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December 2001

No. 152

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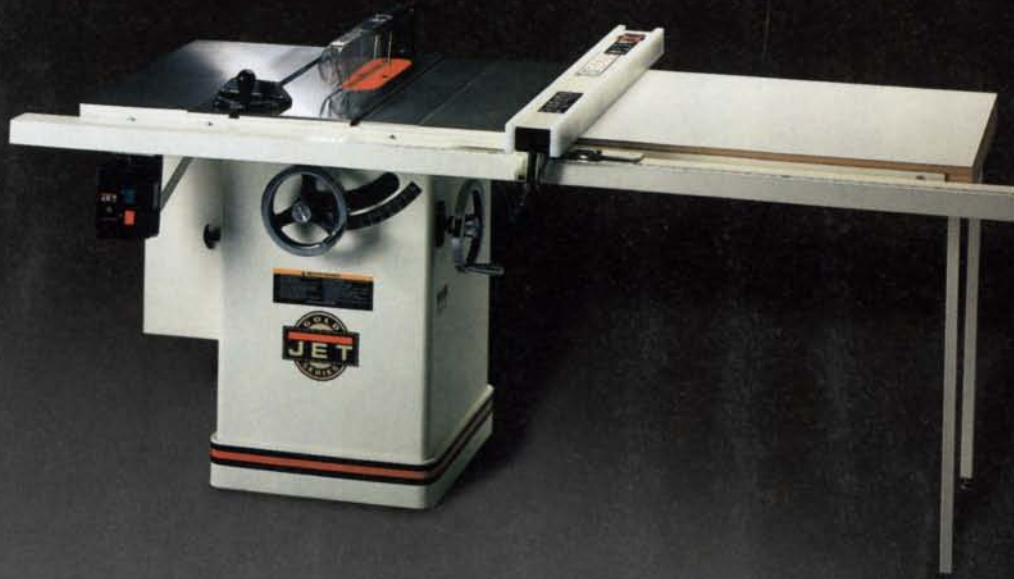


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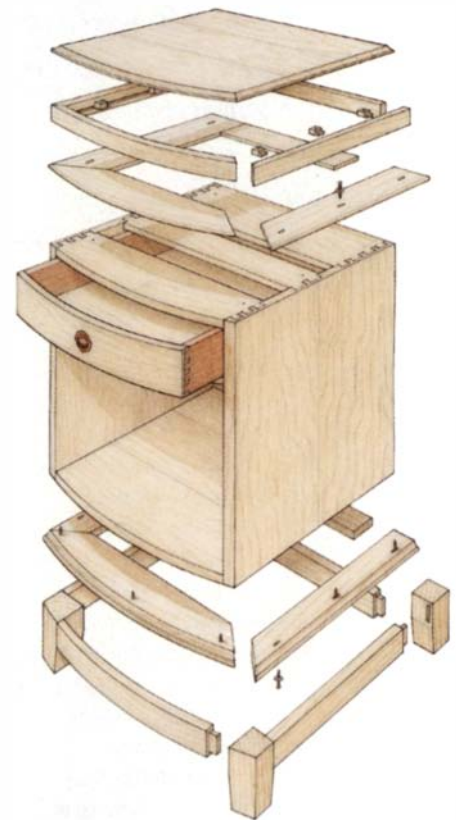
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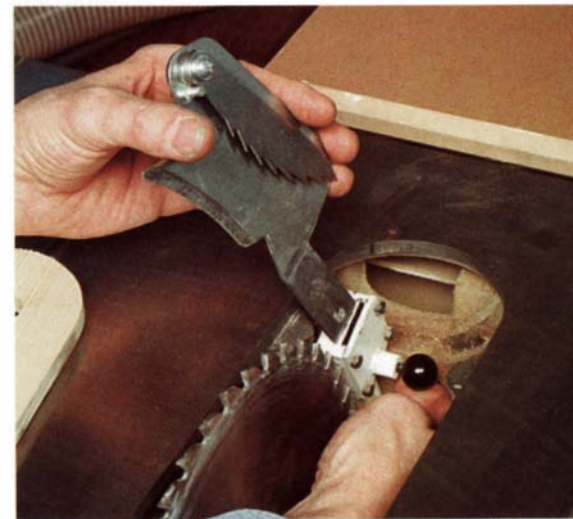
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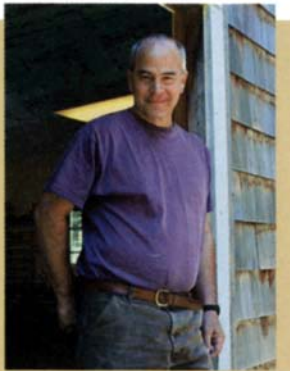


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Contributors

Scott Gibson (“An Everyday Cabinet”) worked briefly as a carpenter and later took up newspapering. He began making furniture in his mid-20s after his father, a practiced woodworker, gave him the rough parts to a small table and suggested he could figure out the rest. A former editor at *Fine Homebuilding*, *Home Furniture* and *Fine Woodworking* magazines, Gibson is now a freelance writer and furniture maker living in Steep Falls, Maine. When he’s not at the home office, he enjoys discovering the back roads of Maine on his aging BMW K100RT motorcycle.



Steve Latta (“Tablesawn Dovetails”) teaches furniture making at Thaddeus Stevens College of Technology in Lancaster, Pa. He also regularly works on private commissions. To add an academic foundation

to his firsthand knowledge of traditional furniture making, Latta is working on a master’s degree in American Studies at Penn State University, with an emphasis on American furniture. He’s already learned a lot about 18th-century shops, such as how they had an abundance of cheap labor in the form of indentured servants— young men sold into seven-year apprenticeships by their families. He’s looking forward to his final thesis, when he can build a piece of furniture for partial credit.

Ernie Conover (“Turn a Classic Floor Lamp”) is a frequently published author in the woodworking field, with seven books, three videos and hundreds of articles to his credit. His work has received numerous awards and been the subject of several one-man shows.



He lectures widely for clubs, trade-show groups and woodworking stores and is frequently called upon as a consultant and expert witness in the woodworking

field. When not writing, lecturing or consulting, he is active in providing academic oversight and teaching at Conover Workshops—a craft school founded by the Conover family.

Phillip C. Lowe (“Surface Prep: Why Sanding Isn’t Enough”) became a professional woodworker in the Navy during the Vietnam War, when he was

based for four years on a repair ship. He continued his training at North Bennet Street School, where he stayed on for 10 years afterward as an instructor and eventual head of the furniture department. As a master furniture maker, Lowe has reproduced and restored period pieces worth as much as \$2 million, for clients ranging from historic sites and museums to private citizens around the country. His latest venture is The Furniture Institute of Massachusetts, a two-year program he teaches at his shop in Beverly, Mass. He graduated his first class, three students strong, in June of this year. Lowe also offers summer workshops.

William Duckworth (“Protect Your Hearing in the Shop”) received a degree in English literature from Rhodes College and worked several years in the publishing business in New York City before he began a self-employed career in woodworking. He spent 18 years building cabinetry, furniture and architectural millwork for commercial and residential applications before signing on with *Fine Woodworking* in 1995. He’s been busy building a basement addition to his house that will serve as a new shop space, and he’s grown to favor disposable earplugs.



Roger Holmes (“Dressing Up a Basic Box”) lives in Lincoln, Neb., where he makes furniture for friends and family. He worked for *Fine Woodworking* as an associate editor in the early 1980s. He now produces gardening books at his small publishing company, WordWorks. He is the author of *The Complete Woodworker’s Companion* (Watson-Guptil, 1996).

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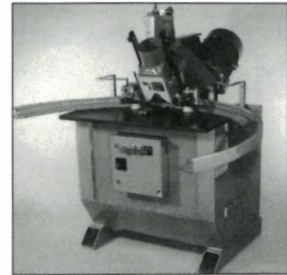
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Putting woodworking in perspective

The events of Sept. 11, 2001, and the aftermath of these terrorist attacks on the United States have changed people throughout the world in many ways. Like others across the globe, those of us who publish *Fine Woodworking* are deeply affected by the tragedy and want to express our heartfelt sympathy to the victims and their families.

Such events are bound to make us put our own lives in perspective and to think about the value and quality of our work and our leisure activities. Woodworking might seem like an insignificant pursuit compared with the important work of rescuers, soldiers, firefighters, police officers and doctors. But woodworking is not alone in that regard.

We assume that you, like those of us here at *FWW*, have been doing a lot of thinking about many aspects of your lives. For some, woodworking in their shop is a necessity because it is how they make their living. For others it is an escape from the demands of life. And for still others woodworking is therapy.

Our hope is that at a time like this, your woodworking offers you a place where life—its transitory nature and its incredible value—can be contemplated and put in perspective.

In defense of turners worldwide—In C. Robert Alexander's letter in the October issue (*FWW* #151, p. 8), he accuses Peter Bloch (*FWW* #150, p. 22) of immoral and inappropriate use of wood and implies that his work is not skilled.

Woodworking is a subtractive process. When trees are harvested, limbs are cut off and left in the forest, along with the stump. The remaining trunk is cut, dried, then milled to its finished dimensions. And then, whether you cut, carve or shave, there's more waste.

Wood turners use "found" wood more often than not. For instance, Bloch uses aspen in his lampshades, which is not generally available commercially. The skill necessary to produce thin-walled

vessels is not one to be taken lightly and requires total concentration.

Every woodworker produces waste. It is a matter of degree. And by extension what each woodworker does with the waste is a matter of his or her moral compass. If it is this matter of degree that Alexander's argument is based on, then it is an argument based on false assumptions and ignorance.

—William M. Zerby, *Albuquerque, N.M.*

Lampshade turner replies—Mr. C. Robert Alexander's letter (*FWW* #151, p. 8) is a personal attack, and totally uncalled for. In all my years of woodworking, and the 10 years of making lampshades, I have not once been criticized for wasting wood in an "immoral" way. A bit of time on my web site would have informed Alexander that the wood I use is a junk species, and if I wasn't using it, it would simply die on the stump or be chipped up for pulp. Additionally, all parts of the logs are used in some way. The shavings get mulched for gardens, and the solid chunks are given to the local school where they are painted by the students and stacked up into totem poles. If he has that opinion about my work, then presumably he feels that way about almost all wood turners, who start with heavy pieces of wood and carve away most of the stock to make something elegant and lightweight. I must assume that Alexander has found a unique product that he makes where he is using the bark, the leaves, the pith of the log ... and perhaps even the roots.

—Peter Bloch, *New London, N.H.*

A sticky Q&A debate—In your August issue, William Duckworth responded to the Q&A "Wood veneer and contact cement" (*FWW* #150, pp. 96, 98) by offering the following advice: "Your problem arose because the solvent in the lacquer soaked through the veneer and delaminated the contact cement." Duckworth further added, "To solve this problem in the future, never use contact cement as an adhesive for wood veneer," by inference paper-backed veneer.

The United States market for paper-backed veneer sheets is well over 100 million sq. ft. per year. Ninety-five percent of this material is laminated using contact



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Letters (continued)

adhesive. Contact adhesive, properly executed, is specifically recommended for application of paper-backed veneers.

The backings of paper-backed veneers are impregnated with various resins to prevent finishing solvents from penetrating the glue line and to keep contact cement solvents from bleeding through to the veneer.

Diagnosing a failure with the scant information provided by the reader is nearly impossible. I would have to ask a number of additional questions to determine an appropriate response.

—Mike DiGiuro, vice president, product development, Flexible Materials Inc.

I'm a commercial woodworker with 30 years' experience. While I agree with Mr. Duckworth's low opinion of the holding qualities of contact cement, there are places nothing else will work, and it can be done successfully. An example would be covering a 10-ft.-long curved wall. I have pieces done with contact cement, which for better than a decade

show no sign of failure. If it's possible to use another adhesive, that's always the first choice. By following some simple guidelines, contact cement will work.

There are some techniques that greatly increase the chances of getting a satisfactory result. First, use a good cement. Stick with the professional grades—I've had success with Fastbond 30, a water-based cement from 3M. Next, prepare the surfaces properly. Scuff the paper backing on the veneer thoroughly and wipe down both surfaces with a tack rag. Use enough glue and avoid dry spots. Then give the glue plenty of time to dry before applying the veneer. Once attached, go over every inch with a veneer paddle, then follow up with a hammer and block—you need a lot of pressure to do it right and J-rollers and the like simply don't provide it.

The most insidious danger lies in finishing. If you're using a finish with "hot" solvents, such as lacquer or any of the catalyzed finishes, seal the surface

with numerous light mist coats applied over the course of a few days before spraying on full coats. Each mist coat should be completely dry before another one is applied. I use a catalyzed sanding sealer because subsequent coats won't redissolve the previous coat.

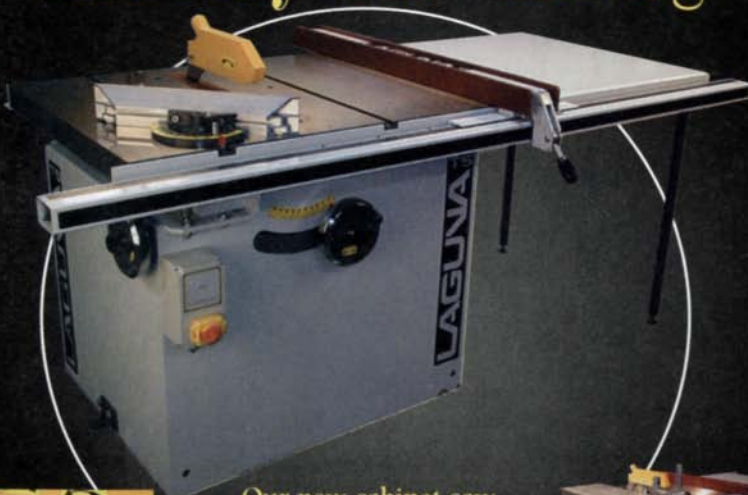
Lacquer, in particular, if sprayed on bare veneer, tends to flash-dry on the surface almost instantly. Meanwhile the still "wet" solvents beneath have a tendency to migrate through the veneer and the paper backing, dissolving the glue line. It can take weeks before the failure becomes evident.

Finally, and this cannot be overstressed, don't put the piece in direct sunlight or

Writing an article

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Letters (continued)

near a similarly intense heat source. If you do, the surface will bubble once it gets hot enough. —*Mark Davis, Prescott, Ariz.*

WILLIAM DUCKWORTH REPLIES: I am happy to hear that Mark Davis has had success using contact cement to glue veneer to curved surfaces. His technique of applying several light mist coats of sealer as barrier coats to minimize solvents bleeding through the veneer is valid.

But I do take issue with his statement that there are “places nothing else will work.” A visit to an antique shop will turn up ample evidence of the reliability and holding power of hide glue for veneering curved surfaces.

From the tone of Mike DiGiuro’s letter, I got the idea he felt as though I was impugning paper-backed veneer, which his company manufactures. Far from it: In my nearly 20 years as a cabinetmaker and an architectural woodworker, I laminated hundreds of square feet of it: I love the stuff. I’m glad to hear that his company impregnates the paper backing

with resins to prevent bleed-through in either direction.

But it’s no secret why some people choose contact cement for gluing up veneer: It’s quick and cheap. And because much of the furniture and architectural millwork produced on a commercial scale has a limited life span from the get-go, it doesn’t really matter that it may not hold up over time. Most *Fine Woodworking* readers invest time in their projects with the hope of producing something a little more permanent.

My biggest gripe with contact cement, however, is that it allows too much creep, and in my opinion that makes it a poor choice for laminating wood veneer.

Correction—A numbers of readers pointed out an error in the Rules of Thumb on metalworking (*FWW* #151, pp. 100, 102). Because of a typographical error, incorrect pitch numbers were given for two common thread sizes. The correct numbers are $\frac{5}{16}$ -18 and $\frac{3}{8}$ -16.

Clarification—The DeWalt charger pictured in “Peak Power for Cordless Tools” (*FWW* #151, p. 51) does use a micro-processor to control the charger. Although Fred Sotcher’s advice is on par, I want to clarify that all of DeWalt’s chargers (past and present) do use a micro-processor. —*Todd Walter, DeWalt public relations account manager*

About your safety

Working wood is inherently dangerous. Using hand or power tools improperly or ignoring standard safety practices can lead to permanent injury or even death. Don’t try to perform operations you learn about here (or elsewhere) until you’re certain they are safe for you. If something about an operation doesn’t feel right, don’t do it. Look for another way. We want you to enjoy the craft, so please keep safety foremost in your mind whenever you’re in the shop.

—*Timothy D. Schreiner, editor-in-chief*

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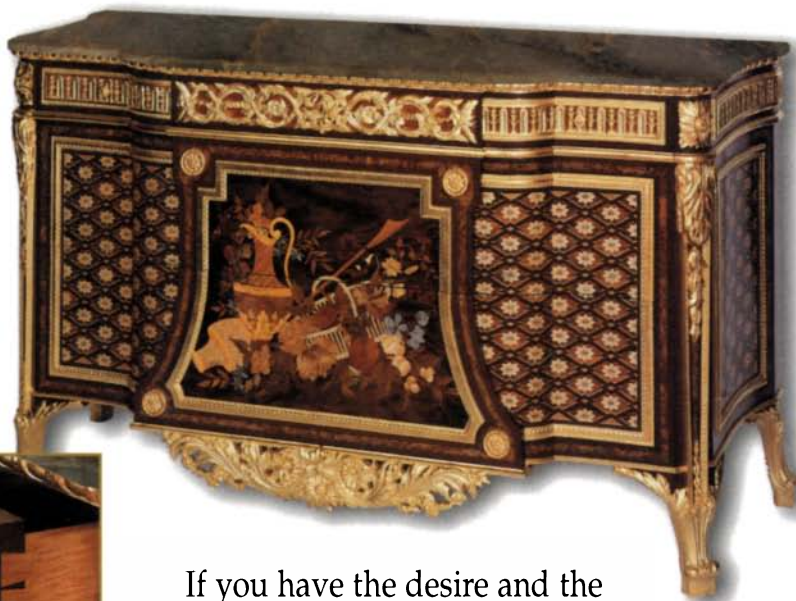
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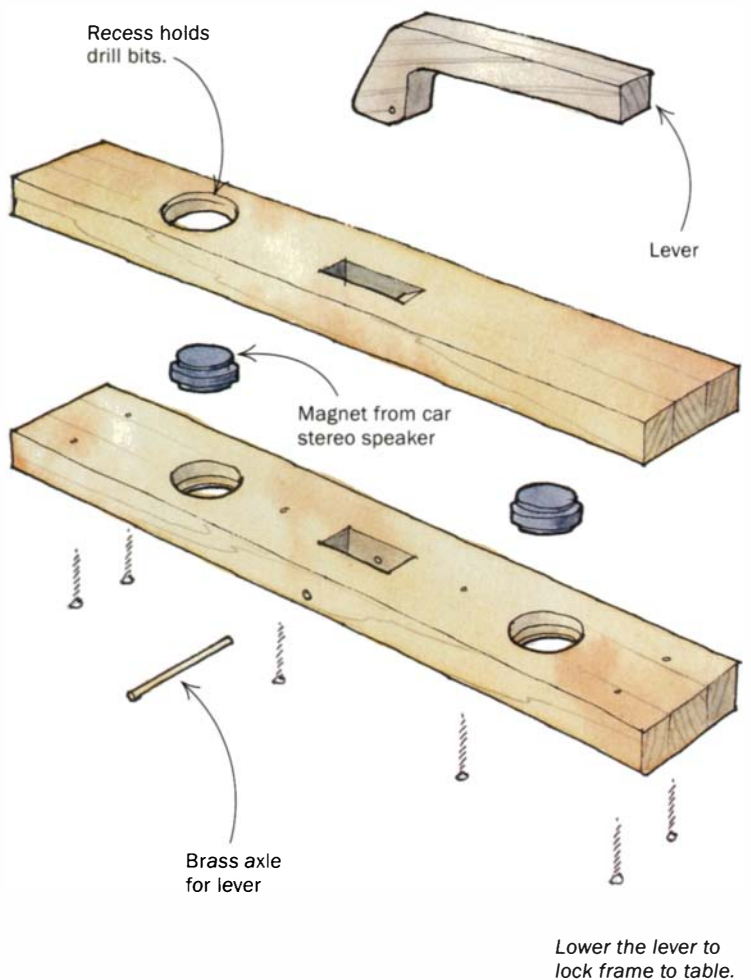


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Magnetic drill-press fence

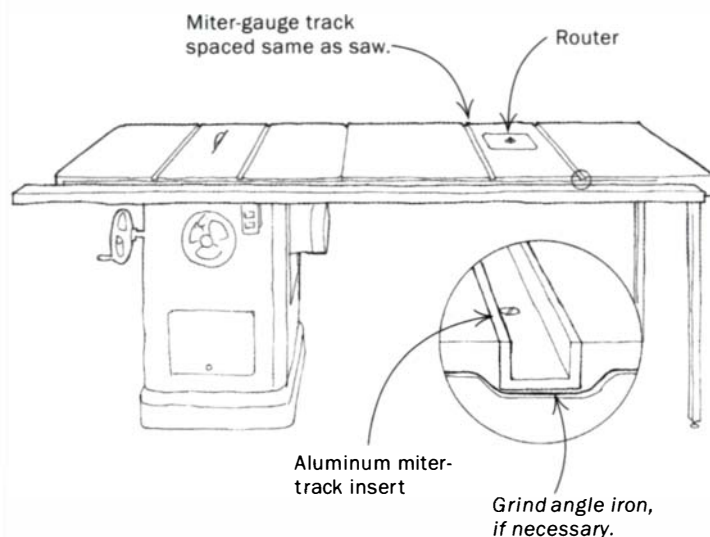


This magnetic drill-press fence is easy to build, simple to adjust and locks down tight. As an added bonus it has a handy magnetic cup for holding loose drill bits.

In the first version I made, the strong pull of the magnets made it difficult to fine-tune the fence's location on the drill-press table. To solve this problem, I installed a handle with a lever that raises the fence enough to break the magnetic pull. This improvement made it easier to adjust the fence. Once the fence is located where I want it, I lower the handle, and the strong magnetic pull takes over, securing the jig to the iron drill-press table. It works great, but you need to take care not to bang your workpiece too hard against the fence, which may cause it to move slightly.

—Lyle Mosher, San Jose, Calif.

Router table borrows table saw's fixtures



One of the unique advantages of the high-end European combination machines is that you can use the sliding table and the cross-cut fence with both the shaper and the table saw. I decided to do something similar on my table saw by mounting a router in the extension table and installing two miter-gauge slots in the extension table that matched the spacing of those on the saw table. This allows me to use not only the rip fence and the miter gauge but also any sliding fixtures I've made for the saw.

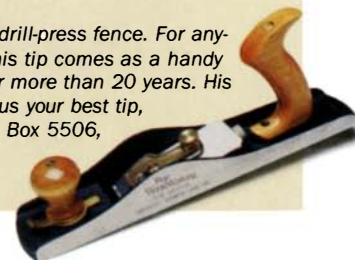
To make this setup, you need to purchase aluminum miter-track inserts (sold by Rockler and other mail-order woodworking suppliers). These inserts are necessary because most extension tables are made from sheet goods that will not hold up to extended wear.

Installation is easy. Simply use your saw's rip fence to guide a router fitted with a straight bit. Rout two parallel dados in the top

A reward for the best tip



Lyle Mosher won an engraved Lie-Nielsen handplane for his winning tip about making a magnetic drill-press fence. For anyone who has tried to find a suitably flat clamping surface on the underside of a drill-press table, this tip comes as a handy solution to a common problem. Mosher has practiced residential architecture in San Jose, Calif., for more than 20 years. His self-taught woodworking pursuits consist of making cabinets and furniture for his own home. Send us your best tip, along with any photos or sketches (we'll redraw them) to *Methods of Work*, Fine Woodworking, P.O. Box 5506, Newtown, CT 06470-5506.



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Methods of Work (continued)

of the extension table, matching the spacing of the slots in the saw table. Screw the aluminum miter-track inserts in place, and you are ready to go.

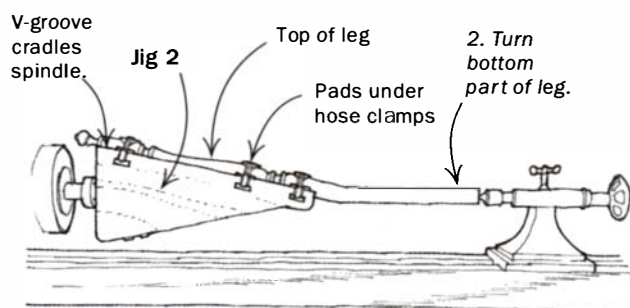
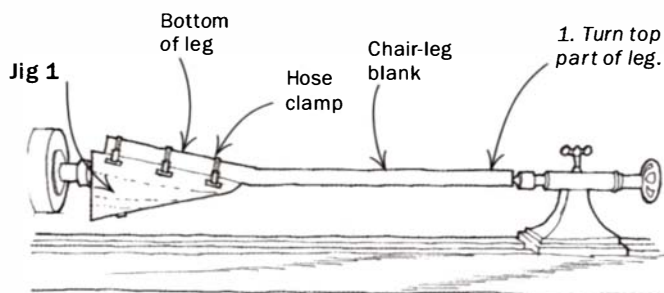
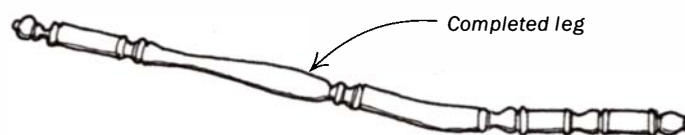
One word of caution: Be sure to grind or file away the lip of the angle iron at the front and back of the extension table, as needed, to provide enough clearance before routing the groove.

—Judd Fancher, Glendale, Ariz.

Quick tip: To quickly add a great nonslip surface to your tablesaw's miter-gauge fence, spray it with a flexible rubber coating. The product I use, Plasti Dip Spray-On Heavy Duty Flexible Rubber Coating (plastidip.com), is available at many home centers and hardware stores.

—Fred H. Walsh III, McDonald, Tenn.

Turning dogleg spindles



I discovered this technique for turning the angled back legs of chairs in an old wood-turning book. First, prepare the leg blanks on the bandsaw. In most cases I use a 2-in. offset from the seat height to the bottom of the leg. With this setup, you turn the leg in two steps using two jigs.

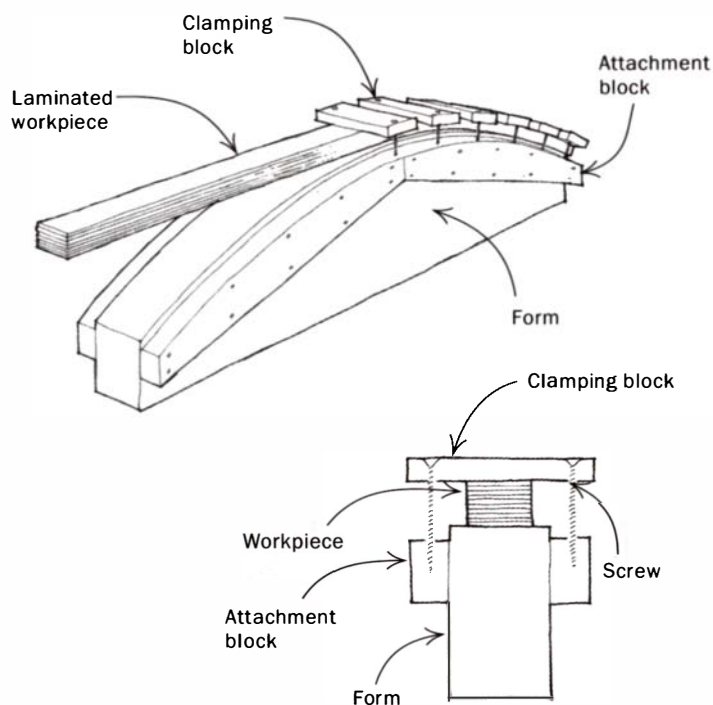
In the first step, attach the bottom portion of the leg to a jig and turn the top part above the seat. In the second step, reverse the workpiece and place the top of the leg in a second jig and turn the bottom part of the leg below the seat.

Three important principles dictate the design of the two jigs.

First, the assembly of the workpiece plus the jig must be balanced so that the center of gravity is on the turning axis. This eliminates vibration on the lathe while turning. Second, the jig must extend as far as possible down the leg to lend rigidity to the workpiece. Third, the jig must provide a convenient method of attaching the work and, in the case of the second jig, do so without damage to the already-turned portion of the spindle. To accomplish this, I made the edge of the second jig in the form of a V-groove and lined it with leather pads under the hose clamps that attach the spindle to the counterweight.

—Jon Siegel, Andover, N.H.

Gluing laminated curves with screw blocks



Here is a method for gluing up laminated curved components that eliminates the need for large numbers of expensive clamps. By using simple hardwood clamping blocks and drywall screws, you can get all of the clamping pressure you need.

First, you'll need to make a curved form for the laminated workpiece. The form should be just a bit wider than the workpiece. Then make screw-attachment blocks for both sides of the form, using construction-grade 2x lumber cut roughly to the shape of the curve. Screw the attachment blocks to the outsides of the form, recessing the curved edges slightly, as shown above.

Next, cut a few dozen 3/4-in.-thick hardwood clamping blocks long enough to span the full width of the form, including the attachment blocks. Drill pilot holes for screws about 1 in. from each end of the clamping blocks.

After a dry run, spread glue on each of the lamination plies and stack them together on the form. Place an extra (unglued) ply on top to help spread the clamping pressure and to prevent marring the workpiece. Starting at the center of the form, screw the clamping blocks in place, perpendicular to the curved plies. Space the blocks about every 2 in., more or less, depending on the radius of



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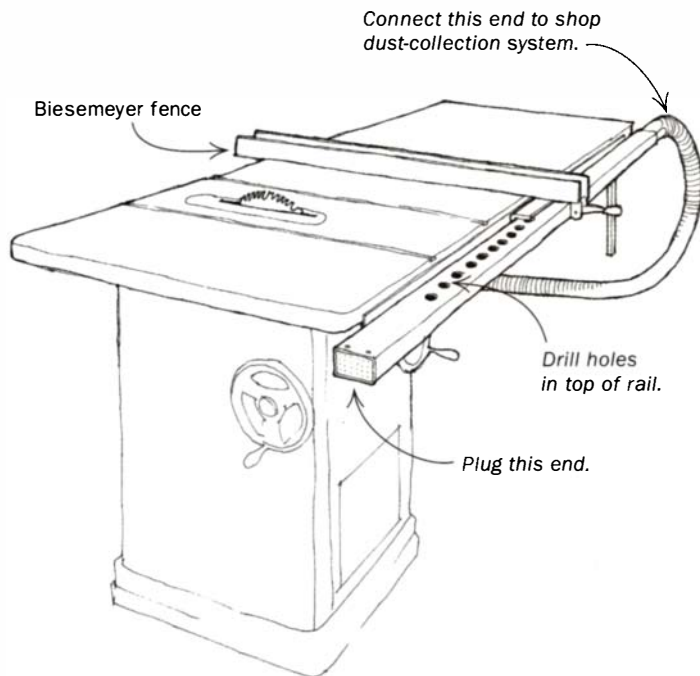
Scraper Burnisher

Methods of Work (continued)

the curve. You can adapt this same basic concept to laminate inside curves or to add edge-banding to irregular contours.

