Be sure to cut an 83° angle on the back end of the front bottom piece, as shown in Fig. 2. This drawing also shows the size and shape of the dog and the location of the

magnet set into its bottom side. Note that the dog is about $\frac{1}{8}$ in. shorter than the opening in the bottom of the box, and that the edges farthest from the magnet are slightly rounded. This promotes easier movement.

Installing the Magnets

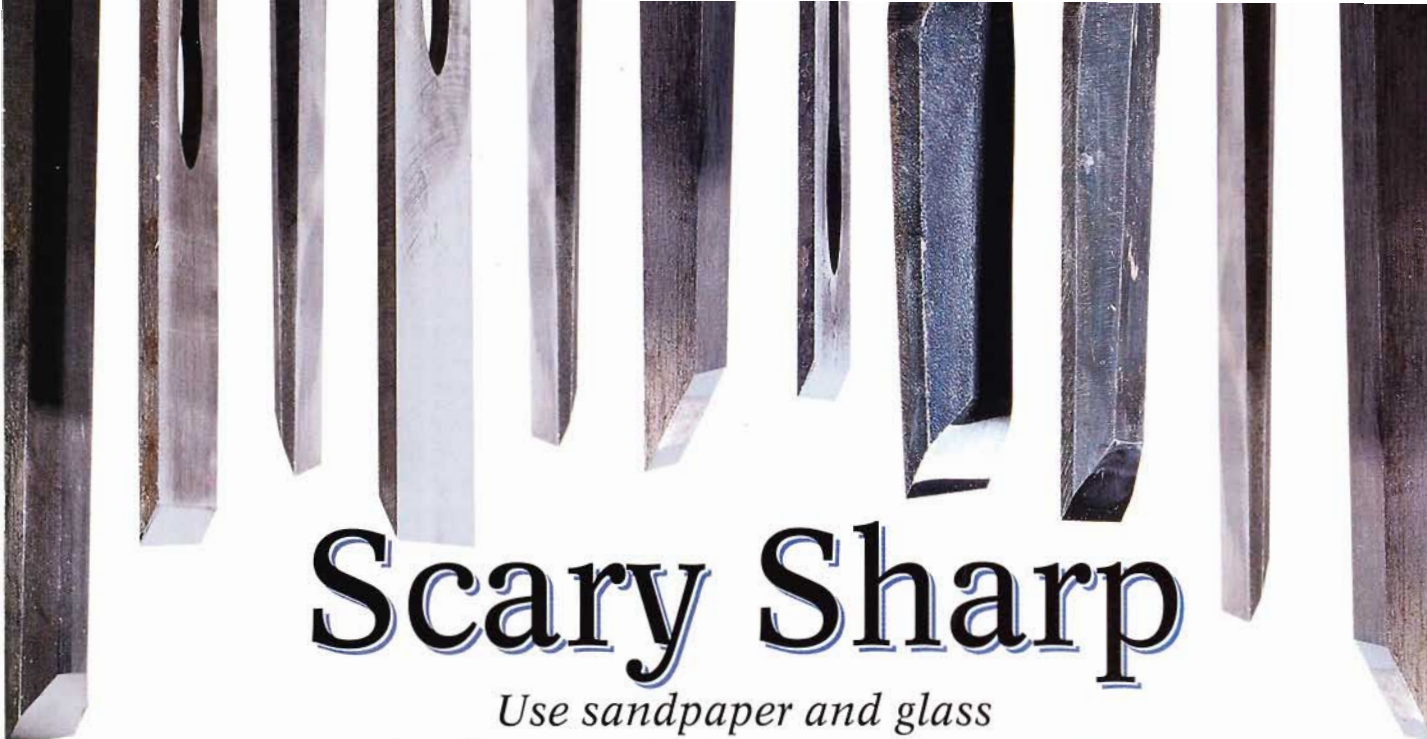
The three magnets are identical $\frac{1}{2}$ -in.-dia., $\frac{1}{8}$ -in.-thick discs, available from Lee Valley Tools (800-871-8158). They should be glued into predrilled holes so that the top of each magnet is just below the wood surface. Hole locations are shown in Fig. 2. Make sure that you glue the two magnets in the lever with their polarity reversed. I used epoxy adhesive; cyanoacrylate will also work.

Attach the release lever to the bottom of the box with a flat-head wood screw. Tighten the screw so that the lever can pivot easily. To limit the lever's throw, glue two $\frac{1}{4}$ -in. dowels into the bottom of the slide box.

Notch the sacrificial jaw to fit loosely over the stem so it can twist to accommodate slightly nonparallel work. I recommend an oil finish for all vise surfaces. This promotes dimensional stability of the parts and keeps sliding smooth. ▲



JERRY BEALL
is a woodworker,
inventor,
and mechanic
in Newark, OH.



Scary Sharp

*Use sandpaper and glass
to give your tools a super-keen edge*

by Mike Dunbar

In our shop we use and teach a sharpening technique with every important advantage I can think of. It's fast and easy. The mess you make is minimal, and there are no stones to flatten. And no special equipment is required, which makes it very economical.

I first described this technique in my book *Restoring, Tuning and Using Classic Woodworking Tools* (Sterling). A reader tried the technique and remarked that the edge was so sharp it was frightening. Before long, the news had spread to woodworking discussion groups on the Internet. The "scary sharp" label was coined, and it stuck. This brings me to the most important benefit of all: This technique yields remarkably sharp edges on all kinds of tools, from simple chisels and plane blades to gouges, drawshaves, and curved carving knives.

Just Glass and Sandpaper

The main components in this sharpening system are sandpaper and plate glass. The glass acts as a flat platen for different grits of sandpaper, which do the abrasive work.

You can get plate glass from any local glass supplier. Make sure that your glass is at least $\frac{3}{8}$ in. thick to ensure a solid platform. Glass size depends on your situation. The sharpening bench that my students use has a piece of plate glass 40 in. long by 8 in. wide. This gives us enough room to adhere sandpaper strips of various grits to a single surface.



Simple, inexpensive supplies.
Plate glass provides a dead-flat platform. When you cover it with different grits of sandpaper, you have an effective sharpening surface.

For one-person use, I recommend a glass size of 5 in. by about 18 in. Cover this area with sandpaper and you'll be able to flatten the bottoms of hand planes and sharpen a wide variety of edge tools.

The sandpaper we like to use is the adhesive-backed variety that is available in rolls. We use several different grits: 80, 120, and 320. We also use 600, 1,000, and 2,000-grit wet-and-dry paper.

To set up the system, cut strips of the adhesive-backed 80, 120, and 320 paper and adhere them to the glass. It's fine to use both sides of the glass. The wet-and-dry sandpaper and other nonadhesive sandpa-

per can be used right on top of the paper that's stuck to the glass. There's enough friction to hold the papers in place while you're using them. Or if you do want to stick them to the glass, use spray adhesive.

We use the 80-grit sandpaper for shaping an edge, smoothing away surface grinding marks, and removing rust pitting. This grit cuts so fast that we rely on it instead of grinding. The 120 grit is a good place to start if an edge is badly worn.

