

WOODWORKER'S JOURNAL

Vol. 22, No. 1 January/February 1998

TOOL
TEST

FIVE NEW SNIPE-FIGHTING PORTABLE PLANERS

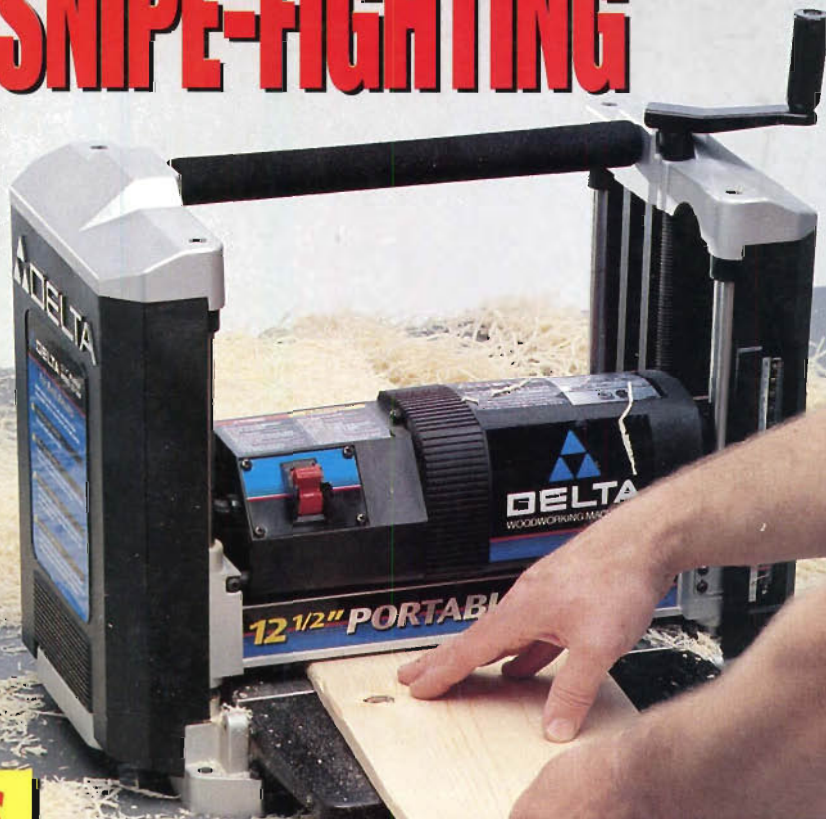
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Plus
SPECIAL TECHNIQUE
MULTI-LAYER
MOLDINGS

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GREAT PROJECTS

- Cigar Humidor
- Ponderosa Pine Cabinet
- Prairie-Style Wall Sconce
- Carved Picture Frame
- Rolling Tool Caddy
- Mahogany Corner Shelf

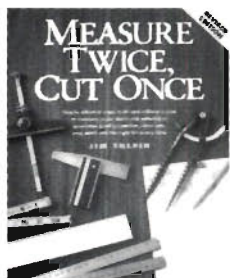


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Ryobi-Makita & all 10"x80Tx5/8"	\$207	\$129
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30T 1/8" or 3/32"	\$135	\$ 99	\$ 89	\$ 79
9"x40T	\$146	\$109	\$ 98	\$ 87
30T	\$125	\$ 99	\$ 89	\$ 79
*8-1/4"x40Tx 3/32"	\$136	\$ 99	\$ 89	\$ 79
8"x40T 3/32"	\$136	\$ 99	\$ 89	\$ 79
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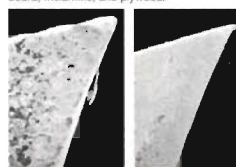
SIZES AVAILABLE	LIST	SALE	SIZES AVAILABLE	LIST	SALE
7-1/4" x 60T x 3/32" K	\$149	\$129	300mm x 100T x 1/8" x 30mm	---	\$189
8" x 80T x 1/8" & 3/32" K	\$202	\$169	12" x 100T x 1-1/8" K	\$253	\$215
220mm x 80T x 1/8" x 30mm	---	\$159	14" x 80T x 1"	\$232	\$197
9" x 80T x 1/8" & 3/32" K	\$207	\$179	14" x 80T x 1"	\$266	\$226
10" x 80T x 1/8" & 3/32" K	\$207	\$159	16" x 100T x 1"	\$262	\$243
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12" D. 1" Bore	\$499	\$449	\$404	\$382

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Fine Woodworking Magazine test Oct. '96 page 43

After installing your blade and 5 in. stiffener the vibration in my saw went down another 20%. I ran several pieces of hardwood through the saw, both crosscut and ripping, and was amazed at the smoothness. It was like cutting butter, maybe smoother. I have never had a saw blade that cut this smooth.

Rick Price

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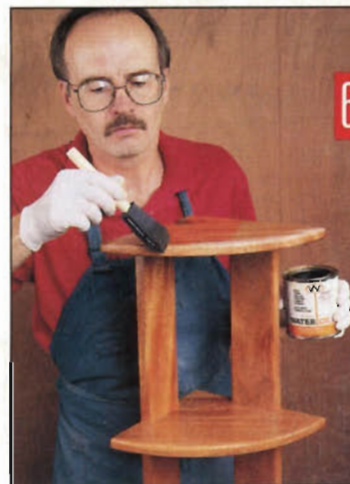
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A three- or four-level unit that really does go together in a weekend

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Outfit your workbench with dogs, pups, holdfasts, and hold-downs

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Cover Photo: Kevin May



Roger Holmes' Sampler a Woodworker's Challenge

If you're looking for a good, hands-on woodworking project to occupy you for a few of these long winter nights, I suggest building Roger's pine cabinet starting on *page 36*. Roger calls it a sampler because its array of joinery reminds him of his Grandmother's cross-stitch sampler that hung on her wall. It truly is a sampler of techniques. As cabinets go, this one isn't large, but I think you'll find it fun working through the various techniques it calls for. Then, let me know what you think of this project. If you like it, we also have a couple of complex Japanese joinery projects to challenge you.



George Middlestetter, winner of the *Woodworker's Journal* Jet Dream Shop Sweepstakes, with some of his prizes.

Congratulations To Our Jet Dream Shop Winner

George Middlestetter of Greenville, Ohio, (that's George pictured at *left*) took delivery of the *Woodworker's Journal* Jet Dream Shop of tools that he won late last summer. When George found out that his new tablesaw, jointer, bandsaw, sander, planer/molder, drill press, lathe, and dust collector would take up over 60 square feet of floor area, he asked Jet to delay shipment of the tools so he could add space to his shop.

More Holiday Gift Projects You Can Build

Many of you will receive this issue well ahead of the holidays, so there's still time to head for the shop and make some of the projects herein to give as gifts. As we promised last issue, you'll find our second and upscaled cigar humidor on *page 28*. The mahogany corner shelf (*page 62*), an interesting carved picture frame (*page 44*), and a versatile rolling tool caddy (*page 56*) would also make excellent gifts. And, if you're looking for something distinctive to make for a home, the Prairie-style scone on *page 50* can't be beat.

Cumulative Index Has Been Updated

Many of you have asked us to update our cumulative index, so here it is (*pages 87-88*). This supplement covers *Woodworker's Journal* volumes 20 (1996) and 21 (1997). It can be used along with our previously published 16-page index, which covered our first 19 years of issues.

Charles Sommers

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Here's How to Turn Your Woodworking Skills into Cash!

"My woodshop makes me \$300 a week, part time. Your's can, too!"

by Rick Gundaker

You've heard of "the woodworker who was a real butcher."

It's true, for many years I was a meat cutter in a butcher shop in Erie, Pennsylvania. But several years ago the poor economy in the Erie area forced me to look for a new job.

After four months, I found a new job, but it paid less and had fewer benefits. I desperately needed a second income.

I was sitting at the kitchen table very late one snowy night in December. I couldn't sleep. My checkbook was overdrawn, bills were piling up and the bank was threatening to foreclose on our home. Then it came to me.

For many years I had been making woodcrafts. I had made many unique items for our home. Everybody raved about them, so I started making them for gifts.

My wife, Amy, always said, "Rick, you should start selling your woodcrafts." But I would just laugh. Well, I wasn't laughing that night. Maybe Amy was right. Maybe I could sell them!

I took what little money we had, borrowed some from my Mom, and turned to my hobby with serious determination.

At first my income was small, \$60.00 to \$90.00 a week. But time and experience helped me develop many easy-to-make woodcrafts and a very successful method for selling them. My income grew beyond my greatest dreams.

Today, Amy and I live in a nice country home on ten acres of land and it's paid for! That's a great feeling, *but the best feeling of all is the self satisfaction I have of being able to make the extra money I need whenever I need it.*

You, too, can make the extra money you need while enjoying your hobby. Using your basic woodworking skills, you can create great gifts and turn your woodshop into a part-time money maker. I know it can be done because

I did it, and I've helped many other woodworkers make money, too!

The following are excerpts from letters I've received from woodcrafters I've helped.

"You sure know what sells! The items I made from your plans have been on display at the local bank in St. Joseph. In less than 30 days I have sold \$1,700 of my woodcrafts! I'm enclosing a news story our local paper did on my work."

W.F.H. of St. Joseph, MN

"My wife is a school teacher. I made her one of your cute designs to set on her desk. Other teachers saw it and she sold eleven of them before the day was over. Keep up the good work."

C.M. of Baltimore, MD

"You're doing good. I've made several of your plans and the response to buy has been great. Every year I sell my crafts at our church fair and donate all the proceeds to the church. In 3 days I made over \$600!"

C.R. of Chalmelle, LA

"Your patterns are simple and very easy to follow. I'm fairly new to woodworking and it's great to see full-size patterns with enough information so that even a beginner with limited woodworking knowledge can complete a project on their own. I'm really having fun with woodworking. Thanks for sharing your knowledge and experience, it's invaluable to the novice."

C.L. of Houston, TX

If these woodworkers can do it, you can, too!

There's plenty of room for everyone in woodcrafting. I won't be competing with you and you won't be competing with me. That's why I would enjoy showing you how you can start your own profitable craft business using your basic woodworking skills. You can go as far as you want... *profits are virtually unlimited!*

Here is what I'll send you:

I've put all my successful methods, plus 35 of my fastest selling designs, with step-by-step instructions into one fact-filled guide.

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- * What tools you will need. I'll give you an exact list.
- * How to buy a saw and other woodworking equipment, cheap!
- * What designs are the best sellers.
- * What type of lumber and hardware to use and where to buy it.
- * How to give your crafts that personal touch that will increase sales by 80%.
- * How to set up books and records.
- * How to avoid the mistakes that I made... and save hundreds of dollars.
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**TOOL-PRIZE
DRAWING
WINNER!**



My favorite feature in your magazine was the hand-carved Santa in the Nov./Dec. '94 issue (vol. 18, no. 6). It inspired me to begin carving. I've enclosed a photo of the Santas I've carved (including the others in your series), and I encourage you to run another series.

*Matt Marheineke
New Baltimore, Mich.*

Tool Prize

For being selected as the winner of the tool-prize drawing, Matt Marheineke will receive a Bosch 1295DH palm-grip random-orbit sander.

The names of readers whose project photos appear in Reader Letters are entered into a tool-prize drawing for each issue. To become eligible, send us a good photo and description of a project you've built from the pages of *Woodworker's Journal*. Send your submissions to: Reader Letters, *Woodworker's Journal*, P.O. Box 1790, Peoria, IL 61656.



READER LETTERS



Iam enclosing a photograph of the Umbrella Stand that I built from the March/April '96 issue (vol. 20, no. 2). As your article said, it is an excellent project for practicing cope-and-stick joinery and raised panels. I gave the project to my brother, who is plant manager at the Porter-Cable factory in Jackson, Tennessee, and suggested he display it in his office to show what an amateur can do with Porter-Cable tools.

*Jerry Sheffield
Birmingham, Ala.*



Enclosed are pictures of the Side-by-Side Chest/Cupboard that I made using the plans from the July/August '92 issue (vol. 16, no. 4). Rather than use the cherry-on-black finish as pictured in the original, I chose to use red oak throughout. I added brass and oak drawer pulls and drawer slides as well. I was pleased with the results and have found this to be one of my most functional and attractive pieces of furniture. Thanks for all the great project ideas and informative articles.

*Bruce Sinkbeil
Newberg, Ore.*



Here are two toy projects that I built from your magazine: the Roaring '20s car from July/August '93 (vol. 17, no. 4), and the Woody Wagon from May/June '94 (vol. 18, no. 3).

*James Cantrell
Jackson, Miss.*



I enjoyed making the Pub Table from the July/August '96 issue (vol. 20, no. 4) so much that I made a second one from walnut. Next, perhaps cherry? Anyway, I've received a lot of personal satisfaction from many of your projects. Please count me as a happy subscriber.

Keith York
Fayetteville, Ark.



My second woodworking project, this Early American Chest, came from an old issue of your magazine—March/April '82 (vol. 6, no 2). What makes it special is that the cherry boards and figured cherry panels were lumbered from trees on our property. I made this for my granddaughter, who is now 12. Needless to say, I was very pleased with the results.

Robert Jensen
Southwick, Mass.

Here is my rendition of the Classic Corner Cupboard from the July/August '94 issue of your magazine (vol. 17, no. 4). I made the cupboard from rough-sawn northern white cedar from an Amish mill in Northern Michigan. I don't consider myself a good woodworker, but I do enjoy a challenging project. It was a bit difficult to get all the cupboard angles right, but it turned out beautiful.

Carolyn McGauley
Leslie, Mich.



Corrections

In our last issue, we listed an incorrect phone number for Bonnie Klein. The correct number is 425/226-5937.

Also, the prices we quoted for the Shop Fox Fence should have read \$255 (model G4723, without rails) and \$275 (model G4722, with standard rails).

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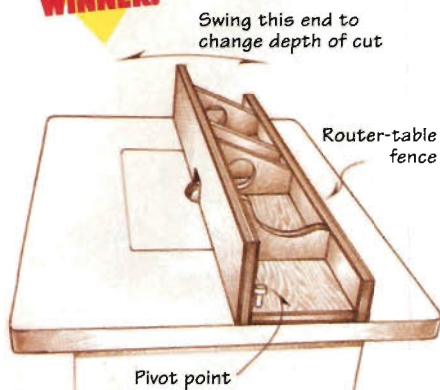
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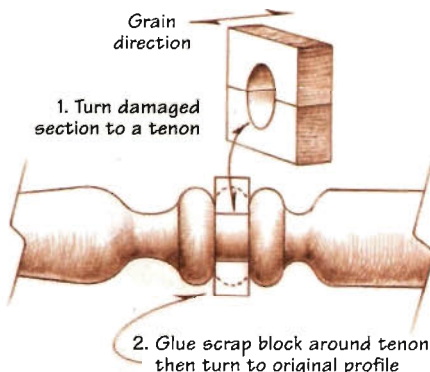
Pivoting Router Fence Simplifies Setup

Rather than clamp or lock my router-table fence at both ends, I installed an anchor pin at one end to serve as a pivot. You can use a hardwood dowel, a hexhead cap screw, or a machine bolt as the pin. To get the desired depth of cut, I swing the other end of the fence to the right or left of the bit, then clamp it in place. Since router bits cut in an arc (rather than in a line like a tablesaw blade), the fence needn't be parallel to the table edges. This pivoting design makes it much easier to set and reset the fence repeatedly when I want to make a series of small, incremental cuts using a large-diameter bit.

*Paul Stotler
Leonardtown, Md.*

Scrap Patch Makes Seamless Turning Repairs

To repair damage to a turned spindle, I use a simple and effective patching technique that produces an almost invisible repair. To start, I turn the damaged section down to a tenon with a diameter that matches one of my Forstner bits ($\frac{1}{2}$ " to $1\frac{1}{2}$ " depending on



the size of the project). Next, I cut two scrap pieces to a thickness that equals the length of the patch area. (Use wood from the original turning stock so it matches the grain and color closely). I butt the scrap pieces

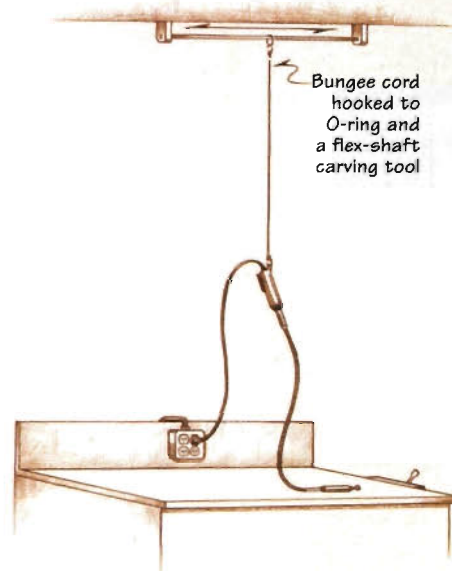
together and drill a centered hole through them using the bit with which I took the measurement earlier. Then, I glue and clamp these two halves around the tenon (checking for good grain match) and turn down the patch to the intended shape.

*John Plank
Wauwun, Wis.*

Yet Another Use For a Bungee Cord

I regularly use a flexible-shaft carving tool in my shop, and I devised this "trolley" system to extend its range. The system consists of a 3'-long dowel hung horizontally a few inches below the ceiling and directly above an electrical outlet and my bench vise. I slid a 3"-diameter chrome-plated ring over the rod and looped one end of a bungee cord to it. On the other end of the bungee cord, I suspended the motor for my flex-shaft tool. This arrangement gives me lots of lateral tool movement and also minimizes sharp bends in the flexible shaft, which can sometimes stop the tool.

*Jay Geisel
LaConner, Wash.*



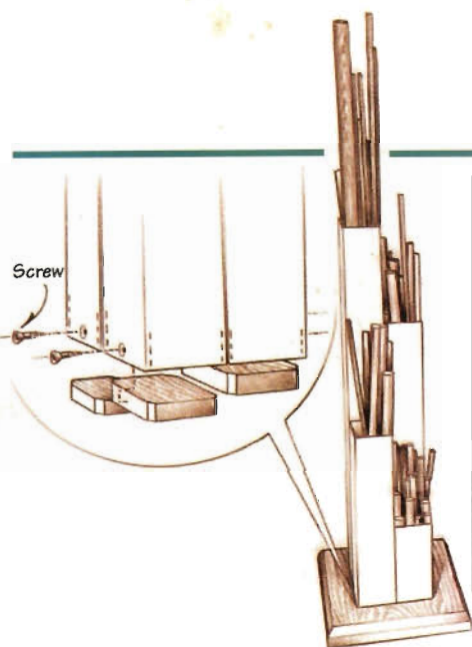
Get Paid For Your Advice

For submitting the best shop tip in this issue, Paul Stotler will receive a Porter-Cable 693PK Router Kit that features the company's 690 series router with both a plunge and fixed base.

If you have a good shop tip, let us publish it. We pay \$50 for every tip published, and you'll also get a shot at winning the tool prize for best tip.

To be considered, your submission must be original, unpublished, and not under consideration by other magazines. Send a description and photos or drawings that help explain the idea to: Shop Tips, *Woodworker's Journal*, PJS Publications, Inc., 2 News Plaza, P.O. Box 1790, Peoria, IL 61656. If you want the material returned, include a self-addressed, stamped envelope. You can also e-mail us at: wwjmag@aol.com





Lengths of vinyl gutter downspout

Store Dowels In Staggered Lengths Of Drain Pipe

Dowel offcuts quickly multiply in a busy workshop. I keep mine sorted and organized by length using pieces of vinyl gutter drain pipe. Cut several lengths of pipe to suit the dowel scraps you have, then cut 1½"-thick blocks that will fit snugly inside the pipe. Screw a block in the bottom end of each pipe, then screw these assemblies to a base that is large enough to prevent them from tipping over.

*Richard Maher
Rochester, N. Y.*

Dish Soap Helps Lubricate Honing Jig

When using water stones to sharpen my plane irons and chisels, I found that the grit from the stones often got into the axle on the wheel of my honing jig. The grit caused the jig to wobble occasionally, instead of rolling smoothly. To solve the problem, I put a drop of dishwashing liquid on the axle. It's a great lubricant, and it helps float away grit from the surface of the stone as well.

*Gary Coyne
Pasadena, Calif.*

Carpet Tubes Come In Handy Around the Shop

In the process of scrounging around for some cardboard, I came across a free resource: cardboard carpet tubes. These thick, sturdy cylinders have a 4" diameter, and I've found many uses for them around the shop, from packaging spindles and turnings to storing dowels and offcuts. Most carpet dealers will gladly let you haul the tubes away, but be sure to take along a handsaw as the 12'-long tubes won't fit in most cars or vans.

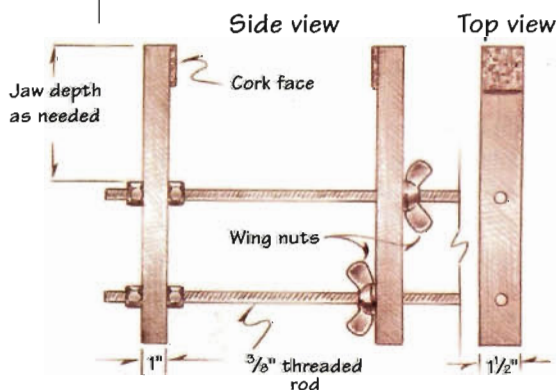
*Dwight Casteel
Herndon, Va.*

Custom Clamps For Hard-To-Reach Places

The next time you need light clamping pressure in a place where regular clamps won't reach, build your own custom clamps from scrapwood and threaded rod. You can make the jaws whatever length is necessary to reach the spot that needs clamping.

Insert two lengths of threaded rod through the lower of the two clamp jaws and secure them with two pairs of hex nuts. Place the second jaw over the rods with two wing nuts positioned as shown. When you tighten the wing nuts, the jaws will come together with enough pressure to ensure a good glue joint.

*Errald Turner
Newport, Maine*



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Long Island Woodworkers' Club

A group that started small and then decided to grow

Seven years ago, Brian Haywood walked into a Long Island hardwood dealer and asked if there were any woodworking clubs in the area. The owner of the store said there were none, but volunteered the store for a meeting place should such a group ever decide to get together.

That was all the encouragement Haywood needed to round up a few friends and remaining members of a Shopsmith owner's club to form the Long Island Woodworkers' Club. For the next five years, the group continued to meet informally and slowly grew by word of mouth to an average size of 60 to 100 members.

More People, More Opportunities

About three years ago, however, the group decided that they wanted to expand. They'd outgrown the meeting room, and their sponsoring store was closing. Bill Hermanek, the club's current president and one of the early members, says the decision to grow the membership was not taken without considerable debate. At the time, some members wanted to maintain the club as a small, extended circle of good friends.

However, Hermanek championed the idea of growing for several reasons. "With a small club, it's easy to get in a rut. We didn't have the money or the size that would attract

guest speakers," he says. "And after a few meetings, you've pretty well learned what the other members know about woodworking." So, the club took a vote, and a majority favored growth.

Operating on a still-restricted budget, the group hatched an effective, inexpensive strategy for bringing in new members. They developed a single-page club application form that also listed meeting times and places and explained membership benefits.

Club volunteers built drop-off boxes and placed them along with the new forms at local tool dealerships, home centers, and lumberyards. "We blitzed the whole island," says Hermanek. In addition to the local campaign, the club placed a few ads in national magazines, and the combined effort swelled the membership ranks to 225 in just two-and-a-half years.

Outgrowing the Old Meeting Hall

The jump in membership brought the anticipated benefits, and the group lined up the Brush Barn, a restored meeting hall in a historic cluster of buildings, for club meetings. The Brush Barn also permitted demonstrators to operate power tools on the premises, something many meeting halls shy away from but which a woodworkers' club can't do without.

The bigger budget that resulted from this growth also enabled the



To house its growing membership, the Long Island Woodworkers' Club required a new meeting place, the historic Brush Barn shown above. But by growing, it was also able to invite nationally known woodworking experts such as Frank Klaus right to speak at their meetings.

CALLING ALL CLUBS

We want to find out more about your woodworking club for future articles in the magazine. To encourage you to tell us about your club and its activities, we teamed up with Jet Equipment & Tools. Jet will present a stationary power tool to each club featured in our 1998 Club Spotlight articles.

To be considered for publication and the tool prize, send us a copy of your newsletter, a brief description of your club and its activities, your goals for the future, and photos you have of club events or members' work. Address the correspondence to: *Woodworker's Journal*, Club Spotlight, P.O. Box 1790, Peoria, IL 61656. Include a self-addressed stamped envelope if you want us to return your photos.



For participating in the *Woodworker's Journal* Club Spotlight program, the Long Island Woodworker's Club will receive this Jet 11-6CSX 6" jointer. This machine's three knife cutterhead is powered by a 3/4-hp motor, and the 46" long table features a rabbeting ledge. Jet recently updated this jointer with a fence that tilts two ways and has positive stops at 45° and 90°.

club to book nationally known experts such as Frank Klaus and Ian Kirby for speaking engagements. Local craftsmen have also been eager to share information with this large and appreciative audience. In recent months, club members have enjoyed presentations from a guitar builder, a birdhouse maker, a bowl turner, and an antique refinisher.

The club's current size has also gotten the attention of at least one power-tool company. During the last three Aprils, reps from DeWalt Power Tool Co. have sponsored a buffet for the club at the local Home Depot store. Members, their spouses, and guests

have been invited to the event. The hosts unveil the latest releases in the DeWalt power tool line, answer questions, and give club members some hands-on time to work with the tools.

Now that they've reached the critical mass they need to function as a full-fledged club, members have decided, ironically, to stop seeking new members. "We haven't put a cap on the membership," says Hermanek, "but we've stopped advertising." If the club got too much bigger, Hermanek fears it might demand more work than members and officers are willing to give.

continued on page 12

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CLUB SPOTLIGHT

Continued from page 11

Big Club With a Small-Club Feel

Despite the group's size, meetings maintain an air of informality that has carried over from the early days when it consisted of a few friends gathering at the lumber store. At each meeting, a table is set up for tool sales and swaps. After a brief discussion of business matters, new members are introduced and encouraged to talk about their woodworking specialties and interests. An open-ended question-and-answer period follows during which members can ask the entire group for ideas, help, or information about any aspect of woodworking. After all questions have been answered, the group moves on to a show-and-tell session, a raffle, and then the guest speaker's presentation.

In comparing the old club to the new, Haywood says it's more of a challenge to maintain the fellowship. "In any large organization, people tend to form cliques," he notes. "Fortunately, we have a very compatible group. There's a lot of concern for each other, and people are willing to help their fellow members."

For the June meeting, the club holds a woodworking contest followed by a barbecue. Members bring in their best work for the judging, and every member present gets to vote for a favorite entry. Winners typically take home a power tool donated by a local retailer.

In December, the group conducts holiday banquets in conjunction with the Marine Corp's Toys-for-Tots program. To boost the number of toys made and donated, the club encour-

ages members to share their designs and open up their scrap bins to anyone else in the club in need of such resources.

The club has also had success in the last two years with an exhibition of members' work that's open to the public. Several dozen members participate in this weekend event held in October, bringing in work that ranges from large case goods to small scrollsaw projects.

The Long Island Woodworkers' Club meets the first Wednesday of the month at 7:30 p.m. from September through June at the Brush Barn, located behind the historic Epenetus Smith Tavern, 211 Jericho Turnpike, Smithtown, New York. For more information, call Bill Hermanek at 516/360-1216 or Joe Pascucci at 516/385-1877. 

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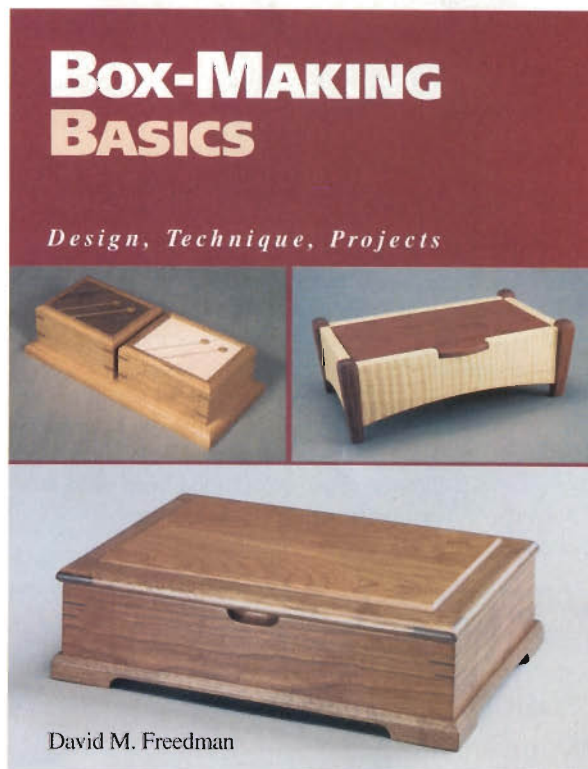
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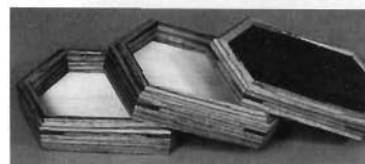
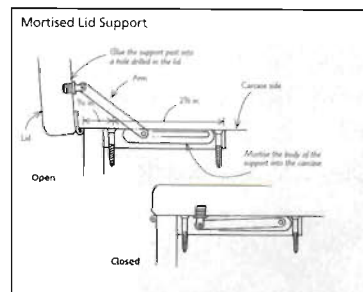
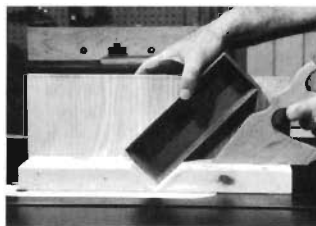
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New Tool Preview **PART TWO**

The best new products for 1998

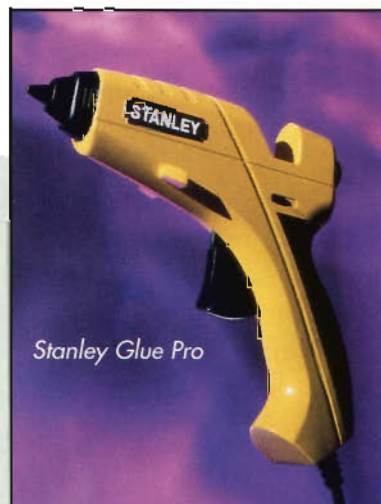


Jet Mini-Lathe

Jet Offers a New Mini-Lathe

If you like to turn small objects, the new 14" mini-lathe from Jet should fit right into your scale of things. This cast-iron unit weighs 59 pounds and has 10" of swing over the bed and a 14" span between centers. Six settings give speeds from 560 rpm up to 3,800 rpm—fast enough to get good results on even the smallest turnings. A hinged door cover provides access to the pulleys for changing speeds. With a 1" x 8 tpi headstock spindle and a No. 2 Morse taper on both the head- and tailstock, this lathe will accept a variety of accessories. Price: about \$380.

Jet Equipment and Tools 800/274-6842



Stanley Glue Pro

Glue Gun Turns Itself Off

After 15 minutes of inactivity, the new Stanley Glue Pro automatically shuts off, reducing the risk of fire in the shop and extending the life of the gun's heating element. The new gun also has dual heaters and a high/low temperature switch that provide correct temperatures for different types of hotmelt glues. There's a covered nozzle to help prevent accidental burns, and an ergonomically designed handle makes it easier to work with this tool. Price: about \$30.

Stanley Fastening Systems 800/343-9329

A Precision Square Sized For Woodworking

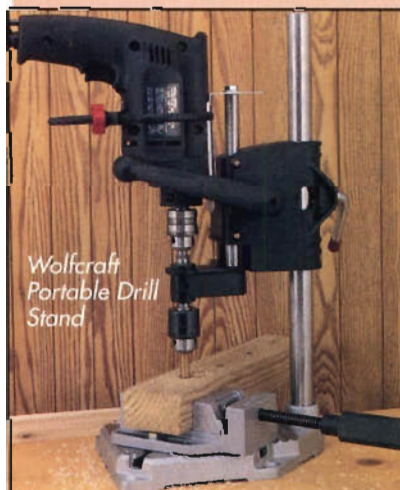
Carpenter's framing squares are too big for most woodworking tasks, so Veritas took the same basic design and shrank it to create a 3 x 6" Precision Square. This stainless-steel instrument is graduated on both sides—the 6" blade to 16ths, the 3" tongue to 32nds. All markings have been etched into a non-glare finish for easy readability. Veritas guarantees the accuracy of the square to .001" per inch of length. Price: \$11.95 plus shipping.

Lee Valley & Veritas 800/871-8158



Portable Drill Stand Comes With Its Own Chuck

On most portable drill stands, you have to remove the drill's chuck and permanently mount it on the stand—so you're out one drill. Wolfcraft designers solved that problem by incorporating a drill chuck into their Universal Drill Press Stand model no. 3408.



Wolfcraft Portable Drill Stand

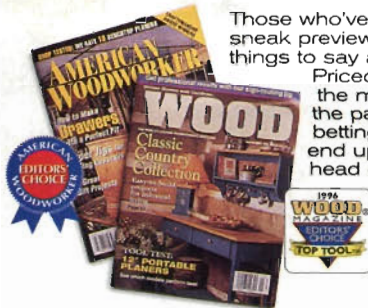
Permanently mounted and keyed, the chuck accepts bits up to 3/8" in diameter. Since you never remove it, the chuck remains perfectly aligned with the vertical post on the stand. The stand permits 2 1/2" of drill travel. A V-groove in the base helps center and hold dowel stock, and a large center-access hole lets you drill into objects positioned below the base. About \$30.

Wolfcraft, Inc.
630/773-4777

Continued on page 16



This Delta exclusive gives you a lock on snipe control. Patent-pending cutterhead snipe control lock stabilizes the cutterhead during operation, for complete rigidity.



Those who've had a sneak preview have nice things to say about it. Priced in the middle of the pack—we're betting it'll end up at the head of its class.



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Practical as they are, most portable planers are notorious snipers. If you're looking to minimize sniping without sacrificing portability, check out Delta's new 12½" Portable Planer (Model 22-560), with its exclusive snipe control lock. Call toll free for the name of your nearest Delta dealer. Delta International Machinery Corp., 800-438-2486. In Canada, 519-836-2840.

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Continued from page 14



Craftsman
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A Pair Of 18-Volt Cordless Tools From Craftsman

A cordless drill/driver and a 5 1/2" trim saw are the first Craftsman tools to sport an 18-volt/2 amp-hour battery system. Both come with an extra battery, and the same 1-hour charger can be used to service either tool. The drill/driver, model no. 27199, features a 1/2" keyless chuck, dual speed ranges of 0-400 and 0-1400 rpm, 24 clutch positions, and an auxiliary handle that mounts just behind the clutch and rotates 360°. The model no. 27181 trim saw weighs in at 6.7 lbs. and comes with an 18-tooth, ultra-thin-kerf blade that cuts up to 1 1/8" deep at 90°. The drill/driver lists at about \$240, the trim saw at \$250. Both can also be purchased in a combination kit.

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There's no better way to get kids interested in the woodshop than to buy them their own tools and equipment, and that's where the new Bucket Boss kids' gear can help. The Little Boss tool bucket, a miniature of the original Bucket Boss, fits over any one-gallon paint can. Its numerous pockets and sleeves offer ample room for storing and organizing small tools or art and school supplies. Strap the Little Rig kid's tool belt on a youngster and he/she will be raring to hammer and nail. The Little GateMouth tool bag helps kids keep their own tools organized and portable, and the Little Shop Apron will keep them (relatively) clean during messy projects. Prices: from \$13 to \$15.

Duluth Trading
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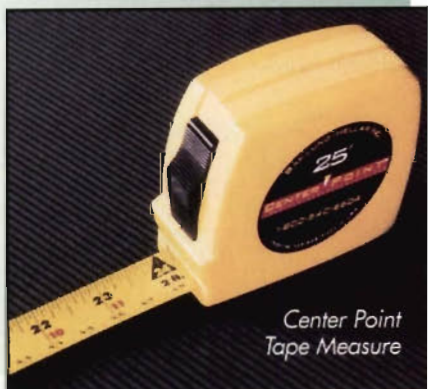


Bucket Boss
Kids' Gear

Tape Measure Automatically Finds The Center Of Your Workpiece

Here's a fast, accurate way to find the center of any board without doing any math in your head. The Center Point tape measure uses two scales. The top scale measures inches; the scale on the lower edge shows the same numbers in increments one-half the actual size. So, to find the center of a board measuring $7\frac{3}{8}$ " wide (on the top scale), you simply need to find the same number ($7\frac{3}{8}$ ") on the bottom edge of the scale. That point marks the exact center of the board's width. This 25' tape has a 1"-wide steel blade that includes foot markings and stud layouts as well. About \$17.

Baklund-Hellar Inc.
800/540-6604



Center Point
Tape Measure

New Accessories For Tormek Sharpening System

Tormek just released several new accessories for its SuperGrind wet-wheel sharpening system. The first product, a profiled leather honing wheel, no. LA-100, mounts outside the regular leather honing wheel. It's shaped for polishing and stropping the insides of carving gouges and V-parting tools. The second, the Horizontal Base, no. XB-100, mounts on the top of the unit's housing for positioning the F-shaped support arm horizontally. This setup enables an operator to grind tools with the wet wheel turning away from the edge instead of into it. This improves tool control, decreases grinding pressure, and makes it easier to see the grinding action. The Profiled Honing Wheel sells for \$45, the Horizontal Base for \$18.

