TAUNTON'S

Fine WoodWorking

One handplane can handle any job, p. 44

Blanket chest with router-carved panels

A BETTER WAY

Why you should build face-frame first

Glass doors that really shine

How to inlay exotic materials

Foolproof French polishing

The right nail guns for your shop

Feb. 2011 No. 217

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Blanket chest featured on new public TV show, p. 52

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Fine Woodworking

JANUARY/FEBRUARY 2011 ■ ISSUE 217

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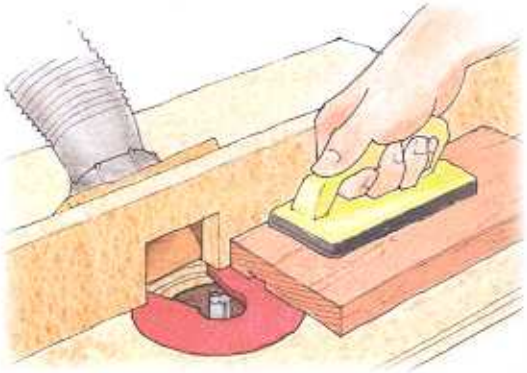

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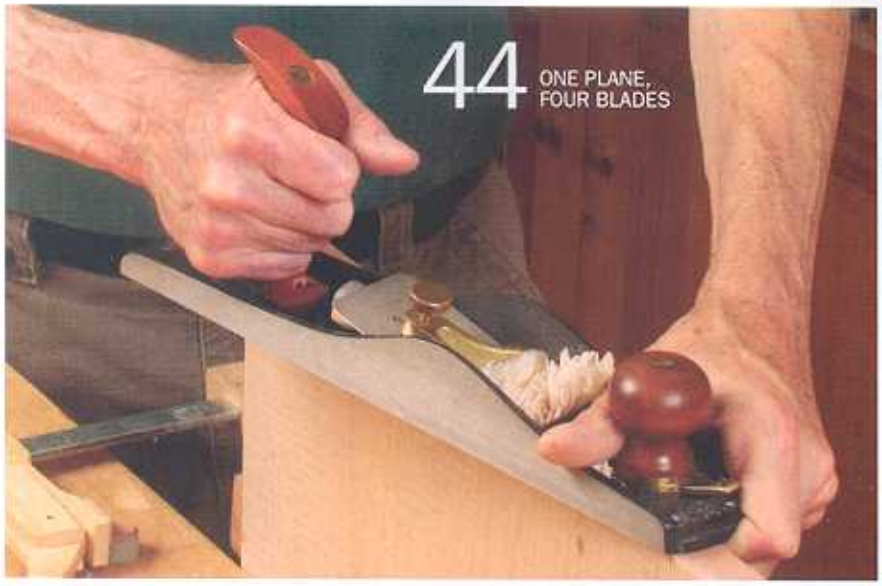
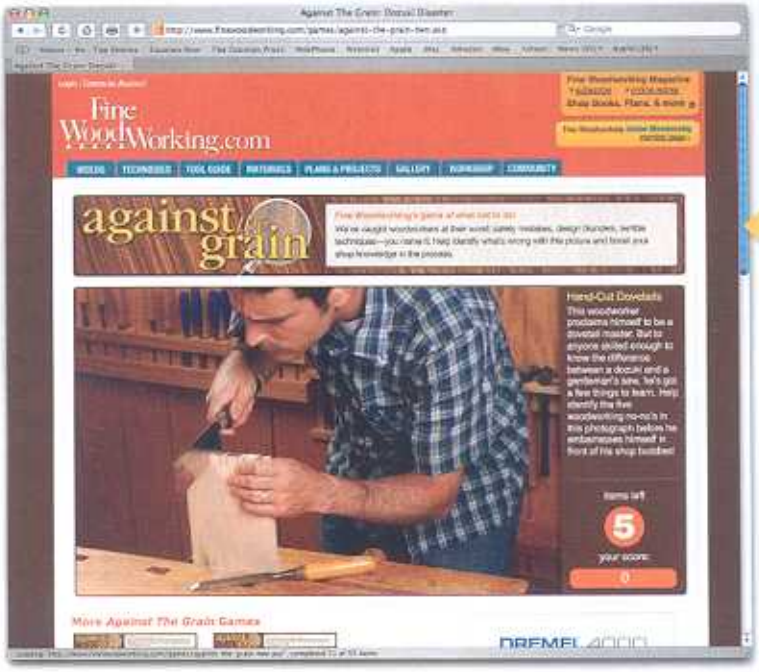


in the back

on the web

THIS MONTH ON FineWoodworking.com/extras

Visit our Web site to access free Web tie-ins, available December 9. While you're there, don't miss our collection of free content, including tool reviews, an extensive project gallery, and must-read blogs.



Avoid Dovetail Disaster

Troubleshoot terrible technique in our new game.

VIDEO: Bevel Large Curves

Watch Geoffrey Carson (pp. 48-51) demonstrate this uncommon use for a common jig.

Audio Slide Show: Daring Design

See what happens when an artist and designer of custom airplane interiors sells his company and joins forces with his best craftsman to push the boundaries of furniture making (back cover).

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VIDEO WORKSHOP

Build a Classic Cherry Bookcase

This new Jeff Miller project features rock-solid construction and looks elegant, so it could easily fit in any room of the house. Watch how to build it step by step and learn how to create:

- Easy tablesawn dovetails
- Custom molding on the tablesaw
- Shopmade wooden shelf standards

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contributors

When designer and artist Harold Wood (right) sold his business, Aviart, which built custom interiors for private jets, he took along his best craftsman, John O'Brien, and set up two private studios in San Antonio, one for his paintings, and another for the furniture and interiors he wanted to create with O'Brien's help. Their latest collaboration is a series of pieces built from a huge timber of old-growth longleaf pine (Back Cover), reclaimed from a 200-year-old textile mill. O'Brien often turns to tools and techniques from his aviation background—vacuum bags, air tools, honeycomb panels, and special fasteners—to meet the challenges posed by Wood's designs. Favorite tool? O'Brien: A 16-in. SCMI jointer. Wood: Pencil, paper, and full-scale mock-ups.

Geoffrey Carson *("Beautiful Bevels on Curved Edges")* claims that 80% of his woodworking knowledge has come from *FWW*, with the other 20% learned from trial and error, talking to other woodworkers, and more trial and error. He is in his eighth year of designing and building furniture, burlwood boxes, and fly-fishing accessories. When not in the shop, he might be found casting a fly in rivers and streams around his home in Issaquah, Washington. Favorite tool? An 8-in. jointer with a Shelix cutterhead upgrade (it treats figured wood so kindly).

When we visited **Tommy MacDonald** *("Early American Blanket Chest")*, his new TV series hadn't aired yet, but already a stream of friends was texting, calling, or dropping by his workshop and studio. *Rough Cut—Woodworking with Tommy Mac* has a three-year commitment from Woodcraft, its primary sponsor, and began airing on local PBS stations in October.
Proudest moment? When his bombé secretary was displayed in the museum at the Rhode Island School of Design.

The work coming out of Straight Line Designs might seem lighthearted, but no one takes creative design more seriously than owner **Judson Beaumont** *("Playful Furniture That Breaks the Rules")*. Whether he's waking up at 5 a.m. to sketch new ideas or running a shop with nine full-time craftspeople, he doesn't cut corners. He has made furniture for Disney, the Cotsen Children's Library at Princeton University, and clients around the world. Last thing he made? Jack in the Box—a piece of furniture with a big spring.

For more information on our contributors, go to FineWoodworking.com/authors.

We are a reader-written magazine. To learn how to propose an article, go to FineWoodworking.com/submissions.

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letters

From the Editor

RENAISSANCE MAN

Soon after I turned into Michael Fortune's driveway in 2002 to shoot a Master Class article on shaping curved furniture parts (*FWW* #159), I knew I had stumbled upon a gem. Here was a guy making only the pieces he wanted to make, all original designs, and living on a woodsy homestead northeast of Toronto, where he worked in a cavernous shop with one assistant.

The first thing editors do when we arrive at a shop like that is to sniff around for the *next* few articles, and I soon realized that this guy's left brain was as strong as his right. Michael had at least five great ways to bend and laminate wood (see *FWW* #193, #197, and #205), yet was able to do all his bandsawing on one cleverly set up 15-in. saw (*FWW* #173), using a single blade. The innovations went on. He was making slip seats in a very simple way (*FWW* #163) for his signature chair, but used an amazing plywood exoskeleton to locate the chair's complex joinery (we haven't covered that yet).

Michael Fortune is FWW's newest contributing editor.

Then I found out that he was the only woodworker to win Canada's Saidye Bronfman award, the country's highest honor in fine crafts, and that he traveled regularly to Central and South America to design chairs and workshops for local economies. The story doesn't end there. To learn more about this amazing guy, go to FineWoodworking.com/extras.

I've often said that we could get a year's worth of articles from Michael Fortune, and now that he has joined our masthead as a contributing editor, I can test out that theory.

—Asa Christiana

Tips for placing pulls

Having just mounted wooden knobs on my kitchen cabinet drawers, I was pleased to see that your criteria for location ("Get a Handle on Your Pulls," *FWW* #215) basically matched my own. I would add two suggestions. Use double-stick tape to allow easy adjustments to your layout. Also I've found that, to my eye, knobs appear to be centered vertically if I place them slightly above center, especially on lower cabinets.

—WILL FINCH, Reading, Mass.

No cutlist conspiracy

I have noticed for some time now that a portion of construction projects seems to be omitted so it can then be sold as part of a package on your Web site. An example is "Make a Limbert-Style Coffee Table" (*FWW* #215), where the cutlist is omitted.

—AUSTIN WADE, Enid, Okla.

Editor replies: *Nothing has changed in the magazine. With just a few exceptions, we have never given cutlists in articles. We provide extremely detailed, exploded drawings, with all the dimensions you need to make a cutlist on your own. By the way, cutlists in articles can do as much harm as good, as they encourage less-experienced woodworkers to pre-cut all their parts to final size, only to find that some come up short later on. So we use that space in the magazine to offer more information on critical techniques.*

We began offering full-scale plans (with detailed cutlists) a couple of years ago as an added service to those woodworkers who have requested them. The full-size plans cost money to produce, so we charge for them. No conspiracy.

Install the cabinet back before the face frame and doors

In "Build in the Right Order" (*FWW* #215), Philip Lowe directs the reader to create and attach the back of the cabinet after not only the face frame but also the installation and subsequent fitting of the inset door, "because you can see the gaps when the door is backlit."

What I have always done is to attach the back first to ensure that the case is square. Then I can glue on the face frame and install the doors with confidence. When fitting the doors, I put a flashlight inside the case to check the gaps.

—KEITH MALETSKI, Saint Clair Shores, Mich.

What type of shellac for French polishing?

In "Shellac's Amazing Journey" (*FWW* #215), Vijay Velji made the oft-repeated statement that dewaxed shellac is the best type for French polishing. I disagree. After 25 years of French polishing, I prefer the lighter grades of shellac with the wax remaining in them. The reason is simple: French polishing requires some sort of lubricating element added to the pad to allow that wonderful skating motion. With dewaxed shellac, this means periodically

Fine WoodWorking

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www.history.org

Asa Christiana, *FWW* editor, Jan. 12–15
Matt Kenney, associate editor, Jan. 16–19

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www.thewoodworkingshows.com

Roland Johnson, contributing editor:

- Detroit, Mich., Dec. 17–19
- Kansas City, Kan., Jan. 28–30
- St. Louis, Mo., Feb. 11–13
- Milwaukee, Wis., Feb. 18–20

Peter Gedrys, *FWW* author:

- Baltimore, Md. Jan. 7–9
- Springfield, Mass., Jan. 14–17 (with Michael Pekovich, *FWW* art director)
- Indianapolis, Ind. Jan. 21–23
- Columbus, Ohio, Feb. 4–6
- Somerset, N.J., Feb. 25–27

adding a little boiled linseed or mineral oil to the pad. This in turn creates the famous "haze" through which one has to perceive the quality of one's work, and which has to be "spirited off" by burnishing with alcohol at the end of the process. This has usually been the most frustrating step for my students.

With waxy shellac, the wax provides the lubrication, so no oil is necessary and hence no haze.

—ALF SHARP, Woodbury, Tenn.

Vijay Velji replies: *Alf is absolutely correct that oil is not required for waxy grades of shellac. But dewaxed shellac has two important advantages: better resistance to moisture and heat. Wax is porous by nature and when amalgamated with shellac, it produces a mixture that allows water to penetrate. Hence the white ring that is formed when a cold glass of water is kept on the surface for an extended period of time. And if the waxy finished piece is exposed to sunlight for a period of time, the wax in it gets soft, and the surface is more easily marred.*

As for the technique, check out my article, "French Polishing Demystified," on p. 64. It should not be difficult to see through the haze. First of all, if the shellac is fresh, very little oil is required. Second, the haze happens only during the bodying stage, when you only need to confirm that the pores are filled. Third, burnishing is necessary in any case, to stretch the shellac evenly over the surface for a mirror finish, which removes the haze automatically.

Tip for hinge mortising

Greetings from Holland. In *FWW* #214 (Methods of Work), Michael Taylor gave a tip for setting up a plunge router to cut mortises. I have an easier way. Open two hinges, put them flat on a table, and rest the baseplate of the router on one side of each hinge, with the bit in between. Lower the bit until it just touches the table, and tighten the depth-gauge rod. This is the depth of your inlay. If you want to cut deeper or shallower, just lay a slice of wood or paper on the hinges or the table.

—HANS DE JONG, Amersfoort, The Netherlands

Miter-saw review came up short

What I got in Patrick McCombe's recent review of the new Bosch GCM12SD miter saw (Tools & Materials, *FWW* #215) was a basic overview of the capabilities and a repeat of the marketing blurb about the sliding mechanism. While it may save 12 in. behind the previous Bosch, there are other sliders that take up far less space: Hitachi and Festool both have versions with the bar in front. And the review told me nothing about the long-term durability of the knuckle mechanism. I'd also like stats on its lateral play and accuracy, and dust collected with and without a shop vacuum.

—CHRIS FRIESEN, Saskatoon, Sask., Canada

Patrick McCombe replies: *Some of my data and information was cut for space, and I welcome the chance to share it with you. I made several cutting tests with a number of materials. Perhaps most telling is the frame I made with 12-in.-wide scraps of maple plywood. All the miters were tight across their width and all of the corners (both inside and outside) lined up perfectly. In another test, I crosscut 12-in.-wide pieces of maple at 45° and 90° and measured the angles with a Starrett combo square. Once again, the cuts were dead-on and easily furniture-quality. I also evaluated the saw's dust collection. I estimate that the saw collected 90% of the particles when it was connected to a shop vacuum, but one-third or more of the dust escaped when I used the built-in bag alone.*

Unfortunately, it's nearly impossible to gauge a tool's long-term durability within the constraints of a magazine schedule without automated test equipment, so all we can do is look at the quality of construction and offer our best guess as to how it will hold up. The mechanism is very robust, and promises to be very durable.

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 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, find another way. We want you to enjoy the craft, so please keep safety foremost in your mind.

Drawing: Kelly J. Dunton

EDITED AND DRAWN BY JIM RICHEY

Best Tip

Ramp up your router-table dust collection

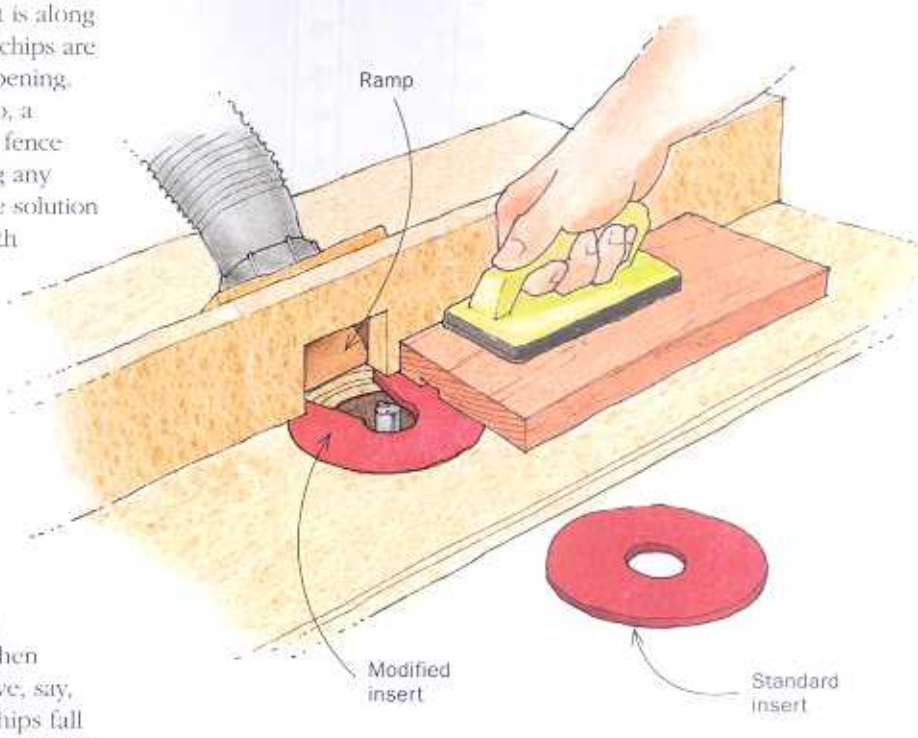
Hendrik Varju is a well-known figure in the woodworking world. He not only operates a custom furniture business, but he also conducts one-on-one woodworking courses and produces step-by-step woodworking videos (passionforwood.com). His latest are *Surface Preparation and Staining* and *Hand Finishing and Rubbing Out*.

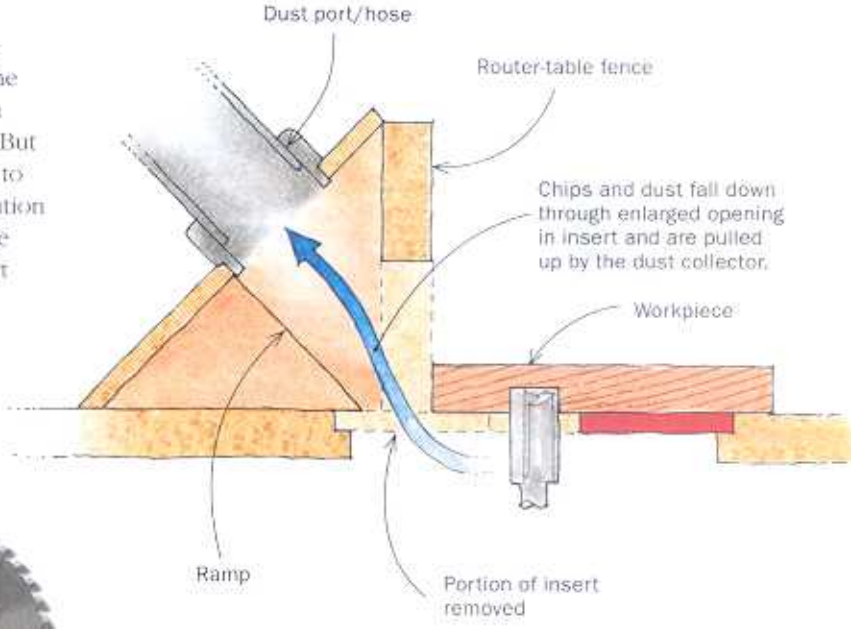
A standard router-table dust collection setup works well when the cut is along the inner edge because wood chips are easily sucked into the fence opening. However, when routing a dado, a flute, or other trapped cut, the fence opening is blocked, preventing any dust from being collected. One solution is to connect a hose underneath the table and enclose the entire base.

However, I had a simpler idea. I modified an extra router-table insert by cutting a large V-shaped opening between the bit and the fence. I also installed a ramp inside the dust-collection opening in my fence, which has helped with dust pickup for all routing. When you're milling a dado or groove, say, ½ in. from the fence, wood chips fall down through the table and are pulled back up and through the V-shaped opening in the insert.

This approach doesn't work if the trapped cut is several inches from the fence because the insert would then be fully underneath the workpiece. But dadoes and grooves are often close to the edge of a board, where this solution works like a charm. For regular edge routing, replace the V-opening insert with a standard insert.

–HENDRIK VARJU, Acton, Ont., Canada

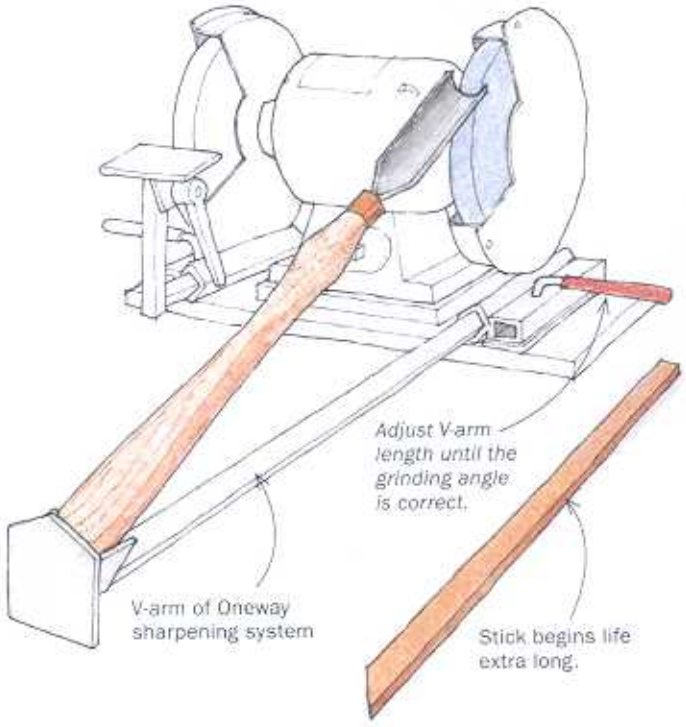


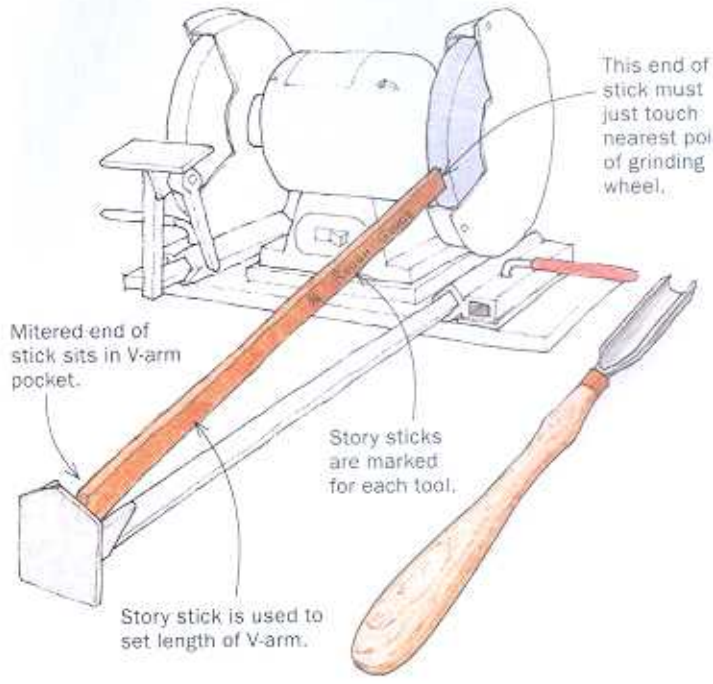


A Reward for the Best Tip

Send your original tips to Methods of Work, *Fine Woodworking*, PO Box 5506, Newtown, CT 06470, or email fwmow@taunton.com. We pay for every tip we publish; the best tip also wins a Forrest Woodworker II combination blade.

Story sticks speed setup for sharpening turning tools





If you are using the Oneway Wolverine sharpening system to grind your detail/spindle/roughing gouges and skews, the V-arm setup can be a bit of a fussy process of trial, eyeballing, retrying, and readjusting multiple times to reproduce a given bevel angle. When I finally had wasted enough time adjusting the V-arm to a different length for each and every turning tool, I came up with some simple, accurate story sticks. They let me position the arm quickly to exactly the right setting.

Make a series of thin sticks mitered at one end. After adjusting the V-arm for a given tool, place a stick in the pocket and, without altering the V-arm's length, cut the other end to length so that it just touches the closest point on the wheel. Finally, label each stick to its companion tool and store it close to the grinder.

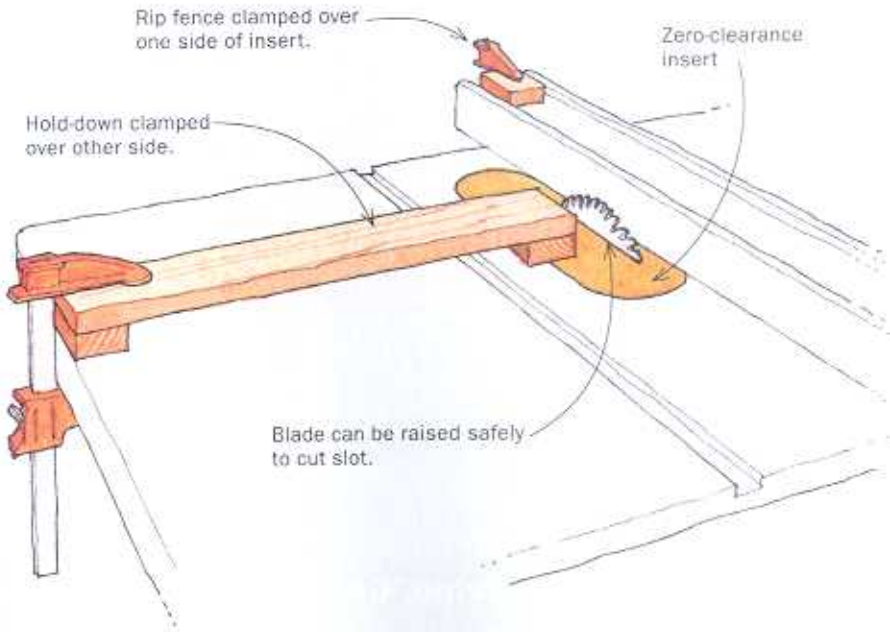
Once in a while I have to shorten the end of the story stick as the tool is worn away over time.

—SERGE DUCLOS, Delson, Que., Canada

Slot a zero-clearance insert safely

Here's how to safely cut a blade slot in a new zero-clearance tablesaw insert. With the blade all the way down, lock the rip fence in place over the right edge of the insert. Clamp the fence at the back. Next, make a temporary long-reach clamp with a clamp, two scrap blocks, and a piece of long stock. The long stock should reach from the edge (or front or back) of the tablesaw to near the center of the left side of the insert. Now you can safely raise the blade through the secured insert with your hands well clear of the blade area.