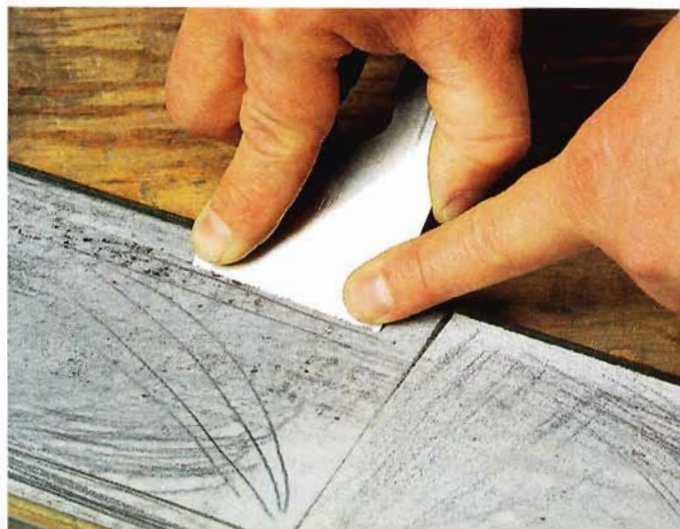
Most sharpening in a workshop is the regular honing needed to restore an edge that has simply lost its keenness. For this, we start with 320 grit, then work our way through finer grits.

600-grit paper produces a good working edge suitable for most tools. You can see yourself reflected in its polish. To get sharper, switch to 1,000-grit wet-or-dry sandpaper. A plane blade sharpened on this grit will cut curly maple without tear-

SHARPENING CHISELS AND PLANE BLADES



Flatten the back first. To flatten and smooth the back of a chisel or a plane blade, keep the metal flat on the sandpaper and use successively finer grits.



Now hone the bevel. The honing angle is easy to maintain when you sharpen with a side-to-side motion instead of moving the blade back and forth.

ing and produce shavings fine enough to read through. If you're still not satisfied, 2,000-grit paper will take you into truly scary territory.

Use a brush to sweep away any loose abrasive particles every time you move from one grit to another. If coarser grit gets onto a finer paper, you will end up with random deep scratches in your edge and it will not be as keen as possible.

Chisels and Plane Blades

These straightedge tools often come from the factory with coarse grinding marks on the face opposite the "bezel" (or bevel; see below). This back face—especially the area within about 2 in. of the cutting edge—must be perfectly flat and smooth.

To remove grinding marks, start working on 80-grit sandpaper. Work at least the first 2 in. of the blade on the sharpening surface, applying even downward pressure with the heel of your palm or with your fingers. Apply the pressure just behind the bezel. (See left photo, above.) It is critical that you keep the blade flat; lifting the far end will round the surface behind the cutting edge.

Gauge your progress by examining the surface. It should be covered with a matte of fresh scratches. Move up to 120 grit and repeat the process until all the 80-grit scratches have been replaced. This surface is beginning to be reflective; but it's not yet a true mirror polish.

Now move up to 320 grit. Once again, continue to work the surface until all the scratches made by the previous grit have been removed. This surface is even more reflective. Although you cannot yet make out the features of your face, the image is less cloudy than it was previously. For rough work, this edge is usually sufficient.

For my very best tools, I like to work all the way up to 1,000 or 2,000 grit. This will give you a mirror polish that enables you to distinguish the hairs in your eyebrows.

When the back is done, hone the bevel. Unless you need to remove a nick or reshape the bevel, you can begin honing on a 120-grit surface. Place the bezel's heel on the paper and

raise the end until you feel the cutting edge make contact. This is the proper honing angle.

Hone the bezel by sliding it side to side, not back and forth or in a figure-eight pattern, as is done on sharpening stones. (See right photo, above.) Running the cutting edge into the grit will dig the grit loose from the paper and tear up the edge. With a side-to-side sharpening motion, you'll be surprised how simple it is to maintain the honing angle. No honing guide is necessary.

The bezel is narrow, so it will sharpen quickly. In no time at all, you'll move through successively finer grits until you arrive at a mirror finish and a razor edge.

Curved Chisel Edges

A hand plane used for thicknessing should have a slightly curved cutting edge to avoid digging into the wood. Sharpening this curve is similar to sharpening an edge with a straight bezel. Deal with the back of the blade first, using the technique described earlier for removing machine marks and flattening the surface.

Find the honing angle the same way as you would with a straight bezel: by placing the tool on its heel and slowly raising the edge until the cutting edge makes contact. Then slide the edge back and forth across the abrasive, but in an arc rather than in a straight line. I hold the blade with both hands and allow my

BEZEL OR BEVEL?

The replacement of "bezel" with "bevel" is a recent occurrence in woodworking. Oddly, the dictionary still seems to favor "bezel." (See below.) I prefer "bezel," too. To me, preserving the language of woodworking is as important as preserving tools and techniques used by earlier generations

—M.D.

Bezel—"a sloping edge or face, esp. on a cutting tool"

Bevel—"the angle that one surface or line makes with another when they are not at right angles"

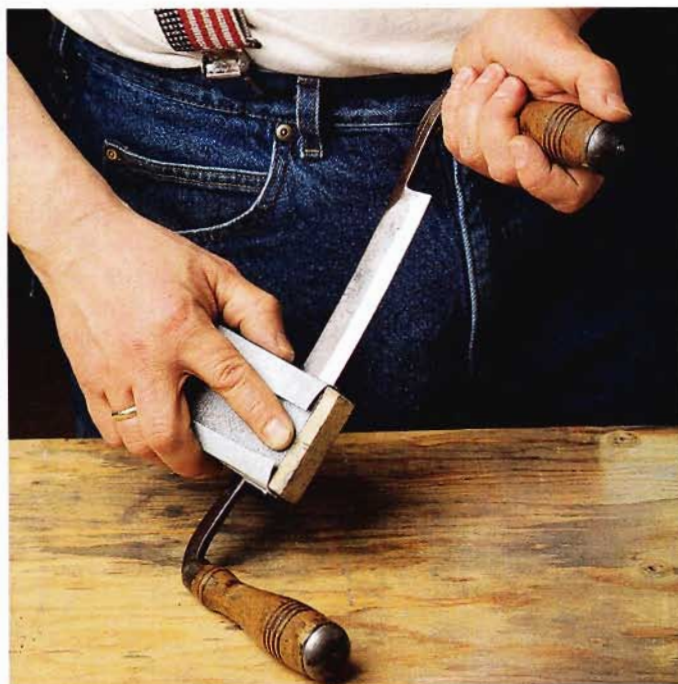
Source: Webster's Third New International Dictionary



Inside curves are easy, too. Wrap sandpaper around a dowel to smooth and polish the inside face of a gouge.



The gouge bezel. A side-to-side motion works for honing the bezel on the outside curve of the gouge. Turn the blade to sharpen the curved surface evenly.



Take the abrasive to the tool. Wrap different grits of sandpaper around a block of wood to sharpen knife-edge tools like this drawshave.

fingertips to provide pressure. I begin a stroke on the right corner, using my right fingers for pressure. As I pass through the stroke, I gradually pass the pressure to my left hand. Using this method, you'll cut back the corners of the cutting edge and create the curve you want in the cutting edge of the tool.

Gouges

To sharpen a gouge, begin once again by flattening and polishing the side opposite the bezel. However, this surface is concave, so you won't be able to move it across a flat surface. Instead, wrap a piece of sandpaper around a dowel that is nearly the same diameter as the gouge. Use this cylindrical sharpener as you would a round slipstone to flatten and polish the surface. (See top photo, left.) The strokes you use should be from side to side rather than back and forth over the length of the gouge.