Tormek U.S.A.
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Continued on page 18

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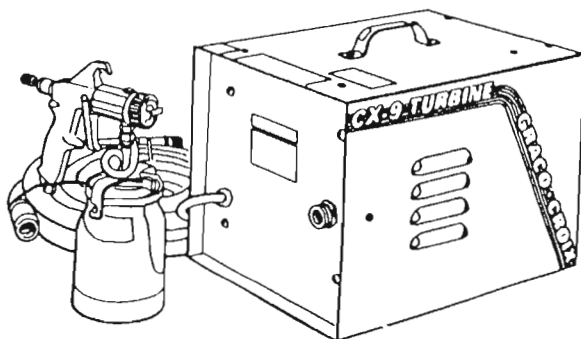


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Continued from page 17

Wooden Replacement Parts For Plastic Knobs and Handles

Stanley/Bailey and Record still make quality hand planes, but both companies now use plastic knobs and handles instead of wood. Highland Hardware offers rosewood replacement knobs and handles that fit No. 4 to No. 8 hand planes. These handles are a bit larger than the factory originals, providing more room for your fingers. They also come with a screw to accommodate the handle's extra height as well as instructions for mounting and customizing the handle or knob to fit your own hand. Catalog no. 10.50.10. Price: \$19.95 plus shipping.

Highland Hardware 800/241-6748



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Continued on page 20

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PRO TIP

The width of profile cut by your panel-raising bit determines the final size of the crown. To calculate the crown's width and length, up the bit to route the profile. Make a test cut on scrap. Measure the width of the crown.

To calculate the crown's length, measure the length of the rail plus stiles, then the width of the bit's (to allow for a 1/8" recess). To calculate width, add the width cut, then add 1/8" for the

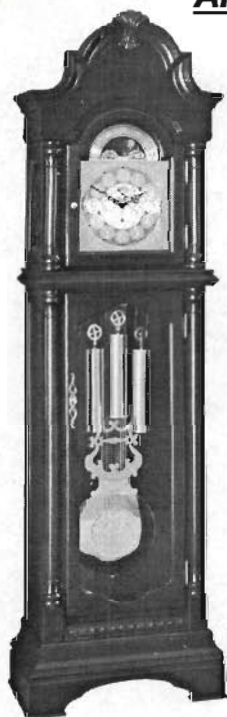
When working with narrow pieces, you start with a piece wider for safer handling operation, then rip it to final width later.



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Continued from page 18



10" table saw



12-speed drill press

Jet Unveils New Tool Line For Woodworkers On a Budget

Woodworkers who have been trying to outfit a shop on a budget will soon have some help thanks to Jet's new Shopline series. This line of tools includes a 10" direct-drive table saw (\$399) with a cast-iron table, a 15-amp motor, and 27" of rip capacity to the right of the blade; a 12" bandsaw (\$299) with a 1/2-hp motor, a tilting table, and 6" cutting depth; a 6" jointer (\$399) with rabbeting ledge, a 3/4-hp motor, cast-iron tables, and a three-knife cutter head. All three of these tools come with a stand. Also included in the lineup is the firm's 14", 12-speed drill press (\$299) with cast-iron floor stand, 1/2" chuck, and a 1/3-hp motor and a choice of bench grinders: a 6" model (\$59) or an 8" model (\$109). To help keep the shop clean, Jet has also included their 610-CFM dust collector (\$209) in the series.

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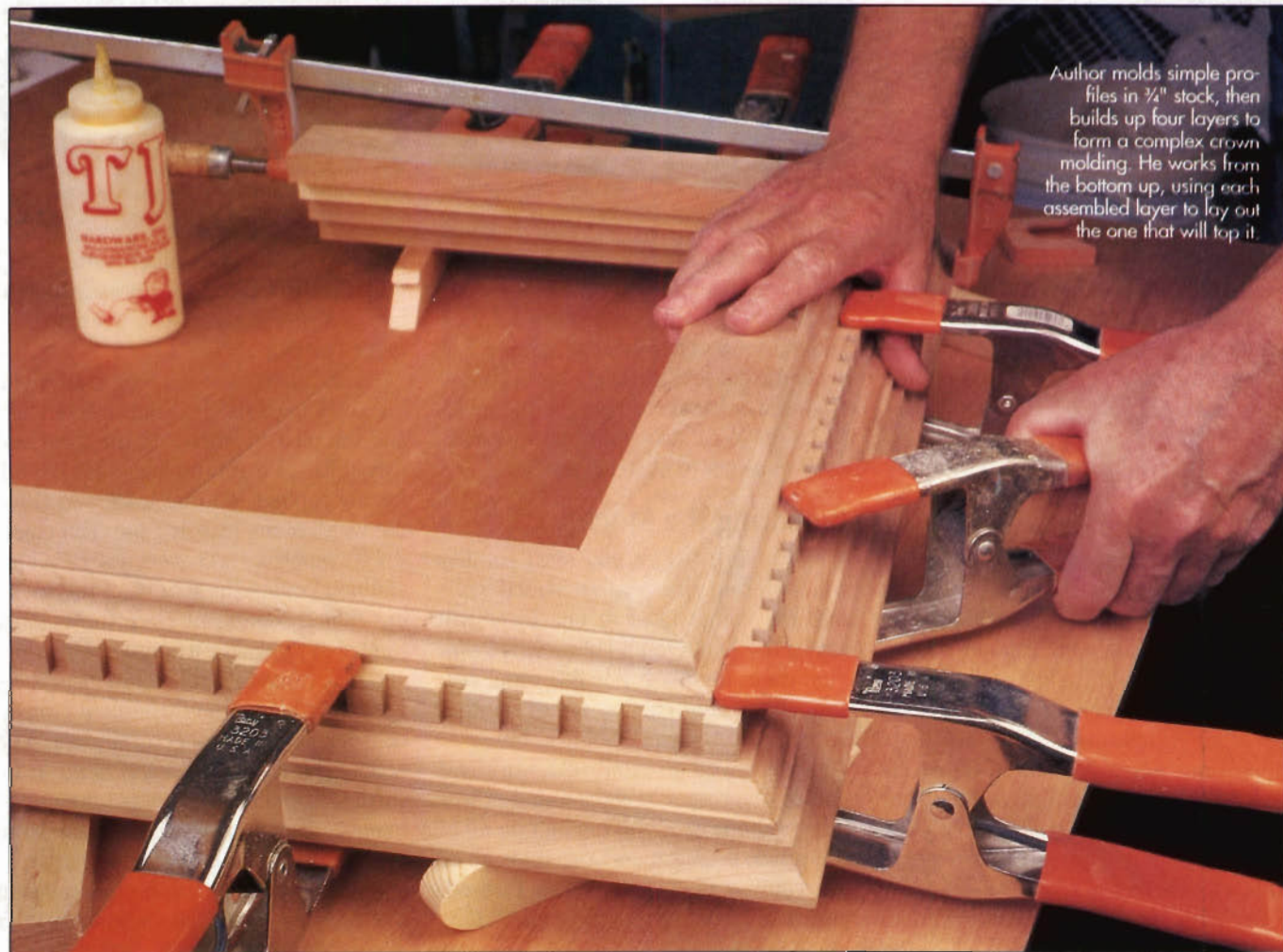
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MULTI-LAYER MOLDING

Making Complex Moldings With the Router, One Layer At a Time

by Sven Hanson



Author molds simple profiles in $\frac{3}{4}$ " stock, then builds up four layers to form a complex crown molding. He works from the bottom up, using each assembled layer to lay out the one that will top it.

Nothing makes a cabinet or room look more classic than trimming it with complex molding. Yet woodworkers sometimes shy away from adding this embellishment because they think they need a shaper and a special set of cutters. They don't.

When you take a close look at even the most elaborate molding, you usually find that it's built up from a combination of simple coves, beads, and ogees. You probably already own some of the bits needed to rout these profiles, and you can buy those you don't have, usually for \$20 or less each. The finer the detail, the smaller

the bit needed, so there's little danger of burning out your small router.

An Overview Of The Technique

You don't need thick, expensive stock. I cut most of my basic profiles in $\frac{3}{4}$ "-thick material, then stack these layers to build-in both thickness and depth. Inserting a $\frac{5}{8}$ "- or $\frac{1}{2}$ "-thick layer here and there adds variety and makes the assembled molding look more professional and sophisticated.

Besides saving you money on materials, layered moldings offer other

advantages over machined thick stock. As I've already mentioned, you don't need to go out and buy a shaper or even a large router. Further, you can miter the ends a single layer at a time, then stack the layers afterwards. This way you can get by without a large-capacity saw, and if you botch the cut on one layer, you haven't ruined the entire assembly.

Layering lends itself to all manner of cabinetry and architectural woodworking. You can trim a door or window opening; create crown, base, or chair-rail molding for a room; or dress up a cabinet, entertainment center, mirror,



Photo A: To crown a cabinet with complex molding, author first makes a full-scale template of the cabinet top. If the molding must overhang an overlaid door, remember to allow for it.



Photo B: Start with a simple Roman ogee for the bottom layer. Use wide ($2\frac{3}{4}$ " stock for this layer to provide width for door overhang and also for firm attachment to cabinet top.



Photo C: As an alternative, start with double-wide stock and rout two of your profiles on opposite edges. Then, rip the piece in half to provide two layers' worth of stock.

or picture frame. To demonstrate the techniques involved, I'll build a crown molding for a simple wall cabinet. (In addition, see "Build a Valance" on *page 24* and "An Easy Three-Layered Picture Frame" on *page 23*.)

Start With a Full-Size Template

From light-colored plywood or other sheet material, cut a template that matches the top of the cabinet you intend to trim. If your cabinet has an overlaid door, your molding will need to overhang it, so remember to include the door thickness in the template dimensions when you size it. (On occasion, I've forgotten to allow for this door overhang and gotten stuck with changing the design to a full-inset door, which adds a lot more work.)

To allow for the $\frac{3}{4}$ "-thick overlaid door on my cabinet, I added $\frac{7}{8}$ " to the front of the template (*photo A*). This includes an extra $\frac{1}{8}$ " for European hinge clearance and adjustment.

I design my molding by arranging precut samples of routed profiles. When you've settled on an arrangement you like and established the desired overlaps between layers, draw a section view of it. (See *figure 1*.) I've found that working from precut samples makes the design work much easier than doing it all on paper. You also get a much clearer view of the required stock widths and overlaps, which you'll need to know in order to miter the successive layers accurately.

If I were making architectural molding, I would tailor the angle of the combined layers to the molding's location and purpose. Overhead moldings can protrude out into the living space, but at chair-rail or baseboard height, the molded layers must stack more or less vertically so as not to obstruct traffic.

Preparing the Stock

Make sure before you start routing and mitering that you've planed your material flat. A twist in one layer will stress the joints in all layers when you glue them together. For the same reason, check your cabinet top to see that it forms a flat plane.

Because you distribute the workload among the router, tablesaw, and power miter (chop) saw, you needn't do all of the stock preparation first, then all of the routing next, and so on. Instead, you can work layer by layer. This

approach may take more time, but I find that it makes for more efficient use of materials and also seems to be more relaxing.

To calculate the total length of molding you'll need for the bottom layer, first add the measurements of the front and two sides of the template—46" overall for my cabinet. To that total, add twice the width of the molding for each piece: $2 \times 3"$ (approx.) $\times 3$ pieces = 18". This addition covers the length of the molding that extends out over the cabinet (and also allows for a couple of botched cuts). To provide a little extra insurance, I usually add another 20 percent (10 percent for larger architectural jobs). The next three layers will each need to be successively longer because they overhang farther; it takes more material to get out to the tips of their miters.

Rip the stock for the bottom layer to $2\frac{3}{4}$ " finished width. That's wide enough

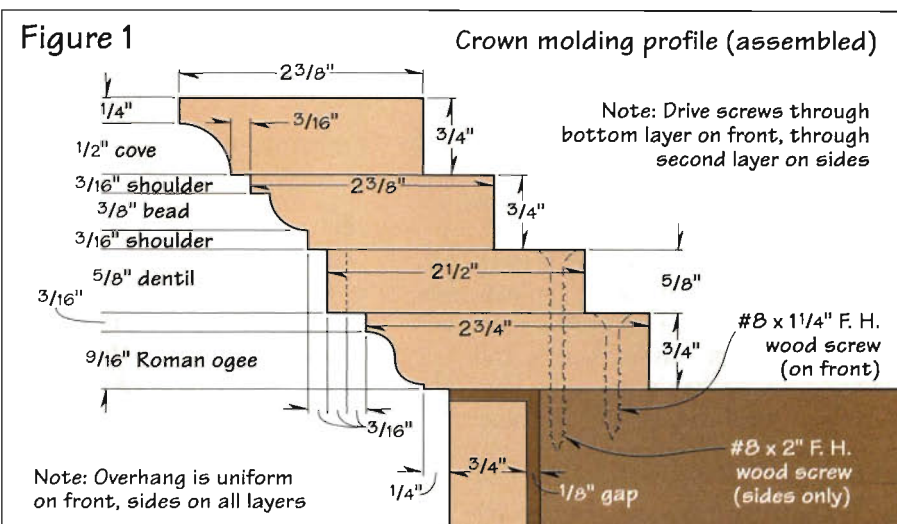




Photo D: Sand the routed profiles to 180-grit before mitering the stock to length. Here, author wraps abrasive around vinyl tubing to sand covered profile on top (fourth) layer.

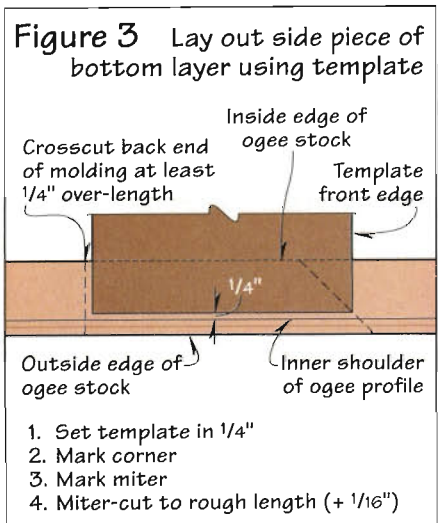
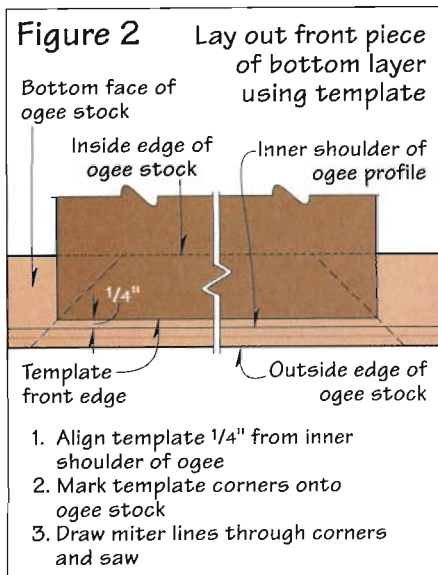


Photo E: To lay out miters on bottom (Roman ogee) layer, align template on stock for $\frac{1}{4}$ " offset, mark template corners, then use an accurate 45° instrument to extend cut lines to front edge of stock.



Photo F: To miter stock, author uses shop-built jig that cuts opposing miters and handles long workpieces. Note use of masking tape to fine-tune the fence angle.

to overhang the door and still extend far enough back onto the cabinet to provide for firm attachment. It's also narrow enough that you can miter-cut it with any 10° miter saw.



Depending on your molding arrangement and the lumber dimensions you start with, it sometimes makes sense to rip to finished width first and then rout the profile on one edge (*photo B*). Other times, I've routed two of my profiles on opposite edges of double-wide stock, then ripped the piece in half to make two layers' worth of stock (*photo C*).

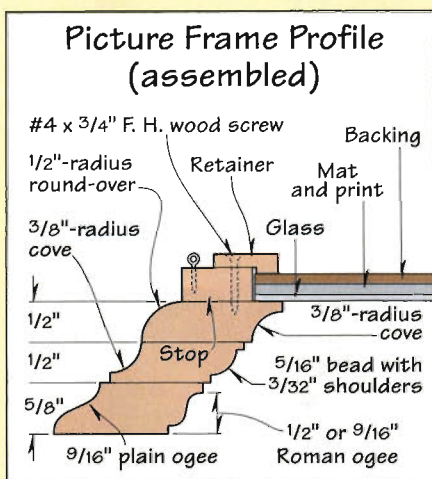
At this point, sand the routed profile to 150- or 180-grit to remove machine marks and burns. I use contoured blocks made of closed-cell foam on the beads and ogees and lengths of vinyl tubing on any coved surfaces (*photo D*).

Building Upside Down

Matching the molding to the template requires that you build the layers from the template up—by working upside down. To lay out the front piece of the bottom layer, center the template between the two ends on the bottom face of the molded stock. (See *figure 2*.) Establish the correct overhang for the bottom layer using a combination square with the blade extended to $\frac{1}{4}$ ".

With an awl or sharp pencil, transfer the template corners onto the molded stock. Then, using an accurate combination square or gauge, mark cut lines for the miters that bisect these corners

AN EASY THREE-LAYERED PICTURE FRAME



One you've fine-tuned your miter jig, you can make elegant picture frames using the multi-layer molding technique. Applying the technique to a four-sided structure with a different purpose, however, requires a couple of changes in the procedure.

To get cleaner glue joints and also save time, assemble all three molding layers first and then cut the miters. I surface the stock for most layers to $\frac{1}{2}$ ", which makes for a lighter frame and better suits the proportions of pictures up to $2 \times 3'$ or so. (See the sample profile at *left*.) The thinner material also glues up more easily in gap-free layers.

While perfect 90° corners make good frame joints possible, they don't guarantee them. The lengths of the opposing sides must be very close to identical—ideally to within $\frac{1}{64}$ ". Actual tolerances depend on the width of the assembled molding stock and the overall frame dimensions. A small frame made of wide molding, for example, calls for extreme accuracy.

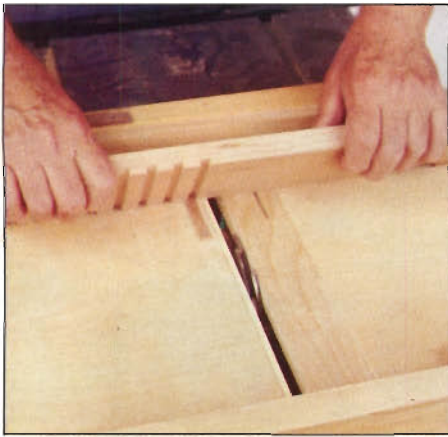


Photo G: Attach key to sliding table to index dentils for second layer. Space $\frac{3}{8}$ "-wide teeth $\frac{3}{8}$ " apart using the indexing key and a dado head on the table saw.



Photo H: After gluing dentil stock to slightly thicker pine backing strip, plane backing flush. Note that backing strip will be hidden by first and third layers after assembly.



Photo I: Glue and pinch-clamp dentil layer, then scrape off squeeze-out and sand or plane joints level if necessary.

BUILD A VALANCE: ANOTHER WAY OF LOOKING AT LAYERED MOLDING

A valance is a piece of architectural woodworking that trims the headers of windows and doors. Designers use them to hide the tops of mini-blinds, window shades, and certain lighting fixtures. Valances also serve to level and unify the size and appearance of openings in a room.

A valance differs both in design and construction from crown molding. In section, it has a flatter, more vertical aspect. (See the drawing at *right*.) It doesn't project into the room as much, which leaves more emphasis on creating strong horizontal lines.

Before designing your valance stock, draw up a room plan, including door moldings, blinds, and adjacent walls—anything that the valance must fit over or inside. Unless adjacent walls get in the way, I oversize each valance by a couple of inches in length. The idea, after all, is to make small openings look larger.

As for construction techniques, you can build a valance from the top down. That's the easier way to work, because the wide top molding makes a solid base to build on. The low profile of this valance—only 2" from front to back—allows you to build it in long sections and then miter the entire width in a single cut.

It's best to make up a generous quantity of valance stock, especially if you're including a dentil layer as I've done here. Each valance will require an extra foot or so of length if you hope to make a front and two sides that all have near-full teeth at the corners and back edges. A little extra waste, however, provides cheap insurance and will also leave you with several nice samples if all the cuts go well.

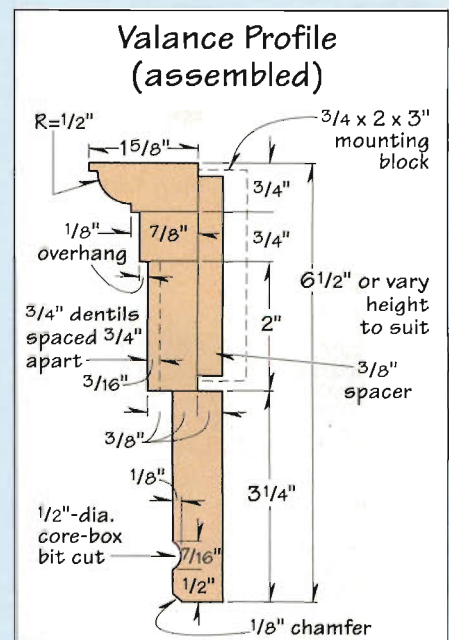
From $\frac{3}{4}$ "-thick stock, rip a top molding to 2" rough width, then joint one front edge. Rout this edge using a $\frac{1}{2}$ "-radius beading bit set up to cut $\frac{1}{8}$ " shoulders at both ends of the radius. Then, rip the piece to $1\frac{1}{8}$ " finished width.

Next, lay the molding top face down on the bench. For the next layer, rip a $\frac{7}{8}$ "-wide piece of $\frac{3}{4}$ "-thick stock. Glue and clamp it to the bottom face of the top molding, aligning the back edges. I include this plain square layer simply to overhang and set off the dentil layer that will follow. If you opt to rout a profile on the front edge, you'll need to widen the stock (as well as the top layer stock) to provide enough depth for the profile.

For the third layer, add a $\frac{3}{4} \times 2$ " strip of dentils. To proportion the teeth to the 2" width, I form $\frac{3}{4}$ "-wide dentils separated by $\frac{3}{4}$ " dados. To maintain a shallow profile, I cut them only $\frac{3}{16}$ " deep.

The fourth (bottom) layer sits back $\frac{3}{8}$ " to provide reveal for the dentils. To even up the back faces of the two sections, cut several $\frac{3}{8}$ "-thick spacers from scrap and adhere them to the back of the top three layers with hot-melt glue. To glue the bottom layer to this assembly, align its back face flush with the spacer.

This $3\frac{1}{2}$ "-wide bottom layer provides visual ballast for the molded layers above, but it may look too plain depending on the stock you're using.



and extend them to the outside edge of the stock (*photo E*). To make sure I don't cut on the wrong side of the line, I mark the path of each saw kerf with Xs.

To lay out the sides, leave at least $\frac{1}{2}$ " of waste stock at both ends of the front piece layout. (See *figure 3*.) You'll adjust the length of the side pieces by cross-cutting their back ends, so you needn't follow the layout procedure you used for the front piece, provided you have a generous amount of extra length.

If I'm cutting it close, however, I still like to lay out all three parts. It gives me a chance to double-check my two off-cuts to see that they'll be long enough for the side pieces. Either way, make sure you allow at least $\frac{1}{4}$ " of extra

length on the sides so you can crosscut them to fit the template later.

Mitering the Molded Parts

The "measure twice, cut once" approach may work well enough for trim carpentry, but it won't suffice for a cabinet crown. You're better off in this situation to stick with "cut to fit."

I favor the tablesaw for this particular mitering operation. It may be easier to miter-cut long stock with a miter saw, but you have to swing the head from one side to the other to cut opposing miters. I use a shop-built mitering jig that will cut opposing miters and can trim longer pieces (*photo F*). As long as

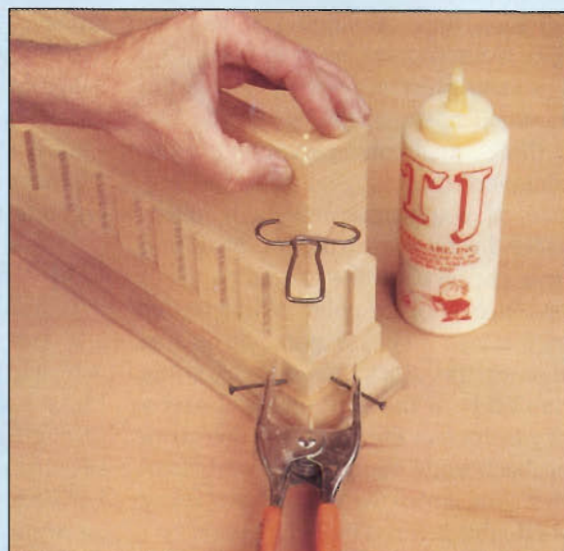
the angles of the combined fences on the jig equal 90° , a pair of opposing miters (one cut on the left fence, one on the right fence) will make a square corner. (To build Bob Colpetzer's "Perfect Miter Jig," see the Jan./Feb. '97 *Woodworker's Journal*, pages 44-50.)

To miter the front piece, make the initial cuts $\frac{1}{16}$ " or more outside the layout lines. Before you make the final cuts, miter the side pieces to the same rough length, and dry-clamp both joints to make sure they add up to 90° .

If the joints aren't quite square, adhere a thickness or two of masking tape to the fence on your miter jig. Position it near the front or back of either jig fence, depending on whether



◀ Miter valance stock using a sliding table. As with crown molding, try to finish each corner with a full-width dentil.



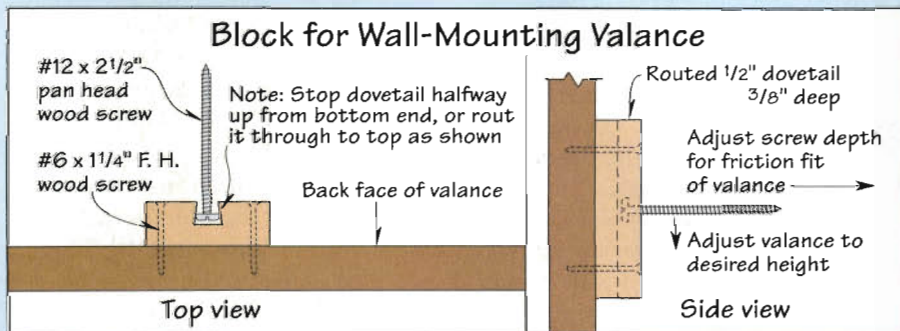
▶ Pinch-clamp the short side pieces to the valance front. Note author's shop-built pinch clamps, which make use of #6 drywall screws.

If necessary, add some detail, such as the $\frac{1}{2}$ " core box cut ($\frac{1}{8}$ " deep) and $\frac{1}{8}$ " chamfer shown in the drawing.

As with the crown molding, try to finish each corner with a full-width dentil on both the front and sides (see photo above left.) I apply glue to both mitered surfaces, spread it with a brush, and apply my shop-built pinch clamps (photo above right.) To attach each valance to the

wall, I use two or more 2x3" blocks with a $\frac{1}{2}$ " dovetail routed $\frac{3}{8}$ " deep along the lengthwise center as shown below. These blocks allow for adjustment and also hold the structure upright, so it can't tilt forward or backward. Depending on how much adjustment you want, you can rout the dovetail through at both ends or stop it about halfway up the block. Attach the blocks to the back of the valance with #6x $\frac{1}{4}$ " flathead screws.

Hold the valance to the wall and mark centers for #12x2 $\frac{1}{2}$ " panhead screws. Drill and screw the panheads part way into the studs that top the door or window opening. Once you fine-tune the screw depth, the blocks will slide snugly over the screw heads, and friction will hold the valance firmly in position.



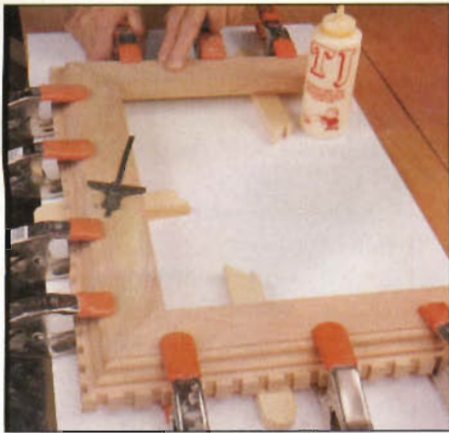


Photo J: Glue and clamp bottom two layers, then prepare third/fourth layers as a separate dual-layered unit.

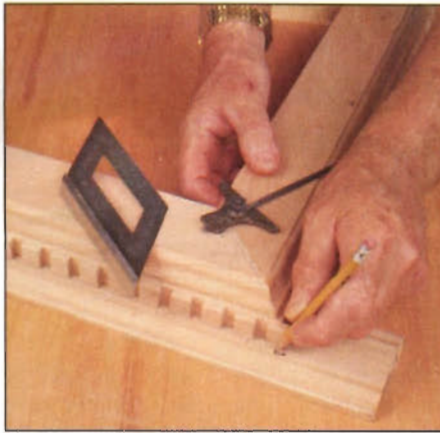


Photo K: Use each assembled layer as a template to lay out succeeding layer. Here, author aligns dentil layer for proper offset, then transfers corners to beaded stock to lay out third-layer miters.



Photo L: Before gluing up the two-layer sub-assemblies, level the mating surfaces with a hand plane and sanding block.

you need to add or subtract a bit from the angle. Although it's better to shim both fence angles to a true 45° , I find it easier to arrive at 90° by adjusting just one of the fences. The final result will still look fine, provided you use the same setup to miter all layers.

Cut some test pieces to make sure the shimmed cuts total 90° . Next, make two or three small cuts at each end of the front piece (checking it against the template as you work) until both miters bisect the template corners. Note that these corners are the crucial points of reference—not the points at which your original layout lines crossed the outside edge of the stock. Now, remiter the front ends of the side pieces if necessary to correct the angle, but don't trim the back ends to finished length until later. (You'll trim these after assembling two double-layered moldings.)

Gluing Up the First Layer

Working over waxed paper, I apply yellow glue to both mitered ends and press the two parts together by hand. Then, I position a shop-built pinch clamp to apply pressure as close to the center of the mitered surfaces as possible. To make these clamps, drill holes through the jaw corners on a standard 2" spring clamp and install sharp #6 drywall screws. (The screws punch tiny holes, but these will disappear if you blot them with a hot water-dampened cloth.)

If you're experienced enough with biscuit joinery to wonder about biscuiting these joints, you *don't need me* to tell you how to do it. However, I've

found that biscuits aren't required here—cleanly mitered $2\frac{3}{4}$ "-wide stock gives you lots of glue surface. End grain though it may be, I've glued up one of these joints and tested its strength by rapping it against a hard surface after 10 minutes of setup time. I gave up before doing damage to my hands or wrists. If your cabinet top and stock are flat and square, the layers will assemble to one another and then to the cabinet without exerting stress on the joints.

Preparing the Dentil Layer

To make dentils efficiently, start with a 2"-wide strip of $\frac{3}{4}$ "-thick stock. (This will yield two strips of $\frac{5}{8}$ "-wide dentil.) Make a sliding table and cut a $\frac{3}{16}$ " kerf through it with a dado head. Make a key that's just a hair narrower than the $\frac{3}{16}$ " dado head, then position the key $\frac{3}{8}$ " from the blade to make $\frac{3}{8}$ "-wide "teeth" (photo G).

Set the depth of cut to $\frac{3}{16}$ ". Place the dentil stock against the fence with the better face down. Butt one end against the key, then cut the first dado. Move the stock over, fit the first dado over the key, and cut the second dado to form the first tooth. Repeat these steps until you arrive at the other end of the stock.

Rip the dentil strips to $\frac{5}{8}$ " wide. (This becomes the thickness of the assembled dentil layer.) Glue and clamp each of them to a slightly thicker pine backing strip that's $1\frac{1}{4}$ " wide. Plane the backing and dentils flush (photo H). Note: If the pine backing wasn't going to be hidden completely by the stacked moldings, I'd have started with thicker cherry stock for the dentil strip.

To size the front piece of dentil molding, position the assembled bottom layer on top of one of the pine-backed dentil strips. Note: Center the corners over teeth rather than over dados—you want to have as much tooth as possible showing at both ends. Establish the overhang of the dentils as shown in figure 1, then transfer the corners of the ogee layer onto the dentil layer. Cut the miters to bisect these corner marks.

Miter the side pieces from the second length of dentil stock, leaving an expanse of tooth equal to that at the ends of the front piece. Then, glue up the dentil layer using your shop-built pinch clamps (photo I).

Make a Second Pair Of Layers

Prepare $\frac{3}{4}$ "-thick stock for the third layer. Using a $\frac{3}{4}$ " beading bit (or a round-over bit set up to cut a bead), rout a bead with $\frac{3}{16}$ " shoulders. (See figure 1.)

Unclamp the dentil layer. Scrape off the glue squeeze-out, level the joints, and then glue up the ogee and dentil (first and second) layers (photo J).

Lay out the miters on the beaded stock using the dentil layer as a template (photo K). Allow a $\frac{3}{16}$ " overhang as shown in figure 1. Miter and glue up the third-layer parts. For the fourth layer, rout a $\frac{1}{2}$ "-radius cove profile on $\frac{3}{4}$ "-thick stock, then use the third layer to lay out the fourth. Miter and assemble this layer, level the joints, then glue and clamp it to the beaded third layer.



Photo M: To attach assembled molding to cabinet, drive screws through bottom layer of front, second layer of sides. Note that door overhang prevents second-layer attachment along front.

Now that you have two pairs of double-layered moldings, trim the back ends to length. (If you wait until you have three or four layers glued up, they might not fit under the blade, especially if you're working with a smaller miter saw.) To do this, place the bottom two-layered assembly (Roman ogee and dentils) on the bench with the top face down. Position the template on top of it, then mark and trim the molding flush with the back edge of the template. Now, use this trimmed assembly to lay out the cuts on the other two-layered assembly.

Check the fit between the two pairs, and level the joints on the mating surfaces if necessary (*photo L*). Apply two small ($\frac{1}{16}$ ") beads of yellow glue, keeping them away from the edges. Center the two assemblies to keep the overhangs equal on the front and sides, and check to see that the back ends line up. Spring-clamp the layers together as shown in the lead photo on *page 21*.

Sand the assembled molding and cabinet to 280-grit, but take care that you don't blur the profile edges. Remove the dust. Before attaching the molding, I apply three or four coats of WaterLox oil finish with a brush or cloth.

Near the inside edges of the molding, drill shank holes for #8 flathead screws. On the sides, you can go through a couple of layers, but the extra 1" of overhang on the front requires that you place the holes near the inner edge of the bottom layer (*photo M*). **WJ**

Photographs: By the author

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Last issue, we offered a basic humidor that would get your cigars into the proper condition before the weekend was out. This time, we present our full-dress version. If you've already built the no-frills model and still want to tackle this one—no problem. You'll easily find a good home for the first one when you're ready to transfer your inventory into this new, eye-pleasing case.



Before You Start

Our Honduras mahogany box frames a strikingly figured walnut burl lid panel. Because burl tends to be highly unstable, we opted to veneer a piece of it to an MDF substrate. To make sure the substrate remains flat, remember to veneer both faces. Since you'll line the case interior with Spanish cedar, you needn't apply the burl on the inside face. A plain-vanilla veneer or even patched-together veneer scraps will do.

Instead of fitting the case with conventional hinges and lid supports, we chose quadrant hinges. These smart-looking hinges span the back corners of the case and have a built-in sliding sup-

port that doubles as a stop. (For more information on the hinges, veneers, humidor hardware, and other supplies, see Sources at the end of the article.)

Veneer the Lid Panel, Then Build the Case

Step 1. Cut an 11x14" piece of 1/4"-thick medium-density fiberboard (MDF) for the top panel (A). Glue and clamp veneer to both faces. (We used a vacuum bag to press the panel.)

Step 2. After the glue has dried, carefully belt-sand the panel faces to

120-grit, then random orbit-sand the burl face to 150-grit.

Step 3. Prepare stock for the front, back, and sides. For best grain match, resaw a piece of 5/4 roughsawn material, then lay out the parts as shown in figure 1. (We ripped the 5/4 stock to 4 3/8" width, then resawed and planed the boards to finished thickness and width.) As you lay out the parts, mark a top edge and outside face on each.

Step 4. Set up your tablesaw with a miter gauge, wooden extension, and stop block. Miter-cut the front and back (B), and two sides (C) to

BILL OF MATERIALS

CASE

PART	T	W	L	MTL.	QTY.
A Top panel*	1/4"	10 1/4"	13 1/4"	V/M	1
B Front/back*	1/2"	4 1/8"	14"	M	2
C Sides*	1/2"	4 1/8"	11"	M	2
D Bottom*	1/4"	10 5/16"	13 5/16"	BP	1
E Base—front/back	9/16"	1"	14 1/4"	M	2
F Base—sides	9/16"	1"	11 1/4"	M	2
G Hygrometer support	3/4"	3"	3"	M	1

LINING

H Box—front/back*	3/16"	2 5/16"	13"	SC	2
I Box—sides*	3/16"	2 5/16"	10"	SC	2
J Lid—front/back*	3/16"	7 1/16"	13"	SC	2
K Lid—sides*	3/16"	7 1/16"	10"	SC	2
L Top/bottom* **	3/16"	9 3/4"	12 15/16"	SC	2

*Parts cut to final size during construction. Please read all instructions before cutting.