—David Gilmore, Maple Ridge, B.C., Canada

Dust collector for the tablesaw



Here's a simple modification to a Biesemeyer tablesaw fence that will dramatically reduce the amount of sawdust that sprays off the front of the saw. Drill 10 or so $\frac{7}{8}$ -in.-dia. holes, $1\frac{1}{4}$ in. apart, in the top of the Biesemeyer fence's square steel rail in the area in front of the blade. Seal off the left end of the rail with a wood plug, and attach a vacuum hose from your dust-collection system to the right end of the rail. The modifications will not affect the operation of the fence, and the holes in the fence catch much of the dust that spins off the blade.

—Timothy Dalton, Middleton, Wis.

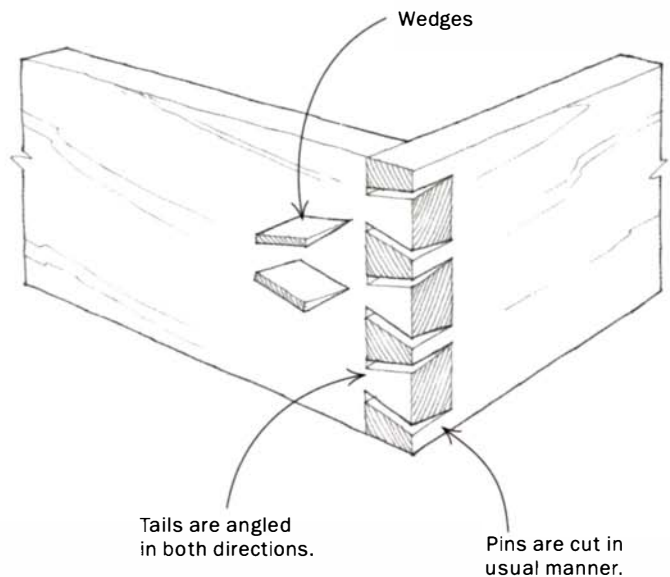
Quick tip: Bamboo skewers make great plugs for filling worn or torn-out screw holes. Put a dab of glue on the blunt end of a skewer, push it into the hole and snap it off. Skewers are available in most supermarkets.

—James McGarry, Willina, Australia

Wedged dovetail joint

I first made these wedged dovetails (see the top drawing at right) for a practical reason—to counteract the tendency of wide, dovetailed carcasses to open at the corners in my dry climate. I discovered that the resulting joint is not only stronger but also visually interesting because you get significant dovetail shapes on both sides of the joint.

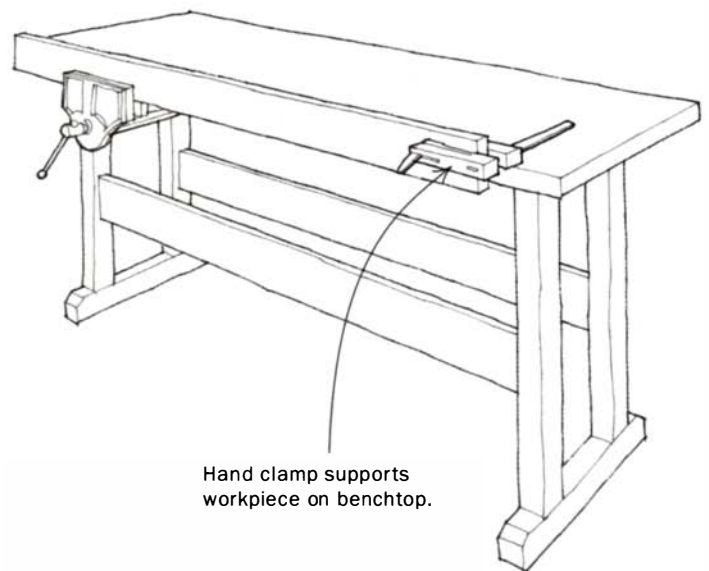
To make the joint, cut the tails first. Instead of marking the tails square on the side of the board, mark the same angle on both the top and the side. Cut the tails and remove the waste. Then mark the pins from the tails and cut the pins as usual. When you put together the joint, the inside will fit exactly, but on the outside you will get wedge-shaped gaps into which you glue and knock in



small wedges. These wedges are easily prepared with a simple jig on the tablesaw. When you knock in the wedges, the whole thing is drawn together tightly. This connection is forgiving of errors, inseparable in both directions and also quite handsome.

—Zvi Rotem, Kiriat-Tivon, Israel

Holding work for hand-jointing



If you don't have a workbench especially designed for the job, holding a long piece of wood for edge-planing is a hassle. Here's a method that is fast and simple. Clamp one end of the board in the vise and attach a hand clamp to the other end, as shown above. The clamp rests on the benchtop and prevents the board from slipping down. I use cam clamps because they require only one hand to position and tighten them in place, but any hand clamp will work.

—Bev Hardy, Poughkeepsie, N.Y.

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8" x 40 T (3/32" Kerf)	\$90	\$ 89	\$ 84
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The 10"x40T earned the Editor's Choice for the best performance regardless of price. *American Woodworker April 1998, pp 68-69.*

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10"x80Tx5/8" Delta, Bosch, Hitachi, Makita, Ryobi, AEG & all	\$130	\$125	\$118
12" x 80T x 1" Delta, Hitachi, Makita, B&D, Sears & all	\$140	\$134	\$127
15" x 100T x 1" Makita, Ryobi	\$190	\$179	\$169

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Woodworker I

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12" x 60 T	\$130	\$125	\$118

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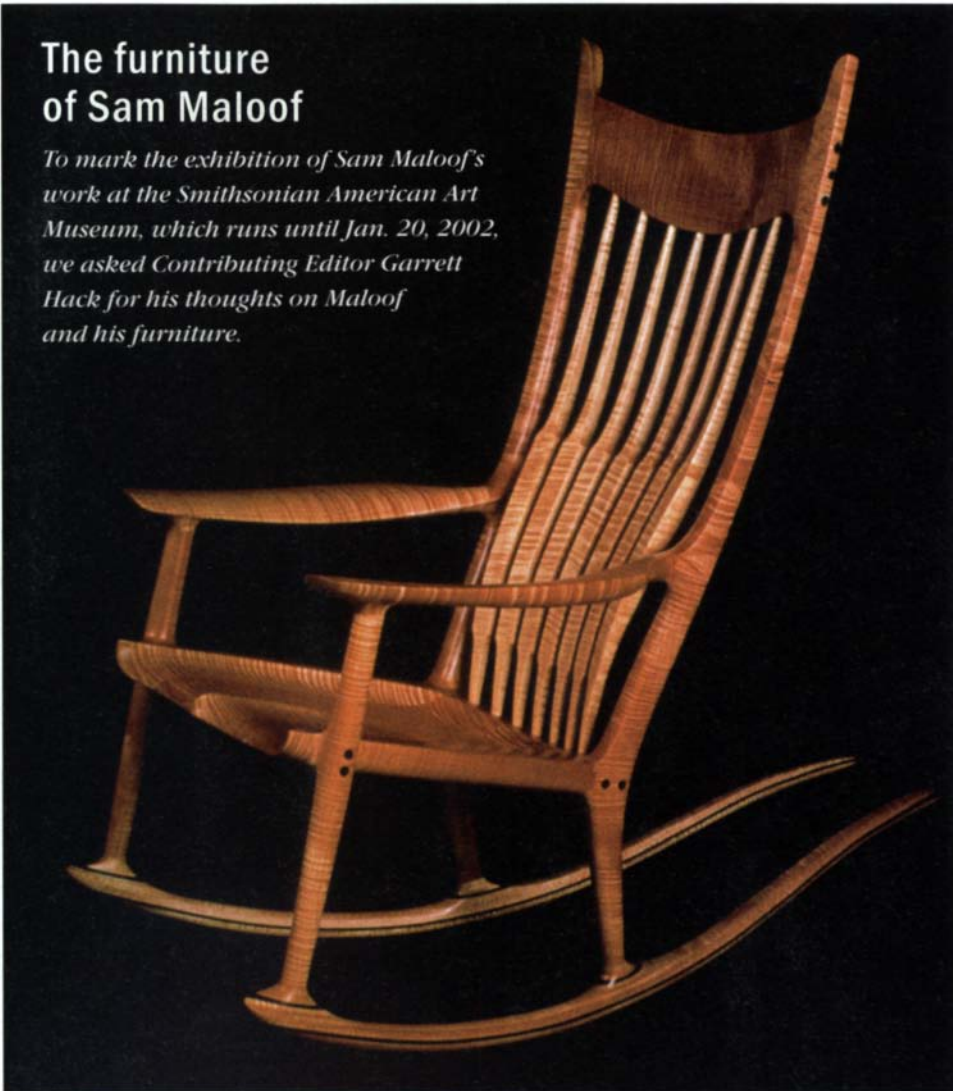
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Notes & Comment

The furniture of Sam Maloof

To mark the exhibition of Sam Maloof's work at the Smithsonian American Art Museum, which runs until Jan. 20, 2002, we asked Contributing Editor Garrett Hack for his thoughts on Maloof and his furniture.



You don't just flop into a Sam Maloof rocker. As much sculpture as it is seating, it invites you to glide into the seat, to run your fingers over the many polished surfaces and to gently start moving the long-tailed rockers. Just sitting in it you feel the touch of its maker and understand why Maloof has risen to the top of his craft. But Maloof's success is the result of far more than perfecting his rocker over a long lifetime of working wood.

To earn a good living as a furniture maker takes many skills. Being a competent craftsman is just one: It also takes unique vision, a bit of luck and the ability to sell both yourself and your work. You must be able to engage others in what you are doing, and this is where Maloof is at his best. He loves people, he loves to schmooze, and he believes deeply in his work. A little bit of Maloof's soul goes out

the door with each workpiece, and his customers know it.

Above all, I am taken with Maloof's mastery of shaping wood. He is well known for his unorthodox method of cutting complex shapes freehand on the band-saw. Through his ability really to *see* his work, Maloof understands how those curves make his rockers comfortable and how they flow through the piece.

Admired as he is, some of Maloof's joinery has other woodworkers rolling their eyes. Many of the joints in his furniture are put together with screws. Who is to say an 18th-century chair maker wouldn't have done the same given access to modern screws and glues? Despite this, there is no doubt Maloof's influence will continue for a long time.

For more information about the exhibit, call (202) 357-2700 (americanart.si.edu).

Wood webs

Woodworkers have more questions regarding finishing than any other area, and as a result the Internet has produced several web sites that attempt to provide some of the answers. The following two sites provide contrasting but complimentary services.

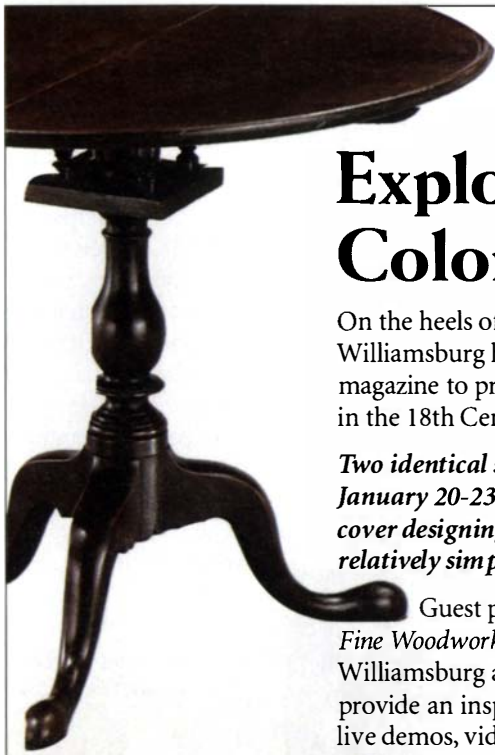
Minwax.com

Woodworkers for whom finish is still a four-letter word may benefit from a visit to this web site. You will find a list of the Minwax products along with their uses, methods of application and what other finishes and stains can be used in conjunction with them. The Wood Resources section gives brief introductions to finishing bare wood as well as stripping and refinishing old pieces, while the Shop Talk section allows viewers to post questions and to get other viewers' answers.

Homesteadfinishing.com

This is the company web site of well-known finisher Jeff Jewitt, who said his aim is to sell the best finishing products at a fair price and with the finest technical service. The site caters to all levels of finishers. The Tips page includes advice on how to touch up sand-throughs and on pressure-pot maintenance. Technical Notes has a headline to grab the attention of any teenager: "Everything you ever wanted to know about alcohol." But a wood-working parent will find the description of denatured alcohol far more interesting. The section on frequently asked questions covers topics that most frequently relate to the finishing supplies that Jewitt sells. If the answer is not found there, post a question on the forum, and most likely Jewitt will answer it personally.

—Mark Schofield,
assistant editor



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Kurt Andersen

A footrest and a hand tool. Andersen never saw a bench or a vise in the village, but much of the hand-tool work is of a very high standard.

Woodworking in Vietnam

While on a recent photography trip to Vietnam, I came across the village of Dong Ky. Despite being in the middle of rice fields, the village has a reputation of being a center for furniture making.

Each craftsman selects wood from huge piles stacked on a side street, has it band-milled to rough dimension and takes it to his shop. From then on almost all of the work is done by hand, including raising panels, cutting mortises and tenons and scraping and sanding. The only power tools are primitive and seemingly ancient bandsaws, jointers and lathes. The lack of safety equipment would give an OSHA inspector apoplexy. The prices are very competitive; for instance, a coffee table and four chairs in a

wood resembling rosewood costs \$300.

—Kurt Andersen, a professional photographer in San Francisco



Kurt Andersen

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DW364K	DW364 Saw with case	165
DW378G	7-1/4" Framers' Saw	159
DW610	1-1/2 HP 2 handle Router	149
DW411K	1/4 sheet Palm Sander w/ case	58
DW682K	Biscuit Joiner with case	169
DW705	12" Compound Mitr Saw	299
DW621	2 HP Plunge Router	199
DW680K	3-1/4" heavy duty Planer	155
DW276	Drywall Gun, 0-2500, 6.5 amp	99
DW703	10" Miter Saw	249
DW706	12" Double Bevel Compound Miter Saw	449
DW920K-2	7.2V Split Screwdriver	105

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D51845	Full round head Framing Nailier	329
D51275K	15 gauge Finish Nailier	249
D51256K	16 gauge Finish Nailier	189
D51238K	18 gauge Brad Nailier	144
D55155	2 HP, 4 gallon Compressor	349
D55153	4 HP, 4 gallon Twin Stack Comp.	309

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1660791	5 HP Model 66 Table Saw	2199
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1791279	6" Model 54A Long-bed Jointer	749
1791227GK10	Contractors Saw w/30" fence, table board and blade	899

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LP6-20XLA	Level Package	285
LD8-300PL	Level Transit - 26x	679
4810-3	ML600 Visible Beam Laser	849
4700-2	Auto 900 Visible Beam Laser	1129
ALP8-26	26x Auto Level w/ tripod & rod	379

BOSCH		
1587AVSC	Top Handle "CLIC" Jig Saw Kit with case and 9 Progressor blades	Super Sale 155

Model Description Sale		
1584V5	Barrel"CLIC" Jig Saw	164
Bosch Metal Case	for above Jig Saws	24
Bosch 30 blade assortment	for Jig Saws	29.99
1619EV5	NEW 3-1/2 HP variable speed Plunge Router	319
1274DVS	3"x21" var. speed Belt Sander	165
1278VSK	1-1/2"x12" Belt Sander	129
1275DVS	3"x24" var. speed Belt Sander	215
1276DVS	4"x24" v/s Belt Sander	225
1194VSRK	1/2" var. speed Drill w/ case	159
1613EVS	2HP var. speed Plunge Router	199
3107DVS	5" Random Orbit Sander	189
3725DVS	5" Random Orbit Sander	145
3727DVS	6" Random Orbit Sander	149
3915	10" Slide Compound Saw	479
3912	12" Compound Mitr Saw	309
11224VSR7/8"	SDS Rotary Drill	229
1347AK	4-1/2" Grinder with case	92
1617	1-3/4 HP Router - 2 handle	159
1617EVS	2 HP Router with variable speed, 2 handle	184
1618	1-3/4 HP Router "D" handle	179
1618EVS	1618 router w/ variable speed	205
3296K	3-1/4" Planer Kit	185
4000	10" Table Saw	495

NEW BOSCH CORDLESS TOOLS		
3360K	12 volt Drill Kit	165
3660K	14.4 volt Drill Kit	185
166		

More desks for Jefferson

Inspired by Lon Schleining's reproduction of the writing desk on which Thomas Jefferson penned the Declaration of Independence (*FWW* #144, pp. 64-71), a woodworker in Lynchburg, Va., has gone one, or rather two, better.

Richard McGann built the first out of poplar as a trial run, and then made two more out of solid mahogany. Where Schleining used mahogany plywood for the leaves to eliminate warping, Mc-



Richard McGann

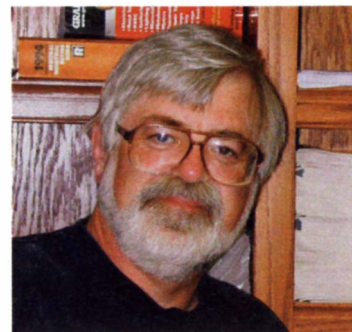
Work in triplicate. Amateur woodworker Richard McGann, from Lynchburg, Va., shows off the three reproductions he made of Thomas Jefferson's writing desk.

Gann put a premium on historical accuracy and used solid wood. He admits that this resulted in some warping but said it is "not too bad."

Jefferson owned a home just outside Lynchburg, and he spent more time there late in life than at Monticello. The house is in the middle of restoration, but visitors can see one of McGann's reproductions on display in the dining room. —M.S.

Roger Cliffe: 1947-2001

The woodworking community lost one of its great educators with the sudden death in August of Roger Cliffe. Author of nine woodworking books and star of numerous instructional videos, it was in face-to-face instruction where Cliffe was in his element.



Marc Adams

As well as a regular speaker at The Woodworking Shows, he was a lecturer at the Marc Adams School of Woodworking, specializing in teaching the basics of cabinetmaking. Adams described him as "the best in America" when it came to teaching beginning woodworkers. A professor at Northern Illinois University since 1974, Cliffe received the coveted Presidential Teaching Professorship for teaching excellence.

Behind his humorous and easygoing manner was a stress on safety and the correct way to use a tool. His most popular book, *Table Saw Techniques*, first published in 1984 (by Sterling), sold more than 250,000 copies. He also wrote a column, Homeshop Hints, for *Woodshop News*. Cliffe is survived by his wife, Cathy, and son, Austin.

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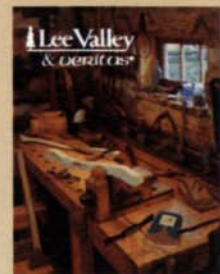
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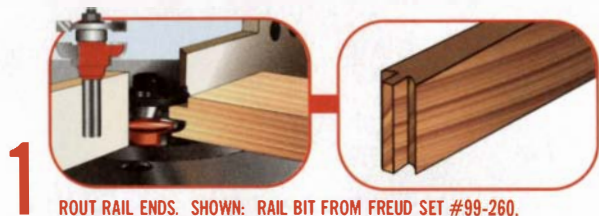
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What's the secret to building perfect panel doors?



Freud panel bits...now available with backcutters

STEPS TO BUILDING A PERFECT PANEL DOOR:



1 ROUT RAIL ENDS. SHOWN: RAIL BIT FROM FREUD SET #99-260.



2 ROUT STILES & RAILS. SHOWN: STILE BIT FROM FREUD SET #99-260.



3 IN ONE STEP, ROUT DOOR PANEL PROFILE AND BACK CUT.



4 ASSEMBLE STILES, RAILS AND DOOR PANEL.

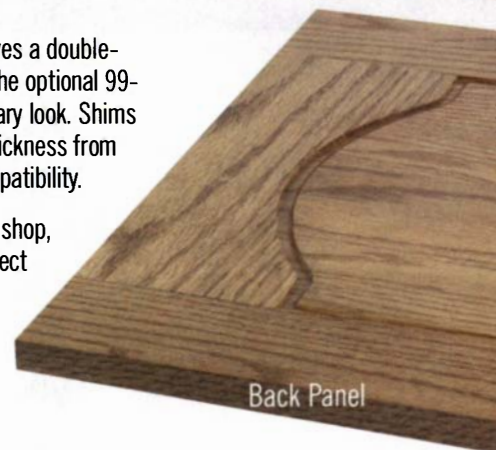
In the past, the only way to make architecturally correct panel doors required the use of two bits. Or, with other raised panel backcutter bits, you had to settle for a smaller profile.

Finally, in one easy step, you can produce panels from $\frac{3}{4}$ " wood with a $1\frac{1}{2}$ " reveal that are flush with the door frame for an architecturally correct appearance. Freud introduces 2+2 Raised Panel Bits With Backcutters.

Available in both bevel and cove profiles, these $\frac{1}{2}$ " shank bits pair a backcutter with Freud's revolutionary 2+2 raised panel bit design. This patented design has four cutting wings that produce an extraordinary smooth finish.

The included 99-562 radius backcutter gives a double-sided appearance and can be replaced with the optional 99-560 square backcutter for a more contemporary look. Shims are included to allow adjustment of tongue thickness from $\frac{7}{32}$ " to $\frac{1}{4}$ " for maximum versatility and compatibility.

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Tools & Materials

Souped-up shaving horse



A horse that holds tight. With its unique clamping system, this shaving horse maintains a secure grip on the workpiece.

Just last week it happened again. Mind you, it's not a regular occurrence, but even once a year is too much. A spindle I was working on slipped from the jaws of my shaving horse and rammed into my solar plexus, leaving me momentarily breathless.

A few days later, by coincidence, I was in Carl Swensson's Maryland workshop, straddling a souped-up shaving horse he had just made. Swensson was explaining to me the intricacies of the clamping mechanism. And with my slipped spindle still a fresh memory, I was paying very close attention.

Swensson is about to start marketing the shaving horse. And as I recently discovered, it has some attractive features, all of which are

designed to create the ultimate clamping mechanism: The pivot holes are far forward, the dumbhead is stubbed off, and the worktable is leveled. An elongated pedal, space-age rubber and fine-height adjustment are also part of the unique design. The result is a shaving horse that can securely hold a workpiece while you cut with a drawknife. And it holds even when your foot is off the pedal. The biggest surprise is an optional puppet system that lets you work between centers without interference from the clamping mechanism.



Puppet system. The optional puppet system lets you clamp a workpiece between centers. That way you can work the entire length of the piece.

The horse has only minor drawbacks. It doesn't have a saddle seat, but a pillow makes an acceptable substitute. And there's no ratchet adjustment for a one-handed rapid change from one stock thickness to another.

The basic horse sells for \$490 (\$590 with the puppet system), plus shipping. For information, call Swensson at (410) 485-5699.

—Curtis Buchanan

New products seen at summer woodworking fairs

August not only provides us with considerable bounty from the garden, but it also serves up a new crop of hand and power tools that are introduced each year at a pair of behemoth national trade shows. From Aug. 1-5, the Anaheim Convention Center in California was the site of the 2001 AWFS Fair, the bi-annual show of the Association of Woodworking and Furnishing Suppliers. And in Chicago, from Aug. 12-14, the 2001 National Hardware Show was held at McCormick Place. It appears to have been a pretty good growing season.

Anaheim

Disneyland might be the big attraction in Anaheim, but during the five days of the AWFS Fair, the Anaheim Convention Center was the exciting place to be for anyone connected to the woodworking trade. More than 19,000 registered attendees and 6,000 exhibitor representatives ignored the sunshine and comfortable temperatures outside, choosing instead to wander the long and sometimes crowded aisles of the 38,000-sq.-ft. center. Here are a few of the interesting products I came across.

The first cordless router

The cordless clan has finally married into the router family, with Porter-Cable displaying its model 9290, a 19.2-volt, 23,000-rpm cordless router that generates about 1 hp. When equipped with a ½-in. round-over bit, Porter-Cable claims the machine can round over the edges of 100 ft. of oak or 200 ft. of pine on a single charge. It sells for about \$279. For more information, contact Porter-Cable at (800) 368-1487.



Laguna introduces a 14-in. bandsaw

This European-style bandsaw features cast-iron wheels and a beefy looking blade-tensioning system. Laguna's model LT-14, powered by a 1.7-hp, 8.2-amp motor, accepts blades from ¼ in. to 1 in. wide. For those looking to resaw, the LT-14 has a capacity of 8¾ in. The price is \$895. For more details, contact Laguna at (800) 234-1976.

Two-speed portable planer

Delta Machinery has built the first portable planer with two feed speeds. Rough cuts can be made with the planer set for 60 cuts per inch (cpi), a feed rate of 22.4 ft. per minute (fpm). For finishing cuts, the machine can be slowed down to 90 cpi, a feed rate of 14.8 fpm. Model 22-580, a 13-in. planer, is expected to sell for about \$500. For additional details, contact Delta at (800) 223-7278.

continued on p. 36

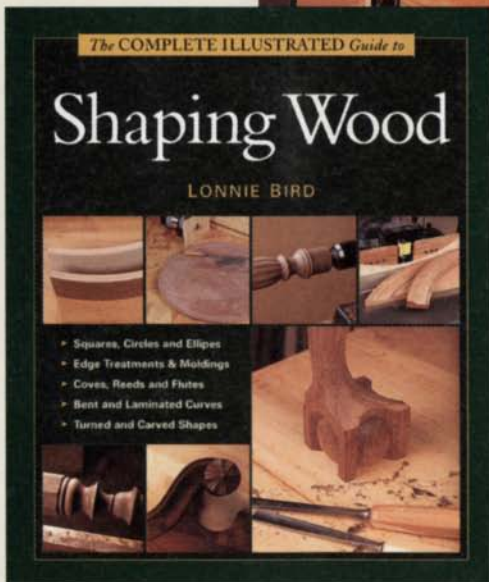
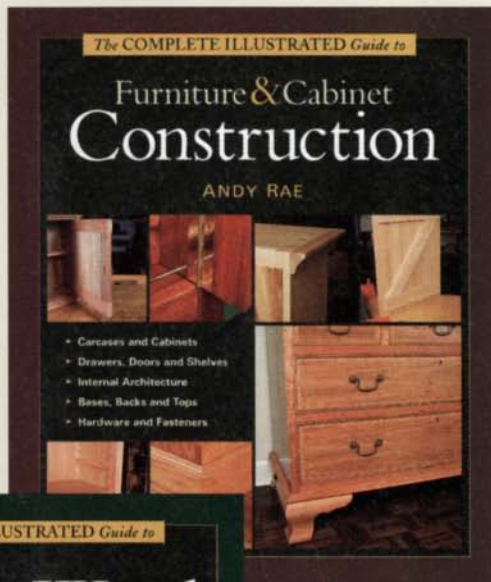
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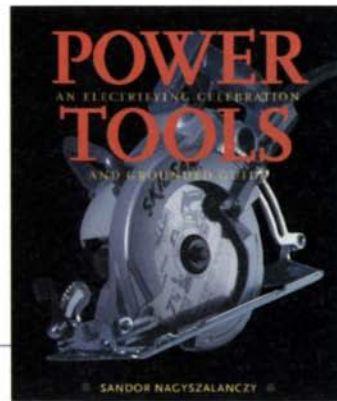
Furniture & Cabinet Construction is the ultimate reference work—a graphic, step-by-step presentation of basic furniture-construction techniques by expert woodworker Andy Rae.

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Custom-furniture maker Lonnie Bird has taken the complex subject of shaping and made it accessible to every woodworker. Techniques of all kinds are covered here—from the simplest ones to more complex bending and carving.

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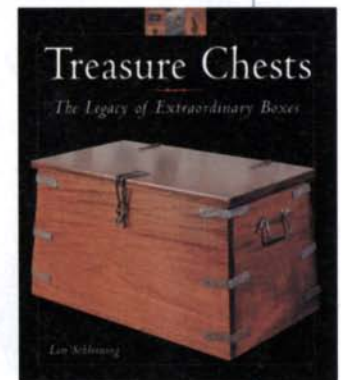


Featuring more than 200 tools—from classics to the most inventively engineered newcomers—this book is the ultimate collector's item for tool lovers everywhere. *Power Tools* is the next best thing to owning every tool on the planet!

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Treasure Chests traces the fascinating evolution of the boxes that have held the things that people valued most over the centuries. From tool chests to toy chests, this book celebrates how extraordinary a box can be.

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Jet spindle sander



The sanding drum oscillates up and down as it spins. Sanded surfaces end up smoother as a result. The machine comes with 10 spindles.

I spend a lot of time sanding the edges of curved stock. Over the years I've managed to get the job done using an assortment of drill-press-mounted spindle sanders and even some homemade sanders. Yet none really produced the quality I needed.

Now, however, my edge-sanding problems are a thing of the past. That's because I recently purchased an oscillating spindle sander from Jet, model JOVS-10. And I couldn't be more pleased.

The large, 24-in. square, cast-iron table is mounted on sturdy trunnions, which in turn are mounted on a stout one-piece steel stand. The table easily tilts to 45° and locks securely in place. The spindle support runs on ball bearings. And the worm-and-gear mechanism that oscillates the spindle runs in an oil bath.

Overall, the sander operates smoothly and quietly. The 1-hp motor gives this sander plenty of power. A 1½-in. stroke and 75 oscillations per minute ensure quick sanding with little clogging of the abrasive. Sanding marks are minimal. And, thanks to a built-in port, it takes little effort to connect a hose for a dust collector.

The JOVS-10 comes with a set of 10 removable spindles, ranging in size from ¼ in. dia. by 5 in. long to 4 in. dia. by 9 in. long. Built-in racks allow for convenient storage of the spindles. I just wish there were also a place to store the wrenches and table inserts. The table is 36 in. high, which is a comfortable working height for me.

All things considered, this machine has been a welcome addition to my shop. The JOVS-10 sells for about \$870. For more information, contact Jet Equipment and Tools at (800) 274-6846 (jettools.com).

—Roland Johnson

New products (continued)

Chicago

A lingering spell of heat and humidity finally pushed off to the East just in time for the National Hardware Show. All of that uncomfortable stuff was replaced by cool, dry and clear weather, making Chicago a wonderful place to spend a few days in early August.

At McCormick Place, some 3,000 manufacturers filled more than 1.1 million sq. ft. of display space devoted to hand and power tools; hardware; paint and home decorating; housewares; lawn, garden and outdoor living; and plumbing and electrical supplies. During the three-day show, more than 62,000 members of the trade filed through the doors. Here's some of what I saw.

Modular workstations from Tool Dock

For more than 65 years, Waterloo Industries has been quietly making toolboxes and storage containers for other companies, including Sears/Craftsman. And along the way it became the world's largest maker of tool-storage products.

With the Tool Dock, however, Waterloo is making an effort to develop its own

product line for home workshops. And it has some things I like. As a modular system, all of the individual components can work together. The system includes several tool stations and stands, along with a crib, a rack and a bench.



Make mine modular. Tool Dock is offering an assortment of workstations for the home shop.

And all of them appear to be more than sturdy enough for use in a small shop. For additional details, contact Waterloo Industries at (866) 866-5362.