You can hone the bezel of a gouge on your flat sharpening surface. Begin at one corner of the bezel and roll the edge onto the surface until you work the entire length of the bezel and reach the opposite corner. (See middle photo.) Proceed through the grits as you would when honing a chisel or a plane iron.

The order of work should be the same when sharpening an incannel gouge—the kind with the bezel on the inner, or concave, surface of the blade. Start out by polishing the outer, convex surface opposite the bezel. Hold the blade flat on the paper and sharpen with a rolling, side-to-side motion.

To hone the bezel, again wrap a piece of paper around a dowel and use it as you would a slipstone. We keep a variety of different-diameter dowels on our sharpening bench with a strip of 320 wrapped around one end and 600 on the other.

Knife-Edge Tools

To sharpen knife-edge tools like the drawshave and ax, I take the sandpaper to the tool. (See bottom photo.) The sharpening "stone" in this case is a piece of $\frac{3}{4}$ -in.-thick wood that is wrapped with sandpaper or covered on at least one side with stick-on sandpaper.

Both the drawshave and ax should have convex edge profiles. This means that when sharpening, you should only be in contact with one area at a time. Do this by tipping the block after a number of strokes to bring the sandpaper into contact with another area. Repeat until you've worked up to the cutting edge.

The scorp and gutter adze also have convex knife edges, but they're curved. To sharpen the inside of these tools, use a sandpaper-wrapped dowel.

Still More Sharpening Possibilities

Once you get the hang of sharpening with sandpaper, you'll find more and more ways to apply this technique. For example, you can sharpen Forstner bits using sanding sticks—small, narrow lengths of hardwood covered on one or both sides with sandpaper of different grits. These sticks can be custom made to suit the sharpening task. ▲



MIKE DUNBAR teaches sharpening, chairmaking, and other aspects of woodworking in his New Hampshire shop. He is a contributing editor to AW.

The Story of a Lapstrake Canoe

Witness the birth of a wooden boat

by Simon Watts



What keeps the water out?
In this "lapstrake" canoe the plank edges overlap about 1/2 in., like clapboards on a house. Lapstrake is a forgiving construction method, well-suited to the novice boatbuilder. Boats built this way combine light weight with flexible strength.

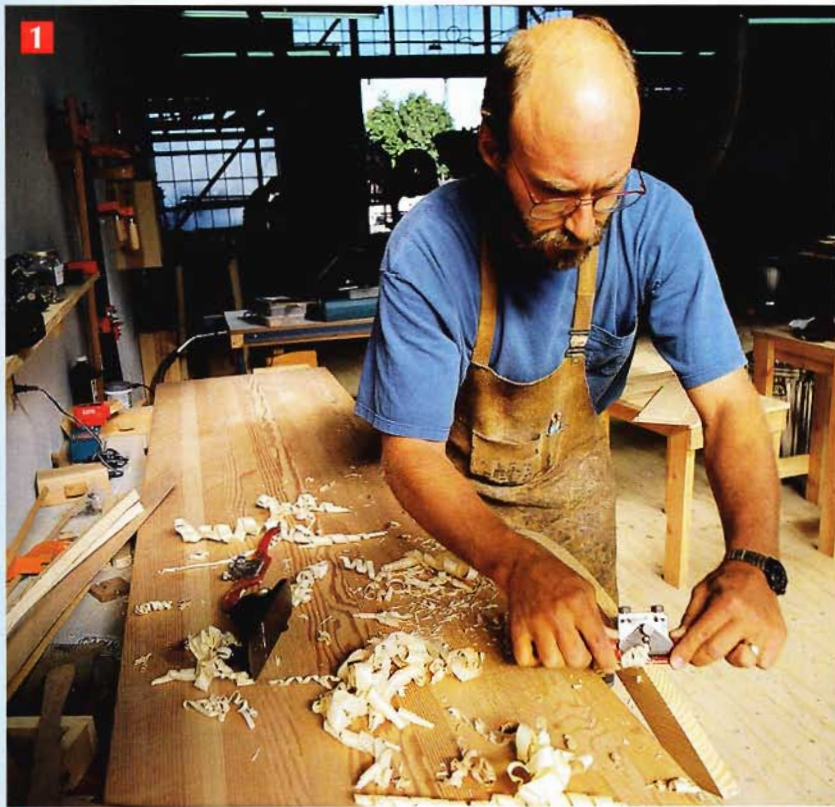
I've built numerous boats with students, but this little 15-ft. canoe, designed by Walt Simmons, remains one of my favorites. It is an ideal craft for an adult or two children on sheltered waters such as lakes, rivers, and estuaries. If you make the planks from spruce, the canoe will be light enough for one person or a car roof rack to carry.

The photos show a six-day class at the Arques School in Sausalito, CA. A little boat like this is easiest to build upside down on wooden forms called "molds." We bend the keel plank over the molds and attach a curved stem to each end. Next, we cut and fit the first pair of planks called "garboards" and continue planking until we reach the top plank, or "sheer strake." Finally, we turn the canoe right side up and add the steam-bent ribs.

The Vikings cruised thousands of miles in open lapstrake boats. They planked in oak and fastened the planks with iron rivets, but the technique was the same. The Norse tradition lives on in some of the names we still use for parts of a boat: garboard, stern, keel, mast, and many more. ▶

Simon Watts is a West Coast editor of AW and co-director of the Arques School.

Prep and Planking



1 Mocking up. Try out complex curves in softwood before you commit to the real thing. Here, a student uses a spokeshave to shape a full-size pine mockup of a stem. We'll laminate the two real stems from ash strips, and attach one to each end of the keel.

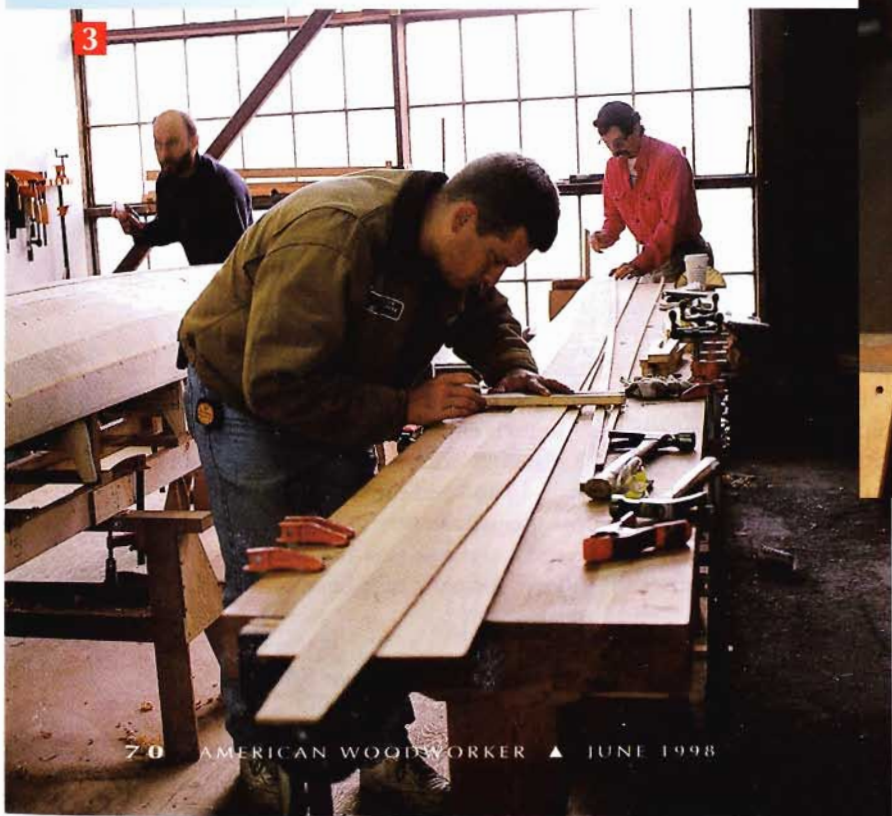
3 Tracing planks. A student traces an outline of the last plank—called the “sheer strake”—for a matching pair. Each pair of planks has a slightly different shape, so it's quicker to work by hand and eye than to use a jig or patterns.