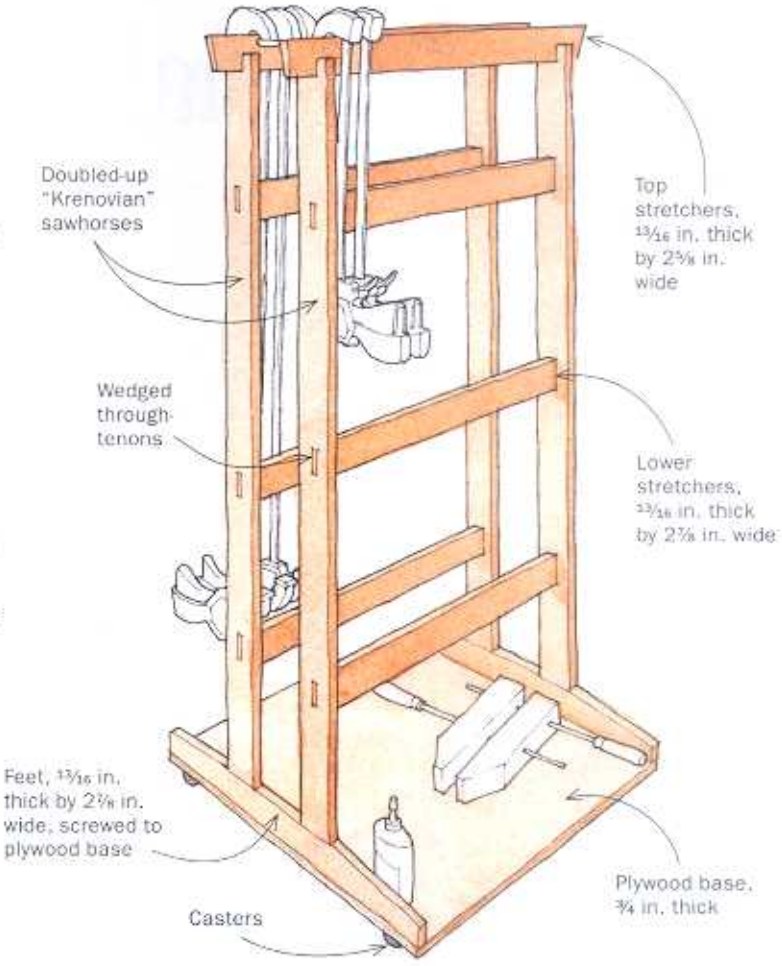
—DENNIS THEISEN, Grand Rapids, Mich.



Krenovian clamp rack on wheels

This compact and effective rolling clamp rack is based on James Krenov's elegant sawhorse design ("Smart Sawhorses," *FWW* #208). During my time at the College of the Redwoods and the different furniture shops where I've worked, I realized a lot of time was spent walking heavy clamps back and forth. I vowed never to walk more than a few feet with a clamp ever again, and this rolling clamp rack was my answer. It's easy. Make a double sawhorse, 30 in. square and 5 ft. tall, with extra cross-braces to hold the clamps as necessary. Fasten the rack to a plywood base and add casters on the bottom.

—JASON STRAW, Gainesville, Fla.



Quick Tip

Popsicle sticks, and the wider tongue depressors, are available at any craft store and are handy around the shop. They make great glue spreaders. You can carve or sharpen them for a variety of uses. They also make good shim material.

—BRUCE D. SMITH, Hanover, N.H.

tools & materials

■ ACCESSORIES

Dust Sentry lets you know when canister is full

EVEN IF YOU'RE CAREFUL about monitoring the dust level in your collection canister, in the heat of planing a pile of lumber it's easy to forget. And before you know it, the canister is overflowing. When you finally pull the overfilled canister out from under the packed cyclone, the chips cascade from the cyclone and scatter on the floor of the shop. Aaargh!

The Oneida Dust Sentry makes this mess a thing of the past. It combines infrared sensing technology with a blue strobe light that flashes when the dust piles to within a few inches of the top of the canister. The strobe is bright enough that you won't miss it.

Installation is dead simple: drill a ¾-in.-dia. hole in the lid of your dust canister about 2 in. or 3 in. from the inlet, adjust the detection distance of the sensor by turning a small setscrew on the sensor body, install the sensor in the lid, mount the light, plug the unit into an outlet, and you're set. The light has a 6-ft. cord so it's easy to mount it high enough to see anywhere in the shop.

$130
oneida-air.com

Not-so-subtle reminder. *When the dust canister is full, the Dust Sentry flashes a brilliant blue strobe.*

—Roland Johnson is a contributing editor

■ BLADES & BITS

Thin-kerf combo blade is a clean cutter

I'M SKEPTICAL WHEN A SAWBLADE manufacturer claims to make one blade that does it all. After all, crosscutting and ripping are quite different tasks and trying to get the geometry right for one process seldom lends itself to having the right stuff for the other cuts. But Freud (freudtools.com) has a new blade, the P410 thin-kerf (40-tooth, with an alternate top bevel grind), that has helped tame my skepticism about combo blades.

I tried the blade on hard maple, white oak, ipé, and a couple of different types of plywood, and quite frankly, I'm impressed.

Its ATB grind doesn't leave a flat-bottom kerf, so it's not perfect for joinery cuts. However, ripping was a breeze in all the material, with clean edges and no burning. Better yet, on crosscuts, the true test of a combo blade, the P410 left no tearout in the plywood and virtually no fuzz on the exit side of the kerf—impressive. With the hardwoods, the blade made exceptionally clean cuts with a glass-smooth end-grain surface and no tearout on the exit side of the cut.

Best of all, it's a thin-kerf blade, which not only helps save material (it cuts a 0.091-in. kerf) but also reduces the power needed to make a cut. Over all, this blade's a winner.

—R.J.

$65
Amazon.com

■ POWER TOOLS

12-volt drill and driver work hard, cost less

$140
Lowes

I FIRST BLOGGED ABOUT PORTER-CABLE'S new Compact Lithium Two Tool Kit (PCL212TDC-2) at the big IWF trade show in August, where I called it the "best deal at the show." For a surprisingly low list price of $140, you get both a 12-volt drill-driver and a 12-volt impact driver. Compact and versatile, it seemed like the ultimate cordless kit for a woodshop. Chuck a drill in one and a driver in the other, and you can work quickly without pausing to switch bits.

But I wondered whether 12 volts would be enough for my toughest tasks. After giving these drills the nastiest tests I could cook up, all doubts were erased. Both tools easily sank long, 5/16-in.-dia. lag bolts into fir studs with no pilot holes. Then I did the same test in hard maple, with 5/16-in. pilot holes. Even then, the drill-driver managed a full inch of penetration and the impact driver 1¼ in., which is only ¼ in. less than my 18-volt drill was able to do. This is more than enough power for woodworking—and all but the toughest carpentry tasks around the house.

The tools also have an impressive array of useful features: LED worklight, metal belt clip that switches sides, plus a magnetic slot on top that holds your most-used bit.

If you are ready to replace your old cordless drill, or you've been flirting with the idea of buying an impact driver, you won't find a better deal than this kit. It includes the two drills, two batteries, and a 30-minute charger in a soft-sided case. For more information, go to deltaportercable.com.

—Asa Christiana is editor of FWW.

Drill and drive without delays. *With the Porter-Cable kit, you can keep a drill chucked in one and a screwdriver bit in the other, which makes drilling and driving screws quick and efficient.*

■ MEASURING

Rule stop simplifies repetitive layouts

THE WOODPECKERS RULE STOP 1 is a small tool with big payoffs. Clamp it to a rule, and you can lay out repetitive joinery, such as multiple mortises and tenons, in quick succession. The body of the Woodpeckers Rule Stop 1 is precisely machined anodized aluminum that grabs the sides of your favorite rules (up to 1½ in. wide). And it aligns itself perpendicularly, creating an accurate replacement for a combination square. But unlike a bulky combination square, the Rule Stop 1 is small and lightweight, so I can keep it in a front pocket. (Woodpeckers also makes a stop for rules up to 2¼ in. wide; $33).

With the Woodpeckers Rule Stop 1, my layout tasks have gotten quicker and easier.

—Gregory Paolini is a professional furniture maker.

$25
woodpeck.com

■ HAND TOOLS

Install square pegs in a jiffy

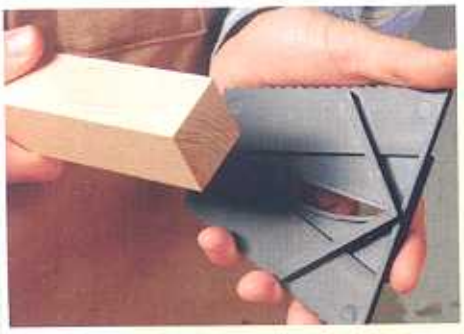
$24.50 - $26.50 each
leevalley.com

WHEN CONCEALING A SCREW OR ROUND DOWEL with a square cap, I've always had a secret weapon: an old hollow-chisel from my benchtop mortiser. I just lined it up over a pre-drilled hole and gave it a whack with a mallet. I must not have been the only one doing this, because Veritas is selling an entire set of hollow-chisel punches for squaring the tops of holes. The Square Hole Punches come in six sizes, ranging from 5/16 in. to 1/2 in., in 1/16-in. increments, and square up holes as deep as 5/8 in. for decorative caps.

Using the punches is easy. Drill the hole for the screw or dowel, remove the bit from the drill, and use it to center the punch by pressing the points into the wood. Then remove the drill bit and rap the punch with a hammer. When you've reached full depth, pull out the punch, and use a narrow chisel to gently remove any waste that's left in the center of the hole. Now you're ready to add the square pegs. The punches work great.

—Michael Pekovich is FWW's art director.

Whack a hole. *Give the punch a few raps with a hammer, and the punch leaves a perfectly square top on a round peg or screw hole.*



Right down the center. *The back side of the jig has a center finder. For precision, use a marking knife with a single bevel to scribe the crosshairs.*

■ TURNING

Simple gauge is a time-saver for turners

$6
rockler.com

ROCKLER'S CENTER FINDER/CALIPER GAUGE makes quick work of setting dial calipers and finding the centers of spindles.

I commonly adjust my calipers by sight using a ruler or vernier caliper, which can be imprecise, especially if you've rounded the tips of the calipers to prevent them from marring or catching the workpiece. But the caliper gauge turns the process of setting the calipers into a function of feel rather than one of sight. Because the caliper tips seat squarely at each measurement increment (from 1/8 in. to 5 in.), the gauge can be real handy for beginning turners.

The center finder is a breeze to use, too, and it works for square or round spindle stock.

—Ralph Tursini is a professional turner and turning instructor.

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Tommy MacDonald Photo © Anthony Tieuli for WGBH Educational Foundation

QUALITY WOODWORKING TOOLS • SUPPLIES • ADVICE®

Seven lessons for the aspiring furniture maker

BY MONICA RAYMOND

In 1985, I announced to friends and family that I was dropping out of college to build a house. I was surprised when several people asked, "What makes you think you can build a house?" It had never occurred to me that I couldn't. My reply was, "People build houses. I'm a person; therefore I can build a house."

Completing that house took many years and plenty of blood, sweat, and tears, but is my proudest accomplishment. And now that experience is bearing fruit as I pursue another passion: making furniture.

If you dream of building furniture but don't know where to begin, or if you are not progressing as fast as you'd like, read on. I won't tell you how to make furniture, but I do have some advice about how to learn. I've already shared Lesson No. 1: Believe in yourself.

Lesson 2: Take a class

I thought that my carpentry skills qualified me to build furniture, and so I made a few tables and cabinets over the years, but nothing ever came out very well. I was about to give up entirely when I wondered if my feeble skill level was due to a lack of training rather than some personal defect. A few months later, I took a two-week basic fine woodworking class and my skills took a quantum leap.

Don't struggle for years like I did before taking a class! Woodworking books are very useful, but if a picture is worth a thousand words, seeing a live woodworking demonstration is worth a million. And when the demo is followed by hands-on practice and feedback, it's priceless. In a class, you learn specific techniques for every part of the furniture-making process. If at first you don't succeed, the instructor can diagnose and correct your mistakes. Even when you make a blunder that seems irreparable, the teacher usually knows a way to fix it.

The technique I was most excited to learn in my first class was dovetails. So, my first project after the course was a blanket chest with 40 hand-cut dovetails. I now knew that starting with perfectly flat boards was essential, but there were still some gaps in my knowledge. While I had learned how to flatten and square a single board, my jointing skills were not great and my handplaning skills (actually, my sharpening skills) were poor. I got around this by using a friend's drum sander to flatten the wide glue-ups. But unlike my first woodworking experiences, which left me frustrated and demoralized, these failures simply motivated me to enhance my skills. Having attended a class made me realize that I *could* improve, and I knew how to make it happen.

3. Find woodworking friends and mentors

Other than taking a class, one of the best decisions I made was to join the Guild of New Hampshire

Photo: Todd Smith; drawings: Scott Johnson

Ask other woodworkers what they use and why. However, don't take their answers as directives, but as information to use in making your own unhurried decision. Consider your own style of woodworking in deciding what is most important to *you*.

If you already have machines made for the hobbyist or carpenter (or can buy them cheaply at yard sales), use them to make furniture for a while. The experience will teach you which features are most important to you and help you make a more informed decision when you upgrade. For example, when using my old jointer for making furniture, I quickly discovered its limitations: at 6 in. it was not wide enough, and it had a sloppy fence that was impossible to adjust finely and tables that were too short and not coplanar. Other than moving up in size, my main considerations when replacing it were getting a brand known for precision manufacturing and a model with a fence adjusted by a handwheel.

The best thing to do is join a club or guild. The more involved you get, the more you will learn.

Woodworkers. This all-volunteer organization has been my greatest source of support, not to mention pure enjoyment. The Guild holds a variety of meetings, mostly mini-courses on a plethora of topics. I always take fellow woodworkers up on offers to visit their shops. Not only do I learn a lot with every visit, but I also have acquired a cadre of mentors and friends who generously help me and advise me.

For instance, when my friend Jon Siegel learned I was selling my hollow-chisel mortiser because it didn't work well, he offered to help diagnose the problem. He determined that my bits needed reshaping, which he did for me in his own shop. When he visited my shop to return the bits, he spent hours showing me how to better tune and maintain the mortiser. We also discussed the qualities of the cherry I had gotten for my next project. He taught me about sharpening with sanding belts vs. stones, and showed me how to tune the guides on my bandsaw.

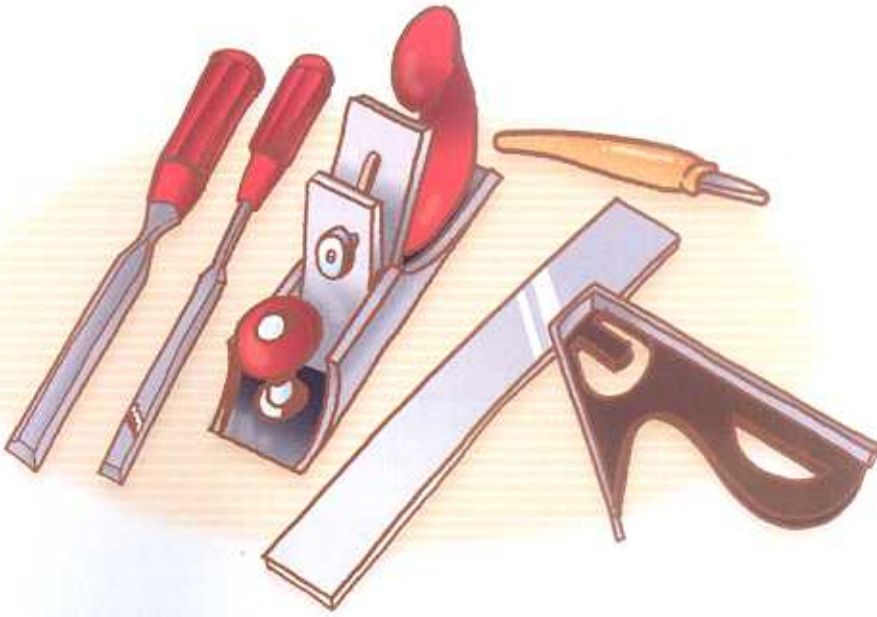
There are a number of ways to find woodworking friends. Woodworking-supply stores often hold events and classes, which are good places to meet people. You can also find folks by taking a class at a nearby woodworking school that caters to locals. Perhaps the best thing to do is join a club or guild and attend as many events as you can. The more involved you get, the more you will learn.

4. Stick with your old machines for a while

One of the greatest challenges facing a new woodworker is deciding what tools and machines to get.

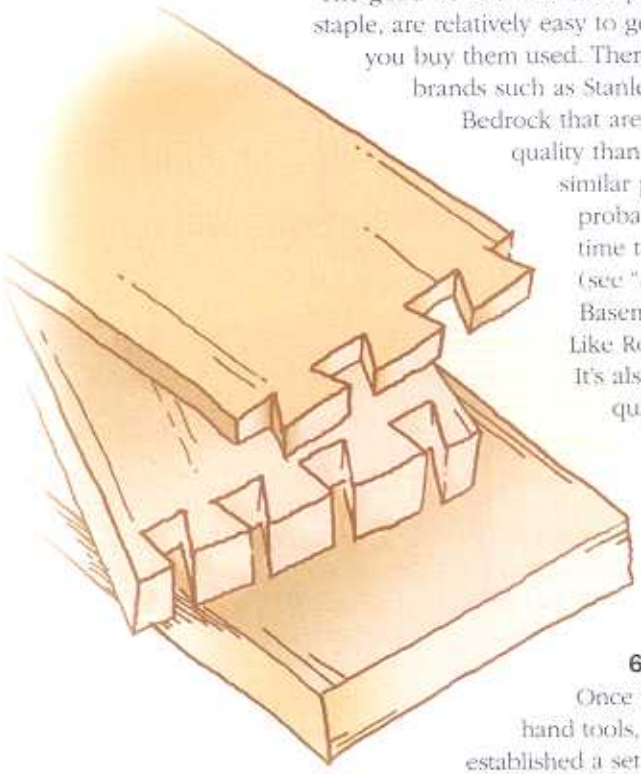
5. Get good hand tools right away

When it comes to acquiring hand tools, my strategy is different. These tools are used for the most critical tasks: measuring, marking, cutting joinery, and eliminating machine marks, among other things. These tasks play a greater role in the quality of the final product than almost anything you do with a machine. Therefore, they



must be effective and accurate. If your square is not square, it is useless. During my first woodworking class, I tried marking the shoulders of a tenon with my old carpenter's combination square and found the lines didn't meet. I realized it was impossible to make a tight-fitting joint without an accurate square. Although I was stunned by the cost of top-of-the-line squares, I bought a 12-in. one and a 4-in. one, and now I can't imagine getting along without them.

The good news is that handplanes, another shop staple, are relatively easy to get inexpensively if you buy them used. There are a few older brands such as Stanley Bailey and Bedrock that are of much better quality than new planes of similar price, though you'll probably need to spend time tuning them up (see "Make a Bargain-Basement Plane Perform Like Royalty," *FWW* #217). It's also a good idea to buy quality replacement blades. On the other hand, if you have more money than time, buy top-of-the-line new handplanes.



6. Practice, practice

Once you've gotten various hand tools, taken a class, and established a set of woodworking friends, how do you go about actually improving your skills? Practice, practice, practice. Although it's probably ideal to do exercises such as jointing a hundred boards or doing a hundred dovetails in a row, I prefer to practice while working on a project. For example, before I do a piece with dovetails, I practice dovetails on scrap lumber until I get them right. Later, if I'm not satisfied with how it's going, I might put the piece aside and spend an hour or more refining my technique.

It's also important to eliminate distractions and pay attention. For years I was not able to cut a straight line with a dovetail saw. Finally, I analyzed my technique and realized that my wrist twisted to the right at the end of each push stroke. I have to concentrate to correct this. If I find myself straying, I pick up some scrap and do 10 or 20 practice cuts.

It helps to make a piece that involves several repetitions of a skill you want to improve. If your project only includes one drawer, for example, you won't get an immediate chance to make the second drawer better than the first. By the time you make another piece with a drawer, you might have forgotten what you wanted to do differently. Frequent repetition—whether in practice or on a piece—is an excellent way to learn. Eventually, as you develop your eye and your muscle memory, you will be able to retain your skills longer and need fewer practice sessions.

7. Rely on your own experience

My final recommendation: Don't blindly follow anyone's advice, mine included. Seek and listen to advice, but just put each bit "in the hopper" with all the other contradictory opinions. Experiment with the ideas that resonate most with you. In the end, take everything you've read and all the viewpoints you've heard, evaluate them through the filter of your own experience, and distill the formula that works best for you. □

Monica Raymond makes furniture in her home shop in Alexandria, N.H.

The lessons, applied. *This white oak side table reflects Raymond's growth as a woodworker through formal coursework, informal help from friends, and her own practice.*

Photo: Gene Bank

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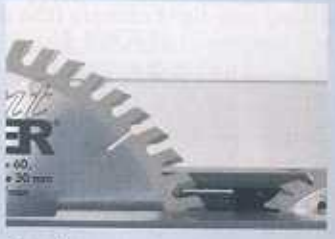

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Got a skew chisel?

MUST-HAVE TOOL IS EASY TO MAKE

BY GARRETT HACK

About 30 years ago at a tool sale, I bought a fine Marples bevel-edged chisel with about a third of the blade snapped off. I took it home and ground a new edge at an 18° skew. I still have that chisel, and I can't imagine cutting dovetails by hand without it.

You can buy bevel-edge skew chisels—they're often sold in pairs for between $60 and $130—but it's far less expensive to make your own. All it takes is a flea-market chisel (⅜ in. or ½ in. works well) or an extra chisel you already own. And there's no reason to make a pair. A single skew works great. I use mine bevel down and bevel up to get into left and right corners.

Making a skew chisel involves blunting the tip at the skew angle, grinding the bevel, and then honing. It's not difficult at all.

Garrett Hack is a contributing editor.

Between tenons. *The chisel is adept at cleaning out waste between double tenons as well as for cleaning up the corners at the base of a tenon.*

Nothing better for reaching into tight spots

The angled tip is ideal for precise cuts deep into tight corners (the skew angle actually forces it into the corner), and for long paring cuts.

Dovetail corners. *The tip of the skew easily shears away the end grain in a half-blind dovetail (far left), and pares the long-grain areas, too (left).*

Photos: Thomas McKenna

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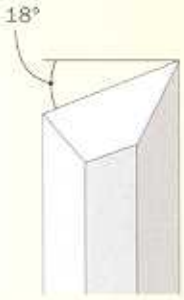
Turn an old chisel into a specialized tool

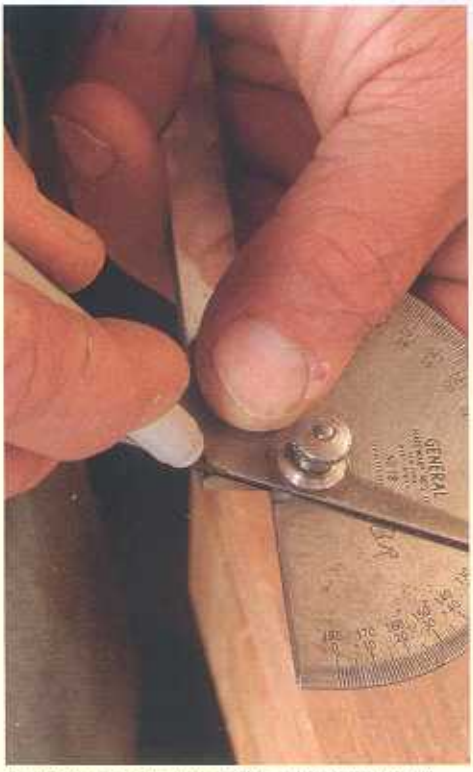
Hack sharpens his skew chisel to an angle of 18°. It's no more difficult than grinding a new edge on a badly nicked chisel.

GRIND THE TIP

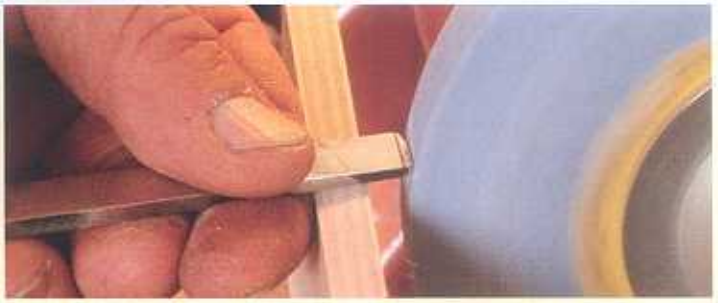
SUBTLE ANGLE IS BETTER



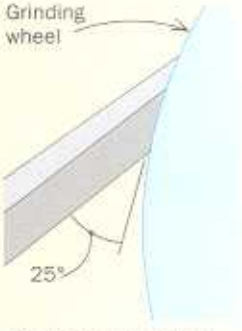
A skew of 18° may seem shallow, but a more acute skew will tend to push the chisel sideways. It will be harder to control and undercutting a pin or the sidewall of a mortise might become an issue.



Mark the angle. *Use a fine-point felt-tipped marker to draw the skew angle on the back of the chisel.*

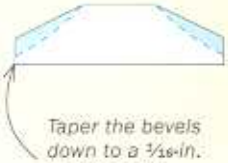


Blunt the tip. *The safest way to make this heavy grind is to hold the chisel horizontal to the grinder and create a blunt edge at the new skew angle. Go slowly and never heat the edge hotter than you can touch or you risk ruining the temper.*



Grind the bevel. *Set the tool rest to 25° and carefully grind the bevel using the blunt edge as a guide. Grind lightly and intermittently, as heat will build quickly at the fine leading edge.*

RELIEVE THE SIDES



Taper the bevels down to a 1/16-in. flat near the front edge.

Thin the edges to improve the reach. *Grinding the steep sides along the blade creates a narrow edge that lets the chisel reach into the tight corners at the bottom of a dovetail.*

HONE THE EDGE

Freehand works best. *Hone the bevel through progressive grits. Also smooth the relieved areas on the long edges of the blade.*

Drawings: John Tetreault

The hows and whys of dyes

BY PETER GEDRYS

Dyes are an indispensable tool for a professional finisher: I use them to give mahogany that rich brown found on antiques, to enhance figured maple, and to brightly color a contemporary piece. However, many woodworkers have a deep fear of coloring wood. I'm reminded of Groucho Marx's witticism: "Die, my dear? Why that's the last thing I'll do!"

In part, this comes from confusion between dyes and pigment stains. Unlike stains, dyes never look muddy or hide the natural beauty of wood. With that in mind, let's take a closer look at what dyes are, where they come from, and how to use them.