Jigsaw from Freud offers speed control

At a breakfast news conference, Freud showed off a new variable-speed jigsaw. Model FJ85 is a 6-amp saw with a couple of interesting features: a no-brainer blade-changing system and a motor with speed control.

You won't need a screwdriver or Allen wrench to mount a blade. Just slip the blade into the collet and flip a lever to lock the blade. Snap open the lever to remove the blade.

The speed-control system maintains the blade speed, even when cutting into tough grain or a nasty knot. As a result, you end up with a smoother cut. For more information, contact Freud at (800) 472-7307.

—Tom Begnal

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Paging through a woodworking catalog recently, I came across an inexpensive metal detector. Neat idea, I thought—find that hidden nail before it finds a sawblade, planer blade or a jointer knife. I wondered whether it would work and whether I should gamble \$20 to see. A few hours later, *Fine Woodworking* called, asking if I'd like to review three metal detectors to find out how well they worked and if they were worth the money. If only this kind of thing would happen when I was wondering about the latest Honda sports bike.

Wizard Detectors currently produces three metal detectors for woodworkers: the Little Wizard (\$20), the Lumber Wizard (\$100) and the Wood Scan Wizard (\$140). In short, they all work well, as long as the metal you're looking for is bigger than a 4d (1½ in. long) nail. Smaller pieces of metal are detectable, sometimes easily, but not consistently enough to make finding



Tom Begnal

them as breezy as waving a wand over a board once or twice.

The test I ran was simple. I pounded several ½-in.-long brads and 4d nails into the edge of a piece of cherry. Then I tried to find them. The Little Wizard found all of

the 4d nails, though it took maybe 10 passes over one that was 1½ in. from the surface. It had more trouble with the brads: It couldn't pick up the brad 1½ in. from the surface, though it did find one 1 in. deep.

The Little Wizard had a much harder

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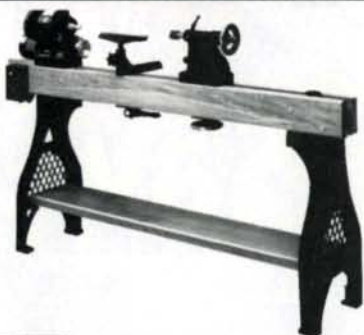
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Tools & Materials (continued)

time finding nails oriented perpendicular to the head of the detector. It did better when the nails ran parallel to the detector head. The company advises a circular motion while scanning, which did indeed solve this orientation problem.

The Lumber Wizard has a head that's 7 in. long, compared to 2 in. for the Little Wizard, allowing you to scan a larger area in the same amount of time. Plus, it's more sensitive, detecting my hammer 16 in. away with a loud wailing siren, a wild flashing light and even a vibrating handle (the Little Wizard simply lights up). It was able to detect all of the brads and nails with more vigor. And it found them at a greater distance. Oddly, though, the Lumber Wizard didn't pick up the 1-in.-deep brad, which the Little Wizard did.

The Lumber Scanner, especially for the price, didn't impress me. It's a rectangular hoop designed to detect all four sides of a board (up to 6 in. thick by 12 in. wide) at once. It detected all of the 4d nails with the same enthusiasm as the Lumber Wizard did, but it had a harder time detecting the



Tom Begnal

Lights on are a heads-up. It's easy to tell when the Little Wizard finds some metal. The red LED lights on the handle come to life.

brads than the Little Wizard. Proximity to the edges of the scanner was important. I could pass three brads through the center of the detector without a response, though closer to the edges it wailed heartily. The scanner couldn't even pick up a 1/2-in.-deep brad right next to the edge.

Interestingly, when set to highest sensitivity, all of the detectors made false alarms

when moved around too quickly. This made the process of detection relatively slow. It took about two minutes to scan a 2-in.-thick by 18-in.-wide by 7-ft.-long board with the Lumber Wizard, and about twice as long with the Little Wizard.

Would I scan every board and sheet of plywood that comes into my shop? Probably not. But the next time a friend wants to resaw some salvaged lumber on my bandsaw, I'll be mighty glad to have one of these detectors handy.

Which one would I keep? If I worked a lot of salvaged lumber, I'd buy The Lumber Wizard. It's more powerful and easier to use than the Little Wizard. But for occasional use, the Little Wizard is perfectly adequate. For more information, call (888) 346-3826. —Strother Purdy

Curtis Buchanan is a chair maker in Jonesborough, Tenn.; Roland Johnson designs and builds furniture in Sauk Rapids, Minn.; Tom Begnal is an associate editor; Strother Purdy is a woodworker in Bridgewater, Conn.

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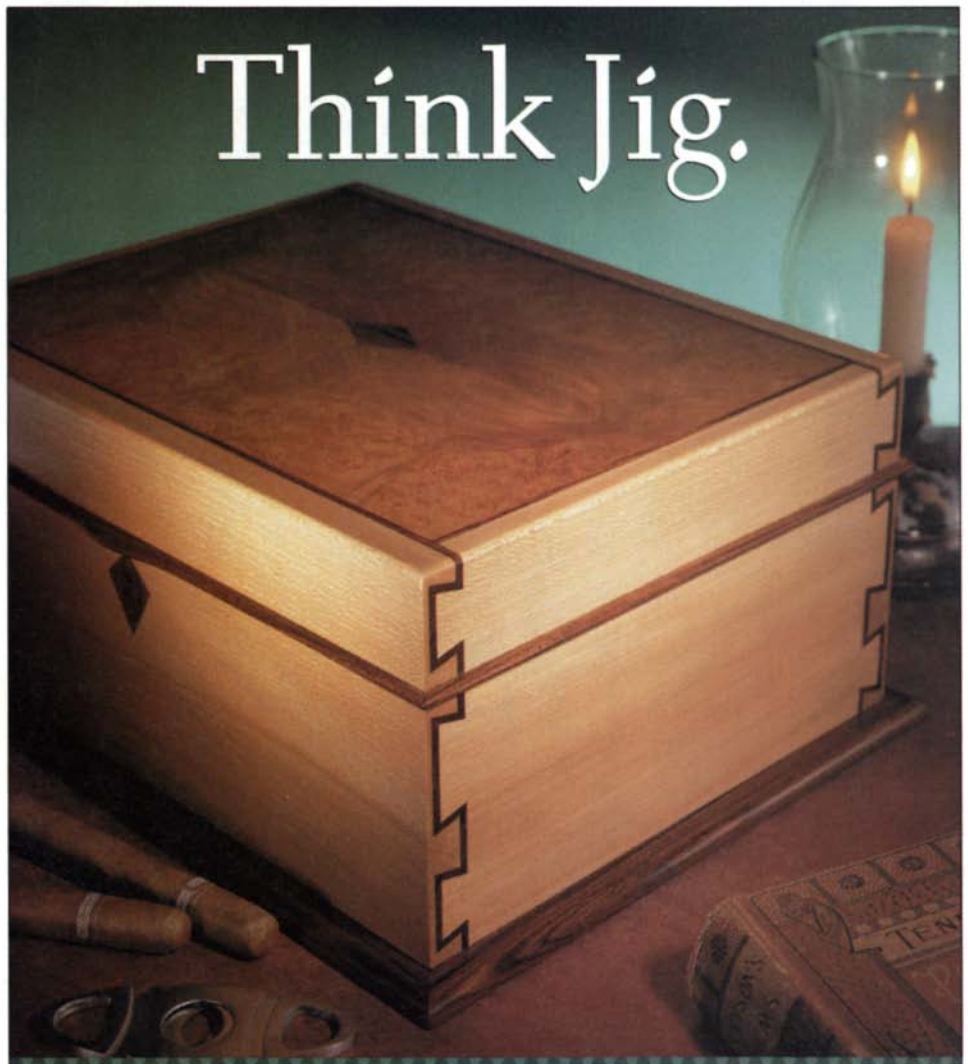
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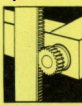
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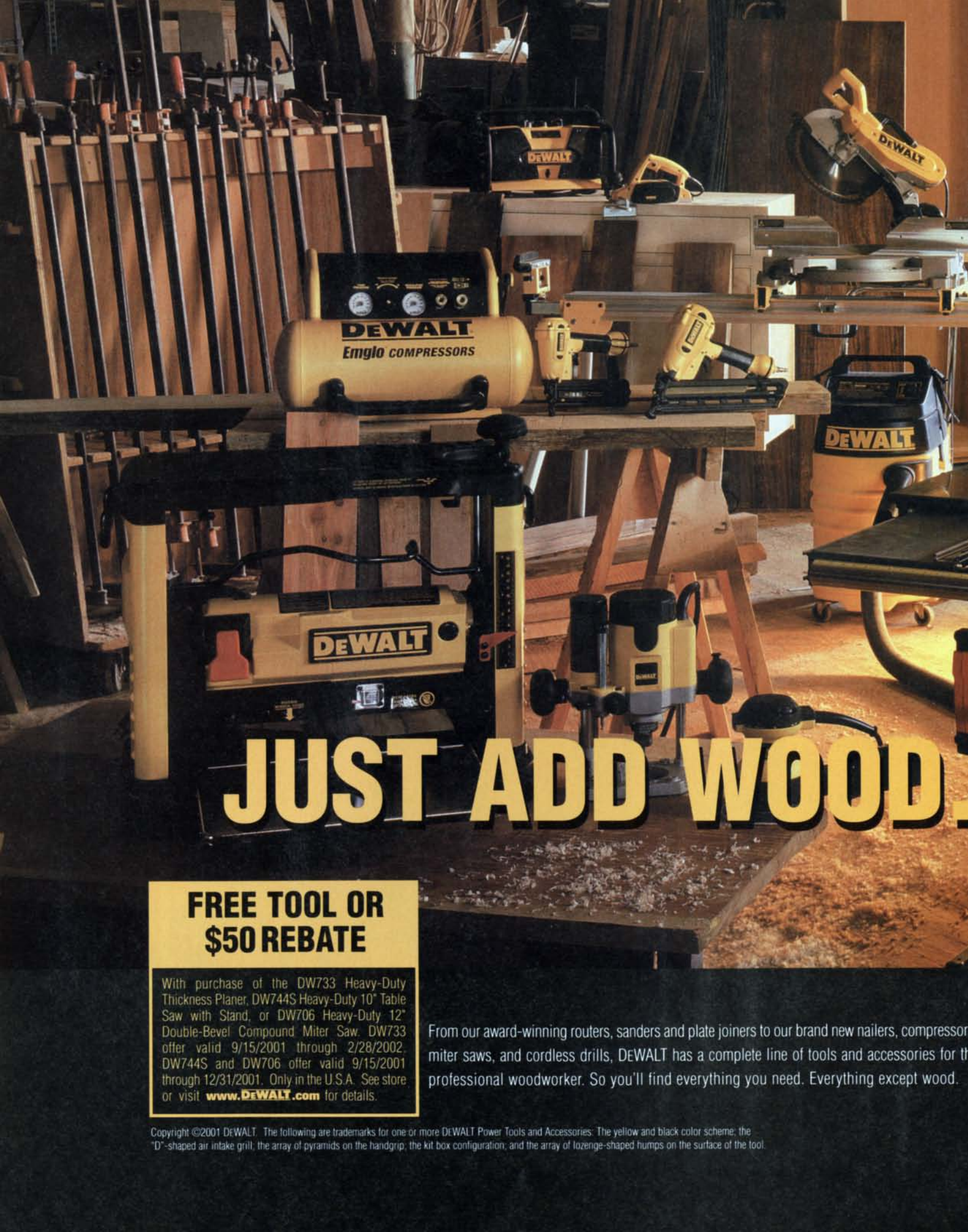


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Tune

Maintenance tips for height-adjustment mechanisms, collets and brushes

BY JOHN WHITE

PLUNGE PERK-UP

It takes just a few simple steps to rejuvenate most any plunge router that is suffering from a balky height-adjustment mechanism.



Clean the posts. Remove the springs from the guideposts before cleaning the outside of the posts with WD-40.

Up Your Router

In most shops a router gets plenty of hard work, so it's not surprising that an occasional problem can show up. But just because your router has been acting finicky doesn't necessarily mean it's time to replace it. You can often get it back into tip-top shape if you know where the problems are likely to be hiding. And chances are, the fix won't cost you much time or money.

As manager of the *Fine Woodworking* shop, I get to see quite a few routers. The problems that most of them have had can be distilled into one of three categories.

The main problem I see is related to the height-adjustment mechanism. Over time it may become difficult to adjust. Or it does not lock properly, causing the motor to creep out of position.

Second on my list of common problems has to do with the collet. Sometimes it won't grip the shank of the bit tightly enough, causing the bit to slip.

Worn brushes are the third most common problem. When brushes have worn too much, the motor might not start. If the motor does manage to run, it can unexpectedly cut out under load.

Height-adjustment problems

It's not unusual for the height-adjustment mechanism to stick or bind, especially on a plunge router. When that happens, it's diffi-

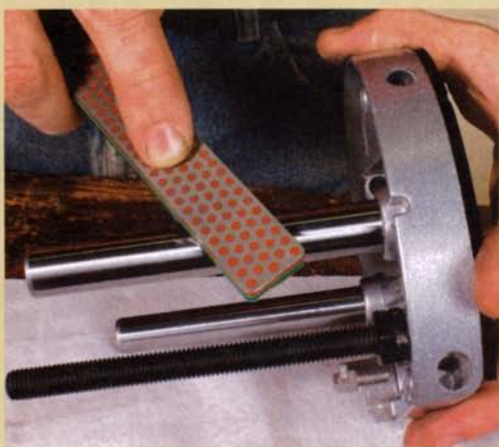
cult to make precise adjustments. When the height adjustment is not working quite right, the first thing to do is check the sliding components and the lock mechanism. A buildup of grime prevents parts from sliding or meshing properly. And parts that aren't properly lubricated suffer the same problem. The fix here is simple enough. It's just a matter of cleaning and lubricating the parts.

Unfortunately, some routers have a complex lock or height-adjustment mechanism that makes disassembly difficult. In this case, first try cleaning and lubing without taking apart the router. Disassemble the machine only if you can't get it to free up.

On a plunge router, first remove the springs from the base unit. Then use a penetrating oil, such as WD-40, and a paper towel or rag wrapped around a rod (a wood dowel works fine) to clean out the holes that accept the two guideposts. Then clean all of the old grease off the springs and wipe down the guideposts.

Use a paper towel or a rag wetted with WD-40 to get into the threads, grooves, gear tracks and other nooks and crannies of the lock and depth controls of your machine. An old toothbrush also comes in handy here. Go over any moving or sliding parts, looking for burrs, rough spots, binding or excess wear. Use files, stones and emery paper to correct any problems you find.

Also, examine the springs, nuts and washers for burrs and dis-



Smooth out any burrs. A burr on the guidepost can make for a sticky plunging action, so a little smoothing with a diamond stone could be in order.



Work on the bores. A cleaning stick, made from a piece of paper towel wrapped around a dowel, is used to clean out the holes that accept the guideposts.



Brush on some grease. Give the springs a generous coating of lithium grease before re-installing them in the guideposts.

FIXED-BASE FIX-UP

A finicky height-adjustment mechanism on a fixed-base router can be smoothed out with a minimum of fuss.

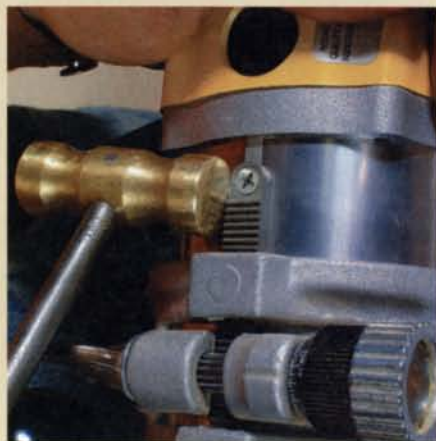


Keep it clean. Wipe down the inside of the base and outside of the motor with penetrating oil, such as WD-40.

Take care of your teeth. Some routers have a rack-and-gear mechanism. Any burrs on the teeth need to be smoothed with a needle file.



A misaligned rack-and-gear mechanism won't operate smoothly. Sometimes it takes just a few light taps from a hammer to realign the parts.



torted or worn-out parts. Washers especially can get cupped or chewed up, making the controls hard to work and lock handles difficult to tighten. If the router has a rack-and-gear mechanism, use a needle file to clean up any burrs down in the gear teeth that can cause interference.

On a fixed-base router, use a paper towel or rag wetted with WD-40 to clean the barrel of the motor and the inside of the base. Some fixed-base routers have a motor housing that threads into the base. Make it a habit to clean out chips and sawdust that get caught between the base and motor. Also, adding an occasional thin coat of wax to the sliding surfaces can reduce wear and help extend the life of the parts.

Eventually, these parts can wear to the point that it becomes hard to thread the motor or lock it in place. If you find that's the case, and if the base is metal, the most cost-effective fix is simply to replace the base. Little can be done for plastic routers because typically both the base and the body are worn out.

Now you can reassemble the machine, lubricating as you work along. Shafts and threads that are somewhat protected from sawdust can get a coat of light oil (such as sewing-machine oil) or lithium grease. On parts that get more exposure to sawdust, such as the guideposts or a sliding motor, it's best to use a stick lubricant or a good wax to make the parts slide smoothly.

Caring for the collet

A typical router bit spins at 25,000 rpm. To prevent slippage, the collet on the router must maintain a viselike grip on the shank of the bit. So it makes sense to keep the collet in good working order.

In time, grime can build up in both the collet nut and the collet, effectively reducing the squeeze on the shank. A collet that isn't properly lubricated can also have less gripping strength.

The nut and collet can also begin to wear or get distorted. And it doesn't take a lot of wear or distortion to cause problems. Indeed, a change of just a couple of thousandths of an inch can prevent the chuck from fully gripping the bit.

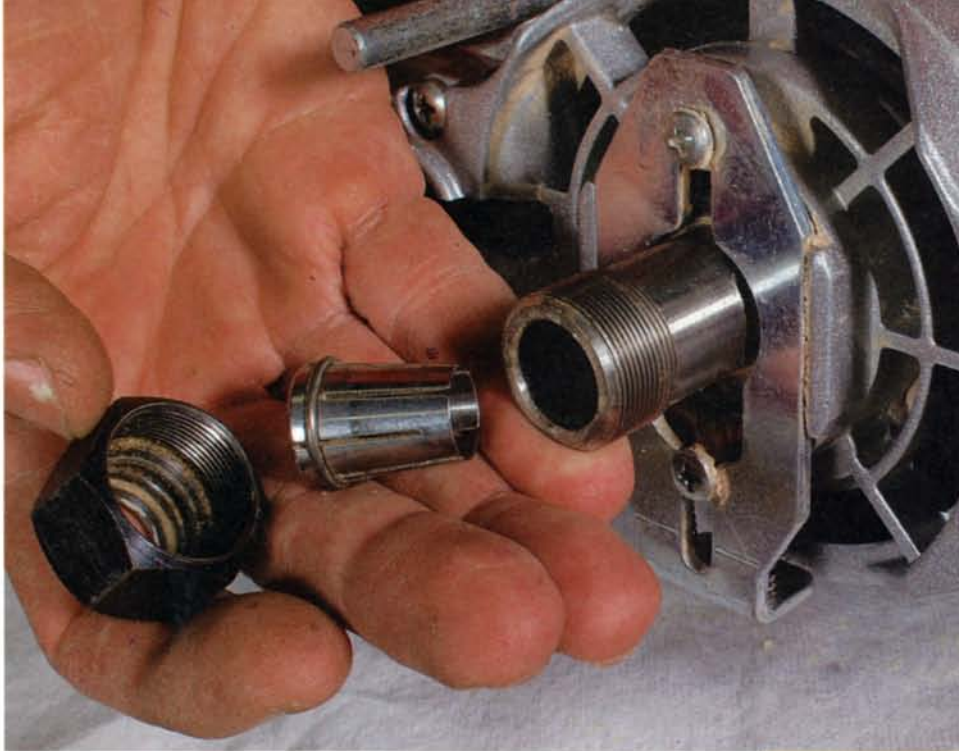
A collet that's worn or distorted can lead to vibration. And that could damage the shank of the bit or the inside of the collet. Or it can cause the bit to creep from the collet, changing the depth of cut as you rout. Should the bit creep far enough, the entire shank could come out in the middle of a cut—the woodworking equivalent of a nuclear meltdown.

Fortunately, it takes only a moment to make sure the surfaces of the collet are clean and properly lubricated. The procedure is pretty straightforward. Remove the router bit and unscrew the nut, then lift the collet from the spindle. On some routers, the nut stays attached to the collet.

Once the collet is out, you can blow out any sawdust. Also give a quick visual inspection to the taper inside the end of the spindle. The tapered surfaces should be smooth, almost polished. And the tapers should be straight, not worn into a bell shape.

Check the collet for cracks, which sometimes show up along the edge, particularly on thin-walled collets. Replace the collet if you spot one. Any burrs or rust need to be smoothed out. I use a fine stone on the tapered surface. On the inside, emery paper (220 grit or finer) wrapped around a dowel works well.

It's important to use a light touch when using a stone or emery paper. The idea is to remove the rough spots without changing the shape of the parts. The collet must fit precisely in the spindle



CLEAN THE COLLET

The collet grips the shank of the router bit. But the collet won't grip as well if it isn't clean.



if necessary, remove the ring. Some collets are attached to the nut with a snap ring. External snap-ring pliers, sold by auto-parts stores, are used to remove the ring.

taper. Be sure to clean off any grit left by the emery paper or stones. The grit will cause rapid wear if not removed.

If you find that a bit has spun inside the collet, chewing up the bore, the collet should be replaced. This sort of damage cannot be fixed and will allow bits to slip, damaging their shanks.

If the spindle taper is chewed up, the router is probably due for retirement. On some routers the spindle taper is a separate part that threads onto the end of the spindle. But it typically requires special tools to remove and replace it.

If the critical surfaces are in good shape, it takes just a few steps to clean and lube the parts. Slightly moisten the corner of a paper towel (or clean rag) with WD-40. Then wipe down the inside of the nut, the collet and the inside and outside of the end of the spindle. After that, use your fingernail to get the towel into the threads on the spindle.

Before cleaning the outside of the collet, tear off a small piece of the oil-treated towel and use a thin dowel to force the towel through the bore of the collet. Because the bore is the part of the collet that actually grips the bit shank, you don't want to leave oil residue there. So run some pieces of clean towel through the bore to make sure all of the oil is gone.

Worn-out brushes need replacing

To produce high power in a light, compact package, a router uses a universal-type motor. Common to this motor is a pair of small carbon blocks, called brushes, that rub against the commutator, a part that spins with a surface speed of some 60 mph. These brushes eventually wear down. When they wear too much, the router starts to complain. So it's a good idea to check the brushes once in a while. And replace them before they wear too much.

One sign of worn brushes is an increasing amount of sparking that can be seen through the air vents on top of the router. Another common symptom is a motor that cuts in and out under load, or one that intermittently fails to start.

Running a router with badly worn brushes for any length of time can damage the soft copper surface of the commutator. Once that



Clean out burrs or rust. Use a dowel wrapped in 220-grit or finer emery paper to remove burrs or rust inside the collet.



Make sure the center of the collet is clean. The inside of the collet grips the shank of the router bit. So after cleaning the collet, run several pieces of clean towel through the center of the collet to remove any residual oil or grit.

REPLACING THE BRUSHES

A router with badly worn brushes won't run well. Replace the brushes before they start to cause problems.



Accessing brushes from the side of the router. On a router with side access to the brushes, remove a cap, then simply pull out the brush (along with an attached spring and lead wire) from the motor housing.

Accessing brushes from the top of the router. Some routers need the top housing removed to get at the brushes. Use a paper clip shaped into a long hook to grab and remove each brush.



happens, the replacement brushes are going to wear faster than they should. Or worse yet, the motor may be ruined.

There is no sure guideline for how often to check the brushes for wear. Most owner's manuals recommend a check every 50 to 100 hours of running time. But running time isn't easy to track, so I just check them once or twice a year.

So how do you know when a brush needs to be replaced? A few manufacturers mold a wear line on the brush. Once worn to the line, it's time for a new brush. Most of the time, however, the brush won't have a wear line. When that's the case, check whether the owner's manual tells you when to replace the brush.

If the manual isn't helping (and that's not uncommon), there's a pretty good rule of thumb that applies here: Replace the brush when it becomes shorter than it is wide. For example, a typical ¼-in.-thick by ⅜-in.-wide by ¾-in.-long brush (when new) should be replaced when it wears to ⅜ in. long. By the way, worn or damaged brushes should always be replaced in pairs.

Most router manufacturers have made brush-changing a simple procedure. On many machines, you can reach the brushes by removing two dime-sized plastic caps set 180° apart on the top of the machine. With the caps removed, the brushes will easily slide out of their brass housings. Brushes held in by threaded caps are typically bonded to a spring and lead wire.

Some routers have the brushes inside the plastic housing that covers the top part of the motor. Held on by a few screws, the cov-

er is usually simple to remove, although some makers hide the screws under labeling that must be peeled off or cut. With the cover removed, the brush assemblies should be easy to spot. Most likely, they are going to be held in position by flat coil springs.

A paper clip comes in handy here. Straighten the clip and bend one end into a small hook. Slip the hook under the spring, then pull it back to release the brush. Be careful, though. The brush could shatter if the spring snaps back against it.

After checking the length of the brush, it's also a good idea to inspect its general condition. A bad electrical connection or heavy use can burn the brush, causing it to crack or crumble.

While you have the brushes out of the router, take a moment to look over the springs and lead wires that usually are attached to the back of the brush. On the springs, look for evidence of burning or cracking. And check the wire to see whether it is frayed, broken or even pulled out of the brush. Any one of these problems is a good reason to install fresh brushes.

Replacement brushes are typically available from the manufacturer. If they can't supply brushes because the motor is too old, a motor repair shop might be able to help. By the way, when installing new brushes, make sure they slide easily into their housings. If they don't, file them down as needed to get a good fit. □

Watch it on the web

Visit finewoodworking.com for John White's tips on replacing a router's brushes.

In addition to his work as a contributing editor, John White also helps keep the Fine Woodworking shop in smooth running order.

Dressing Up a Basic Box

Traditional plinth and cornice plus a curved front transform a simple case piece

BY ROGER HOLMES



Most woodworkers that I know spend three quarters of their time making boxes of one sort or another. Boxes for books, clothing, linen and blankets, dishes, cutlery, keepsakes and odds and ends. We even spend a great deal of time making boxes for boxes, i.e., drawers for a chest or other case piece.

Designing with boxes is deceptively simple. First you figure out the right size and configuration of box or boxes to store or display the desired items. Then you try to make the boxes attractive. A recent request to build a pair of bedside cabinets for friends allowed me to explore methods of enhancing the basic box.

Wedged between the bed and a wall in many bedrooms, most bedside cabinets don't benefit from exposed joinery or lovely wood—you don't get much of a view of either. Trying to think outside the box, I started sketching various curvy alternatives, deciding on the simplest of them all—curving the front plane of the cabinet along a gentle arc. For centuries simple curves have been used to break the four-square rigidity of a box without sacrificing the advantages of rectilinear construction.

A good start, but it wasn't enough. I wanted to add some visual weight to the top and bottom, something a little more substantial than the $\frac{7}{8}$ -in.-thick edges of the box. The solutions—a 5-in.-tall

DETAILS MAKE THE DIFFERENCE

Mitered corners of this cornice are not 45°. Take angle measurements for the curved front pieces from working drawings.



Dovetails on the skew. Holmes cuts the dovetails on the skew rather than flattening the face where the joint comes together. While tricky, it adds to the subtle details of superb craftsmanship of the piece.

Plinth raises the piece off the ground. The plinth makes the box look less like a box and provides a structural base for the cabinet.



plinth and 2-in.-high cornice—are also traditional, even classical. As far back as the Egyptians, architects have used the plinth to raise a box off the ground and, in a sense, put it on display. They added a cornice on top, like a crown, terminating the structure with a flourish. Furniture makers have used both elements extensively.

My plinth is slightly larger than the box it supports, and simple moldings make the transition between the two elements.

A bead molding announces the beginning of the cornice. The body of the cornice is the same size as the box, but the grain runs horizontally on the sides, setting it off subtly from the vertical grain of the box below. Set in slightly from the cornice body, the cove-molded top panel finishes the job.

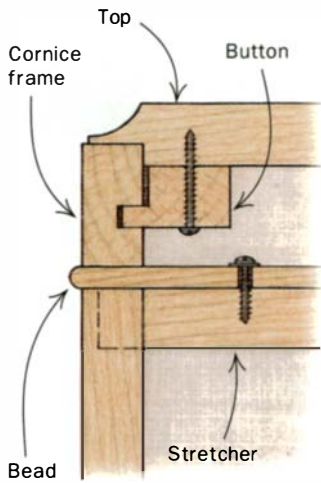
Construction notes

Adding a curve, plinth or cornice is a time-consuming but rewarding way to make something special out of a simple box. I laminated the curved drawer front and rails for the plinth and cornice out of maple. I resawed the stock to about $\frac{3}{32}$ in. thick, then pressed the pieces between male and female forms made of medium-density fiberboard (MDF). For more on this type of laminating, see *FWW* #145, pp. 56-63.

The plinth rails and legs were joined with mortise and tenons. Joining the curved front rail and leg required some careful layout but wasn't difficult to cut by hand or machine. The molding required slightly different cutter profiles for the curved and straight pieces to ensure an accurate fit at the corners. The molding was glued to the top of the rail-to-leg assembly. The plinth was screwed to the carcass through slots in the molding. The slots allow for seasonal movement.