2 Time for planking. With the stem-and-keel plank assembly on the molds, it's time to hang the first plank: the garboard. This piece must withstand twist and is often soaked or steamed, so it won't split when fastened to the keel plank.



4 Fitting the final plank. A clothespin-type softwood clamp holds the sheer strake in place for riveting. For a canoe this size, you need a couple dozen clamps like this. To prevent splitting along the grain, use a wood with interlocked grain, or add a rivet at the “V” of the clamp.



Framing and Riveting



5

5 Framing goes fast. To frame a boat, you quickly bend and rivet steaming-hot green wood ribs to the inside of the planked hull. Leave the ribs 1 ft. over length for handling.



6

6 Nailing a frame. Because the frames are green and very hot, you can drive copper nails through them without drilling pilot holes. While one student drives a nail through from outside the planking, another holds the frame in place inside, using an anvil-shaped tool called a backing iron.



7

7 Riveting the frames. The point of each nail gets a small copper washer, called a "rove," that's forced down with a hollow punch called a "roving iron." We cut the nail off short, and peen it as shown here to form a rivet. This time the backing iron is held outside the planking against the nail's head, to keep the nail in place.

FOR MORE INFORMATION

- Plans for this boat, a building manual, fastenings, and some tools are available by mail order from Duck Trap Woodworking, (207) 789-5363. Ask for design #53.

- Six-day lapstrake canoe workshops and other boatbuilding courses are taught at the Arques School of Traditional Boatbuilding, Box 2010, Sausalito, CA 94966, (415) 331-7134. You'll find them on the Web at <http://www.arqueschl.org/>.



8

8 Almost finished. Framing and riveting are done. Next step is to fit and fasten the inwale and outwale, two strips that stiffen the top edge of the hull. Finally, we trim the ribs flush, paint the outside, and varnish the inside.

White Oak

by Paul L. McClure



White oak has always been one of America's most durable and useful woods. Native Americans fashioned it into baskets and distilled a tea from the bark to relieve asthma, chills, and fever. In the 18th century, English shipbuilders used the wood extensively because their own oaks had been overcut. 19th-century laborers fashioned white oak into railroad ties. The wood became especially popular for furniture in the Victorian period, and again in the Arts and Crafts movement of the early 1900s.

Why is white oak so versatile? The wood is incredibly strong. Tiny bubble-like structures in the wood pores, called *tyloses*, keep liquids out, even when the wood is repeatedly wet and dried. And because wood movement in the quartersawn lumber is minimal, white oak is handsome enough for furniture but weatherproof enough for outdoor use. It's also a joy to work.

Appearance

Heartwood is light tan to brown, often with a gray cast. Sapwood is similar in color, and not sharply demarcated. The color changes little on exposure to sunlight and air.

White oak has three distinct and beautiful faces. When flatsawn, it has a dramatic cathedral figure. Quartersawn displays a medium to very large ray pattern called "tiger oak" in antiques. The third face, riftsawn, lacks large rays but has a very straight, even, comb grain.

WHITE OAK

SPECIES AND COMMON NAMES:

Quercus alba—white oak, Appalachian, northern, or southern white oak

GROWING RANGE: Southeastern Canada down the eastern seaboard to Florida, west to Texas, and north to Nebraska and Minnesota

SPECIFIC GRAVITY: 0.76

DENSITY: 47 lbs. per cu. ft.

WOOD MOVEMENT¹: Tangential (flatsawn): medium (just over 1/4 in. per ft.). Radial (quartersawn): small (just over 1/8 in. per ft.)

DURABILITY: Heartwood very durable; sapwood moderately susceptible to decay

White oak has large pores and can be rather coarse. The wood gives off a mildly acrid smell when worked.

Workability

White oak works very well with both hand and power tools, though its density calls for carbide blades and cutters. It glues easily and readily accepts fasteners, but I recommend preboring. White oak planes and sands easily to a smooth surface but doesn't take a high polish. It steam-bends easily. You can carve or turn it if you keep your tools very sharp.

"Golden oak" is the most popular traditional finish for white oak. In the 1800s, cabinetmakers used resin varnishes to give the wood a light golden glow. Today you can get this look with a multi-step finish using dye stain and glaze. (See AW #38.) Another finish, "fumed oak," comes from the Arts and Crafts movement. Ammonia fumes react with the wood's tannins, turning it a beautiful, uniform brown. (See AW #32, page 46.)

Before applying a hard finish such as lacquer or varnish, fill the pores with wood filler and follow up with sanding sealer. If your project will be exposed to the elements, use an oil finish or marine varnish.

Uses

White oak is used for indoor and outdoor furniture, cabinets, trim, flooring, boats, and caskets. It's also used for beer, wine, and whiskey barrels. ▲

SUSTAINABILITY: Sustainable at current harvest levels

AVAILABILITY: Hardwood lumber dealers, sawmills, and large home centers

SIZE: Thicknesses: 4/4 through 8/4 commonly available; 12/4 and 16/4 occasionally available. Widths: 6 to 20 in. Lengths: 8 to 20 ft.

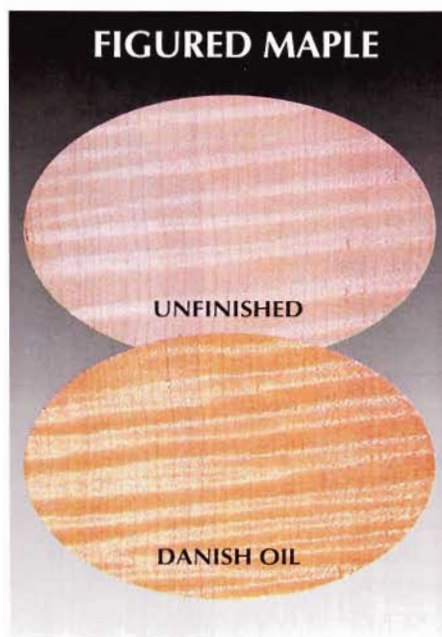
COST: Lumber—\$2.85 to \$7 per bd. ft., depending on thickness and cut. Quartersawn costs most; flatsawn costs least. Veneer—80 cents to \$1.40 per sq. ft.

¹Indicates wood movement across the grain from 6% to 12% moisture content

Danish Oil

It's not just for beginners

by Michael Dresdner



Danish oil was the first finish many of us tried. It was easy, quick, and didn't require spray guns or brushes. Besides, it makes the wood look rich, enhances grain patterns, provides some protection for low-wear surfaces, and doesn't cost much.

What might surprise you is that Danish oil shows up on the shelves of more experienced finishers as well, not only as a thin, one-step finish, but also as an element of more complicated finishing schedules. In this column I'll talk about what Danish oil is, and tell you about some of the ways you can make it work for you.

What Is It, Anyway?