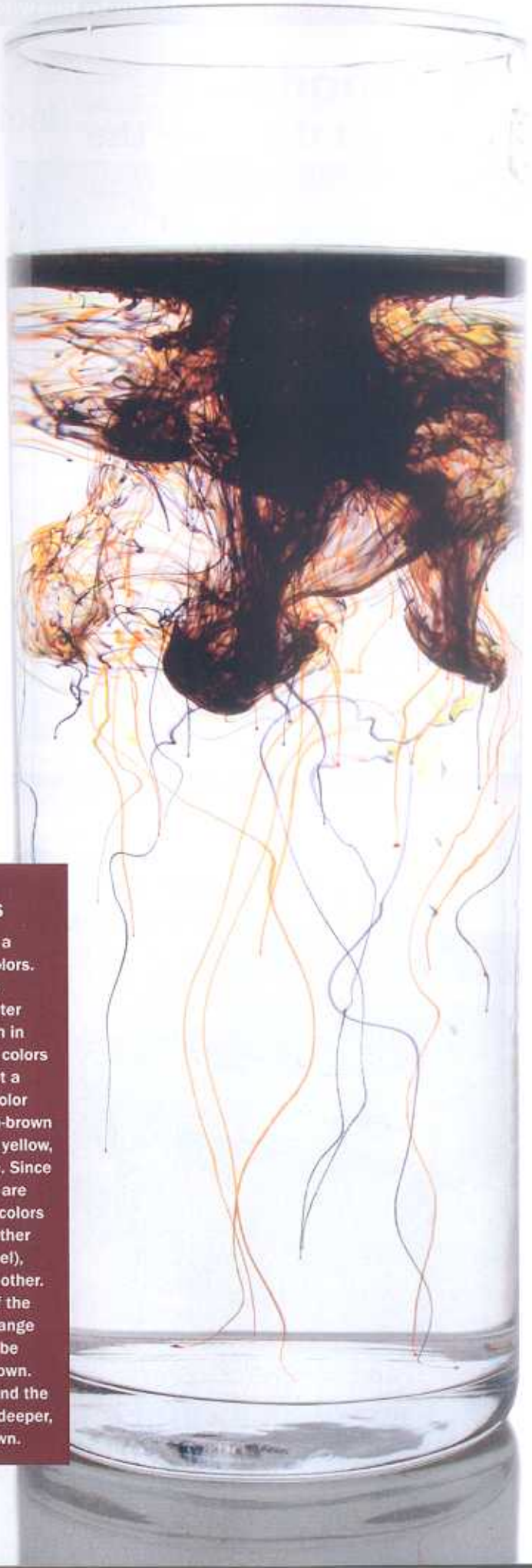
What is a dye and how is it made?

For centuries, dyes were obtained from natural products such as roots, berries, insects, and nut husks. Then in the mid-19th century, William Henry Perkin discovered how to make a synthetic purple dye from aniline, an organic compound derived from coal tar. This was a giant step forward: There was now an inexpensive method to mass-produce dyes. Today, most dyes are derived from crude oil but the term aniline is still widely used.

Many woodworkers think that dyes, like stains, are simply finely ground pigments, but this is not true (see facing page).

Although you can buy dyes already dissolved, powders offer the widest range of colors and are the most inexpensive option. You also have full control over the color strength by adding powder or diluting the solution.

The three main dye groups associated with woodworking are acid, basic, and solvent dyes. The water-soluble dyes are, for the most part, the acid group, and the alcohol dyes



THE SUM OF ITS PARTS

Dyes are usually a blend of three colors. This can be seen clearly with a water dye. Drop a pinch in water, watch the colors separate, and get a lesson in basic color theory. A reddish-brown dye may contain yellow, orange, and blue. Since orange and blue are complementary colors (opposite each other on the color wheel), they offset each other. In other words, if the dye has more orange than blue, it will be a warmer red brown. Add more blue and the color shifts to a deeper, less reddish brown.

DYES AND STAINS ARE TWO DIFFERENT PRODUCTS

A dye is generally an organic compound that is soluble in water, alcohol, or oil. This creates a color in solution that penetrates the wood. Conversely, a pigment remains in suspension and requires a binder to help affix it to the surface. Think of dyes as sugar and pigment as sand. Drop them into warm water and the sugar will dissolve; the sand will collect at the bottom. This is also what makes dyes transparent and stains cloudy.

DYES POP THE FIGURE
On close-grained woods like maple, dyes add uniform color while magnifying any figure that is present. Stains muddy the figure.

STAINS POP THE GRAIN
On open-grained woods, the pigment particles lodge in the pores, highlighting the grain structure. Dyes give a more uniform color.

are the basic group. The solvent dyes are soluble in a variety of oil solvents from mineral spirits and naphtha (aliphatics), to xylene and toluene (aromatics), to acetone and lacquer thinners (ketones).

So much for chemistry. Which dye is right for your project?

Water-soluble dyes work for most needs

Water-soluble dyes account for roughly 70% of Lockwood's sales (see below) and there are good reasons for you to focus on them, too. They dissolve easily in warm water, have no odor whether dry or dissolved, and resist fading. They are best applied to new wood and are suitable on any species, but particularly dense-grained species such as maple, cherry, or poplar.

Water-soluble dyes are also easy to apply by hand. On large areas, you want to flood the surface (see next page); on smaller areas, folded paper towels or a small brush work well. On very large areas, spraying is an option, and because the dye is water based, there is no need for an explosion-proof spray booth.

Don't be fooled by the dead look that dyes have when they dry. They come back to life when a clear finish is applied.

The problem of water-soluble dyes raising the grain is overblown. Some boards swell more than others (use a test sample), and for these, dampen the surface prior to final sanding. On all others, any raised-grain fuzziness disappears when you sand the first coat of clear finish. But what you don't want to do is sand the dye coat, as you will sand through the color in spots.

When preparing your test board, you may find that surface tension prevents these dyes from adding color to the pores of

Pass it on. *Two generations of the Schiffrin family operate W.D. Lockwood, supplying dyes to the woodworking industry.*

The first family of colors

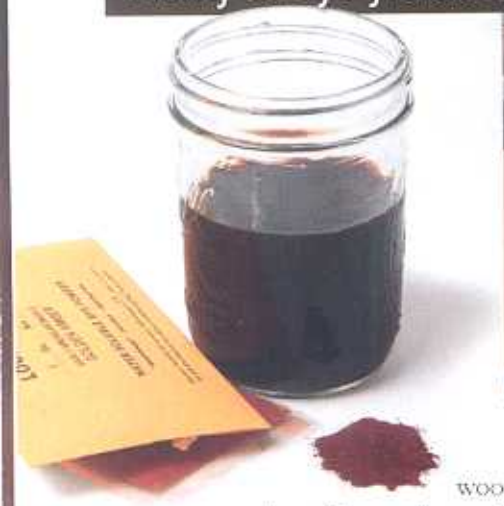
One of the oldest distributors of dyes in the United States is W.D. Lockwood & Co. in New York City (wdlockwood.com). They have been providing their own line of colors to the furniture and instrument-making industry since the late 19th century. They also provide dyes to many companies that repackage them under their own name.

The current owners are the Schiffrin family: Herb, his wife Robin, and their son Jesse. They gave me a fascinating tour of their operation from the filing cabinets full of dye recipes, to the underground vault where the drums of dye powder are stored, and to the mixing facility. Each time a color sells out, a new batch must be blended following the secret recipe. To ensure that the new and old colors are identical, white coffee filters are dipped in both solutions and then compared. Simple, yet effective. —P.G.

Family secrets. *Samples of all the colors Lockwood has made are filed away along with the recipe of how each was formulated.*

Photos, except where noted: Mark Schofield

Plenty of dye yields an even color



Flood the surface. *Don't skimp when applying the dye. You get better penetration if you wet the surface thoroughly.*

Uneven application? *If you pause on a large surface, you can apply more dye as long as the surface is wet. At first the boundary will be obvious because the earlier dye had longer to penetrate.*

woods like mahogany, oak, and walnut. To ease the surface tension, add a scant drop of dishwashing detergent to the dissolved dye. Don't add too much or you'll get a sudsy dye.

Alcohol-soluble dyes dry fast

The biggest difference between water-soluble dyes and alcohol-soluble ones is that alcohol-soluble dyes dry much faster, generally in less than 15 minutes even when applied by hand. They are considered non-grain raising, which eliminates any need to raise the grain prior to dyeing and makes them excellent for quick touchups. Furniture finishers and restorers often have a plastic box with 18 compartments for a wide variety of alcohol-soluble dye powders. Mixing the dyes with a little shellac quickly rectifies finishing flaws such as sanding through color on edges.

On the other hand, while small areas can easily be dyed by hand with a quick-drying solvent like alcohol, it takes careful planning to avoid unsightly streaks when doing a large area. In these cases, spraying is more effective.

Dissolve the powder in denatured alcohol and stir the mixture occasionally for at least an hour. Once the powder is dissolved,

Uniform color. *After a minute, the boundary will disappear and when the surplus dye is wiped away the surface will have an even color.*

you can use the dye to tint finishes such as shellac and lacquer (when tinting lacquer, use a 3:1 mix of methanol and acetone).

All dyes will fade to some degree, but alcohol powders are not as lightfast as water ones. The most fade-resistant dyes are metal-acid complex types. In a sophisticated piece of chemical engineering, a metal such as chromium, copper, or cobalt is liquefied and attached to a molecule of dye in a 1:1 or 1:2 ratio. This creates a much stronger molecular bond and improves lightfastness. TransTints concentrated dye and Solar-Lux NGR dye contain this metal-complex dye, as do some of Lockwood's water-soluble powders.

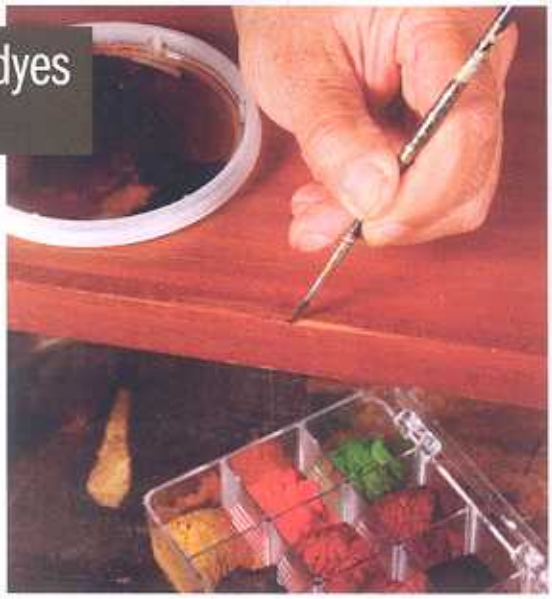
Oil-soluble dyes are best for tinting

These are probably the dye powders you will use least, but they still have some niche uses. They are useful to add a hint of color in oil-based finishes. By tinting a clear finish, you create a toner that can slightly adjust a wood's color. This is also an easy way to shift a very amber-colored varnish to a more neutral brown. Oil-soluble dyes will dissolve in an aliphatic such as mineral spirits or turpentine, but are best dissolved in lacquer thinner, which mixes well with oil-based finishes. Add the dissolved dye in

Preparing a dye

Heat helps. *Dyes dissolve best in liquid that is around 160 °F. If you are heating anything but water, make sure you do it in a hot water bath and not directly over a heat source.*

Alcohol dyes dry fast



Great for touchups. *Alcohol-soluble dyes mixed with some dewaxed shellac are a great way to cover up mistakes such as oversanded edges.*

small increments and don't exceed 5% of the finish by volume, or you run the risk of a streaky surface. Less is more here.

Success with dyes

There are a few simple safety precautions for working with dyes. Always wear gloves, and when handling dye powders wear a dust mask—you only get one pair of lungs.

When mixing a dye, it is best to work by weight vs. volume, but if you lack a sensitive scale, 1 oz. of dye as measured in a plastic medicine dispenser is just under 1 oz. in weight. As you gain experience, you'll get a feel for how much powder is needed to create your colors. The standard concentration is 1 oz. of powder per quart of liquid. However, I normally make a stock solution at twice that strength. If I want to dilute the color, I'll pour some of this stock into a measured amount of clear solvent and test the result. Keep records of the ratios and you can re-create any color.

Dye powders dissolve best in solvents warmed to about 160°F. You can directly heat water (distilled is best), but if you warm up flammable solvent always use a hot-water bath as opposed to open flame or microwave. Failure to do so could ruin your day.

Dissolved water-based dyes are susceptible to bacteria, which can form a mold on the surface. However, I keep my dyes in glass or plastic containers out of sunlight and they last a year without problem. Alcohol or oil dyes are not as easily affected by bacteria, but can come out of solution over time and may require stirring and filtering.

If you've never used dyes, you'll be happily surprised at their versatility, brilliance, and clarity. Even though chemists have advanced their quality, some things stay the same. One example is Lockwood's walnut crystals, whose base color comes from a peat found in Germany. Once washed and filtered, it produces a lovely brown we associate with walnut.

Welcome to the wonderful world of dyes. □

Peter Gedrys is a professional finisher in East Haddam, Conn.

Why I don't use chemical dyes

I have deliberately not covered chemical dyes, though a few woodworkers still swear by them. Some, like the vinegar-and-steel-wool concoction, are relatively benign (if you let the hydrogen escape while it brews) but you can get the same color with dye powders with much less hassle. Avoid other chemical dyes at all costs. Potassium dichromate, used to darken cherry and mahogany, contains a heavy metallic salt, hexavalent chromium, which is very dangerous to humans and the environment. —P.G.

Oil-based dyes are best for tinting clear coats

Sneak preview. *To see what tinting an oil-based finish will look like, put some finish on a white plate, sprinkle on some dye powder, and rub it around.*

Strain the solution. *Dissolve the oil-soluble dye in mineral spirits or lacquer thinner, then add it to the clear oil-based finish via a fine paint strainer.*

Apply normally. *Wipe or brush the tinted oil onto the surface and let it soak in. After waiting a few minutes, wipe up any excess with a clean, lint-free cloth.*

Photos, this page (bottom left 2), p. 31 (top 2): Kelly J. Dunbar

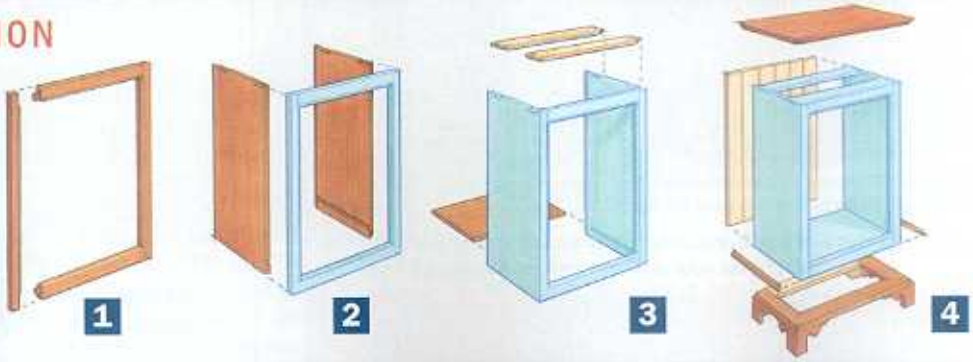
Do an About-Face on Cabinets

For better case pieces, start with the face frame, not the box

BY STEVE LATTA

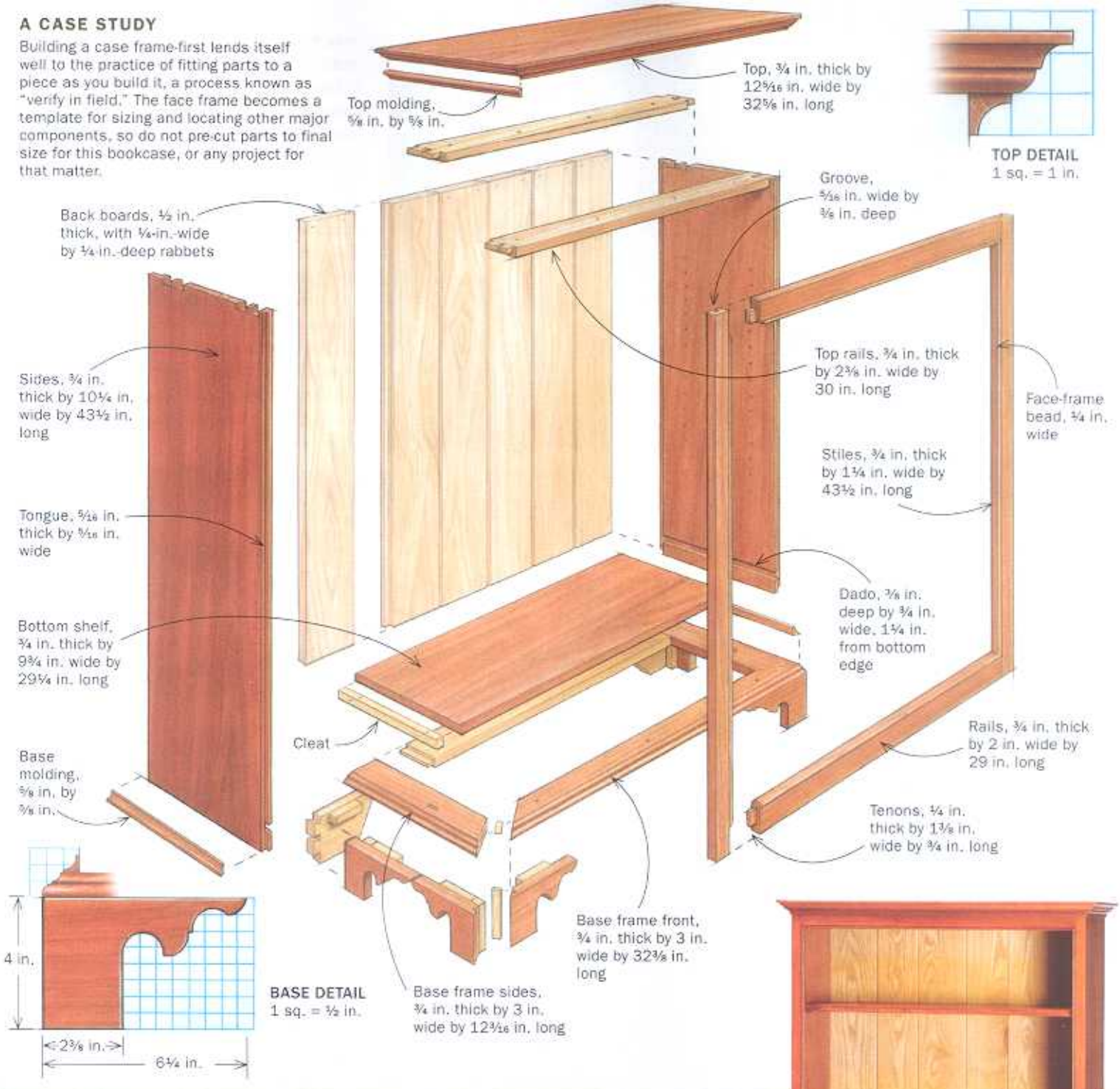
FRAME IS THE FOUNDATION

Latta builds the case by first assembling the face frame (1). Next, he rabbets the sides into grooves in the back of the frame (2). With the frame dry-fitted to the sides, Latta marks out and fits the bottom shelf and top rails (3). After gluing up the case and attaching the frame, he can size and attach the top and base (4).



A CASE STUDY

Building a case frame-first lends itself well to the practice of fitting parts to a piece as you build it, a process known as "verify in field." The face frame becomes a template for sizing and locating other major components, so do not pre-cut parts to final size for this bookcase, or any project for that matter.



This small but classic bookcase is one of my favorite projects. The finished piece is practical and attractive, and for the fledgling woodworker it presents a great introduction to face-frame case construction.

A face frame on a case piece serves a couple of different roles. It improves how the piece looks, letting you hide through-dadoes and change proportions to make the front of the piece appear more substantial and formal. And, if you're adding doors, it can help keep the opening square and allows a good mounting surface for the hinges.

Like anything else in woodworking, though, there's more than one way to get the job done. Many furniture makers build the case first and then assemble and attach the face frame (see "Build in the Right Order," *FWW* #215). I take a different approach. My early woodshop training was in commercial cabinetry, where the practice was to build the frame first. I do it that

Drawings: Bob La Pointe

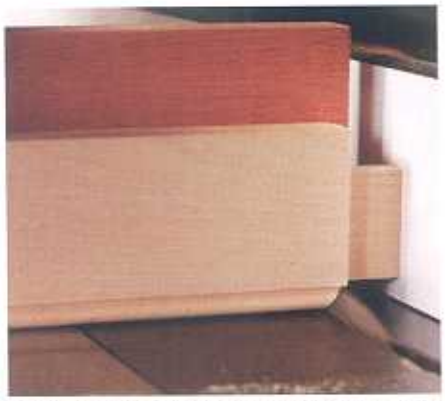
FOCUS ON THE frame

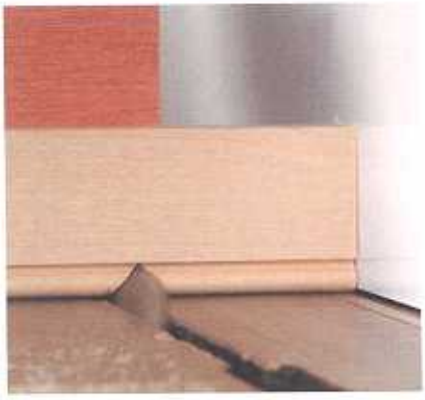
By building the frame first, you can ensure there are no flaws in the most prominent part of the bookcase.

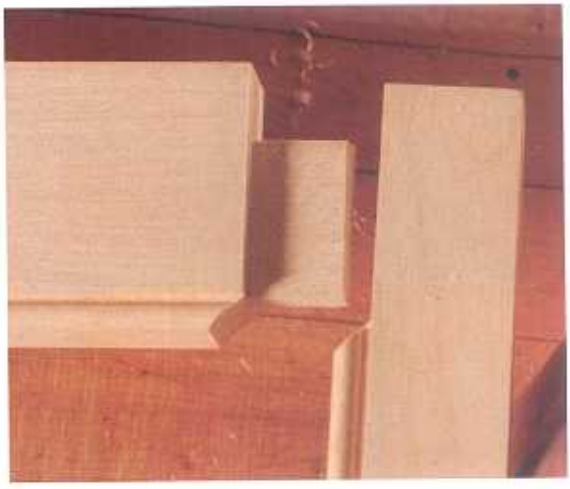
TIP

MILLING TRICK

After cutting the bead on the rails and stiles, run the pieces on edge through the planer to guarantee consistent widths.







Cut clean joinery. *Because the case is not yet constructed, any problems with the corner joints can be corrected by recutting them and making the frame slightly smaller.*

Glue up the frame. *Check that the frame is square and flat. The joints should come together cleanly with no gaps.*

way for fine furniture, too, because it offers several advantages.

First, building the frame at the outset gives me the freedom to alter its dimensions slightly to fix any tearout or minor mistakes in its construction. For instance, this frame is decorated with a bead around its inner edge with miters in the corners that can be easy to miscut. I'd lose the flexibility to make an easy fix if I were building the frame to fit an already glued-up case.

Second, I like joining the face frame to the case with strong and positive tongue-and-groove joinery as opposed to just gluing the frame in place. Assembling the face frame before building the case makes it easier to locate that joinery. I like that positive connection because the assembled frame helps align the whole assembly during glue-up of the case, simplifying the process and helping to ensure that it goes together squarely.

If you've never tried the face-frame-first method, read on. This handsome bookcase project will illustrate all of the advantages.

Put your best face forward

The face frame on this cabinet is decorated with a ¼-in. bead that runs around the inside edge and is mitered at the corners. I cut this bead at the router table while the stock is still wide and long, so that any bead marred by tearout, snipe, or other mistakes can be cut away and redone.

Afterward, rip the frame members extra-wide and run them through the planer on edge to a finished width that is 1/32 in. greater than called for in the drawing. Later, after the case and frame are glued

Photos: Steve Scott

up, you'll plane away this extra material to bring the frame flush with the case sides.

As I mentioned, mitering the beaded corners on the frame can be challenging because it's possible to miscut by a fraction and wind up with a gappy miter. If that happens, simply cut the miter again and recut the corresponding parts to match. You'll end up with a slightly shorter or narrower frame, but that won't be an issue since my process ensures that the case will fit the frame.

If, instead, I messed up a miter while trying to fit the frame to an already assembled case, I wouldn't have room for that sort of adjustment. My only choice would be to waste time and stock milling up new frame parts.

Once the miters are cut, you can cut the joinery for the face frame and then glue up the frame. When gluing up, be sure to

CONNECT THE sides

1. RABBET THE CASE SIDE

Rabbet the front of the case sides to create a tongue for the face frame, but leave the sides wide so you can trim away any mistakes. Putting the cutter above the work ensures consistent thickness for the tongue, as long as there is a hold-down pushing down on the workpiece.

2. GROOVE THE FACE FRAME

Cut test grooves in a piece of scrap (above left) to locate the groove accurately. When this is done, the frame should overlap the rabbeted side by 1/32 in. (above right). Now cut the grooves in the frame (below). Clamp a piece of long stock to a sawhorse or table to help support the workpiece.