**Parts edge-glued from narrower stock.

MATERIALS LIST

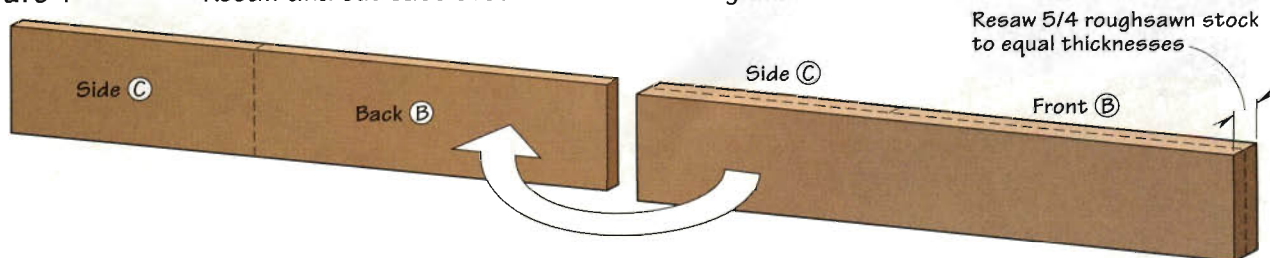
M—Honduras mahogany
BP—birch plywood
SC—Spanish cedar
V/M—Veneered MDF

SUPPLIES

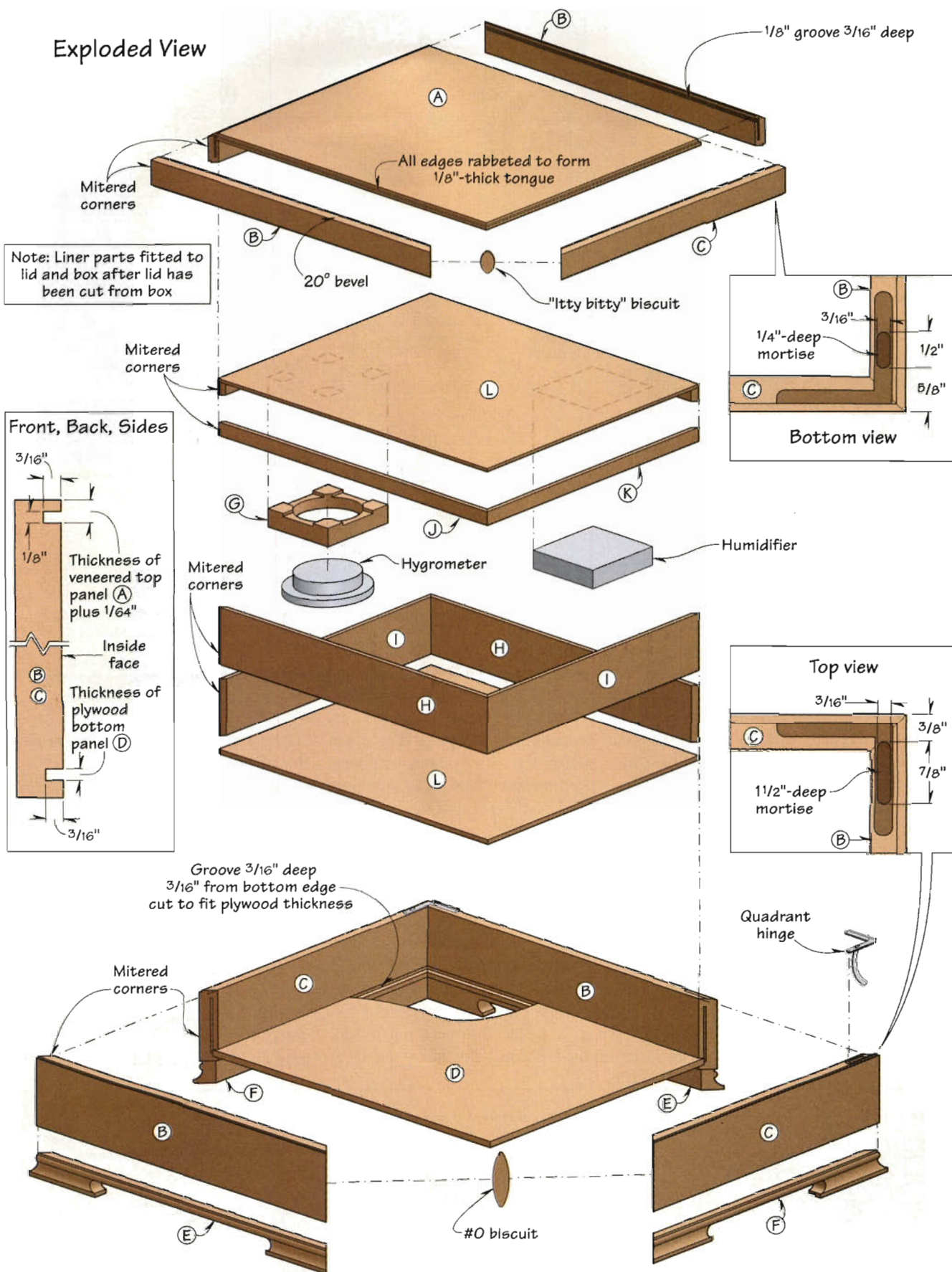
#0 and Woodhaven "itty bitty" biscuits; brass quadrant hinges (2); hygrometer and humidifier; satin lacquer. (To order quadrant hinges and humidor hardware, see Sources at end of article.)

Figure 1

Resaw and cut case stock to achieve best grain match



Exploded View



length. Remove as little waste between the parts as possible to preserve grain continuity. (The miter-gauge extension backs the cut and helps minimize chipping.)

Prepare the Joints, Then Assemble the Case

Step 1. Cut grooves on the inside face of the front/back and sides to accept the top and bottom panels. (For dimensions, see the Front, Back, and Side detail on the Exploded View.) Base the top-groove location on the top panel's actual thickness. You want to inset the panel just enough ($\frac{1}{64}$ " or less) so you can catch a fingernail on the top edges of the case after assembly. To cut the groove for the bottom panel, use a $\frac{1}{8}$ " saw blade but make two passes so the groove matches the thickness of your plywood bottom.

Step 2. Lay out two biscuit slots in the mitered ends of each part: a #0 slot near the bottom edge and a slot for an "itty bitty" biscuit near the top. (See figure 2 for dimensions. To order these miniature biscuits, see Sources

on page 34.) Cut the #0 biscuit slots using your biscuit joiner.

Step 3. Set up a table-mounted router with a slot cutter and notched fence to rout the slots for "itty bitty" biscuits. You can do this by setting the fence flush with the cutter's bearing, and clamping a wide stop to the fence $\frac{5}{8}$ " to the right of the cutter's centerline. If you own an AngleWright or similar tool, set it at 45° and use it as a jig. Or, make a large 45° wedge from scrap and screw $2\frac{1}{2}$ "-wide wooden flanges to two of its edges.

Step 4. Spring-clip one of the workpieces to the AngleWright's flange, aligning its top edge with the flange's right edge. Place this edge firmly against the stop and plunge the mitered end of the workpiece into the spinning bit until it contacts the bit's bearing and fence (photo A). Then, rout the remaining three parts. To slot the opposite end of each part, reset the stop $3\frac{1}{2}$ " to the right of the

cutter's centerline and repeat, using the same jig setup.

Step 5. Bevel the top outside edge of the front, back, and sides. To do this, tilt your tablesaw blade to 20° from vertical and set the rip fence far enough from the blade to leave a $\frac{5}{32}$ " flat along the inside edge. (See the Side View.)

Step 6. Dry-assemble the front, back, and sides using biscuits. Measure the case's interior width and length, add the groove depths,



Photo A: Cut the itty bitty biscuit using an AngleWright or other 45° -angled jig and a stop.

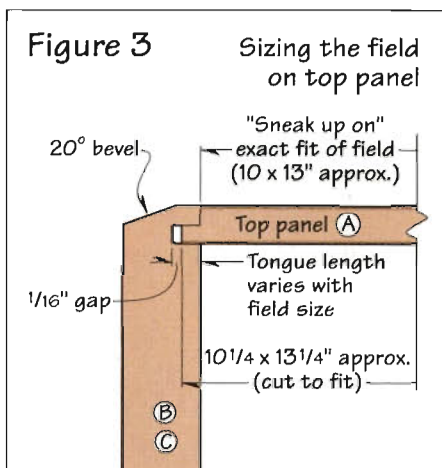
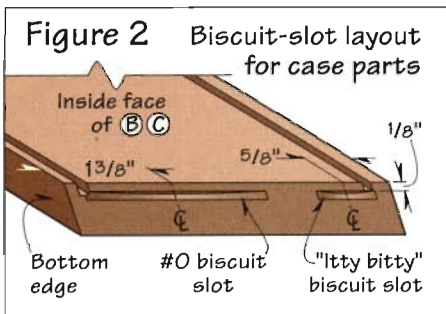
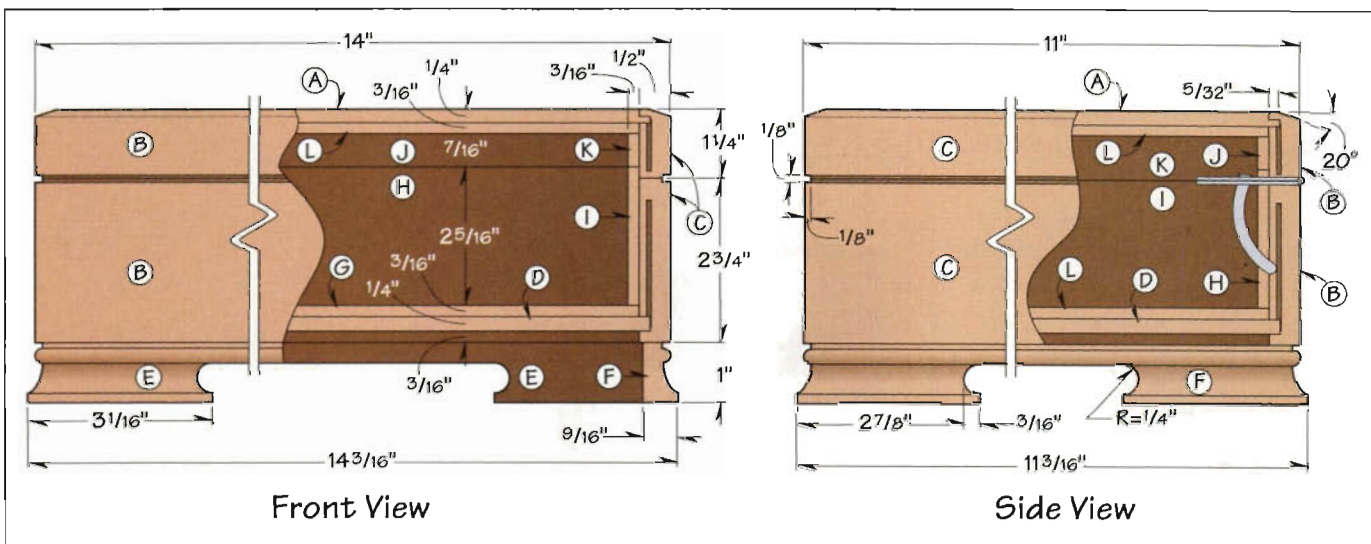


Photo B: The box miters take a #0 biscuit. The lid miters require a miniature version.



and then cut the bottom (D) to fit from $\frac{1}{4}$ " birch plywood, allowing a small gap ($\frac{1}{32}$ ") on all sides to ensure that the miters will close tightly. At the same time, square the veneered top panel and trim it to fit the top grooves, allowing a $\frac{1}{16}$ " gap on all sides.

Step 7. Cut a rabbet around the top edge of the top panel to form a $\frac{1}{8}$ "-thick tongue. Note: The field of the top panel must be sized to fit the interior of the box frame precisely. (See *figure 3*.) This step takes patience—any error will prevent the miters from closing or leave a visible gap around the field. First, determine the interior length of the case parts by measuring between the inside ends of the miters. (Ours measured 10x13".) Attach an auxiliary wooden fence to your rip fence and partially bury a $\frac{1}{8}$ " saw blade in it. Set it to cut a $\frac{3}{32}$ "-wide rabbet initially. Elevate the blade to $\frac{1}{16}$ " or so for the first pass, then sneak up on the final cutting depth, leaving a tongue thickness that fits the groove snugly. Next, sneak up on the final field dimensions by moving the fence in slight increments to widen the rabbet. Check the fit after each pass to make certain you don't over cut.

Step 8. When you have a precise fit, carefully nip off the rabbeted corners of the panel. Next, compress the biscuits slightly (with a hammer) to ensure that they won't bind in the slots. Then, dry-assemble and clamp all parts with the biscuits to check for fit. Disassemble the parts and remove any dust from the slots, grooves, and mitered ends. Now, apply glue carefully to the top, bottom, biscuits, and miters. Assemble the case, putting the best face of the plywood bottom out, then clamp. Note: Cleanup won't be possible inside the closed box.

Make the Molded Base

Step 1. Prepare a 1x1 $\frac{1}{2}$ " blank at least 40" long for the base (you'll want the extra for setups later). Install a profile bit like the one shown in *figure 4* in your table-mounted router and set the bottom of the cutting edge flush with the tabletop. (We used a Porter-Cable no. 43542. Eagle America's no. 175-1605 and similar bits will also work.) For the first pass, cover two-thirds of the bit's profile with a notched fence. Rout both edges on the workpiece. Reset the fence to expose another third for the second routing pass, then remove the fence for the final pass.

Step 2. Using push sticks, rip a $\frac{1}{16}$ "-wide molded strip from both edges of the piece. Miter both ends of the base parts (E, F) to fit the case by measuring along the bead and make it flush with the outside of the case.

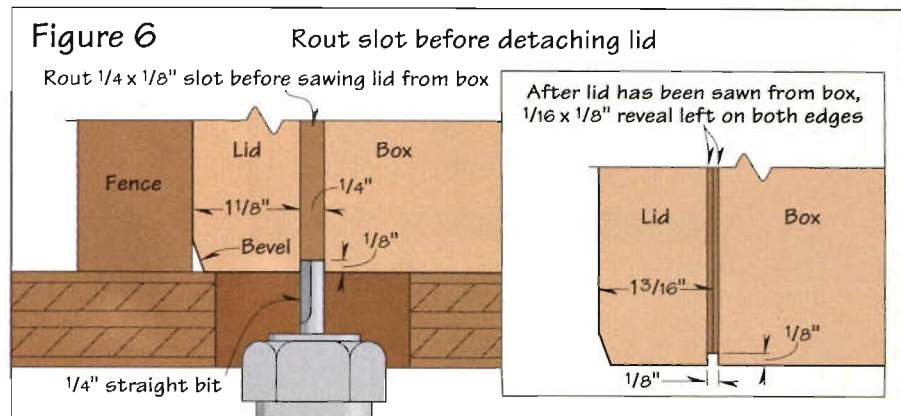
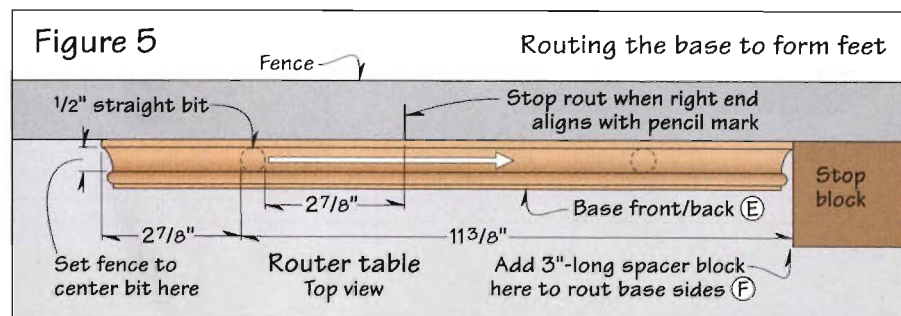
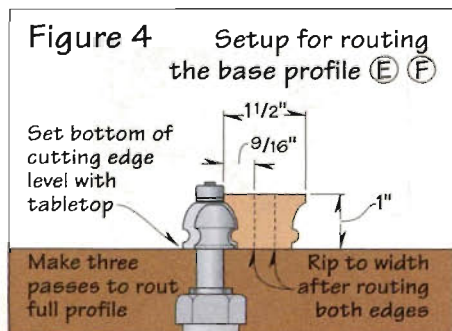
Step 3. To rout a stopped cutout in the base parts, install a sharp $\frac{1}{2}$ " straight bit in your table-mounted router. Using a fence, center the bit between the bead and the flat along the bottom edge. (See *figure 5*.) Set a stop 11 $\frac{3}{8}$ " to the right of the bit's left-hand cutting edge. Also, mark a vertical stop line on the fence (from top to bottom) 2 $\frac{7}{8}$ " to the right of the bit's right-hand edge. To rout the base sides (F), use a

3"-long spacer so you won't have to reset the stop.

Step 4. Using this setup, elevate the bit $\frac{1}{8}$ " and start routing the base parts by placing the bottom of the workpiece against the fence and one end against the stop. Lower the part carefully onto the spinning bit, then advance it until that same end aligns with the stop line. Next, rout the remaining parts at this same depth, placing the 3" spacer against the stop to compensate for the shorter length of the sides. Make additional passes with all four parts, elevating the bit each time. Note: To minimize tearout on the break-through pass, set the bit to remove only $\frac{1}{32}$ " on this pass.

Step 5. Cut away the bottom edge of the routed sections to form the feet. To do this, use a miter gauge with a wooden extension and stop block. Set the stop to cut $\frac{3}{16}$ " from the end of the routed cutout as dimensioned on the Front and Side Views. Use the 3" spacer again to cut the (shorter) sides. Cut the first end of each piece with the molded face resting against the extension, then rotate the piece 180° to cut the opposite end. Note: Use extra caution on this second cut when the small waste strip comes loose.

Step 6. Glue the base frame together, band-clamp, and square. After the



glue has dried, sand the routed radii on the feet. Sand the molded profile and lightly break all edges except the top edge. You want this to remain crisp to define a reveal between the bead and the case's bottom edge.

Separate the Lid, Then

Attach the Base

Step 1. Set up your router table with a $\frac{1}{4}$ " straight bit and elevate it to cut $\frac{1}{8}$ " deep. Position a fence $1\frac{1}{8}$ " from the bit's cutting edge. (See *figure 6*.) Place the top of the case against the fence, and rout a slot around all four sides. Note: You'll separate the lid later by ripping through the center of this slot with a $\frac{1}{8}$ " saw blade to form a $\frac{1}{16} \times \frac{1}{8}$ " reveal on each part.

Step 2. Sand the box exterior to 220-grit, but stay clear of the bottom edges. Keep these square to ensure a tight joint with the base frame. Sand the top edges flush with the panel. Mark a common face across both edges of the slot to ensure that you can easily match the faces after detaching the lid.

Step 3. Set your tablesaw fence $1\frac{3}{16}$ " from the blade, then check the setting to make sure the blade centers in the $\frac{1}{4}$ "-wide slot. Elevate the blade to cut through all but $\frac{1}{64}$ " of the case. (We tested the setup on same-thickness scrap. This will keep the parts from breaking loose and binding in the saw.) Now, saw around all four sides of the case. Complete the cut with a sharp knife, then sand the mating edges flush using a sanding block or sandpaper adhered to a flat surface.

Step 4. Apply glue sparingly to the base frame, center it on the case bottom, and lightly clamp. After clamping, make sure the bead on the molding is flush with the box face on all sides. After five minutes, remove any glue squeeze-out from the reveal at the top of the base. You won't be able to do this after the glue has fully hardened without marring the detail.

Step 5. Lay out and rout gains for the quadrant hinges as dimensioned on the Exploded View details. See Sources for a mail-order supplier, but note that the hinges listed were slightly wider than the advertised $\frac{1}{4}$ ". Also, we used a Pro Template for this and strongly recommend that you use a

template of some kind. (See *photo C*.) Position the template fence to center the gains on the box and lid edges (excluding the $\frac{1}{8}$ " of reveal). Rout the gains a bit shallower than the leaf thickness so the leaves protrude very slightly. This will keep the lid from binding when you close it.

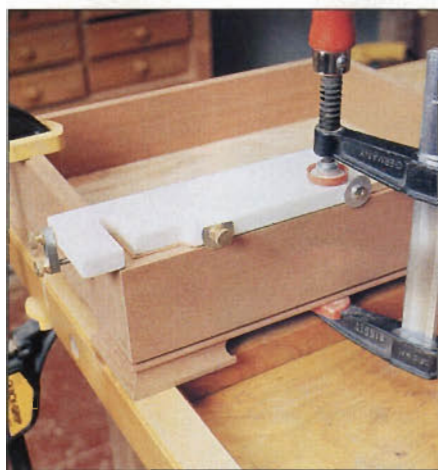


Photo C: Use of a template helps in routing the quadrant-hinge gains.

PRO TIP

To ensure that the hinge blade fits tightly against the forward or most visible edge of the gain, spot the screw's pilot hole off center toward the front of the hole. Then, drive this screw first so that it pushes the leading edge of the hinge snug against the gain. Then, drive the remaining screws.

Step 6. Mortise the hinge gains to create clearance for the built-in lid supports. (See the Exploded View details.) We used the drill press for this, then cleaned out the remaining waste with a chisel. Next, carefully drill $\frac{1}{16}$ " pilot holes for the tiny hinge screws. See the ProTip *above*. Attach the hinges to the lid, then to the box.

Add the Hygrometer Support, Lining, and Hardware

Step 1. For the hygrometer support (G), prepare a 3" square of $\frac{3}{4}$ "-thick mahogany or other stock. (See the Exploded View.) Cut a centered

hole through the support to friction-fit your hygrometer.

Step 2. Mount a $\frac{3}{4}$ " dado set on your tablesaw, and elevate it to cut a deep enough recess in the back face of the support to allow ambient air to circulate around the hygrometer. (We cut ours $\frac{3}{16}$ " deep.) Using a miter gauge and extension, cut a centered 2"-wide recess in the back of the support, leaving a $\frac{1}{2}$ "-wide strip along both edges. Turn the support 90° and repeat. This will leave a $\frac{1}{2}$ "-square foot at each corner. Now, final-sand the support.

Step 3. To make the case lining, first measure the interior, then rip $2\frac{5}{16}$ "-wide pieces for the box front, back, and sides (H, I) from $\frac{3}{16}$ "-thick Spanish cedar stock. Cut them to rough length, then sand or rout a full-radius round-over on one edge. (This becomes the top edge.) Miter the parts' ends to fit snugly in the box.

Step 4. Repeat these steps to make the corresponding parts for the lid (J, K) from $\frac{1}{16}$ "-wide material, but don't round the edge. Note: With these dimensions, the box liner should stand about $\frac{3}{16}$ " proud of the top edge of the box, but the narrow lid liner provides clearance for it. (See the Front View.)

Step 5. From your remaining Spanish cedar stock, glue up rough-dimensioned top and bottom panels (L). Cut them to fit, allowing $\frac{1}{4}$ " of clearance (overall) on the width and $\frac{1}{16}$ " on the length. Sand the panels, then adhere them to the lid and box with two or three dots of glue, centering them widthwise. Note: This clearance will allow the panels to expand in the humid interior.

Step 6. Friction-fit the front, back, and sides into the lid and box without adhesives. Glue the hygrometer support to the lid panel liner. Attach the humidifier mounts. (See the Exploded View for locations.)

Apply Finish

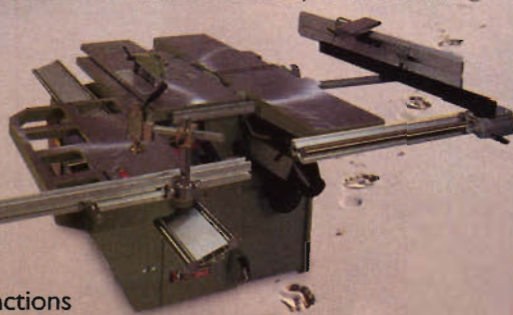
Step 1. Remove the hinges, then final-sand any parts of the case exterior that still need it. Remove all dust, then assemble the lid to the box. (The overlap of the lining will effectively mask the case interior during finishing.)

Continued on page 34

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Step 3. Reattach the hinges and reassemble the lid to the box. Install the hygrometer and humidifier. 

Photographs: StudioAlex, Kevin May

Project design: Dick Coers

Written by Doug Cantwell

Cigars courtesy of Paul's Pipe Shoppe, Peoria, Ill.

SOURCES

Spanish Cedar. Available in 3/16 x 4 x 24" boards. Catalog no. 124872, price \$3.50 each plus s/h.

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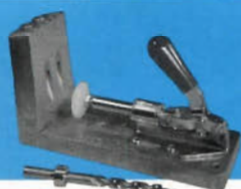
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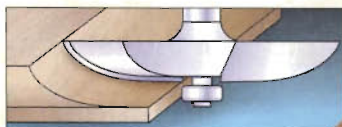
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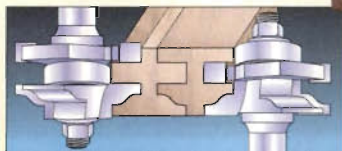
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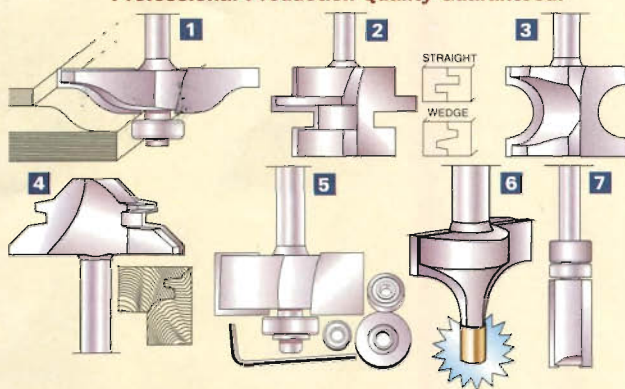


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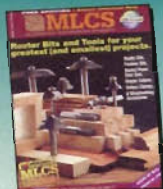
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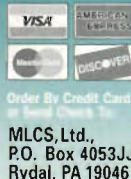
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PINE DISPLAY CABINET

Hone your hand skills as you craft this cabinetmaker's "sampler"

by Roger Holmes



Attention to proportion and detail is essential in a simple cabinet like this. The dovetails, through-wedged tenons, and bookmatched panels in the framed back catch the eye but don't overwhelm the pleasing proportions and understated appearance.

Part of the fun of woodworking comes from stretching our skills on challenging pieces. This small hanging cabinet incorporates several of the joints used in "finer" case pieces. The through dovetails joining the corners and through-wedged stub tenons that fix the internal dividers are mainstays of traditional cabinetmaking, valued today as much for their decorative qualities as for the strength and durability they offer.

Because this cabinet draws on a variety of techniques and skills, I like to think of it as a sampler, not unlike

the needlework sampler that hung on my grandmother's wall. As a young woman, she had carefully stitched a farm scene and its inscription, "God speed the plough," and in so doing had acquired a number of needleworking techniques that she would use for the rest of her life. As you work your way through the steps of making this cabinet, you'll also gain or refine skills that will serve you for years. And you, too, can hang your sampler on the wall as proof of your abilities.

Editor's Note:

Roger Holmes returns to the pages of *Woodworker's Journal* after a three-year leave, during which he wrote *The Complete Woodworker's Companion*, published by Watson Guptill in 1996. This project has been adapted by Roger from a chapter in his book.

I've tried to make the overall proportions coherent and have given the details special attention as well. The rails and stiles of the back, for example, appear identical in size to

those of the door frame. By running the horizontal rails the full width of the door, I found that they blended nicely into the lines of the back. Note also that the front shoulders of the door rails have been relieved slightly to accommodate a mitered bevel on the inner edge. Book-matched back panels catch one's eye from a distance, while neatly mitered chamfers on the case's front edge provide close-up interest.

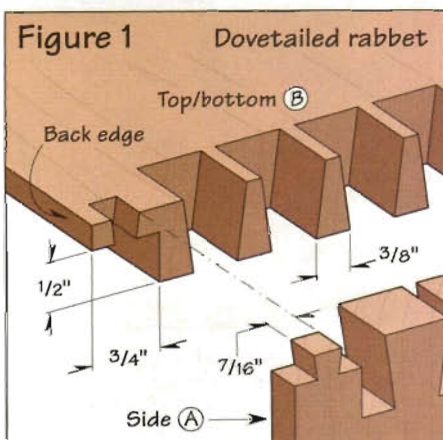
I made the cabinet from Ponderosa pine, which is relatively easy to work, though not inexpensive. Any close-grained hardwood such as maple, walnut, or cherry would work well, too. The coarser grain of oak or ash doesn't suit the scale of this piece, and if you're inexperienced, you'll probably find cutting joints in these woods more difficult.

Prepare the Case Parts and Cut the Mitered Dovetails

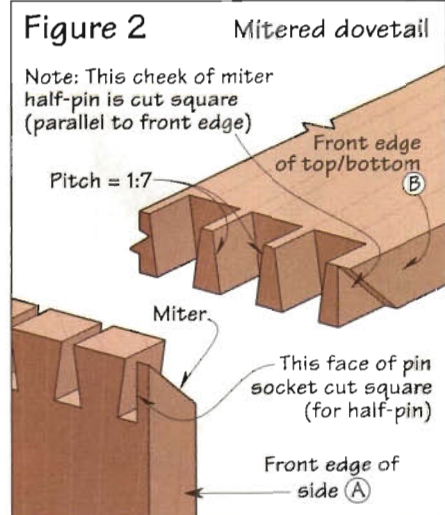
Step 1. Plane your stock to $\frac{3}{4}$ " thick for the case parts. Cut the sides (A) and top and bottom (B) to dimension. Then, select and mark an outside face and front edge on these parts. Cut the dividers (C) to the same length as the sides, but leave them $\frac{1}{4}$ " wider than finished width for now.

Step 2. Cut a $\frac{3}{4}$ "-wide rabbet $\frac{1}{2}$ " deep on the inside back edge of the top, bottom, and sides. (For location, see the Exploded View.)

Step 3. Lay out and cut mitered dovetails on the top, bottom, and sides, including the small dovetail that joins the rabbeted back edges, as described in the following steps. (See



the Dovetail Layout drawing and figure 1.) Note: Cut the miters last. When laying out the pins and tails, set your marking gauge to allow an extra



$\frac{1}{64}$ " of length so the joints can be planed flush after assembly.

Step 4. Cut and clean up the tails and pin sockets on the sides. Don't cut



Photo A: To fit the mitered front edge of the dovetailed case parts, drive the joint home without glue. Note the small dovetail that secures the rabbeted back edge.

BILL OF MATERIALS

PART	T	W	L	MTL.	QTY.
CASE					
A Sides	$\frac{3}{4}$ "	6"	22"	P	2
B Top/bottom	$\frac{3}{4}$ "	6"	36"	P	2
C Dividers*	$\frac{3}{4}$ "	5 $\frac{1}{4}$ "	22"	P	2
D Back rail—bottom	$\frac{1}{16}$ "	3 $\frac{1}{4}$ "	35 $\frac{1}{2}$ "	P	1
E Back rail—top	$\frac{1}{16}$ "	2 $\frac{1}{4}$ "	35 $\frac{1}{2}$ "	P	1
F Back stiles—middle*	$\frac{1}{16}$ "	4 $\frac{1}{4}$ "	16 $\frac{13}{16}$ "	P	2
G Back stiles—outer	$\frac{1}{16}$ "	2 $\frac{1}{4}$ "	21 $\frac{1}{2}$ "	P	2
H Back panel—center**	$\frac{3}{8}$ "	10 $\frac{1}{4}$ "	16 $\frac{3}{4}$ "	P	1
I Back panels—outer**	$\frac{3}{8}$ "	7 $\frac{1}{4}$ "	16 $\frac{3}{4}$ "	P	2
DOOR					
J Stiles*	$\frac{3}{4}$ "	1 $\frac{3}{4}$ "	20 $\frac{1}{2}$ "	P	2
K Bottom rail*	$\frac{3}{4}$ "	2 $\frac{3}{4}$ "	13"	P	1
L Top rail*	$\frac{3}{4}$ "	1 $\frac{3}{4}$ "	13"	P	1
M Fillets—sides*	$\frac{1}{4}$ "	$\frac{9}{16}$ "	16 $\frac{1}{2}$ "	P	2
N Fillets—top/bottom*	$\frac{1}{4}$ "	$\frac{9}{16}$ "	10"	P	2
O Catch*	$\frac{1}{2}$ "	$\frac{7}{8}$ "	1 $\frac{5}{8}$ "	P	1
P Knob*	$\frac{5}{8}$ "	$\frac{7}{8}$ "	1 $\frac{1}{4}$ "	P	1

*Parts cut to final size during construction. Please read all instructions before cutting.

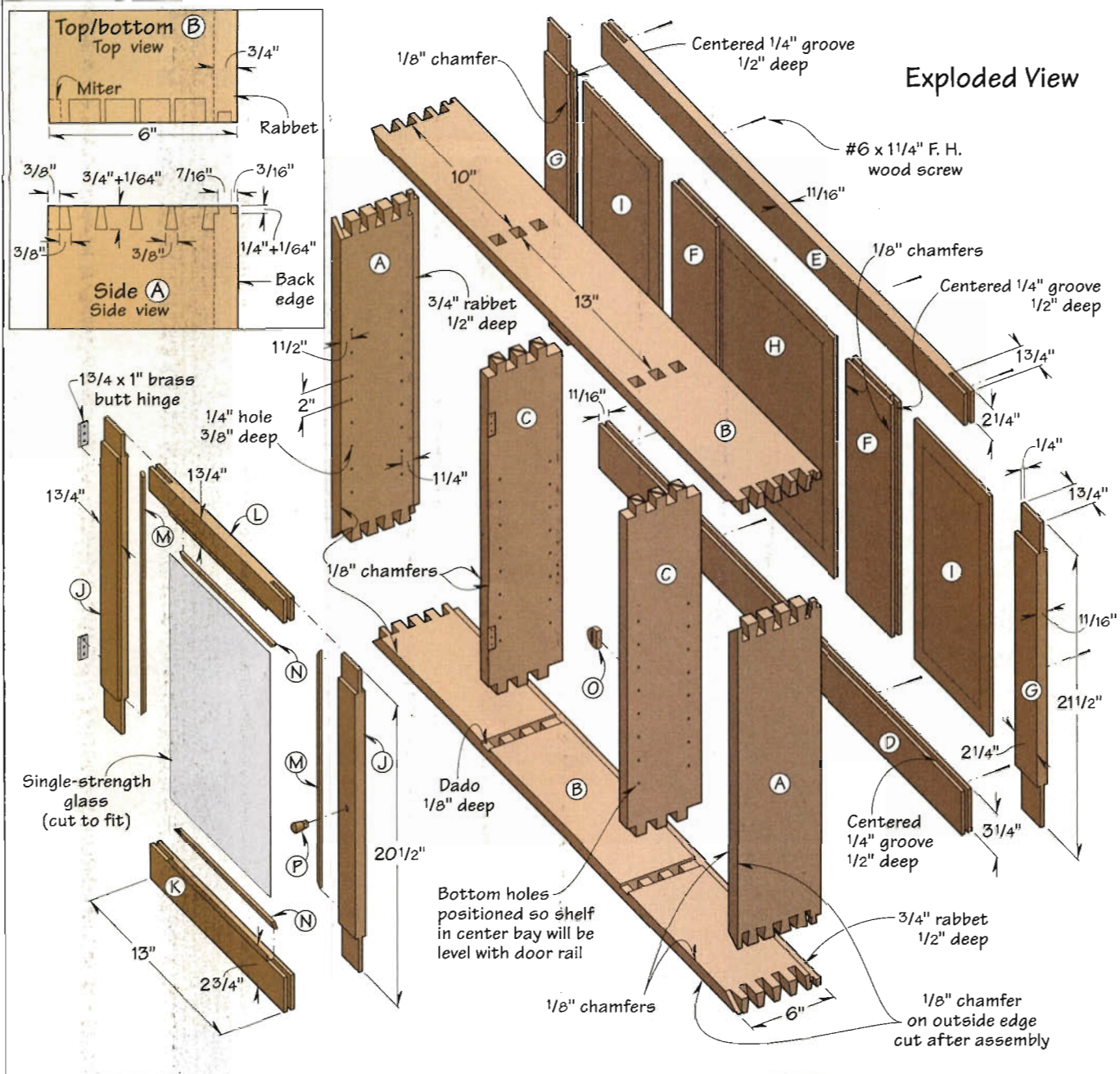
**Parts edge-joined from narrower stock.