Unlike olive oil, which actually comes from olives, Danish oil has little to do with Denmark. Some manufacturers invoke the Scandinavian moniker because they feel it conveys a sense of fine craftsmanship and contemporary style. We use the term Danish oil to describe any thin blend of natural oil (linseed or tung) and varnish that you apply by wiping it on, letting it soak in a while, and wiping off the excess. If the instructions say to wipe it on, then off, you can confidently call it a Danish oil, even if the manufacturer doesn't.

Danish oil penetrates into wood, imparting depth, or *chatoyance*, in much the same way that oil soaking into a brown paper bag makes it more translucent. It also contributes a pleasant amber hue, which tends to brighten dark woods such as cherry and walnut, and brings warmth to light woods such as maple. (See photos.)

By contrast, "wiping varnish" is simply a thinned varnish designed to be wiped on but not off. It generally has more resin, less oil, and a lot less solvent than Danish oil. Because it's thicker and more resinous, wiping varnish is a bit more difficult to apply uniformly without leaving brush or rag marks.

Once it is absorbed by the wood, Danish oil hardens by polymerization,

which uses oxygen from the air to convert the oil and varnish resin to a solid. The first one or two coats (depending on the porosity of the wood) penetrate and seal the wood, while subsequent coats create a soft, natural-feeling surface with a satin sheen. You rarely need to apply more than three or four coats of Danish oil.

When to Use It

Danish oil is undoubtedly the easiest finish to use. Fortunately, it also has many of the other qualities we demand in a finish. It provides adequate protection for items that will get light to moderate wear, such as art objects, cabinets, bookshelves, occasional tables, and even chairs (but I wouldn't use it on a high-wear surface like a kitchen table or bartop). Danish oil is easy to repair because it is applied so thinly, and it enhances the appearance of virtually any wood. Occasionally, it can go on blotchy—this happens most often on pine and some other softwoods. So it's always a good idea to test the finish first on a piece of scrap from your project.

The only type of wood I would not consider coating with Danish oil is any member of the *dalbergia* genus, which includes true rosewood and cocobolo. These woods contain a chemical that can prevent oil-based finishes from drying.

How to Use It

The most common sequence for Danish oil is to apply it liberally to the wood with a brush or rag, reapplying it after a few minutes to any areas that absorb the finish and look "dry." After about 30 minutes, wipe away any excess on the surface. You can also dip smaller pieces, immersing them for 30 minutes, then wiping them off when you take them out. Once wiped, allow the wood to dry for 24 hours—or possibly longer in very high humidity.

Apply subsequent coats just as you did the first, rubbing the surface between

coats with 0000 steel wool or an ultra-fine abrasive pad. On large-pore woods, you can wet-sand the second (and/or third) coat of Danish oil onto the surface with 400- or 600-grit wet-and-dry sandpaper. This will create a slurry of Danish oil and sanding swarf that will help fill the pores of the wood. Wipe off any excess after about 15 minutes and let it dry overnight. I advise against wet-sanding if your project has contrasting woods, though, because the slurry can darken lighter woods.

For a bit of added protection and luster, after 24 hours apply a coat of paste wax to the dry finish with 0000 steel wool, wait five minutes, and buff the wax with a clean cloth.

A Minor Pitfall

About the only pitfall you are likely to encounter with Danish oil is "pore creep" or "bleed-back," which may occur while the first coat is drying—possibly the second coat too. This happens mainly on large-pore woods, such as oak, ash, and

mahogany. The finish "creeps" back out and forms a nub of dried varnish at the mouth of the pore, leaving the surface of the wood rough and pebbly. You can prevent this by wiping it off as soon as it appears—which could be every couple of hours, for several hours after the application. Or, you can wait until the nubs dry and simply remove them with fine (320-grit) sandpaper or 000 steel wool, then apply another coat of Danish oil or a coat of wax.

Danish Oil Under Other Finishes

The fact that Danish oil seals the wood and brings out its chatoyance means that it makes a wonderful "basecoat" under many other finishes. Some finishers use Danish oil first to "pop" the grain of figured woods, such as curly or quilted maple, or to add depth to darker woods like walnut and cherry. After letting the oil dry for 24 hours, add a different topcoat to achieve a very hard or high-gloss surface.

As a sealer or grain enhancer, Danish oil is compatible under any oil-based or solvent-based finish. That includes shellac, lacquer, and oil-based varnish (including polyurethane).

Water-based finishes may have trouble adhering to Danish oil, but there is a way around that. Again let the oil dry 24 hours, then add a barrier coat of fresh, *dewaxed* shellac. You'll have to mix it yourself from flakes, since premixed shellac generally has wax in it, and coatings don't stick well to wax. Once the shellac coat is dry, you can apply the water-based coating. (For more on mixing your own shellac, see AW #60.) ▲



Join Michael Dresdner live

on America Online Sunday nights from 9:30 pm to 10:30 pm eastern time for answers to your finishing questions. Keyword "wood" takes you to AMERICAN WOODWORKER ONLINE. Click the "Shop Talk" icon to enter the chat room.

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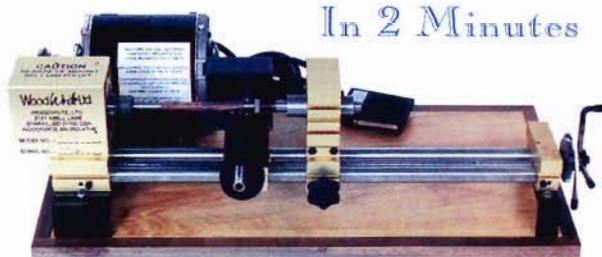
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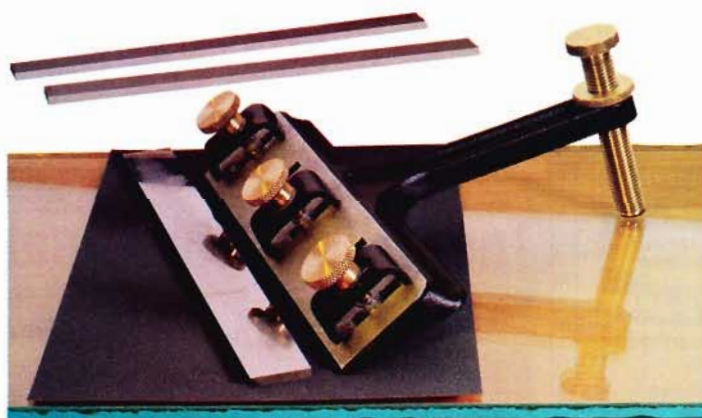
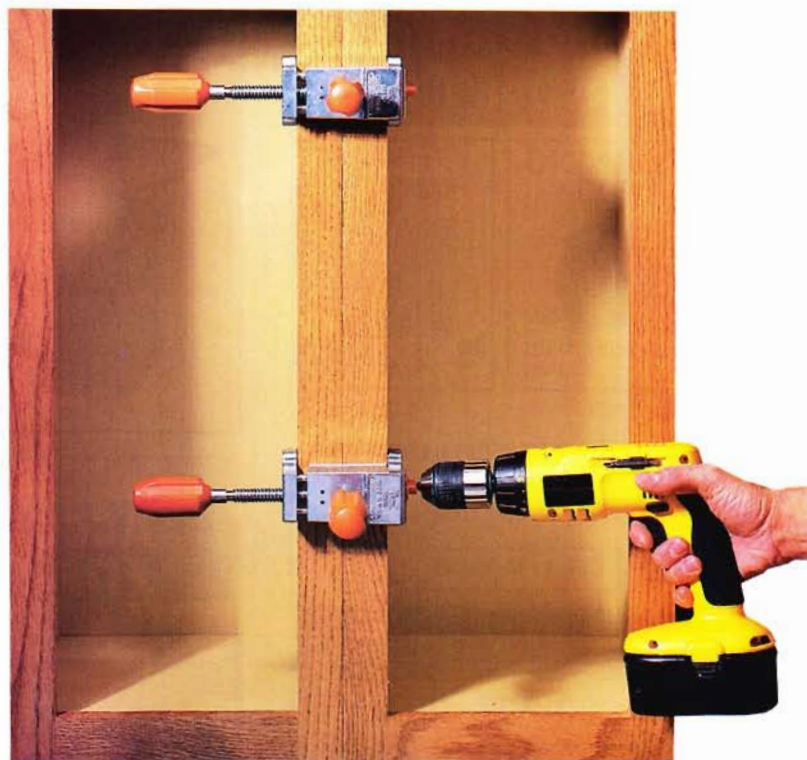
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CIRCLE NO. 81 ON PRODUCT INFORMATION FORM