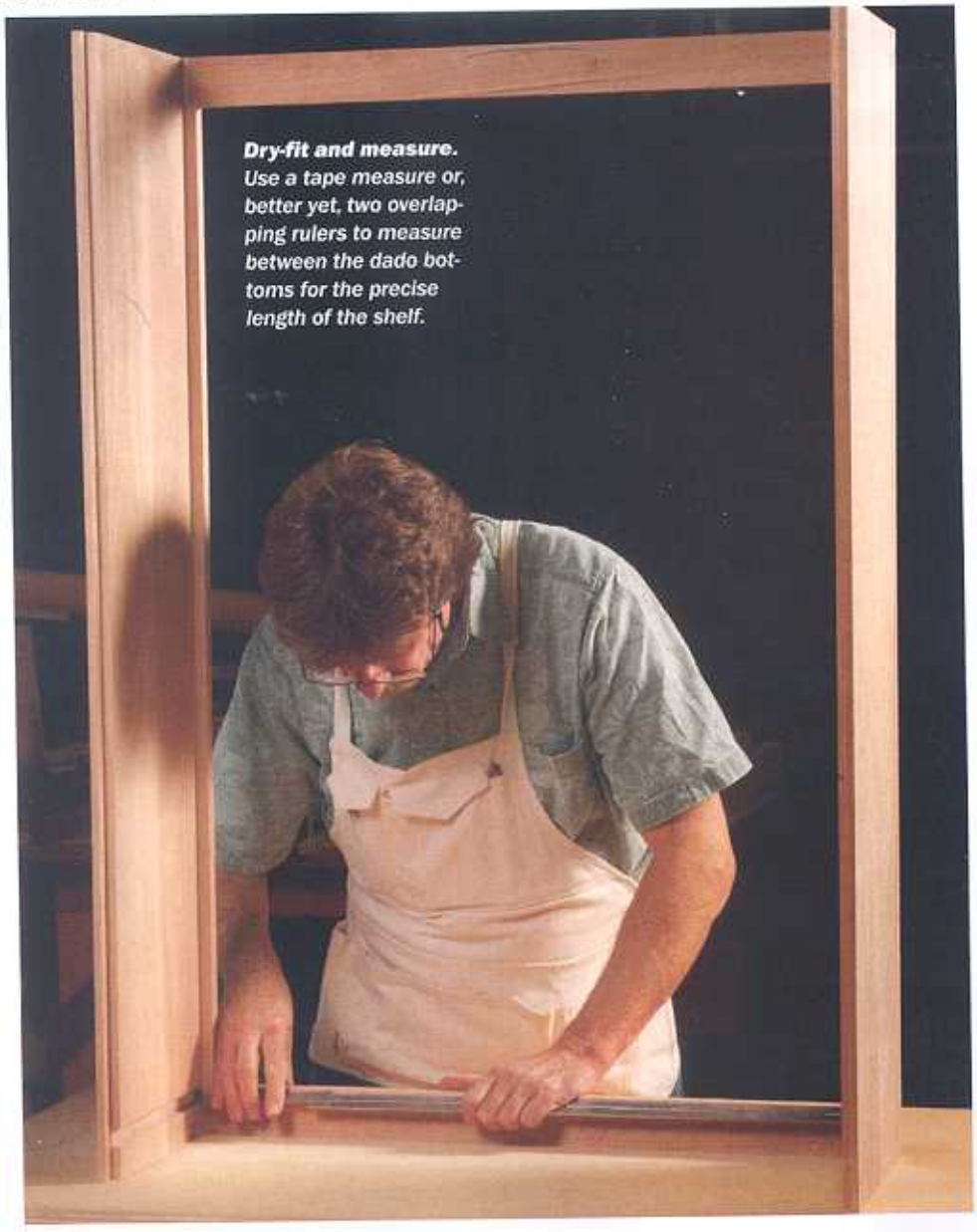
Dry-fit PARTS AS YOU BUILD

A PERFECT BOTTOM SHELF

Locate the dadoes in the case sides. *To ensure that the bottom shelf ends up level with the bottom rail of the face frame, use a combination square to pick up the width of the rail.*

Transfer the dimension. *Put the square against the outside of the dado set to position the rip fence. You can trust that it's right.*

Dado with no doubts. *Verify the cut's location in a test piece, then cut the dado. Use a wide push paddle with a cleat in the rear to guide the workpiece.*



Dry-fit and measure. *Use a tape measure or, better yet, two overlapping rulers to measure between the dado bottoms for the precise length of the shelf.*

clamp carefully to avoid twist, and check diagonal measurements to ensure that the frame stays square.

It's impossible to go wrong on the case

Here's a great feature of this approach. Notice how the process ensures a perfectly sized case. Because the case isn't built yet, and the parts are still oversize, I can now rabbet the front edge of the case sides, cut grooves in the rear of the frame stiles, and then dry-fit the two to find the exact length of all the case's crosspieces.

Also, this case-to-frame joinery is easier to execute than locating biscuits on a face frame, and it's much stronger and more manageable to glue up than a simple butt joint between the case and frame.

Still, it's important to locate the grooves in the back of the frame carefully so the

Cut with confidence. *Because you used the face frame to position the sides, you know this shelf will fit perfectly.*

UPPER RAILS ARE STRAIGHTFORWARD, TOO

Leave them oversize. *With the rails 1/16 in. longer than the width of the case, Latta begins cutting the shoulders.*

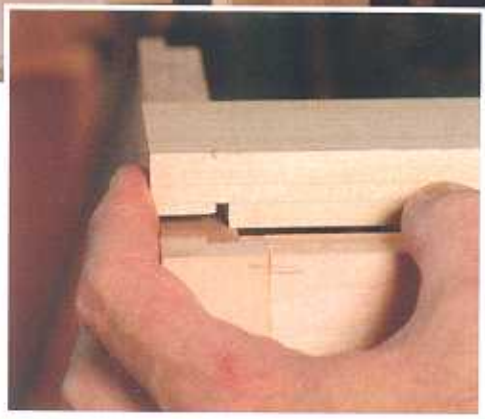
frame ends up 1/32-in. proud of each side, for planing flush later. To ensure a snug fit and accurate placement of the groove, I cut test joints in scrap stock.

With the case-to-frame joinery cut, you can use the frame to find the exact sizes of all the case parts, and locate the dadoes in them. After squaring the bottom of each side, dry-fit them to the face frame, mark their height and width, and then cut them to size on the tablesaw.

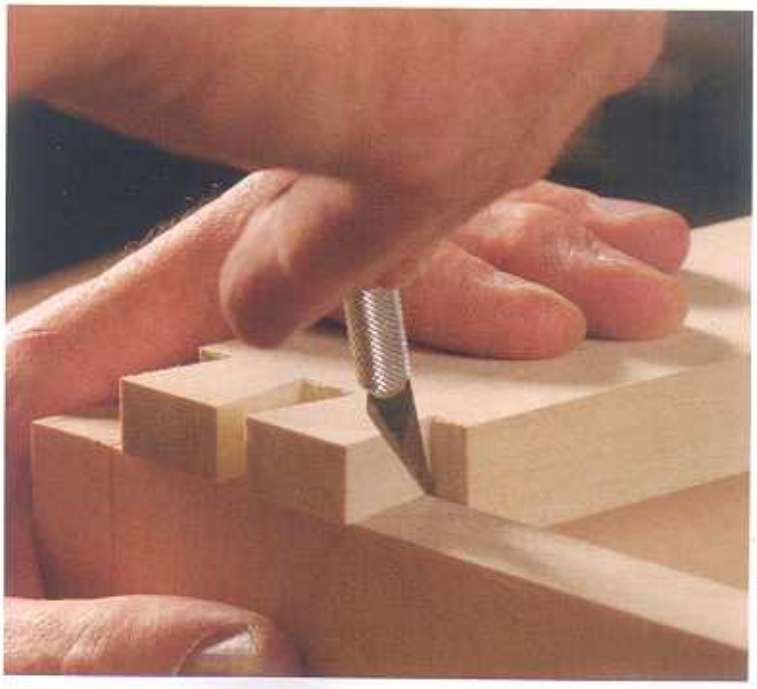
The face frame also serves as a reference for sizing and locating the bottom shelf and the rails across the top. With the sides cut to size and once again dry-fit into the face frame, I locate the dadoes that will hold the bottom shelf, to ensure that it ends up perfectly level with the frame's lower rail. Once these dadoes are cut, I go ahead and rabbet the back edges of the case sides to accept the back. Then, I dry-fit the frame and sides again to measure for the bottom shelf's length. When the shelf is cut to length and dry-fitted, you can mark and then rip it so it ends at the rabbet.

The screw rails that support the case's top are joined to the sides with a pair of shouldered through-dovetails at each end. Working with the frame, sides, and bottom all dry-fit allows me to quickly fit the shoulders very accurately with no measuring or even marking.

I start with the rails about 1/16 in. longer than the outside width of the case. This will

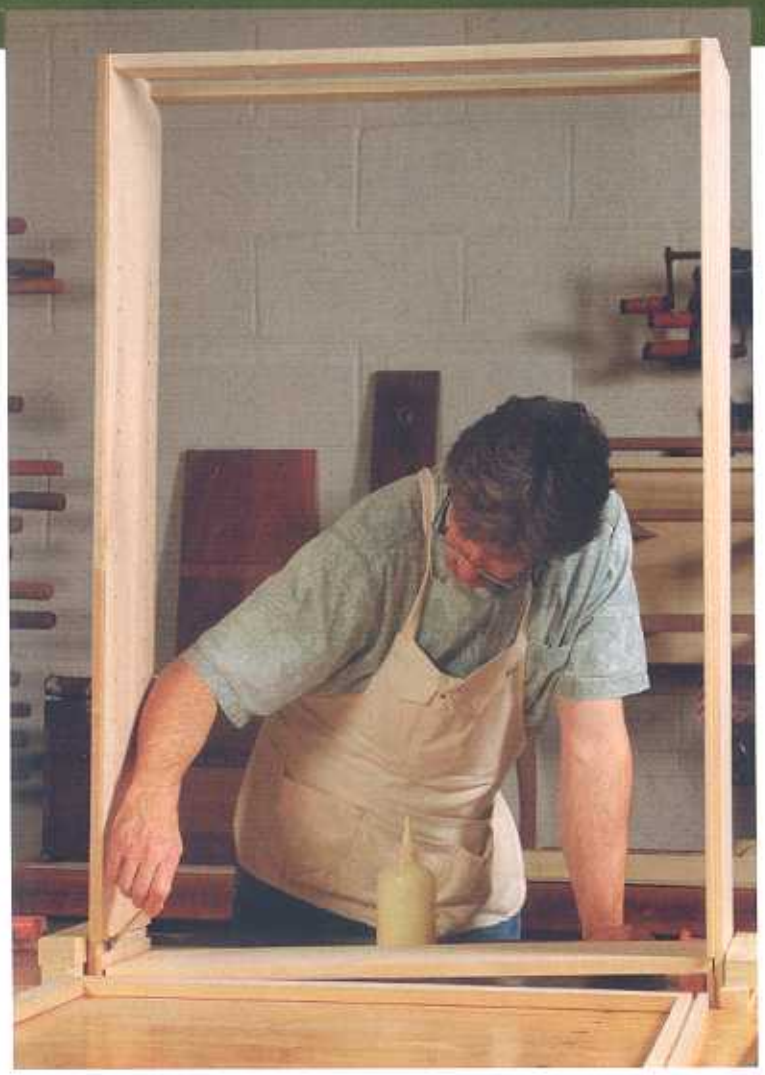


Shoulders first. *Working again with the rest of the case dry-fitted, Latta can cut the shoulders accurately. He removes material in small increments from both ends until the shoulders drop snugly between the case sides.*



One part determines the next. *With the shouldered dovetails cut, Latta marks their mating sockets in the top of the case sides.*

Assemble THE CASE IN STAGES



Dry-fit the top to glue up the bottom. *With the top rails holding the sides in place, Latta brushes glue into the dadoes that will hold the bottom shelf. Cleats that allow for cross-grain movement will be added later to reinforce this joint.*

leave about a 1/32-in. overhang on each side that will be easily pared with a chisel.

Using a miter gauge and the saw's fence, make a shoulder cut on each end that you know is too short. At the bandsaw, remove just enough of both cheeks to let you butt against the shoulder for test-fitting. Now you can sneak up on the fit by moving the fence farther away from the blade in small increments and recutting the shoulders until the rail drops in place. For accuracy's sake, make sure you are fitting right behind the face frame. Once the shoulder cuts are established, cut the cheeks using a tenoning jig or a high fence. Now you can cut the tails and easily lay out the mortises in the tops of the sides.

As a last step before glue-up, drill the shelf-pin holes.

Let's get this straight: The frame simplifies glue-up, too

The case glue-up is another stage where having an assembled frame is a distinct advantage. Keeping the case parts together during glue-up can be a challenging exercise in positioning cauls and shifting clamps. But the tongue-and-groove connection to the frame helps to keep

Add the frame, too. *Dry-fitting the frame helps square the assembly and hold it rigid. With the frame in place, you can clamp the sides tight to the bottom.*

Now glue in the top rails. *Leave the dry-fitted frame in place.*

everything aligned and eliminates a lot of fussing. I start by dry-fitting the top screw rails in place and then gluing the bottom into the case sides. Then I immediately dry-fit the frame to the sides to help keep them parallel before putting the assembly in clamps. Then I glue in the screw rails at the top. When the glue is dry, I remove the face frame, apply glue, and reattach it to the case.

When the assembly comes out of clamps, I use a plane, scraper, and sanding block to bring the face-frame stiles flush with the case sides. Check often to make sure the corners stay square, especially at the bottom where the cove molding will be attached. When this work is done, you are ready to add the base and top. □

Steve Latta teaches furniture making at Thaddeus Stevens College in Lancaster, Pa.

Now glue on the frame and trim to fit. *When the bottom shelf and top rails are dry, remove the frame, apply glue (above), and clamp it in place. Later, use a block plane (left) or scraper to remove the excess frame stock that overhangs the sides of the case. Everything will be square and perfect now, and ready for the crown moldings and base.*

One Bench

4 blades, 4 tasks

1. STANDARD ANGLE FOR END GRAIN

2. HIGHER ANGLE FOR FACE GRAIN

3. HIGHEST ANGLE FOR FIGURED WOOD

Photos: Anissa Kapsales; drawings: Kelly J. Dunton

Plane Can Do it All

Stretch your tool budget by using different blades in one low-angle jack plane

BY CHRISTIAN BECKSVOORT

I once was labeled as the belt-sander guy because I used that tool to do a lot, including level the faces of my 15-drawer chest. So it might surprise you that despite this label, I have quite the plane collection. Over the last two decades, I've used handplanes more and more. They are quiet, create no dust, use no electricity, and, when used correctly, do as good a job as—or better than—a sander.

I love all my planes, but lately I reach for one in particular most of the time—the versatile low-angle jack plane. My Lie-Nielsen version (also known as the 62) is based on the old Stanley 62. At 14 in. long, it is the size of a jack plane, but the blade is bevel up and is bedded at 12°, making it technically a block plane. But you use it like a bench plane, with a two-handed grip that gives more power and control.

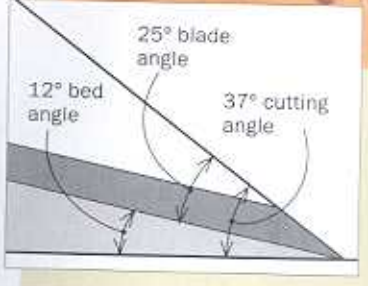
But here's the best thing: By grinding blades to different angles, I can use the low-angle jack plane for a variety of tasks such as end-grain work, smoothing straight and wild grain, and removing a lot of wood on finicky boards.

For the cost of two extra blades at $40 each and one toothed blade at $65 (all from Lie-Nielsen), you can have essentially four different planes for less than what it would cost to buy two. By the way, other companies offer low-angle jack planes (and extra blades), too. For example, Lee Valley sells a very good one for $25 less than the Lie-Nielsen.

If you don't have a grinder or are afraid to risk drawing the temper out of the blade, it may seem daunting

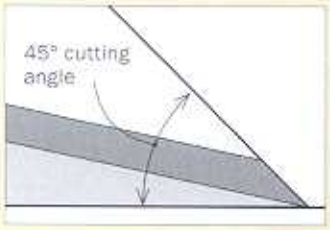
4. TOOTHED BLADE FOR FLATTENING WIDE BOARDS

1. SMOOTH END GRAIN



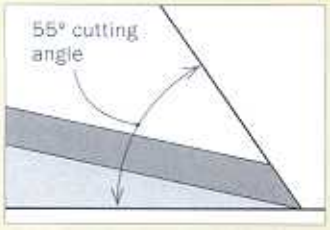
37° angle. *This blade angle excels at end-grain work. Use it for cleaning up dovetails and the ends of tabletops.*

2. SMOOTH FACES AND EDGES

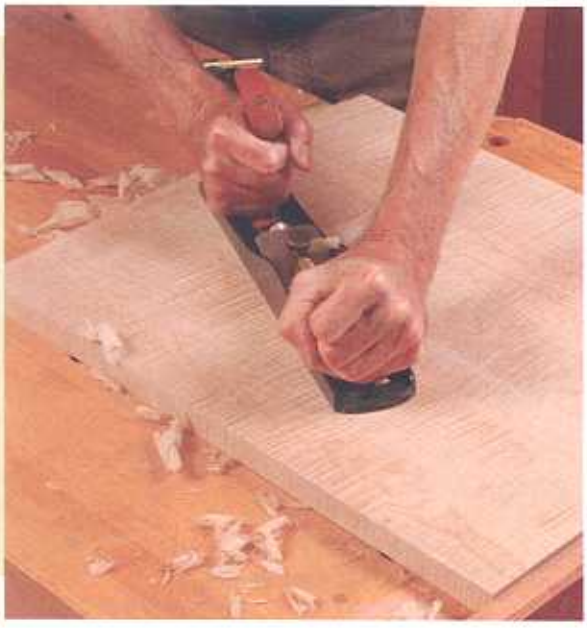


45° angle. *Cutting at the same angle as a standard bench plane, this setup is perfect for all your standard smoothing tasks.*

3. TAME THE WILDEST GRAIN



55° angle. *This steep cutting angle makes for some hard work, but it's perfect on highly figured wood, smoothing it without tearing it out.*



to change the blade angle. However, because you are increasing the bevel angle, you only need to hone at the very tip of the edge.

The low-angle jack plane comes with a 25° beveled blade. Together with the 12° bed angle, it cuts at 37° (like a block plane), perfect for end-grain work. Block planes were originally used on butcher blocks, hence the name. Think of end-grain planing like paring with a chisel. The back of the chisel is flat on the wood, and the bevel, at 30° or 35°, does the cutting. I use this blade for trimming drawer dovetails, as well as smoothing end-grain edges.

Increase the angle for standard smoothing

Switch to a second blade, and the low-angle jack becomes a great smoother, with its 14-in.-long body bridging dips and bumps to produce a dead-flat, glass-smooth surface. I grind this blade at 33°, for a cutting angle of 45°, the same as standard bench planes.

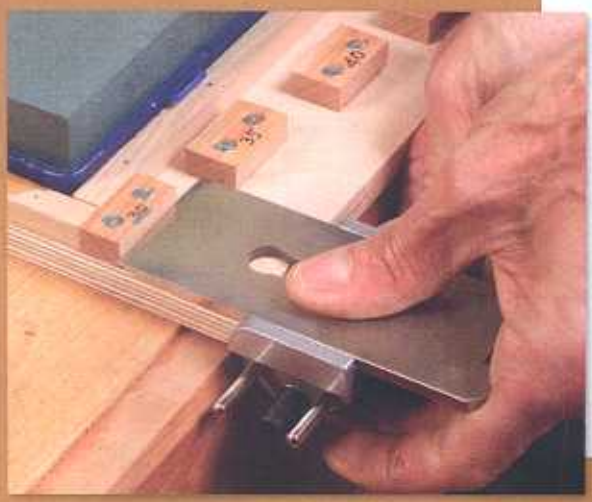
Keep three things in mind and you'll get better results with less effort: First, keep the blade sharp. Second, keep the shavings as thin as possible (I would rather take three light strokes with a handplane than one heavy one). Finally, skew the plane at an angle in the direction of the stroke. This is more of a shear cut, producing a narrower shaving.

Higher still for figured wood

I go out of my way to find figured cherry. The figure, of course, is the result of

How to change the bevel angle

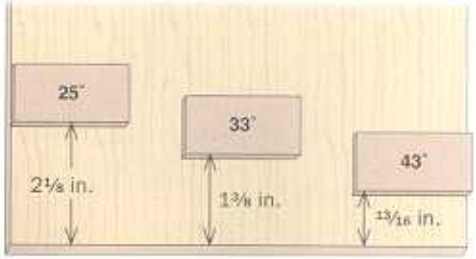
Of the four blades, two come at the appropriate angles and two need to be honed to a new angle. But changing blade angles is easier than you might think.



Stop blocks set honing angles. *The honing guide bumps up against the edge of a simple setup jig.*

SIMPLE JIG

Becksvoort uses an all-in-one honing station similar to the one described by Deneb Puchalski in *FWW* #213, p. 43.



The measurements give approximate angles for most side-clamping honing guides.

wavy grain, which does not plane well. Invariably, when using a standard blade angle there is tearout. So my third blade is ground to 43°, giving a hefty 55° cutting angle. Over the years, I've learned that a steeper cutting angle causes less tearout. With a freshly sharpened and honed blade set at a 55° angle, taking only a 0.001-in. to 0.002-in. shaving, I can plane over knots, across tiger stripe, flame, bird's-eye or fiddleback. What's more, the steep angle allows you to come in from any direction. This high angle comes at a price, however. The effort of pushing the plane is almost doubled, so I use this blade only when necessary.

Toothed blade is a specialist

I only have an 8-in. planer, so to flatten wide boards I use a scrub plane. This removes lots of wood quickly, but on curly wood the tearout is unbelievable. Switching to the last blade in my arsenal, a toothed blade, is a great way to flatten a wide board with tricky grain (I usually use my most difficult woods in fancy door panels that are wider than 8 in.) before it goes through the planer. The blade has 32 teeth with equal-size grooves between them. The result is 32 narrow shavings, much like shredded paper.

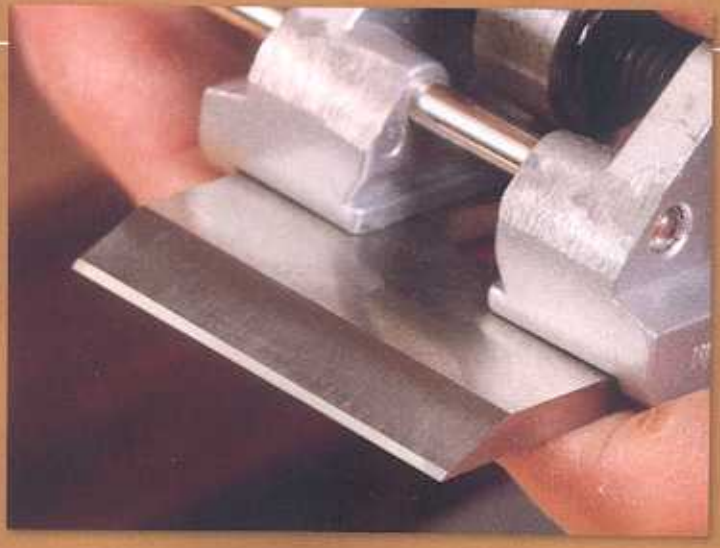
It's easy work because the low angle and gaps mean you are removing only half the material at a time. The tiny teeth and the gaps between them allow me to set the blade to take out a maximum of material and reduce the effort. □

Christian Becksvoort is a contributing editor.

4. FLATTEN WIDE BOARDS

A blade with bite. *When your figured wood is wider than your jointer bed, a toothed blade lets you hog out a lot of material without tearout. Becksvoort hits the high spots first, and then planes the whole face flat. Once that's done, it's ready to go in the planer (left) with the flat face down.*

Set the angle and move through the grits. *Becksvoort establishes the new angle on a 200-grit stone, then moves through the finer grits.*



Don't change the entire angle. *It isn't necessary to change the angle of the entire bevel in the first sharpening session. Just after the tip of the blade, the only part that's making the cut. Eventually, the entire bevel will be honed to the new angle.*

Curved Bevels Made Easy

Tablesaw sled creates facets, and a bit of sanding finishes the job

BY GEOFFREY CARSON

Several tables that I make have curved ends with bevels as wide as 2 in. The curves are a straightforward cut at the bandsaw, but the wide bevels can be a challenge. Bevels wider than 1 in. cannot be cut with a router, because bits that large aren't available. A shaper with a tilting head or custom knives would work, but that's an expensive solution. Also, in my experience router bits and shaper knives do a mediocre job on figured woods, often tearing out the grain more than cutting it.

So I devised an easy way to bevel curved edges using a tablesaw. All you need is a slightly modified panel-raising sled. The tabletop stands on end, clamped to the sled, as it is pushed past the blade. Then you make successive cuts, rotating the tabletop a bit each time, and leaving a curved, but faceted, bevel. These facets are surprisingly easy to level out with sandpaper, leaving a smooth bevel.

Modified sled is the key

The sled I use is basically a box that sits over the rip fence. It rides on the table and the fence guides it past the blade. I made it from ultra-lightweight MDF, which is just as flat and rigid as standard MDF but weighs much less.

The most critical part of making the sled is getting it to ride smoothly along the fence. If it is too tight, it will bind. If it's too loose and wiggles side to side, the bevels won't be accurate. Cut the sides first and place one on each side of the fence. Measure the distance between them and rip the horizontal spacers to that width. Then clamp them in place and test how well the sled slides. If the fit is loose, trim a bit off the spacers. If it's too tight, shim the spacers with masking tape and try again. Screw the sled together after you are sure it will slide smoothly along the fence.

If you don't have an outfeed table, use a roller stand to support the sled as it leaves the saw table. Otherwise, the sled and tabletop might tip downward, pulling the other end up.