MATERIAL LIST

P—Ponderosa pine
(or close-grained hardwood)

SUPPLIES

1 $\frac{1}{2}$ x 1" brass butt hinges (2); $\frac{1}{4}$ x $\frac{1}{4}$ x $\frac{7}{8}$ " magnets (2); #6 x $1\frac{1}{4}$ " flathead wood screws; #2 x $\frac{1}{2}$ " brass flathead wood screws; single-strength glass pane for door; $\frac{1}{4}$ " plate-glass shelves for center and outside bays; $\frac{1}{4}$ " brass rod for shelf supports.



the miter yet, because you'll need the full thickness of what I call the "miter strip"—the material at the front edge that will form the miter—to lay out the pins on the top and bottom.

Step 5. On the top and bottom, lay out the pins from the tails with a marking knife as you would for standard dovetail construction. Cut and clean up the pins and tail sockets. Note: As shown in *figure 2*, cut the outside cheek of the half-pin, next to the miter strip at a 45° angle, but do not allow the saw to break through the outer face of the top/bottom.

Figure 3 Through-wedged joint for dividers

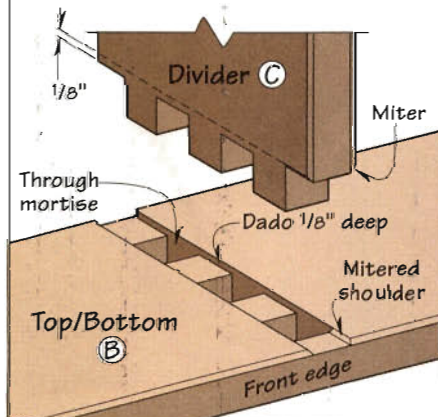


Photo B: Cut 1/8"-deep dados to seat the dividers. Square the shoulders of the full-width rear dado. Later, miter the shoulders of the narrow extension at the front to full width.



Photo C: Cut tenons on the dividers, then align the front faces of the parts and carefully knife the mortises on the dadoed (inside) face of the top/bottom directly from the tenons.

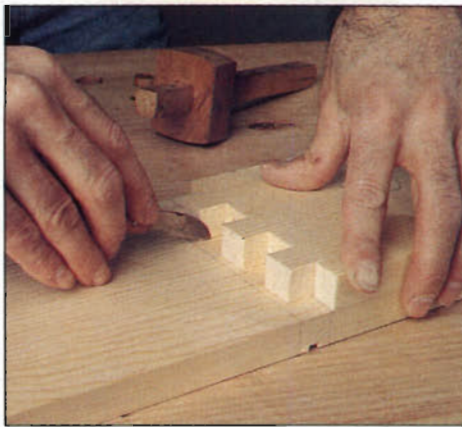


Photo D: Knife the divider tenons on the outside face of the top/bottom, keeping the front edges of the parts aligned.



Photo E: After boring holes to clear most of the waste, square up the mortises by chiseling from both faces of the top/bottom.

Step 6. Cut and fit the miters on the front edges of the mating parts. To cut them, I used a chisel and a simple shop-built 45° miter template. (See *photo F*.) To final-fit the miters, drive the (dry) joint completely home, something you wouldn't do with ordinary dovetails (*photo A*).

Cut the Divider Joints

Step 1. Lay out and cut $\frac{1}{8}$ "-deep dados in the inside face of the top and bottom to accept the dividers. (See the Exploded View and *figure 3*.) Stop the full-width dado $\frac{5}{8}$ " from the front edge (*photo B*). From this point forward, cut a narrower dado of the same depth, approximately $\frac{3}{8}$ " wide and centered on the wider dado. You'll miter the shoulders of this section to finished width later. I routed

out most of the waste using a small straight bit, then cleaned up the dados with a chisel.

Step 2. Lay out and cut tenons on the divider ends, allowing for the depth of the dados. (See *figure 3* for dimensions.) Index the layout from the front edge of the divider. Again, add an extra $\frac{1}{64}$ " of length to the tenons so you'll have a bit to plane flush after assembly. I cut the tenon cheeks with a backsaw, cleared the waste with a coping saw, and then cleaned out the sockets with a chisel.

Step 3. Carefully lay out through mortises in the top and bottom dados to accept the divider tenons (*photos C, D*). Align the front edges of the parts precisely, then knife the mortises directly from the tenons onto both faces. Bore holes to clear out most of the waste, then chisel

carefully from both faces to square the mortises (*photo E*). Don't be too concerned if the joint doesn't dry-fit as tightly as a dovetail; the wedges will spread the tenons and close small gaps.

Step 4. Miter the shoulders of the narrow dados you roughed out earlier at the front edge of the top and bottom (*photo F*). Use a chisel and miter template for this, taking thin shavings until you reach the full width of the square-shouldered part of the dado. Rest the chisel flat on the template for the final paring cuts. On the ends of each divider, carefully miter the front edge to fit these mitered dados (*photo G*).



Photo F: Miter the shoulders in the front section of each dado using a chisel and 45° template. Clamp the template in place and take thin cuts until the chisel rests flat on the template.

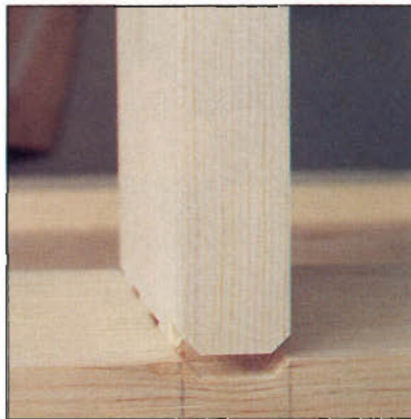


Photo G: Miter the front section of each divider end to fit the mitered dado. Then chamfer the front edges of the parts to create beveled miters.



Photo H: This detail of the completed cabinet shows the through-wedged tenons (planed flush) and $\frac{1}{8}$ " chamfers on both the inside and outside front edges.

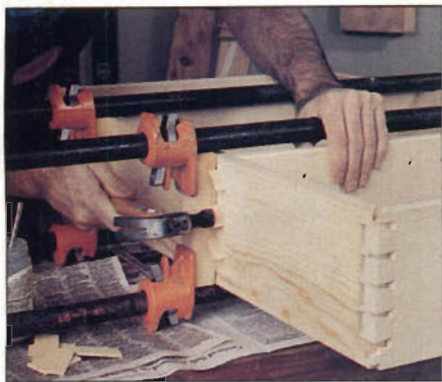


Photo I: Assemble the dividers to the top and bottom, then drive the sides part way on without glue to help square the assembly. Draw the dividers tight, then drive wedges into the tenons.

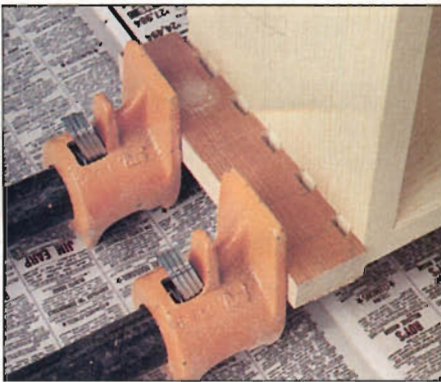


Photo J: When assembling the sides to the top/bottom, use clamp blocks that straddle the slightly protruding dovetail pins.

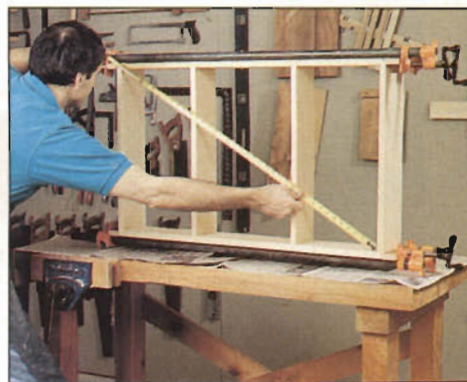


Photo K: Check the assembled case for square by measuring it diagonally, then adjust the clamps as necessary to square it.

Assemble the Case

Step 1. Rip the dividers (back edge) to align flush with the rabbet on the top and bottom. Cut a $\frac{1}{8}$ " chamfer along the inside front edge of the top, bottom, and sides and both front edges of the dividers. Note: This will bevel the mitered divider joints, so make sure the chamfer widths equal the depth of the dadoes that seat the dividers.

Step 2. Using a template, drill uniformly spaced $\frac{1}{4}$ " holes about $\frac{3}{8}$ " deep for shelf supports in the sides and dividers. (See the Exploded View for dimensions.) On the inside divider faces that form the center bay of the case, position the lowest set of holes so that the top of the glass shelf will sit level with the top of the bottom door rail. I touched the rim of each hole with a countersink to form a small chamfer for easier pin insertion.

Step 3. Using a backsaw, cut diagonal full-depth kerfs in the divider tenons. To make wedges for these kerfs, cut several $\frac{3}{4}$ "-long strips from the end of a piece of stock. Stand these on end and bevel-cut them on the bandsaw to a maximum thickness that is two to four times the width of the saw kerf. Cut the 12 wedges to fit with the long grain running lengthwise. (See *photo H*.)

Step 4. Final-sand the inside faces of the case parts. Next, glue and assemble the dividers to the top and bottom (*photo I*). Apply clamps with cauls to draw the dividers tight, but use only light clamping pressure and leave the tenons unobstructed. Drive the sides part way on (without glue) to help square the assembly. Measure diagonals to check for square. Now, apply glue to the wedges and drive them into the tenon kerfs.

Step 5. Remove the clamps, then

glue and assemble the sides to the assembly. Clamping cauls that straddle the dovetail pins make this job easier (*photo J*). Check for square, and adjust the clamps to square the case if necessary (*photo K*). Allow the glue to dry.

Step 6. Trim the wedges flush with the tenon ends using a small saw and chisel. Then, plane the joints flush with the exterior faces of the case (*photo L*). To support the case, I cantilevered three boards off the benchtop using clamps. Now, cut a $\frac{1}{8}$ " chamfer around the outside front edge of the case.

Prepare the Back Frame Parts

Step 1. Plane stock for the back rails, outer stiles, and middle stiles to $\frac{1}{16}$ " thick. Cut the rails (D, E) and middle stiles (F) to dimension. Rip the outer stiles (G) to width, but leave them $\frac{1}{2}$ " longer than finished length for now.

Step 2. Cut a centered $\frac{1}{4}$ "-wide groove $\frac{1}{2}$ " deep in the inside edge of the rails and outer stiles and both edges of the middle stiles.

Step 3. Cut centered $\frac{1}{4}$ "-wide mortises in the ends of the back rails for simple bridle joints. Remember to allow for the groove, which will reduce the width of the stile tenon. (See the Exploded View for dimensions.) Next, cut mating tenons on the ends of the outer stiles. Check for fit.

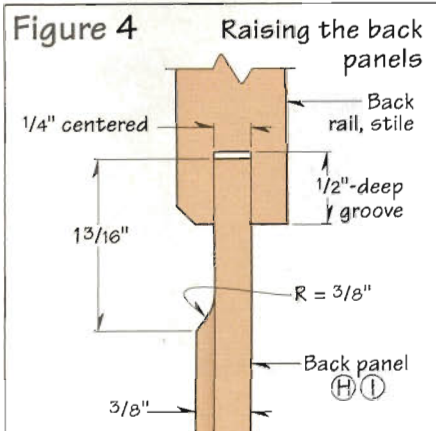
Step 4. Dry-assemble the back frame (D, E, G). Measure its interior



Photo L: Plane the joints flush with the exterior faces. To support the case for planing, author cantilevers three boards from his bench.



Photo M: Cut bridle joints on the rail and stile and stub tenons on the middle stiles. Make the shoulder-to-shoulder length of the middle stiles match that on the outer stiles.

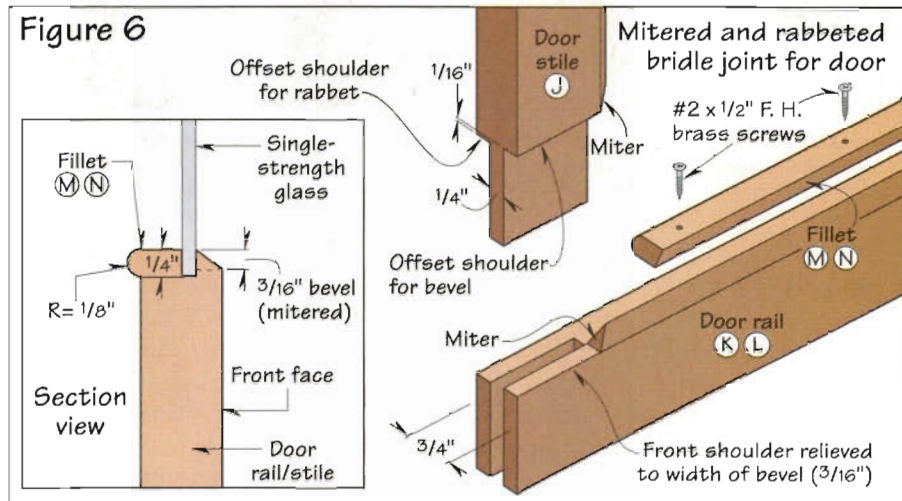
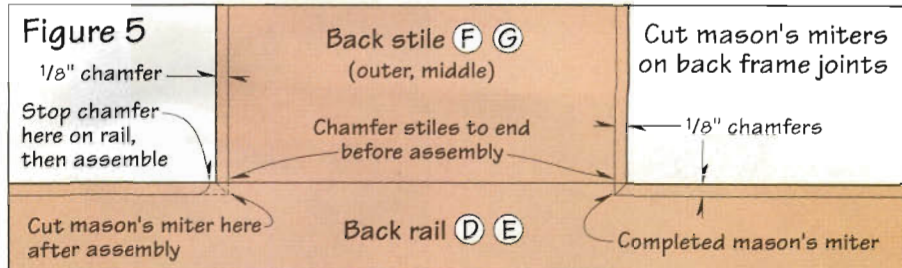


width (height), including the depth of the grooves. Subtract $\frac{1}{8}$ ", then cross-cut the middle stiles to this length. Cut stub tenons on the ends of these stiles, making the shoulder-to-shoulder length exactly the same as on the outer stiles. Cut the tenons thick enough to fit snugly in the rail grooves and $\frac{1}{16}$ " shorter than groove depth so they won't bottom out at assembly (*photo M*). Check for fit.

Make the Back Panels

Step 1. With the back frame dry-assembled, measure for the middle panel and two outer panels, including the groove depths. Size the panels $\frac{1}{4}$ " smaller in width and $\frac{1}{8}$ " in length to allow for expansion due to climatic conditions.

Step 2. To make book-matched panels, resaw and plane thick stock into pairs of pieces about $\frac{1}{2}$ " thick. Cut them to rough dimensions, then joint the mating edges. Edge-glue



and clamp the panels.

Step 3. Scrape off excess glue, then plane the panels to $\frac{3}{8}$ " thick. Rip and crosscut a center panel (H) and two outer panels (I) to finished dimensions.

Step 4. To field (raise) these thin panels, I first removed most of the waste with my tablesaw, then routed a partial $\frac{3}{8}$ " radius at the edge of the field with a core-box bit. (See *figure 4*.) Make sure that the tongue will fit the $\frac{1}{4}$ " groove snugly. Finish-sand the panels.

Step 5. Cut a $\frac{1}{8}$ " chamfer along the inside front edge of the outer and middle stiles. Chamfer this edge on

the rails as well, but for now stop the chamfers just short of the joints. You'll finish them with mason's miters after assembly.

Step 6. Dry-assemble the back frame with the panels. Adjust the fit as necessary, then glue and clamp the back, allowing the panels to float in their grooves without glue. Check for square.

Step 7. Plane the back frame joints flush using a hand plane. Now, finish the chamfer at each joint by cutting a neat mason's miter with a sharp chisel. (See *figure 5*.)

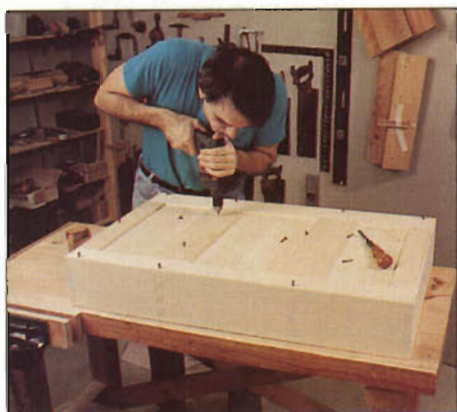


Photo N: Lay out divider centerlines on the middle stiles, then screw the frame-and-panel back into the rabbeted recess. Angle the screw holes slightly outward around the edge.

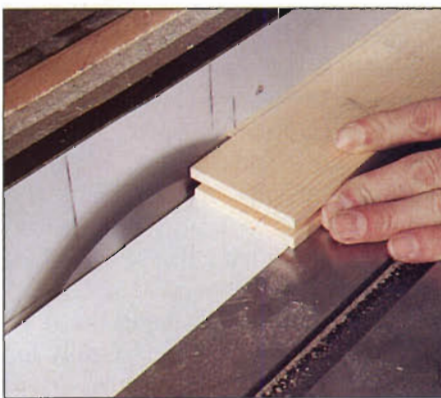


Photo O: Rabbet the door parts to accept the glass, then relieve the rabbeted shoulder on the rails to allow the rabbets on the stile and rail to meet in a miter. Marks on rip fence and work-piece indicate where to stop the cut.

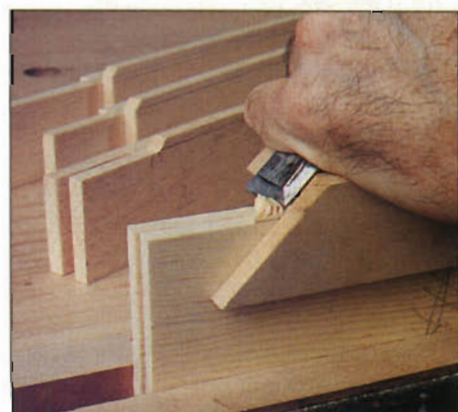


Photo P: Cut the miter at the new end of each rabbet shoulder using a sharp chisel and the 45° miter template. Take thin cuts so joints fit snugly when assembled.

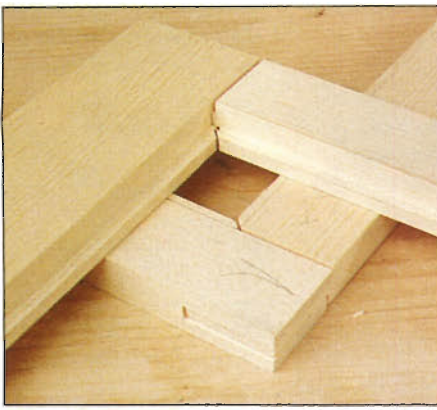


Photo Q: The partially assembled door parts on top show the rabbeted back face; those on the bottom show the mitered front face (before the bevel has been cut).

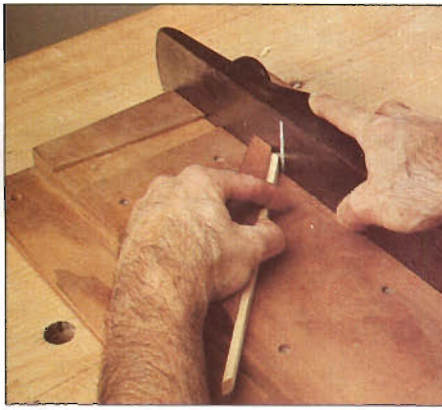


Photo R: Miter the glass fillets to fit the door rabbet. Author uses a hand plane and shooting board to miter the fillet ends.

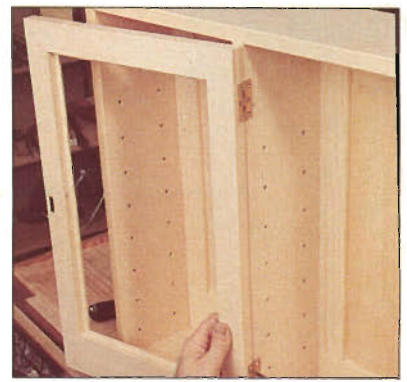


Photo S: Cut gains and attach hinges to door first, then position door flush with back edge of case chamfer to lay out hinge gains on the case divider.

Step 8. Fit the back into the rabbeted recess in the case. Mark the divider locations on the back faces of the stiles so you can position the screw holes. Drill and countersink shank holes for #6x1¼" flathead screws, angling those around the edges slightly into the corner of the rabbet (*photo N*). Remove the back until after applying finish.

Make the Door Frame

Step 1. Plane stock for the door stiles (J) and rails (K, L) to ¾" thick. Measure the center bay of the case. Rip the parts to finished width, but leave them ⅛" longer than finished length. Select and mark a front face and inside edge on each piece.

Step 2. Lay out and cut bridle joints on the stiles and rails. (See *figure 6*.) Adjust the tenon length (and mortise depth) so that the assembled parts, measured edge to edge, fit the case opening exactly. Note: Offset the tenon shoulders on the inside face of the stiles ⅛"—the difference between the depth of the rabbet and the cutaway for the miter. As you size the stiles and rails, remember to factor in the extra length you added earlier, which you'll trim off after assembly.

Step 3. Lay out and cut a ¼"-wide rabbet ½" deep on the back inside edge of the stiles and rails to accept the glass. Make sure that the rabbet shoulder aligns with the front of the mortise and tenon. Note: The rabbet will reduce the tenon width on the stiles.

Step 4. To prepare for the miter on the inside edge of the door frame, cut away ⅜" of the ¼" rabbet shoulder on both rails as shown in *figure 6*. This creates an overlap that permits the rabbet shoulders to meet in a miter. I used the tablesaw to cut away most of the waste (*photo O*). To leave enough material for the miter, stop this cut at least ¼" short of the width of the stile. Remember that the blade's arc produces a longer cut on the back face of the rabbet. To allow for this, mark the position of the blade's lead edge on the rip fence and the miter's location on the workpiece. Stop the cut when the two marks align.

Step 5. Using a sharp chisel and 45° template, miter the rabbet shoulder on the rails and stiles (*photo P*). Take thin cuts and trial-fit the parts as you make the final cuts so the mitered joints fit snugly and the assembled frame is square (*photo Q*).

Step 6. Lay out and cut a ⅜" bevel on the front inside edge of the door parts. (See *figure 6*.) I used a sharp block plane for this. Make sure the bevel's width equals the miter's depth. Again, test-fit the parts to make sure the bevels align at the mitered corners.

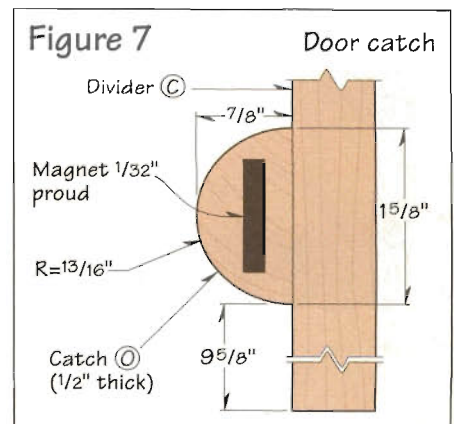
Step 7. Glue and clamp the door frame, then check the assembly for square. After the glue has dried, trim the protruding ends of the stiles and rails flush with the edges. If necessary, plane the door faces flush with a hand plane.

Install the Glass and Hang the Door

Step 1. Cut or order a pane of single-strength glass to fit the rabbet in the door. Allow no more than ⅛" clearance on all sides.

Step 2. To make the fillets or glass stops (M, N), surface a 28" length of stock to ¼" thick, then rip it to 3" wide. Round both edges to a ¼" radius. Fit the glass into the door, then measure for fillet width. Rip a strip from both edges of the blank wide enough that the radiused edge will stand proud of the door's back face.

Step 3. Miter both ends of the fillets to fit the rabbet. I used a hand plane and shooting board with a miter stop (*photo R*). Drill and countersink shank holes for #2x½" flathead brass screws in the fillets. Temporarily install the glass pane and fillets, then lay out pilot holes in the door frame by pressing a screw through each shank hole in the fillets. Remove the fillets and glass,



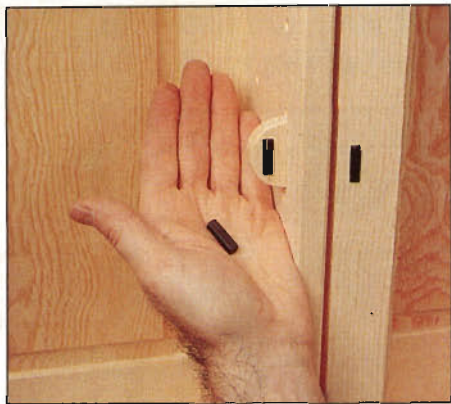


Photo T: Make a simple door catch using two small bar magnets. Mortise one into a semicircular block and the other into the door stile, allowing both to stand slightly proud.

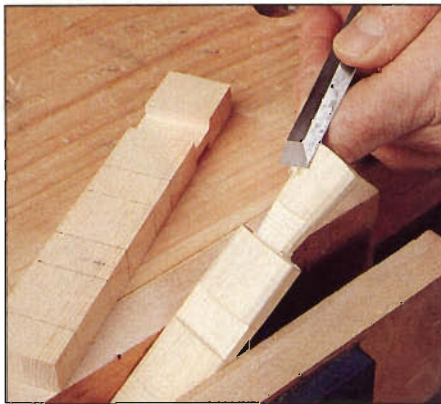


Photo U: To make the knob, cut dados in an oversized blank to form a tenon, then work the tapered oval cross section using chisels and fine files.



Photo V: Mortise the door stile to accept the knob tenon. This joint ensures a much more permanent attachment than fixing the knob with a screw.

and lay the glass aside for now. Drill the frame pilot holes where marked.

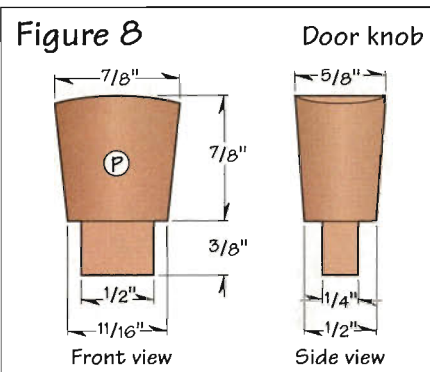
Step 4. Plane the door frame to fit into the case opening with as little clearance as possible. (You'll adjust the fit to final dimensions later.) Lay out and cut gains for $1\frac{3}{4} \times 1$ " brass butt hinges in the door stile where shown on the Exploded View. Keep in mind that the door must be set back slightly so that it aligns with the back edge of the chamfer on the cabinet front. Also, the center of the hinge pin must align with the cabinet face to allow the door to open completely.

Step 5. Drill pilot holes and attach the hinges to the door stile. Next, position the hinged stile in the door opening and align its front face with the back of the chamfer. (The door will fit snugly top to bottom, but the opposite stile won't clear the opening with the hinge attached.) Lay out and cut gains in the divider, then drill pilot holes and attach the hinges to the case (*photo S*).

Step 6. Remove the door, then plane the top and bottom rails and the stile opposite the hinges to create a small, uniform gap between the door and case. If you're working in the dry season, allow slightly more clearance to leave room for expansion. (You'll need to mount and remove the door several times during this fitting.)

Make the Catch and Knob

Step 1. To make the door catch (O), prepare a 2×6 " strip of $\frac{1}{2}$ "-thick stock. On this blank, draw a $\frac{3}{16}$ "-radius arc,



centering it $\frac{1}{16}$ " in from one edge to form the $\frac{7}{8} \times 1\frac{5}{8}$ " catch. (See *figure 7*.) Cut a mortise for a small bar magnet just deep enough so the magnet will stand $\frac{1}{32}$ " proud. Bandsaw and sand the catch to shape, but do not mount it yet.

Step 2. Lay out and cut a mortise for the mating magnet in the back face of the door stile, locating it so it aligns with the catch magnet (See *figure 7* and *photo T*). Epoxy the magnets into the mortises, orienting them so they attract each other.

Step 3. With the glass removed, hang the door and close it to establish the front-to-back position of the catch. Make sure the closed door face aligns with the back edge of the case chamfer. Position, glue, and clamp the catch to the divider.

Step 4. Prepare a $\frac{3}{4} \times 1 \times 8$ " blank for the door knob (P). Cut dados across both faces 1" from one end to form a $\frac{1}{4}$ "-thick, $\frac{1}{2}$ "-wide tenon. (See *figure 8*.) Using chisels and files, shape the knob to the dimensions shown (*photo U*). Final-sand the knob, then crosscut the tenon to $\frac{3}{8}$ " long.

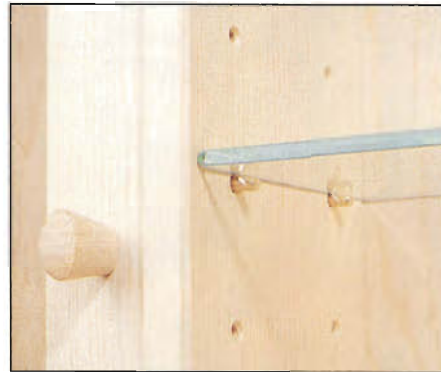


Photo W: This view shows the attached knob, chamfered support holes, brass-rod shelf supports, and fitted plate-glass shelf.

Step 5. Lay out and cut a centered mortise for the knob on the front face of the door stile (*photo V*). Glue the knob to the stile.

Step 6. Apply several coats of oil or varnish to all parts, scuff-sanding lightly between coats.

Step 7. Install the glass pane and fillets, then rehang the door. From $\frac{1}{4}$ " brass rod, cut $\frac{3}{4}$ "-long segments for shelf supports. Measure the cabinet bays, then have $\frac{1}{4}$ " plate-glass shelves cut and edge-polished to fit (*photo W*). Keep in mind that the shelves for the center bay must be narrower to clear the door.

Step 8. To hang the cabinet, drive flathead screws through the top rail of the case back and into the wall studs. As an alternative, use a keyhole router bit to cut blind pockets in the back face of the top rail to accept large round-head screws. Either way, make sure you drive the screws into studs. **W**

Photographs: Michael Farrell

Let your scrollsaw do
most of the work

CARVED PICTURE FRAME

by Patrick Spielman

Mix a little carving with some scrollsawing, and you can produce an eye-catching project without a lot of work. The sculpted edges and corners on Joan West's picture frame add depth and refinement, making it much more attractive than if she'd left it flat and square-cut. Before you dismiss the idea as too difficult, let me assure you that you'll find rounding over convex shapes easier than carving dished-out, concave surfaces. And you won't need a lot of fancy carving tools.

Designer Joan West combined scrollsawing and carving to produce this unique butternut picture frame.

Before You Start

The number one rule of carving: Keep your cutting tools sharp and properly honed. If necessary, consult a good tool-sharpening reference to learn the proper procedures, then take the time to grind and maintain sharp edges. To make this easier, don't sand until you've finished carving. Sanding grit left on the surface dulls cutting edges quickly.

If you're new to carving, start by working with a wood that carves easily. I like to work butternut, but I've found

pine, basswood, redwood, mahogany, and even walnut suitable for this type of work. Stay away from hardwoods like oak, ash, and maple; you'll find them much tougher to work.

Always keep safety in mind. Clamp the workpiece to a bench, make cuts by moving the knife away from your body, and keep your hands behind the tool's cutting edge. For best results, make vertical, grain-severing cuts first. Then, cut with the grain, working toward the vertical cuts by slicing out clean chips.

Another tip to remember: Keep some glue close by. If I accidentally slice off a piece of stock, I'll just glue it back in place and work around it until the glue has dried.

My slightly modified rendition of Joan West's butternut frame gives you a chance to try a couple of alternative techniques. You can form some areas by segmentation. (See the Pro Tip *opposite*.) Or, you can relief-carve the frame as one integral unit using a combination of hand and portable power tools.

PRO TIP

Scrollsaw segmentation makes it easy to round over or carve parts. Simply scrollsaw the object into segments—like puzzle parts, work these segments individually, and then reassemble them. You can round the edges of each segment, thin all or part of it, or do more complex relief-carving.

You may notice that the frame shown in the photo differs slightly from the one depicted by the pattern (page 46). I modified Joan's original plan to provide a larger rabbet around the back inside opening. Also, in order to meet page-size limitations, we had to scale the pattern down a bit, so that it won't accept a full 8x10" photo without cropping. If you're making the frame to fit a larger photo, simply enlarge the pattern to the required size on a photocopier and increase the size of the blank.

Prepare a Blank and Apply the Pattern

Glue up and clamp enough $\frac{3}{4}$ "-thick material to make a $10\frac{1}{2}$ x15" blank, or larger if making a bigger frame. I like to lay out my stock and arrange the pieces for best color and grain match first. Then, I'll chalk a large triangle across the good faces to ensure that I edge-glue the pieces in the same order (photo A). When you glue and clamp, apply the glue to

the mating edges carefully, then let any squeeze-out skin over before you try to remove it. I use a putty knife for this.

Make a copy of the full-sized frame pattern shown on page 46. I recommend that you photocopy the patterns and use the photocopier to enlarge or reduce the pattern's size. Remove most of the excess paper from around the pattern edge, then apply a light coating of spray adhesive and adhere it to the good face of your frame blank.

Drill start-holes through all inside openings. Scrollsaw the inside openings, but don't touch the outside edges yet. When sawing, cut on the line, working as accurately as you can. I also suggest that you save the large waste piece from the center cutout for carving practice before you start on the actual frame.

Turn the blank face down and lay out the $\frac{1}{4}$ "-wide rabbet as represented by the dashed line on the pattern. Next, fit a handheld router with a straight bit and guide bushing. Then, using a template, rout the rabbet $\frac{1}{4}$ " deep in the back. As an alternative, use a short pattern bit and follow a straightedge to cut the rabbet (photo B).

Note: I like to use a small router or laminate trimmer fitted with a clear plastic base for routing tasks like this. These small routers are easy to handle, and the transparent base gives you a much better view of the work.

Start Shaping the Face

Turn the blank face up. Using a crafts knife, cut away those areas of the paper pattern covering the flat surfaces around the inside opening. Next, install

HOW TO ROUND OVER WITH A ROUTER

Study the grain direction of the parts and locate the areas where short grain and otherwise weak, delicate appendages may be a problem.

Where possible, feed the router against the bit's rotation. This approach is safer, because it automatically pulls the bit into the work, pressing the pilot bearing against the workpiece at the same time.

Thin, narrow appendages—especially those that have short grain—can split or tear out when routed. To minimize this hazard, you may want to climb-cut some parts—that is, feed the router with the bit's rotation. For this technique, I generally prefer to use the old-style, high-speed-steel round-over bits that have small, integral pilots.

A round-over bit set for a shallow cut removes comparatively little material, so you should be able to hand-hold the router and physically resist its tendency to jump during a climb cut. However, if you still don't feel secure with climb-cutting, let these areas go for now and hand-work them later with files and carving tools.



Photo A: Edge-glue clear, straight-grained pieces to form the blank, arranging the pieces for best grain and color match. Note the clamp placement and ideal amount of glue squeeze-out.