Speedy Cabinet Clamp

The Pony Cabinet Claw makes it easy to join face frames when installing wall or base cabinets. Turning the clamp's two handles automatically aligns and clamps the cabinet stiles together. An integral drill guide lets you drill a pilot hole and install a screw to fasten the clamped cabinets together. (Street price: about \$60) Adjustable Clamp Co., Dept. AWT, 417 Ashland Ave., Chicago, IL 60622, (312) 666-0640. **Circle #601**



Depth Stops for Forstner Bits

SlipStops lock onto your Forstner bit's shank to let you drill holes to precisely the depth you want. The key to the SlipStop's accuracy is a "tripod foot" that stops the bit from advancing without marring the workpiece. SlipStops are available in six sizes, with each size covering a small range of Forstner bits

(for example, a #1 SlipStop fits 9/16-in. to 13/16-in.-dia. bits). (Price: individual SlipStops, \$9.95 to \$10.95; all six SlipStops, \$49.95) Woodworker's Supply, Inc., Dept. AWT, 1108 N. Glenn Rd., Casper, WY 82601, (800) 645-9292.

Circle #602



Great
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Do-it-Yourself Blade Sharpener

Sending planer and jointer blades out for sharpening is costly and time consuming. The Veritas Planer Blade Sharpener lets you sharpen blades yourself. The jig holds the blade at just the right angle so you can hone the bevel on a piece of abrasive paper adhered to a flat surface, such as a piece of plate glass. The sharpener comes with a piece of adhesive-backed 15-micron paper (about 1,000 grit) that will sharpen blades to a keen edge. (It's not designed for badly nicked blades.) For an even finer polished bevel, use 5-micron and 0.5-micron paper available from Veritas. (Price: \$29.95; extra abrasive paper, \$2.30 per sheet; glass lapping plate, \$7.95) Lee Valley Tools, Dept. AWT, Box 1708, Ogdensburg, NY 13669, (800) 871-8158. **Circle #603**

Heirloom Dovetail Saw

Independence Tool has created the smoothest-cutting and most beautifully made dovetail saw we've ever seen. Modeled after a British saw circa 1830, this saw's teeth are filed to a rip profile with only a very slight set, as advocated by master cabinetmaker and AW contributing editor Frank Klausz. The result is an almost effortless, yet aggressive cut with a kerf less than $\frac{1}{32}$ in. wide. The saw's 9-in. blade has 15 tpi. Its hand-carved curly maple handle and chamfered brass back provide great heft and balance. (Price: \$124.50) *Independence Tool, Dept. AWT, R.R. #2, Box 324B, Hughesville, PA 17737, (717) 584-6440. Circle #604*

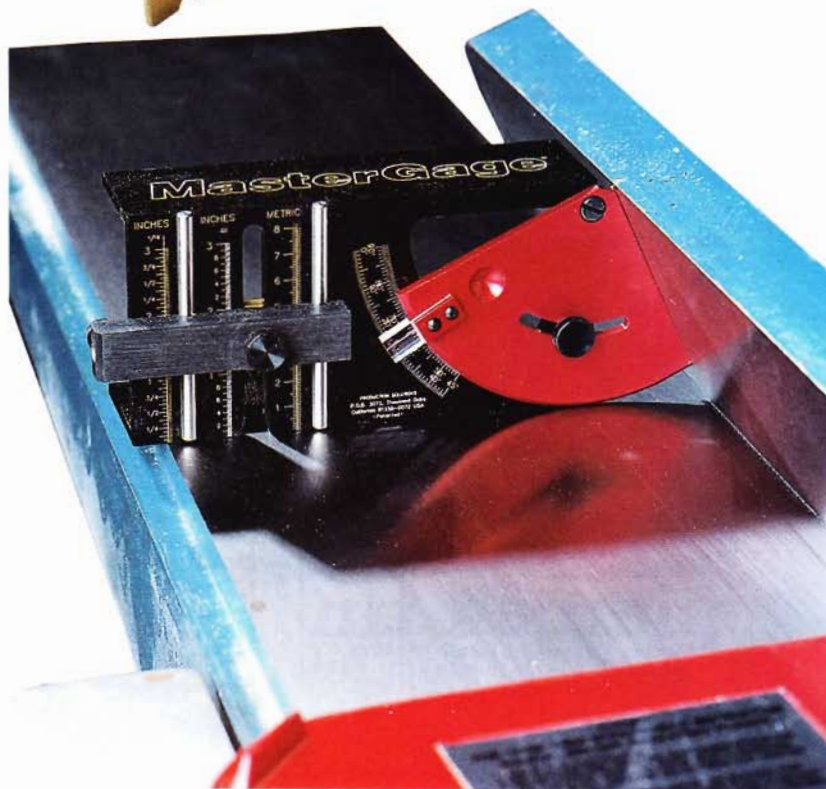


Talking Tape

With the Zircon Repeater, you'll never again have to fumble with paper and pencil or rely on memory to record measurements. This new tape measure sports a built-in digital voice recorder that lets you record up to twenty seconds' worth of multiple measurements. Just hit the playback button to hear the measurements in sequential order. Oh—the 25-ft. measuring tape works well, too. (Street price: about \$30) *Zircon Corp., Dept. AWT, 1580 Del Ave., Campbell, CA 95008, (800) 245-9265. Circle #605*

Precision Setup Tool

Master Gauge is a multipurpose calibration and measurement gauge that's designed to help you set up and align bits, blades, fences, and jigs on any power tool. The precision gauge features an adjustable protractor for angular measurements and a sliding bar for linear measurements in any plane. Laser-etched scales make it easy to take readings in fractional or decimal inches and millimeters. Several optional accessories are available. (Price: \$225) *Production Solutions, Dept. AWT, Box 3072, Moorpark Rd., Thousand Oaks, CA 91360, (805) 492-4616. Circle #606*



Excalibur Sliding Table Model SLT60

by Andy Rae

Tired of manhandling large, heavy panels or sheets of plywood on your tablesaw? The Excalibur Sliding Table is the answer. Attached to the side of any cabinet or contractor-style saw, this sturdy steel table supports the stock so you can push it easily past the blade for accurate crosscuts. Whether it's sheet goods or solid stock, the Excalibur makes cutting anything large or long much easier, safer, and more accurate.