Lay out the tabletop and set up the saw

For a tabletop like this one, I leave the overall panel ⅛ in. wider than the final

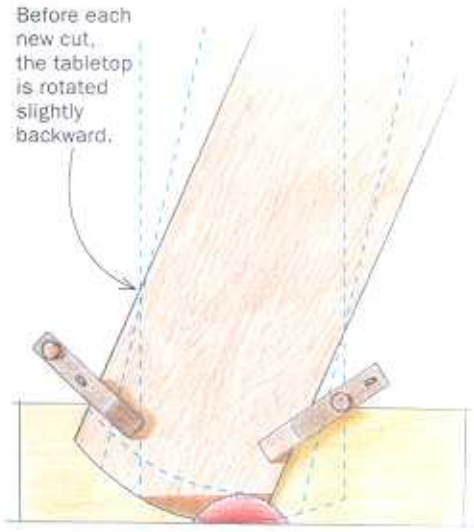
Wide bevels are attractive on curved edges. *However, they haven't been easy to cut, until now. Router bits are too small, and most woodworkers don't have a shaper with a tilting head.*

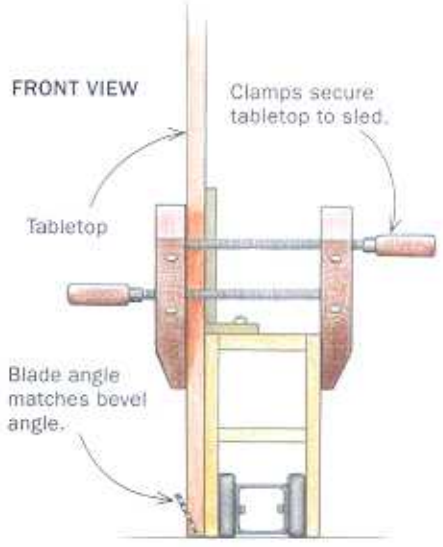
Online Extra

To watch Carson demonstrate his technique, go to **FineWoodworking.com/extras.**

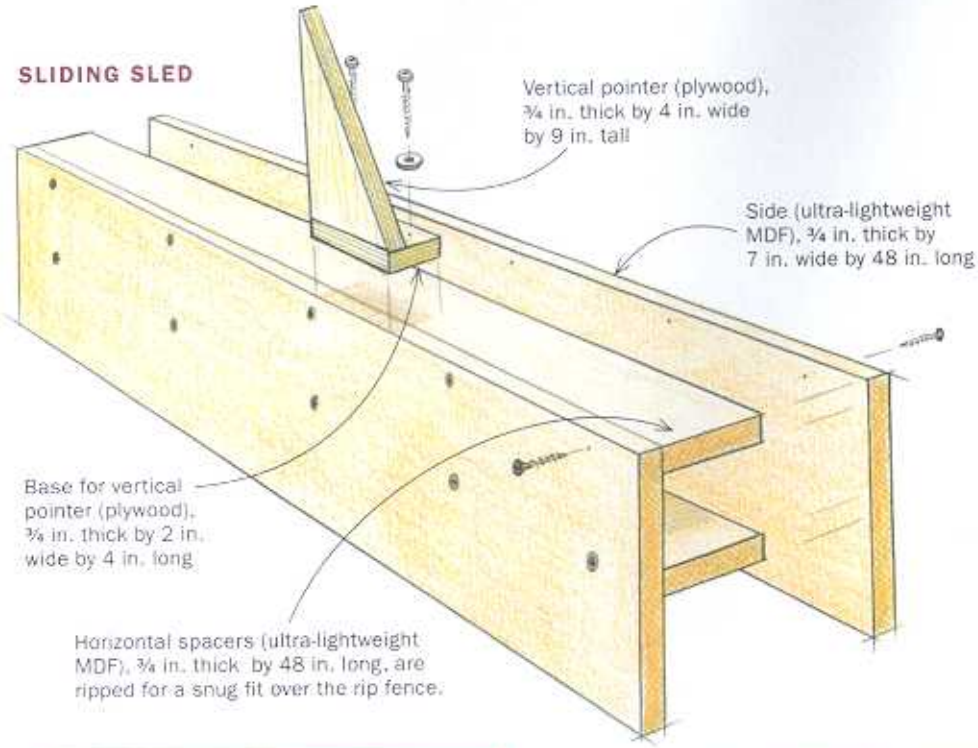
Photos: Matt Kenney

HOW THE SLED WORKS





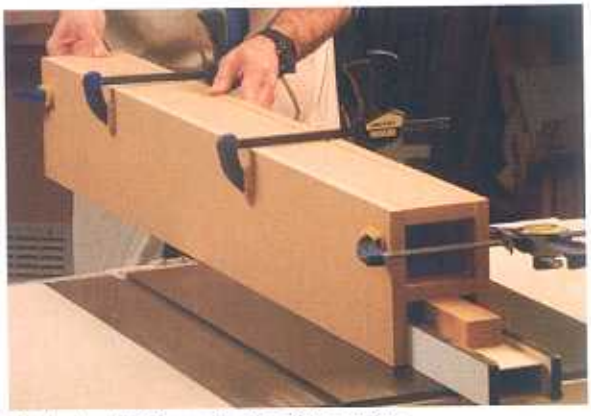
Tall order. *Actually, the sled makes it easy. Rotate the top incrementally before each cut, and after just a handful of passes you'll have a slightly faceted bevel that needs only a bit of sanding to make it smooth to the touch. (Turn the page to find out how the pointer works.)*



BUILD THE SLED TO FIT THE FENCE

The sled should slide easily over the fence without any slop. Building it around the fence makes it much easier to get a good fit.

Clamp the sides to the fence. *This gives you an accurate reading of how wide the horizontal spacers need to be.*



Sled should fit snugly but slide easily. *Dry-fit and clamp the sled together and test how well it slides. If it binds, shim the spacers. If there is any slop, trim the spacers.*

Attach a vertical pointer. *It should be a right triangle, located midway along the sled's length and flush with its front face. The vertical edge provides a reference to ensure that all of the facets are a consistent width and length.*

dimension and trim it later, just in case the last beveling cut causes tearout.

Begin by cutting and smoothing the arc. On the top side of the tabletop, place a mark every 2 in. along the arc. Then mark the centerpoint of the curve and, using a straightedge, connect it to the marks along the arc. When you cut the bevel, you'll align these lines with a vertical pointer on top of the sled, telling you how far to rotate the top between each cut and ensuring consistent facets that will be easier to sand into a uniform curve.

Now draw an arc on the underside of the tabletop to represent the inside edge of the bevel. This layout line simplifies setting the blade to the right angle. Draw the bevel on a piece of scrap the same thickness as the top and use it get a rough setting for the blade's angle. If you cut the bevel with the blade at that angle, the bevel will be wider than you intended because rotating the board changes the effective angle of the blade. So increase the angle of the blade 2° (angle it away from the fence). You're now ready to make the first test cut.

Forming the bevel is easy

Stand the tabletop on the saw, with the side to be beveled facing the blade. I typically place a scrap of veneer between the top and saw table. After clamping the top to the sled, I remove the veneer scrap. This clearance keeps the tabletop from being marred as it's pushed past the blade.

Align the first reference line (on the leading edge) with the vertical pointer on the sled, clamp the top to the sled, remove the veneer scrap, and make the first test cut. Turn off the saw. After the blade has stopped spinning, adjust the blade angle back just a bit toward vertical. Make a second test cut. Repeat this process until the bevel stops at the arc marking the inside edge of the bevel.

After the blade angle is set and the first facet cut, unclamp the top, rotate it, and align the next reference line with the vertical pointer. Reclamp the top and cut the second facet, and so on.

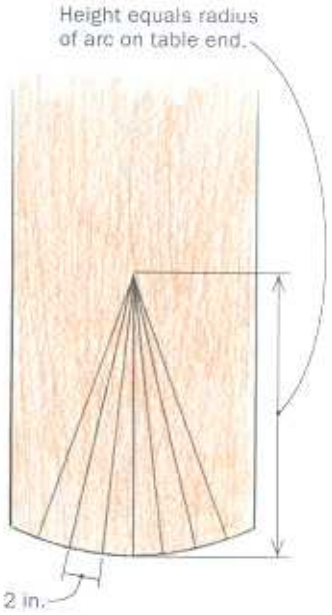
After all of the facets have been cut, use a pencil to mark them with cross-hatching. Sand the lines away evenly for a smooth

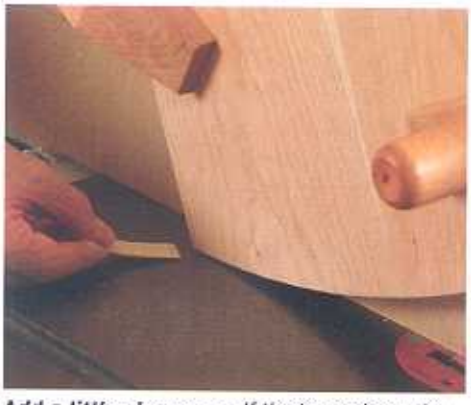
Drawings: John Tetreault

A SERIES OF EVEN CUTS

Each pass through the blade cuts a flat facet. Aligning the pointer with the reference lines ensures that the facets will be the same width, and easy to sand into a uniform bevel.

Draw reference lines. *Carson draws lines from the edge to the centerpoint of the curve. He has found that spacing the lines about 2 in. apart along the edge produces a bevel that's easy to smooth while minimizing the number of cuts needed.*





Add a little clearance. *If the top rode on the saw table, it would get marred and the sled would be harder to push. Use a veneer spacer when clamping the top in each new position.*

Reference lines guide the rotation. *After each cut, move to the next line.*

Curved bevel from straight cuts. *The bevel is still faceted at this point, but your eye wouldn't know it.*

curved bevel. On wide bevels, I use a random-orbit sander to remove the facets. Sand with P-80 grit until the bevels are gone, relying on your sense of feel to know when the bevel is smooth. Then work through finer grits to polish the surface. On bevels narrower than 1¾ in., use a sanding block. □

Geoffrey Carson builds furniture, burl-wood boxes, and fly-fishing accessories in Issaquah, Wash.

Sander removes facets quickly. *Start with P-80 grit and trust your hand to know when the facets are gone. Your hands are more sensitive than your eyes when it comes to noticing smoothness.*

Early American Blanket

Router technique makes carving a cinch

BY TOMMY MACDONALD

When I was looking for good projects for my TV series, *Rough Cut—Woodworking with Tommy Mac*, my mind went back to my first year at North Bennet Street School. One of our first tasks as would-be woodworkers was to make a scale drawing of a frame-and-panel blanket chest. The original, now in the Wadsworth Atheneum in Hartford, Conn., was built in 1670 and constructed in the rustic, utilitarian style typical of Colonial-era furniture that preceded the high styles of the 18th century.

It's a great project because it combines straightforward design and machine-cut joinery suitable for a novice woodworker, with optional carving to challenge those with more experience. The design also can be scaled down to a toy box or even a large jewelry box. Whatever you build, you'll be rewarded with a piece that recalls this country's basic beginnings and the long heritage we woodworkers enjoy.

Many of you are familiar with frame-and-panel joinery, so this article will concentrate on the carved panels and the router-cut detailing. The blanket-chest episode is slated for mid-December, but check your local public TV listings for showtimes. For season one episodes of *Rough Cut—Woodworking with Tommy Mac* on DVD, along with full plans to build the projects, please visit my Web site, roughcutwoodworking.com, or ShopPBS.org.

Tommy MacDonald is a furniture maker and TV host/producer who lives near Boston. Woodcraft is the exclusive sponsor of his new program.

Chest

THE JOINERY IS STRAIGHTFORWARD

The sides of the chest consist of eight panels enclosed in frames. The rails connect to the legs using haunched mortise-and-tenon joints, while regular mortise-and-tenons join the stiles to the rails. All joints are pegged for centuries of durability. The bottom simply rests on four cleats while the lid is attached using a shopmade hinge consisting of two battens and two wooden pins. Not only did the original maker avoid having to pay the blacksmith to forge expensive ironware, but the battens also serve to keep the lid flat.

Photos: Michael Pekovich; drawings: John Hartman

BEAD THE LEGS, RAILS, AND STILES WITH ONE SETUP

Although you could leave them off the piece, the parallel lines of beading break up the flat surfaces on the chest's carcase. The original beads would have been laboriously carved with a scratch stock, but today's woodworker can get them done quickly and flawlessly on the router table. *Fine Woodworking* recommends using Whiteside bit 10-382 (available from woodcraft.com) to get the exact profile seen here. Set the height of the bit and the location of the fence using a test piece, and then run the parts against the fence, flipping them 180° to cut the second bead.

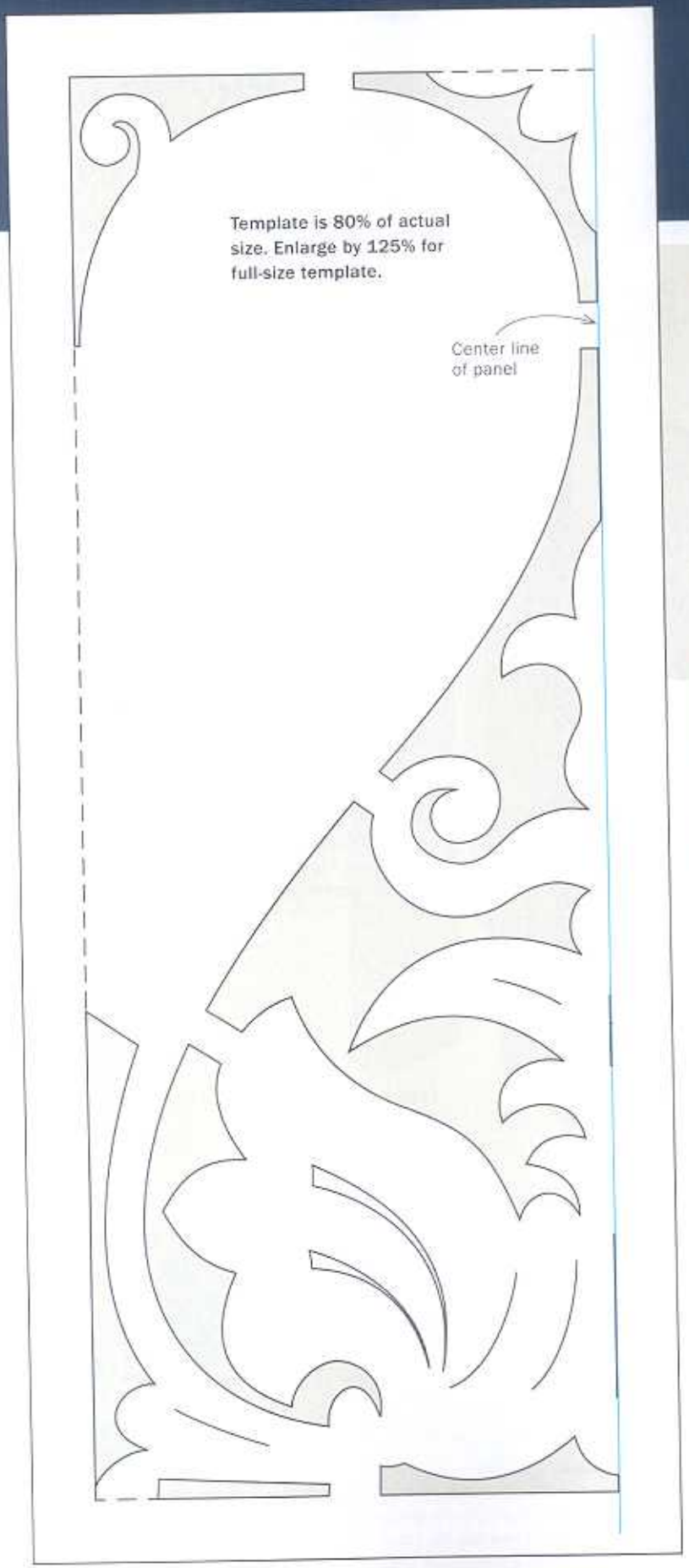
STOPPED CHAMFERS ARE EASY AND ELEGANT

Stopped chamfers are a little trickier than normal ones, but you are rewarded with a sophisticated look. Make the router table's fence opening as small as possible, and the inside edges will show you exactly where the bit is at all times.

How to start and stop. *Mark the ends of the chamfers. Pivot the front of the workpiece into the bit with the mark in line with the inside edge of the outfeed fence. Move the workpiece across the bit. Then pivot the back of the workpiece away from the bit when the second mark reaches the inside edge of the infeed fence. If you don't cut the chamfers quite long enough, it is a simple job to extend them using a bench chisel bevel-side down.*

CARVE WITH A POWER-TOOL ASSIST

The three carved panels elevate and personalize the chest, but you don't have to start by apprenticing with a master carver. The heavy lifting is done with a router, carving tools are used only for cleanup cuts, and two shopmade tools texture the background. Once you get the hang of it, you can create your own designs for future projects.



CLEVER DESIGN REPEATS ITSELF

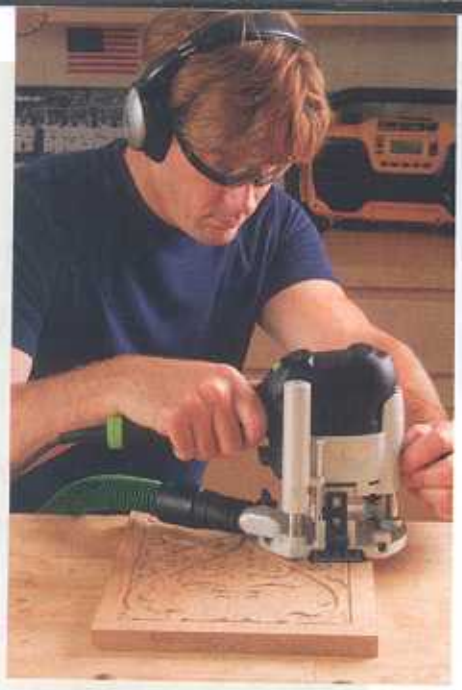
At first sight, this design appears to be a simple mirror-image, but the pattern is actually flipped lengthwise, too, to complete the design. This clever arrangement saves time making the original pattern. Photocopy the design, cut away the shaded areas, then trace the design onto stiff card. Cut this out with a knife and use it as your template. As with all carving, try to use the tools you have to create the design. This way the curves will match the sweep of your gouges and you won't have to own every gouge ever made. I used six tools on this design; sweep gouges 7/20 (the first number refers to the sweep or curve, the second to the width in millimeters), 8/13, 9/10, and 11/10; fishtail gouge 5F/20, and V-parting tool 16/3. If you have slightly different tools, feel free to alter the design accordingly.

FOUR PARTS MAKE A WHOLE

Start by tracing the template onto one half of the panel (1). Flip the template vertically and horizontally to fill in the detail in the upper quadrant (2). Repeat on the second half of the panel (3).

HOG OUT THE WASTE WITH A ROUTER, AND FINISH BY HAND

It is a whole lot faster and more consistent to remove the background wood with a router than by hand. Because you are only going down about 3/32 in., you don't need a full-size router to do the job—a laminate trimmer or even a Dremel attached to a base works fine. What is important is to have a clear view of the workpiece to make sure you don't stray into the design. With the bulk of the waste removed, outline the design with the matching gouges, then use a bench chisel, bevel-side down, to chip away the waste up to the line.



Rout in stages. *It helps to have several sizes of straight bit in the 1/16-in.-dia. to 1/4-in.-dia. range. The big bit removes large areas of waste quickly, while small ones can reach into confined parts of the design and reduce the need for handwork.*

Chop and pare. *Clean up the pattern with gouges. Make vertical cuts first and then use a 1/4-in. bench chisel, bevel-side down, to remove the waste.*

Carve the leaf veins. *Use the V-parting tool to carve the veins on the foliage.*

TEXTURED BACKGROUND CONCEALS AND REVEALS

The last step to carving the panel is to texture the background using a couple of shopmade tools and a mallet. Texturing conceals any irregularities left by the router or the gouges, but more importantly it makes the raised part of the carving stand out.

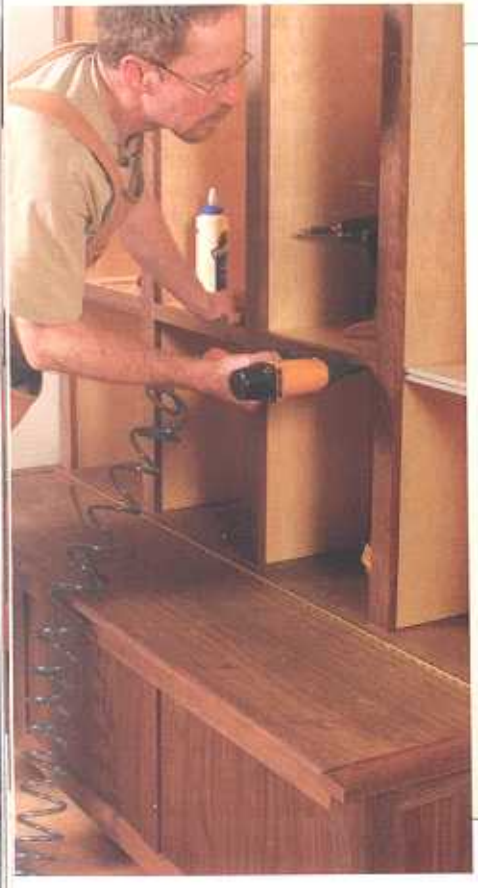
From pin to punch. *MacDonald used a pin from an old hinge as his texturing punch. Use a triangular file to create the six-pointed star on the end. When texturing, don't try to create a pattern with the punch—it doesn't matter if the punches overlap—but avoid leaving flat spots.*

Second tool for tight corners. *File the end of a screwdriver into three peaks, and use it to texture the surface right up to the carved lines.*

These handy tools will make your life easier and your shop time more productive

BY PATRICK McCOMBE

Two Nailers You



Brad nailers for heavier work

These nailers are right at home constructing and installing built-ins, face frames, and other tasks that require strong, fast connections. Use a colored wax pencil to fill the holes.

Photos: staff

Some woodworkers think there's no place for nails in fine furniture, but professionals like Gregory Paolini, Tony O'Malley, and Roland Johnson all find small air nailers useful in their woodworking. Brads and pins can be a speedy substitute for clamps and a great way to attach glue blocks, case backs, and other parts where the nails won't show. Where the nail holes will be visible, colored wax pencils are a quick and effective fix. And even those woodworkers who don't use them on their projects find nailers invaluable for building jigs and shop fixtures. It's also a great tool to have around the house for trim work and improvement projects.

There are two basic types of nailer appropriate for woodworking: pin and brad. Pin nailers are a relatively new breed, and fire extremely small headless nails. They don't have a lot of holding power on their own, but they work great when the joint is backed up with some glue. And the hole is so small it practically disappears.

Brad nailers shoot a larger fastener, up to 2 in. long, and leave a larger hole, but offer more holding power than pins. Most of the woodworkers I spoke with think it makes sense to have both a brad and pin nailer, especially since they've become so inexpensive. But if you're just starting out, read on to see which type makes sense for you.

What to look for in a nailer

For brad nailers, you'll want an adjustable depth-of-drive. Without it, you'll have to control fastener depth by adjusting air pressure at the compressor. This can be inconvenient, especially if you're fastening materials of varying thickness or density. Pin nailers countersink every time, so they don't have a depth-of-drive adjustment.

Be sure to check out the nosepiece, as some have rather bulky rubber covers that make it tough to see where you're placing the nail. The best guns have slim rubber or plastic tips that protect the work and provide an unobstructed line of sight. You'll also want to decide between a conventional or oil-free model. This mostly applies to brad nailers. All the pin nailers I've seen require oil, but Porter-Cable just introduced what they claim is the first oil-free pin nailer (model PIN138). If you're considering an oil-lubricated model, look for one with a rear exhaust, which will direct any oil spray away from your project.

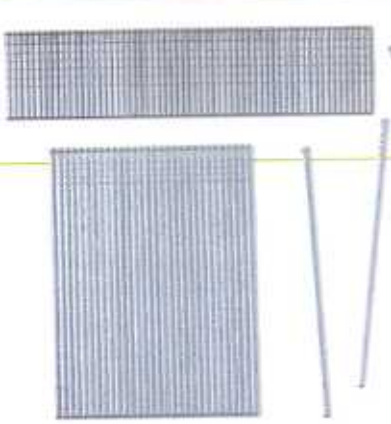
Patrick McCombe recently switched over from the FWW staff to Fine Homebuilding.

Need

Pin nailers for precise placement

Pin nailers, with their small nosepiece and tiny fasteners, are great for attaching small moldings and tacking parts while a glue joint dries. And the holes are so small that they usually don't need filling.

18-gauge Brad nailer



Fasteners for 18-gauge brad nailers range from 5/8 in. to 2 in. long.

A brad nailer is great for building jigs and fixtures, attaching face frames to built-in cabinets, assembling plywood drawers, and fastening plywood cabinet backs

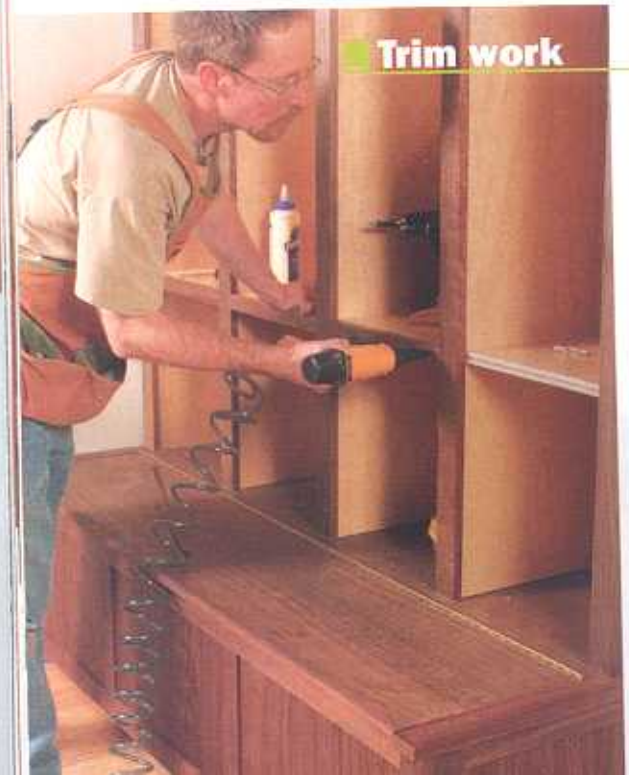
Brad nailers fire 18-gauge fasteners that sell for between $6 and $8 per 1,000. These tools have straight magazines that hold about 100 nails. Pneumatic brads have a small head and hot-melt adhesive on the nail shank. The adhesive heats up as the nail is driven, acting first as a lubricant and then, as the glue cools, as a boost to the nail's holding power.

Prices for pneumatic brad nailers start around $50, and there are more than a dozen high-quality models selling for less than $100. Cordless brad nailers are also an option. They're especially popular with remodelers, because they can be deployed quickly and provide freedom from a compressor. But with prices starting around $250, they're comparatively expensive and make less sense for a home shop.

Jigs

Quick work. *Building this spline jig took minutes and it went right to work without a wait. Keeping the brads about 3 in. above the table prevents them from hitting the sawblade. The metal is soft, so striking a nail is unlikely to damage carbide-tipped tools. But flying shrapnel is a danger.*

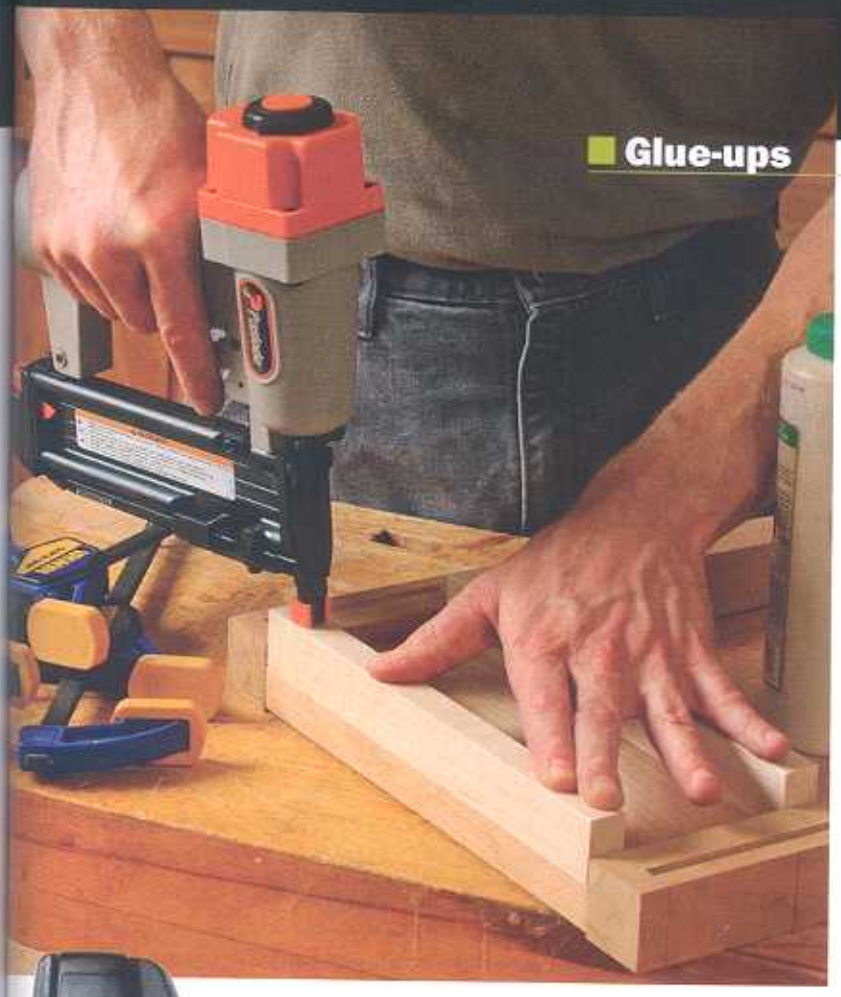
Trim work



Splits are unlikely. *Because they're made from such thin wire and move so fast when they're fired, 18-gauge brads are less likely to split hardwoods than hand-driven nails.*

TIP

Fill visible holes with a colored-wax pencil or putty.