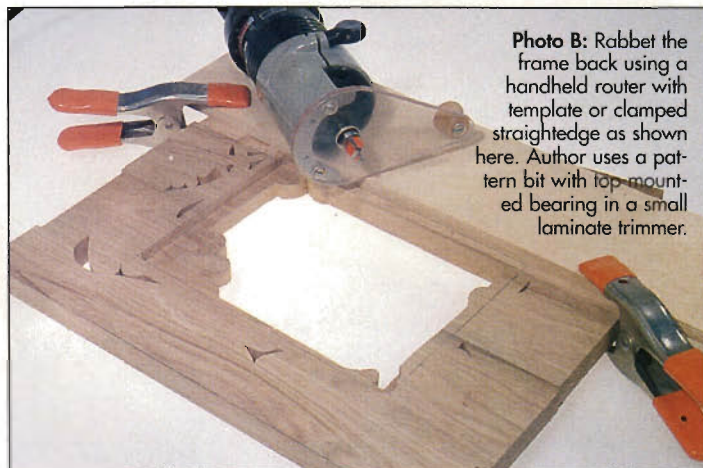
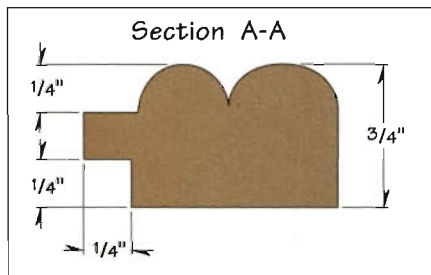
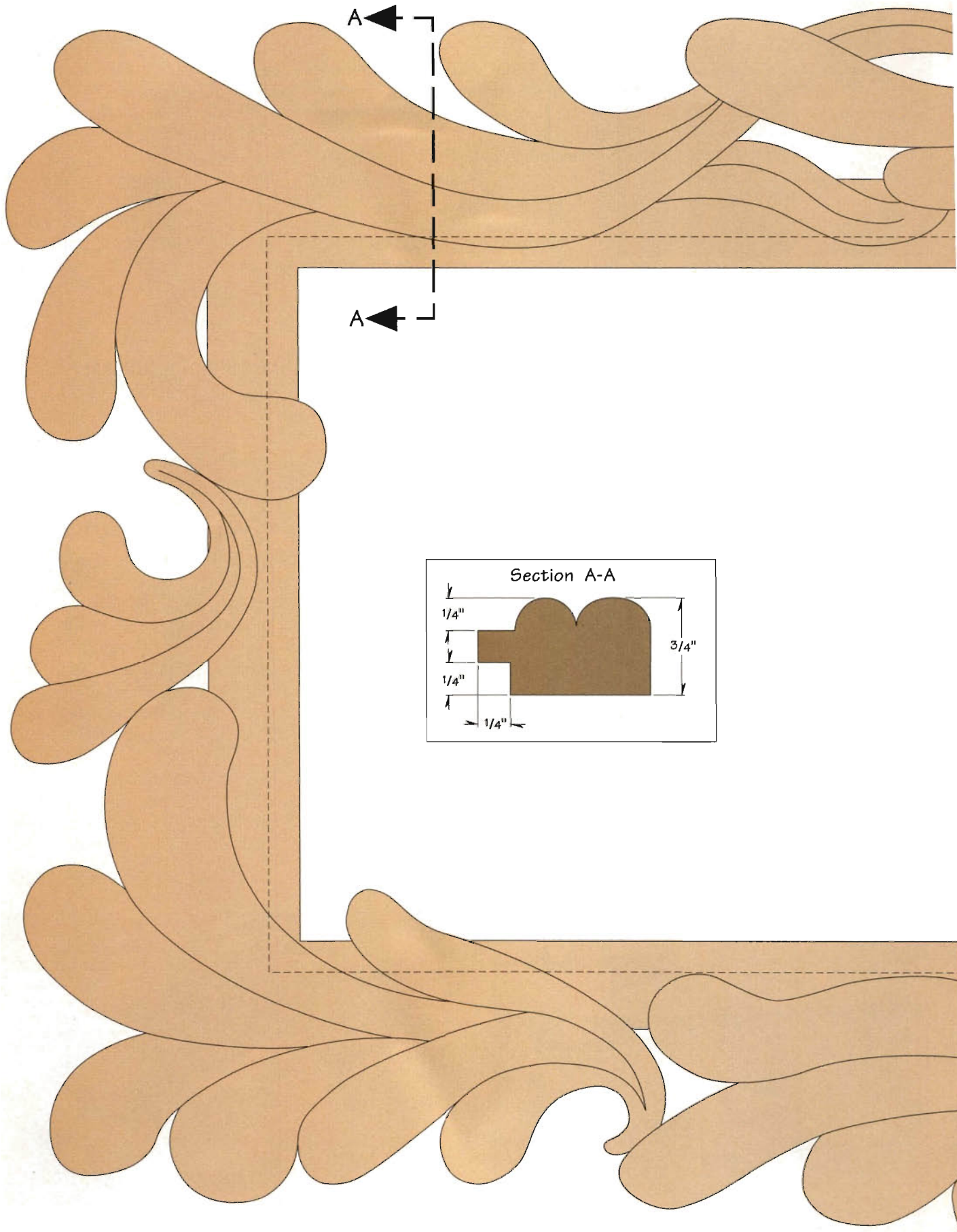
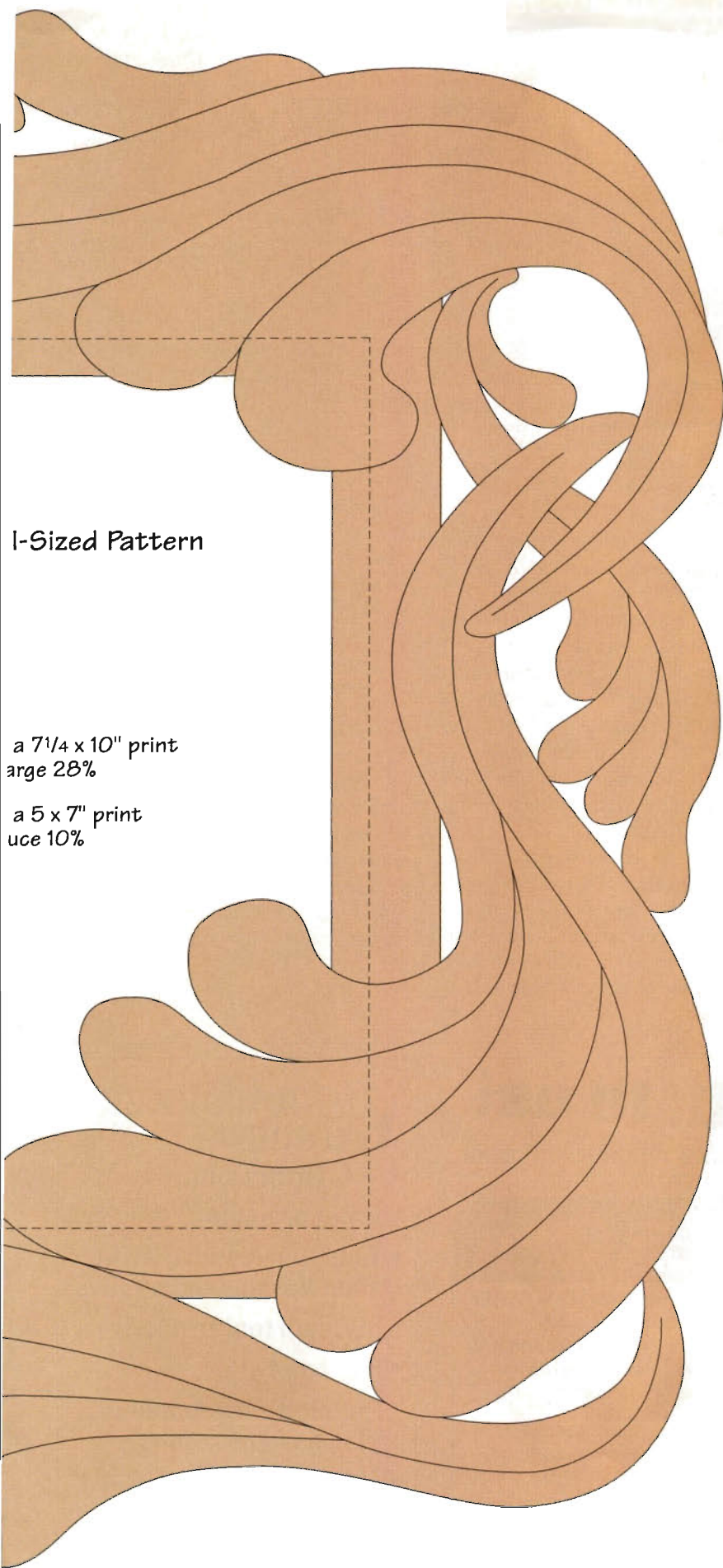


Photo B: Rabbet the frame back using a handheld router with template or clamped straightedge as shown here. Author uses a pattern bit with top-mounted bearing in a small laminate trimmer.





I-Sized Pattern

a 7 1/4 x 10" print
large 28%

a 5 x 7" print
scale 10%

a flat-bottom bit in your router and set it to cut 1/4" deep. Now, rout the waste from the larger, exposed areas (*photo C*). Use a smaller-diameter straight bit to rough-out the small, tight areas.

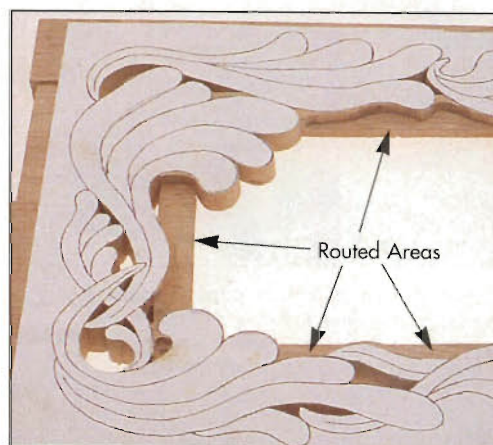


Photo C: Rout out the flat surfaces around the inside opening on the frame's front to 1/4" depth. Author uses a mortising bit to work the larger areas, a small straight bit to rout the smaller radii and other tight areas.

To practice your carving techniques, first sketch elongated teardrop shapes—both across and with the grain—on the waste piece from the center cutout. Practice making knife strokes in both directions on the piece to get a feel for how the wood works (*photo D*).

Scrollsaw the frame's outside profile to shape, keeping the blade on



Photo D: Practice your carving strokes on the large waste piece from the frame opening, making cuts both with and across the grain to shape the teardrops. Note author's use of the left hand to steady and guide the knife.

the line. Next, using a sharp X-Acto knife, cut along all remaining internal pattern lines to transfer them to the blank's face in case the pattern

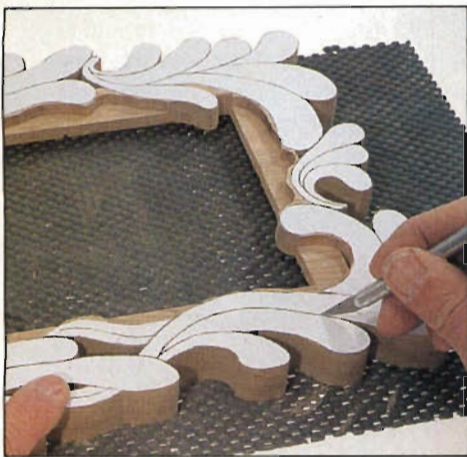


Photo E: Knife through the paper to transfer the inside pattern lines to the wood. This scores the pattern on the frame surface in case the paper pattern gets torn away during routing.

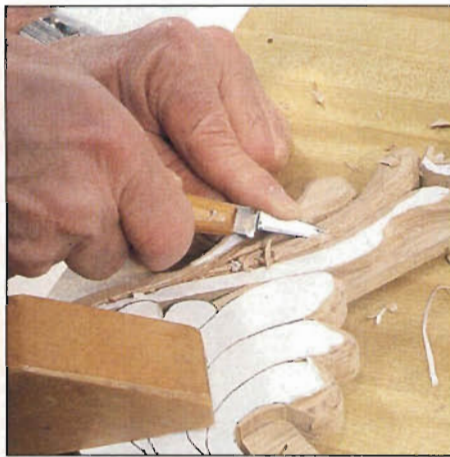


Photo F: After partially rounding the teardrops, use a sharp carving knife to finish shaping them. Start with vertical fiber-severing cuts, then make slanted slicing cuts. Begin each cut on the pattern line, then work deeper as you widen the cut.

tears loose during the next step (*photo E*).

Clamp the frame to your bench or work surface to keep it from moving. Fit your router with a small round-over bit, then rout whatever scroll-sawn edges you can with it. This will save some work and will also give you a rounded reference to carve to. For more information on rounding over scrollsawn edges, see "How To Round Over With a Router" on *page 45*.

To start the carving work, make deep vertical knife incisions following the knife or pattern lines. Slant your knife and make long slices, working toward the deeper areas. Always note the grain direction, and carve with the grain (*photo F*). In

those areas where one part overlaps another, aim for $\frac{3}{16}$ " to $\frac{1}{4}$ " of relief between the two layers.

Where the segments or fingers are too wide to round properly, gouge out or cut smaller concave channels to avoid leaving any flat areas. Shift the workpiece as necessary to keep the knife-slicing cuts running with the grain. Also, hone and strop the knife edge frequently to keep your cutting edge razor-sharp.

After you've completed all of the knife work, sand the wood to smooth and refine the contours. I wrap the abrasive around small blocks and lengths of dowel—this makes it easier to smooth the surfaces to a pleasing final shape.

Next, apply a finish. I prefer to use a satin finish without stain on carved work. Glossy finishes and stain tend to accentuate knife marks, torn grain, sanding scratches, and other surface flaws.

Cut a piece of $\frac{1}{8}$ "-thick double-strength glass to fit snugly in the frame rabbet, and clean it thoroughly. Next, size your photo (and mat if you elect to use one). From $\frac{1}{8}$ "-thick hardboard or plywood, cut a back to fit. Then, secure the glass, mat, photo, and back in the rabbet with small brads. Center a sawtooth hanger on the frame back and nail or screw it in position. Your frame is now ready to hang.

If you'd rather display the frame on a desk or dresser, you'll need an easel back. Ready-made easels can be purchased at most art-supply stores. Simply adhere the easel to the frame's back. *WJ*

*Project design: Joan West
Lead photograph: StudioAlex
Other photos: the author*

This project was prepared from an article in Patrick Spielman's Home Workshop News, a bimonthly publication devoted to scrollsawing projects, patterns, and tips. To subscribe or get more information, write the author at Spielman Publishing Company, P. O. Box 867, Fish Creek, WI 54212-0867.

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PRAIRIE-STYLE WALL SCONCE

DESIGN INSPIRATION FROM THE MASTER

One of the many advantages of being a woodworker is that you can build furnishings that aren't readily available.

Our designer/craftsman, Dick Coers, has long admired the unique lighting fixtures that Frank Lloyd Wright designed for the May House in Grand Rapids, Michigan. You can't buy these sconces—and they'd cost a fortune if you could—so Dick designed and built his own interpretation of them.



Our Prairie-Style wall sconce uses readily available electrical parts. The small stained-glass panes can be purchased at a stained-glass supply store.

Before You Start

While our sconce may look complicated, a quick scan of the Exploded View will reveal that we've used basic construction techniques. With a router and shop-built trammel, you can make the two rings and also cut the globe opening.

The electrical parts we used are inexpensive and easy to find. We purchased the glass globe, electrical socket, threaded lamp pipe, and electrical cord (part of a kit) at a home center and obtained the small panes of colored art glass from a local stained-glass supply store. Because the fit of the glass globe and hard-

board retainers in the base opening is critical, we recommend that you buy the globe first and use its actual dimensions to size the hole.

To minimize wood movement problems, Dick constructed the base plate from cherry plywood and edged it with $\frac{1}{8}$ "-thick solid stock for appearance. He made the remaining parts from solid cherry. This was his personal preference—other hardwoods would work equally well.

We suspect you'll want to make more than one of these sconces. If so, cut the required quantity of identical parts using the same setup before moving on to the next step.

First, Make the Base

Step 1. From $\frac{3}{4}$ " plywood, cut a $10\frac{1}{4} \times 11\frac{1}{4}$ " blank for the base (A). From solid $\frac{3}{4}$ "-thick stock, rip enough $\frac{1}{8}$ "-wide edge-banding to cover the front and side edges of the base. Fit, miter, glue, and clamp the edging to these edges as shown on the Exploded View. After the glue dries, trim the edging flush with both faces of the base.

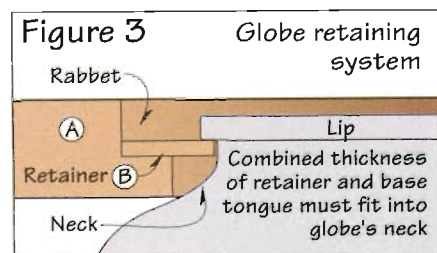
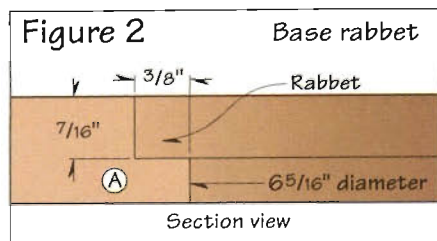
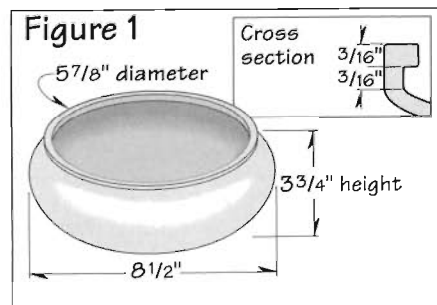
Step 2. Select the base's better face for the bottom. Lightly pencil a lengthwise centerline on this face, then intersect that line with a perpendicular line $5\frac{1}{4}$ " from the front edge. Using a plunge router, $\frac{1}{4}$ " straight bit, and

trammel, rout a $6\frac{5}{16}$ "-diameter hole centered on the point of intersection. To do this, set your router trammel carefully and test the setup on scrap first. Make several passes to cut through the plywood's full thickness.

Note: The size of this hole is critical to the fit of the glass globe and the globe's retaining system. (See *figure 1*. We purchased a white glass mushroom globe with a $5\frac{7}{8}$ "-diameter lip designed to fit standard 6" light fixtures.) If you purchase a globe with different dimensions, you'll need to resize both the opening and retainers.

Step 3. Rout a $\frac{3}{8}$ "-wide rabbet around the top inside perimeter of the hole as dimensioned in *figure 2*. Note: The rabbet depth depends on the actual thickness of your plywood base. Make the rabbet deep enough so that the combined thickness of the retainer and remaining base tongue will fit in the neck of the glass globe. (See *figure 3*.)

Step 4. On the top face, lay out centerpoints for two $\frac{3}{8}$ " holes $\frac{3}{8}$ " from the base's back edge. Space them 2" to the left and right of the lengthwise centerline. Using a Forstner bit and



BILL OF MATERIALS

WALL SCENCE

PART	T	W	L	MTL. QTY.
A Base**	$\frac{3}{4}$ "	$10\frac{1}{2}$ "	$11\frac{3}{8}$ "	CP 1
B Retainers*	$\frac{1}{8}$ "	8"	8"	HB 1
C Back	$\frac{3}{4}$ "	$5\frac{5}{8}$ "	$10\frac{3}{4}$ "	C 1
D Rings*	$\frac{1}{4}$ "	$9\frac{3}{4}$ "	$9\frac{3}{4}$ "	C 2
E Ring posts	$\frac{1}{2}$ "	$\frac{1}{2}$ "	$1\frac{3}{4}$ "	C 4
F Ring ribs	$\frac{1}{4}$ "	$\frac{3}{8}$ "	$1\frac{1}{2}$ "	C 8
G Frame—bottom	$\frac{1}{8}$ "	$\frac{1}{2}$ "	8"	C 4
H Frame—top	$\frac{3}{8}$ "	$\frac{1}{2}$ "	8"	C 4
I Frame posts	$\frac{3}{4}$ "	$\frac{3}{4}$ "	$1\frac{3}{8}$ "	C 4
J Socket block	$1\frac{3}{4}$ "	$1\frac{7}{8}$ "	$2\frac{3}{8}$ "	C 1

*Parts cut to size during construction. Please read all instructions before cutting.

**Dimensions include $\frac{1}{8}$ "-thick banding on front and side edges.

MATERIALS LIST

C—cherry
CP—cherry plywood
HB—tempered hardboard

SUPPLIES

#6x1 $\frac{1}{2}$ ", #8x1 $\frac{1}{2}$ ", #8x2 $\frac{1}{4}$ " flathead wood screws; #0 biscuits; 4" length of threaded lamp pipe; $\frac{1}{4}$ -lp threaded nut; glass mushroom globe (to fit standard 6" light fixture) one Make-A-Lamp light socket; 40-watt candelabra-type bulb; lamp cord (as needed); stained glass (cut to fit); single-strength glass cover for top frame (optional, cut to fit).

drill press, drill the holes to a depth just shy of breaking through the base's bottom face.

Step 5. Cut two $\frac{3}{4}$ " lengths of $\frac{3}{8}$ " dowel. Glue one in each hole, then sand them flush with the base's top face. Note: These cross-dowels provide solid stock for the screws to bite into when you attach the back to the base. The plywood end grain alone wouldn't provide enough holding power.

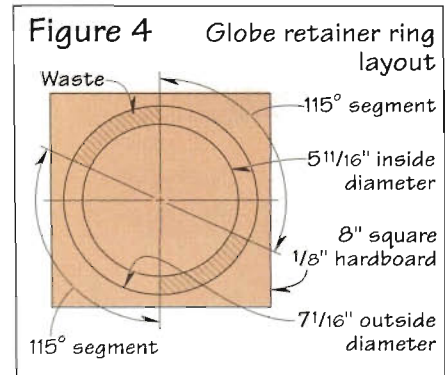
Step 6. Cut a $\frac{3}{32}$ " chamfer along the top and bottom edges of the base front and sides. This will leave about $\frac{1}{32}$ " of edge-banding along both faces to ensure that you don't expose any of the plywood edge.

Cut the Retainers

Step 1. To make the globe retainers (B), first cut an 8"-square blank from $\frac{1}{8}$ " tempered hardboard. Using a compass, lay out concentric circles on the blank's face of $3\frac{17}{32}$ " radius ($7\frac{1}{16}$ " diameter) and $2\frac{27}{32}$ " radius ($5\frac{11}{16}$ " diameter). Next, divide the ring into two 115° segments as shown in *figure 4*.

Step 2. Bandsaw or scrollsaw the hardboard ring to shape, keeping the blade wide of the lines. Then, sand to the lines. Cut the ring into segments and keep the two 115° sections. Sand a $\frac{3}{4}$ "-long taper on opposite ends of the two segments.

Step 3. To check the retainers, insert the rim of the glass globe through the hole in the base from the bottom, then push the globe to one side of the hole. Stack the two segments with the tapered ends facing opposite directions (the end on the bottom piece should taper downward) and place them in the rabbet along-



Exploded View

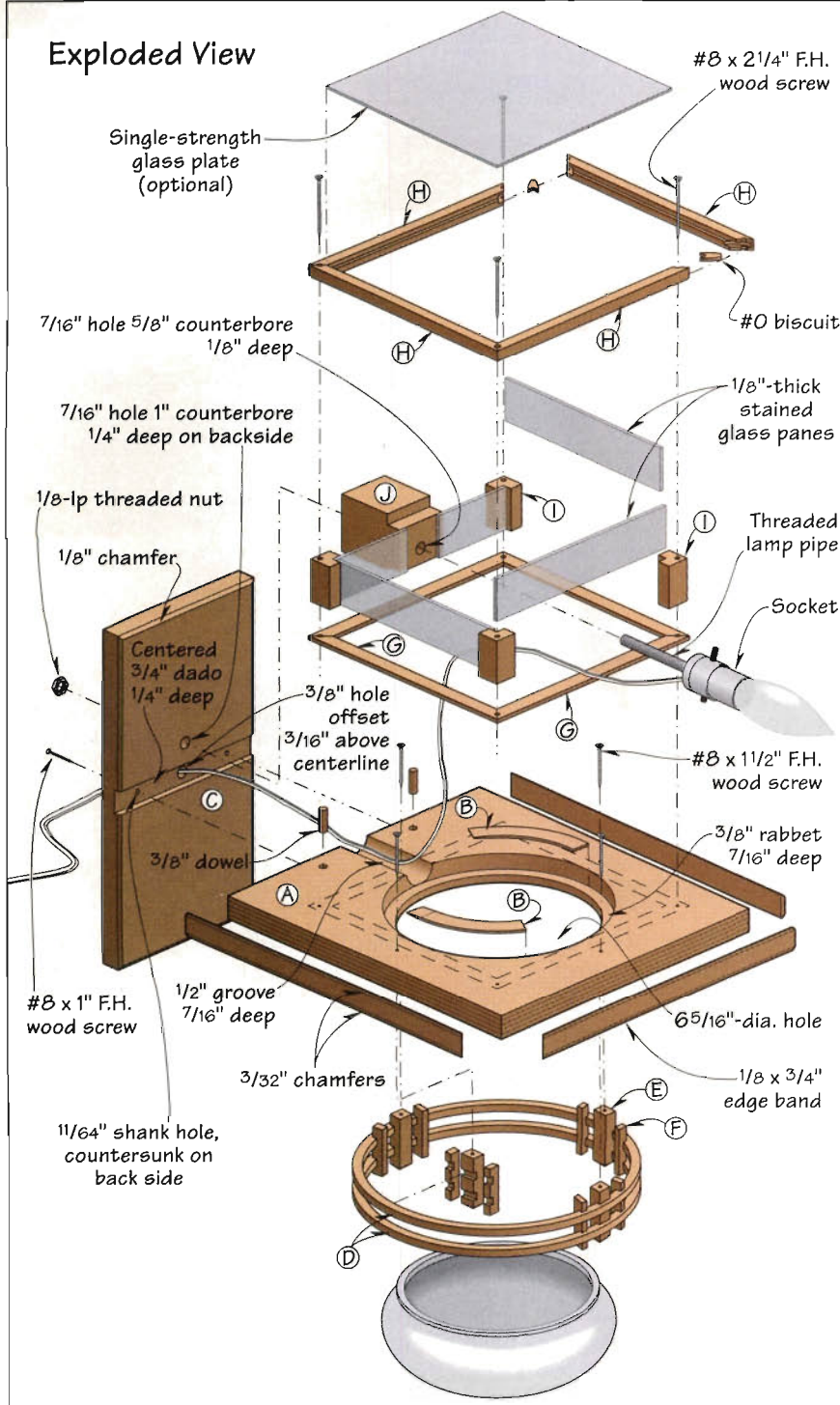


Photo A: Top view of the assembled scone without the glass cover. Note placement of the globe retainers, stained-glass panes, and light socket.

out and then cut a $\frac{1}{4}$ "-deep dado wide enough to match the base's thickness in the front face as dimensioned in *figure 5* and on the Side View drawing.

Step 2. On the opposite (back) face, lay out centerpoints for two $\frac{1}{64}$ " shank holes where shown in *figure 5*. Note: These screw holes must align with the cross-dowels glued into the base. Drill and countersink the holes.

Step 3. Lay out and drill a $\frac{3}{8}$ " hole through the back for the lamp cord. (See *figure 5* for location.) Next, drill a $\frac{7}{16}$ " hole to accept the threaded pipe. On the back face, counterbore this hole (1" diameter by $\frac{1}{4}$ " deep) for nut clearance. If you know where to

side the globe's neck. Next, push the globe toward the center while at the same time sliding the top retainer segment around the rabbet and under the lip of the globe. (See *figure 3*.) The segment should slide freely around the globe's neck, centering and holding it in place. If the segments don't slide easily, remove them and lightly sand the outside radius. See *photo A* for a view of the completed assembly. When satisfied with the fit, remove the

globe and retainers and store them in a safe place.

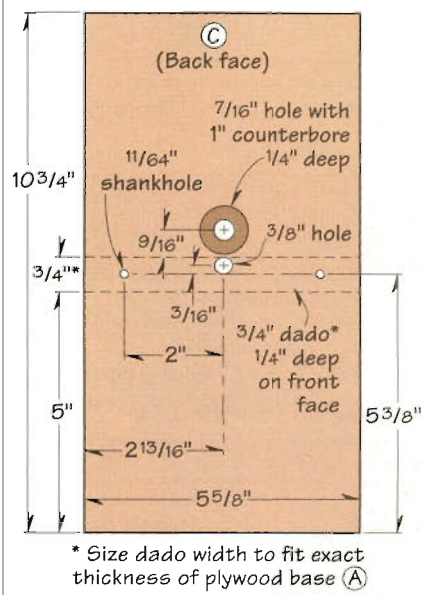
Step 4. Using a $\frac{1}{2}$ " core-box bit, rout a $\frac{3}{16}$ "-deep channel for the lamp cord in the base's top face where shown on the Exploded View.

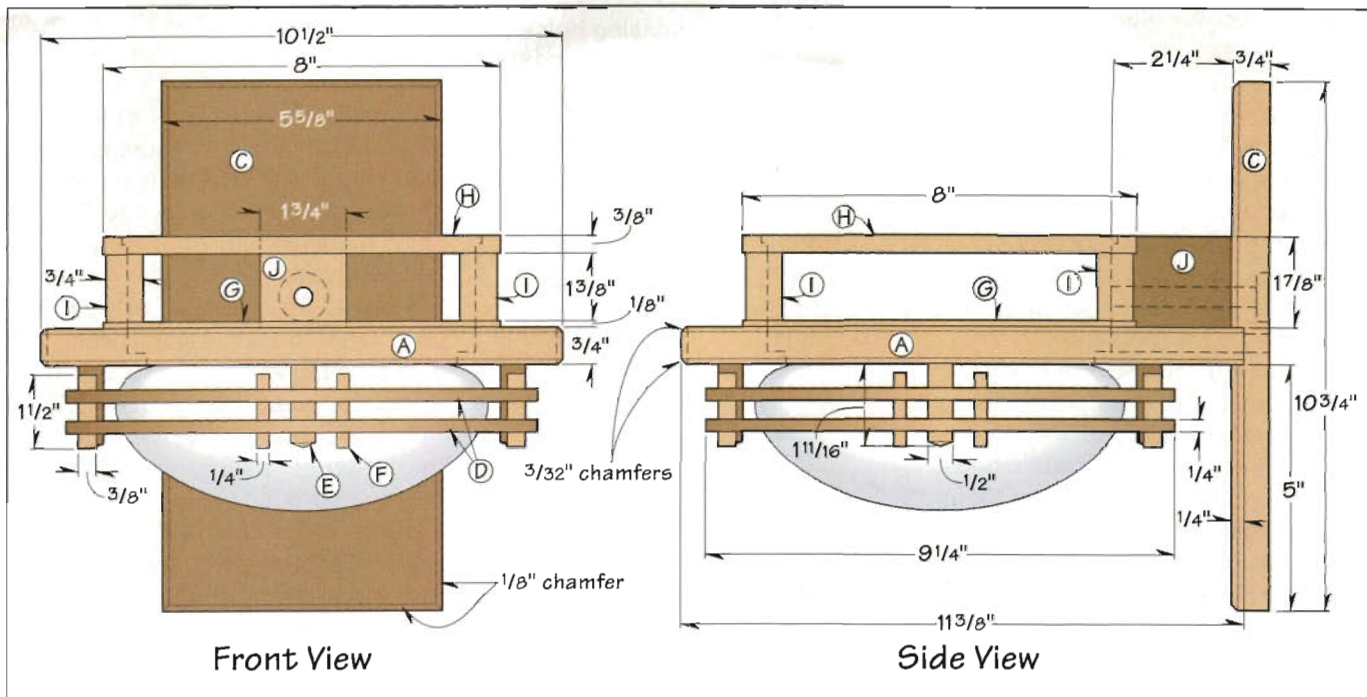
Prepare the Back

Step 1. From $\frac{3}{4}$ "-solid stock, cut the back (C) to dimension. Rout a $\frac{1}{8}$ " chamfer along the front edges. Lay

Figure 5

Back layout





position your wall-mounting holes, drill them now.

Make the Globe Rings

Step 1. To size the stock for the globe rings (D), first cut a $\frac{1}{4}$ " dado $\frac{1}{4}$ " deep in a piece of scrap. Use the dado as a thickness gauge in the following step.

Step 2. From solid stock, make two $9\frac{3}{4}$ "-square blanks for the globe rings. We recommend a single wide board for these parts. If you don't have material this wide, glue up narrow stock that matches in grain and color. Plane both blanks to fit snugly in the $\frac{1}{4}$ " thickness gauge you made in the previous step. Then, mark centerlines (both width- and lengthwise) on one face of both blanks to help you position the posts later.

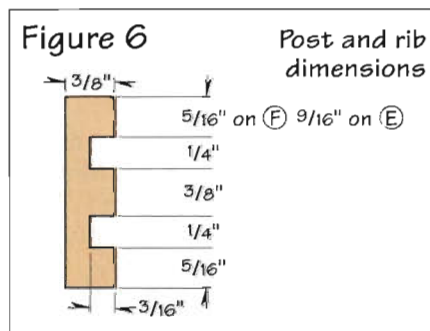
Step 3. Using a router with a tram-mel or modified base, cut a $4\frac{5}{8}$ "-radius disc from each blank, making two or three passes to reach full depth. This will form the outside edge of the ring. Next, cut the $4\frac{1}{4}$ "-radius inside edge of the ring. You should now have two $\frac{3}{8}$ "-wide rings with a $9\frac{1}{4}$ " o.d. and an $8\frac{1}{2}$ " i.d. Sand the ring edges, then lightly break the corners.

Step 4. To make the ring posts and ribs, cut two pieces of solid stock to these dimensions: $\frac{1}{2} \times \frac{1}{2} \times 12$ " and $\frac{1}{4} \times \frac{3}{8} \times 16$ ". Sand them smooth. Cut the shorter piece into four $1\frac{3}{4}$ "-long posts (E). From the longer piece, cut eight $1\frac{1}{2}$ "-long ribs (F).

Step 5. Mount a $\frac{1}{4}$ " dado head on your table saw and elevate it to cut $\frac{3}{16}$ " deep. Make sure its cutting width matches the $\frac{1}{4}$ " thickness of the gauge you made earlier. Using a sliding table and stop block, carefully cut the two dados in each post and rib as dimensioned in figure 6. Note: Use an eraser-tipped pencil or clamp to hold these parts during the cut.

Step 6. Set the miter gauge on a stationary disc sander at 20° from perpendicular, or clamp a fence to the table at this angle. Then, sand four facets on one end of each $\frac{1}{2} \times \frac{1}{2}$ " post to form a pyramid. Note: Take care that you don't shorten the posts as you sand. Do not sand the eight ribs.

Step 7. Using the centerlines that you penciled on the rings earlier, glue the four posts to both of the rings. (For uniform spacing, we positioned the left edge of each post on one of the lines.) Apply glue sparingly to avoid squeeze-out.



Step 8. From scrap, make a $\frac{3}{8}$ "-wide spacer and use it to position and glue a pair of ribs alongside each post. Note: To align the ribs tangent to the rings, keep the spacer snug between the parts on the back side. This will leave a slight gap between the spacer and parts on the front.

Step 9. Locate the hole centerlines you penciled earlier on the bottom face of the base. Place your ring assembly on this face and center the four posts on these lines. Note: Align the ring posts and ribs squarely with the base as shown on the Front/Side View drawings. Mark each post location, then find and mark the center of each of these "footprints." Drill a $\frac{9}{64}$ " shank hole through the base on each of the centerpoints. Countersink the holes on the top face.

Step 10. Position the ring assembly on the base's bottom face as before, and secure the posts in their marked locations using hotmelt glue. Invert the assembly, then drill pilot holes into the posts, using the shank holes as guides. Now, carefully drive $\#6 \times 1\frac{1}{2}$ " flathead screws through the base and into the posts.

Build the Glass Frame

Step 1. To make the bottom glass frame (G), first prepare a $\frac{1}{8} \times \frac{1}{2} \times 36$ " piece of stock. From it, face-miter four

8"-long pieces. Glue, clamp, and square the frame.

Step 2. To make the top glass frame (H), prepare a $\frac{3}{8} \times \frac{1}{2} \times 48"$ piece of solid stock. Cut a $\frac{1}{8}"$ rabbet $\frac{1}{2}"$ deep along one edge. From this piece, face-miter four 8" lengths (with the rabbet on the inside or short edge).

Step 3. Cut a partial #0 biscuit slot in the ends of the top frame parts where shown on the Exploded View. Use a fixture if necessary to safely cut the slots into the small parts. Then, glue, biscuit, clamp, and square the frame. Note: Let the biscuits extend inward into the frame and trim them flush with the frame edges. Then, using a chisel, clean up the corners of the glass rabbet.

Step 4. Stack the top frame on the bottom frame with the glass rabbet facing up. Then, drill a $\frac{3}{16}"$ shank hole at each corner, centering the holes $\frac{7}{32}"$ in from the outside edges. Countersink the holes in the top frame.

Step 5. For the glass corner posts (I), cut a piece of solid stock to $\frac{3}{4} \times \frac{3}{4} \times 12"$. Rout a $\frac{5}{16}"$ rabbet $\frac{5}{16}"$ deep along one edge. From this piece, crosscut four $1\frac{3}{4}"$ -long posts. Lay out and drill a $\frac{3}{16}"$ hole through each corner post where dimensioned in figure 7. Note: The offset hole centers in the posts will provide the desired reveal between the frames and the posts.

Step 6. Dry-assemble the glass frames and corner posts as shown on the Exploded View, then position the assembly on the base. Center the bottom frame $2\frac{1}{8}"$ from the back edge of the base, then attach the glass frame assembly by driving #8x $2\frac{1}{4}"$ screws through the top frame, posts, bottom frame and into the base. Note: Drive these screws carefully—the tapered heads will wedge the miters apart if overdriven.

Step 7. To make the socket-mounting block (J), cut a piece of 8/4 scrap to $1\frac{3}{4} \times 1\frac{7}{8} \times 2\frac{3}{8}"$. On one end, lay out and cut two rabbets as dimensioned in figure 8. Next, lay out and drill a $\frac{7}{16}"$ hole through the ends of the block. Counterbore the hole ($\frac{5}{8}"$ diameter, $\frac{3}{16}"$ deep) on the rabbeted end to clear the socket.

Step 8. Cut a $3\frac{3}{16}"$ length of threaded lamp pipe. Attach the lamp socket to one end of the pipe.