The cornice was the trickiest element. I assembled the cornice frame, mitering the front corners. I attached the rabbeted cornice top to the frame, gluing the front edge and buttoning along the sides to allow for movement. Next, I attached the mitered bead molding to the carcass, gluing it down to the front edge and screwing it to the sides through slots, which allow the carcass to move. Finally, I glued the cornice assembly to the bead molding. □

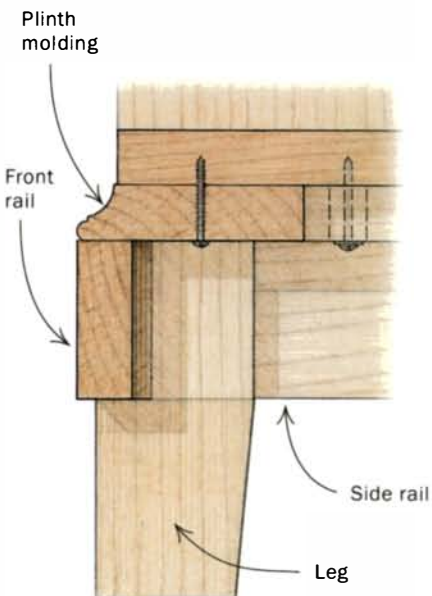
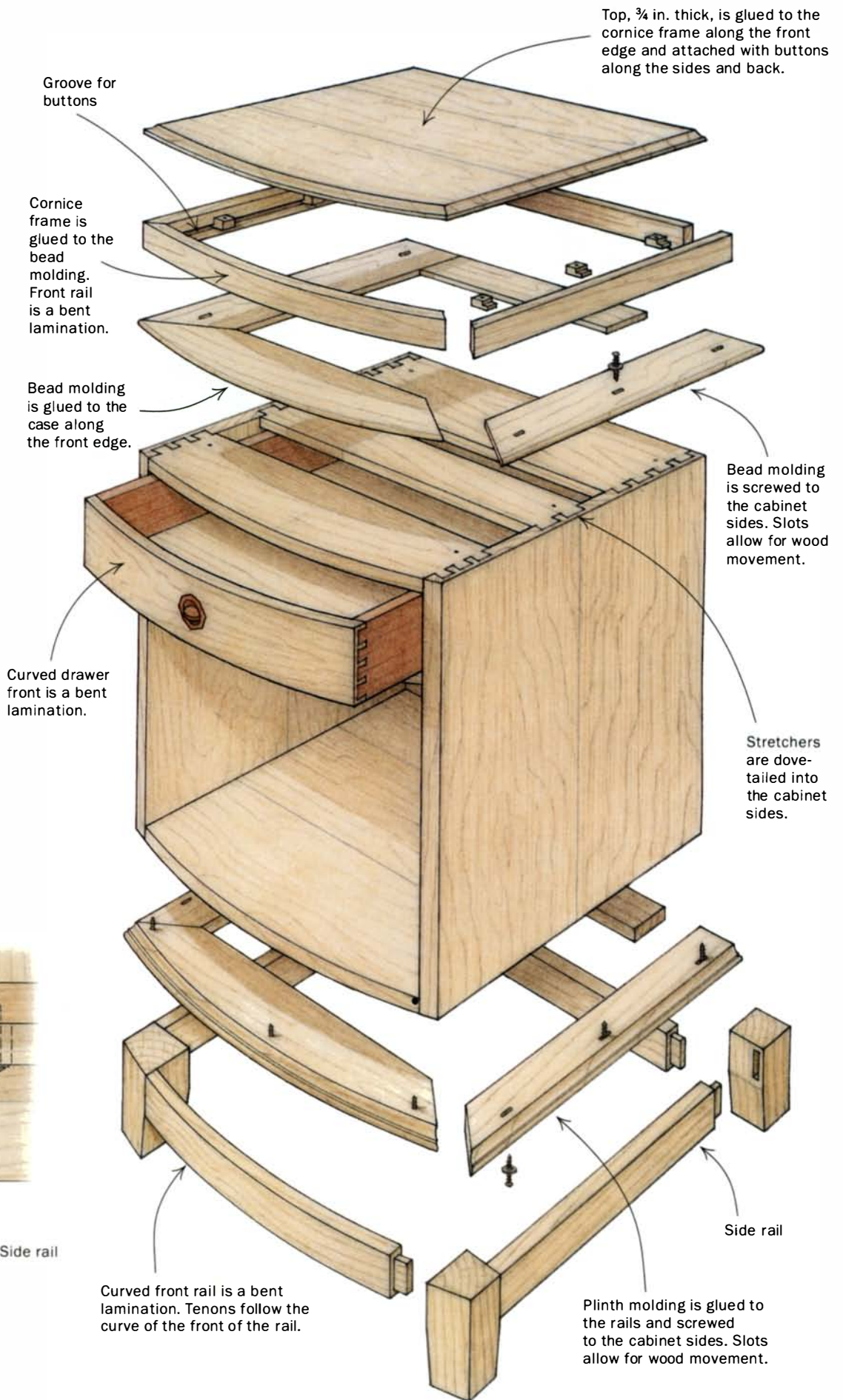
Roger Holmes is a former associate editor of Fine Woodworking. He lives in Lincoln, Neb., where he publishes books and works wood.



CORNICE DETAIL

AN ELEGANT CASE FROM TOP TO BOTTOM

Construction of this box is straightforward, except for the curved front. Holmes uses slotted holes for the screws where wood movement is likely to be an issue. The piece shown here is 18 in. deep by 19 in. wide by 28½ in. tall.



PLINTH DETAIL

Surface Prep: Why Sanding Isn't Enough

Three-step process
leaves a flawless surface
for finishing

BY PHILIP C. LOWE

As the knives on your jointer and planer go dull after the first few board feet, the surfaces of your boards take a turn for the worse. Instead of cutting the wood cleanly, the dull knives heat the surface and pound it into a compressed layer of fibers. Unfortunately, many woodworkers go straight to sandpaper at this point, removing just the tool marks and no more. Without slicing well below that crushed layer, they never see the full beauty of the wood. Minute characteristics, such as the pores and medullary rays, are obscured. To expose these hidden elements, the surface must be cut cleanly. One reason why antiques have such a glow is that all of the surfaces were planed and scraped.

I haven't been able to improve much on the classic methods for

fine surface preparation. I still find that a sharp smoothing plane and scrapers are the most efficient tools to get the best surface. Aside from cutting quickly below that "compression layer," these tools leave a dead-flat surface and produce less dust.

The following process may seem like a lot of bother, but each stage involves only a few strokes with a well-tuned tool to remove the marks made by the previous tool. Don't get me wrong—I love the thickness planer as much as the next guy. It takes away hours of drudgery, leaving more time for joinery and ornamentation. But it's just a starting point for fine surface preparation. □

Philip C. Lowe runs a furniture-making school in Beverly, Mass.

STEP 1 HANDPLANE ALL SURFACES

The process starts after the parts have been thickness-planed and the panels have been joined. Begin by planing all surfaces with a No. 4 smoother. Sharpen the blade with a slight curve over its entire width, leaving the corners about $\frac{1}{4}$ in. back from the center. This crown prevents the corners from digging in. An iron that is correctly ground and properly adjusted laterally leaves a series of subtle undulations or hollows in the surface.

A handplane quickly flattens a surface, leaving it level but textured. A random-orbit sander, on the other hand, just follows the ups and downs that are already there. If you put a glossy finish on a tabletop that has gone straight from glue-up to sandpaper, be sure not to look at it in a raking light. You'll see hollows where there was planer snipe, where boards were misaligned and where the sander lingered.

TIPS FOR SUCCESS

Adjust the frog so that its leading edge lines up evenly with the throat. If it is skewed, the blade will not project through the throat squarely. Make sure the bottom edge of the chipbreaker meets the blade cleanly. If there are any gaps, the chipbreaker will clog with shavings and prevent cutting. File and hone the chipbreaker flat along its bottom edge.

Like most surfacing tools, the handplane should be pushed in the direction of the grain but skewed slightly to create a shearing action. The cap iron should be tightened enough to keep the iron from shifting in use.



Handplaning is the most important step. A well-tuned smoothing plane will flatten the surface quickly and slice below the "compression layer" left by planer blades. To make the job easier, rub some paraffin on the sole and skew the plane slightly to create a shearing action.



A slightly crowned plane blade won't dig in at the corners. Grind and hone a gentle curve across the entire width of the blade, with the corners about $\frac{1}{4}$ in. back from the center.



Secure the blade tightly. Planing with the tool held at an angle puts lateral pressure on the blade and can shift it out of alignment.

STEP 2 REMOVE TEAROUT WITH A CABINET SCRAPER

Even the best-tuned smoothing plane leaves undulations and tearout. These imperfections become quite apparent once a finish has been applied. The Stanley No. 80 cabinet scraper, with its 2 $\frac{1}{4}$ -in.-wide blade, removes these textures, leaving even shallower undulations in their place while maintaining the level surface.

The blade of the cabinet scraper is tipped forward in the body of the tool at about 30°. The edge is burnished like a card scraper, but it starts out at a different angle. File a 45° bevel along its edge

using a second-cut mill file, then hone it on medium and fine stones to create a sharp edge for burnishing. To create the burr, hold the blade in a vise and draw a burnisher along the edge.

TIPS FOR SUCCESS

To prevent the sharp edge from getting nicked, place the blade in the tool by sliding it up through the throat. When setting up the tool, loosen the thumbscrew on the back of the body until there is no tension applied to the blade. Now place the body

on a flat surface, let the blade drop down level with the sole and tighten the screws to hold the iron securely. Turning the thumbscrew on the back of the body bows the blade, which makes the cutting edge protrude and regulates the amount of cut.

Push the cabinet scraper along the grain, removing the undulations and tearout left by the plane. The hollows left by the No. 80 are shallow, but if a finish were applied at this stage, the unevenness of the surface would still be apparent. The card scraper is the next step.

Burnish the hook onto the edge. Start with the burnisher at 45°. Then tilt it slightly toward level for subsequent strokes.



Place the tool on a flat surface. Loosen the thumbscrews and let the blade drop down level with the sole. Then tighten the screws while keeping the blade in contact with the surface.

Next, tighten the thumbscrew on the back side. This bows the blade, regulating the depth of cut by making the blade protrude from the sole.



The Stanley No. 80 cabinet scraper removes material faster and more uniformly than a card scraper. Continue until all of the handplane marks and most of the tearout are gone. Again, angle the tool for better cutting action.

STEP 3 HAND-SCRAPE AND SAND



Use a wide card scraper to remove the subtle hollows left by the cabinet scraper and any remaining tearout. The flat blade should be bowed in the hands as it is pushed or pulled across the work. Scrape in the direction of the grain, and skew the tool slightly.

The card, or hand, scraper cleans up nicely after the first two tools, leaving much subtler depressions. Like the cabinet scraper, this blade employs a burr as its cutting edge. However, the edges are filed and honed to 90°, leaving four square corners to be turned over into cutting hooks using a burnisher (for more on sharpening and using a scraper, see FWW #147, pp. 94-96).

When this wide tool is sharpened correctly, it will surface a board quickly. It should be bowed slightly in the hands and pushed or dragged across the surface. A card scraper removes any leftover tearout or tool marks from a board, but it leaves a slightly detectable texture.

OKAY, BREAK OUT THE SANDPAPER

To bring the panel to final smoothness, go through a few grits of sandpaper. Start with 120 grit wrapped around a block of wood that has a thin piece of fine cork glued to the surface. Be careful to make all strokes in the direction of the grain.

Next, raise the grain by wetting the surface with a damp rag. Let it dry and jump to the next grit of sandpaper (150) and continue through 180 and 220 grits.

WORTH THE EFFORT

Each of these steps is essential to the process, and together they will produce the finest surface possible for staining and finishing. Tune up your tools, and give it a try. You will uncover a clarity in your wood surfaces that might surprise you.

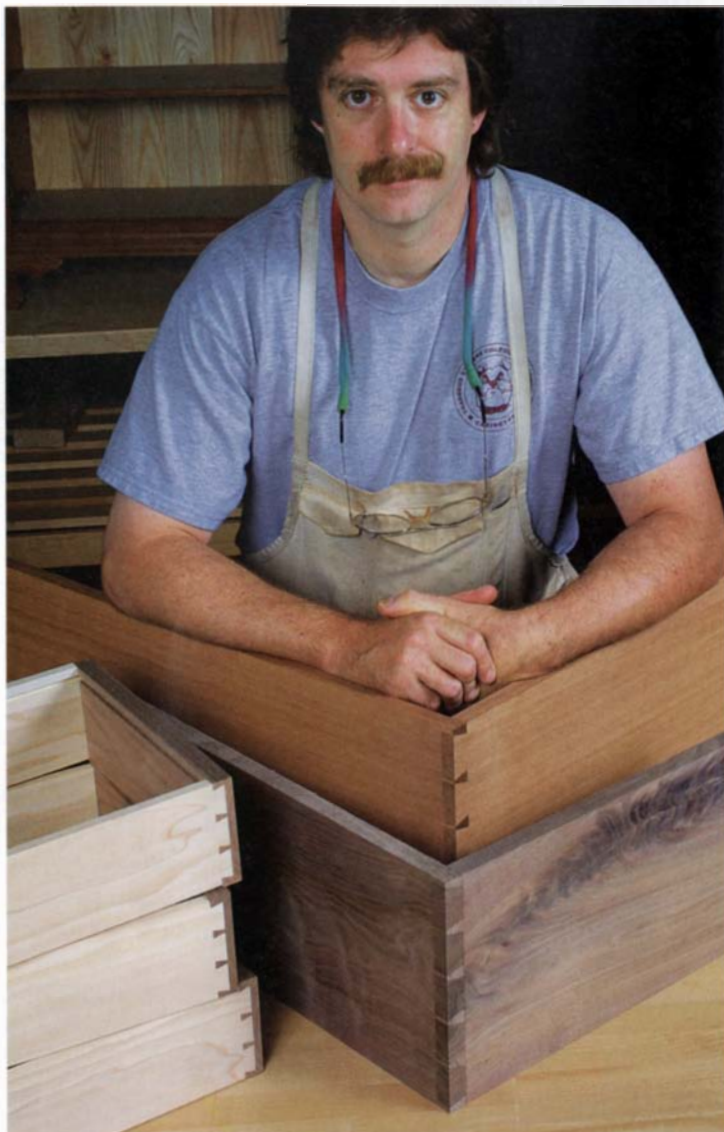


No power sanding needed. Start with 120 grit. Sand evenly and use a cork-lined sanding block to maintain the flat surface.



Raise the grain. After the first sanding grit, wet the surface with a damp rag and let it dry before continuing through the grits to 220.

Tablesawn Dovetails



Accuracy and hand-cut look
in half the time

BY STEVE LATTA

Dovetailing—time-tested, reliable and strong—is also ornamental and should reflect the personality of the builder. For this to happen, the cabinetmaker must control the number of pins and tails and their size and spacing. Unfortunately, most router dovetailing jigs don't allow for that type of expression. The appearance of the final joint, with thick pins and uniform spacing, is void of personality.

Hand-cutting represents the other end of the spectrum. The size and spacing of the pins are determined by the cabinetmaker. Combine that with the natural irregularities of handwork, and this technique yields a look that is truly wonderful, tying the builder to traditions that are hundreds of years old. However, it requires a great deal of time and skill.

I teach students a tablesaw method that bridges the gap between router-cut and totally hand-cut dovetails. The technique guarantees accuracy while allowing you to control spacing and size. The tails can be as close together as the width of your sawblade. And it's easy to make the spacing irregular, another sign of handwork.

The main problem my students have with hand-cutting dovetails is crooked sawcuts, which come back to haunt them when they use the tails to lay out the pins. Any irregularities create gaps and splits when the boards are joined. Cutting the tails on a tablesaw, using a miter-gauge setup or a guide block riding the rip fence, ensures square cuts. This leads to an accurate transfer and, inevitably, a better joint. The guide-block setup also lets you run a stack of parts in one pass.

Another big advantage is that you spend less time on layout. For multiple dovetails that are identical, the tails need to be marked on only a single piece of stock. The tablesaw setup guarantees repeatability. This also means that pieces are interchangeable, so when running components such as drawer sides, I send a few extra parts along for the ride. If one gets damaged later, a replacement is at hand.

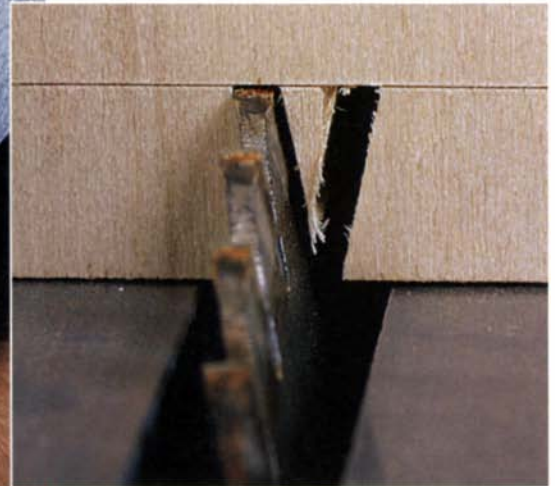
The pins are pretty easy, as long as the layout is transferred accurately with a marking knife. I use machines to remove the waste between the pins and then pare them by hand, working to the incised line.

Have a blade specially sharpened

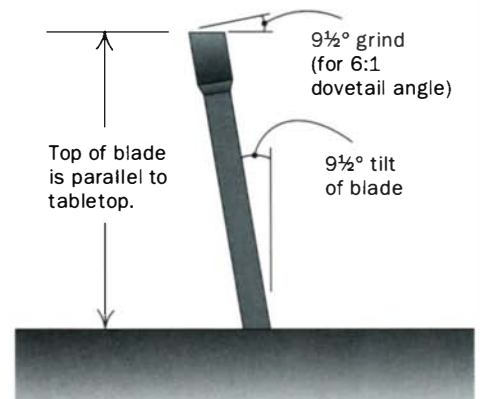
Years back I read an article where a cabinetmaker ground all of the teeth of a table-



CUSTOM-GROUND BLADE IS THE KEY



Angled teeth make for perfect tail cuts. With the sawteeth ground to the dovetail angle, the blade can be tilted to the same angle, making the top of the cut flush with the scribe line. Only a small triangle of waste stock is left.



Tablesaw setup involves a tall support board attached between two miter gauges. A simple stop and clamp allow for accurate repeat cuts.

saw blade $11\frac{1}{2}^\circ$ in one direction and used the blade strictly for dovetailing. Fascinated by this idea, I spent \$12 to have an old narrow-kerf blade ground this way to work with my Unisaw. I had another blade sharpened in the reverse direction to fit my left-tilting Powermatic 66.

When tilted to the proper angle, the top edges of the teeth should be parallel to the surface of the table. Although this tablesaw technique will work with a standard blade, the cut will not reach all the way into the corner. The specially ground blade cuts a perfect corner, leaving only the small triangle of waste between the cuts.

You can have your blade ground to your favorite dovetail angle. I chose a 5:1 angle,

which works out to $11\frac{1}{2}^\circ$, but you might prefer 6:1 ($9\frac{1}{2}^\circ$) or an 8:1 ratio (7°). The cost of having a blade custom ground is usually under \$20 (a couple of grinding sources are listed below). The blade will handle its light task for many years without resharping. I'm still on my first one.

SOURCES FOR GRINDING

Forrest Manufacturing (800-733-7111) will grind an angle on any square-tipped blade for \$11.

Freud Manufacturing (800-472-7307) has a list of regrinding services around the country.

I recommend using a carbide-tipped blade that has a flat-top grind. Square-tipped teeth like this are common on older blades and blades designed for ripping. The problem with alternate-top-bevel (ATB) teeth is that too much of the carbide may have to be removed to get each tooth down to a common angle, and then the blade may not cut properly. Try telling your local sharpening service what you want; they may be able to work with almost any blade.

Cut the tails first

When teaching students to cut dovetails, I lay down a simple rule: pencil marks for the tails, knife marks for the pins. Because

MARK AND CUT TAILS



Make a test cut to set your sliding bevel tool. Use that setting to lay out your dovetails.

The rip-fence-and-support-block method works well for smaller parts. In this case the rip fence acts as the stop, making it possible to run up to six parts at a time and keep them aligned.

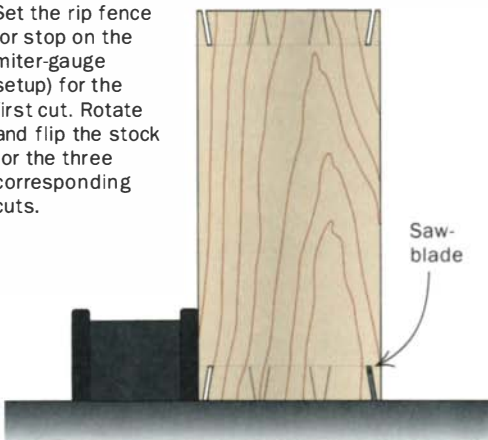


FOUR CUTS ARE POSSIBLE WITH EACH SETUP

If the dovetail layout is symmetrical, these setups allow you to make up to four cuts without moving the stop or rip fence. And the dovetails have to be laid out on only one end of one board.

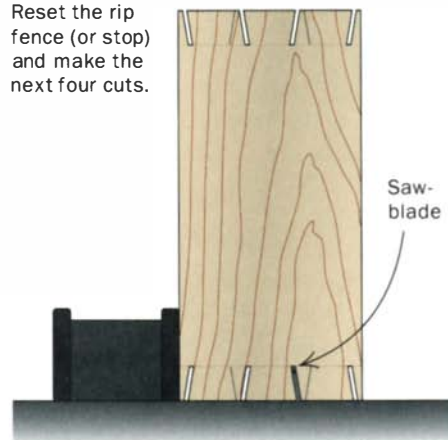
SET-UP ONE

Set the rip fence (or stop on the miter-gauge setup) for the first cut. Rotate and flip the stock for the three corresponding cuts.



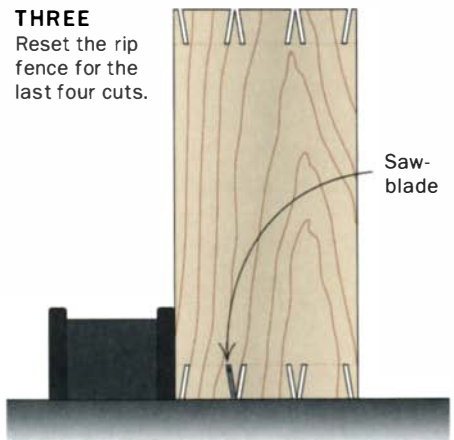
SET-UP TWO

Reset the rip fence (or stop) and make the next four cuts.



SET-UP THREE

Reset the rip fence for the last four cuts.



the tails are cut first, it's no big deal if your cut misses the pencil mark by a little. If it's a scribe line, however, you'll have to cut or pare all the way to that line to remove it and get rid of the small blowouts from severed fibers. Of course, I use a marking gauge to scribe the depths on both the pins and tails boards.

Size matters—Basically, I cut the tails by setting the board on end and pushing it through the angled blade. However, depending on the size of the workpiece, I do this in two different ways. For large case pieces, I use drywall screws to attach a support board of medium-density fiberboard (MDF) to a pair of miter gauges, which makes a very stable jig. Then I clamp a stop onto this board to allow repeat cuts. With a very high support board and a waxed table, I've made dovetail cuts on boards standing over 6 ft. tall.

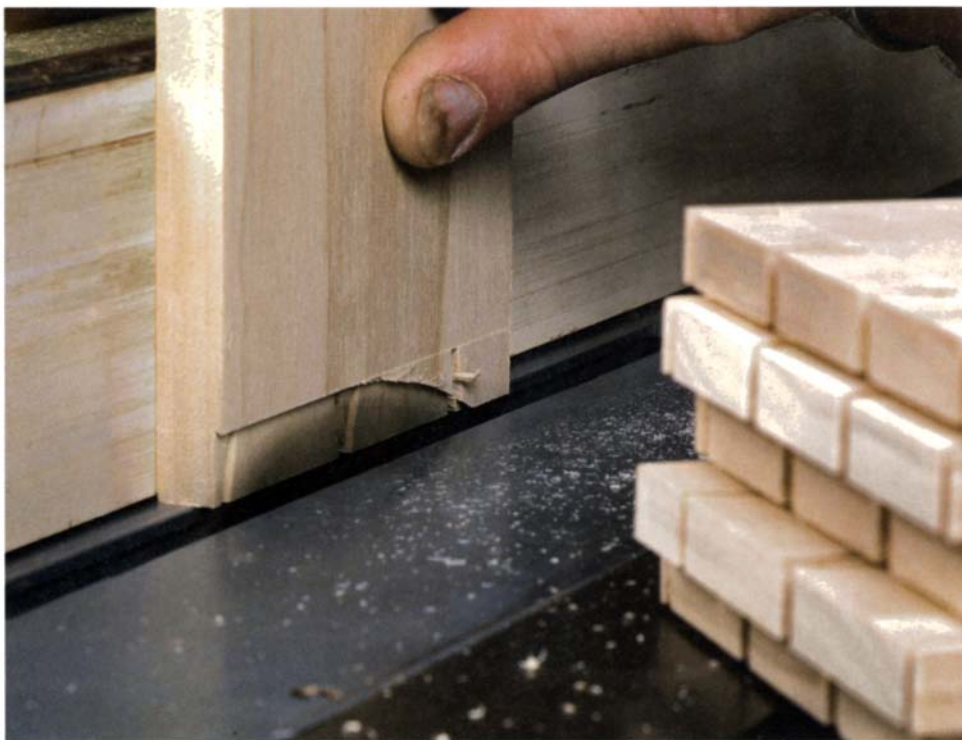
Rather than using a miter-gauge setup for narrow pieces such as drawer sides or drawer stretchers, pieces can be guided by a heavier chunk of stock riding against the rip fence (I save the cutoffs from bedposts for this purpose). This method has a couple of advantages: It's quicker to set up, and the stop, which is the rip fence in this case, is easier to adjust.

Typically, I'll run each set of drawer sides as a pair, cutting through both simultaneously. For larger-scale jobs, with several drawers equal in height, I often run a stack of six parts in one shot. The rip fence keeps them aligned. Once again, this support block also works to prevent chipout, so make sure each cut goes into fresh stock.

Setting the blade height—For through-dovetails, when using the marking gauge to scribe the baseline, go a hair deeper than the thickness of the mating piece. This will cause you to leave the tails slightly proud when the joint comes together; then they can be planed flush to create a perfect appearance. The same should be done for the pins. Half-blind dovetails, however, should be laid out for a flush fit.

Scribe a piece of scrap stock and use it to fine-tune the blade height. Tilt the blade to the appropriate angle and raise it slowly, making several test cuts until the blade is cutting right at the line. If you accidentally go too high, reposition the support board or flip the support block. That board or block backs up the cut to prevent chipout.

RABBET, THEN REMOVE WASTE



Rabbit the tails. A small rabbet behind the tails creates a clean inside edge on the finished joint and makes it easier to locate the tails over the pins board when transferring the layout. It also protects the corners of the tails when the boards are stacked.



Latta prefers the scroll saw for removing waste stock between tail cuts. He cuts directly across the scribe line, leaving no waste, and the job is done in one step. This waste also can be removed quickly with a chisel.

When the blade is hitting the scribe line exactly, you can use the sawkerf in the scrap piece to set the angle of your adjustable bevel. Lay out the dovetails on your first workpiece. Move the stop block so that the blade lines up with the pencil line, then guide the piece through the cut.

Rabbit the tails before cleaning out the waste

Before I clean out the waste between the tail cuts, I rabbet the inside edge of the

joint. The rabbet is flush with the bottom of the tail sockets and serves a number of purposes. Most importantly, it makes it much easier to locate the tails board on the pins board, resulting in a precise layout transfer. Rabbeting the tails also leaves a clean corner on the inside of the finished joint, with the shoulder covering blowout, milling errors and glue squeeze-out.

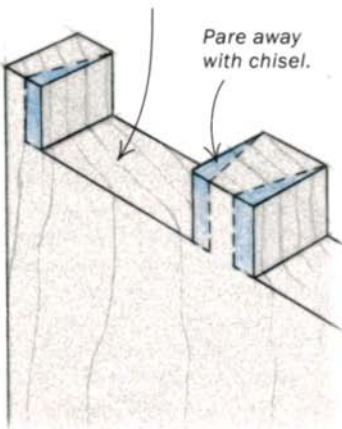
Cut this rabbet *after* making the tail cuts. If the rabbet is there first, you will get blowout when cutting the tails. When you

THROUGH-DOVETAIL PINS



Transfer the layout. The rabbet makes it much easier to keep the boards correctly aligned. Use a knife to mark pins; the scored line will guide your chisel later.

Area cut away with dado blade



Pare away with chisel.

Use a dado blade to remove as much stock as possible. Again, the rip-fence and support-block set-up allows multiple workpieces to be run at once.



Paring to the line. The dado blade (or a router) will leave a square, clean bottom between the pins but small triangles of wood to be pared away. The combination of a chisel and knife works well for paring right to the scribe line and then severing the fibers at the inside corner of the pin.



put the rabbeted side against the miter fence, there will be no support there for the cut. However, rabbet the tails before cleaning out the waste between the angled tablesaw cuts. There will be less waste to clean out and the rabbet will help guide your chisel if you're chopping by hand.

For small to medium workpieces, make a shoulder that's less than $\frac{1}{8}$ in. deep. You can make this cut in a single pass over the tablesaw blade. For carcass pieces or drawer stretchers $\frac{5}{8}$ in. or thicker, when the rabbet is thicker than a sawblade, make a shoulder cut followed by a cheek cut on the tablesaw.

It is critical that this rabbet hit the scribe line exactly. Otherwise, the joint won't fit or there will be an unsightly gap on the inside corner. After rabbeting the inside of the tails, don't forget to reset your marking gauge for the pins, which now have less stock to pass through.

Clean out the tails—I prefer to use a scroll saw to cut away the waste. The thin blade can slide sideways down to the base of the tablesaw cut and then cut straight across the bottom in one shot. Cut to the scribe line. It's a waste of time to stay shy of the line and leave the rest for hand-paring.

If you don't have a scroll saw, waste some of the stock out with a bandsaw and finish with a sharp chisel. Of course, chop only halfway into the workpiece before flipping it over and working in from the other side. Regardless of the method, this step goes quickly—especially if the spacing between the tails (the size of the pins) is kept to a minimum.

Now cut the pins

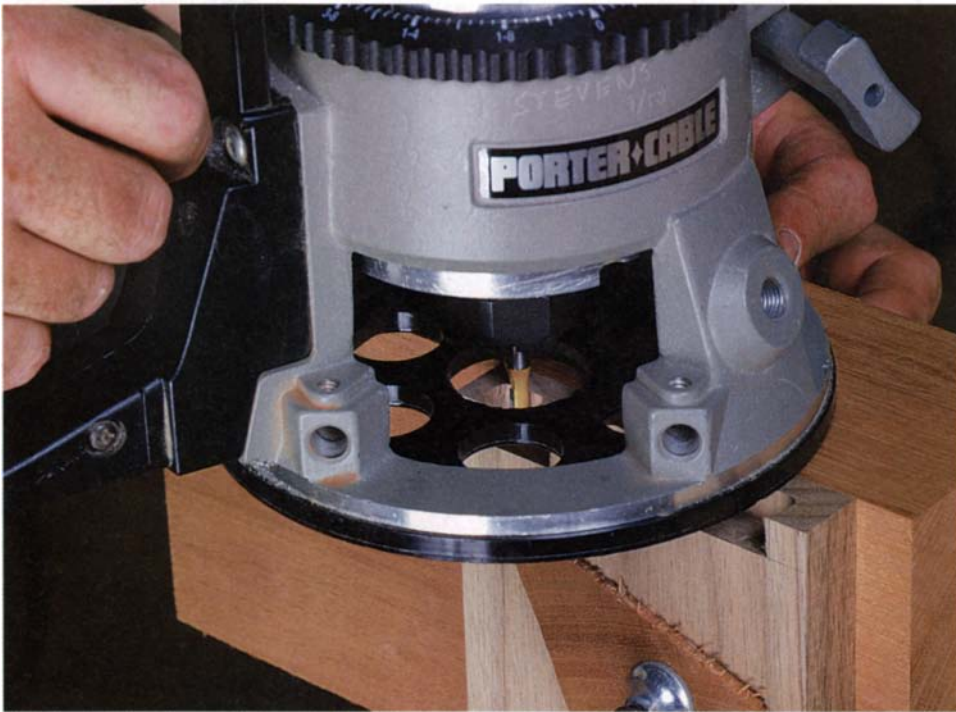
Use a marking knife or X-Acto when transferring the location of the tails to the pins board; a pencil line is just not accurate enough. Also, during the final paring, the tip of your chisel will fall right into the knife mark, leading to a perfect fit.