Hold steady. *Tacking parts with brads is a great way to prevent them from moving while they're glued together. Once tacked in place, the part can be clamped firmly along its length for a furniture-quality joint.*

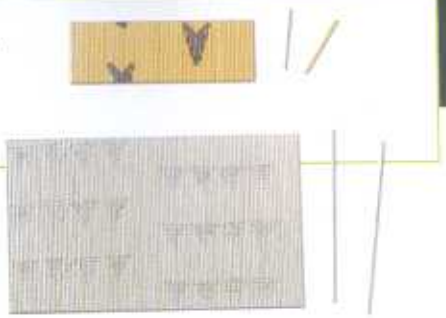
FEATURES TO LOOK FOR

With slim, lightweight housings, adjustable depth-of-drive, and easy-to-load, side-access magazines, both the Bostitch BT1855K ($90) and the Paslode T200 F18 ($90) have all the features you want in a brad nailer. The Paslode accepts nails from ⅝ in. to 2 in. long, the Bostitch takes nails from ⅝ in. to 2⅛ in.

Fuss-free drawers. *For shop storage and other utility cabinets, it's tough to find a faster construction method than a brad nailer. Combined with glue, it makes for very strong joints.*

23-gauge Pin nailer

Several models use pins from ½ in. to 1⅜ in. long, although some start at ⅜ in. or ⅝ in. and others go up to 1¾ or even 2-in. pins.



With a headless fastener that's about the same diameter as a straight pin for sewing, pin nailers leave a hole that's nearly invisible—even under finish. Johnson says this quality makes a pin nailer his most-used nail gun. Of course, such a skinny nail without a head offers little holding power on its own, but when combined with glue, this slimmest of fasteners is very useful. Many woodworkers use them for attaching moldings or tacking on glue blocks. They're especially valuable for holding odd-shaped parts that are difficult to clamp, and for attaching glass stop and other tiny moldings.

Paolini uses his to attach patterns and templates to workpieces. "A couple of pins are a lot more secure than double-sided tape, and they pop right out of the pattern and workpiece when I'm finished routing," he says. He also uses his pin nailer to temporarily hold banding on plywood edges while the glue sets.

Pin nailers have few rules with regard to the length of fasteners they accept (see above). It's tempting to consider a pinner that accepts 2-in. pins as a replacement for a brad nailer, but pins will follow the grain quite readily, sometimes blowing right out the side of a project. So it's best to use the shortest pins that will do the job. The least-expensive pinners, like the Porter-Cable Pin100, sell for as little as $100. The pins sell for between $3 and $5 per 1,000.

Assembly

Non-slip miters. *Mitered corners on boxes and frames can move around as they're clamped, but a few well-placed pins make glue-ups much easier.*

A bit of flex. *Both pins and brads are thin enough to allow movement with changes in seasonal humidity, making them ideal for attaching back slats.*

Templates

Non-stick router templates. *You can use a pin nailer instead of double-sided tape to secure router templates to workpieces. Pins leave almost invisible holes in the workpiece when they're removed, but in most cases you can place them in spots that will be hidden.*

Moldings

Perfect for glass stop. *An errant hammer swing can destroy a glass door with a single blow, but a pin nailer almost eliminates that possibility.*

Precise placement. *Small applied moldings are tough to glue and clamp, but a pin nailer with its tiny nosepiece makes it easy to hold and fasten even the smallest moldings.*

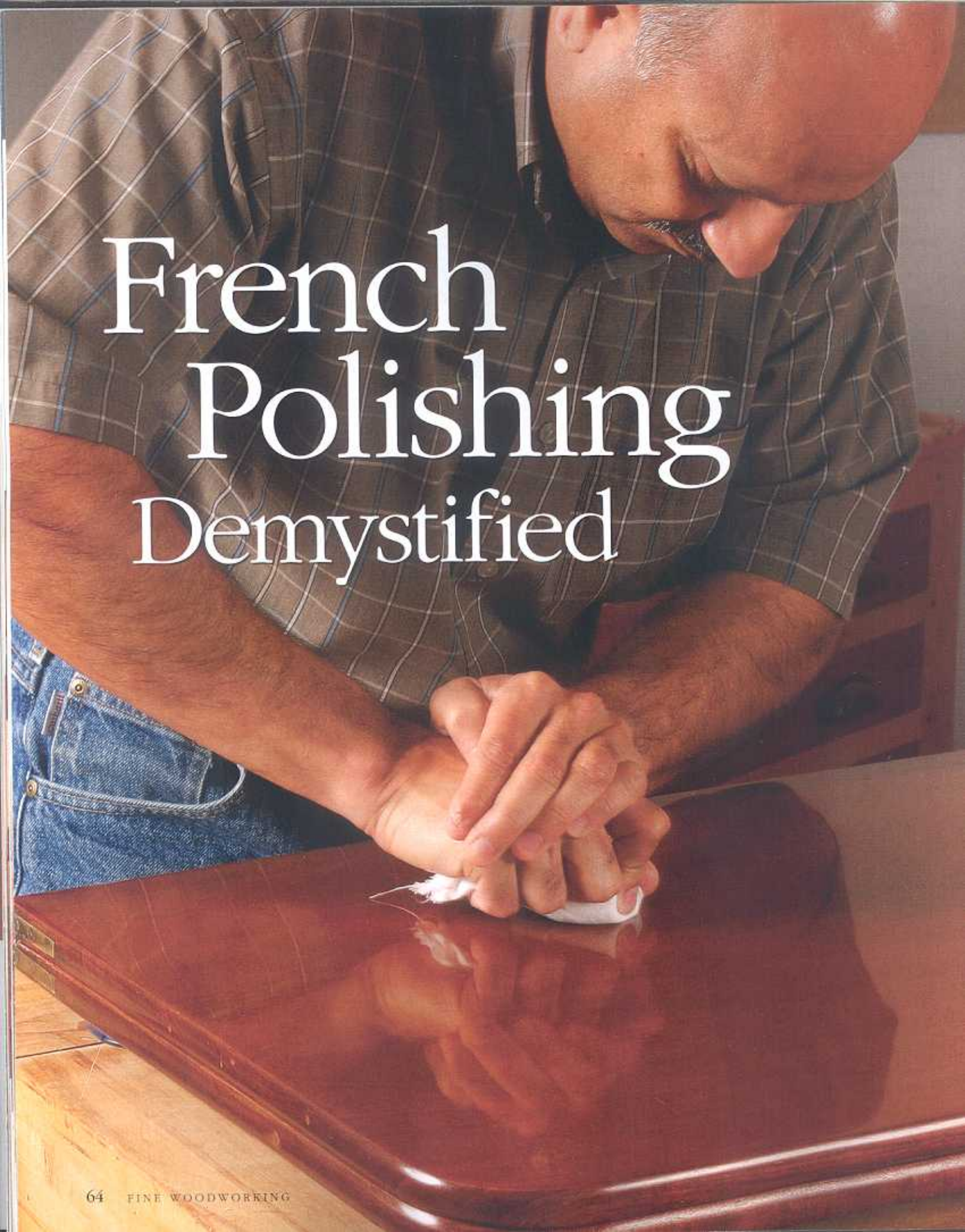
FEATURES TO LOOK FOR

With a swivel air-fitting and a built-in blower for clearing dust, the recently introduced Cadex V1/23.35 ($230) accepts pins from ½ in. to 1⅜ in. The Porter Cable Pin 100 has a tiny nosepiece for precise pin placement and an auto-adjusting magazine for pins from ½ in. to 1 in.

Small compressors are fine

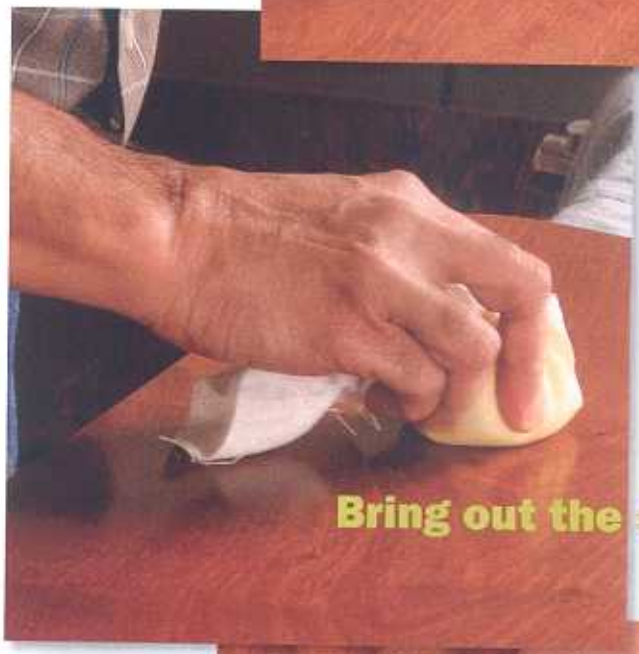
The minimal air required by brad and pin nailers means you need only a small compressor. These can be found for less than $200. One example is the 6-gal. Porter-Cable C2002-WK ($180). This model includes useful accessories like an air hose, tire inflator, blow gun, and quick-connect fittings.

French Polishing Demystified



A step-by-step guide to an unmatched finish

BY VIJAY VELJI



When I was growing up in Calcutta, India, my family's apartment had a clear view of a workshop that made high-end cabinets for radios. Standing there, I could watch the master craftsman make a carcase, veneer it, and finally finish it. For the latter, he used a curious circular motion with his hand that produced a most gleaming finish. Over time I talked to him about his technique, called French polishing, and after I had made a few pieces of furniture, I decided to try it myself.

In the years since, I've spent many hours reading articles about this mysterious finish, but practice was the key to getting the method correct. I will guide you through the process, from prepping the surface to filling the grain, from applying the shellac in very thin coats to giving the surface that final mirror shine. No other finish can match the clarity and depth of French polishing or the way it reveals a wood's beauty. There are no deep secrets to this finish, but there are some tips you need to know.

Careful sanding lays the foundation

Whether you are refinishing a piece, as with this card table, or finishing a new piece, the steps are the same. To start, the surface has to be dead flat with a uniform scratch pattern, because any irregularities will be magnified after the shellac is applied. Start sanding with P100-grit paper and work your way up to P320-grit. You can use a random-orbit sander until the last grit, which must be done by hand using a cork-faced block, sanding with the grain. There are no short cuts, so take your time.

You can French polish both flat and curved surfaces, but you can't get a polishing pad into inside corners. Because this piece is already assembled, I'll be brushing shellac on the inside corners of the base. However, it is perfectly possible on a new piece to polish the components first, and then carefully assemble them. The only exceptions are small areas such as molding or trim.

Use fresh flakes

The best shellac for French polishing is dewaxed orange, garnet, beige, super blond, or platina flakes. Always use dewaxed shellac when finishing new or restoring old furniture. It is the wax in the shellac that gives rise to poor water resistance. Decanting seedlac or machine-made shellac can never get rid of enough wax, so use dewaxed varieties that have a wax content of 0.2% to 0.5%. Even in flake form, shellac has a shelf life of only two to three years, so don't use flakes you picked up at a tag sale. Also don't use premixed shellac sold in cans for

Photos: Mark Schofield

1. Fill the grain

Before being polished, open-pored wood must be filled with a mixture of shellac and pumice. Applying the mixture with a pad is good practice for later steps.

French polishing, as the additives that extend its shelf life make it hard to pad on very thin coats.

Open-grained wood must be filled

To achieve a mirror-like finish, the polished surface must remain perfectly smooth. Because shellac shrinks over time, if you try to use it to fill wood pores, eventually the pore structure will reappear on the surface. On close-grained species such as cherry or maple, grain filling may not be necessary, but on open-grained woods like walnut and mahogany it certainly is. Use superfine 4F pumice, a white volcanic rock. Sprinkle the pumice with a simple cotton bag made from a roughly 8-in. square of T-shirt material held together with a rubber band.

Make two pads—You will force the pumice into the pores with the first of two pads, so take a moment to create these tools. Take an 8-in.-square piece of linen and a ball of cotton batting that fits in your palm.

Pounce the pumice. *Pour some superfine 4F pumice into a cotton bag and then knock the bag at even intervals on the workpiece.*

Prepare the pad. *The pad consists of a cotton batting core inside a linen covering. Dampen the core with very dilute shellac.*

Fill the grain. *Force the pumice into the wood's pores using a circular motion. Sprinkle on more pumice until the pores are filled.*

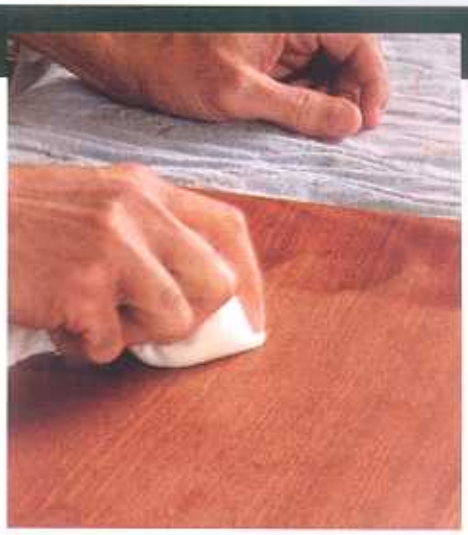
Check your progress. *To see if all the pores have been filled, check the surface against a raking light. You can also lightly run your fingernail across the grain. A smooth slide indicates that the pores are full.*

2. Build the finish

This is the heart of French polishing: padding on multiple layers of shellac. The thin layers dry so fast that you can build up a deep, smooth finish in one session, without stopping.

Start at the core. *The second pad has a cheesecloth core and a linen cover. Dampen the core with alcohol and shellac.*

Knock it flat. *After charging the pad, press it onto a scrap of wood to form a flat, wrinkle-free surface that will contact the workpiece.*



Apply the shellac and raise the shine. *Move the pad across the surface in a circular motion (left). You can employ a figure-eight pattern both along and across the grain, covering the entire surface of the wood. The shellac builds surprisingly quickly (below). Never stop the pad on the surface, as this will leave a mark.*

Place the ball on the linen, grasp the four corners of the linen, bring them together, and twist them tightly over the ball to form a pad. The second pad, used later, is almost identical but has a cheesecloth core. All three materials can be found at fabric stores.

Open the first pad and dampen the core with alcohol and a 1-lb. cut of shellac in roughly a 10:1 ratio, working it into the batting. Close the pad and sprinkle some pumice on the wood. Now work the pad with firm pressure in a circular pattern mostly across the grain. The pumice soon takes on the color of the wood. Avoid working with the grain, because that will remove the pumice that has been packed into the pores.

The tiny amount of shellac is enough to create a kind of mastic that will glue the pumice in the pores. If you add too much shellac and the pad becomes sticky, simply add more alcohol. Grain filling is hard work, so take frequent breaks and try not to leave obvious swirls of the sawdust and pumice mixture on the

Three ways to deal with a sticky pad

Recharge the pad with just alcohol. *When the pad becomes sticky, try dampening the core with alcohol alone.*

Move the core. *If shellac starts to build up on the outside of the pad, it is more likely to stick. Move to a clean part of the linen.*

A little oil. *Apply a drop of mineral oil to the pad. You will remove the oil from the workpiece later, so use as little as possible.*

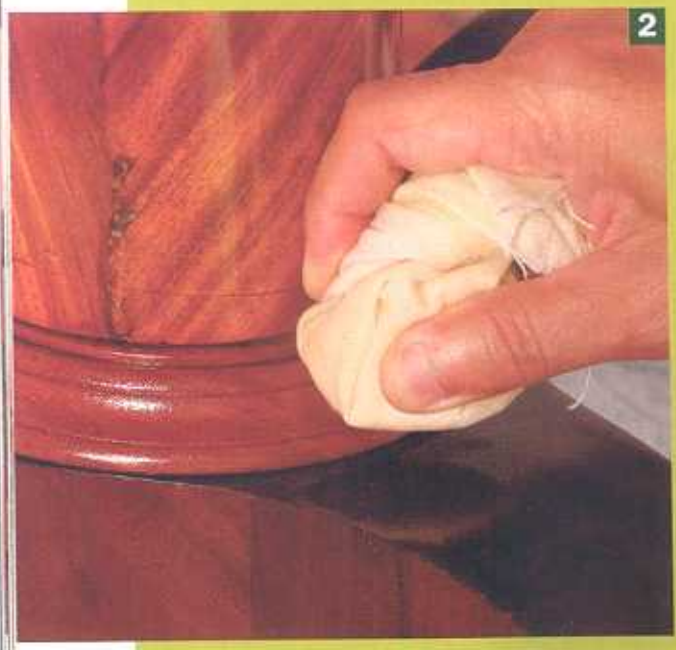
1

How to handle small surfaces

1. Brush tight spots. *Use an artist's brush to apply shellac to inside corners that a pad can't reach.*

2. Blend the surface. *Immediately after brushing on shellac, use the pad to feather the wet edge into the rest of the surface.*

3. Don't forget the edges. *Only the top surface needs to be grain filled and fully French polished, but you can use the pad to apply shellac to the rest of the workpiece while bodying the top.*



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surface. Recharge the pad with alcohol and shellac and sprinkle more pumice as required. Once you are satisfied, lightly run your fingernail across the grain. A smooth slide indicates that the pores are full. Add a 1-lb. cut of shellac on the outside of the pad and lightly coat the surface. Let it dry for at least four hours.

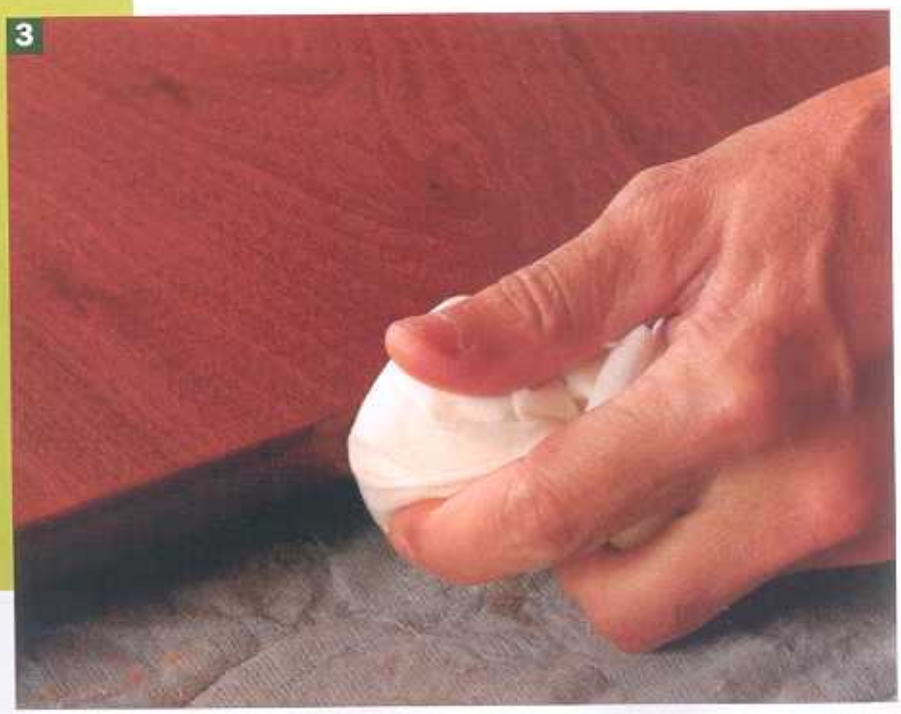
Slightly wet the surface with water and lightly sand in a circular pattern using 1,500-grit wet-or-dry sandpaper. Dry sanding would create heat, melt the shellac, and clog the sandpaper, causing uneven sanding. Run your palm on the surface to determine if it is smooth and flat. Remove the residue with a clean cloth.

Thin coats dry almost instantly

To get a mirror surface, the finish has to be perfectly smooth. Any waves or ridges will scatter the light rays. The easiest way to build a smooth finish is to apply very thin layers using a 1-lb. cut of shellac. With experience, you can move toward a 2-lb. cut.

The process of applying the shellac is known as bodying. Switch to the second pad. Dampen the cheesecloth core slightly with alcohol, then work in an equal mixture of alcohol and a 1-lb. cut of shellac. Twist the linen around the core and flatten the pad on a scrap of wood. Move the pad in a small circular pattern over the surface. Look for a faint glow of shellac seeping through the linen as it flows out of the core. As well as the circular pattern, you can employ a figure-eight pattern both along and across the grain, covering the entire surface of the wood. As the pad dries out, open it and add equal amounts of shellac and alcohol to the core. Never add shellac from the outside of the pad because the shellac must flow in a controlled manner from the core.

As the shellac builds up in the pad, it may get sticky. This can cause the linen fibers to separate and end up in the finish. There are three ways to deal with a sticky pad: Recharge the core with alcohol. If you see any accumulation of shellac on the linen cover, move the inner core to a new part of the linen. As a last resort, add a drop of mineral oil on the outside of the pad. Any oil added now has to be removed at the later stage of burnishing, so use it sparingly. Luckily, fresh flakes usually don't need much oil.



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3. Now burnish everything

Pause for a pore check. *After letting the surface dry overnight, check to see if the shellac has shrunk into the wood pores and more shellac needs to be applied (left). Then use a barely dampened pad to burnish the shellac to a mirror finish (below). At the same time, the pad removes any oil that was used when building the layers of finish.*

Bodying is the most time-consuming part of French polishing. You can do it in one long stretch or spread it out over several days. I can't give you a rule on how much shellac to apply; a grain-filled, open-pored wood will usually require more than a close-pored wood. To determine if the bodying process is complete, look at the surface from an angle against the light. If you see any pores of wood grain, you have more work to do. The initial bodying process is complete once you've have laid a flat and even layer of shellac over the entire surface.

Let it dry overnight. The next morning, because shellac shrinks as it dries, you may see some areas that require more work. Continue with the bodying process but if you have been using one of the darker grades of shellac, switch to super blond or platina. These grades have the best resistance to moisture.

Once the pores are filled with shellac and the surface looks perfectly smooth again, start using alcohol alone to get rid of all the shellac from the core as well as the linen. Again let the piece sit overnight to double check that shellac shrinkage doesn't reveal any more pores.

Burnish the surface for that mirror finish

Burnishing is where you evenly stretch the shellac and remove any oil used when bodying the finish. You can use the same pad, but if the linen cover looks thin and worn, replace the whole pad.

Burnishing is hard labor because pressure must be applied on a pad that is almost dry to the touch. If you are using an old pad, wet just the core with alcohol. Use a little more alcohol to wet the core of a new pad. Move the pad with the grain and sometimes in small circular patterns, always applying pressure, and always moving. If you stop, the pad will stick and mar the surface. If this happens, try burnishing away the blemish; if this doesn't work you will have to apply more shellac. If the pad gets too dry, add alcohol very sparingly.

Working this way will give you the mirror finish you have heard about. By the way, you do not have to apply a layer of wax, because the shellac is hard and durable enough to stand on its own merits for a long time. □

Vijay Velji is the owner of ShellacFinishes.biz.

Beautify Doors With Divided Light

A surprisingly painless approach for multi-pane doors

BY MARIO RODRIGUEZ

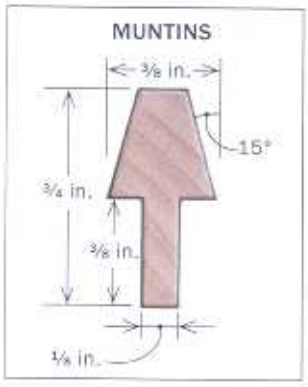
Recently, I received a commission for a small sideboard. My design, inspired by classic English Arts and Crafts pieces, was a low, three-section piece in riftsawn white oak, each section a slender drawer above a divided-light glass door.

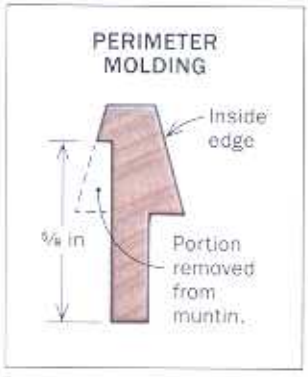
My client and I decided the doors should be true divided lights, with individual panes and real muntins (no fake grille fitted over a single piece of glass). The originals that I liked had muntins of contrasting stock, assembled in a separate grid inside the door frame rather than as an integral part of it, which is the usual method.