Figure 7 Locating holes in corner posts

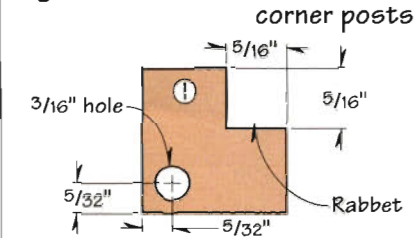


Figure 8 Socket-mounting block dimensions

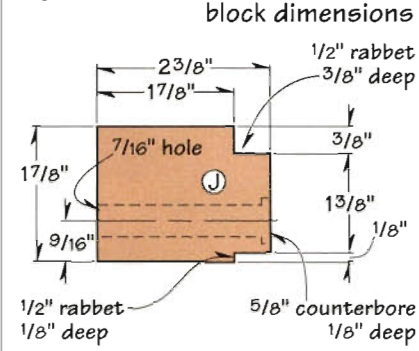
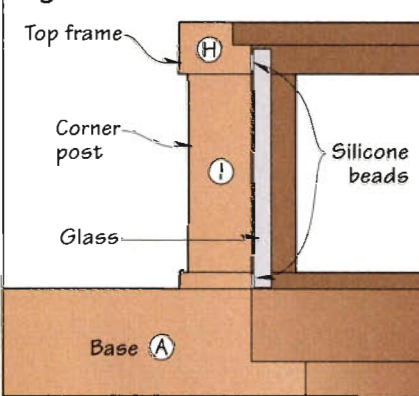


Figure 9 Placement of caulk



Step 9. Temporarily attach the back to the base. Trim the socket-mounting block to fit snugly between the glass frame and the back, removing any excess length from the unrabbeted end. Add the socket and pipe assembly to test-fit the parts.

Step 10. Disassemble the back from the base and remove the socket-mounting block. Finish-sand all parts, then remove the sanding dust.

Finish and Assemble The Sconce

Step 1. Apply your choice of finish. (We applied four coats of Minwax Satin Wipe-On Polyurethane.) After the finish has dried thoroughly, reassemble the wooden parts.

Step 2. Thread one end of the electrical cord through the back, base,

and socket cap. Attach the wires to the socket terminals, then snap the socket shell in place.

Step 3. Measure the inside of the glass frame and cut two full-length side panes, one front pane, and two shorter panes for the back to fit. (We sized the front and back panes to fit inside the side panes.)

Step 4. Apply a bead of clear silicone caulk to each frame corner and along the top and bottom edges, then install the glass. (See figure 9.) Hold the glass in place while the caulk sets by wedging strips of thin wood between opposite panes.

Step 5. To keep out dust, cut a single-strength glass pane to fit in the top-frame rabbet. For bright lighting, use clear glass. If you prefer a subdued light, use an opaque or colored pane. Lay this pane in the rabbet (without adhesive) after the caulk has cured.

Step 6. Mount the fixture. The best approach is to connect it to a permanent, wall-mounted junction box and wire it directly to an electrical circuit. If you prefer to use the fixture as a lamp, wire in a longer electrical cord, add an in-line switch, and attach a plug to the end if necessary. (We were not able to attach our sconce to an electrical junction box. Instead, we drilled two screw holes in the back for mounting to the wall studs, then counterbored the holes to accept $\frac{3}{8}"$ -diameter plugs. To make the plugs, we cut a 4" length of $\frac{1}{2}"$ -square stock, mounted it between centers on our lathe, and turned $\frac{1}{2}"$ -long, $\frac{3}{8}"$ -diameter tenons for two plugs. We then sanded the square end of each plug to a pyramid shape.)

Note: For electrical components, we used a Make-A-Lamp kit for bottles (marketed by Angelo). The light socket provided has a hole in the side of the socket cap through which you feed the cord. If you can't find this type of socket, use a conventional lamp replacement socket that brings the cord in through the socket base. With this type, you feed the cord through the threaded pipe. 

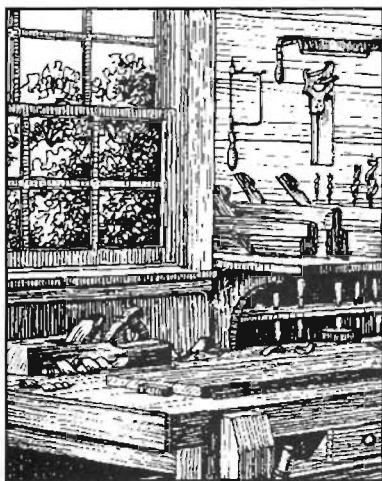
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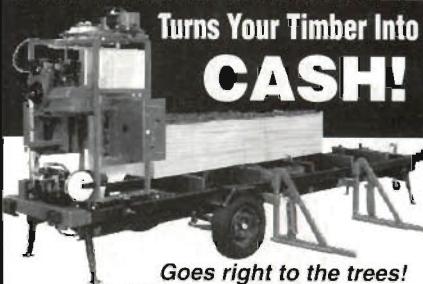


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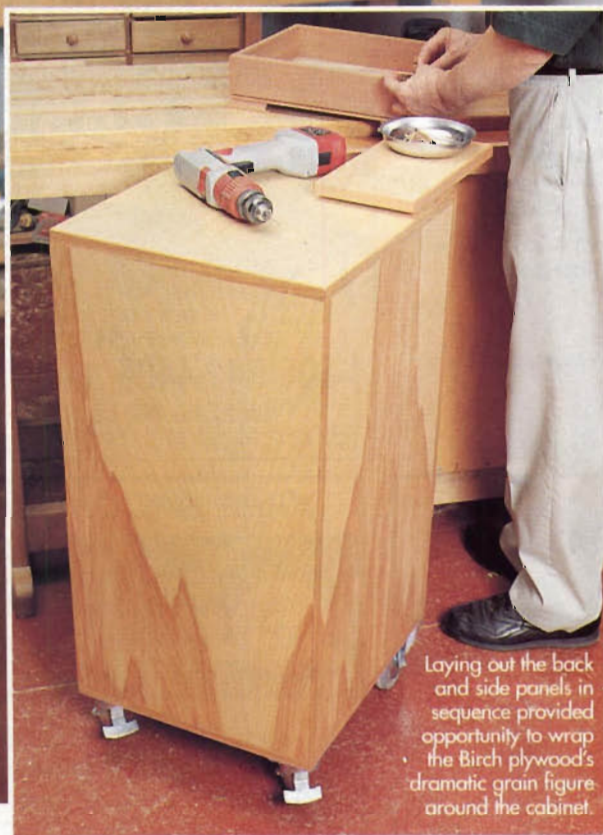
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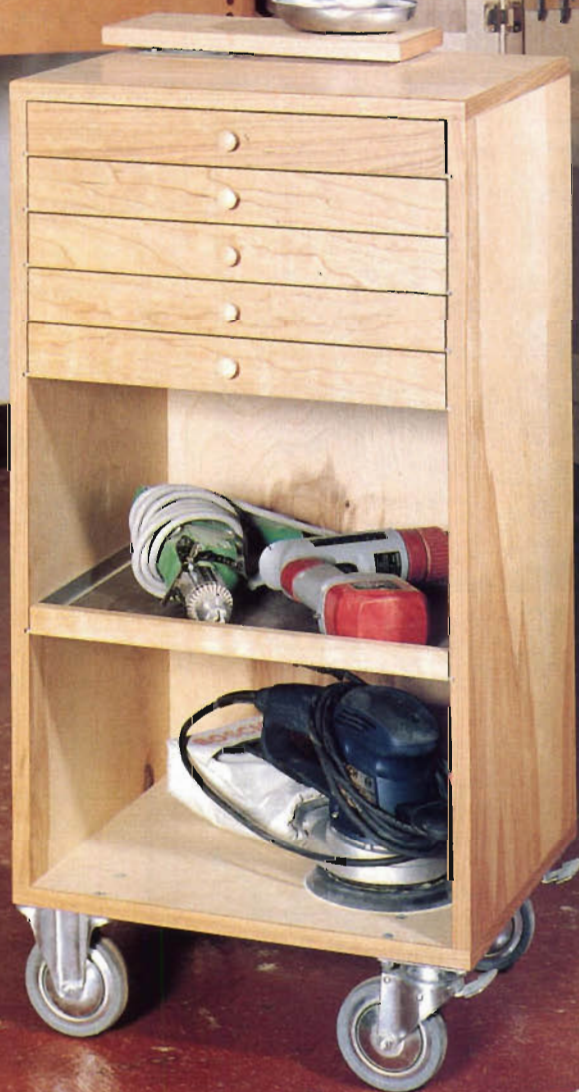
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Laying out the back and side panels in sequence provided opportunity to wrap the Birch plywood's dramatic grain figure around the cabinet.



Small parts can be a big hassle when they start spreading out across the shop. Yet most portable plastic storage bins don't have enough compartments to hold the variety of screws that woodworkers use, let alone the threaded inserts, dowel pins, biscuits, screwdriver tips, hex keys, and other assorted hardware we need.

If you've lost time rummaging through miscellaneous bins and cans, here's a solution. Our mobile caddy has five drawers with adjustable dividers that let you create 30 or more individual bins per drawer. To further

enhance its versatility, we fitted the caddy with a magnetic parts dish that sits on a rotating tray. Lest you think this is a time-consuming project for a master joiner, we made use of two recent hardware breakthroughs—aluminum drawer sides and drawer-divider holders—that simplify the construction process.

Before You Start

You can vary the design of the tool caddy to suit your own needs, but buy your hardware and plywood beforehand and measure their actual dimen-

sions. Note: We sized our cart, including the height of the casters, to be level with the top of our workbench. (To order the casters and other hardware we used, see Sources at the end of the article.)

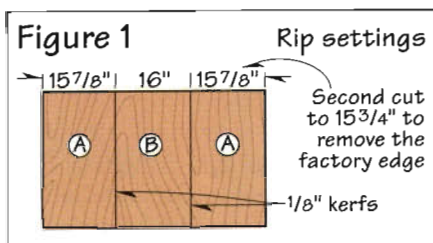
Since many hardwood plywoods commonly measure $\frac{1}{32}$ " less than the nominal thickness, remember to take this into account when calculating the panel dimensions. Ours measured $\frac{1}{32}$ " undersize so we had to cut the sides and back $\frac{1}{16}$ " wider.

As you'll note in the Bill of Materials, we've cut the sides and

back panels from birch plywood and used cherry stock for the drawer fronts and backs. This combination makes a handsome cabinet, but less costly materials will serve you just as well and could be substituted.

Size the Plywood and Edge-Banding

Step 1. To make the two sides (A) and back (B), first cut a 29 $\frac{3}{4}$ x 48" piece of $\frac{3}{4}$ " hardwood plywood. Rip this piece into three parts in side-back-side sequence to wrap the grain around the case. (See *figure 1*.) Then, rip the side pieces to 15 $\frac{3}{4}$ " wide, making these cuts on the factory edges.



Step 2. Rip at least 22' of $\frac{1}{8}$ "-thick, $\frac{13}{16}$ "-wide cherry edge-banding stock. For now, glue banding to the front edges of the two sides only. (For some tips on edge-banding, see the Builder's Note at *right*.)

Step 3. After you've trimmed the banding, crosscut the three plywood panels to the length listed in the Bill of Materials. Again, cut away the factory edge.

Step 4. To cut grooves for the runners on the aluminum drawer sides, mount a $\frac{1}{8}$ " blade on your tablesaw and set it to cut $\frac{1}{4}$ " deep. Cut a test groove in scrap plywood and test-fit the runners. If they fit too tightly, widen the groove just a hair as described in the Pro Tip on *page 59*. Cut the kerfs as dimensioned on the Exploded View drawing.

Step 5. Edge-band the back edges of the sides, then flush-trim the banding as before. Note: Do not allow the router bit's bearing to drop into the runner grooves. To avoid this, hold the bearing off the wood as it nears each groove. Then, sand the resulting bumps flush with a sanding block.

BILL OF MATERIALS

CADDY

PART	T	W	L	MTL.	QTY.
A Sides**	$\frac{3}{4}$ "	16"	29 $\frac{3}{4}$ "	BP	2
B Back	$\frac{3}{4}$ "	16"	29 $\frac{3}{4}$ "	BP	1
C Top, bottom**	$\frac{3}{4}$ "	16"	17 $\frac{1}{2}$ "	BP	2
D Parts tray	$\frac{3}{4}$ "	6"	12"	BP	2
E Drawer fronts*	$\frac{5}{8}$ "	2"	15 $\frac{5}{8}$ "	C	5
F Drawer backs*	$\frac{1}{2}$ "	2"	15 $\frac{5}{8}$ "	C	5
G Tool shelf front*	$\frac{5}{8}$ "	1"	15 $\frac{5}{8}$ "	C	1
H Tool shelf back*	$\frac{1}{2}$ "	1"	15 $\frac{5}{8}$ "	C	1
I Drawer/shelf bottoms*	$\frac{1}{8}$ "	14 $\frac{3}{8}$ "	15 $\frac{3}{4}$ "	HB	6
J Drawer dividers—long*	$\frac{1}{4}$ "	1 $\frac{3}{4}$ "	15 $\frac{3}{4}$ "	HB	4
K Drawer dividers—short*	$\frac{1}{4}$ "	1 $\frac{3}{4}$ "	14 $\frac{3}{8}$ "	HB	4

*Parts cut to fit during construction. Please read all instructions before cutting.

**Dimensions include $\frac{1}{8}$ "-thick edge banding.

MATERIALS LIST

BP—birch plywood
C—cherry
HB—tempered hardboard

SUPPLIES

#20 biscuits; #4 x $\frac{1}{2}$ " roundhead wood screws; #6 x $\frac{3}{4}$ ", #12 x 1 $\frac{3}{4}$ " flathead wood screws; $\frac{1}{4}$ x 1 $\frac{1}{4}$ " flathead machine screws with nuts, washers; #8-32 x $\frac{3}{4}$ " flathead machine screws; drawer knobs. (For other parts, see Sources at end of article.)

Assemble the Case

Step 1. Cut matching slots for #20 biscuits in the back and case sides where dimensioned on the Exploded View. To do this, first see "Use Edge-

Banding To Make Perfect Butt Joints" on *page 60*.

Step 2. Biscuit, glue, and clamp the sides to the back. Use cauls to distribute clamp pressure evenly and protect

Builder's Note:

In the course of applying miles of edge-banding over the years, I've developed an approach that delivers clean, accurate results. Here's how I do it.

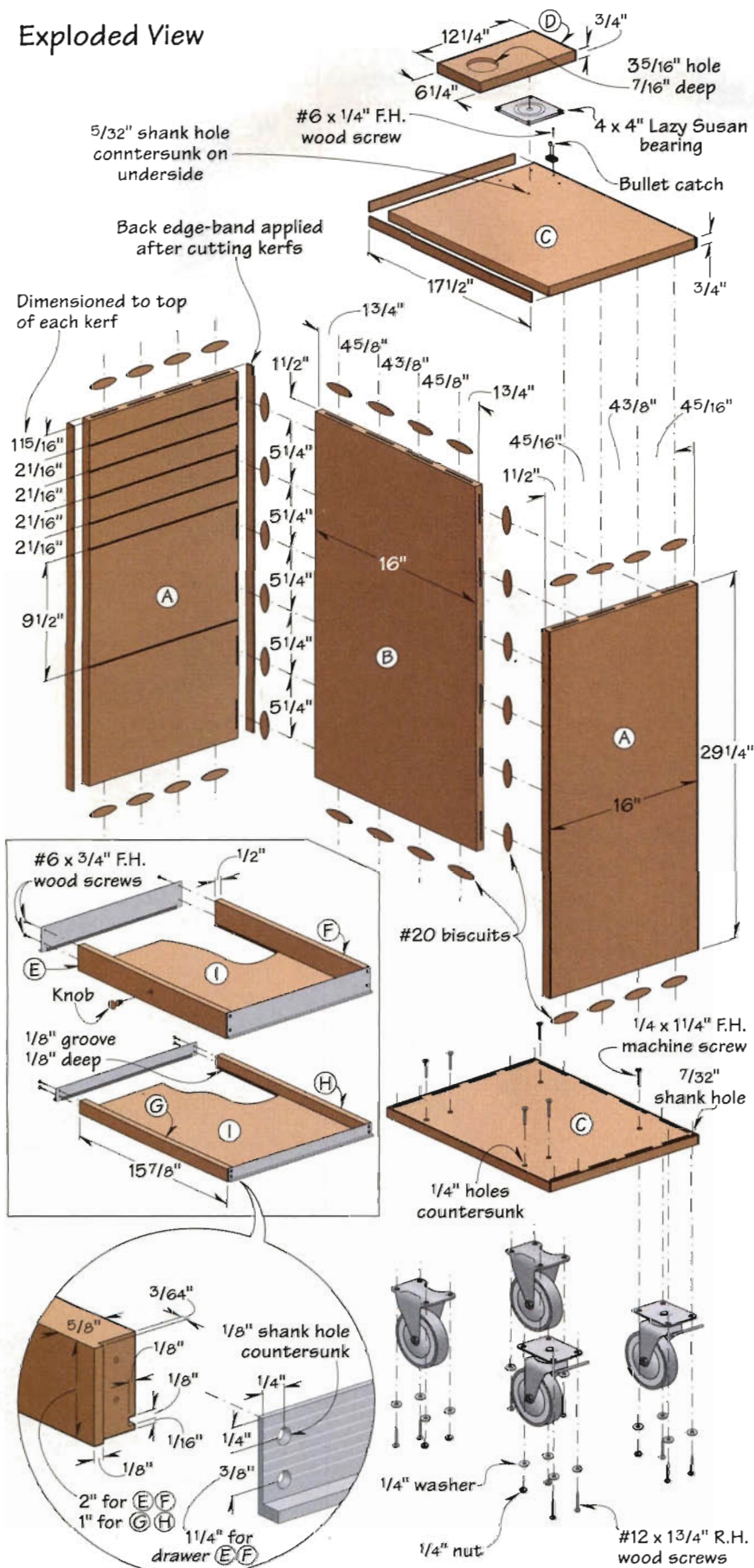
Rip the edge-banding material from stock measuring at least $\frac{1}{8}$ " (preferably $\frac{1}{4}$ ") thicker than your plywood. This allows extra material for trimming and makes positioning the edge-banding less critical during glue-up. Initially, crosscut the edge-banding at least 1" longer than the plywood edge.

Always use a caul between the clamp jaws and the banding to distribute pressure evenly. Space your clamps no more than 6" apart. Apply glue generously (plywood edges really drink it up), but don't get sloppy, or the dried glue will interfere with flush-trimming later. If you use yellow glue, 15 minutes of clamp time is enough, but don't trim or disturb the edge-banding until the glue has cured for 30 minutes or more.

To trim the ends, cut the banding to within $\frac{1}{8}$ " of the ends of the plywood. Then, secure the workpiece in a bench vise. Mount a piloted flush-trim bit in a small router, and start routing near the left end of the panel on the side that faces away from you. Work around the piece in a counterclockwise direction.

Dick Coors
Designer/Craftsman

Exploded View



the plywood. Also, use spacers in the front of the assembly to keep the sides parallel. This alignment is critical: the sides must be parallel and square to the back for the drawers to fit. After the glue dries, flush-trim the sides.

Step 3. To size the top and bottom (C), measure the width and length of the side/back assembly. Subtract $\frac{3}{16}$ " from the width and $\frac{7}{32}$ " from the depth, then cut the two plywood pieces to these dimensions. After you add the edge-banding, $\frac{1}{32}$ " will overhang on both ends and along the back edge of each piece, which you'll trim away later for a clean joint line. Note: The front edge of the top and bottom align flush with the banded front edges of the sides.

Step 4. Edge-band all four edges of the top and bottom. Apply the banding to the side edges first, then band the front and back edges.

Step 5. Cut matching #20 biscuit slots in the top and bottom and the side/back assembly as dimensioned on the Exploded View. When positioning your pieces to mark the biscuit center-lines, remember to align the front edge of the top and bottom flush with the front edges of the sides. Also, offset the biscuit-joiner fence by $\frac{1}{32}"$ when slotting the sides and back to allow for the $\frac{1}{32}"$ overhang of the top/bottom.

Step 6. Biscuit, glue, and clamp the top and bottom to the side/back assembly, again using cauls. After the glue has dried, flush-trim the overhanging edge-banding.

Step 7. Round over the top edges and four outside corners of the case with an 1/8"-radius bit. Then, sand all surfaces to 150-grit.

Build and Install The Parts Tray

Step 1. To make the parts tray (D), cut a piece of $\frac{3}{4}$ " plywood to 6x12". Add $\frac{1}{8}$ "-thick edge-banding all around. After the glue has dried, rout a $\frac{1}{8}$ " round-over along all edges.

Step 2. Cut a 3 $\frac{5}{16}$ "-diameter recess $\frac{7}{16}$ " deep in the parts tray to accept the magnetic base of the metal parts dish. To do this, first outline the recess using a circle (fly) cutter and drill press. Then, clean out the interior waste with a router and straight bit.



Photo A: The magnetic parts dish holds ferrous metals securely and the drawers can be divided into 30 or more compartments.

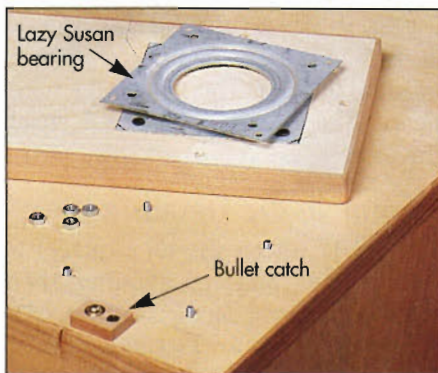


Photo B: Note the location of the bullet catch on the case top and the lazy Susan bearing on the underside of the parts tray.

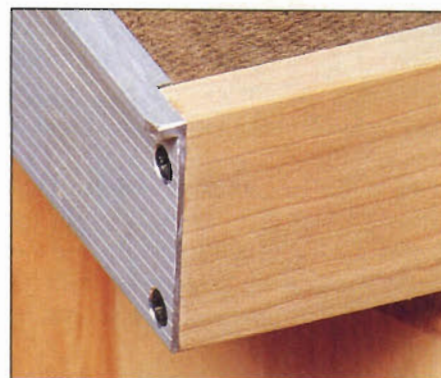


Photo C: Cut away flanges on the ends of the drawer slides to accept drawer fronts/back. File tips round to smooth their operation.

Step 3. Lay out and drill pilot holes for the lazy Susan bearing in the cabinet top and the underside of the parts tray (figure 2). Make the holes $\frac{3}{8}$ " in the top and countersink them on the underside. Make the tray holes $\frac{5}{64}$ ". Now, screw the flange of the lazy Susan bearing to the underside of the parts tray using #4 x $\frac{1}{2}$ " roundhead screws.

Figure 2 Parts tray mounting

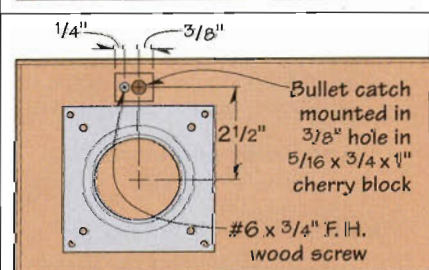
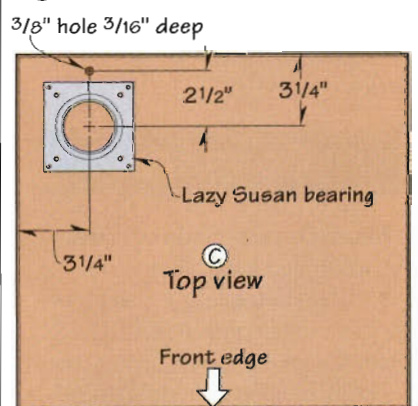
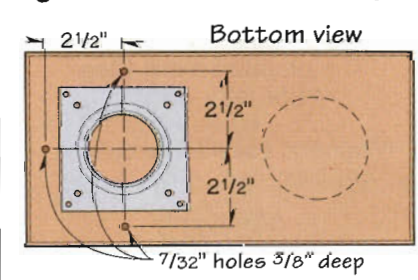


Figure 3 Parts tray ④



Step 4. Cut a $\frac{5}{16}$ x $\frac{3}{4}$ x 1" block of cherry for the bullet catch. Drill a $\frac{3}{8}$ " hole through it to accept the catch and a countersunk $\frac{7}{64}$ " shank hole. Next, lay out and drill a $\frac{3}{8}$ " hole in the top of the cabinet where shown to accept the lower portion of the bullet-catch barrel. Screw the block of cherry to the top of the cabinet using a #6 x $\frac{3}{4}$ " flathead wood screw. Now, insert the bullet catch (photo B).

Step 5. Insert machine screws up through the holes in the top and drop the tray holder/lazy Susan assembly over the tops of the screws. To position and start the nuts in the narrow gap between the parts tray and cabinet top, adhere them to a metal scale or rule with double-faced tape. When the nut is directly over the machine screw, turn the screw from underneath until the nut just catches on the screw. Tighten the nuts with an open-end wrench and screwdriver.

Step 6. After the tray is securely mounted, spin it around several times so that the bullet catch traces a faint, circular line on the underside of the tray. Now, remove the tray and drill three $\frac{7}{32}$ " holes $\frac{3}{8}$ " deep centered on this line where shown in figure 3. These holes will serve as stops for the bullet catch.

Step 7. Remove the hardware from the cabinet and tray, then final-sand all surfaces to 220-grit. Apply three coats of finish. (We used a wipe-on polyurethane.) After the finish has dried, reattach the lazy Susan and parts tray.

Build the Drawers

Step 1. Cut the aluminum drawer and tool-shelf sides $\frac{1}{8}$ " shorter than the

PRO TIP

To create a smooth, sliding fit between two wooden parts, you can usually surface-plane or sand a few thousandths of an inch off one part to make it fit properly. If the sliding part can't be thickened, as in the case of our aluminum drawer runners, try widening its groove slightly as follows.

Insert a piece of paper between the arbor flange and the blade just above the arbor. This will make the blade wobble enough to enlarge the kerf by twice the thickness of the paper. Shim with more paper if necessary until you get a good sliding fit of the drawer runner in the groove.

inside depth of the cabinet assembly (photo C). The sides we used serve as both structural parts of the drawers and as slides. (To order these, see Sources.)

Step 2. On both ends of the drawer and tool-shelf sides, trim away $\frac{1}{2}$ " of the flange that holds the drawer bottom. Note: You can cut aluminum on the tablesaw with a carbide-tipped blade, but wear eye protection (a visor is best) to shield your eyes from any flying bits of metal. Also, use a backing block to support the piece as you cut it.

Step 3. Drill and countersink two holes for #6 x $\frac{3}{4}$ " flathead wood screws through both ends of each side. (See the drawer detail on the Exploded View.)

Step 4. Surface stock for the drawer and tool-shelf fronts to $\frac{5}{8}$ " and for the backs to $\frac{1}{2}$ ". Rip the stock to the widths specified for the fronts (E, G) and the backs (F, H). Measure the interior

width between the cabinet sides, then subtract the thickness of two drawer sides plus $\frac{1}{16}$ " for clearance. Crosscut the drawer and shelf fronts and backs to this length.

Step 5. To capture the drawer bottoms, cut $\frac{1}{8}$ " grooves $\frac{1}{8}$ " deep in the fronts and backs of the drawers and tool shelf. The grooves should align with the $\frac{1}{8}$ " flanged grooves on the aluminum drawer sides.

Step 6. Cut a $\frac{3}{4}$ " rabbet $\frac{1}{2}$ " deep on both ends of the drawer and tool-shelf fronts. This will align the aluminum drawer sides flush with the ends of the drawer fronts.

Step 7. From $\frac{1}{8}$ " tempered hardboard, cut the drawer bottoms (I) to fit the drawer frames.

Step 8. Assemble the drawers and tool shelf. To do this, glue the bottom into the grooves in the front and back, then screw and glue the aluminum sides to the cherry fronts and backs. Use polyurethane glue, and allow it to cure overnight. Using a file, radius the back corners of the runners on the drawer and shelf sides to prevent them from digging into the grooves in the plywood.

Step 9. Finish-sand the cherry drawer parts to 220-grit. Apply three coats of finish to both the cherry and the hardboard. After the finish has dried, attach the drawer knobs.

Complete the Details

Step 1. Attach the four casters to the cabinet bottom, aligning their mounting plates flush with the case edges. At the screw locations that fall inside the cabinet interior, drill countersunk holes in the top face of the plywood bottom. Then, attach the casters using $\frac{1}{4} \times 1\frac{1}{4}$ " flathead machine screws, washers, and nuts. At the remaining hole locations, drill pilot holes in the cabinet bottom. Drive #12 $\times 1\frac{3}{4}$ " roundhead wood screws with washers up through the bottom and into the sides.

Step 2. Cut the adhesive drawer-divider holders to length and attach them to the drawer fronts and backs (*photo D*). Use a $\frac{3}{8}$ "-thick piece of scrap to space the dividers up off the drawer bottom.

Step 3. Cut the drawer divider strips (J, K) from $\frac{1}{4}$ " tempered hardboard to



Photo D: These pre-formed plastic drawer dividers are slotted to accept $\frac{1}{4}$ " hardboard and can be installed in just minutes.

fit. Position the side-to-side strips in the holders and mark the locations where they intersect with the front-to-back strips. Measure the actual thickness of your tempered hardboard and mount a dado head of matching width. (Ours measured $\frac{7}{32}$ " thick, so we used one dado blade and a $\frac{3}{32}$ " chipper from the dado set.) Elevate the dado head to one-half the width of the strip. Then, using a backing board, carefully cut half-lap slots at the marked locations.

Step 4. Install the dividers, then insert the drawers in the cabinet. 

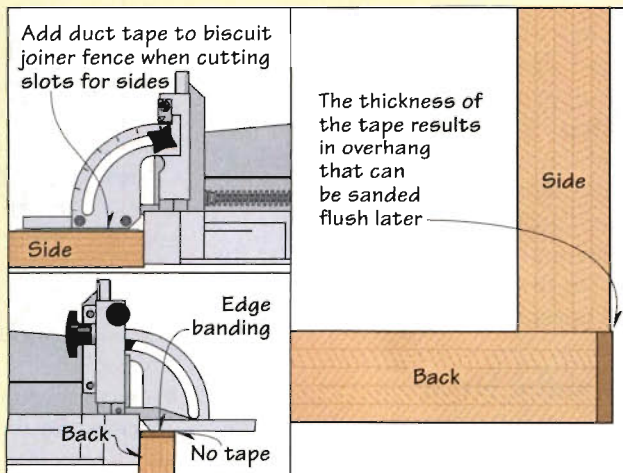
*Photographs: StudioAlex, Kevin May
Written by Tom Jackson*

USE EDGE-BANDING TO MAKE PERFECT BUTT JOINTS

Theoretically, if you butt two pieces of plywood together at a right angle (one edge-banded, the other not) and join them with biscuits, you'll get a crisp, clean joint line. But the loose-fitting nature of biscuits can sometimes lead to small misalignments—not significant, but enough to catch a fingernail on. With solid stock, these slight overhangs can easily be sanded out, but plywood's thin veneer faces don't permit corrective sanding.

You can avoid this problem by offsetting the two pieces so that any potential misalignments will fall under the $\frac{1}{8}$ "-thick edge-banding which can be sanded. (See the drawing *below*.) To create an offset, adhere a piece of duct tape to your biscuit-joiner fence

before slotting the side (the unbanded part). Remove the tape before you cut the slots in the back (the banded piece). When you add the biscuits and join the two pieces together, the edge-banded piece will overhang the unbanded piece by the thickness of the tape. Rout and/or sand this overhang flush for a clean, seam-less joint.



SOURCES

Micro Drawer Slides/Sides.

2 x 36" (5 needed), catalog no. 12K78.02, \$4.50 each; 1 x 36" (one needed), catalog no. 12K78.01, \$3.25 each; 4" locking swivel caster (two needed), catalog no. 00K20.01, \$10.95 each; 4" rigid caster (two needed), catalog no. 00K20.02, \$9.95 each; 4" lazy Susan bearing, catalog no. 12K01.02, \$1.70. Order from:

Lee Valley and Veritas
800/871-8158

Drawer-divider holders.

1x60" ($\frac{1}{4}$ " slots), catalog no. 14762, \$8.99 each. Bullet catch, $\frac{3}{8} \times \frac{1}{2}$ ", package of 10, catalog no. 28464, \$5.49. Order from:

The Woodworkers' Store
800/279-4441

Magnetic Parts Dish. Catalog no. APT 7000, \$6.95. Order from:

A&I Supply
800/260-2647

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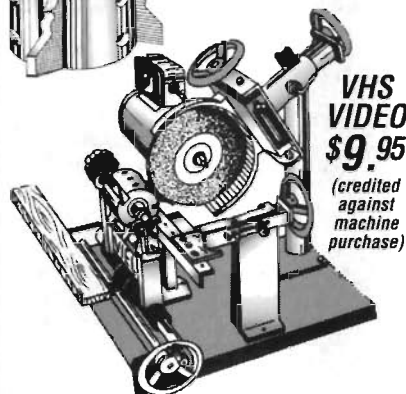
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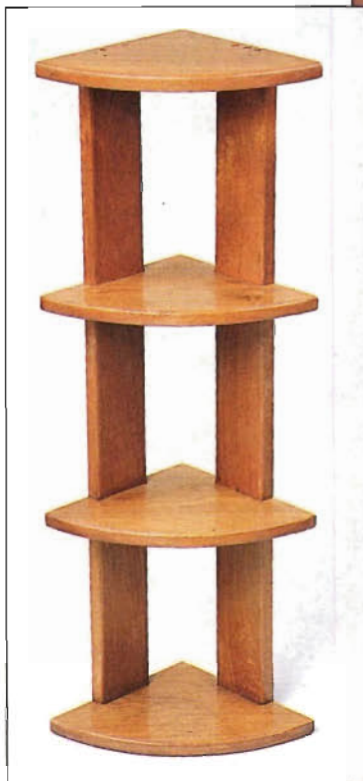
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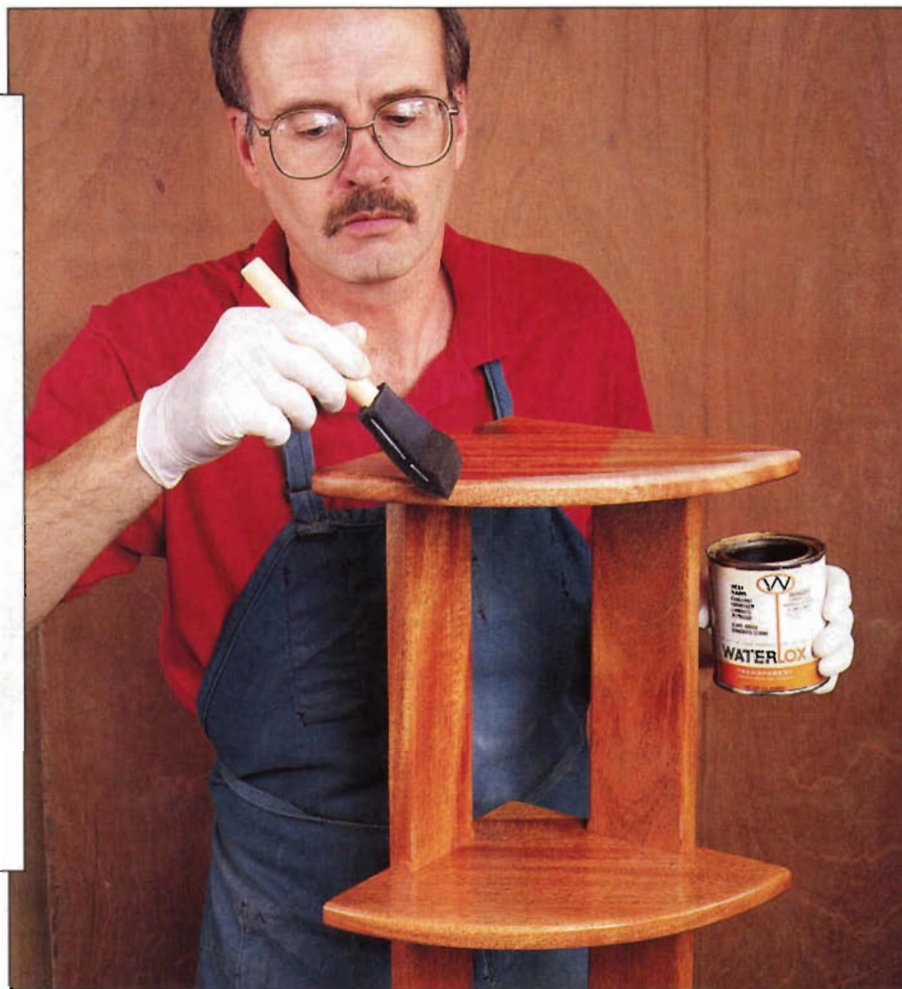
Mahogany Corner Shelf

A Genuine "Build-It-In-A-Weekend" Project

by Sven Hanson



Author builds and finishes this simple piece in an afternoon as either a three-shelf or four-shelf unit.



The old promise "build this project in a weekend" rarely rings true. Even if it did, many of us face time demands that keep us from spending all day Saturday—never mind Friday night and Sunday—in the shop. This project not only builds fast, it also looks good, and you can construct the three-shelf version from a single 9x60" board. That's less than six board feet of lumber, including the waste—a perfect use for that matchless board you've been saving.

If you have a 72"-long plank, you can make the four-shelf unit shown in the inset photo. Simply cut an extra shelf and make the two *vertical* supports half again as long.

Start With a Template

On a scrap of flat $\frac{1}{4}$ " plywood, find or cut a square corner. Set your compass point on this corner, and draw a 9"-radius arc of at least a full 90° (quarter-circle). (See the Shelf drawing on *page 64*.)