How you waste out the stock between pins depends on the type of dovetail being cut, the size of the workpieces and which machines you own.

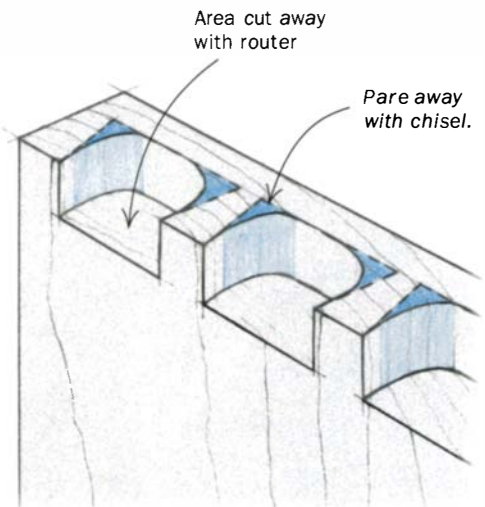
Three options for through-dovetails—

For smaller workpieces, I use a scroll saw to clean out the waste between the pins. Cut in along the widest part of the pin and across the depth line. With a little practice you will be able to cut right to the scribe

HALF-BLIND DOVETAILS



Rough them out freehand with a router. The end-grain orientation makes it easy to control the cut as you work close to the lines. Clamp the workpiece to an extra block to support the base of the router.



line. Having removed the bulk of the waste, use a chisel and marking knife to pare away the remaining triangles of stock.

For larger case pieces with through-dovetails, or when you have a lot of parts to do, use either a router setup or a dado head on the tablesaw. By working with the board set on end, you can use the height adjustment on these machines to establish a clean and square surface at the bottom of these wide spaces.

A router with a straight bit leaves the cleanest cut at the bottom of the pin spaces, and it lets you work closer to the angled cheeks of the pins, but it involves one quick extra step. First clean out most of the material with a scroll saw or bandsaw. The router will work more smoothly with less material to hog through. Because the router will be riding on the end of the board, clamp on a wide support block. This piece will also back up the cut. Remove as much stock as possible, then pare to your scribed layout lines with a sharp chisel or knife.

On the tablesaw, use the double-miter-gauge setup. I usually stack the dado head to a 1/2-in. thickness, which doesn't hog away too much material in one pass but still makes the job go quickly. Just as before, if you go too high with your test cuts on scrap, reset the support board so that

the cut plows through fresh stock. Place the workpiece so that the widest part of the pin is facing the dado head; that way any blowout will be mostly in a waste area. Again, finish the joint by hand.

Router setup for half-blinds—The router-and-support-block setup works well for just about all half-blind dovetails, whether fitting dovetailed stretchers into the tops of table legs, drawer sides into drawer fronts or case tops and bottoms into sides. Once again, set the router's cutting depth exactly to the scribe line. Finish the pins with a chisel and knife.

Method is a good compromise

I'd love to teach my students to cut all of their dovetails by hand, cherishing both the process and final product. But their skill levels and the reality of the marketplace they're entering simply won't allow for that. The structural integrity and final appearance of the joint is what matters most. With this tablesaw technique, you get most of the character of a hand-cut joint in much less time. All in all, it's a compromise I can live with. □

Steve Latta is a furniture-making instructor at the Thaddeus Stevens College of Technology in Lancaster, Pa.



Finish with a sharp chisel. For accurate results when making the final paring cuts, start the chisel in the scored layout marks.

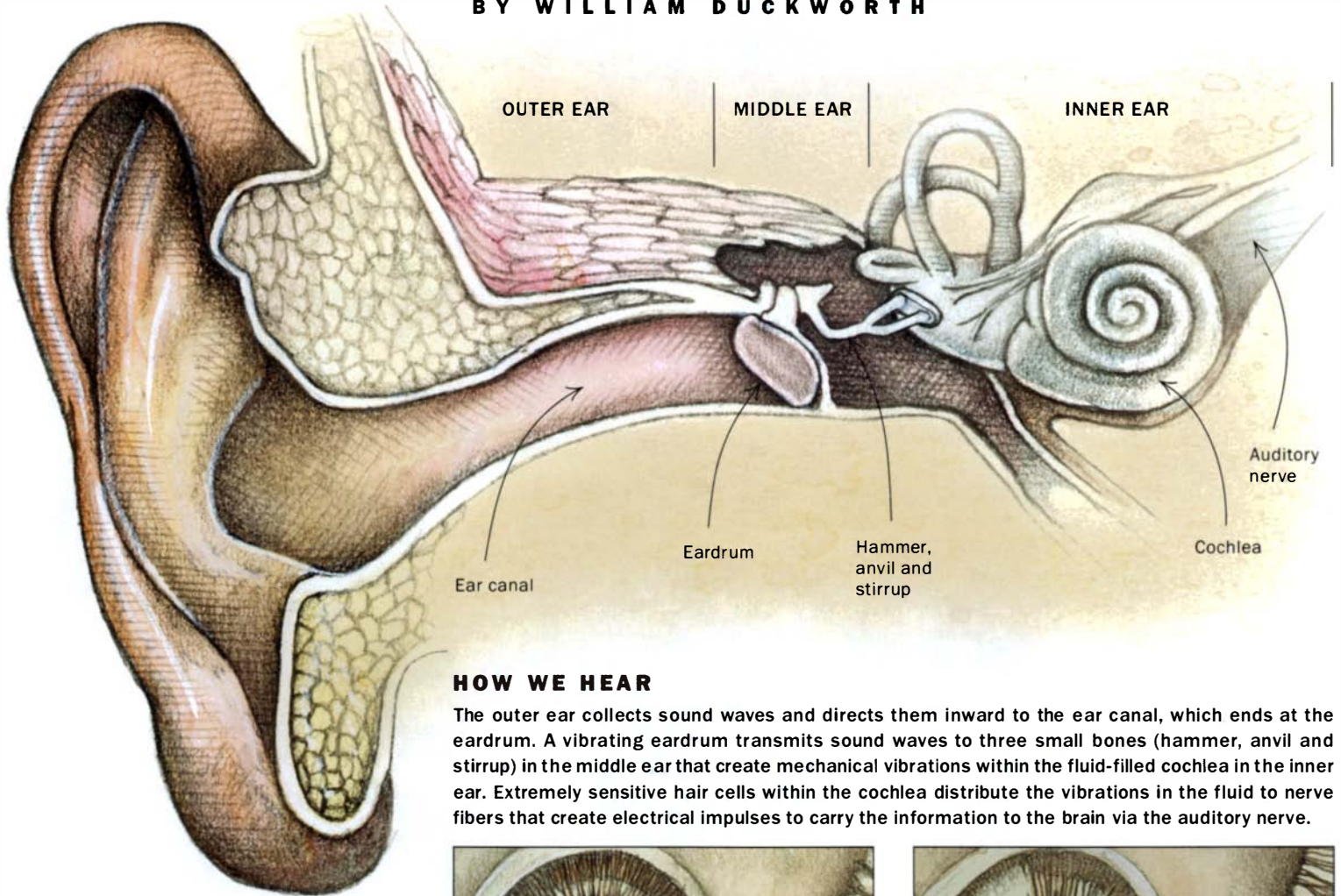


Expect a flawless fit. A few light taps should be enough to close the joint.

Protect Your Hearing in the Shop

Choose ear protection that's comfortable, and learn how to use it correctly

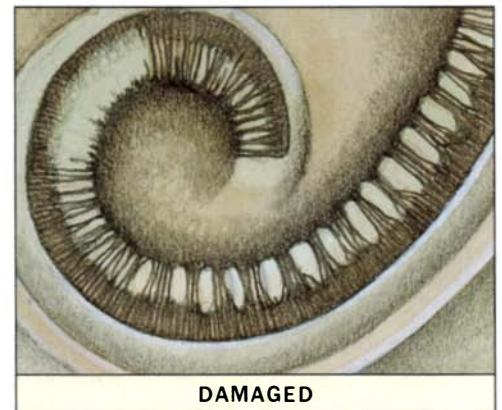
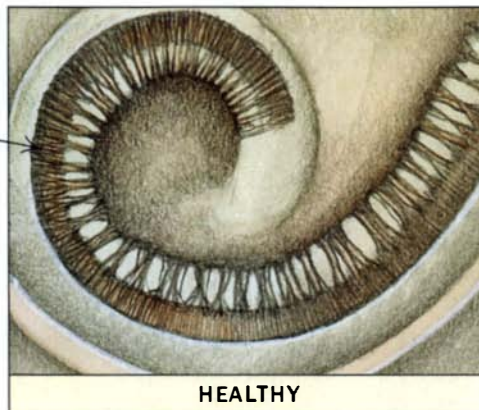
BY WILLIAM DUCKWORTH



HOW WE HEAR

The outer ear collects sound waves and directs them inward to the ear canal, which ends at the eardrum. A vibrating eardrum transmits sound waves to three small bones (hammer, anvil and stirrup) in the middle ear that create mechanical vibrations within the fluid-filled cochlea in the inner ear. Extremely sensitive hair cells within the cochlea distribute the vibrations in the fluid to nerve fibers that create electrical impulses to carry the information to the brain via the auditory nerve.

The inside of a normal, healthy cochlea contains thousands of cilia and hair cells that transmit sound vibrations. Noise damage causes hair cells to die, resulting in hearing loss.



For nearly 20 years I was exposed to the often painfully loud whines of tablesaws and routers, banging hammers, whirring planers and the assorted din you hear daily in a small cabinet shop. Did I wear hearing protection? Well, some of the time, but more often than not, no. I'd characterize those habits more as careless than as cavalier. I had two sets of earmuffs—one good pair for an employee and one fairly cheap set that I'd use on occasion. What I didn't like about those earmuffs was that they just weren't comfortable. The cushion quickly lost its spring and softness, affecting the seal; the plastic covering around the cushion was scratchy and hot, and it stuck to sweaty skin on warm days.

After speaking with a number of people in the hearing conservation industry, from makers of protection devices to hearing-aid suppliers, it turns out that my experience was not uncommon. The biggest challenge many makers of hearing protectors face is making devices comfortable enough that people will actually use them. Another thing I learned is that the science behind the effort to provide good hearing protection can be quite complicated. But like most other fields of study, you don't have to understand all the science to benefit from its hard-won results. With that said, it may help to put some of that science into perspective.

Hearing loss—what is it, and what causes it?

The onslaught of damaged hearing can result from medical problems, including illnesses. But the most common cause of damage is being too close to too much loud noise for too long. How much is too much? Average daily noise levels of 80 decibels and lower pose no threat of hearing damage. Noise levels of 90 decibels and higher can be hazardous, and several machines in a woodshop exceed those levels (see the graphic at right). The duration of exposure has as much to do with it as the decibel level. Noise-induced damage is cumulatively degenerative and mostly irreversible.

Our outer ears collect sound (see the drawing on the facing page), directing it down the ear canal to the eardrum. Fluid in the inner ear conducts sound vibrations to the cochlea. The cochlea is to hearing what the retina is to seeing: Within each cochlea are approximately 35,000 tiny microscopic hairs, or cilia, that bend to the movements of fluid motions caused by the sound vibrations. The cilia connect to hair cells that set off nerve impulses that move through the auditory nerve to an area of the brain where the electrical messages translate into sounds the brain can recognize.

It is those cilia and hair cells that become the victims of noise-induced hearing loss. Repeated loud blasts of sound (air guns and hammer blows) or extended high-pitched whines (routers and belt sanders) can simply obliterate them or wear them out. And when those hair cells are destroyed and disappear, they don't grow back.

Noise-reduction ratings are the standard of measure

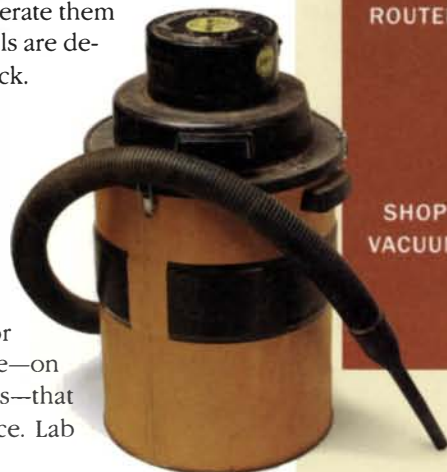
Look at any package of earmuffs or disposable plugs, and you'll find a government-mandated noise-reduction rating (NRR), which is an ideal laboratory measure. The NRR figure (usually in the teens or 20s) represents in decibels how much noise—on average across a spectrum of frequencies—that particular device will attenuate, or reduce. Lab



Shop noise: How loud is it?

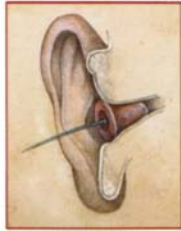
We set up a sound meter in the *Fine Woodworking* shop and took readings on machines and power tools running under load. We placed the meter on a tripod at ear level off the floor and placed it at a distance from the machines that would approxi-

mate an operator's position. Listed below are the decibel levels of the equipment we tested. Prolonged exposure to noises louder than 90 decibels poses the greatest threat.



Not a surprise for many. The loudest machine in the shop is the vacuum.

PLUGS

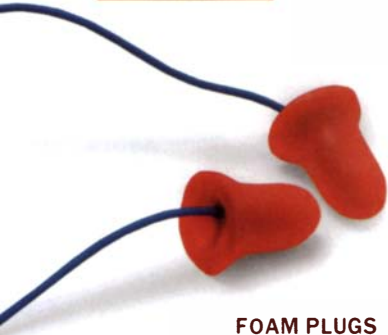


DISPOSABLE FOAM PLUGS

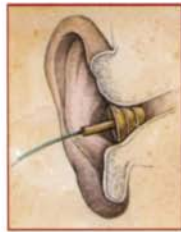
Learning to fit disposable foam plugs requires an education. Inserted properly, foam plugs offer considerable protection.



Depress the foam first between your fingers, then pull up and back on the ear to insert the plug.

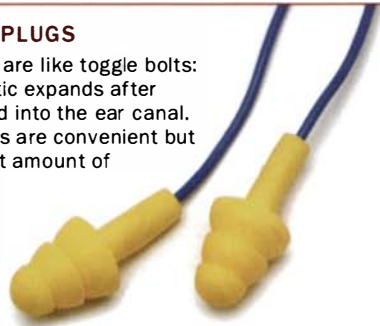


FOAM PLUGS



REUSABLE PLUGS

Barbed plugs are like toggle bolts: The soft plastic expands after being inserted into the ear canal. Hearing bands are convenient but offer the least amount of protection.



BARBED PLUGS



HEARING BANDS

technicians arrive at the figure by averaging the effects on at least 10 different people fitted with that device in a lab. Higher numbers signify greater effectiveness. However, in the real world these ratings don't mean a whole lot.

In the real world, people don't always fit themselves with a hearing-protection device correctly, as is often the case with plugs. One manufacturer I spoke with makes foam earplugs with an NRR of 29 decibels and a set of muffs with an NRR of 22 decibels. So I asked the scientist in the research and development lab whether I could then conclude that the foam plugs offered considerably better protection. The answer was a resounding no; as a matter of fact, the opposite is true. Earmuffs are relatively idiot-proof: You put them over your ears, and the spring action holds them firmly in place. Generic-sized foam plugs don't fit all ears the same, and many people simply don't know how to install them properly. So in the real world, the muffs usually offer better protection despite their lower rating.

And in the real world, people don't always use the device when they're exposed to noise. Is one quick cut on the table saw always worth a walk across the room to pick up that set of muffs you left on the workbench? One manufacturer suggested that for a more accurate and realistic assessment of how well a hearing-protection device will reduce sound within a workplace, you could roughly divide its NRR figure in half.

There are many types of gear on the market

Among the three or four major manufacturers, woodworkers have never been offered more choices than they have now. The two major categories of products offered—muffs and plugs—can be broken down into several subsets of hearing-protection devices (for a list of sources, please visit finewoodworking.com).

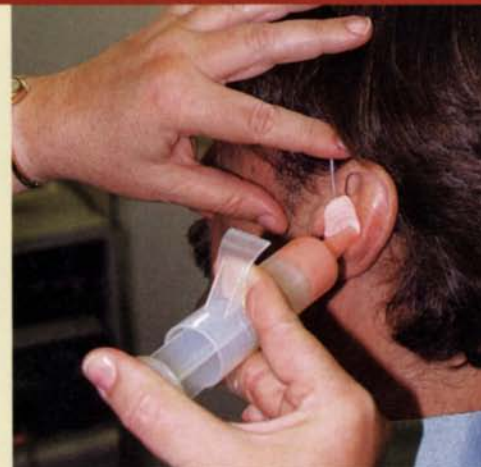
Disposable foam plugs—These things are surprisingly effective—as long as you learn how to fit yourself with them properly—and for about 20 cents a pair, you can't beat the price. We found one brand (Howard Leight Industries) with an NRR of 33 decibels. To fit them, it's important to insert them fully into the ear canal; otherwise, they won't offer much protection. Depress the foam by rolling it between your fingers. Pull back and up on your outer ear with one hand (which gives you better access to the ear canal) while inserting them with the other. As the foam begins to expand

CUSTOM-MADE EARPLUGS

In the price range of \$65 to \$80, custom-fitted plugs are the most expensive alternative for plug-type protection. You can get plugs made with a filtered air channel (that facilitates conversation while wearing them) that offer protection with an NRR of 25 decibels to 29 decibels. Custom plugs without the air channel are rated as high as 37 decibels. You know these plugs will fit perfectly because they are made from an actual mold of each of your ears. To have a set made, look in your local yellow pages for a certified hearing specialist or a hearing-aid supplier.



CUSTOM PLUGS



Custom-fitted plugs offer the best for the most. For people who already have damaged hearing or who simply want first-rate protection and don't mind paying for it, custom plugs can be the answer. Here, silicone is injected into the ear to make a mold.

it sounds as though you've got an ear full of soda water for a few minutes until the foam fully regains its shape.

Foam plugs come with or without cords that hold a pair together. With the cord you're less likely to plop down the plugs on a workbench covered with sawdust.

Reusable plugs and hearing bands—Reusable plugs are made of soft plastic rather than foam. They're tapered and have successively larger barbed rings of the flexible plastic, which block off the ear canal. A hearing band is worn under the chin instead of over the head. The spring action of the plastic band holds two foam pads in place. But the pads cover only the outside of the ear canal, so they offer the least amount of protection of all of the devices I examined.

It actually hurt to wear the reusable plugs. The hearing band was just the opposite—comfortable and convenient. The NRR for the hearing band is low (20, 21 decibels), so it wouldn't be my first choice for protection from really loud noises. But when you're putting on hearing protection and taking it off repeatedly, there is something to be said for the convenience of leaving the band hanging around your neck. Also, you can wear the band and a set of safety glasses or goggles at the same time without compromising the hearing protection you are getting.

Muffs—Among the various brands of muffs, you'll find a wide range of choices regarding cost and comfort. Surprise—the more expensive ones (\$20 or more) are the most comfortable, but even the lower priced versions (less than \$10) are fairly cozy until they get too old and worn out. NRRs of muffs vary from as low as 15 decibels to as high as 33 decibels.

The one big downside with muffs is that you can't wear them with safety glasses without sacrificing their effectiveness, because the stem of the glasses breaks the seal of the foam surrounding the ears. They also don't work well with full-face masks. You can wear them with a set of goggles held in place with an elastic band, but many people don't like wearing goggles because they tend to fog up, obscuring good vision.

More than one industry source suggests a solution for people who have to face extended exposure to extremely loud environments or people who already have hearing damage and can't risk exacerbating it. Wearing both the foam plugs and earmuffs at the same time increases the level of hearing protection by about 6 decibels. □

William Duckworth, associate editor, is a lucky man. A hearing specialist recently tested him and said that despite all that time spent in the shop he has "unbelievably good hearing."

MUFFS

Muffs are the benchmark of the industry. Regular earmuffs range in cost from about \$8 to \$25, and have an NRR of 15 decibels to 33 decibels.



UNUSUAL MUFFS FOR THE MONEY

Here are two special exceptions to your standard foam-filled earmuffs. **Leightning Powered by Pro-Ears**, made by Howard Leight Industries (800-327-1110), are marketed primarily to gun users, who need protection from the loud impulse noise of shots being fired. **Battery-powered electronics, small built-in microphones and independent volume controls for each ear allow the person wearing these earmuffs to monitor conversations while loud noises are electronically compressed to safe levels. Wearing these muffs, you can still hear what goes on around you, but the noises don't hurt. At sporting-goods stores these muffs sell for about \$250.**

The Peltor Lite-Com, made by Aearo (800-225-9038), is a wireless headset with a five-channel FM radio that has a communication range of more than 1,000 ft. The muffs connect to a transmitter/receiver, which is equipped with a belt clip. These muffs would work in a busy commercial or industrial shop, where workers face an all-day din. They might also work for the well-to-do home hobbyist who wants to keep in touch with a spouse in another part of the house. These units sell for about \$300, and they are designed for extended wear.



Adjusting the volume. The small foam pad on the bottom of the Leightning Pro-Ears muff is a microphone. The volume control adjusts the noise level.



Keep in touch in a busy shop. The Peltor Lite-Com headset, designed for daylong wear in noisy environments, makes it possible to communicate with others by way of a built-in radio.

An Everyday Cabinet

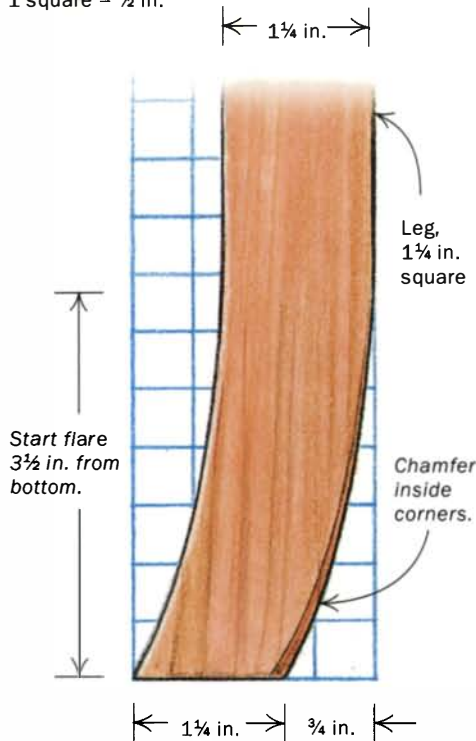
Straightforward construction methods
for building a case with doors and drawers

BY SCOTT GIBSON



A Leg with Flare

1 square = $\frac{1}{2}$ in.



Story stick aids leg layout. To ensure consistent leg form, shape a single template to trace the layout of all four leg blanks. The same template can be used for marking out the mortises.



Cut all but the curve. Mark the fence to indicate how far to cut, then cut to that line and shut off the saw. Take care to hold the stock tightly against the fence until the blade has stopped.



Finish on the bandsaw. Cutting from the bottom of the leg, finish the sweep of the foot on the bandsaw.

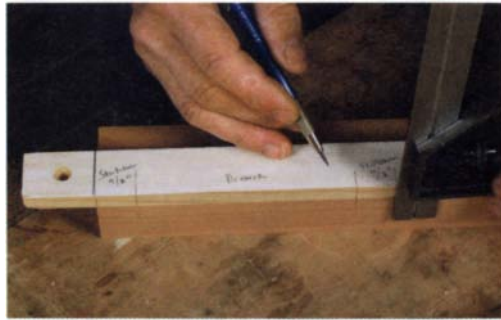
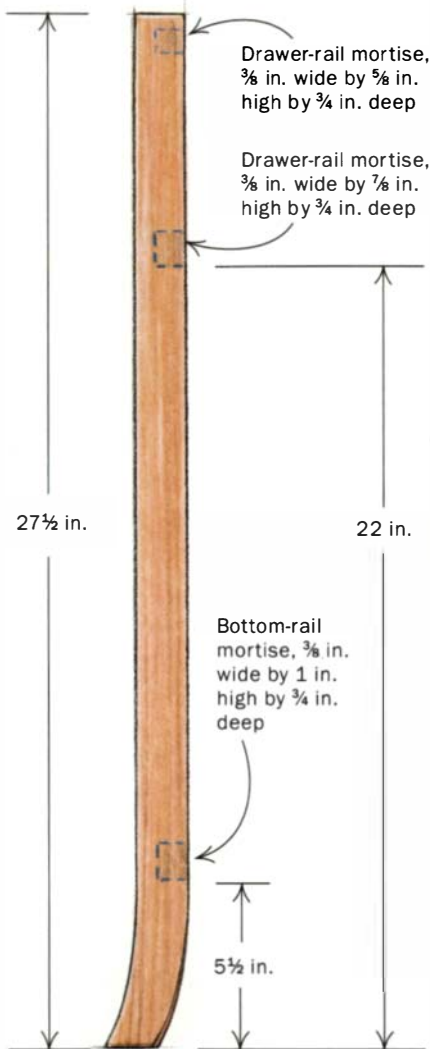
When I set up an office and began working at home, I vowed to be careful with what little space I had. But before long I was awash in all of the junk any office accumulates—pencils, notebooks, phone books—and not enough storage room. Part of the solution was this small, shallow cabinet, which tucks beneath a window without blocking the view. Its two drawers offer useful storage, and the lower compartment is unobstructed by a center door divider.

I wanted to build the cabinet quickly and with a minimum of materials. The sides and back are frame and panel with frame stiles biscuited to the legs. That makes for a sturdy carcass that is easy to put together. With the exception of the drawers, the rest of the joinery is mortise and tenon.

The bottom of a table or cabinet leg can be hard to get right. This cabinet is boxy to start with, and I thought a straight leg would be too plain. In Wallace Nutting's *Furniture Treasury* (Macmillan Publishing Co., 1933), I found drawings of several legs that meet the floor in a graceful curve. The one I liked the most was a tall clock foot with Hepplewhite origins.

The cabinet's design is adaptable. It would be easy to alter the height of the

Front-Leg Joinery



Mark and cut mortises. For consistency, mark the mortise locations directly from the story stick (above). A dedicated mortising machine makes quick work of cutting all 12 mortises (below).



drawers or even the overall dimensions of the cabinet without changing its look very much. Figured veneer door panels or drawer fronts would give the piece a much more formal feel. In the end, I kept the design simple.

A template helps with the legs

It's easier to lay out and shape a template than it is to measure and duplicate the same pattern on four separate legs. I used scrap pine for this template, marking the sweep of the foot with a French curve and noting the locations of mortises for the front frame pieces. These legs curve in only one plane, away from the case sides.

The tip of the foot extends about $\frac{3}{4}$ in. beyond the side of the cabinet, so there really isn't much waste in cutting the legs from solid wood. Most of the cutting can be done on a tablesaw by running the leg blank through the blade until the kerf just reaches the start of the curve. Mark the extent of the blade's reach on the fence before you start so that you know how far to go before turning off the saw. A bandsaw will finish the cuts, and a rasp, file and scraper quickly remove the saw marks.

A tapered chamfer helps the leg look thinner and more delicate as it reaches the floor. It begins just where the curve starts outward and widens as it nears the floor, making the leg look less bulky at the bottom. This is very simple to do with a spokeshave. If the wood wants to tear going around the bend, use a file. But try to stay



Biscuit-join the leg and stile. It's helpful to place the stock and machine on a flat surface (like the MDF pictured) for square cuts. The MDF also acts as a riser, allowing you to lay the leg flat, with the foot hanging off the end and out of the way.



Glue up the leg and stile. To ensure a tight bond along the entire glue-line, glue and clamp the leg to the stile before setting the frame and panel into place.

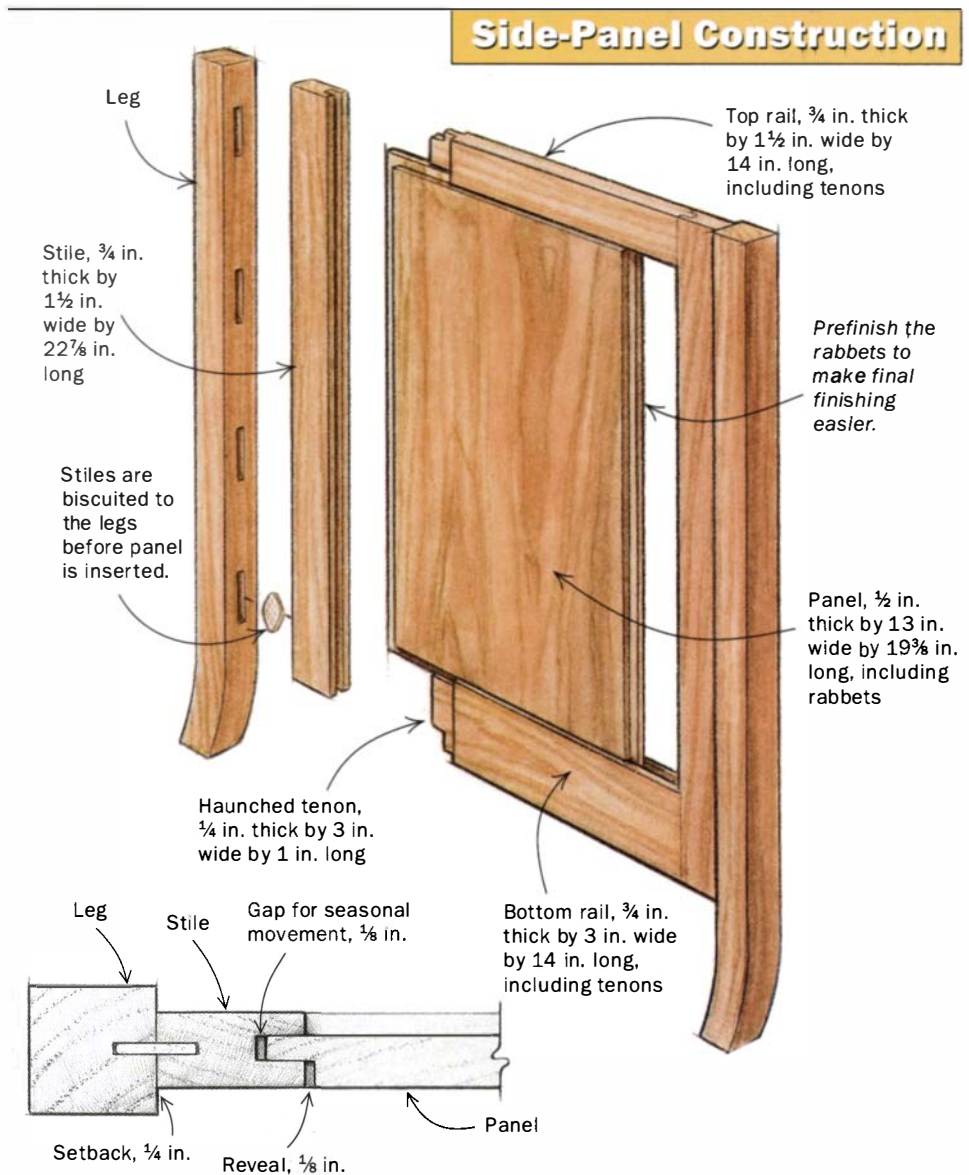
away from sandpaper as much as possible because it rounds over the edges.