The Excalibur table rides on six sealed ball bearings for a smooth sliding action. This requires much less effort than pushing stock against a rip fence and across the saw top at the same time.

The table includes a 64-in.-long fence bar that you can set at any angle between 0° and 45° for miter cuts. The fence can be mounted at either the front or the rear of the table. For most work, I keep the fence in the front, where I use it like a super-accurate, over-size miter gauge for crosscuts up to 37 in. wide. For even wider crosscuts (up to 62 in.), move the fence to the rear position. This makes easy work of 4x8 sheets and even 5-ft.-wide panels. (The smaller Excalibur model SLT40 has capacities of 28 in. and 49 in., respectively.)

Assembling the Excalibur took about four hours, followed by another three hours to align the table and fence. The alignment is tedious, but it's worth it for producing perfectly square cuts. The Excalibur's mounting plate comes predrilled to fit popular saw models, though you can adapt it to fit any cabinet or contractor-style saw.

The fence includes a very solid flip stop that lets you accurately pre-set cuts up to 54 in. long. For longer stock, an extension arm telescopes from the end of the fence to act as a work stop (up to 118 in.) as well as a support. An optional work hold-down clamp (\$34) locks on the fence. Once you've squared the fence to the blade and zeroed the measuring tape, you can rely on the tape for accurate, repeatable crosscuts.

Moving the fence bar to the rear position only takes a minute, but it means switching the position of the miter pivot stem on the fence. This, in turn, requires that you rezero the tape when you move the fence back to its front



Super capacity and smooth operation. The Excalibur's large sliding table rides with ball-bearing smoothness, delivering precise cuts in all sizes and types of materials.

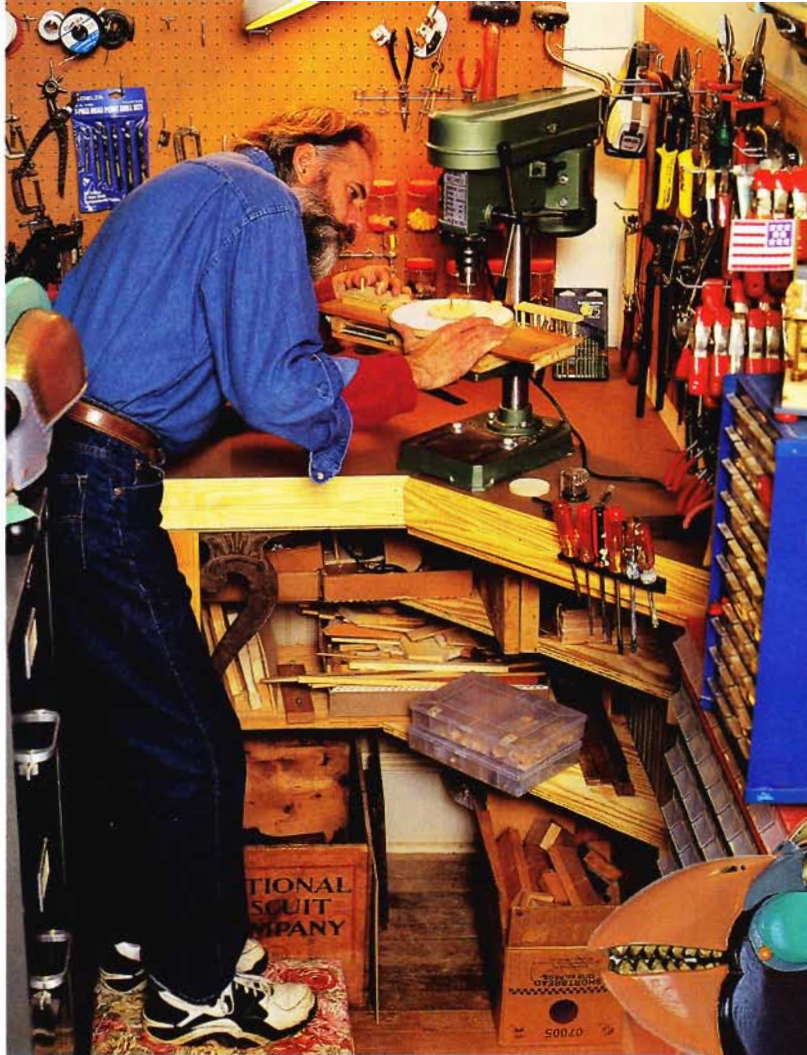
position. I overcame this inconvenience by buying a second pivot stem and attaching it permanently to the fence for rear cuts. Another con is the slotted table, which can allow small workpieces to fall through and fingers to get snagged. I solved this by using contact cement to adhere a 1/8-in.-thick piece of plywood over the table with a cutout for the locking handle.

The Excalibur takes up a lot of space (the outside rail is 103 in. long), but cutting large panels requires open space on the infeed and outfeed side no matter how you do it.

If you work regularly with large sheet goods, I recommend the Excalibur SLT60 without reservation. The smaller and less expensive SLT40 is a good alternative if you can get by with less crosscut capacity. Both models are available from common mail order catalogs. (U.S. street price: SLT60, \$669; SLT40, \$499. Canada: SLT60, \$699; SLT40, \$569) *Sommerville Design & Mfg. Co., Inc., Dept AWT, 940 Brock Rd. S., Pickering, Ontario, Canada L1W 2A1, (800) 357-4118. Circle #607*

Andy Rae is an associate editor of AW.

Tinkerer at work.
Morgan jigs up
for precision drilling
in his one-room shop.



The Moving Work of John Morgan

John Morgan's work combines the varied interests of the social commentator, watchmaker, and mad scientist. Precision-cut pieces are fitted together, then brought to "life" via wooden cranks and gears, or electric lights and motors. Morgan's movable sculptures, which are known as *automata*, have been shown as far away as England and Japan. As a professor of illustration and graphic design at Auburn University in Alabama, Morgan is more accustomed to working in two-dimensional media. When asked about his obsession with three-dimensional work that pokes fun at animals—human and otherwise—the teacher smiles: "It's really my reminder to keep life in its proper perspective."



◀ **"Night Life, Armadillo" nightlight**
Hardboard, plywood, Plexiglas,
enamel paint, lights, and photocell
W: 12½ in. D: 4 in. H: 10¾ in.



◀ **"Jabberwock" nightlight**
Pine, maple,
enamel paint,
copper tubing,
found table leg,
and truck cab lights
W: 20 in.
D: 10½ in.
H: 33½ in.

PHOTOS BY TED BOENKE

► **"The Wise Fool"**

Pine, maple, enamel paint,
brass, and electric motor
W: 10½ in. D: 12 in. H: 23¼ in.