Note: If you cut the back corner of a quarter-round shelf to a right angle, it would probably bottom out on its point before both front edges touched the wall. (On most inside wall corners, the plaster or drywall tape usually fills in and rounds the corner.)

To allow for this, draw a trim line along both straight edges of the

template, starting flush with the front corners and tapering in $\frac{1}{16}$ " at the back corner. This increases the quarter-circle from 90 to about 93°, forming a blunter angle that usually compensates enough for a non-square corner so that the shelves' front corners will contact the wall before the back corner bottoms out. If you have doubts, measure the angle of the corner in which you plan to place the shelf and cut the template angle to fit. Now, bandsaw the template to shape, keeping the blade just wide of the line. Then, sand carefully to the line.

Lay Out and Cut the Shelves

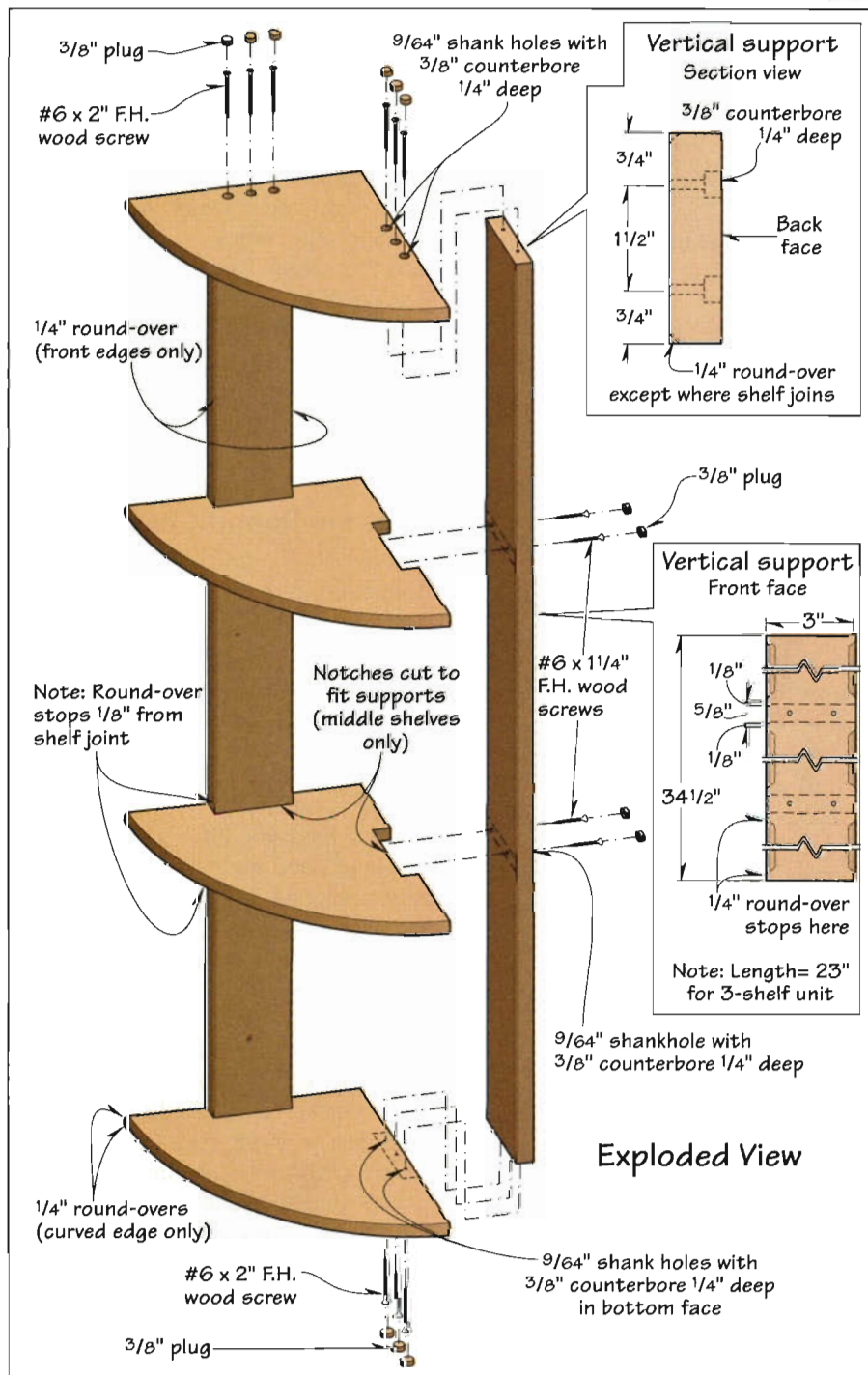
On one of the template's straight edges, mark the position of the $\frac{3}{4} \times 3$ " vertical shelf support. Using a dovetail or other thin-kerf saw, cut a pair of shallow kerfs ($\frac{1}{4}$ " deep or so) to establish the two edges of the support. Use these kerfs as a guide to lay out the notch in the middle shelf (or shelves). I insert the fine tip of a drafting pencil through each kerf to mark a line. Note: Don't cut kerfs in both of the

template's edges. Instead, flip the template over to lay out the notch in the opposite edge of the shelf. This ensures perfect symmetry of the vertical support positions.

Select a board at least 9" wide, or glue up narrower stock to this width, and surface it to $\frac{5}{8}$ " thick. When the grain runs diagonally across the shelf, it makes interesting oval patterns centered on



Photo A: Lay out triangular shelves so the grain runs across them, flip-flopping the template to conserve stock.



the curves. To achieve this look, set your combination square against the edge of your stock in the 45° position, and use the blade to orient one of the template's straight edges. Trace around the template with a soft pencil, then flip-flop the template to lay out the remaining shelves (*photo A*).

If the grain doesn't run parallel to the edges, use a straightedge to scribe several lines along the actual grain direction. Then, place the template's front corners parallel to the lines to orient the grain.

If your stock for this project doesn't quite measure a full 9" wide, go ahead and lay out the shelves anyway. Just allow the template's back corner to overhang the edge. Then, cut a 12" or 14" length from the other end of the board that's just wide enough to make up the required width.



Photo B: Bandsaw shelves to shape. Depending on your jointer's performance, you may want to joint the straight edges before bandsawing the curved front edge.



Photo C: Set jointer to remove only $\frac{1}{64}$ " of stock, then joint straight edges to the line.



Photo D: Using a stationary belt or disc sander, sand curved shelf edge to the line.

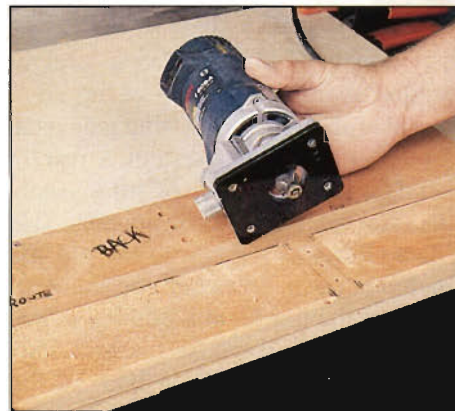


Photo E: Lay out shelf position(s) on vertical supports, then rout edges with $\frac{1}{4}$ " round-over bit, stopping the cut $\frac{1}{8}$ " from shelf position. Author uses a laminate trimmer, but you may prefer a table-mounted router with stop lines marked on a fence.

Joint one edge of this piece, then crosscut it into the required lengths. Joint both edges of the main board, then glue and clamp the pieces along its edges where needed to shore up the width. Now, plane your patchwork board to thickness. When I've done this, the resulting shelves usually appeared seamless, but even when they didn't, the joints went unnoticed because they ended up so close to the back corner.

Bandsaw the shelves to shape, keeping the blade just wide of the line (*photo B*). Set your jointer to remove $\frac{1}{64}$ " of stock, then joint the straight edges to the line, feeding the stock with the grain (*photo C*). Note: If your jointer is likely to tear out the front corners, joint the straight edges before bandsawing the curved edge. Now, sand the curved front edge to the line

using either a stationary disc or belt sander (*photo D*).

Machine the Vertical Supports

Surface the stock for the supports to $\frac{3}{4}$ " thick, then rip these two parts to $3\frac{1}{8}$ " initial width. Crosscut them to length: 23" for a three-shelf, $34\frac{1}{2}$ " for a four-shelf unit. Joint one edge of each, then rip them to 3" wide. Select the better face of each support and mark it "front." (See the detail on the Exploded View on *page 63*.)

Mark a centerline across one of the supports for each middle shelf where shown on the drawing. Then, lay out the position of each $\frac{5}{8}$ "-thick middle shelf, centering it on this line. Transfer the layout lines to the second support.

Before you round the edges, sand the supports and shelves to 180-grit. This way, you'll avoid doing much sanding afterwards, which can cut into the routed profile. Next, lay out centerpoints for two screws, spaced evenly on each centerline. (See the Exploded View drawing for locations.) Note: Don't drill the holes yet—wait until you've aligned and clamped the mating parts.

Rout the Round-Overs

Using a $\frac{1}{4}$ " round-over bit, rout the front edges of both supports. Stop the rout $\frac{1}{8}$ " from the middle-shelf positions you laid out in the previous step. (See *photo E*.) I freehanded the stopped routs using a laminate trimmer, but you may prefer to use a router table and mark stop lines on the fence for greater accuracy.

Install the same bit in a table-mounted router, and rout the curved front edges (top and bottom) on all shelves. Because of the grain orientation, this requires routing against the grain at a steep angle for half the cut. (See *figure 1*.) To avoid the tearout that often results from this, I "climb-cut" this half of the shelf. In other words, I rout in the wrong direction, feeding the stock from left to right into the inverted, counterclockwise-spinning bit.

This non-standard technique calls for extra caution, a firm grip on the workpiece, and an athletic stance with arms flexed and knees bent. A word of caution: Never attempt to climb-cut with a large bit or a dull bit.

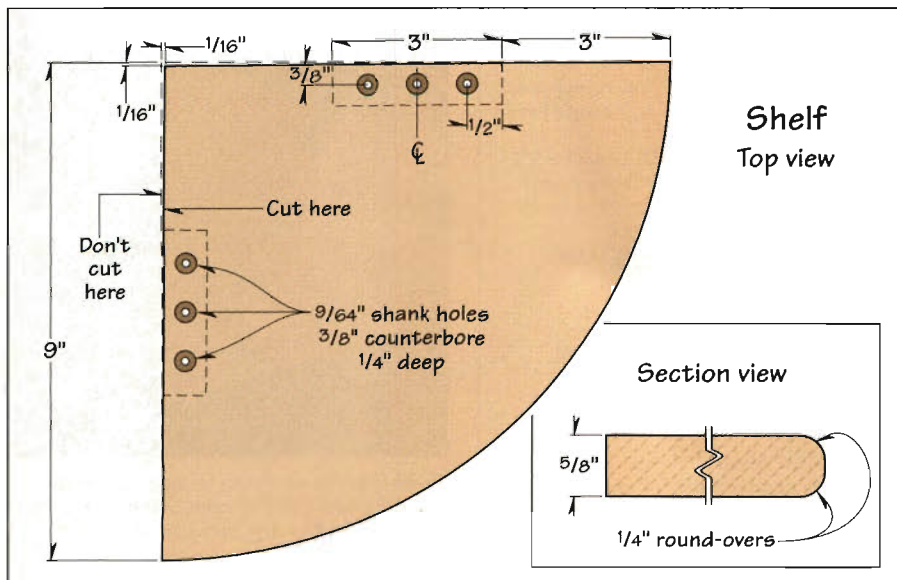




Photo F: Use a sliding crosscut saw table or miter gauge with extension to cut shelf notches. Size notches to fit support width and depth, sneaking up on final dimensions. Cut both shelves at the same time.

Even when using this procedure, back the workpiece at the "exit" end of the rout with a scrap board to avoid splintering the corner.

Hand-sand the rounded edges on the shelves and supports to 220-grit or finer. Then, sand the flat support surfaces to the same grit. Take care not to round the square edges or flatten the round ones.

Cutting the Notches

The vertical supports fit into the notches you laid out earlier on the middle shelf edges. To cut the notches, install a $\frac{1}{2}$ " to $\frac{3}{4}$ " dado head on the tablesaw. (To save time, I usually mount a second 10" blade alongside the first, adding a shim between them to space the teeth $\frac{1}{16}$ " apart, and make multiple cutting passes.) If you're making a four-shelf unit, stack the two middle shelves using double-faced tape, clamps, or hotmelt glue.

Using a sliding crosscut table or miter gauge with a wooden extension, rough out the notch by sawing a bit short of the final width and depth. To do this, measure the actual thickness and set the cutting height $\frac{1}{16}$ " short of this. Start cutting $\frac{1}{16}$ " from one line and proceed toward the opposite edge (*photo F*). Stop when you're an equal distance from that line. Now, sneak up on the final width, test-fitting one of the supports as you work. Remove equal amounts of stock from the two edges to keep the notch centered.

Adjust the cutting height slightly upward. Also, set a pair of stop blocks



Photo G: After aligning and attaching supports to middle shelf, clamp top/bottom shelves to this assembly and bump them into position before drilling screw holes. When square, drill and counterbore the shank holes.

to make sure you don't widen the notch as you deepen it. Make another round of passes, then test-fit the support for depth. Repeat if necessary until the back face of the support fits flush with the shelf edge.

After you've notched the edges of both shelves, inspect the cuts to make sure the bottoms are flat and the edges are square. Clean them up with a chisel if necessary.

To Assemble, Begin In the Middle

First, fit the supports to the middle shelf (or shelves). To do this, align and temporarily attach one support to a shelf, then fit the second support to the same shelf and align it with the first (temporarily attached) shelf. Temporarily attach the second support, then attach the second shelf to both supports.

To join the first support to the first shelf, center its unrounded section in the shelf notch. Clamp the parts to a right-angle jig, then check for squareness in both directions.

With the parts clamped squarely, drill the counterbored shank and pilot holes. To get perfectly aligned shank and pilot holes and truly round counterbores with crisp edges, I use a Fuller tapered bit and countersink cutter. (See Sources for mail-order information.) This tool drills both holes and adds a $\frac{3}{8}$ " counterbore in one operation. It also has a stop collar that ensures counterbores of uniform depth.

Attach one support to the shelf using screws but no glue. As you clamp the second support to the shelf, check its alignment with the first support before you drill. Make sure the two supports align lengthwise, and check to make sure they are parallel on both axes. Then, screw the second support to the shelf, again without glue.

Add the Top and Bottom Shelves

The support ends simply butt against the top and bottom shelves. Using clamp pads, position and dry-clamp these shelves just tight enough to keep them in place (*photo G*). Their back faces should align flush with the shelf edges. If they don't, you can bump them into position with a rubber mallet. Don't bump them so far that you flex the support noticeably. Tighten each clamp as you fine-tune each support's position.

The end grain of the supports offers poor holding power for screws, so I compensate by using 2"-long screws. I adjust my Fuller bit, then lay out and drill three counterbored holes through the shelf and into each support end. (See the Shelf drawing for locations.) Drive the screws, then check the overall unit for squareness and alignment. Adjust the fit as necessary.

Unscrew the parts, then apply a thin bead of glue along the center of each shelf notch, including the ends. (I use polyurethane glue and lightly mist the mating surfaces with water to enhance curing.) Drive the screws. Stand the assembly up, and apply a thin bead of glue along the top ends of the supports. Position the top shelf and drive those screws. Repeat for the bottom shelf.

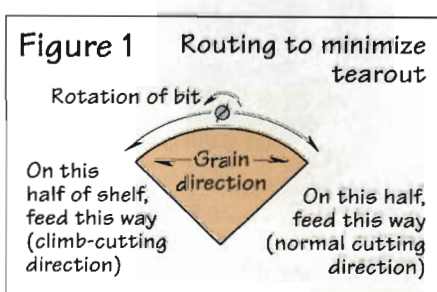




Photo H: Cut plugs in over-thick blank, then resaw the blank to make plugs $\frac{1}{8}$ " longer than counterbore depth. Author applies masking tape before resawing to keep plugs together.



Photo I: Glue in plugs, then pare them almost flush with a chisel, taking a thin shaving in first one direction, then the other. Note pencil marks help align grain.

Plugging the Counterbores

Counterbored screws and plugs take a tenth as long as mortise and tenons and about a third of the time it takes to dowel a joint. To make sure I'll have plug stock to match the parts that need plugging, I save and label all of my cutoffs.

To cut the plugs, select well-matched material that measures at least $\frac{1}{8}$ " thicker than your plug cutter's depth of cut. Install a sharp, high-quality, tapered plug cutter in your drill press. (Again, I like Fuller cutters.) Cut the plugs to depth, making several more than you need so you'll have a selection to choose from.

Before you cut the plugs from the blank, cover their ends with a strip of masking tape to keep them from flying in all directions. Next, measure the actual depth of your counterbores. Add $\frac{1}{8}$ " to this dimension, then set your bandsaw fence to cut the plugs to this length. Turn the plug blank on edge and resaw it to free the plugs (*photo H*).

If the grain direction in the plugs doesn't stand out, pencil a line down the center of each plug top before you peel the tape off the bottom ends. Apply glue sparingly to the inside of the counterbores. As you tap in each plug, use the pencil line to orient the grain.

After the glue has dried, I trim the plugs with a chisel, using light shaving cuts (with the grain) in first one direction, then the other (*photo I*). This makes a smooth cut without splintering the grain off below the surface. After paring the plugs nearly flush, touch them with a sander if necessary, then finish-sand the entire shelf face to 220-grit.

Instead of trying to hide the plugs, you may prefer to show them off by making them from contrasting stock. This also solves the problem of trying to conceal the plugs if the shelf grain is so wild that it's impossible to make the plugs blend with it. If you choose to go the fancy route, align the counterbores in a perfectly straight line, or the results will look sloppy. Also, for a

strong and serious look, make the plugs from stock that's darker than the primary wood.

The Finish Line

Using a sharp chisel, carefully remove any glue squeeze-out around the joints. With a crumpled sheet of 220-grit sandpaper, do any touch-up sanding that's necessary. Then, apply finish. (I brushed on three coats of Waterlox oil finish, sanding between coats with 320-grit paper—two swipes over all surfaces.)

After the last coat has cured for two weeks, buff the surface with a fine synthetic wool pad. Your shelf will stand nicely in a corner on three adhesive cork pads, or you can wall-mount it. *Wj*

Photographs: By the author

SOURCES

Fuller Tapered Bits, Counterbores, and Plug Cutters. Various sizes and kits available. To order, contact:

The Woodworkers' Store
800/279-4441

Woodcraft
800/225-1153

Waterlox Oil Finish. Available in quart or gallon quantities. To order, contact:

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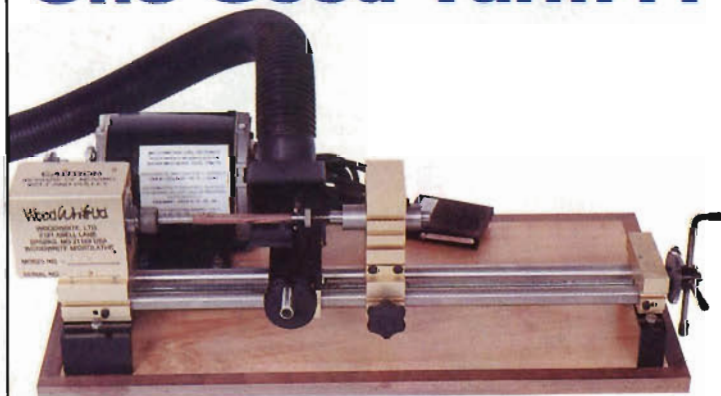
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PORTABLE 12" PLANERS

The notorious snipe is now an endangered species thanks to these new four-post designs

Late last summer Delta, DeWalt, Jet, and Sears unveiled new 12" portable planers with a "four-post" footprint. These vertical steel posts, placed at the outside corners of the machine, provide the primary support for the motor and cutterhead.

Like the wide wheel base on a sports car, the four-post design gives the planer head more stability and rigidity than the two-post configuration used on some earlier versions of these machines. For woodworkers, the chief benefit of a four-post design is that it reduces snipe—that shallow but vexing divot that some planers leave near the ends of a board.



But what's really making news these days is all the new and innovative features that many of these companies are designing into this once basic machine. Two of the new planers feature cutterhead-locking mechanisms to further reduce the poten-

tial for snipe. Engineers have also made significant improvements in some blade-changing systems, introduced a plunge-router-like depth stop mechanism, and added a host of small but woodworker-friendly improvements. In fact, this new generation of 12" portable planers represents a significant evolution for this category of machine.

To find out if these planers live up to their makers' promises, we brought them into our shop for a full battery of tests. We also added the Grizzly 12" planer to the pack since this machine has always come with a four-post configuration. The results are reported on the pages that follow.

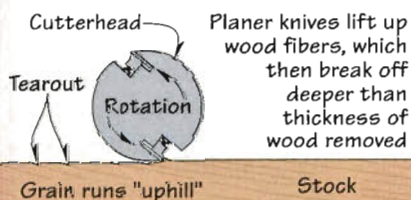
Also, a lot of readers rightly note that most magazine tool reviews are based on just a few minutes of work with a new tool. In response, we've decided to put the tools we review into long-term tests—the kind of use you would give them in your own shop. So stay tuned: we'll tell you how these planers hold up in a future issue.

Continued on page 75

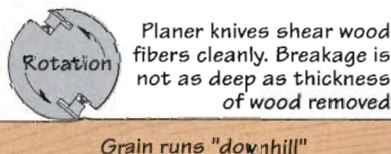
PLANING WITH THE GRAIN TO PREVENT TEAROUT

Reducing Tearout

Incorrect feed direction



Correct feed direction



To avoid tearout with any planer, "read" the grain and feed the correct end of the board first. The same principle holds true for hand planing. The knives must dig into grain that is leading "downhill" when viewed on edge. (See the drawing at left.)

Under ideal conditions, this rule would be easy to follow. But what about grain that swirls uphill and downhill, or grain that's hard to read? In these cases, we recommend making a shallow test pass in both directions and comparing the results. Then, follow the direction that gave the least tearout. Keep all subsequent passes shallow, and reduce the depth of cut to less than $\frac{1}{64}$ " for the last few passes.



THE BENEFITS OF A PORTABLE PLANER

If you're new to woodworking, a portable planer probably doesn't top your list of essential shop machines. Tablesaws, bandsaws, drill presses, and jointers take priority, and these days you can often get by because many hardwoods have already been thickened to $\frac{1}{4}$ ", $\frac{1}{2}$ ", $\frac{3}{4}$ ", or 1".

But the more woodworking you do, the more you'll come to need a thickness planer. The thicknesses mentioned above may work well on cabinets and other cases, but they usually look out of scale on smaller projects. If you think you're about ready for a planer, here are some good reasons to buy one now.

Planing non-standard thicknesses. Clocks, jewelry boxes, lamps, toys, and musical instruments, to name a few examples, often require some parts thickened to $\frac{1}{8}$ ", $\frac{3}{16}$ ", $\frac{5}{16}$ ", or $\frac{3}{8}$ ", or in increments as small as $\frac{1}{32}$ " or $\frac{1}{64}$ " between these thicknesses. With other types of projects such as chairs, desks, and large furniture, you'll probably

encounter larger or very specific thicknesses that you can't get in store-bought stock. Only a planer can give you the capability to prepare a full range of thicknesses.

Sizing exotic species. Your choice of pre-thickened stock becomes even scantier once you venture away from the common domestic woods. Exotic and tropical species usually can only be found in one or two thicknesses. If you want a $\frac{1}{2}$ "-thick strip of koa, purpleheart, or osage orange for a detail, the only solution is to thickness it yourself.

Fitting tenons and splines. You'll eventually have a need to thickness stock to fit perfectly in a groove, joint, or other mating assembly. Floating tenon stock, for example, should slide with just the right amount of friction in its mortise. The same holds true for spline stock: If the groove forces a tight fit on your spline, the planer offers a quick way to remedy the problem.

Turning trash into treasure. Wood recyclers find the thickness planer a valuable tool for turning salvaged material into fresh, clean stock. On most old pieces, you need plane only $\frac{1}{16}$ " or so below the surface to reveal a new, unblemished face.

Resawing your own veneers. Yet another resource-conserving tactic is to resaw thin slices of stock on your bandsaw, then use the thickness planer to smooth away the bandsaw marks. This technique is also a great way to make your own custom edge-banding for plywood.

Planing wide bevels. If you ever need to cut a wide bevel on a long piece of stock, a planer used in combination with a simple jig will make short work of the job. This approach yields better results with fewer hassles than using a router or tablesaw. (See the jig and technique we developed on *page 49* of our Sept./Oct. '97 issue.)

DELTA MODEL 22-560



When Delta engineers introduced this new four-poster, they also revamped a number of other components to make it a better and more user-friendly machine than any of its predecessors.

The new cutterhead lock is activated by tightening a lever on the side of the machine. In tandem

with the four-post design, this lock secures the motor/cutterhead assembly, which helps eliminate snipe.

The cutterhead uses two double-edged, high-speed-steel knives. They are slotted to fit over locator pins in the cutterhead and are intended to be thrown away when dull, rather than resharpened. Locator pins automatically set the height of the knives and eliminate the need for knife-setting jigs. A replacement set of Delta's double-edged knives costs about \$30. Only one tool is needed to tighten or loosen the knives in the cutterhead, and the manufacturer provides a novel magnetic lifter that's helpful for picking up and reinstalling the blades without nicking one's fingers (*photo A*).

We also were impressed with Delta's extension-table adjustment bolts (*photo B*). To minimize snipe, both the infeed and outfeed tables of any planer must be adjusted to within a few thousandths of an inch of parallel with the main table. Delta put the adjustment bolts on each table where they can easily be reached with an open-end wrench.

One turn of the elevation handle changes the cutterhead height by $\frac{3}{32}$ ". This mechanism on the Delta unit felt tighter than those of the other test units, with only $\frac{1}{8}$ " of backlash in the movement.

A foam-padded bar on the top of this machine serves as both a carrying handle and a stock return roller. (These rollers make it easier for an assistant to roll the boards back to the operator feeding the stock into the machine.) A pair of handholds on each side of the unit allows you to grab it from the bottom as well. Delta also provides a removable safety switch, which can instill some peace of mind if you have little ones about who might want to try thickening a toy or two.

The Delta unit lacks a material-removal gauge. We also noticed when taking a medium-heavy cut, that it was essential to have the optional dust-collector chute attached and hooked up to a vacuum source. Otherwise, chips tended to ball up around the cutterhead and get pressed down into the workpiece by the knives and feed rollers, and thus marring the surface finish. In short, we feel that the \$15 dust chute is a must.

Compared to the other machines in the test, however, the Delta produced the cleanest surface and the least amount of snipe. The other planers in the test also gave us excellent surface finishing, but the Delta stood out as just a bit better.



Photo A: Delta's magnet-backed lifter makes it easy to handle the knives and protects fingers from nicks and cuts.

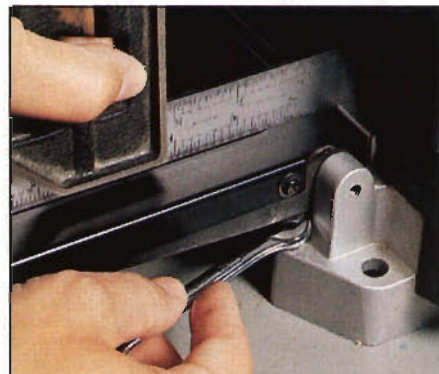


Photo B: Easy access to the bolts simplifies height adjustment on the Delta planer's infeed and outfeed tables.

DEWALT DW733



DeWalt's machine also fights snipe with a four-post design and locking cutterhead. The lock consists of a horizontal steel bar that runs in front of the motor/cutterhead assembly (*photo C*). The long edge of this locking bar is easy to push down and pull back up,

which helps speed up the locking process. It also typifies the thoughtful ergonomics incorporated into this machine, as does the large, paddle-shaped on/off switch, which makes an easy target for your fingers, thumb, or the end of a board if neces-



Photo C: To lock the head on the DeWalt planer, simply push down on the bar.

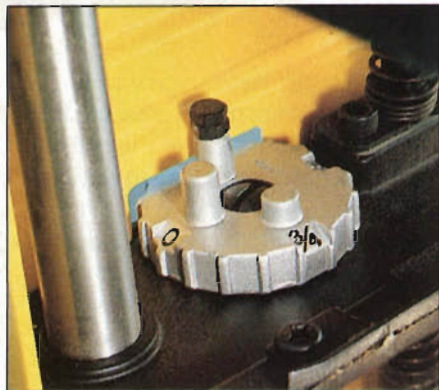


Photo D: DeWalt's four-position depth-stop turret works like its counterpart on a plunge router.

sary. For safety, the switch can also be padlocked.

The most innovative feature on this machine, however, is the depth-stop turret (*photo D*). It works just like the depth stop on a plunge-router and has four settings (0, 1/4", 1/2", and one adjustable height setting). If

you have a lot of stock that must be planed to a reliably uniform thickness, you'll find this a godsend. If you've ever wasted precious stock trying to plane to the exact thickness required for a dovetail jig, then lost time adjusting the jig because the stock thickness changed from one run to the next, you'll also appreciate this feature.

A material-removal gauge on the DeWalt lets you determine how deep the cut will be before you relinquish your stock to the pull of the infeed rollers. Unfortunately, the gauge on the machine we tested was off by 1/64", and it's designed in such a way that you can't adjust it.

The crank on the DeWalt's elevation mechanism delivers a neat 1/16" up/down movement for every 360° turn. This permits fairly precise adjustment without any mental math. The mechanism felt a bit loose, however, with about one-quarter turn of backlash. At the base of the handle, an adjustable dial can be reset to zero wherever the handle may be in its rotation, which can also help you to gauge the distance required for a quarter, half, or three-quarter turn (*photo E*).

We also liked the freedom provided by DeWalt's extra-long cord (just over 10') and the tool tray. This tray holds all the tools needed to make adjustments or change blades, and it bolts securely and conveniently on the machine. The knives are spring-loaded in the cutterhead, which makes them easy to set after resharpening. We do have some reservations, however, about the long-term durability of the plastic knife-setting jig.



Photo E: A gauge on the DeWalt's elevation mechanism permits zeroing the existing setting before turning the handle.

GRIZZLY MODEL G1017



As mentioned, Grizzly's planer has always used the four-post design, although it doesn't include a head-locking mechanism. At first glance, the Grizzly looks like a bare-bones machine; it lacks the cowlings or surrounds that encase the other

units. The manufacturer covers the four corner posts with expandable rubber boots, and you can see the chains and gears for the feed rollers through openings in the top of the castings.

When it came to planing stock and reducing snipe, however, the Grizzly did just as well as any of the others. The gears and chains didn't clog with chips, and their exposed location may actually make it easier to blow off accumulated dust and keep the components clean. The chain-and-gear-driven elevation mechanism allows you the unique option of removing slack and thus reducing the backlash in the handle (*photo F*).

To set the cutting height on the Grizzly, you read a spring-loaded steel tape that's visible from the top of the machine. It works well, even though the cursor is situated about 1/4" above the tape. This could cause you to misread the tape if your eyes aren't positioned dead-center above the cursor.

On the main table, we measured a .008" twist from side to side, but the front-to-back measurement proved very flat, with only .0015" of variation. The Grizzly's blade-changing system took a bit more time than those on the other machines. Jack screws lift the knives to the proper position, but the knives would sometimes move on us as we tightened the gib bolts. For about \$30, however, you can buy a magnetic knife-setting device called the Magna-Set Planer Pal that will eliminate this difficulty. (You can find the Planer Pal in the Grizzly catalog and through several other catalog and retail outlets.)

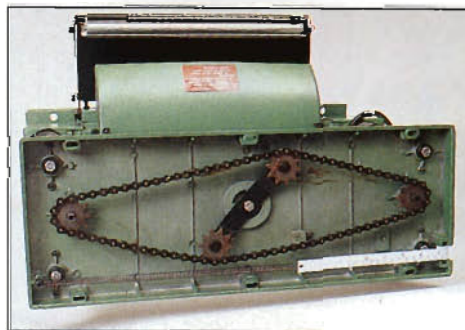


Photo F: Grizzly's chain-driven elevation mechanism can be adjusted to remove backlash.

IS SNIPE GONE FOR GOOD?

Technically, the answer is no. However, these five machines reduce snipe to the point where it hardly matters. Even the deepest snipe we encountered could easily be blended into the workpiece with light sanding. So the only situation that might require you to chop off the sniped ends of a workpiece would be to obtain a perfect sliding fit on a spline or loose tenon.

The planers we tested reduce snipe significantly, but you still get just a whisker's worth because the knives tend to lift the workpiece until the second feed roller engages the board's leading edge. (See the illustration *opposite*.) Once the second roller forces the workpiece down, the two points of pressure convey the board through the machine on a flat trajectory.

To totally eliminate snipe would require the addition of a pressure bar or chip breaker in front of the cutterhead to act as a second hold-down. For this, you have to move up to a more expensive stationary or industrial-grade planer.

To test for snipe, we set up each machine for a $\frac{1}{32}$ "-deep cut, then fed $\frac{3}{4}$ "-thick oak boards through them.

JET JWP-12-4P and the SEARS CRAFTSMAN 23378



These two machines appear quite similar except for a few minor details. What outward differences we did find include the Sears' elevation crank, which can be positioned on either side of the machine (*photo G*), and the motor ratings. Jet rates its motor at 16 amps, the Craftsman carries a 14 amp rating.

Both planers use four corner posts, but neither incorporates a cutterhead lock. A bit of assembly is required to put together the dust chute, crank handle, and blade-setting gauge, but the required tools came with the machines.

Removable lockout switches prevent unauthorized use (*photo H*) on both planers. A pair of rollers built into the top assists with stock conveyance, but neither machine has a material-removal gauge.

The knives on these machines were thicker than on the other units we tested. They're also double-edged and resharpenable, which can save you some time and money if your resharpening service offers reasonable prices.

Both machines use springs to push the knives against a double-ended knife-setting gauge (*photo I*). The gauge and the spring tension under the knives make it fairly easy to set them accurately.

The elevation mechanism on the Sears and Jet raises or lowers the head $\frac{1}{16}$ " for every complete turn of the handle. Jet's mechanism felt a bit tighter, allowing only one-quarter turn of backlash, and operated more smoothly than the Craftsman's. Our Craftsman test unit permitted a half-turn of backlash.

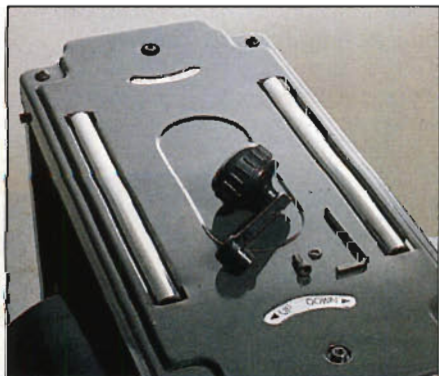


Photo G: On the Sears machine, you can position the elevation crank on either the left or right side.



Photo H: Removable lock-out switches on the Jet and Sears planers prevent use by unauthorized individuals.

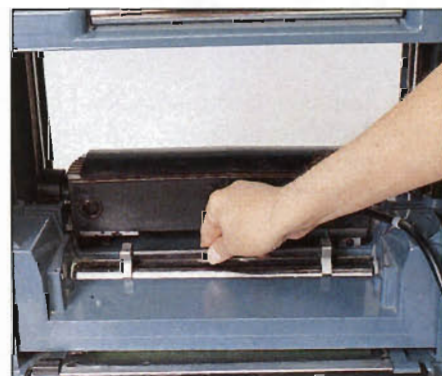


Photo I: A double-ended knife-setting gauge gives accurate results easily on both the Jet and Sears models.

Then we used a micrometer to check the depth of the snipe. Each planer produced a barely visible bit of snipe about 2" in from both the leading and trailing ends of the test boards. The worst snipe we found was just .004" deep. (To give you a number to compare this to, a human hair measures about .003" thick.) The DeWalt recorded only .0015" of snipe on the front end. The Delta registered just .001" of snipe at both ends.

Continued from page 70

Which is the Best Machine?

We were pleased to find that all of the test planers did an excellent job, and we doubt that you could go wrong with any of them. Their uniformly high quality made it tough to choose one above the rest.