The only thing left on the legs are the mortises for the front frame pieces. These are located so that the frame pieces (and doors) can be set back from the front of the leg by $\frac{1}{4}$ in. This dimension is important. Depending on where the hinge pivots, too much of a setback will prevent the doors from opening very far. It's a good idea to have the hinges in hand before you start.

The front frame pieces extend to the back edge of the leg, making for a clean corner inside the cabinet (that will be helpful later). Now is a good time to cut the mortises for the knife hinges and to plunge a groove in the back of the bottom drawer rail with a biscuit joiner for the intermediate drawer support (both operations will be very difficult to do later). Also, the dados or dovetailed mortises for the center drawer divider can be made now.

Making and fitting the frame and bottom

These frame pieces are made of $\frac{3}{4}$ -in.-thick material with a groove for the panel $\frac{1}{4}$ in. wide and $\frac{1}{2}$ in. deep. A single panel is on each side, and two panels are on the back. After milling up the parts, I set up an adjustable dado to cut all of the grooves in the center of each stile and rail. Before running off all of the pieces, I tinkered with the width of the cut to make sure it would match the width of my mortising chisel. I wanted to make sure the 1-in.-deep mortis-



Attach the rails. Once the leg-and-stile assembly has dried, insert the bottom and top rails of the frame and panel.

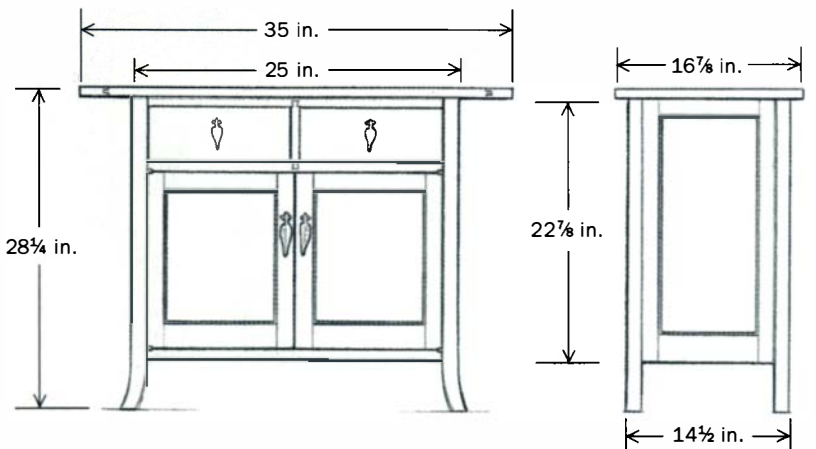
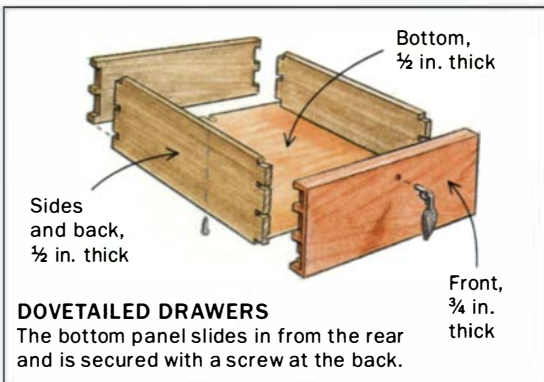
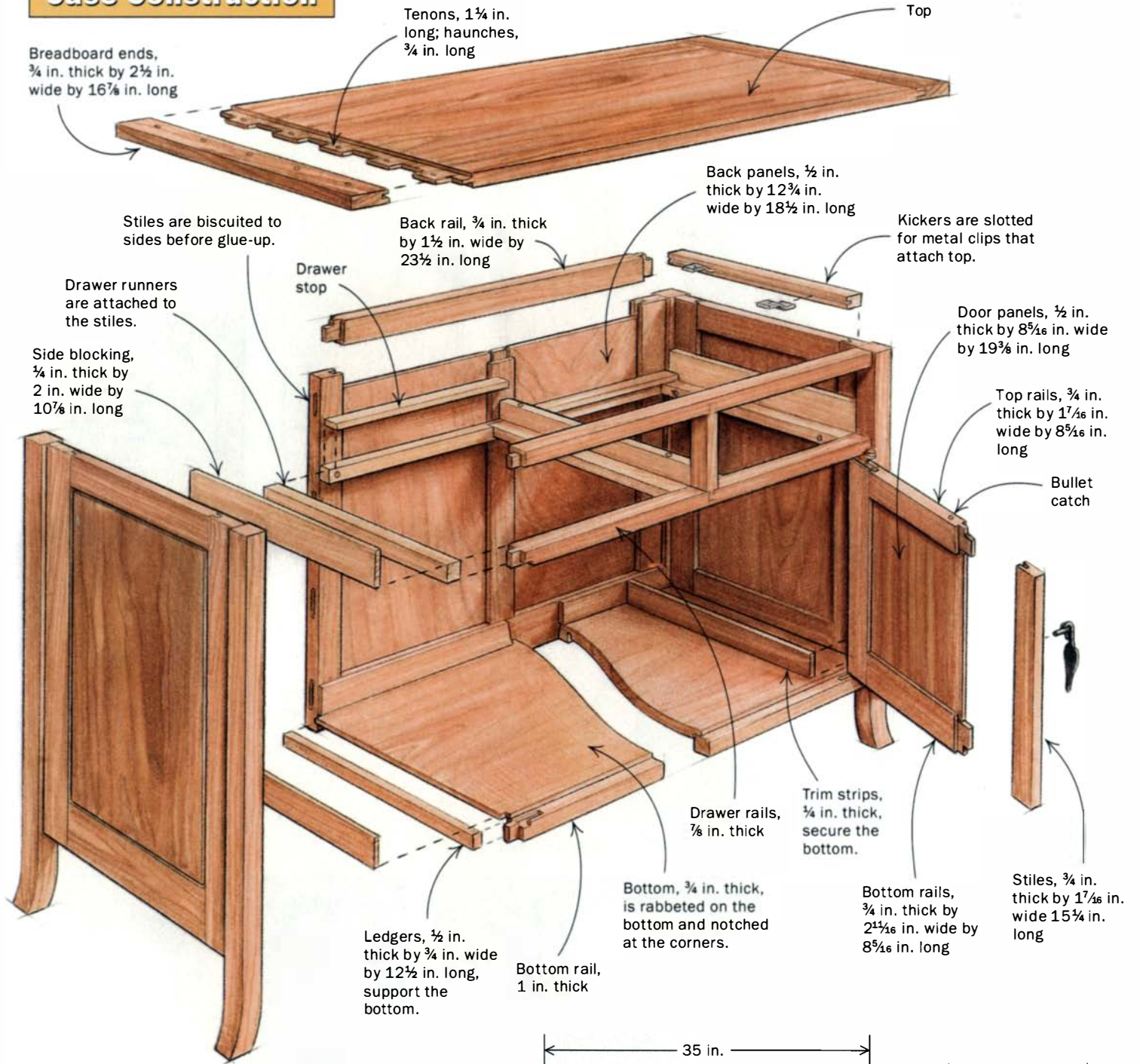


Drop the panel in place. Gibson prefinished the rabbets on the panel so that he wouldn't have to squeeze finish into the small gap between the frame and the panel.



Complete the side. Finish by attaching the other stile and leg, which have been biscuited. Glue and clamp horizontally.

Case Construction



Important Note



Install knife hinges before glue-up. Knife hinges must be installed before the carcass has been assembled. See *Master Class* (p. 108) for techniques on installing knife hinges.

es aligned with the sidewalls of the groove as closely as possible.

After years of cutting mortises with a plunge router, I recently bought a mortising machine, which is faster and less prone to error. I cut tenons with a homemade jig on the tablesaw.

It would seem logical to glue up the frame-and-panel assemblies now, but that's not a good idea. The panel stiles are attached to the legs with #20 biscuits, and the full length of the stile should be clamped to the leg while the glue dries. That's not possible if the frame-and-panel assemblies are put together first. So start by gluing just the stiles to the legs, and then add the rails and panels to complete the carcass when those assemblies have dried.

The cabinet's solid-wood bottom goes in after the carcass has been assembled. It needs to move with seasonal changes in humidity. I glued and screwed ledgers around the inside perimeter of the cabinet, rabbeted the bottom panel and set it inside. Only the front edge is glued. It forms the doorstop. The back edge of the bottom can move to its heart's content. To keep it firmly in place and to hide the seam between bottom and cabinet, I attached 1/4-in.-thick strips of wood to the inside rails with an 18-gauge pneumatic brad nailer. They trap the tongue on the edge of the bottom panel and keep it in place, and the nail heads are so small they're hard to see.

In gluing up the carcass, the assembly should be as close to square as you can get it. An out-of-square carcass makes fitting



Assemble the back frame and panel. Lay one side facedown on risers and attach the back. It helps to do a complete dry run before gluing up the back-panel assembly.



Complete the case. It is easiest to finish the assembly with the case on its side (left). To ensure an equal reveal around the panel, shim the opening and hold the door in place with masking tape (above) until the carcass dries.

Case-Bottom Installation

Ledgers hold up the bottom. After the carcass glue has dried, ledgers are screwed into the back and sides to provide solid support for the bottom panel.



Rabbeted lip rests on ledgers. Fit the bottom so that it's snug at the front, but leave room at the back to allow for seasonal movement.

Secure the bottom with trim strips. The front edge is glued to the front rail and acts as a doorstop. To keep the bottom in place and to cover the expansion gap, tack additional strips into place on the sides and back.



the bottom a real pain in the neck (don't ask how I know) and makes it much harder to fit the drawers correctly.

Adding the drawer guides and drawers

It may defy common sense, but a drawer that fits loosely in its opening will bind as it's opened and closed. To get a drawer to work well, it must fit its opening very closely, and the opening must be square. Drawer guides and runners can be any kind of wood. Even pine will give you decades of service before it wears out.

Drawer runners on the sides of the cabinet are screwed directly to the panel stiles. Then add blocking with the inside face exactly even with the edge of the leg that forms the drawer opening. At the center of the cabinet, the drawer supports are a little more complicated. Add a center runner wide enough to handle both drawers. This is where that biscuited slot comes in handy: The front of the runner is biscuited and then eased into the cabinet. The back of the runner is dadoed into a ledger that runs along the back of the cabinet. A vertical divider, the same width as the drawer divider in the frame, completes the opening. The last components are the kickers, which prevent the drawers from tipping too much as they are opened. These are slotted to accommodate metal clips that attach the top to the cabinet.

The best explanation of drawer fitting I've read comes from Alan Peters, the English cabinetmaker (see *FWW* #125, pp. 72-78). I like the way hand-cut dovetails look, but the drawers could be made in any one of several ways: dovetailed with a router or assembled with biscuits or a tongue-and-groove joint. The key is choosing a sturdy joint, making sure the parts fit precisely and ending up with a square drawer box. Drawer bottoms should be oriented so that they move seasonally front to back, not side to side, as Peters suggests.

These drawer sides are made of quarter-sawn white oak, which is very stable dimensionally, and they are a bit thinner than the drawer front. The white oak may not make a big difference, but it can't hurt.

Adding the doors and top

These are very simple frame-and-panel doors. Because knife hinges are used, they must fit the opening very closely (for more on knife-hinge installation, see *Master Class*, p. 108). I don't allow any extra when

cutting the door stiles to length—they should be exactly the same height as the opening minus the two washers on the hinges. For width, it's a good idea to allow a little extra material, $\frac{1}{8}$ in. or so, and plane the doors to fit after they've been made. There's no solution to doors that are too narrow other than making new ones.

The front edge of the cabinet bottom forms the only doorstop. At the top of the opening, Brusso bullet catches hold the top of the doors in place. I insert the part containing the spring-loaded ball into the cabinet frame, and the catch into the top of the door. When assembled this way, the ball will wear a tiny groove in the top of the door stile, but no one will see it unless the door is open. If the ball goes in the door, it will wear a groove in the cabinet frame that will be visible all of the time. Although these catches are beautifully made, they are a little fussy to put in because you really have only one chance to get it right. I check the layout several times before drilling the holes, and then I epoxy the pieces in place and hope for the best.

Breadboard ends give a tabletop a finished look. The overhangs are a personal choice, but I think between 4 in. and 5 in. is about right on the ends, and about 1 in. on front and back. This keeps the top from getting too wide, while adding a horizontal dimension that prevents the cabinet from looking squat.

Choosing a finish and hardware

Everyone has a favorite finish. Chris Becksvoort and others who routinely work in cherry like an oil finish because it brings out the wonderful color of the wood. I like a harder finish. After trying just about everything, I now spray either nitrocellulose lacquer or blond shellac. Both have a pleasant amber color and terrific clarity, and they offer very good protection to the wood. Also, they don't dry out over time and can be repaired or recoated. Still, I start with a thin coat of a polymerizing oil, such as Watco, to bring out the rich color of the cherry. I don't think cherry needs stain.

Like finish, hardware is a personal call. To my eye, good iron hardware looks just right on cherry. I was lucky that my son, Ben, is skilled in the forge. He designed and made the drop pulls. □

Scott Gibson, a former editor at *The Taunton Press*, is a freelance writer.

Drawer-Guide Installation



Not quite a sliding dovetail. The drawer divider is joined with a dovetail only half the thickness of the rail so that rail strength is not compromised.



Fit the center runner. For ease of assembly, the back is rabbeted and drops into a notch in the ledger. The front is biscuited into place.



Attach the divider. Before screwing the divider into place, mark its location using a square. Then fit to the lines.



Runner fits flush with rail. Screwed in for strength, the runner lines up with the back guide and the front rail.



Tack in the side blocking. Finish the interior of the drawer-guide installation by attaching the side blocking.

A True Oil Finish



Nontoxic and easily repaired, this traditional finish is still worth considering

BY CHRIS BECKSVOORT



After 30 years of building and finishing furniture, I still turn to an oil finish for almost all of my work. Oil seeps into the wood and leaves a hand-rubbed sheen that film finishes just can't replicate.

Oil finishes are very popular, and I've tried them all: boiled linseed oil from the hardware store, Watco, Waterlox, Velvit, oil and polyurethane mixes, Livos (now Bio Shield), tung oil and Minwax. But when Tried & True came

on the market in the early 1990s, I decided to use it as my primary finish. It has all of the attributes of an oil finish: spot repairability and easy maintenance, ease of application and quick build of both the finish and the patina. However, what really sealed it for me was the fact that I would no longer be exposing myself and my customers to toxic metal and petroleum driers contained in most other oils. I have no qualms about using Tried & True for baby cribs, children's

Fine Woodworking asked its contributors: What's your favorite finish and why?



APPLYING AN OIL FINISH

- 1. Lay It on.** Becksvoort heats the finish to 120°F in a glue pot, which makes application easier. Wipe it on with a clean cotton rag. A rubber squeegee can be used for large surfaces.
- 2. Wipe It off.** Allow an hour for the finish to be absorbed, then wipe off any excess with a clean cloth.
- 3. Rub It out.** Once the first coat has dried completely, buff it out with #0000 steel wool. Residue from a dry oil finish will be dusty (like the steel wool on the right), not gummy (as it is on the left).

furniture or even cutting boards. Never again will I be dipping my bare hands into “boiled” linseed oil.

Believe it or not, the “boiled” linseed oil you get from the hardware store is not boiled at all. It’s raw oil with either petroleum or heavy-metal driers. Many contain volatile organic compounds (VOCs), which cause air pollution. Even so, they never really dry. The raw, unfiltered oils used in most oil finishes should not be applied to cabinet interiors. When opened, one of my 30-year-old cabinets still greets me with the smell of rancid oil. Tung oil is a decent oil finish, but it takes ages to dry, and it tends to turn yellow.

As far as I know, the only real boiled linseed oil on the market is Tried & True Varnish Oil. This filtered, pure linseed oil is light in color, has a pleasant odor and is very thick. Wiping it is a bit like pushing honey, giving the term “hand-rubbed finish” a whole new meaning.

Tried & True was developed by Joe Robeson, a furniture maker in Trumansburg, N.Y. He found an 1850 formula for producing the oil used in coach-makers varnish. Heat causes the oil to polymerize and absorb oxygen when drying, yielding a bright, durable finish. Robeson found the right boiling time

and temperature to produce an oil with great film strength and beauty. The Material Safety Data Sheet is almost too good to be true. It contains less than 0.1% of any substances listed as carcinogens by government agencies. Think about that the next time you stick your bare hands into an oil finish containing petroleum distillates or heavy-metal driers.

Tried & True can be applied over bare or stained wood. The directions say the oil and wood should be at least room temperature (70°F). But heating the oil to 120°F in a glue pot makes it penetrate better.

Apply a thin coat, allow it to penetrate for an hour, then wipe with a soft cloth until the surface is completely dry. A clean rag should not drag or pick up any oil. Allow the finish to dry for 24 hours and then rub it with #0000 steel wool or a soft cloth. Because low temperatures and high humidity tend to slow the drying time, I find that three days between coats works better in my Maine shop. But it’s easy to tell whether the finish is dry. When buffing with steel wool, if the residue is gummy, allow more drying time. The residue from a thoroughly dry finish is dusty. I only buff with steel wool after the first coat, preferring to rub with a soft cloth after subsequent coats.

Additional coats deepen the shine and increase protection. I apply three coats on

beds, cases and chairs, and five coats on tabletops (both top and bottom, for even moisture transfer). For me, the finishing process takes about two weeks. However, dust in the shop is not a problem. What I initially found most amazing about Tried & True is that it has a faster surface build than any other oil finish I’ve found. As with any oil finish, oily rags must be disposed of properly: spread to dry, placed in water or in an approved sealed metal container.

Tried & True not only builds fast, but it also lasts. I recently visited a customer who had one of the first pieces I finished with Tried & True. Compared to my early pieces finished with Watco or “boiled” linseed oil, the finish was still bright and shiny. Tried & True Varnish Oil is available directly from the company (607-387-9280; triedandtruewoodfinish.com), from the Garrett Wade finish catalog (800-221-2942; garrettwade.com), Woodcraft Supply Corp. (woodcraft.com) and Lee Valley (800-871-8158; leevalley.com). □

Watch it on the web

Visit finewoodworking.com to see how Chris Becksvoort gets a beautiful oil finish.

Chris Becksvoort is a contributing editor.

A simple repair kit

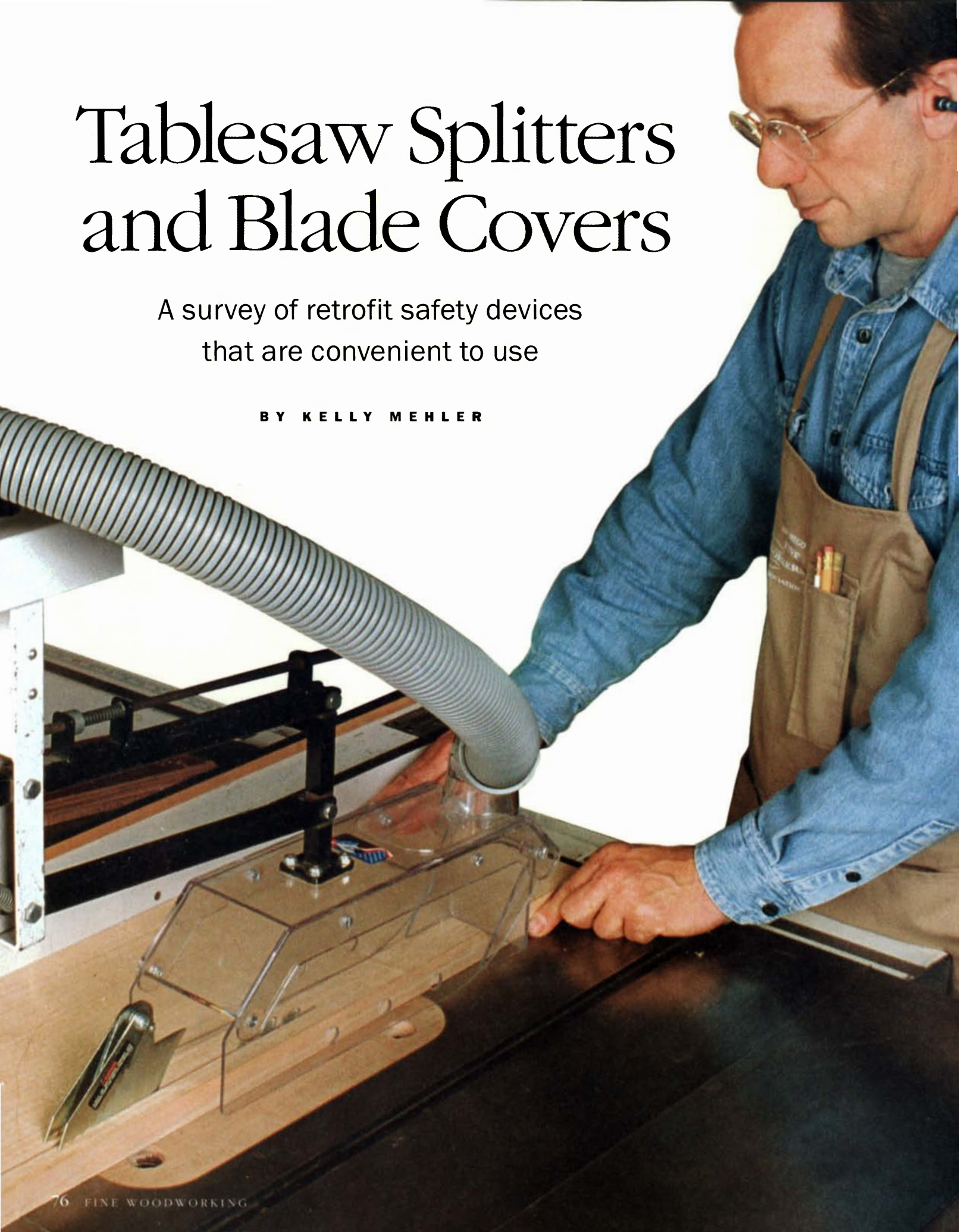
Spot repairability is a real plus in oil finishing. Becksvoort has many customers who need to take out a scratch or water ring or need to re-oil their tabletops every couple of years. He supplies them with a maintenance sheet, #0000 steel wool, paper wipes and a small bottle of oil. No other equipment is required, nor is a degree in chemistry. One of his favorite reasons for using oil is because the natural color, or patina, develops in a matter of months, not years.



Tablesaw Splitters and Blade Covers

A survey of retrofit safety devices
that are convenient to use

BY KELLY MEHLER



Standard tablesaw guard systems in the United States are no good. There, somebody has said it. Nearly every woodworker knows this, but we all have to listen to the experts remind us in books, magazines and on television to use our guards. *They* have removed the guards on *their* tablesaws, they tell us, so we can better see the operations they are demonstrating. Nonsense. The reason why they and so many woodworkers discard standard guards is because they are inconvenient.

Underwriters Laboratory recommends that a splitter, antikickback fingers and a blade cover be included on every tablesaw sold in the United States. American manufacturers combine these components into a three-in-one system that bolts to the saw's carriage assembly. This combination system severely limits the flexibility of the machine. So it usually is cast aside in a dark corner of the shop, collecting dust.

Among the problems with the three-in-one system is that the user is limited to making through-cuts. Because the splitter sits higher than the blade, any partial cut such as a groove or a joint can't be done without removing the entire system. Use of crosscut sleds and other jigs is also impossible with the system in place. So it comes off. But taking off these systems and putting them back on in perfect alignment with the blade is neither quick nor easy.

Making matters worse is the fact that if anything gets in the way—the cover, the splitter or the antikickback fingers—the entire system must be removed. Today you can buy splitters and blade covers that attach separately, and one can remain in place doing its job when the other must be removed.

Because most three-in-one systems won't stay up when lifted, common tasks around the blade are difficult to perform (such as measuring to the rip fence, checking the blade height and changing the blade). And ripping narrow work is difficult if not impossible with a standard blade cover in place.

European saws provide the best solution for tablesaw safety: a splitter that sits just below the level of the top of the blade and never has to be removed. Mounted to the arbor assembly, it moves up and down and also tilts with the blade. The blade cover is usually narrow and unobtrusive, can be removed easily and provides for efficient dust collection. However, for an American tablesaw, the best option is to purchase these safety devices as accessories.

Why you need a splitter and blade cover

In my opinion, using a tablesaw without appropriate guarding at the blade is not an option. You may be very clever in how you

avoid danger on the saw, but without the two most important safety devices—a splitter and a blade cover—you are relying on your wits alone to prevent catastrophe. One thoughtless moment when you are tired, daydreaming or in a hurry, and disaster could strike. According to an estimate by the U.S. Consumer Product Safety Commission, there were more than 30,000 emergency-room admittances for tablesaw-related injuries in 1999. Many such incidents can be avoided by using a splitter and blade cover.

Add-on splitters and blade covers are much more convenient than standard equipment and are therefore more likely to be used. Getting comfortable with them on my machine was no more trouble than getting used to putting on a seat belt.

A splitter should be your priority—A splitter is the most important piece of safety equipment because it virtually eliminates the potential for kickback—both the most common and the most vicious tablesaw accident.

Workpieces tend to rotate onto the back of the tablesaw blade, where they can be lifted and thrown toward the user at up to 120 mph. Most woodworkers have a story of a near-miss, and horrific accidents are not uncommon.

The splitter forms a barrier to this rotation (see the drawing at left). Without the specter of kickback always looming in the background, the user can work faster and with greater peace of mind (and a brighter future).

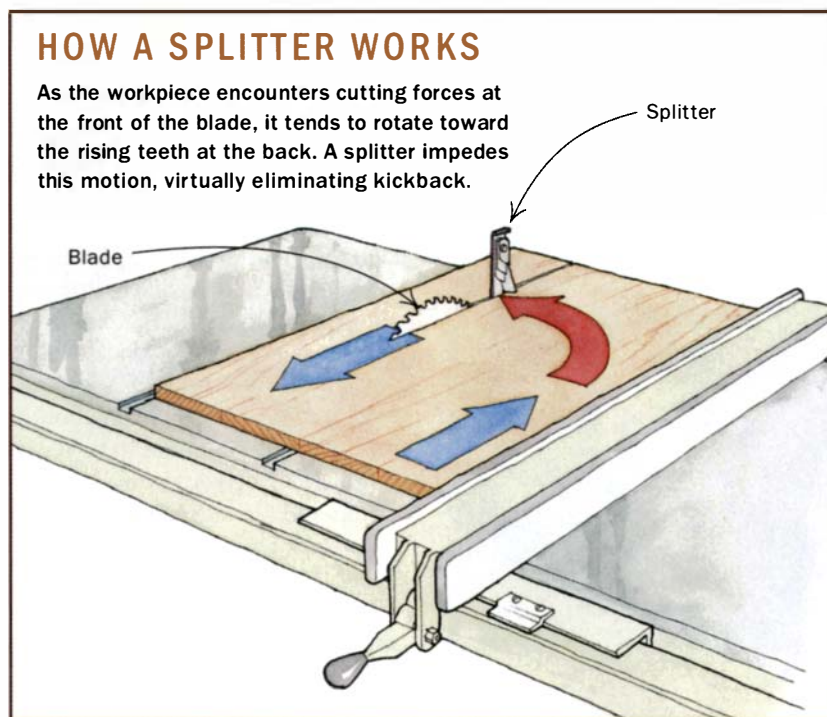
The splitter would be more aptly called an antikickback plate. On the other hand, the antikickback fingers, or pawls, included on most splitters are misnamed and are unnecessary equipment,

in my opinion. They don't prevent kickback but occasionally prevent what I call "pushback," in which the blade pushes the workpiece straight back. And they can't even serve that minor function consistently.

Three splitters

Most American tablesaws are able to support a splitter retrofit, with the exception of benchtop portables. There currently are three splitters available. However, because of differences between machines, not every splitter fits every saw. For instance, Delta makes two of the three choices, and Delta splitters are made to fit Delta tablesaws. On the other hand, Biesemeyer produces models that fit a wider range of saws.

Biesemeyer splitter is solid and adaptable—Biesemeyer's Anti-Kickback Snap-In Spreader fits many tablesaws, both Ameri-



TABLESAW SPLITTERS

Biesemeyer Anti-Kickback Snap-In Spreader

The Biesemeyer splitter is sturdy and convenient. A spring-loaded rod releases it and locks it precisely in position.



Delta Disappearing Splitter

The Disappearing Splitter never has to be removed, making it the most convenient of the three. The splitter is simply pushed down below the table surface when not needed. However, it fits only right-tilting Delta Unisaws.



Delta Removable Splitter

Kickback protection for less money. The Removable Splitter is separated from its holder by loosening a knob, making it slightly less convenient than the other units. It is included with the Delta Deluxe Blade Guard or can be purchased separately.



MODEL	PRICE
Biesemeyer Anti-Kickback Snap-In Spreader	\$120
Delta Disappearing Splitter	\$137.95 (part No. 34-868)
Delta Removable Splitter	\$29 (part No. 1349941)

can and imported. The Biesemeyer has a cast-iron holder that attaches to the cradle assembly of a table saw. It has a solid feel resulting from its hefty holder and thick splitter. However, the almost 1/8-in.-thick splitter will not work with thin-kerf blades.

Delta's Disappearing Splitter is easy to use—The Disappearing Splitter was designed to fit the right-tilting Delta Unisaw as part of its Uniguard Blade Guard. The Uniguard has been discontinued in favor of the Deluxe Blade Guard, but the Disappearing Splitter is still available.

What I have always liked about the Disappearing Splitter is its ease of use. It never has to be removed from the saw. The splitter simply is pushed down and out of the way.

Thin-kerf blades can be used with the Disappearing Splitter, but the splitter's thin and narrow body also allow it to be easily bent. This calls for caution when handling large or heavy workpieces. Another drawback of this splitter is that it fits only Delta Unisaws, and only right-tilting models.

Delta's latest fits more models—The newer Delta Removable Splitter fits all Delta cabinet and contractor table saws. Delta designed this removable splitter to go with its Deluxe Blade Guard, but the splitter is available separately.

This splitter is removed from its holder by loosening the large, round knob that clamps it in place. While not as convenient to remove as the other two, this splitter still is easy to use. Like the Delta Disappearing Splitter, the Removable Splitter can be used with thin-kerf blades. It is slightly wider than the Disappearing Splitter and not as prone to bending.

Splitter recommendations—It's critical that you select the splitter that is the most convenient for you and your machine.

The Delta Disappearing Splitter and the Biesemeyer Anti-Kickback Snap-in Spreader are similar in price, but they both have limitations. The Disappearing Splitter is the most convenient but fits only the right-tilting Unisaw. The heavy-duty Biesemeyer comes closer to the blade than the Disappearing Splitter, reducing

SOURCE	APPLICATIONS	CONVENIENCE	DURABILITY	COMMENTS
Biesemeyer (800-782-1831; biesemeyer.com)	Delta and Jet cabinet and contractor's saws; Powermatic 72, 66, 64; General 350	Good	Excellent	Heavy duty but doesn't work with thin-kerf blades
Delta (800-223-PART; deltawoodworking.com)	Delta right-tilting Unisaws	Excellent	Adequate	Easiest to use but fits only right-tilting Unisaws
Delta	All Delta cabinet and contractor saws	Adequate	Good	Included with Delta Deluxe Blade Guard

the likelihood of kickback, but it must be removed from time to time. The newer Delta Removable Splitter isn't as easy to remove and replace as the others, but it is by far the least expensive. The bottom line is that I would use any one of these three splitters on my tablesaw, as long as it fit my machine and blade thickness.