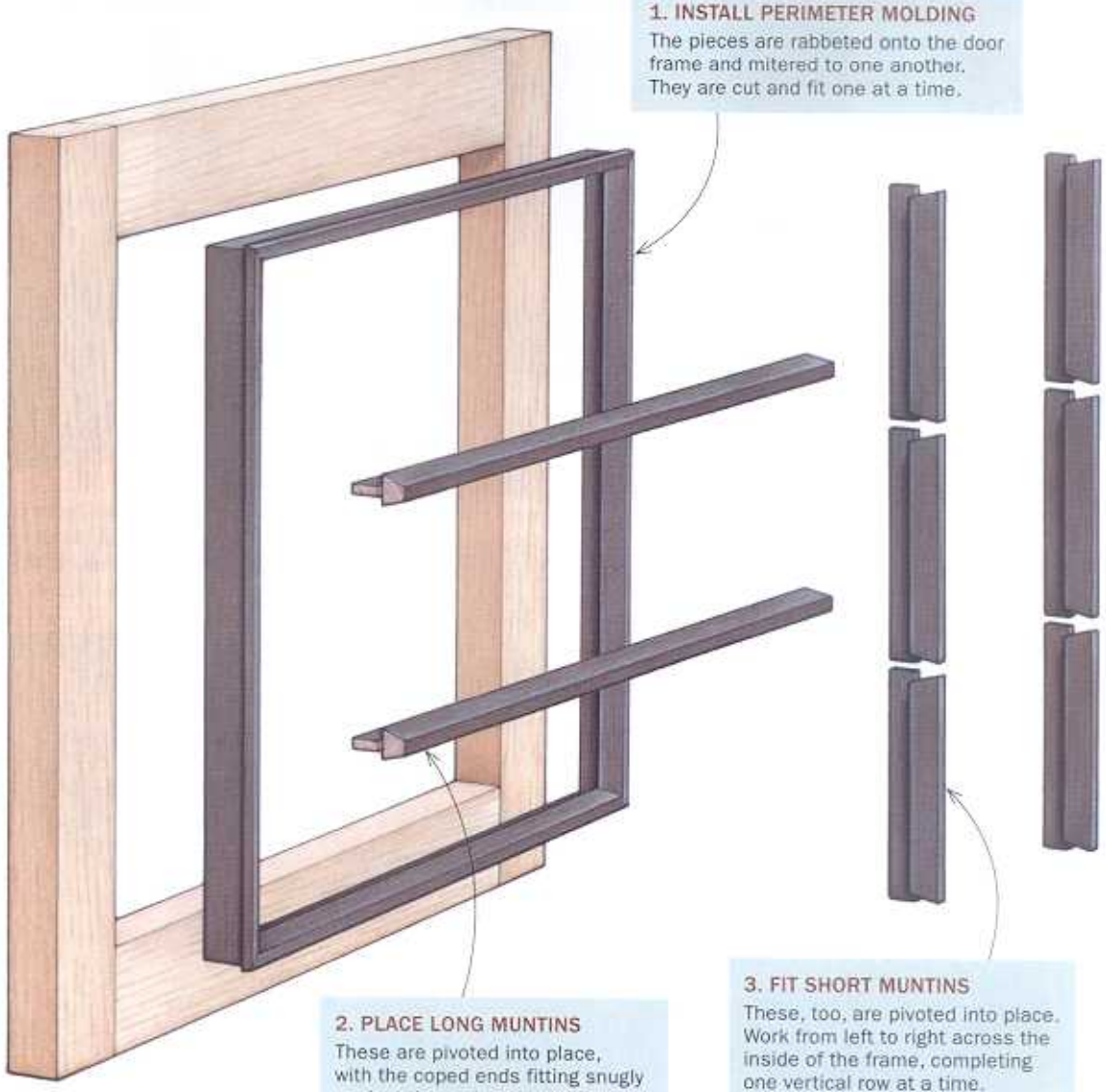
Several of the original pieces also had muntins made from slender stock with a flat, beveled profile on the edges. To make the design work, I needed to produce this type of profile in stock only ¾ in. thick and find a way to create strong joints. Cope-and-stick router bits would work, but none of the profiles I found in catalogs were right. So after some experimenting, I devised a simple technique that involves milling the beveled edges on the tablesaw at 15°, and then coping the mating ends on a router table using a 15° dovetail bit, creating clean joints. Then I borrowed an age-old window-building trick, using

Smart joinery is the secret

Rodriguez simplified the handsome muntin grids for this Arts and Crafts sideboard by beveling the edges of each muntin. That made it easy to create a matching, interlocking profile on the ends of the mating pieces.







glue-soaked cloth strips to lock the thin muntins into place. It worked perfectly.

The result is a clean and modern-looking grid that contrasts beautifully with the door frames—a great option for furniture makers who want to make distinctive doors with divided light. Here's how I did it.

Mill the muntins

English Arts and Crafts designers often used ebony for muntins like these, but ebony is hard, brittle, and prone to splitting. It's also expensive and hard to find. So I used walnut instead, milling the pieces and then dyeing them with an alcohol-soluble dye (Moser's ebony jet black powder; woodworker.com) to resemble ebony. Start with stock in lengths of 18 in. to 20 in. Thickness the stock to ⅜ in. and rip the boards into 2-in.-wide strips. Each strip yields two lengths of finished muntin. Be sure to mill extra stock to use in case of mistakes.

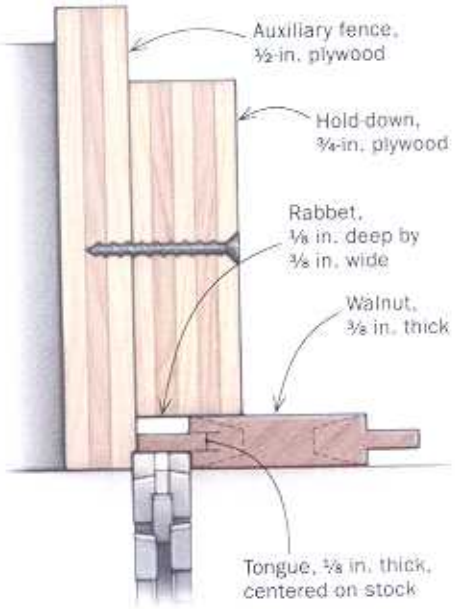
The first step in shaping the stock is to cut the rabbet that holds the glass. I do this at the tablesaw using a dado set. To ensure accuracy and uniformity, use a zero-clearance insert and a sacrificial plywood fence with a screwed-on integral hold-down. After several test cuts, make four passes, two along each edge using a push stick on its side. After rabbeting, rip each piece into two identical strips.

Use a sled for beveling—I chose a 15° bevel for the muntin angle. This gave me enough of a mating surface for a strong coped joint, yet provided a thin, delicate profile. To safely cut the bevel on the edges of the stock, I made a sled to support each strip as it passed the tablesaw blade. The sled travels face down, riding the fence and holding the stock firmly against the table. Capturing the molding this way

Safe setups for small pieces

Rodriguez rabbets the muntins and shapes their beveled edges at the tablesaw, using both a dado set and a combination blade. Hold-downs and a hardwood sled help hold the small parts.

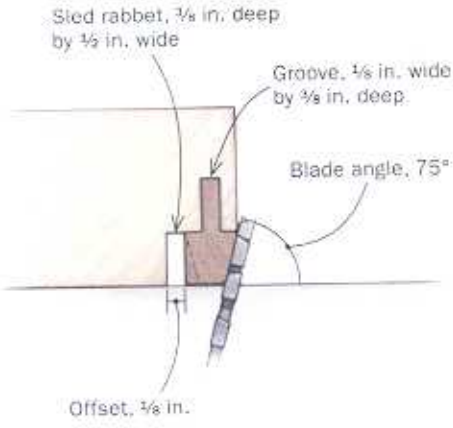
1. SHAPE THE BLANKS

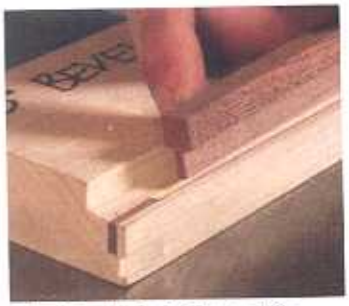


Start with wide stock. *Bury a dado set in a sacrificial fence (left) to mill a pair of rabbets on each edge. Screw on a hold-down to press the stock tight to the saw table, producing a muntin tongue exactly ⅛ in. thick. After rabbeting, rip the stock into two ¾-in.-wide strips (above). Be sure to use a splitter and a push stick to control the stock.*

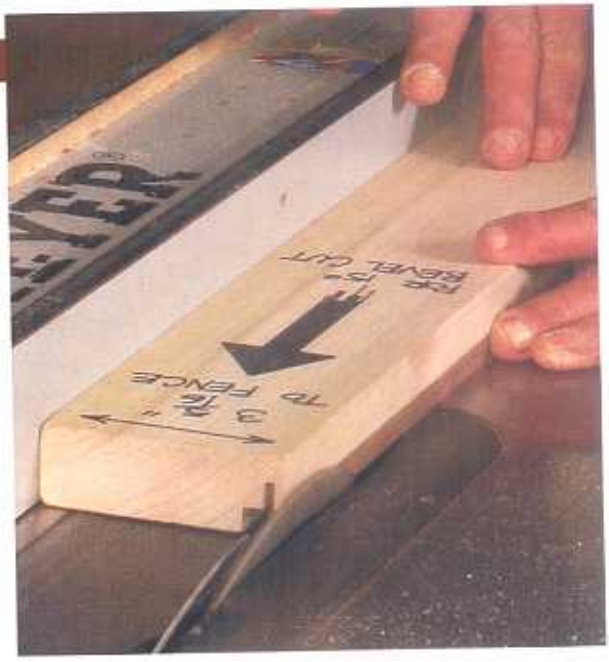
2. BEVEL THE EDGES

The sled is a length of hardwood, milled foursquare, with a groove and a rabbet along one edge to hold the workpiece against the table. The other edge rides the tablesaw fence.





Grip it and rip it. *Glue a shim into the groove (above) to keep the stock from slipping. Angle the blade at 75° and set the fence so the top of the cut meets the edge of the sled (right).*



prevents the stock from coming loose during the cut. Switch to a combination tablesaw blade and use a protractor to set the angle. After cutting one side of a strip, flip it and cut the other. The completed strip can be cleaned up as needed with a scraper or block plane.

The perimeter molding—Instead of a muntin profile that is integral to the door frame, perimeter molding strips are set against the inside edges of the door frames. One edge is rabbeted and the other accepts the coped ends of the interior muntins. To cut the rabbet, put the dado set back on your saw and place the material once again into the beveling sled. This time, though, the sled is run past the dado cutter on its edge.

To install, start at the edges

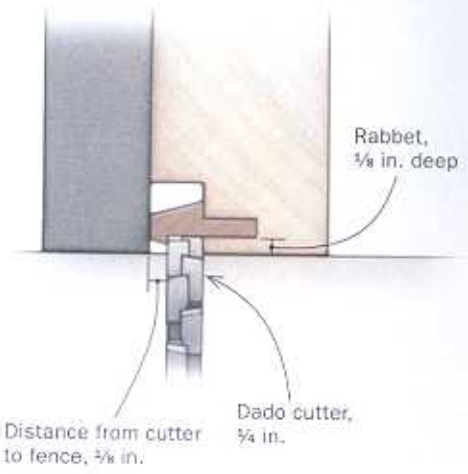
To install the grid into the door frame, begin by mitering the perimeter moldings and gluing them in place. With this done, turn the door face side down. Now measure the space between the top and bottom moldings, referencing from the inside face of each tongue. Cut the vertical moldings to this exact dimension for a tight friction fit.

Cut and fit the coped ends as you go—The muntin sides are beveled at 15°, and the ends of the muntins must be coped at a mating angle. This critical operation is done on a router table with a couple

Photos: Steve Scott; drawings: Christopher Mills

3. INSTALL THE FRAME

The beveling sled rides on edge to widen the rabbet for the perimeter moldings.



Switch back to the dado set. *Extending the rabbet on one side lets the perimeter molding mate with the inside edge of the door frame. Set the dado set for a cut that is ¾ in. wide by ⅛ in. deep.*

of shopmade accessories. In addition to an auxiliary fence with a zero-clearance opening, I made a plywood sled to support the muntin upside down at 90° to the router-table fence. The sled has a sloped hardwood fence that supports the muntin as it passes the router bit. Underneath, a cleat rides the edge of the table to guide the work. With the muntin stock on the sled, raise the bit so it cuts to just below the shoulder of the muntin profile.

Use a template to fit the muntins—After making the cuts on the vertical muntins, slip them into place, setting the spacing with a plywood template. Now repeat the process of measuring, cutting, coping and fitting for the shorter horizontal muntins. Once all the muntins are in place, use the template and a straightedge to check the size and alignment of each opening.

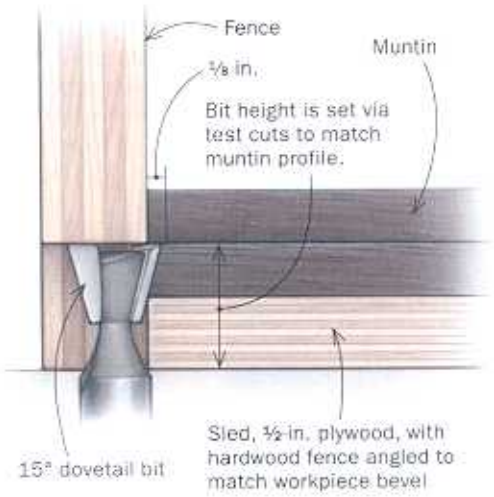
Clever corner braces—To strengthen the coped joints, and to avoid a messy glue-up, I used thin cloth strips soaked in glue. This was a method I encountered many times when restoring glazed doors in cabinets. The thin strips harden when the glue dries, reinforcing the delicate joinery where the muntins intersect. I use the glue sold by Titebond as liquid hide glue (woodcraft.com). Unlike traditional hide glue, which requires heat to stay liquid, this glue remains workable at room temperature. And unlike yellow glue, it has an open working time of about an hour. Cut up a piece of old bed sheet into ⅛-in.-

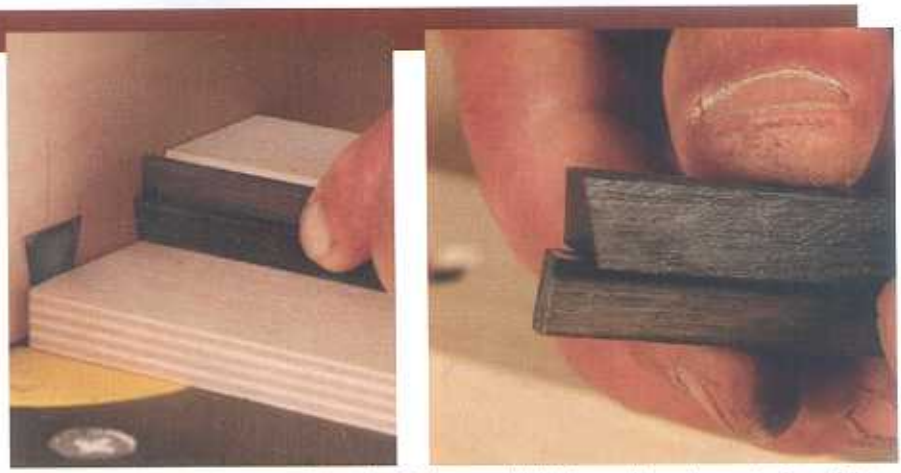
Miter and fit the perimeter moldings. *For clean miters, cut the piece to rough length and trim the joints on a belt sander (above). A 45° jig lets you sneak up on the fit. Strips of blue tape secure the pieces for glue-up (right).*

Install the muntins

The muntins won't stay put unless they fit tightly into place, so start by cutting each one to length for a friction fit against the perimeter molding. Then you are ready to cope the ends to complete the fit.

1. COPE THE ENDS ON THE ROUTER TABLE





A dovetail bit cuts the cope. *Bury the bit in a sacrificial fence. Keep the workpiece tight against the fence and check the bit height with test cuts (left). To help ensure that the top of the muntin lies flush with its neighbor, the bit should leave a tissue-thin layer of waste material (right) that can be trimmed by hand.*

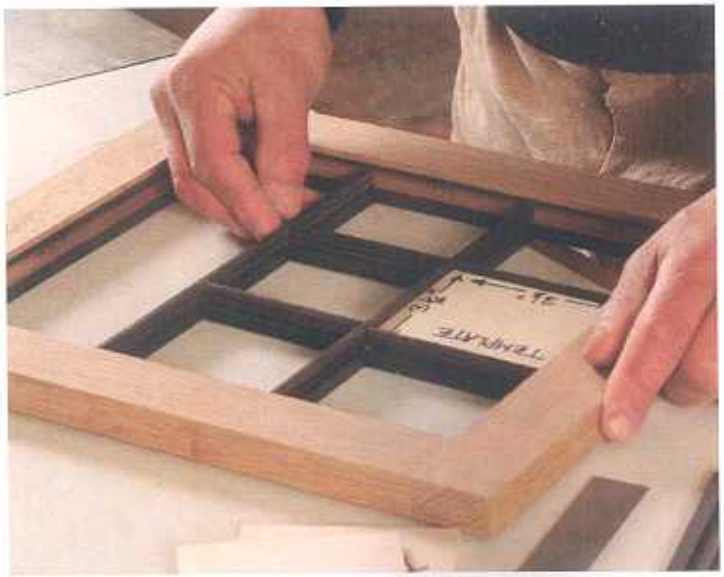
2. ASSEMBLE THE GRID

Place the vertical muntins. *To space them evenly, Rodriguez uses plywood templates.*

wide strips about 1 in. long. After soaking the strips in a shallow dish of glue for about a minute, use a pair of tweezers and a dental pick or any other thin metal blade to work each strip all the way into its corner and press it flat. Afterward, flip the door and recheck the position of the bars.

Installing the glass

To enhance the handmade character of this piece, I used "restoration" glass (available from bendheimcabinetglass.com or VanDykes.com). This glass is designed to mimic the wavy, inconsistent thickness and



Install the horizontal muntins. *Use the plywood templates to set the spacing.*

Work from left to right. *Work across the inside of the frame, completing one vertical section at a time.*

3. GLUE THE JOINTS

Time-tested trick. *Cloth strips soaked in liquid hide glue dry hard and create strong joints with no smearing or squeeze-out. Hold the strip with tweezers and smooth it into place with a dental pick or similar tool.*

flatness that characterizes the glass in antique furniture, as well as the "seeding" caused by air bubbles in the glass. This specialty glass can be cut just like regular glass. I used a straightedge and a handheld, carbide-wheel cutter available at most home centers. To get the glass panes past the cloth strips in the joints, I cut the panes a hair smaller than the templates used to space the muntins.

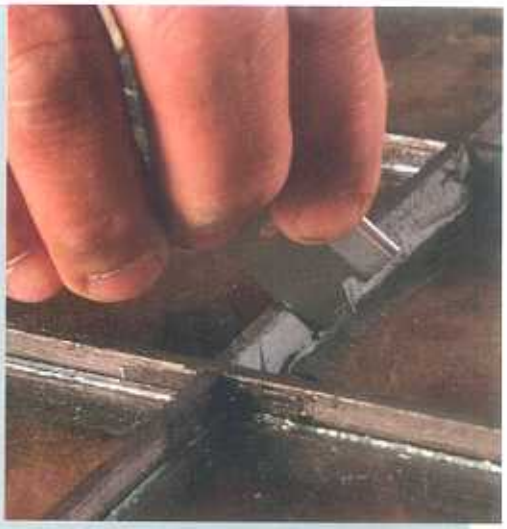
Glazing the doors—To secure the panes, I used an acrylic glazing putty (Aqua Glaze) that would dry fairly quickly and do a good job of conforming to—and holding—the irregular shape of the restoration glass. To match the color of the wood, I tried a trick suggested by David deMuzio, the senior furniture conservator at the Philadelphia Museum of Art: I tinted the compound with powdered pigments (available at earthpigments.com). A mix of dark chocolate brown and jet black gave me the color I needed without altering the working properties of the putty.

With a small flat-bladed knife, apply a small dab in each corner of the muntin grid. Then set the glass in place, squishing the putty. These initial dabs cushion each corner, leveling each pane and preventing any rattling. Next, carefully apply putty along the edges of each pane, using the knife to push it against the muntin and a single-edge razor blade to smooth the angled surface. After allowing the putty to set up a bit, use the putty knife and razor to carefully remove any excess from the muntins and the glass. Once the putty dries, after an hour or so, the glass is secure and the door is ready to hang. □

Mario Rodriguez is a longtime contributor who is a teacher at the Philadelphia Furniture Workshop.

Glazing holds glass firmly

Color the putty. *Use powdered pigments to darken the putty so it more closely matches the muntins. Work in small batches so the putty doesn't begin setting before it's applied.*



Apply the glazing. *Use a flat-bladed knife to apply putty along the edges of each pane and draw it onto the muntin at an angle. Then use a single-edge razor blade to smooth the glazing. Don't wait too long to do this, because acrylic putty sets up relatively quickly. Once the glazing sets up a bit, use the razor to remove the excess from the glass and muntins.*

Playful Furniture

CINDY DRESSER

Unorthodox construction brings cabinets to life

BY JUDSON BEAUMONT

Of all the furniture I design and make, the Cindy dresser is the most popular. Like most of my furniture, it is curvaceous and playful. It also is completely functional, as furniture should be. However, to make it I had to forego traditional methods of furniture construction, relying instead on techniques inspired by aircraft construction and the human body. I begin with an internal skeleton, assembled with a nail gun, and then skin it with thin sheets of plywood, which in turn can be either veneered or painted.

My technique can be used to make just about any shape, so I can design furniture with dramatic curves, exploding or compressing parts, or distinctly human postures. The possibilities are truly unlimited. That's why I'm sharing my methods with you—your designs should be limited only by your imagination, not by the traditional techniques of furniture making. Some of you will be offended, I'm sure, but I hope that most will be inspired.

Start with a sketch. *Beaumont spends time every morning sketching out his ideas. His office is full of drawings, from quick sketches of rough concepts to detailed illustrations of mature designs.*

I start with a drawing and templates

I spend a lot of time sketching out my designs. When I'm happy with a design, I do a full-size drawing on paper, standing back to check that everything works at full scale. Only then do I begin building.

I first make a template of the front, including the drawer pockets, and every drawer front and back. I use the template of the front for the back, too. I make the templates from ¼-in.-thick MDF. I cut them out with a jigsaw and smooth the curves with rasps and files, trusting my eye and hand to tell me when they're fair. I'm constantly stepping back and checking that the lines flow nicely.

Then I build the skeleton and add the skin

After I've finished the templates, I get to work on the bones of the cabinet, using the templates to make the front and

Photos: Mike Wakefield (furniture); Matt Kenney (action)

That Breaks the Rules

MELTING DRESSER

BOOM CABINET

ACCORDION CABINET

LITTLE BLACK DRESSER

How to blow up a box

I try to give my furniture a personality, one that will surprise, shock, and amuse, but I don't pursue those goals at the expense of functionality. No matter how whimsical a piece might be, it must work as furniture.

I arrive at that personality by asking, "What if?" Often I think in terms of human behavior and ask questions like "What if this dresser sits, reclines, or puts it arms on its hips?" But there are times when I'm a bit more aggressive and wonder what a piece might look like if it were to explode or melt. These questions help me see furniture as something that can do things and have things done to it.

Also, I don't worry about the *how* until I've designed the *what*. That lets me throw out the rule book and allow my imagination to run wild. But I do get stuck now and then. When I do, I turn my attention to designing something different, but related. Sometimes I design elaborate birdhouses, but I've also dabbled in baby bottle and radio design. These side steps help to open up the channels I need to unstick the stuck design.

—J.B.

His usual process for unusual pieces

START WITH A FULL-SIZE TEMPLATE

Beaumont's techniques are quick but effective. He makes curvaceous pieces like the Cindy dresser using sheet goods, air nailers, and a variety of adhesives. His front-view sketch on MDF becomes a template for the front, back, and drawer fronts.

Refine the design at full size. *Beaumont draws on ¼-in.-thick MDF, using sandpaper as an eraser and working the drawing until it pleases his eye.*

Cut the template with a jigsaw. *He drills a hole in each corner of the drawer openings and then saws between them to remove the waste.*

Rout the front flush. *After smoothing all the edges of the template, inside and out, Beaumont uses it to rout the front (and back) of the cabinet using nails to hold them together temporarily.*

back from MDF, and the drawer fronts and backs from plywood. Then I use plywood ribs to connect the front to the back.

I secure the template to a piece of ½-in.-thick MDF with a few brad nails and trace it onto the MDF. Then I remove the template and cut out the openings with a jigsaw, leaving about ⅛ in. of waste. I place the template back on the workpiece and secure it with finish nails, then rout the workpiece flush to the template.

I first attach wide ribs on both sides of the drawer pockets. These ribs serve as both a mounting surface for the drawer slides and as a way to strengthen the cabinet. They're made from ½-in.-thick Baltic-birch plywood, which is lighter and stronger than MDF. It also holds nails better, and I use nails, along with a bit of glue, to secure the front and back to the ribs. As for driving the nails, there is no better tool than a pneumatic nailer. It drives the nails so fast that I can easily hold the ribs in place while securing them.

Next, I attach narrow ribs—also made from ½-in.-thick plywood—to the front and back, taking care to keep them flush with the edges of the front and back.

After the skeleton is complete, I add skin to the outside. I use ⅛-in.-thick Baltic-birch plywood, cut so that the grain runs from the front to the back of the cabinet for better flexibility. I spread white glue on the cabinet parts, lay the plywood in place, and secure it with an upholstery stapler, with the staples running in the same direction as the grain. Otherwise, they make dimples that show up in finishes.

At this point you can veneer the skin with either paper-backed wood veneer or countertop laminate. I use veneer on pieces that will be stained. The smooth surface of laminate is a great base for paint. I apply the veneer or laminate to the sides of the cabinet first, and then to the front and back, using a router and flush-trimming bit to re-cut the drawer openings and trim the outside edges. For both veneer and laminate, I use Wilsonart H_2O, a water-based contact adhesive, and I have never had a failure. □

Judson Beaumont is the founder of Straight Line Designs Inc., a custom furniture company in Vancouver, B.C., Canada.

A FLEXIBLE SKIN COVERS A RIGID SKELETON

Inspired by aircraft construction, Beaumont uses ribs to connect the front and back of the dresser. He then covers the ribs with a thin, flexible piece of plywood, which makes for a very strong case.

First, attach wide ribs to the back. *Beaumont uses an MDF spacer to check that the ribs are parallel to each other to accommodate drawer slides.*

Then, glue and nail on the front. *After the front and back are attached, the drawer pockets are complete.*

Add strength with narrow ribs. *He keeps these flush with the edges of the front and back so that the outer skin can be stapled on tightly.*

Finally, staple the skin in place. *Beaumont rolls glue on its inside surface and holds it in place with clamps. The staples run with the grain so that the outer veneer doesn't dimple. Then he veneers or laminates the entire exterior for a seamless look, using contact cement to make the job a snap.*

readers gallery

J. MICHAEL O'DONNELL
Bolingbrook, Ill.

When O'Donnell learned that the cherry wood harvested from his father's Pennsylvania property was being used for garden stakes, he drove a rental van from Chicago to Pennsylvania to rescue what he could. This sideboard (16 in. deep by 54 in. wide by 34 in. tall) is made from that cherry, with Carpathian elm burl veneer on the doors. The finish is gel varnish and polyurethane.

MICHAL OPALSKI
Victoria, B.C., Canada

Opalski's inspiration for this contemporary design came from Danish mid-century furniture and the work of Charles and Ray Eames, as well as furniture by the modern design team APRRO, particularly their JFK chair. The kwila chair with a Danish cord seat and backrest is 31 in. deep by 22 in. wide by 27½ in. tall. The wood is finished with oil and wax.

ARE YOU A WOODWORKER UNDER 30?

Fine Woodworking and The Center for Furniture Craftsmanship in Rockport, Maine, are co-sponsoring an exhibition for today's best young makers. The submission deadline is April 1, 2011. The pieces will be on display at the Center's Messler Gallery and in the magazine, and prizes will be awarded. For information, go to www.woodschool.org/regeneration.

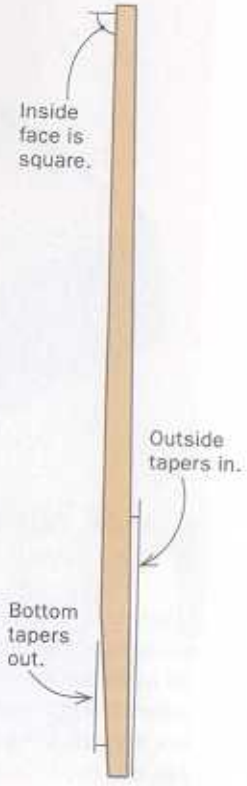
DESIGN SPOTLIGHT

ANDREW WALLACE
Fort Bragg, Calif.