But after the wood chips had settled, we called it a tie between the Delta and the DeWalt. Of these two, the DeWalt incorporates more innovative features; we especially liked the turret-style depth stop and the zero-reset dial on the handle. However, the Delta impressed us with its great surface finish, knife lifter, and table adjustment; we also appreciated the convenience of its quick-change disposable knives. **WJ**

Product testing: Dick Coers

Photographs: Kevin May, Randall Sutter

Written by Tom Jackson

SOURCES

Delta: 800/438-2486

DeWalt: 800/433-9258

Jet: 800/274-6848

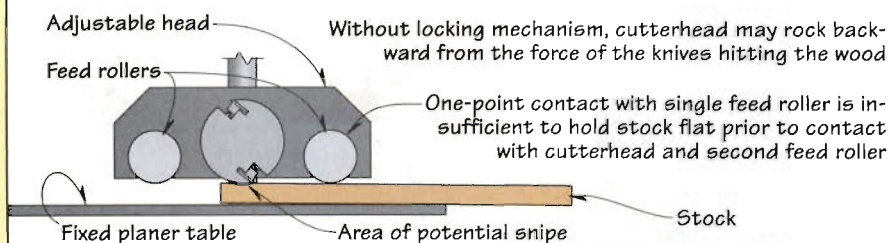
Grizzly: 800/523-4777 east of the Mississippi, 800/541-5537 west)

Sears: 800/377-7414

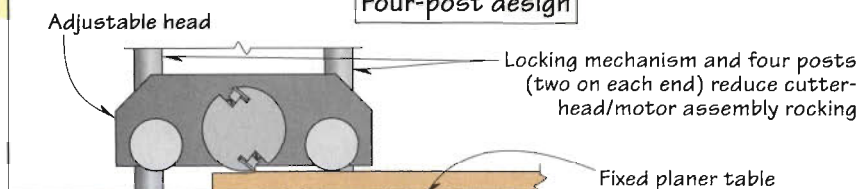
Editor's Note: Just before we went to press with this issue, AMT also announced a four-post portable thickness planer listing for \$375 in the company's current catalog. We haven't had an opportunity to test this unit yet, but will as soon as a unit becomes available. For information, contact the company at 800/435-8665, and look for our review in a future issue of *Woodworker's Journal*.

Planer Snipe: The Causes and Cures

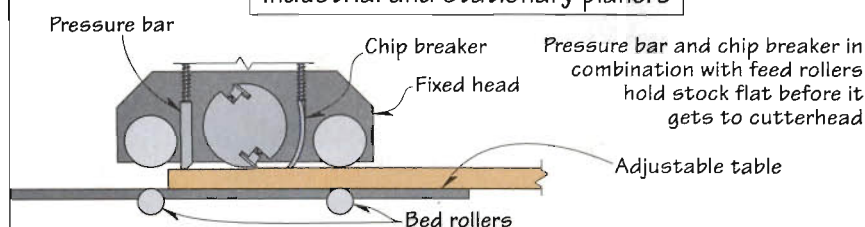
Two-post design



Four-post design



Industrial and stationary planers



PORTABLE PLANER SPECIFICATIONS

Manufacturer/Model	Delta 22-560	DeWalt DW733	Grizzly G1017	Jet JWP-12-4P	Sears Craftsman 23378
Motor Amps	15	15	16	16	14
Cutterhead Speed (RPM)	8,000	10,000	8,500	8,000	8,000
Max. Depth* Cut/Width Stock	1/8" on 7" or less	1/8" on 5 1/2" or less	1/16"	1/8" on 5 1/2" or less	3/32" on 5" or less
Stock Thickness* Max.	6"	6"	(elevates over 6") 5"	6"	6"
Stock Thickness* Min.	1 1/64"	5/64"	1/4"	5/64"	1/2"
Stock Length* Min.	12"	12"	6"	13"	14 1/2"
Knives	Disposable Double Edge	Resharpenable Single Edge	Resharpenable Single Edge	Resharpenable Double Edge	Resharpenable Double Edge
Cord Length	6'-6"	10'-2"	5'	6'	6'
Weight	65 lbs.	75 lbs.	73 lbs.	60 lbs.	68 lbs.
Warranty	2yr.	1yr.	1yr.	2yr.	1yr.
Street Price	\$399	\$460	\$400	\$370	\$420
*As specified by manufacturer					

ACCESSORIES FOR THE BENCH

A survey of some ancient
tool designs and some
recent innovations

Suffering from slippage?
These hold downs, hold
fasts, and bench dogs set
up in just seconds and turn
almost any workpiece into an
immovable object.

Most workbenches serve two basic purposes: they collect tools and clutter and they help you hold wood securely. If you're interested in the latter, we present here the second in a series of articles on outfitting your bench. In our first installment (Sept./Oct. '97), we reviewed vises—the primary wood-holding component of a woodworker's bench. In this issue, we'll focus on your second set of hands—bench accessories such as hold-downs, dogs, and dedicated clamps.

Bench Dogs: One of Woodworking's Best Friends

Nobody knows who first named these little helpers dogs (or why), but they've been a loyal companion in workshops for thousands of years. The first versions were wooden and relied on wedges to create the clamping force to hold a workpiece. Today's dogs are usually brass or steel and work in tandem with your vise to hold the workpiece tightly.

With a vise-and-dog system, you can hold a board firmly on the bench and perform most sanding, routing, carving, and planing tasks without having to fiddle with clamps. The top end of the dog stays below the workpiece's face, so you can work the entire surface of the wood without interruption, interference, or re-clamping.

We found two basic styles—those with round bodies and those with square. On either type, a spring-tensioned mechanism of some sort

holds the dog tight in the hole at the required height. Tapping on the dog's top or bottom adjusts the height. To prevent the vise's clamping force from lifting the workpiece off your bench, the face of a round dog is typically tapered at about 3° to create downward pressure. With square dogs, we get the same effect by angling their square holes.

Square Dogs For Square Holes

Square dogs come in several sizes (*photo A*). Ulmia, a German firm, manufactures two models: a $\frac{1}{2} \times \frac{5}{8} \times 4\frac{3}{4}$ " dog and a hefty $\frac{3}{4} \times \frac{7}{8} \times 6\frac{1}{2}$ " version. The smaller Ulmia dog works with benchtops as thin as 1½". Both have spring clips that hold them in their holes. The Woodcraft Supply catalog lists the small dogs for \$34.99 per pair (#16F51), and a pair of the larger dogs goes for \$44.99 (#16A71). (See Sources at the end of the article to contact the firms listed.)

Veritas makes a $\frac{5}{8} \times \frac{3}{4} \times 6\frac{3}{4}$ " square dog with a black anodized finish over a steel body and brass face. Should you accidentally strike it with a plane or chisel, the soft brass reduces the chance that you'll damage the blade. A pair of the Veritas square dogs runs \$31.95 (#05G02.01).

A word of caution: Square dogs don't retrofit easily into an existing bench. If you're building a bench from scratch, you can design it specifically for them. (You machine the square holes as dados in a solid edge piece, then glue this piece to the rest of the benchtop.)

Retrofits require that you add a 2" or wider edge piece or skirt to the existing bench.

Round Dogs Easy To Install

Whether used in retrofits or new benchtops, round bench dogs install easily. Bore a $\frac{3}{4}$ " hole where you need it, and you're done. Round dogs offer other significant advantages, too: You can rotate them 360° and use them in pairs to hold angled or circular objects.

The two round dogs we tested seem almost identical (*photo B*). Both measure 4¾" long and are made of solid brass with angled faces. Both are machined just a hair less than $\frac{3}{4}$ " in diameter to fit without binding in a $\frac{3}{4}$ " hole. The Woodtek version relies on a spring-loaded ball to hold it in the hole, whereas the Veritas gets its grab from a spring-tensioned wire that runs down one side. Woodtek sells its round dog for \$9.95 a piece (#911-194), and Veritas asks \$9.50 for one (#05G04.01) or \$17.95 for a pair (#05G04.02).

Veritas also makes a shorter version, the Bench Pup, for use in benchtops less than 1½" thick. In case you need to clamp pieces vertically, the Pup also works well in holes drilled into the edge of a bench. The Pup sells for \$7.75 individually (#05G04.3) or \$14.50 per pair (#05G04.04).

A Mixed-Breed Dog With Purebred Performance

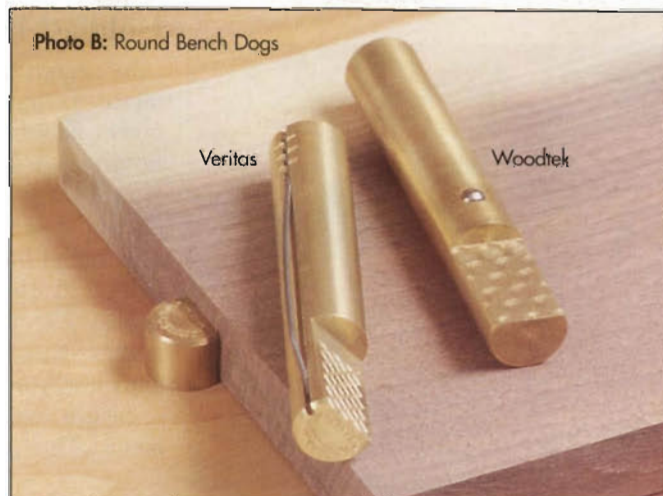
A few years back, the inventive minds at Veritas added a new twist to the old technology with the Wonder

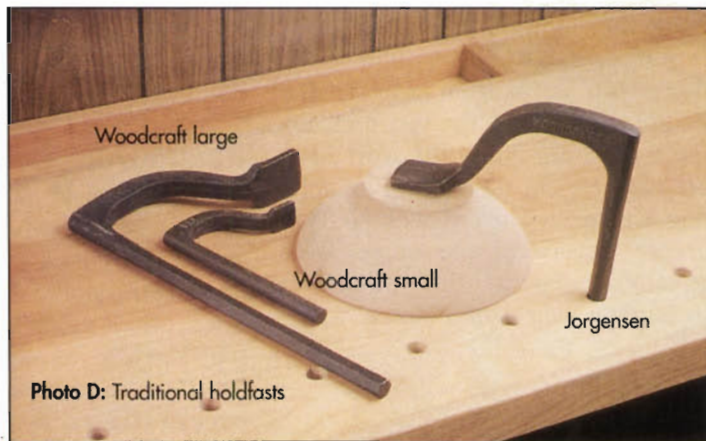
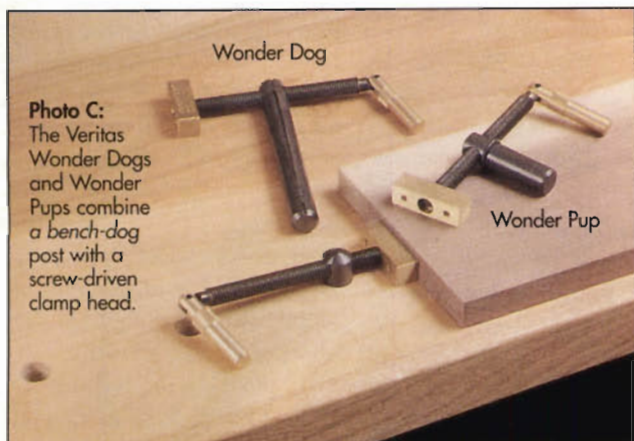
Dog—essentially a dog that clamps (*photo C*). It consists of a $\frac{3}{4}$ "-diameter post with a top end that has been tapped and threaded with a 6" lead screw. The screw has a swiveling handle at one end, and a 2"-long brass block on the other.

To use this novel device, you position a conventional dog at one end of the workpiece and a Wonder Dog at the opposite end. Then, turn the handle on the Wonder Dog to produce the in-line clamping force. This gives you all the benefits of a dog-and-vise arrangement without a vise. Since the Wonder Dog rotates 360°, you can clamp triangles, hexagons, octagons, and other odd-shaped assemblies that don't have 90° corners.

The brass head also has two screw holes on the ends that really open up the Wonder Dog's possibilities. With these, you can fasten a variety of clamping cauls to the head and hold curved or irregularly shaped objects. Wonder Dogs currently sell for \$23.50 each (#05G10.01).

The company also offers the Wonder Pup, which has a shorter 2¾"-long post and an O-ring (rather than a side spring) that prevents it from slipping through the hole. Like the Bench Pup, the Wonder Pup can be used in benchtops of 1½" or less in thickness and also in holes bored into the edge of your bench. By boring holes and positioning the Pups in $\frac{3}{4}$ " plywood, particleboard, or solid stock, you can create a variety of custom clamping fixtures for large, irregularly shaped workpieces. Veritas asks \$19.95 for the Wonder Pup (#05G10.02).





Holding On With A Holdfast

Like the bench dog, the traditional holdfast has been around for ages (*photo D*). Despite its primitive, rough-forged character, it can be a highly effective, time-saving tool.

To use a holdfast, insert the post into a $\frac{3}{4}$ " hole in your bench, place the workpiece under its flat, square foot, and strike the top with a mallet directly over the post. The downward blow wedges the post into the hole and clamps the workpiece under the foot. To release the holdfast, simply tap the bottom of the post beneath the benchtop, and it pops free.

This type of holdfast works well with objects such as carvings that require frequent repositioning. Yet it has enough holding power to secure workpieces for sanding, hand-planing, or routing as well. You can also use a holdfast with a vise to secure long boards. Just bore a hole horizontally through one of the front bench legs and insert a holdfast. Then, clamp one end of the stock in the vise, rest the opposite end on the

holdfast post, and secure it with the holdfast's foot.

On the large holdfasts, the 8" throat depth provides plenty of reach on the bench, and the 16"-long post lets you clamp objects up to 8" tall. The post on these larger models is octagonal, which gives them a bit more bite in the hole than the round posts on the smaller versions. The small holdfasts provide 4" of throat depth and clamping height.

We found two sources—Jorgensen and Woodcraft—for these traditional tools. The firms sell essentially the same product; the only differences we found were in the company name, which is cast into the pieces, and the hole drilled through the end of the post (for hanging) on the larger Woodcraft model. Woodcraft holdfasts sell for \$19.50 (#04H72, large) and \$9.99 (#04H71, small). The Jorgensen holdfasts run \$21 for the large (#1708) and \$10 for the small (#1716).

Variations On the Holdfast Theme

In recent years, two manufacturers have introduced different adaptations of the basic holdfast design. The Veritas Hold-Down gets its clamping pressure not from the whack of a mallet but from a turn of a brass knob atop the post (*photo E*). Turning the knob levers the arm downward, allowing you to fine-tune the pressure exerted on the workpiece. The post is round but

grooved, much like a ring-shank nail. The grooves grip the sides of the hole securely with minimal clamping pressure, but once you release the tension, the post slides in and out of a $\frac{3}{4}$ " hole with ease.

Like the traditional holdfasts, the new Veritas model gives you about 8" of reach and clamping height. The manufacturer machines the post from steel and the arm from a high-strength zinc-aluminum alloy. It sells for \$49.75 (#05G14.01).

If you're familiar with the Quick-Grip clamp line, you'll recognize the Hold-Down Bar Clamp (*photo F*). This consists of a Quick-Grip movable clamping head mounted on a bar that inserts through a $\frac{3}{4}$ " hole in your bench. Underneath the bench, a locking collar prevents the bar from being pulled up by the downward force of the clamping head.



Photo E: To generate clamping pressure with the Veritas Hold-Down, turn the brass knob.



Photo F: A locking collar beneath the benchtop secures the Quick Grip Hold-Down Bar Clamp for benchtop duty.

The bar rotates 360° in the hole, and the quick-release trigger and neoprene-padded clamping head make this a convenient tool for securing stock flat on the benchtop. You'll find the Quick-Grip Hold-Down Bar Clamp priced at about \$22 in home centers and hardware stores.

A Hold-Down With A Bolt

One of the most effective and inexpensive benchtop hold-downs we found was the Jorgensen no. 1623 (photo G). The 3"-tall, cast-iron body of this device is held to the benchtop by a special bolt that drops down flush into a counterbore when not in use. To use the clamp, push up on the bottom end of the bolt and slide the body over the bolt head. (A cotter pin through the body prevents it from slipping off the bolt). Then, turn the screw handle to apply downward pressure on your workpiece. To release the tool, simply back off



Photo G: A pop-up bolt anchors the Jorgensen Hold-Down clamp to your bench and allows it to exert up to 2,000 pounds of pressure.

the screw, remove the cotter pin, and slide the body off the bolt.

This small, modest-looking unit costs just \$11 and can exert up to 2,000 pounds of pressure. You can

position it anywhere you can drill a hole for the bolt, and Jorgensen sells extra bolts for \$3 apiece. The Jorgensen may not set up and clamp as quickly as the traditional hold-fasts or the newer hold-downs, but it's a good choice for cantilevering a heavy object off the edge of a bench or holding a workpiece securely against a lot of torque. **W**

Photographs: Studio Alex

Written by Tom Jackson

SOURCES

Lee Valley & Veritas
800/871-8158

Woodcraft Supply
800/225-1153

Jorgensen
312/666-0640

Woodworker's Supply, Inc.
800/645-9292

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A Turning Workshop With John Jordan

WJ staffers hit the road to learn bowl and hollow-vessel turning from one of the masters

by Tom Jackson



▲ John Jordan (at right) gives Jim Kroll some pointers on hollowing out a bowl.



◀ The bowls produced by our class of four during two days of turning instruction.

Last spring, some of us here at *Woodworker's Journal* got the bug to take a road trip and expand our repertoire of woodworking skills. Dick Coers, our designer/craftsman, had been experimenting with bowl and hollow-vessel turning, a subject that had also caught the fancy of contributing editor Bob Colpetzer. After surveying the seminars and classes available, we selected one of John Jordan's woodturning workshops.

Known for his carved and textured hollow-vessel turnings, John has taught and lectured throughout the U.S., Canada, the U. K., and Australia. His work has been displayed at the American Museum of Art, the Smithsonian, the High Museum of Art, the American Craft Museum, and the White House. For turners and woodworkers who would like to

learn more about his methods, John also conducts a handful of three-day turning workshops each year at his studio in Antioch, Tennessee, just south of Nashville.

Our class included Dick, Bob, and myself from the magazine, as well as Jim Kroll, a Chicago-area homebuilder. Because of scheduling conflicts, we couldn't commit to the full three days, so John agreed to give us an abbreviated two-day version of his basic course.

Class Starts At the Woodpile

John's classroom/studio occupies a brightly sunlit 1,000-sq. ft. building and includes a full shop with four lathes, including a Oneway 2036, the current Cadillac of lathes. To start day one, we met in the studio, went over the course agenda, and then stepped out to the woodpile. Since he turns all

of his projects from green wood, John keeps a pile of log sections outside under a tarp. We chainsawed bowl blanks for the hands-on work to come while John briefed us on how to get the best possible material from a log, how to orient the grain for different effects, and how to deal with numerous wood imperfections.

Back inside the studio, John revealed his two commandments of bowl turning: first, rub the bevel—that is, keep the bevel of the gouge in contact with the wood; second, point the tool in the direction of the cut. John believes that if you stick with these two basic rules, you can perform a variety of cuts safely with little chance of catching your gouge on the workpiece. Despite their simplicity, most of us managed to violate these rules at least once.



◀ Bowl blanks for the day's turning were harvested green and come straight from the woodpile.

▲ On a bark-edged bowl, John shows how end grain and edge grain react differently to the cutting action of a gouge.

After a brief lecture on the various stages of making a bowl on a lathe, John turned a bowl from start to finish, which took us up to lunch. During the next stage, we each selected a bowl blank and went to work on the lathes.

Sharpening Makes The Difference

We all discovered early on that we needed to refine our sharpening skills. John sharpens his deep-fluted bowl gouges with a side-grind profile. He uses the long cutting edge formed by this grind for a whole range of operations, from roughing out shapes and hogging out waste to the delicate finishing cuts you would normally get from a scraper.

Before putting metal to wood, John showed us how to side-grind, both free-hand and with the help of Oneway's new Wolverine Grinding Jig. (See our review of this jig on *page 84*.) To keep things moving, John reground all of our gouges and several extras he had on hand. As our work progressed, John demonstrated another important principle: when things start to get difficult, sharpen your gouge. Advice like this rarely shows up in turning books, and the difference it made was surprising.

If you've never turned green wood with a freshly sharpened gouge, it's a

pleasurable experience. With minimal tool pressure, shavings fly from the bowl blank in long curling ribbons. Before long, the four of us had covered the floor with mountains of shavings. And by day's end, everyone had completed a bowl and some had started on a second.

The next day, John demonstrated his methods for hollowing vessels, turning bark-edged bowls, carving, texturing, sanding, and finishing. Noted for his textured turnings, he showed us the full gamut of techniques from carving to stippling. Since it takes time to hollow out a vessel, we opted to skip that portion of the hands-on, and most of us used the afternoon to turn a bark-edged bowl.

Minimum Tools, Maximum Skill

Over the course of the two days, John's philosophy became clear: use a minimum of tools with a maximum of skill. On his bowls, a side-grind gouge takes care of 98 percent of the work; a parting tool and shop-made detail tool take care of the rest. The same holds for hollow-vessel work—John has found the hollowing tools that work best for him and uses them exclusively. Although he turns his own work on the best lathe money can buy, he admits

that good work can be produced on any smooth-running lathe.

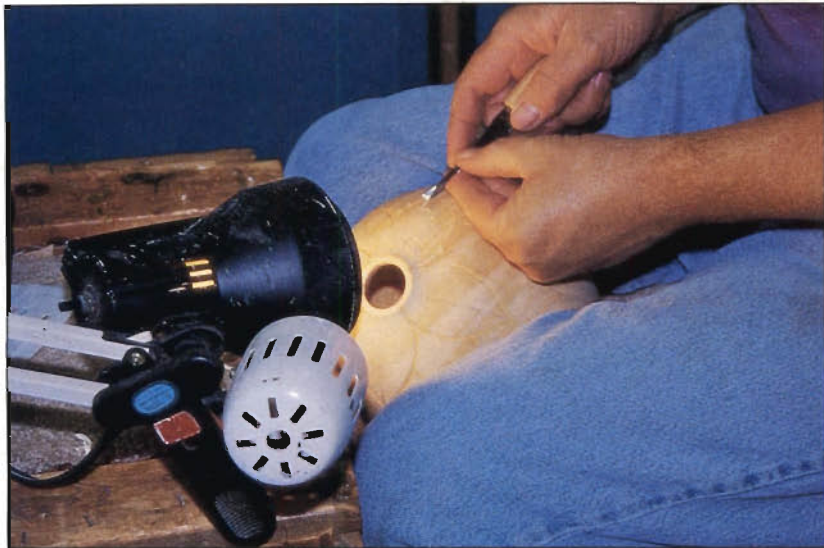
This low-tech, make-it-work philosophy extends to his texturing as well. John is perfectly happy using a \$70 Ryobi detail carver for this work. As for his choice of supplies, he likes to improvise. For example, he uses aniline shoe dye to ebonize bowls; to cushion his sanding discs, he cuts up computer mouse pads. The only costly tools that John considers mandatory are well-made, high-speed steel gouges. These run from \$50 to \$100 each, but the high-speed steel won't lose its temper (and thus its edge-holding ability) during sharpening.

Learning the Fundamentals

We came away from our condensed two-day session not with a certificate of mastery but with a solid grounding in the fundamentals. This may sound like a modest achievement, but self-taught turners can slave away for years using the wrong technique and never know it. In turning especially, it's the small details—the angle at which you hold the tool or the shape of your grinding profile—that can make the difference between steady progress and constant struggle. With an expert's guidance, such errors can be corrected before they become habits.



◀ John, Jim, and Dick examine the smooth inside surface of a bowl after it has been dressed with a freshly sharpened gouge.



▲ Carving decorative designs into a hollow-turned vessel requires good draftsmanship, a good light, and a good work clamp. Shown here is the "knee-squeeze clamp."

Since taking the class, I've gotten good results applying John's techniques at my own lathe. Yet I'm starting to substitute some of my own techniques for certain operations rather than follow his approach to the letter. My classmates confirm a similar experience. Our instructor, for example, smoothed his turnings so well with a gouge that they needed only minimal sanding, which he did off the lathe. However, the rest of us have found it necessary to keep the bowl on the lathe for a little power-sanding in order to achieve the same ridge-free surface.

Take Notes, Pay Attention

Another benefit of spending time with an expert of this caliber is the wealth of small details, tips, and ideas you can pick up if you keep your eyes open and your mental tape recorder running. Things happened pretty fast in the studio, however, so I found it useful to write out notes and make sketches after class rather than rely on my memory.

John's approach to teaching struck me as rather relaxed, reflecting more of an artist's temperament than an instructor's. He gave us no handouts or paperwork and resorted only briefly to sketching on the chalkboard. (All the more reason to make notes.) John also encouraged us to discuss and firm up

our own agenda the day before we arrived, and during the workshop he made several ad hoc course corrections. This flexibility seemed well-suited to a group with varying skill levels such as ours.

As befits an artist's approach to things, John has developed a very personal approach to turning. He has acquainted himself with his colleagues' methods, but he doesn't teach them. Rather than present students with some version of "Bowl Turning 101," John offers three solid days (two in our case) of focused quality time.

Lunch With the Masters

For lunch on the second day, John and his wife Vicki treated us to a meal at their home and an extensive slide show that featured the work of about a dozen of John's woodturning colleagues. I've seen lots of impressive turnings in books, but this show included about 30 books' worth of stunning photographs. Only a handful of these projects had ever been published or exhibited in public.

I particularly enjoyed the works that ventured way out on the ragged edge of art. Some could only be categorized as fascinating failures. But when you glimpse the full spectrum of an individual turner's work—the classics alongside the catastrophes and the ambi-

tious experiments—you get a much clearer sense of the creative process in flux. Observing an artist's meandering efforts to bring a particular idea to fruition—however vague and nutty that idea might seem—gives you courage to keep working on your own ideas.

If you're interested in attending one of John's courses, I recommend that you first acquire one or both of his videos and put in as much practice as possible. This gets the preliminaries out of the way beforehand and allows you to make more serious use of the studio time. The two videos, *Bowl Turning* and *Hollow Turning*, rent for \$14.95 each (or sell for \$39.95) from Craft Supplies USA, telephone 800/551-8876.

The three-day workshop costs \$500 and includes instruction, use of tools, materials, lunch, and snacks (some homemade by Vicki Jordan and world-class in their own right). 

For more information about classes and schedules you can contact the instructor at:

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Antioch, TN 37013
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E-mail:
johnjordan@mindspring.com

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English Garden Set May/June '90



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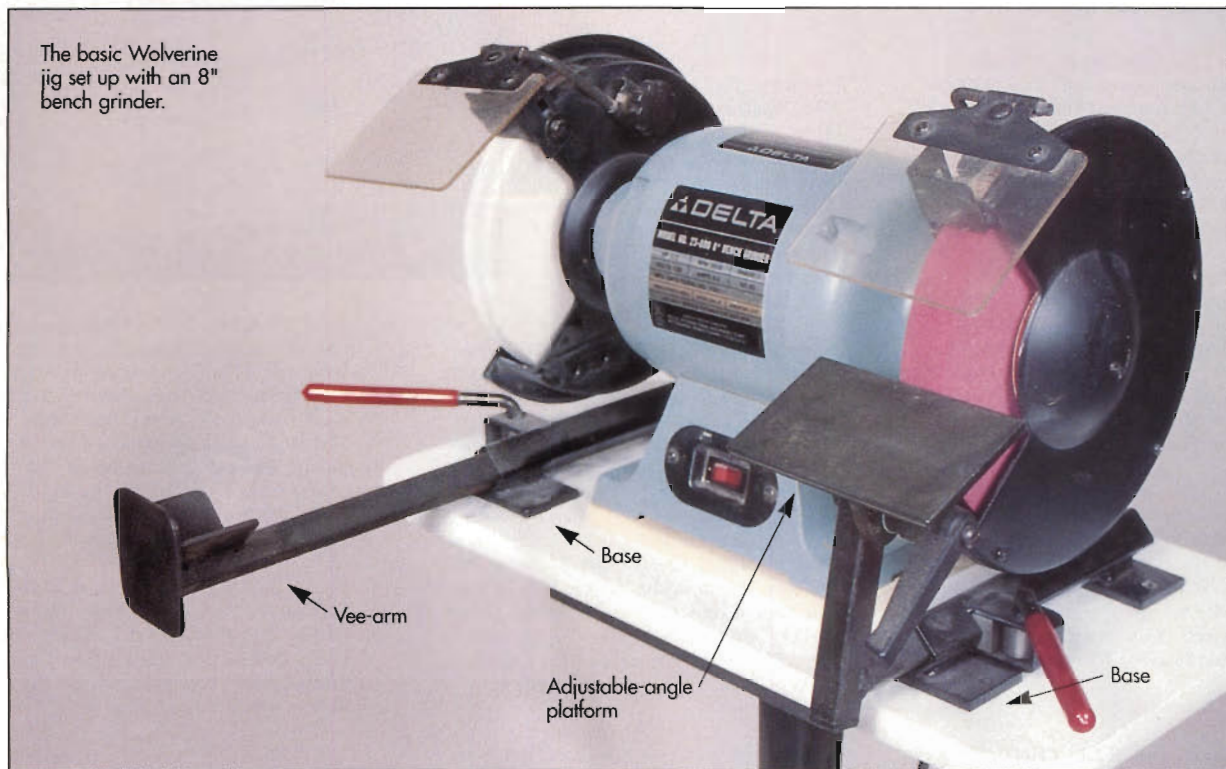
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Wolverine Grinding Jig System

Rock-steady support for sharpening a variety of tools

by Bob Colpetzer



The basic Wolverine jig set up with an 8" bench grinder.

Oneway Manufacturing, an Ontario-based company, recently developed the Wolverine line of grinding jigs and fixtures. This firm offers products designed by woodturners for woodturners, so the jigs are intended primarily for lathe tools. However, you can sharpen bench chisels, plane irons, and a wide assortment of carving tools with them as well.

The grinding jig, which is the basic component of the Wolverine line, actually consists of four parts: two bases, one for your coarse wheel and one for your fine wheel; and two adjustable tool rests, a Vee-arm and an adjustable-angle platform, that slides in and out of the bases. (See the photo above.) Both tool rests interchange with both bases, which makes it easy to switch a tool from coarse-wheel to fine-wheel grinding.

A trio of accessories rounds out the Wolverine line: a wheel-dressing attachment, the Vari-Grind attachment, and a newly released skew-grinding attachment. I used this system over a period of several weeks to grind a variety of tools. Here's how it works and what I found.

Grinding With the Vee-arm

The Vee-arm was designed to steady roughing gouges, spindle gouges, and some bowl gouges during the grinding process. To use it, you place the gouge handle in the pocket at the end of the Vee-arm, then slide the arm in or out of the base until the gouge's bevel lies flat on the wheel. Clamp the Vee-arm in place using the cam locking lever on the base. Lift the gouge off the wheel and turn on the grinder. Then, lower the gouge to the



Photo A: To sharpen gouges, use the Vee-arm to support the tool at the proper angle to the wheel.

wheel and rotate the handle to grind the desired profile (*photo A*).

You can also sharpen straight-sided and diamond parting tools quickly using the Vee-arm to establish the grinding angle. Light grinding on both bevels also keeps the profiles equal and maintains the cutting edge in the center of the tool.

Two Ways To Grind Skews

With the Wolverine system, you can use one of two methods to grind straight and radius skews. For the first method, insert the handle of the tool in the Vee-arm pocket, using it to establish the grinding angle as you did with the gouges. To generate a sharp edge, just bring the bevel of the skew to the spinning wheel and slide it sideways. For rounded or radius skews, follow the same procedure, but first grind the initial radius using the adjustable-angle platform. Then, grind the bevel, rolling the skew in the Vee-arm pocket.

To use the second method, attach the optional skew-grinding jig to the pocket of the Vee-arm. This jig provides two additional pockets, one on each side of the centerline. These off-set pockets establish the proper angle of the skew and allow you to grind the skew perpendicular to the sharpened edge. In use, the skew-grinding jig gave me a consistent bevel and angle along the entire surface of the grind.



Photo B: The Vari-Grind attachment used with the Vee-arm makes it easy to grind a sharp, even profile on deep-fluted bowl gouges.

Using the Vari-Grind Attachment

In combination with the Vee-arm, the Vari-Grind attachment lets you grind deep-fluted bowl gouges with a side-grind profile (*photo B*). This attachment has a tool-clamp/protractor head with an adjustable leg. To use it, secure your gouge in the clamp, adjust the leg to the desired angle, and seat the end of the leg in the Vee-arm pocket. Then,



Photo C: The large surface on the adjustable-angle platform provides plenty of support for sharpening scrapers, chisels, or plane irons.

swing the end of the gouge to the right and left to achieve the side grind. In the past, I've used different jigs for producing this profile, and I found the Wolverine to be the easiest to set up and use.

Adjustable-Angle Platform

To grind scraping tools, use the 3x5" adjustable-angle platform that comes with the basic jig (*photo C*). Adjust the platform so that the tool meets the wheel at the desired angle, then lock it to the base for proper clearance from the wheel. Simply let the large and sturdy platform support the tool while you grind the desired profile.

I quickly came to appreciate the platform's generous size and rugged steel construction. Many tool rests are made of aluminum, which quickly galls and wears as tools are slid across its surface. Add the inevitable grinding dust to an aluminum tool platform, and it becomes almost impossible to move a tool smoothly across the surface. With the steel platform, the tools glided smoothly and I ended up with a more evenly ground profile.

Sharpening Other Tools

Although designed primarily for lathe tools, the Wolverine Vee-arm provides support for a variety of carving gouges. Having an established grinding angle and steady support under the tool allowed me to use a very light touch, which produced excellent results on even the most delicate carving tools. The adjustable-angle platform can also be used to sharpen almost any chisel or plane iron.

Continued on Page 86

Wolverine Wheel-Balancing System

With most pedestal and bench grinders, balancing the wheels poses a problem. Because of their mass and the speeds at which they turn, any unevenness in wheel density will cause some vibration. This can make it difficult if not impossible to obtain a smooth finish and keen edge on tools, and it will take its toll on your grinder bearings as well. To determine if you have a balance problem, lay a coin on your grinder motor and then turn it on. If the coin vibrates off, you have a problem and should correct it.

Until recently, only heavy industrial machines have come equipped with a wheel-balancing apparatus. Now, Oneway has developed a balancing system for the rest of us, designed for grinders with spindles of $\frac{1}{2}$ ", $\frac{3}{8}$ ", or $\frac{3}{4}$ " diameter. It consists of a balancing fixture, one left and one right wheel-mounting flange, two spacer washers, a hardened dowel pin, and 14 screw-on balancing weights. The flanges fits wheels from $\frac{3}{4}$ " to 1" thick with an arbor-hole diameter of 1" to $1\frac{1}{4}$ ".

I found the balancing process straightforward and easy. Oneway's clearly written instructions show you how to level the balancing fixture, attach the balancing flanges to the wheels, and then screw the balancing weights to the flanges. As the final step, you install and dress the balanced wheel. Once you've balanced it, a wheel should never need rebalancing.

Having balanced the wheels on my 8" bench grinder, I can personally attest to their improved performance. The grinder now runs quietly and smoothly with virtually no vibration. If you have a balance problem, I highly recommend the Wolverine balancing system. It sells for \$65.45 direct from Oneway. Specify your grinder's spindle size when ordering.



The grinding wheel rests on the balancing fixture. The flange and balancing screws help distribute the weight of the wheel evenly around the arbor.

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User Report

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A Wheel-Dressing Tool

Even the best sharpening jigs have limited capability unless the grinding wheel has been properly dressed. The people at Oneway solved this problem by developing a well-designed dressing attachment that can be attached to either base (*photo D*).

After installing the dresser, I used the fine-adjustment knob to bring the diamond to the wheel. This device lets you make dressing passes that remove just .001" to .002" of wheel material. This conserves material, prolongs the wheel's life, and also helps prevent you from overheating and ruining the diamond. Because the dresser attaches to the base, it squares the wheel to all of the jigs and attachments.



Photo D: Dressing either grinding wheel is quick and accurate using the diamond wheel-dressing attachment.

My Conclusions

With the Wolverine system, I was able to grind consistent bevels and razor-sharp edges on all types of lathe tools. Thanks to the lever activated cam clamps (*photo E*), the setup time was minimal, and I found it easy to duplicate the previously ground bevel, which saves regrinding time as well as the expensive steel of turning tools. The Wolverine wheel-dressing attachment impressed me as the most



Photo E: Lever-actuated cam clamps lock the Vee-arm and the adjustable-angle platform to their bases.

efficient and easily controlled diamond dresser I have yet to use. Where the Wolverine system really pays off, though, is in the performance of the tools you sharpen with it. Lathe tools are notoriously difficult to sharpen well, but the ones I sharpened with this system gave me excellent results at the lathe.

The basic Wolverine jig, including the two bases, the Vee-arm, and the adjustable-angle platform, lists at \$76.50. The optional wheel-dressing attachment sells for \$56.10, the Vari-Grind attachment for \$47.52, and the skew-grinding attachment for \$25.45. The cost of the complete system might seem a bit high, but for most of us, the basic jig should serve the majority of our grinding needs. With this unit you can sharpen a standard set of lathe tools as well as your bench chisels, plane irons, and most carving tools. The optional attachments may be purchased as needed. I found that the quality and performance of this grinding system made it a good value.

You can order the Wolverine system directly from the manufacturer by calling Oneway at 800/565-7288. A catalog of the company's products, including a list of dealers, is also available. **WJ**

Photographs: By the author

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Volume 20 No. 1 through Volume 21, No. 6

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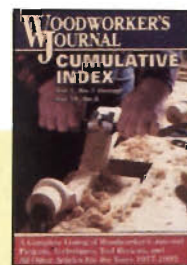
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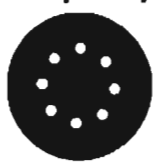
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