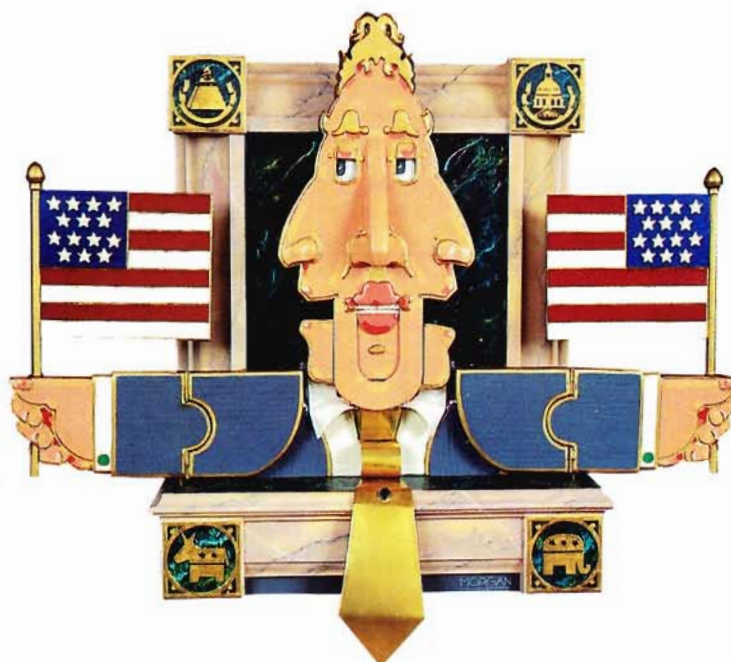
▲ **"Rights of Spring #1"**

Maple, walnut,
acrylic paint, and brass
W: 5 in. D: 9 in. H: 13 in.



▼ **"Electric Mouse" nightlight**

Pine, enamel paint, wheel, casters,
utility trailer lights, and photocell
W: 5 in. L: 18 in. H: 11 in.



◀ **"American Politician"**

Pine, maple, enamel paint,
brass, and electric motor
Closed (above); open (below)
W: 39½ in. D: 8 in. H: 18 in.

Want to see your work in "Gallery"? Send color slides or larger transparencies to: "Gallery," AMERICAN WOODWORKER, 33 E. Minor St., Emmaus, PA 18098. Please include a title, a brief description of techniques used, materials, dimensions, name of photographer, your name, address, and phone number. We'll pay you \$35 per entry published. If you want your photos returned, enclose a self-addressed stamped envelope. Please note that we don't provide plans for the work shown.

Portable Miter Saw Stand

Long stock support and fold-up storage for under \$80

by Brian Lamont



Stability and portability. This shop-made miter saw stand offers sturdy support for lumber up to 16 ft. long. And you can take it anywhere... just fold up the stand and tie it with a bungee cord.

I was helping a friend build a deck when I decided to build this miter saw stand. I needed a stable platform with outboard support for long deck lumber, but I didn't want to spend a fortune on a store-bought version. My homemade miter saw stand fills the bill nicely and folds up for easy storage. (See right photo, above.)

I made the stand primarily from 1x4 maple. The joinery is simple: dadoes and rabbets that are glued and screwed.

For stability, the leg assemblies are splayed in two directions. As shown in the drawing, I cut the rail ends on one

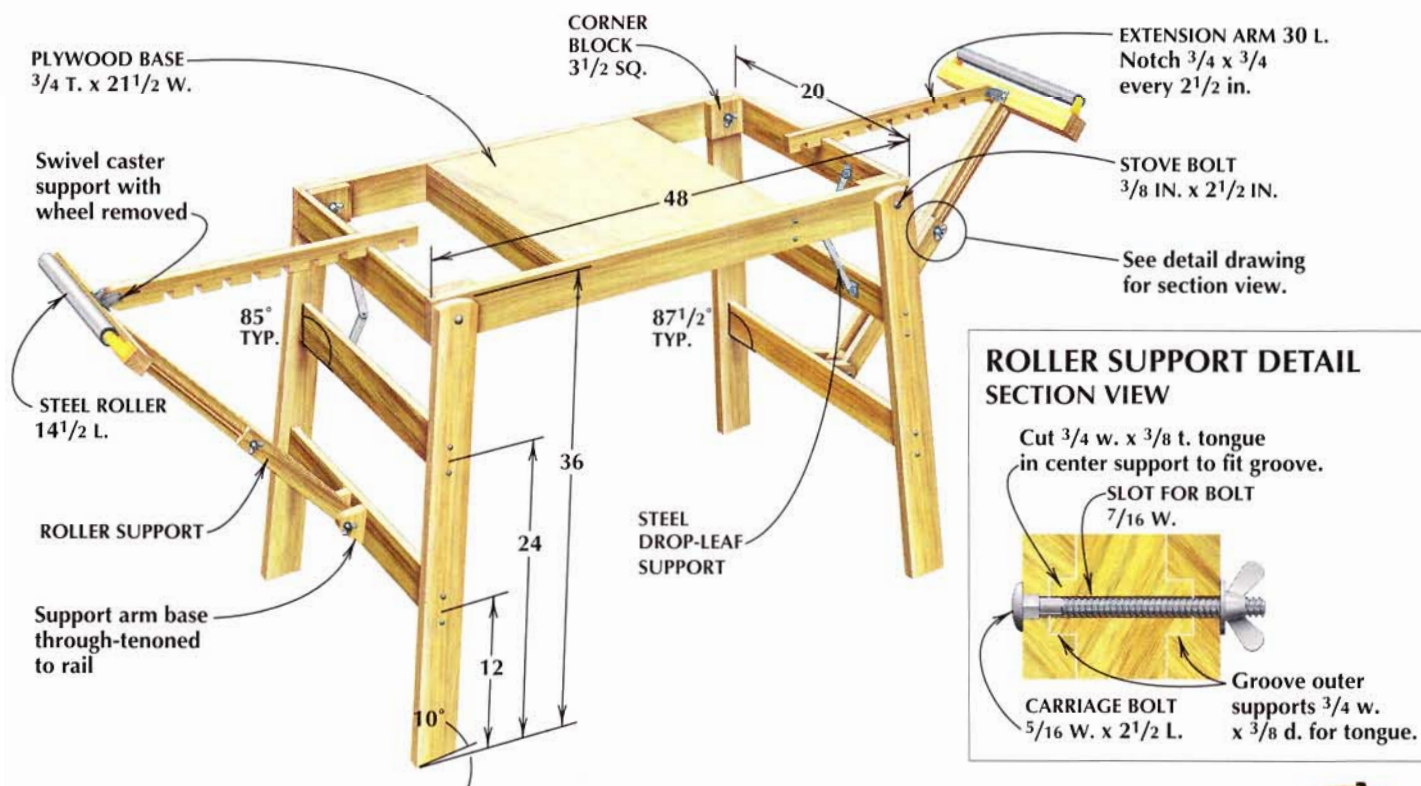
side at 85°, and on the other side at 87½°. The difference helps the legs to fold up more compactly. When the leg assemblies swing open, steel drop-leaf supports (available from Woodworker's Supply, Inc., 800-645-9292) keep each assembly splayed at 80°. Attach each leg assembly to the platform with stove bolts.

Steel rollers (also available from Woodworker's Supply) support the stock at each end of the table. Notches on the extension arms will let you extend the rollers for a maximum roller-to-roller distance of 9 ft., 4 in. It's easy

to adjust roller height—simply loosen the wing nut on the roller support, slide the support up or down, and then tighten the nut.

If space is tight, you can remove the rollers and extension arms from the main frame. To stow the miter saw stand, just unhook the extension arms, loosen the wing nuts on the roller supports, and fold it up. A bungee cord keeps it from unfolding. ▲

Brian Lamont is a real-estate appraiser and woodworker in northern Maine.



BEST SOLUTION WINS!

Have a shop jig or fixture you'd like to share? Send a photo or sketch with an explanation to "Shop Solutions," AMERICAN WOODWORKER, 33 E. Minor Street, Emmaus, PA 18098. Next issue's contributor will receive a Fein Turbo II Dust Extractor, model 95513, valued at \$325.