Six blade covers

The blade cover does not protect against kickback; however, it does present a barrier between the user's hands and the spinning blade, preventing accidental contact.

All six blade covers available have many advantages over stock covers. First, each of these covers is separate from the splitter, allowing it to be moved out of the way without affecting kickback protection. Also, each interferes minimally with everyday cutting tasks because it easily can be moved out of the way and quickly dropped back into place.

Each of these covers allows for small horizontal adjustments; the blade can be tilted, and the cover can be offset to rip narrow pieces and let push sticks pass by. The covers also can be pushed to the far right of the table to make room for tall workpieces or jigs. And each cover can be removed for oversized work that requires an unusual amount of space. Four of the six covers offer dust collection.

Deluxe Blade Guard is a good value for Delta owners—The Delta Deluxe Blade Guard is designed for Delta tablesaws and fence systems. It will not work with fence systems that ride on a rear rail. According to Delta, you can cut off up to 12 in. on both the main support tube and the extension arm for mounting the assembly on a tablesaw that doesn't have a long extension table. The extension arm doesn't move very far to the right of the blade, but it can be removed easily to make room for tall jigs or workpieces. For cutting very long and wide boards, the entire assembly can be rotated below the work surface after loosening a few mounting bolts.

Like the other blade covers, the cover for the Deluxe Blade Guard is a transparent, "basket" type. However, it is split into two,

which allows one side of the cover to remain on the table, doing its job, while the other side may swivel up to allow a cutoff to pass underneath. There is no provision for dust collection, but this may not be a big consideration for those who collect dust from underneath the saw and haven't been using the blade cover anyway.

The Deluxe Blade Guard includes the Delta Removable Splitter and a plastic tray that mounts on the main support member and is designed to hold a note pad, tape measure, push stick and the splitter, when not in use. A light and a holder for the tablesaw's on/off switch are available as accessories.

Biesemeyer is well designed, with one exception—I tested one of the 50-in. models of the Biesemeyer T-Square Blade Guard System, but larger and smaller sizes are also available. The support frame bolts to a Biesemeyer back fence rail (a back rail is available for those who don't have a Biesemeyer-style fence).

I had only one problem with this system: the extension arm that allows the cover to be moved horizontally. To make lateral adjustments you must walk around the extension table to the end of the main support member to crank a long internal screw. While the latest models have a quick-release lever that frees the extension arm for a large, rapid move, I still found it inconvenient to go to the far end of the saw to release the screw. I solved the problem by removing the threaded rod altogether, which allows the cover to slide back and forth easily and then be locked in place, all without leaving the operating position.

The counterbalanced assembly lets the cover ride up and down easily over the workpiece while staying parallel to the surface. Also, it takes only one hand to lift the cover away from the blade (for measurements, for example), where it locks into place. A dust-collection kit is available for \$95 and consists of a 2-in. dust port and 10 ft. of heavy-duty 2-in. hose.

Excalibur's blade cover fits all saws with extension tables—The Excalibur Overarm Blade Cover is bolted directly to the side of the extension table, close to the back corner. Side attachment means that the Excalibur can be used with any fence system,

TABLESAW BLADE COVERS

Delta Deluxe Blade Guard with splitter



The system includes the Delta Removable Splitter and features an innovative two-part blade cover. This complete system is a good value, though it doesn't offer dust collection.

Biesemeyer T-Square Blade Guard System



The Biesemeyer blade cover is light, easy to use and offers excellent visibility. But it's more expensive than most of the others, especially when dust collection is included.

Excalibur Overarm Blade Cover



The Excalibur is a solid system with excellent dust collection. The cover can be locked in place anywhere up to 8 in. above the table.

MODEL	PRICE	SOURCES	APPLICATIONS	CONVENIENCE
Delta Deluxe Blade Guard with splitter	\$250	Catalogs; Delta (800-223-PART; deltawoodworking.com)	Works with Delta, Biesemeyer-style fences that don't utilize rear rail	Good
Biesemeyer T-Square Blade Guard System	\$400 (for 50-in. model)	Catalogs; Biesemeyer (800-782-1831; biesemeyer.com)	Works with Delta, Biesemeyer-style fences that don't utilize rear rail, but ceiling and floor mounts are available	Excellent (after modification)
Excalibur Overarm Blade Cover	\$380	Catalogs; Sommerville Design & Mfg. (800-357-4118; excalibur-tools.com)	All table saws with extension tables	Good
Exaktor Industrial Overarm Blade Cover	\$290	Exaktor (800-387-9789; exaktortools.com)	All table saws with extension tables	Fair
Brett Guard, cantilever mount	\$490	HTC Products (800-624-2027)	All saws with extension tables; accommodates only Delta Disappearing Splitter	Good
Brett Guard, original mount	\$280	HTC Products	All saws but accommodates only Disappearing Splitter	Good

because it won't interfere with rear fence rails. A lower support column extends to floor level, but there is no provision for attaching it to the floor. To stabilize the heavy boom and hold the main support arm parallel to the saw table, two metal braces triangulate from the lower column to points under the extension-table frame. The system puts a lot of torque on the end of the extension table, which can cause it to twist.

The blade cover attaches to steel support tubes that are also used for dust collection. The tube assembly is sealed for excellent efficiency. The blade cover is basically a metal frame with clear plas-

tic panels. The rear panel can be removed to accommodate the table saw's original splitter or any retrofit splitter.

Exaktor shares features with Excalibur—The Exaktor Industrial Overarm Blade Cover is very similar to the Excalibur cover, with some exceptions. First, the front of the blade cover is not angled backward to allow the cover to ride easily over a workpiece. The user must either lift the blade cover onto the workpiece or lock it somewhere above the workpiece's thickness. Second, it takes two hands to both lift and push the inner support tube for

Exaktor Industrial Overarm Blade Cover

Brett Guard, cantilever mount

Brett Guard, original mount



The Exaktor blade cover is similar to the Excalibur. However, the flat front on the cover doesn't ride up and over workpieces, and the extension arm is difficult to adjust.



The Brett Guard is heavy duty and easy to use. But using a splitter with it is problematic.



The original Brett Guard mounts on the saw's left edge. It can be added to any saw, but its position limits cutting capacity on the left side of the saw table.

DUST COLLECTION	COMMENTS
No	Comes with Delta Removable Splitter, accessory tray
Yes (\$95 extra)	Blade cover locks in upper position with one hand
Yes	Mounting system puts stress on extension table; best dust collection
Yes	Similar to Excalibur with drawbacks, but better mounting system
Yes (model with dust port is \$39 extra)	Very heavy duty; comes with poor splitter
No	Limits capacity on left side of saw table; comes with poor splitter

side-to-side adjustments because the fit is a bit rough. Also, there is no channel in the main support boom to keep the smaller boom, which holds the hood, from rotating down when the locking knobs are loosened. And when the smaller tube rotates, the hood doesn't operate parallel to the table surface or workpiece.

Two slots at the rear of the blade cover accommodate a splitter. The trouble with having the splitter sit in a slot is that the cover cannot be slid to the left or right when pushing narrow pieces through the blade or when crosscutting using the miter gauge.

On the other hand, the Exaktor is less expensive than the Excal-

ibur, and its mounting system is sturdier, so it places less stress on the extension table. The blade-cover assembly can be purchased separately for ceiling or other custom installations.

Brett Guards are in their own category—The Brett Guards differ from the other systems in the blade cover itself. Instead of a basket-type cover, a Brett Guard has a thick but shallow plastic box connected to a control housing that is adjusted manually. Unlike gravity-type covers, it presents a fixed barrier that does not ride up and over the workpiece on its own. While this thick, sturdy cover can hold down a workpiece, providing some kickback protection, it also leaves the blade somewhat exposed after the workpiece has passed.

There are two types of Brett Guards, both manufactured by HTC. The original Brett Guard attaches to the left edge of the saw table, significantly limiting the working area on that side but providing a blade-cover option for shops with limited space. The cantilever-mounted Brett Guard is supported by an overarm frame like the other blade covers reviewed here.

The Brett Guards are easy to use, but the small splitter plate attaches like a standard splitter and is just as inconvenient. And the only splitter accessory that fits behind the large cover of a Brett Guard is the Delta Disappearing Splitter, which fits only right-tilting Unisaws.

Blade-cover recommendations—All of the covers are preferable to the standard three-in-one system. However, I favor the Biesemeyer system because of its overall ease of use. The only disadvantage of the Biesemeyer cover is that it won't work with fence systems that use the back rail. For woodworkers who have a Delta tablesaw or Biesemeyer-style fence, especially if budget is a consideration, I also recommend the Delta Deluxe Blade Guard. There is no provision for dust collection, but this factor may be outweighed by the cost savings. Finally, the Excalibur Overarm Blade Cover offers good value with superior dust collection. □

Kelly Mehler is a woodworker and teacher in Berea, Ky., and the author of The Tablesaw Book (The Taunton Press, 1993).

Turn a Classic Floor Lamp

Manageable sections, connected by concealed joints, combine to make a lamp you won't find in any store

BY ERNIE CONOVER

As an avid reader, I have long appreciated the good illumination afforded by a floor lamp. Most store models are incompatible with period furniture and tend to be expensive and, to my way of thinking, a bit too low for good over-the-shoulder illumination.

When designing the floor lamp, I looked to the late 18th century for inspiration. A design that originally would have held a candle (hence such vestiges as the cup just below the socket to catch wax drippings) still works well electrified. Building this lamp allows you to practice both faceplate and spindle turning. The base (12 in. dia. by 3 in. high) is faceplate-turned, as is the wax cup. The three spindle-turned feet ensure that the lamp will never rock and allow the electrical cord to exit the bottom of the lamp in any direction.

The design accommodates a range of lathe sizes as well as different turning abilities. Depending on your lathe's distance between centers, you can either turn the shaft in one 36-in. section, as I did, or in 24-in. and 14-in. sections, the extra 2 in. to allow for a tenon. A bead in the main shaft will conceal the joint.

The lamp can be turned from any durable hardwood. I chose mahogany because it was the preferred wood of late

18th-century craftsmen. Also, it is straight grained, so it is very easy to turn and will tolerate generous amounts of scraping.

Prepare the stock

It is easiest to glue up stock for the shaft from two or more pieces of wood. Before glue-up, mill a trough in each half of the blanks with a small core-box bit. While I do this with a handheld router and a fence, a router table will work just as well.

When I made the lamp, my lumber merchant had sold out of 8/4 and 6/4 mahogany. I therefore had to assemble four pieces of 4/4 stock to create a hollow core. Two pieces of 3/4-in. square poplar at both ends keep the four mahogany sections correctly separated and act as points of contact for the headstock and tailstock centers. To avoid gaps, apply strong, even clamping pressure during glue-up.

If you prefer to make the shaft from a single piece of mahogany, you will have to drill through the center of the main shaft with a pod auger (often call a lamp auger). This task requires special equipment: You will need either a hollow-tailstock spindle with a special hollow center or an accessory that mounts in the tool base (banjo) and holds the work during drilling.

Ideally the base would be turned from a



Turn the upper base first. Cut a 2-in.-long tenon using a bedan. Use a pair of calipers to determine when the correct diameter of 1½ in. has been reached.

plank of 12/4 stock 12 in. wide. A more economical method is to use a 6-in.-wide plank of 12/4 mahogany. To maintain uniformity of color, cut the stock in half and glue the two pieces side by side.

Start with the upper section of the base

With the lathe turning at 900 rpm to 1,100 rpm, rough out a 3-in.-wide by 3-in.-deep by 10-in.-long blank with a roughing-out gouge, until there are no flat spots. Next, turn a tenon 1½ in. dia. by 2 in. long using a bedan. To gauge the final diameter use either a pair of calipers or a wrench of the correct size. When turning heavy stock (8/4 or bigger), it is common for the center to have a higher moisture content and hence to shrink a bit once turned. For this reason allow the tenon to dry for a day or two before fitting it to the lower base.

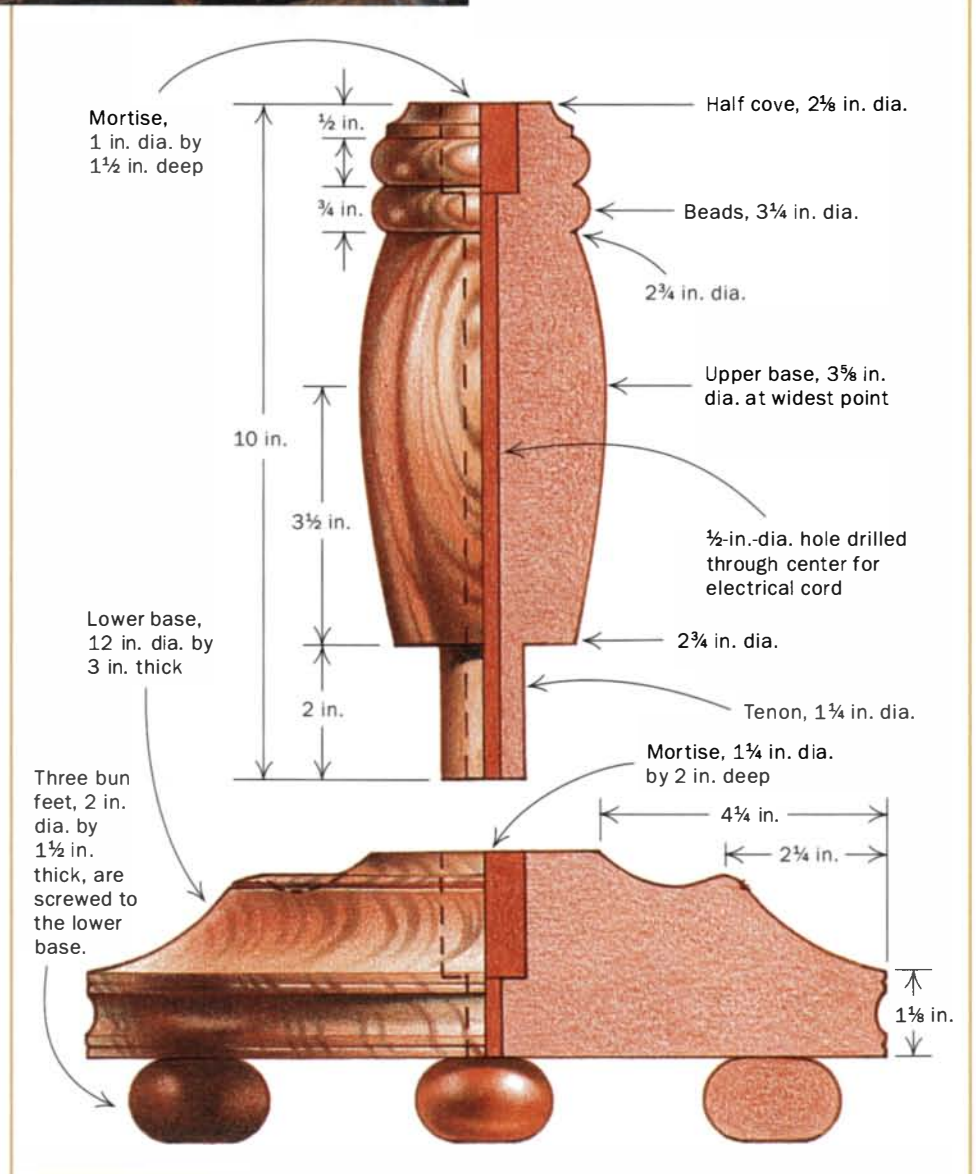
Although some turners recommend using a skew chisel to turn beads (see *FWW* #145, pp. 84-87), a spindle gouge is a more forgiving tool. I use a skew chisel to sharpen the profile of a bead by cutting a narrow bevel at its base. Any tearout near the peak of the bulge is sanded out.

When you are satisfied with the surface texture, apply a coat of dark dewaxed shellac (2-lb. to 3-lb. cut). I applied it with a

THE BASE PIECES



Make the joint between the upper and lower bases. Flatten the area on the lower base, where the upper base will make contact, with a ½-in. bowl gouge to create a seamless joint.



shaft. Before unchucking the base, use the lathe's indexing mechanism to lay out three equally spaced locations for the feet.

Turn the main shaft

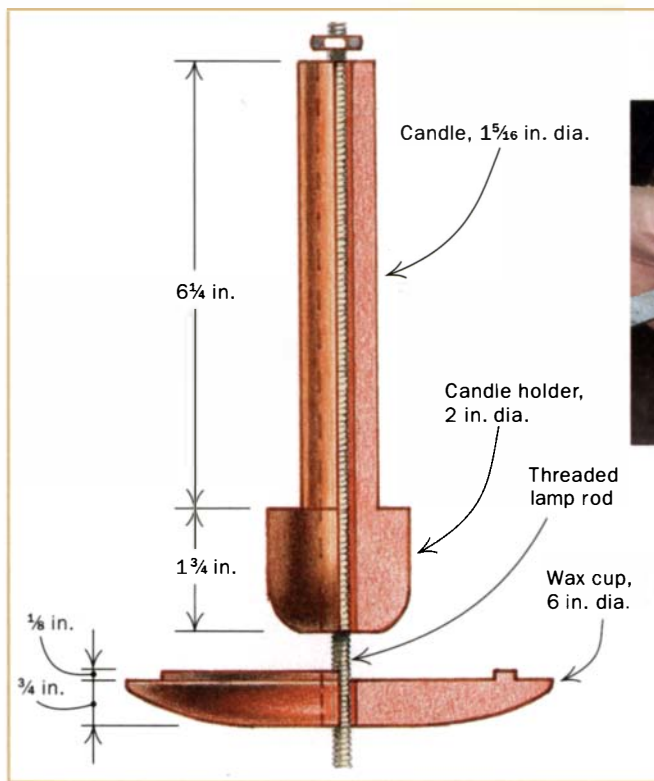
Rough out the blank, then cut a 1-in.-dia. tenon 1½ in. long at the lower end and a bead just above to conceal it. Roughly halfway up the shaft, another bead breaks up the monotony of a long section and can conceal a joint if you need to turn the shaft in two sections. Before turning the long taper, form the beads to define the diameter of the shaft. To check for a steady taper all the way up the shaft, hold a straightedge to the work. To reduce vibration, steady the workpiece with one hand and guide the tool with your thumb.

Sand the shaft and apply a shellac finish. Then drill a hole through the solid sections at both ends of the shaft to allow the lamp rod to enter at the top and the lamp cord to pass through the bottom.

Turn the last parts and assemble

A 6-in.-dia. by 1-in.-thick blank for the wax cup is turned on a screw chuck. If you do not have one of these, they are easy to make by putting a #8 or #10 wood screw through a block of wood and attaching the block to a faceplate.

The candle blank is 2 in. square and 8 in. long and is turned to imitate a wax candle in its holder. You have the



WAX CUP AND CANDLE



The two sides of the wax cup. Turn the piece on a screw chuck and refine the inner and outer surfaces with a scraper.

option of painting the shaft a cream color to represent the candle or leaving it in its natural mahogany.

Using the same 7/16-in. drill bit used to drill the ends of the main shaft, drill down the center of the candle section and the wax cup to allow the passage of the lamp rod.

The final items to be turned are the three bun feet made from 2-in. by 2-in. blanks 1½ in. thick. These can be attached to the base using screws or tenons.

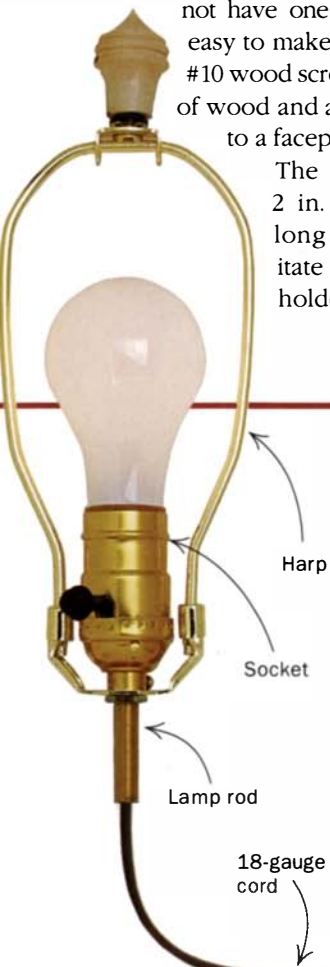
With all of the parts completed, dry-assemble the lamp to be sure you are happy with the overall proportions. (I thought the top bead of the upper base was too large, so I decided to reshape that section.) Next, make the electrical connections (see the story below) and place a suitable lampshade on the harp. □

Ernie Conover runs Conover Workshops in Parkman, Ohio.

Wiring the lamp

To meet electrical code, the lamp cord must be continuous from the plug to the socket. There cannot be any splices inside the lamp base or shaft. Use 18-gauge, or heavier, wire long enough to thread through the shaft and reach an outlet. You also need a two-blade plug rated for 15 amps at 120 volts, a single- or three-way socket with a similar electrical rating, a lamp rod of at least 15 in. and a couple of nuts for it and, finally, a harp and a shade. Hardware stores and electrical-supply houses should be able to provide all of

these items. One of the two wires (the neutral) in the lamp cord has ribs or a line molded into the insulation. The plug, if it meets code, has one blade a bit wider than the other so that it can only be plugged into the electrical receptacle in one orientation. This wider blade is the neutral line, and the ribbed wire should be attached inside the plug to the terminal for this blade. On the bulb socket, the ribbed wire should be attached to the silver terminal. Attach the other wire (hot) to the dark (often copper-colored) terminal.



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Robert L. Burton ▶

Burton, a student at North Bennet Street School, built this writing desk (29½ in. deep by 57 in. wide by 49 in. tall) for a class project. Inspired by the Greene-and-Greene writing desk featured on the front cover of *FWW* #12, Burton used curly cherry, cherry, soft maple and ebony in the desk's construction. He finished the desk with linseed and tung oils. Photo by Lance Patterson



◀ Edward Ballantine

Based on a piece that appeared in David Bryant's *Wooden Clock Cases* (Stackpole Books, 1995), Ballantine built this cherry Shaker tall clock (10¼ in. deep by 18 in. wide by 78 in. tall) for a friend. The movement is from Murray Clock Craft Ltd. in Canada. The piece is finished with natural Watco Danish oil, two coats of Watco cherry, one coat of Minwax mahogany gel stain, four coats of sprayed Deft semi-gloss clear wood finish and a thin coat of paste wax.



Craig R. Nixon ▶

Nixon, a test pilot for Boeing, decided to test his 10 years' worth of woodworking experience when his wife asked him to build a jewelry box for her. This box (9 in. deep by 21 in. wide by 24 in. tall) replaces the one she had outgrown—one of Nixon's earliest and roughest projects. The new jewelry box is made of Indian rosewood and bird's-eye maple and is finished with a gel varnish and paste wax.





▲ **John Robinson**

This tall sack-back Windsor chair (20 in. deep by 25 in. wide by 43 in. tall) is one of Robinson's designs. Formerly a contractor, Robinson attended The Windsor Institute about five years ago. "Driven by the help and encouragement of Mike Dunbar," said Robinson, "I was able to move from the job I did not like to making and teaching chair making here in Ontario full time." The chair is made of cherry, oak and brown hickory. The finish is three coats of Danish oil and wax. Photo by John Bradbury

▼ **Allen Arnold**

Returning from the 2000 Williamsburg conference on case furniture, Arnold was inspired to build this chest of drawers for his computer room. The chest (23 in. deep by 37 in. wide by 40 in. tall) is made of cherry with figured maple drawer fronts and poplar drawer sides. The drawer dividers are dovetailed through the sides of the case, a unique construction method that Arnold had seen on one of the chests at Williamsburg. A maple cockbead contrasts the drawer fronts. The finish is seedlac shellac.



◀ **Jeff Dilks**

Made of quartersawn white oak, European beech and ebony, this blanket chest (20 in. deep by 41½ in. wide by 20 in. tall) is Arts and Crafts inspired. The finish on the exterior of the frame-and-panel chest is shellac and wax. The interior is lined with an aromatic eastern red cedar. It took Dilks approximately 200 hours to complete the piece. Photo by Steve Kaminoff

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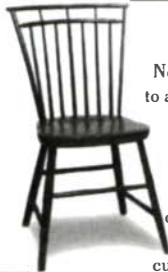
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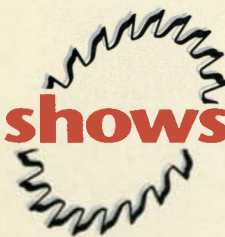
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Story sticks leave little room for error

If you asked a dozen woodworkers to measure and cut a piece of wood measuring 12 in., you'd likely end up with 12 pieces of slightly varying length. Each time a workpiece is measured and marked, an opportunity for error creeps into the process.

The error factor is an unavoidable aspect of human nature. We're not machines, and each time we repeat a task, the result is likely to be a little different than the time before. A momentary distraction or a tight deadline, and maybe you take a measurement from the wrong side of the piece, read the tape wrong or simply forget a number. This results in a cabinet that doesn't fit into a designated space, a misplaced mortise on a cabinet frame or turned legs that don't match.

The simplest way to ensure uniformity and accuracy is to eliminate some of that measuring, trading the by-the-numbers approach for direct transfer of dimensions. For years, woodworkers have used shop-made gauges called story sticks to create a physical record of a piece, not only improving their accuracy but also saving time.

A story stick is essentially a slender strip of wood (or metal) that holds a series of markings, notches or notations designating the exact locations and profiles of critical elements. The stick can be used to produce multiples or set aside to be reused in the future. The stick saves the time and trouble of remeasuring each time the information is needed, and it virtually eliminates measuring errors.

Story sticks are invaluable for cabinetry

These compact tools are especially useful on job sites, for the layout and installation of architectural woodwork and cabinetry. But story sticks are also used by furniture makers, whether for chairs, turnings or even case pieces.

I was introduced to story sticks as an apprentice working for a trim-carpentry company. When we installed kitchen cabinets and vanities in expensive New York high-rise apartments, we used story sticks to locate cutouts

in the cabinets for electrical, water and waste lines. The contractor wanted these holes located within $\frac{1}{4}$ in. of the pipes, so they had to be dead-on. After establishing a level line around the room, we placed a story stick either against the last-installed cabinet or the corner of the wall and marked the exact horizontal locations of pipes or outlets. Then, working from the same level line, we marked the vertical locations of the pipes on the other side of the

stick. Thus we were able to record confidently the locations of the cutouts without suffering the gut-wrenching fear that we might tear a hole through the back of a custom cabinet and be 2 in. off the mark.

Story sticks are also used to lay out entire kitchens. The horizontal and vertical positions of each unit can be planned and recorded on a length of narrow plywood. Aside from the other benefits, a story stick serves as a double-check for blueprint dimensions. Sometimes planning and design errors that were missed on the blueprints are caught when the actual kitchen is laid out on the stick.

A story stick is also useful for the installation of hinges and drawer slides on a cabinet carcass.

The chair maker's story stick

For makers of ladder backs and other post-and-rung chairs, a story stick is indispensable, holding everything the maker needs to reproduce a chair. No drawings are necessary. The surface of the stick will bear the decorative profile, center and diameter of each mortise and dimensions of each tenon. It allows the craftsman to mark the decorative divisions and precisely locate any mortises along the leg. Often a chair maker's stick will have a small hook on one end for quick and accurate registration at the end of the leg.

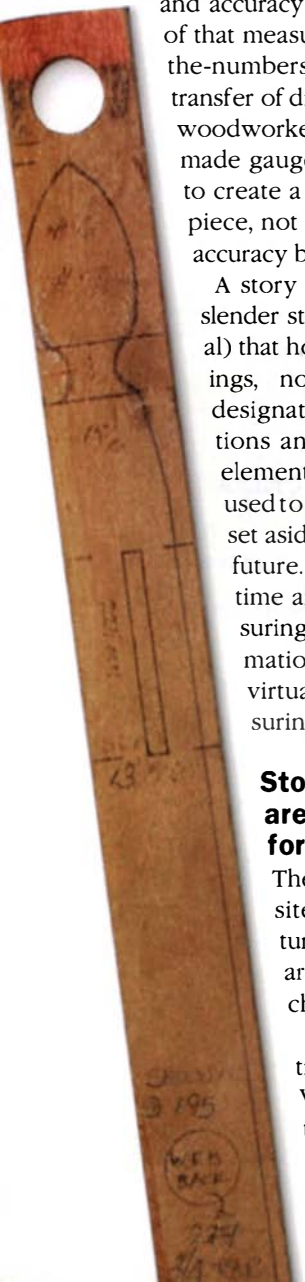
Furniture makers also benefit

For years I used story sticks in the shop when building furniture and freestanding cabinets. Sometimes I laid out the sticks from scaled blueprints; other times, I made them from full-sized drawings. You may have a favorite piece that you find yourself building again and again. A story stick can hold everything you need to jog your memory.

Why prepare a story stick when there are drawings? Well, sometimes the information necessary to build the piece is contained on more than one sheet. This requires unfurling, flipping and cross-checking. Usually a single story stick can contain all of the critical measurements. The horizontal divisions and features of the project



A Shaker chair maker's story stick. Charles Harvey of Berea, Ky., has created story sticks for more than 80 different chairs over the past 20 years. The stick at left contains all of the information he needs to build his standard dining chair (above), including mortise locations, rough and finished lengths of components, and the profiles of back slats and the turned finials.





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Rules of Thumb (continued)

SIDEBOARD ON A STICK

A story stick for a case piece must hold multiple layers of information. The horizontal dimensions of the project go on one side of the stick; on the other side are the vertical divisions. Each side also can be broken up into columns. In this case the first column contains the dimensions for the top, face frame, door rails and knobs, and the next displays the information for the cabinet sides, bottom and partitions. A third column could be added to include more drawer information.



go on one side of the stick; on the other side of the stick are the vertical divisions.

Drawings get dirty, torn or wet in a normal shop environment. Story sticks are more durable. In my shop we cut the dimensions into the stick with a marking knife, darken them with a pencil, then seal the stick with a coat of lacquer; or we use indelible markers. To distinguish the sticks quickly from the countless other plywood scraps lying about, we highlight them with bright spray paint.

One of the best things about a story stick is that it can be used to set up a machine quickly and accurately. The story stick for a cabinet, for example, can be placed directly on the tablesaw to set the fence for ripping or to place a stop block for crosscutting. By the way, storing a stick is easy: Drill a 1/2-in.-dia. hole at one end and hang it on the wall.

There tends to be more information on a furniture story stick than on a cabinet-installation stick, so I divide a furniture stick into columns. Each column is for a different layer of the project. If one column contains the dimensions for the face frame and door rails, the next displays the information for the cabinet sides, bottom, rails and partitions, and the last contains dimensions for the drawer box. As you read the stick from left to right, the information takes you deeper into the cabinet.

Turners use them, too

When building Windsor chairs, I often have to turn 40 or 50 legs at a time. I've preserved my sanity by developing a smooth routine, which starts with a story stick. Turners almost always work from a

story stick, whether it's an actual strip of wood or just a strip of masking tape on the tool rest. My basic story stick is a scrap of plywood with a profile of the leg drawn onto it. Lines through the important divisions of the turning are extended to the edge of the stick and are used to mark the blank as it spins on the lathe.

A snazzier version is another strip of 1/2-in.-thick plywood with the pattern drawn onto it, but this one has 4d nails protruding at the significant divisions. Once the leg blank is round, I press the stick against the spinning workpiece and scribe every critical dimension in one shot. With the aid of the story stick, it takes me about three minutes to turn a leg.

Many woodworkers aren't aware of story sticks, which are part of the age-old practice of direct layout. Why measure twice to cut once when you can be sure the first time? □

The turner's story stick. Rodríguez made this stick for the front leg of a 17th-century corner chair. Each mark represents an important transition point. Spindle turning often begins with a parting tool plunging in to establish the depths at these key points. Then the turner works to reproduce the finished profile.





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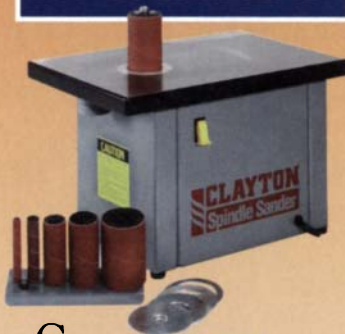
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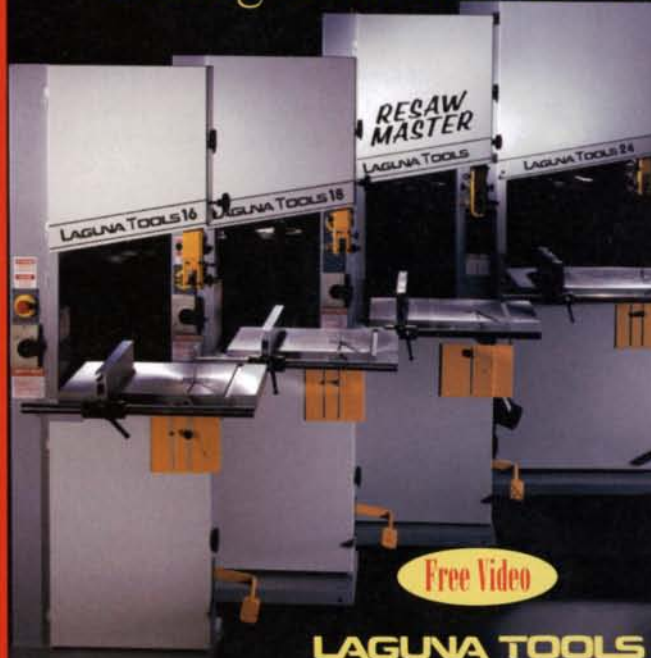


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How to mill a log

How do you saw a log for furniture-grade lumber?

—Richard Armstrong, Port Jervis, N.Y.

Garrett Hack replies: When I saw logs into lumber, I shoot for four qualities: consistent, even grain; no internal stress; no knots or other defects; and as much width as possible. Success depends mostly on the initial quality of the log, but the sawing method is also a key.

A common method is to saw a log through and through—one cut after another from one side to the other. It's the most efficient method and, therefore usually the least expensive. But the outside boards are flatsawn and prone to warping, while the center boards often contain knots and defects from when the tree was young. You will get wide boards this way, but of potluck quality.

Far better is sawing for grade: basically, taking off boards while rolling the log to expose the best faces to the saw. This takes more time and effort than cutting the log through and through.

Place the log on the mill with the best side of the log facing the saw for the first cut. It is important to saw with the grain, whenever possible. For example, if the log has any curvature, saw in the same plane as the sweep. This will reduce the built-in tension, and you'll be able to correct some of the crooked grain later in the ripping process. If the log has

a lot of taper, wedge up the smaller end so that you saw parallel with the center of the log.

Take off a board or two and then roll the log and make cuts until all four faces are exposed. Then simply find the best face and take off boards until the quality changes. Then roll again to your next-best face, and so on. You won't get the widest boards, but you will get fewer defects and more consistent grain.

More time-consuming and expensive still is quartersawing, which yields very stable material and, in the case of species such as oak and sycamore, beautiful fleck patterns as well. The first cut is through the center of the tree, and then these halves are quartered. Each cut after that is parallel to one of these sawn faces, or close to radial from the center of the tree. Quartersawn boards are not very wide but offer vertical grain and stability that are very desirable for certain applications.

No matter how you saw your lumber, however, you won't get quality material unless you also dry it correctly. For a guide to air-drying your own lumber, see *FWW* #151, pp. 72-75.

[Garrett Hack harvests lumber and makes furniture on his farm in Vermont.]

Paint inside of steambox?

Thanks for Lon Schleining's excellent and timely article on steam-bending (FWW #149, pp. 78-83). Should the box be painted with, say, a polyurethane

paint to minimize water absorption into the plywood?

—Roy Presley, Los Altos, Calif.

Lon Schleining replies: I see no advantage in making the steambox more complicated. I've used the uncoated boxes in the article dozens of times. As long as you use exterior-grade plywood or solid lumber, the box will dry out in a day or two without any noticeable deterioration. Remember, the box should have holes to allow for circulation and to release any buildup in pressure.

[Lon Schleining is a contributing editor.]

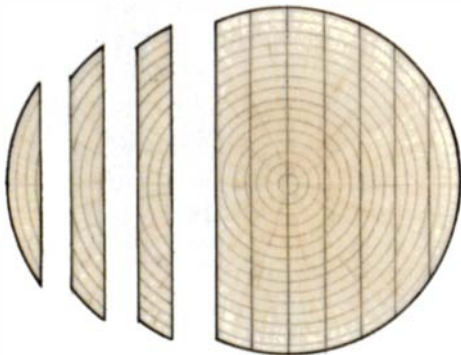
Trouble with drill-press mortising attachment

I just bought a drill press that came with a mortising attachment and three bits. The fence is bolted to the drill-press table and doesn't have much latitude for adjustment. Fence alignment is also a problem. Any tips? Are these attachments worth the trouble?

—George Zocher, Fertile, Minn.

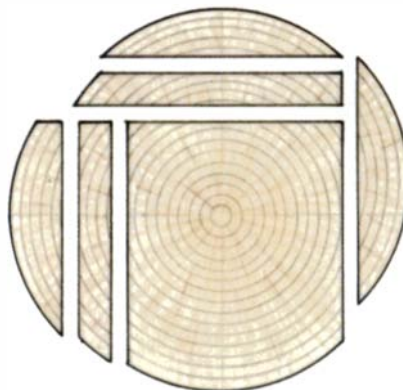
Gary Rogowski replies: My advice would be to melt down all of the mortising attachments and make plowshares from them. They are hard to adjust, finicky to use and prone to overheating and leaving burn marks. The bits need perfect sharpening and setting to work—plus, on some drill presses, you have to take off the chuck every time you mount the

LOGS TO LUMBER: THREE APPROACHES



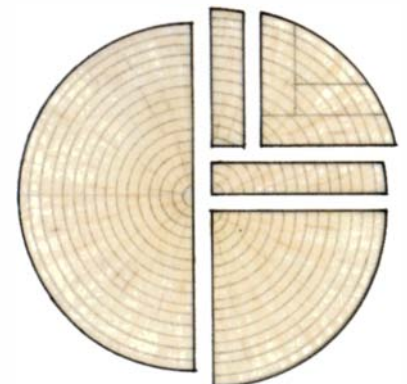
THROUGH-AND-THROUGH SAWING

Also called flichtsawing, this is the simplest and least costly method and delivers the widest boards. However, the overall quality is random, and the boards that pass through the center, or pith, of the log often contain defects.



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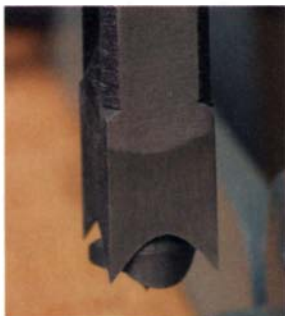
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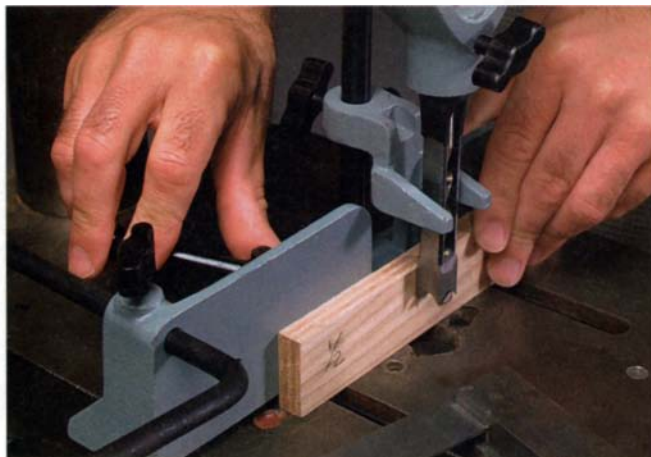
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Getting a good cut. Relieve the faces of the chisel after the first 3/4 in. or so, to minimize rubbing. Set the bit a little below the chisel points, and rehone the chisel and bit often.



Setting the fence. Drop a machined block between the chisel and fence to square the fence to the chisel and set the distance.

attachment. Also, the mounting collars and the fences don't mate well with some drill presses. There are some ways to make hollow-chisel mortising machines and attachments work better. Relieving the chisel faces behind the first little bit of cutting surface helps the cutting action. You don't need the chisel to be full-sized

along its entire length. Polish the outside faces to reduce drag.

You need to align your fence with the hollow chisel, or your holes will come out beautifully odd. The quickest way to do so is to bring the chisel to the bottom of its stroke and put a block with parallel faces between the chisel and fence.

I cut mortises with a good set of brad-point drill bits and square them up with a sharp chisel. Invest your money in these tools and invest your time in learning how to keep the chisels sharp. [Gary Rogowski is a contributing editor.]

Single tenon for wide apron? I'm building a hall table with a large drawer (for a District of Columbia phone directory). The apron is 7 in. wide with mortise-and-tenon joints where it meets the legs. Will a single tenon make the apron crack? —Bill Lindau, Vilas, N.C.

Mario Rodriguez replies: After mulling over the intended purpose of the table and the heavy duty it will likely serve, I recommend a double crenellated tenon.

A crenellated tenon is simply two or more large tenons with a shorter stub tenon in between. The joint can also be used to attach breadboard ends to a large panel, such as a tabletop, to keep it flat.

One of the large tenons should be a bit

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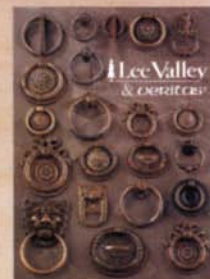
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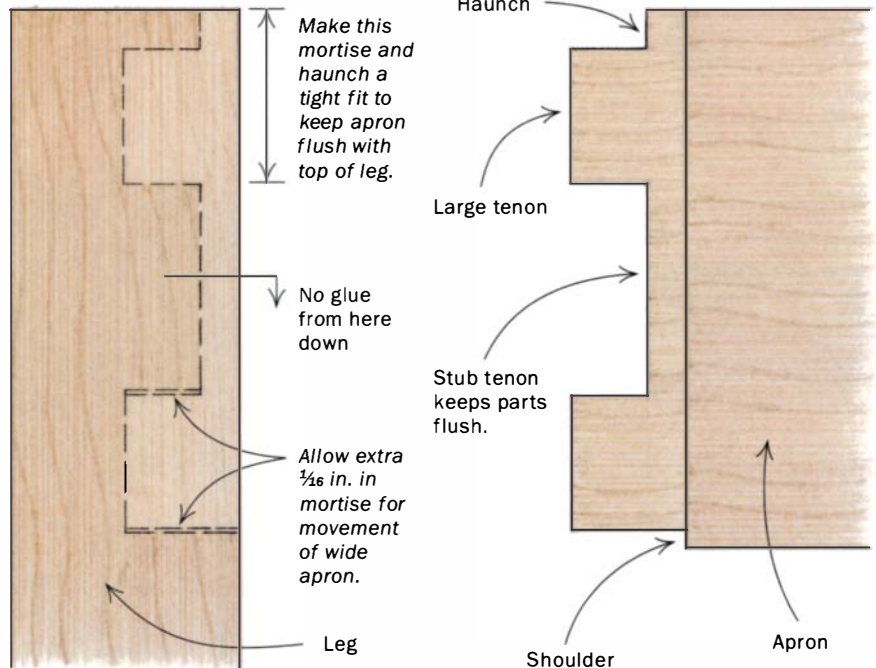
loose in its mortise, allowing it and the full width of the apron or panel to move as well. The stub tenon keeps the parts flush with each other. For a 7-in.-wide apron, make the tenons about 1 3/4 in. wide each with a 1/2-in. haunch at the top and a 1/4-in. shoulder at the bottom. This leaves 2 3/4 in. for the central stub portion.

The specific configuration of the joint will depend on the application. For instance, the position and fit of the longer tenons on a tabletop should fix the joint at the center and allow movement at both ends. On a drop lid for a desk, the joint should be fixed on the hinge side and only move on the side opposite the hinges. That way the lid will always operate without binding.

On your project, be sure to cut the top haunch and top tenon for a snug fit. This will ensure that when the wood moves, the top edge of the apron will remain flush with the end of the leg. For a 7-in.-wide apron, about 1/16 in. of room should be left above and below the lower tenon. [Mario Rodriguez is a contributing editor.]

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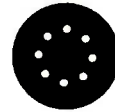
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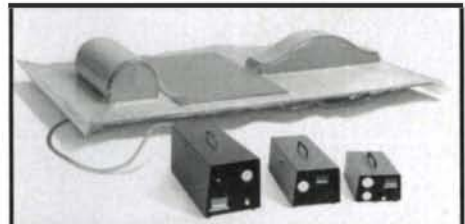
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Installing knife hinges



Attach the hinges to the carcass first. Then assemble the mating parts of the hinges and slide the doors into place.

Knife hinges are a good choice when you want cabinet hardware to be unobtrusive. With doors closed, all that can be seen on each door are two pivots about the size of a pencil eraser. Knife hinges are available in straight and double-offset styles. The straight hinges are used for overlay doors; the double-offset hinges may be used for overlay or inset doors. For the cabinet on pp. 66-73, I used Brusso double-offset hinges, which are very well made and available through woodworking catalogs.

Installing knife hinges is a bit different than putting in butt hinges. Knife hinges allow very little wiggle room in sizing the door: The top-to-bottom dimension must be exact. Last, mortises in cabinet parts should be cut before the cabinet has been assembled. They're a bear after the fact.

Lay out mortises on cabinet parts

To locate the hinge leaves on the cabinet stretchers above and below the door, start with a wood gauge block the same thickness as the door rails and stiles. The gauge block is used to establish the rear line of the door (see the left drawing on p. 110). Once this line has been drawn, measure the width of the hinge leaf, split the difference between the hinge and the door and draw a second line to represent the back edge of the leaf mortise. This places the hinge in the middle of the door.

The last critical layout mark represents the length of the leaf mortise. On the cabinet stretcher, the mortise should be the length of the leaf plus about $\frac{1}{16}$ in.—that extra distance becomes the space between the side of the cabinet and the edge of the door.

After making a light pencil line at the end of the mortise, you have two reference lines for the hinge leaf—the back edge and the end. Place the leaf on the stretcher and trace the front edge of the mortise and the outline of the hinge knuckle. To make it easier to fine-tune the mortise with a chisel, mark these lines with a knife.

Cut the mortises

A laminate trimmer and a carbide spiral bit make short work of cutting the mortises to a uniform depth. Set the depth of cut so that the leaf will fit flush with the surface of the wood (see the left photos on p. 110).

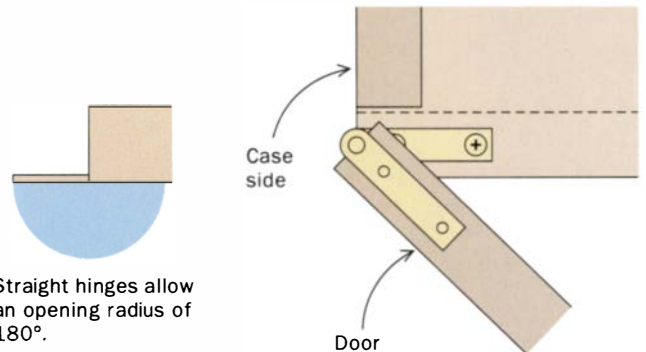
Freehanding a cut with one of these small routers is surprisingly easy, but don't tempt fate. Pick a router bit slightly smaller than the finished width of the mortise, and keep the bit away from the pencil line while you're cutting. After the router has done the hard

HINGE TYPES



STRAIGHT HINGES

Straight hinges are nearly invisible, giving a case a very clean, modern look. They are mounted to the cabinet and door ends, not to the sides. Because there is little room for error, they do require precise installation. Straight hinges are used for doors that overlay the case sides.



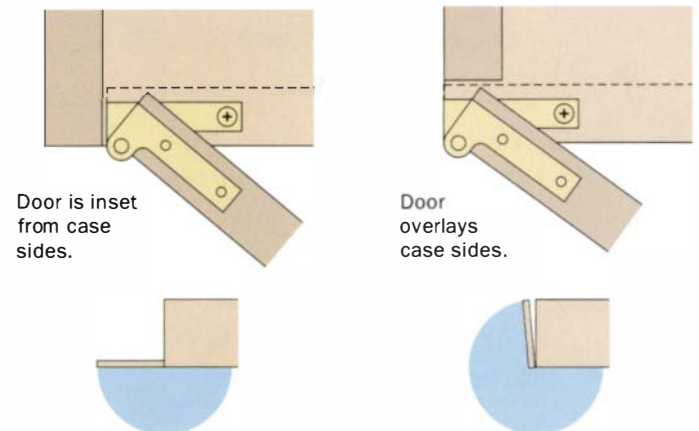
Straight hinges allow an opening radius of 180°.



DOUBLE-OFFSET HINGES

Like straight hinges, double-offset hinges are mounted to the cabinet and door ends. The double-offset variety places the pivot point outside both the door and the cabinet. They are generally used for inset-door applications (as pictured here) but may also be used for overlay doors.

INSTALLATION OPTIONS



Door is inset from case sides.

Door overlays case sides.

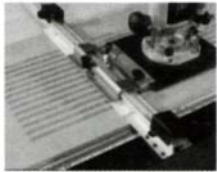
When inset from the case sides, the door opens 180°.

When overlaying the case sides, the door opens 265°.

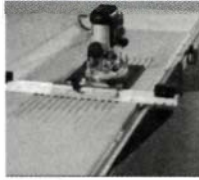
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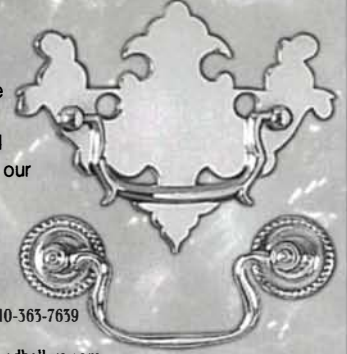
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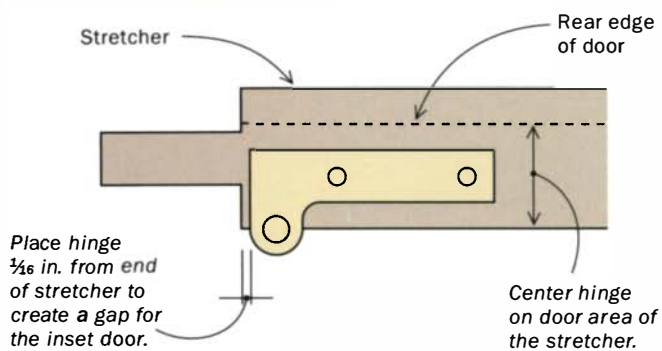
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STRETCHER MORTISE



Lay out and install the hinges before glue-up. Use a piece of scrap the same thickness as the door to locate the door's rear edge on the stretcher.



Use the hinge as a template to mark the mortise. The hinge should be centered in the door area of the stretcher (see the drawing above).



Set the depth of cut equal to the thickness of one hinge leaf. A laminate trimmer makes quick work of routing the mortise, leaving little waste to be cleaned up with a chisel.



work, clean up the mortise with a chisel. By paring carefully, a snug fit doesn't take long.

To install the hinges on the doors, first trace the edges of the mortise, this time with the edge of the leaf flush with the edge of the door. Follow up with a marking knife and router. A few cautions here. It's a real pain to trim the top or bottom of the door after the hinge leaves have been installed (you have to tinker with the depth of the mortise). So stiles should be cut to the vertical dimension of the door opening less twice the thickness of the

washer between hinge leaves. By cutting the stiles exactly the first time, you won't have to worry about them again.

It's much easier to adjust the width of the door, so make it slightly oversized—by $\frac{1}{8}$ in. or so—which allows you to fine-tune the fit when the door has been installed.

One other caution about the door mortises: Working in the end grain of the stile is unforgiving. It's easy to chip these delicate fibers with a chisel and end up with a sloppy-looking mortise. Go slowly, and use a very sharp chisel.

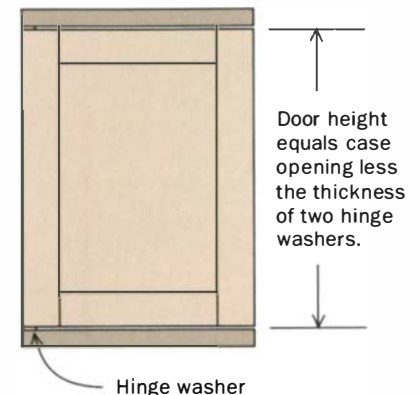
Install the door

With the mortises cut, the leaves can be installed and the door fitted. The brass screws that come with the hinges won't take much abuse, so size the pilot hole carefully and lubricate the screw with a bit of wax. If the resistance is still too much, drive in a steel screw of the same size first, back it out and install the brass screw.

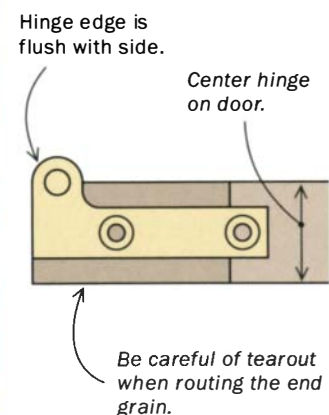
Install the leaves on the stretcher first. Also, drill one pilot hole for a screw at the top and bottom of the door. But instead of attaching the hinge leaves to the door, slip them on the pins of the stretcher leaves, then slide the door into place. Start with one screw in the top and bottom of the door, and then check the swing and fit. If the hinge must be moved slightly, it's easier to patch one hole than it is two.

If door stiles have been cut to the right length, and both door and cabinet are square, the door should swing easily. □

DETERMINING DOOR HEIGHT



DOOR MORTISE



Mark the location of the door hinges. Layout is done after the doors have been fitted to the case opening.

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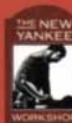
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LVLP

Low volume, low pressure: The next generation of efficient spray technology

As a longtime user of conventional spray guns, I was intrigued when high-volume, low-pressure (HVLP) spray systems hit the market 15 years ago. HVLP looked promising early on, but it clearly needed further development, so I kept using my old guns. When I finally decided to upgrade my spray equipment two years ago, I was delighted to discover how far low-pressure spray systems have come since they were introduced.

Because I already owned an air compressor, I began looking into conversion HVLP guns, which run on compressed air, rather than the turbine-powered HVLP units. Then I spoke with Chris Minick, a consulting editor for *Fine Woodworking*. He asked if I had looked at any low-volume, low-pressure (LVLP) guns, and I had to admit that I didn't know anything about them. After Minick described some of the advantages of LVLP spraying, I became hooked on this improved technology.

The benefits of low-volume spraying

An LVLP gun operates the same way that an HVLP gun does, delivering atomized finish at a lower velocity than conventional guns, with more finish material transferring to the workpiece and less of it ending up as wasted overspray. With an HVLP gun this performance comes at a price. Many conversion HVLP guns require a high volume of air—as much as 15 cubic feet per minute (cfm), or more. To drive those guns properly, you need a big compressor. My 5-hp industrial compressor has a maximum rated output of 17 cfm. It would have a hard time keeping up with an air-hungry HVLP gun.

An LVLP gun requires a much smaller volume of air. As you spray, there is less air turbulence around your workpiece. With less air streaming from the gun, there is less chance of force-drying the outer surface of a wet finish film as you apply it. You can spray inside corners of cabinets without the finish bouncing back, and you don't have to worry as much about particles of overspray and dust

being blown onto nearby surfaces. Because the spray pattern is completely adjustable, you can use the gun for anything from covering large surfaces to detailing delicate work. Also, your air compressor won't be working as hard to power the gun, which means there will be less moisture and fewer contaminants collecting in the air line.

What to look for in an LVLP spray system

LVLP is simply HVLP technology with a few refinements. My gun is a Binks Mach 1. It has an HVLP body fitted with an LVLP needle, fluid nozzle and air cap (also called an air nozzle). The passage-

ways inside the nozzle and air cap are designed to provide proper atomization with a lower air volume. These internal components are available in a range of sizes and combinations, which allow you to configure the gun to suit your needs, depending on the type of finish you will be spraying.

Several companies (such as Binks, Iwata, Optima and Walmec) manufacture good-quality HVLP and LVLP spray guns. With some research, you can find

the gun that best suits your needs. On-line woodworking forums are excellent places to find out what others have to say about various brands. As you compare guns, focus on performance specifications. Some HVLP guns use as little air as my LVLP gun, but the manufacturers don't all use the term LVLP. So ignore the terminology and look at each gun's air requirements instead. Air-efficient guns use 9 cfm of air or less, with an inlet pressure of 20 psi or less. (As an example, on average, my Binks gun uses about 7 cfm with the inlet pressure set at around 15 psi to 18 psi.)

A good LVLP gun is not cheap. At \$350 for the gun alone (without a fluid cup), the cost of my Binks was about average for a name-brand gun.

A big part of choosing a gun is deciding on a delivery system for



Finish Line (continued)

the fluid material. I don't use a standard siphon-feed quart cup with my gun because there isn't enough air moving through the gun to create the level of suction needed to draw fluid material up the siphon tube. Other LVLP guns come with a siphon-feed quart cup, but those cups really don't deliver the material as fast as they should. With an LVLP gun, you need to boost the material through the fluid passage, and there are three ways to do it.

The first option is to buy a gun with a gravity-feed cup, which mounts on top of the gun. Gravity feed provides better delivery than siphon feed, but the flow rate still can be a bit weak. Also, I find these guns awkward to use. They work well for spraying cars but are hard to maneuver in and out of cabinets and furniture.

The second option is to use a pressure cup, which mounts under the gun like a standard siphon-feed cup. This type of cup works well but is expensive. And with the extra air fittings typically required, the cup adds unwanted bulk and weight to the gun.

I chose the third option: A separate pressure tank, which feeds material to the gun through a fluid hose. Pressurized material sprays better than siphon- or gravity-fed material, and having a more lightweight, flexible hose attached to the gun allows me to get into tight spaces and spray with the gun in any position, even upside down.



A separate pressure tank is ideal. This small pressurized fluid tank delivers the finish material to the gun effectively. Fatigue is reduced because the operator is spared the additional weight of a cup of finish, and the spray gun is easier to handle.

After deciding on a gun, I'd recommend buying one from a regular dealer instead of a discount warehouse. Most auto-supply stores sell spray systems. With a little cordial negotiating, some dealers can come pretty close to the warehouse price. And dealers offer a wider selection of needles, fluid nozzles and air caps, as well as fittings and other parts.

Discount warehouses sell the

gun as-is, with few or no options or other parts available. Also, most dealers can offer tech support that discount houses don't. I needed tech support before and after buying my gun.

When choosing the internal components for your gun, consider the types of materials you need to spray and check the manufacturer's literature for recommended nozzle sizes. Smaller-bore LVLP fluid nozzles use less air but have a harder time atomizing thick fluids, such as paint. Larger-bore nozzles use more air and atomize thick fluids better. Thicker fluids also require a higher atomizing pressure at the nozzle to increase the airflow. Your gun will use more air to atomize thick material no matter what size nozzle you're using. Because larger nozzles also do a decent job of atomizing thin materials, I chose a larger nozzle so that I could spray many types of finishes without swapping components in and out of the gun. With this setup I can adjust the gun to produce spray

patterns from a wide fan to a fairly tight cylindrical shape.

Match your compressor to the gun's airflow needs

Once you choose a fluid nozzle and air cap based on the atomizing pressure needed for the thickest material you'll be spraying, you'll know how many cubic feet per minute of air the gun will demand. Then you'll know how big a compressor you'll need. Judge compressors by their cubic-feet-per-minute output, not by their horsepower rating. You should have a unit that puts out more air than you need. Some home workshop compressors are underpowered and run faster and harder than they should to achieve their claimed output ratings. A compressor with a large tank will cycle on and off less often.

When you're installing the air line for an LVLP gun, the size matters. Ordinary 1/4-in. inside diameter (I.D.) air hoses and fittings often used for conventional guns are too small for LVLP guns because they restrict the airflow so much that the pressure drops, which will impair the gun's performance. The minimum recommended hose size is 5/16 in. I.D., and that minimum should be maintained from the gun all the way back to the compressor.

The transition to my LVLP gun was fairly easy because the unit handles and operates much like a conventional gun. However, there are some aspects of low-volume spraying that take some getting used to. It can be hard to gauge how heavy a coat you're spraying because the stream of atomized material coming from the gun isn't highly visible. You have to watch the surface of the work constantly. Finishes such as water-based lacquer are especially difficult to see. It's easy to spray too heavy a coat, which leads to sags and runs. To remedy this problem, I improved the light fixture in my spray booth.

After spraying, my gun's stainless-steel internal components and Teflon seals make it easy to clean and maintain, and the material line and pressure tank don't require any more fussing with than a quart cup. However, I learned that you shouldn't backflush the material line during cleanup, which is something I usually do with conventional guns. Backflushing an LVLP gun pushes the material up into the air passageways, where it can build up and restrict the airflow. □



Smaller holes mean less fluid flowing. Shown here are two fluid nozzles for comparison. The smaller one at left goes on Young's LVLP gun. The larger one on the right is from a conventional high-pressure spray gun.



Hose sizes make a difference. LVLP spray equipment needs at least 5/16-in. inside diameter hose (right) to function properly. The 1/4-in. hose (left) cannot deliver sufficient air to prevent pressure drops in the system that will adversely affect the spray patterns.

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Bert Declerck was a 19-year-old Belgian student when he set about making a reproduction of an 18th-century French desk. He had no idea that it would take him six years and some 11,000 hours to complete. The original desk was built in the 1760s in the shop of Jean-François Oeben, cabinet-maker to King Louis XV, and it resides at the Nissim de Camondo museum in Paris.

Declerck cut and dyed his own veneer for the intricate floral marquetry covering the desk, using a variety of chemicals. He carved pearwood casts for the fretwork fence around the top of the desk, which were cast in bronze and mercury-gilded.

While working on this project, Declerck was able to secure scholarships, grants and interest-free loans from corporate benefactors. He still owns the reproduction, and he's considering selling it to pay off the debts that he incurred.

A visit from the queen. After Declerck completed the desk, Queen Paola of Belgium paid a visit to his shop to view his accomplishment.