A designer knows he has achieved perfection not when there is nothing left to add, but when there is nothing left to take away.
—Antoine de Saint-Exupéry

The design of Wallace's yaka and kwila "Scotch Cabinet," 13 in. deep by 17 in. wide by 34 in. tall, is subtle but elegant, with no extraneous decoration. Wallace also used elegantly simple construction. Although the legs taper toward the top, the inner dimensions are rectangular. He used the lines of the grain and the shape of the legs to create the sweep of the cabinet, avoiding the complicated construction of a tapered carcase. The finish is shellac.

GRAIN LINES CREATE AN OPTICAL ILLUSION
Wallace was able to arrange the grain lines so they move upward and inward.



LEGS ADD TO THE EFFECT

ERNEST BRYANT
Check, Va.

A professional woodworker, Bryant built "Boxus Anatomous" for his own amusement. He uses his creation to show clients different woods (mahogany, maple, birch, basswood, and beech), and woodworking techniques such as carving, turning, inlay, and dovetails. The box man is 24 in. deep by 24 in. wide by 55 in. tall and finished with Watco Danish Oil. A female counterpart is in the works.

readers gallery continued

DICK SCHULTZ
Edina, Minn.

Schultz built these four jewelry boxes to nest inside one holding tray. The boxes and tray are wenge, and the anigre lids are designed with one marquetry pattern flowing across all four. Finished with oil and wax, the whole piece is 13 in. deep by 17 in. wide by 3 in. tall. PHOTO: RAMON MORENO

JOSEPH CLEGHORN
New York, N.Y.

Heavily influenced by Scandinavian design, Cleghorn built this desk (40 in. deep by 64 in. wide by 30 in. tall) from a few thumbnail sketches—building, fitting, and tweaking the design as he went. The desk won the European Bolia Design Award. The sapele and maple (legs and drawer fronts) are finished with clear lacquer and white lacquer.

Submissions

Readers Gallery provides design inspiration by showcasing the work of our readers. For submission instructions and an entry form, go to FineWoodworking.com.

MARTIN MILKOVITS
Mason, N.H.

The original of this Shaker clock was made by Elder Micajah Tucker (1764–1848) of the Canterbury Shakers, and is an unusually ornate design by Shaker standards. Milkovits saw it in an antique shop in 1999 and got permission to make tracings and copy all the dimensions exactly. The movement is from David Lindow, and Gloria Murphy painted the face. The birch clock (11½ in. deep by 24 in. wide by 83 in. tall) is stained and then finished with oil and wax.

BEST OF MINNESOTA

The Minnesota Woodworkers Guild is open to all woodworkers, regardless of skill level or style of work. For more than two decades, the Guild has sponsored the Northern Woods Show, a juried exhibition of fine woodworking. Here are just a few pieces from the 2010 show. You can see more at mnwwg.org. PHOTOS: RAMON MORENO

DAVID LANE
Minneapolis, Minn.
Woodworking for Pleasure

Inspired by the collection of 17th- and 18th-century Chinese furniture at the Minneapolis Institute of Arts, Lane built this chest of drawers to learn Chinese joinery, and he did it without using any power tools. Finished with oil-based polyurethane, the wood is reclaimed walnut floorboards and beams from barns in Indiana and Missouri.

CRAIG JOHNSON
Saint Paul, Minn.
Best in Show

Johnson designed this kwila and makore sideboard (18⅝ in. deep by 39¼ in. wide by 39⅝ in. tall) to challenge himself technically. The biggest challenges were the parquetry, the curved front and doors, and the hand-cut dovetailed drawers. The finish is shellac and wax.

TIM GORMAN
Minneapolis, Minn.
Best Turning

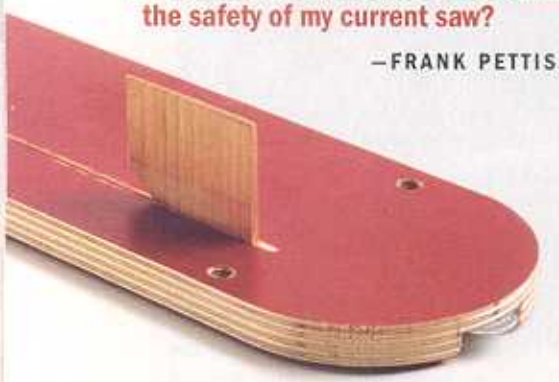
Gorman's idea for this purpleheart and basswood vessel (10 in. dia. by 8 in. tall) came from a glass-blowing demonstration. He used chisels and files to create the spiral fluting. The finish is Danish oil and paste wax.

Q&A

Make any tablesaw safer with a shopmade splitter

Q: I stopped using the splitter and blade guard on my cabinet saw years ago because they interfered with too many cuts. I can't afford a new saw with a riving knife and guard, so what can I do to improve the safety of my current saw?

—FRANK PETTIS, Chesterfield, Mo.



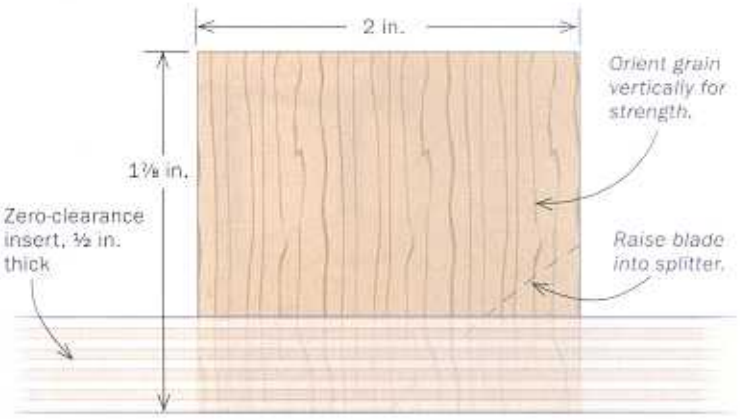
A: I HAVE AN OLDER SAW, TOO, and understand your frustration. There are two potential dangers: your hand contacting the blade and the workpiece kicking back. To minimize the risk of hand contact, I use a push stick. To reduce the risk of kickback, I make a zero-clearance throat insert (see Fundamentals, *FWW* #200), raising the blade as high as it will go, and glue a stub splitter into the back of the kerf. After the glue has dried, raise the blade again and cut into the splitter so it hugs the blade like a riving knife. You won't be able to work with the blade at full height or when it is tilted, but I've found that one insert with a splitter works for more than 90% of my work. The combination of the stub splitter and push stick is a huge improvement in safety over nothing at all. If you want to replace your blade guard as well, take a look at the aftermarket options.

—Matt Kenney is an associate editor.

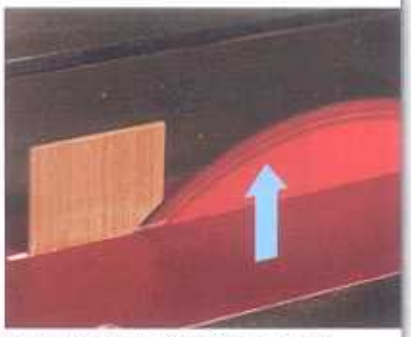
Ask a question

Do you have a question you'd like us to consider for the column? Send it to Q&A, *Fine Woodworking*, 63 S. Main St., Newtown, CT 06470, or email fwqa@taunton.com.

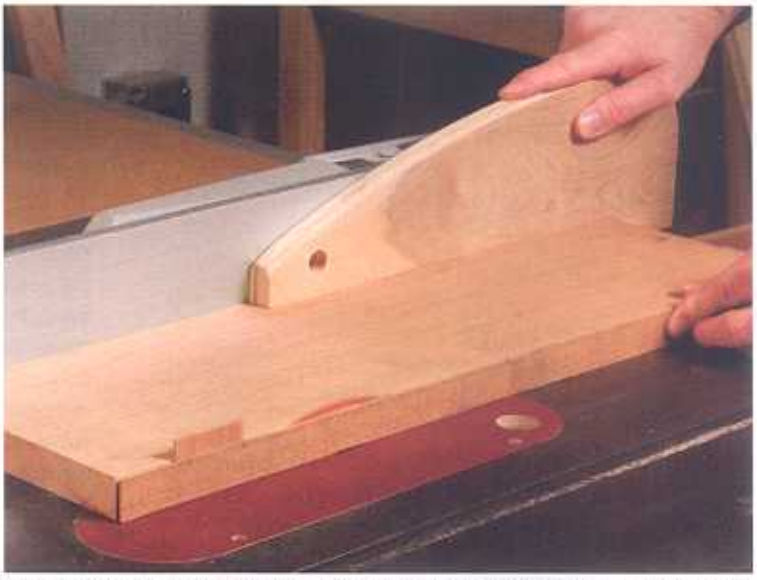
HARDWOOD SPLITTER FITS INTO BLADE KERF



Make room for the splitter. *Raise the spinning blade as high as it will go, cutting a long slot in the throat plate. Then glue in the splitter.*



It's OK to cut into it. *But to work with the blade tilted or at full height (which is rare), you'll need to change out the throat plate.*



Use a push stick for added safety. *Make it tall enough to keep your hands 4 in. to 5 in. from the blade. Notice how the splitter sits in the sawkerf, keeping the board from pivoting onto the back of the blade and kicking back.*

Photos: staff; drawings: Kelly J. Dunton

Amperage is more accurate than horsepower

Q: Greg Paolini recently tested dedicated plunge routers with 3-hp motors ("Heavy-Duty Plunge Routers," *FWW* #214). All of the routers have 120-volt motors. As I understand it, a typical 120-volt circuit couldn't support a true 3-hp motor, so what do those ratings refer to?

—BILL MULVIHILL, Ottawa, Canada

A: ALL MANUFACTURERS OF PORTABLE POWER TOOLS play a similar numbers game. The ratings refer to the motor's peak horsepower, the maximum amount of power it can develop. To determine peak horsepower, the motor is run up to speed and then a mechanical load is applied to it. At the exact moment the motor locks up, its amp draw is recorded. That amp draw is used to determine the motor's horsepower. Of course, if the motor ran for even a short time at that amp draw, it would burn out. Peak horsepower, then, doesn't accurately tell you the amount of power a motor can sustain in regular use. To get a better sense of a motor's power, look at its amp draw.

—Roland Johnson is a contributing editor.

Check the label. *Determine a motor's amperage draw, typically listed on the motor plate or sticker, to get an accurate sense of its power.*

TRUE HORSEPOWER RATINGS

To find the horsepower a motor is able to maintain during use, multiply its amp draw by the voltage of the circuit it is plugged into to determine the maximum number of watts it can produce. Multiple that number by 0.7 (motors average about 70% efficiency) and then divide by 746 (the number of watts in one horsepower).

TOOL	AMPS	VOLTS	ACTUAL HP
Router listed at 1¾ hp	11	120	1.25
Router listed at 2¼ hp	12	120	1.35
Router listed at 3 hp	15	120	1.70

Is there a waterborne finish as nice as solvent-based lacquer?

Q: I'm trying to avoid the safety and health problems associated with solvent-based lacquer, so I've tried spraying several waterborne clear finishes. However, none of them have the same clarity, luster, and depth as solvent lacquer, especially on figured woods. Is there a water-based clear finish that has the advantages of lacquer without the drawbacks?

—TOM SMITH, Green Bay, Wis.

A: NO. IN 30 YEARS OF FINISHING AND REFINISHING WOOD, I've never seen one and probably never will. Water-based finishes just don't penetrate and envelop the cellular structure of the wood as well as solvent-based finishes, and that's why they don't have the same luster and depth. However, there are still some very good-looking water-based finishes. For spraying, try either Target Coatings EM6000 production lacquer or General Finishes Water-Based lacquer. For brushing, I use General Finishes Enduro-Var, which has a nice amber tint that mimics the look of lacquer.

—Jeff Jewitt is a finishing expert and regular contributor to FWW.

Three water-based finishes that look great. *For brushing, General Finishes Enduro-Var comes closest to the look of solvent-based lacquer. With spraying, try Emtech EM6000 from Target Coatings or General Finishes water-based lacquer.*

Apply shellac first to improve the luster of the wood. *Use a 1-lb. cut of dewaxed shellac. After it dries, sand with P320-grit sandpaper and then apply the waterborne finish.*

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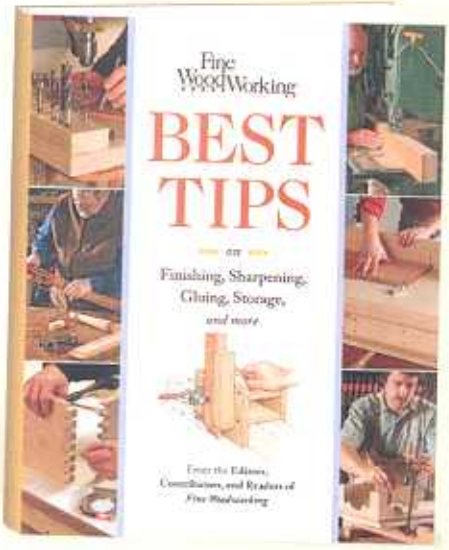

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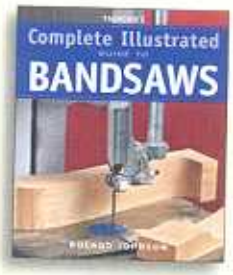

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When sliding dovetails are long, taper them

Q: I understand the difference between normal and tapered dovetails, but when should I use the one versus the other?

—CRAIG BENNETT, Morgantown, W. Va.

A: STANDARD SLIDING DOVETAILS are useful and easy to rout accurately and quickly. The challenge is that a snug-fitting sliding dovetail can be a bear to get together, especially when the joint is long. I use a standard sliding dovetail when the parts are narrow—less than 10 in. wide in softwood and less than 8 in. wide in hardwood (see "A Better Way to Build Wall Cabinets," *FWW* #210). For wider joints, tapering the joint makes it easier and far less stressful to assemble (see "Quick, Sturdy Bookcase," *FWW* #194.)

—Garrett Hack is a contributing editor.

Don't glue the entire joint. *Whether sliding or standard, partially assemble the joint first, then add glue to the last 2 in. of the tails.*

HOW TO CHOOSE

To maximize its strength, a sliding dovetail needs to fit snugly, which makes it harder to assemble when glue is added. For wide cases, use a tapered sliding dovetail, which tightens only when driven fully home.

STRAIGHT SLIDING DOVETAIL

TAPERED SLIDING DOVETAIL

Exotic inlays

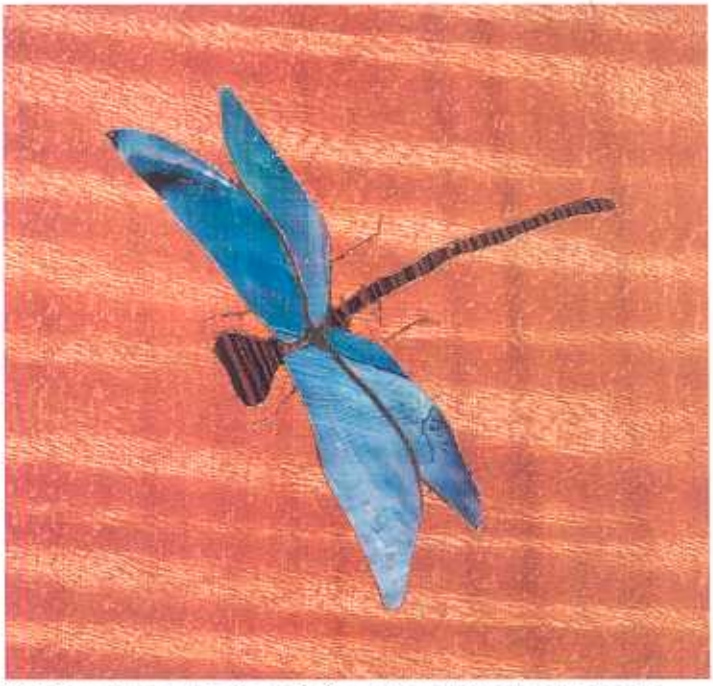
CREATE EYE-CATCHING EMBELLISHMENTS WITH STONE, SHELL, AND HIGH-END PLASTICS

BY CRAIG THIBODEAU

I've used wood for marquetry and inlay for many years, but I began using more exotic materials after seeing the beautiful guitar inlays done by fellow Californian Larry Robinson. While his complex inlay work is the focal point of his guitars, I use it more sparingly, as highlights in my marquetry, accents on veneered pieces, and small inlays in solid wood. The good news is that the techniques are basically the same no matter what the background is.

The only new tools you'll need are a jeweler's saw and files, a scalpel, and a few tiny router bits. The best glue for the job is cyanoacrylate (CA), which sticks to everything and hardens instantly with a quick shot of activator spray. I use it both to assemble multiple parts into a single inlay and then to glue the inlay in place. For very large inlays, I sometimes give myself a bit more working time by using 24-hour epoxy.

The inlays themselves can be as simple as precut mother-of-pearl dots, which only require a shallow hole drilled with a Forstner bit, or as complex as the multi-part dragonfly on this page. But none are particularly difficult, and all make a strong impact.



Bring furniture to life. *A dragonfly, with a wenge body and abalone wings, hovers above the floral marquetry on Thibodeau's Lily Cabinet.*

A new world of brilliant materials

I was surprised to discover a wide array of inlay materials that contrast beautifully with wood yet can be cut with simple tools. Mother-of-pearl and abalone shell are both readily available in thin pieces, while reconstituted stone and Acrylester (a form of colored plastic used for pen turning) have a wider variety of color and figure. By the way, I often combine these materials with thick wood veneers. The dragonfly has a body made of wenge to tie it visually to the cabinet's wenge frame.

All of these materials are sold in small quantities either by weight or by size and most always in specific thicknesses, which allows you to assemble multiple pieces and cut the inlay recess to a consistent depth. Natural materials usually

New world of materials

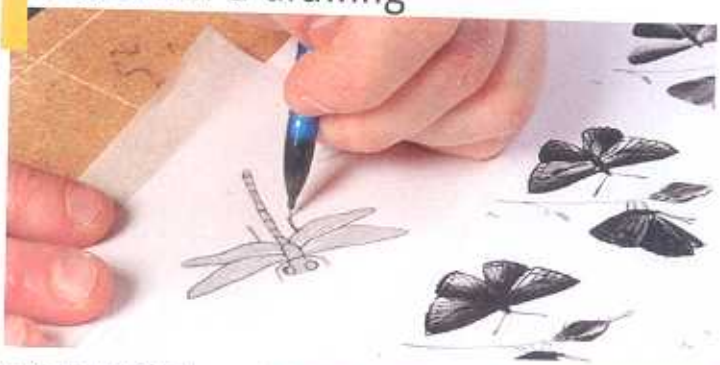
Rescuepearl.com is Thibodeau's favorite source for all of the following materials, except for plastic pen-turning blanks, which are available at Rockler.com and Woodcraft.com.

MOTHER-OF-PEARL
0.040 in.–0.125 in. thick
$15–$50/oz.

ABALONE
0.060 in. thick
$50/oz.

RECONSTITUTED STONE
0.065 in. thick
$10–$20/oz.

Start with a drawing



Not an artist? *Find a book. Use tracing paper to copy a drawing you like, and then modify it (above). When you are happy with it, make photocopies. Use spray adhesive to stick a copy on each piece of inlay material (right). The dragonfly has multiple parts, combining wood veneer (wenge) and abalone, and each is cut separately.*

Saw out the parts

Simple sawing setup. *Thibodeau uses a bird's-mouth jig (V-plate) to support the fragile material, and cuts it with a jeweler's saw. Most exotic materials are toxic as dust, so he attaches a vacuum hose to the jig (left). Use jeweler's files and a sanding block to smooth the saw cuts and refine the shapes (above).*

only come in small pieces, but Abalam, a lamination of shell material, is available in 5½ in. by 9½ in. sheets for larger inlays. It also comes in a wider variety of colors and patterns.

Start with a good drawing

Don't rush the design stage. There is a fine line between an elegant detail and one that seems somehow off-kilter. Line drawings of butterflies, dragonflies, and other insect and animal shapes can be found in books and on Web sites. I recommend that you change some of the details to make it your own.

The inlay will be much easier to cut if the drawing is made with a very fine-tipped pen. Another way to achieve a fine line is to draw the image larger than the final inlay and reduce it on

ABALAM LAMINATED SHELL
0.030 in.–0.250 in. thick by 5½ in. by 9½ in.
$100–$500/sheet

ACRYLESTER
¾ in. sq. by 5 in. long
$5–$10/each

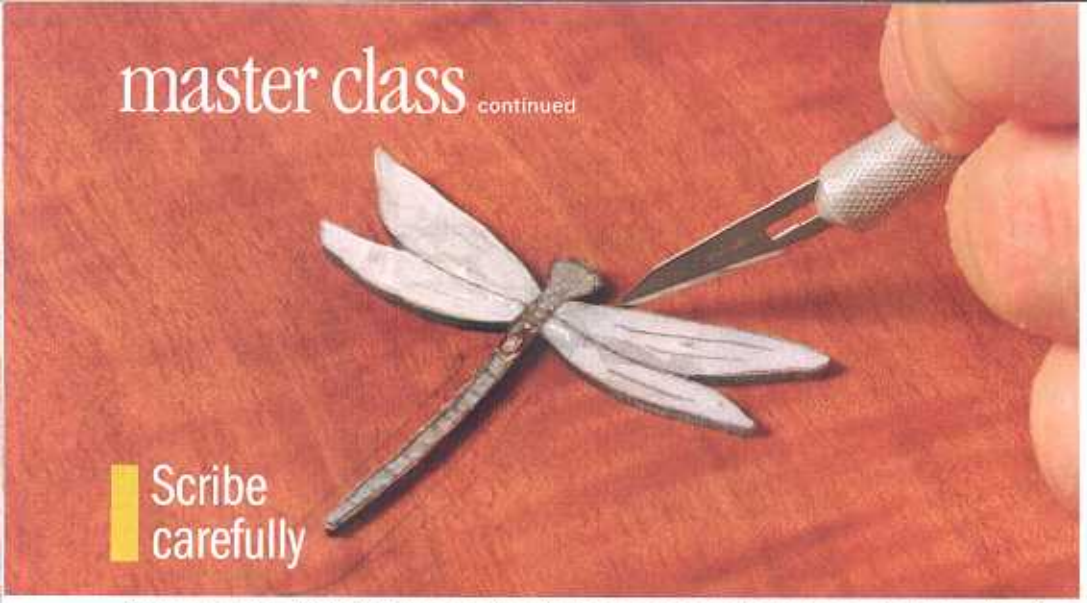
Assemble the parts before inlaying them

Super glue makes it easy. *Tape down some plastic first, and get the pieces just where you want them before dripping CA glue into the joints (above). Spray on activator to set the glue instantly. Do the same on the other side of the inlay. Rub the back side of inlay on a sanding block to flatten any beads of glue (below).*

Online Extra

To learn Thibodeau's simple method for inlaying mother-of-pearl dots, watch an audio slide show at **FineWoodworking.com/extras.**

Scribe carefully



Scalpel, please. *After wiping on a seal coat of shellac to keep the grain free of chalk and sanding dust, use a couple of dots of CA glue to attach the inlay temporarily. Thibodeau uses a scalpel for scribing, making the first pass a light one to be sure it hugs the inlay tightly.*

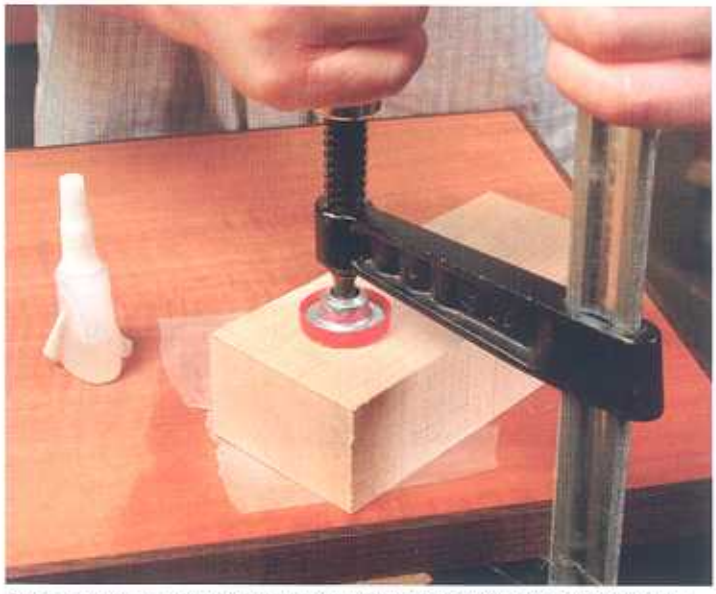
The chalk trick. *Pop off the inlay and rub chalk into the lines to make them more visible. Wipe off the excess dust.*

Rout, fit, and glue

Set the depth. *Lay a piece of the inlay material across the router base, and set the bit's depth just shy of the inlay's thickness.*

Rout right to the line. *Using a head-mounted magnifier and plenty of light, Thibodeau works right up to the line with a 1/16-in. bit, stopping just as the chalk disappears.*

Fine-tune the fit. *The scalpel and a tiny gouge come in handy for cleaning up the recess and adjusting the fit. If you have to force the inlay when gluing it in, you risk breaking it.*



Glue and clamp. *Use a small stick to spread a thin layer of CA glue in the cavity, including the edges, and use a wood block with a layer of plastic under it to push the inlay home. Leave it clamped overnight.*

a copier. Make several copies of the final drawing for future use and in case you need to recut a piece.

Tips for cutting inlays

I cut all of the materials with an $18 jeweler's saw and a bird's-mouth, which is a simple shopmade sawing platform that supports brittle materials. I also use a 1.5x–2.5x magnifier headset with attached lights to see precisely what I am doing.

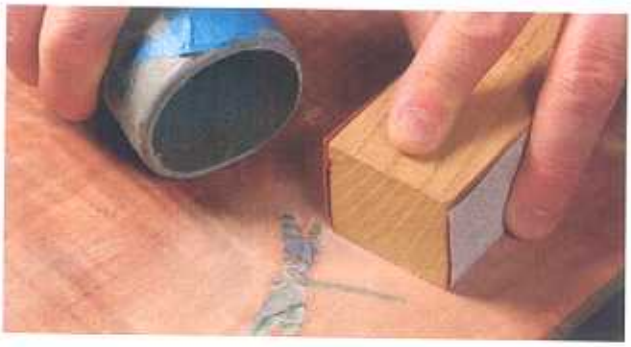
Reconstituted stone, like all stone, tends to be even more brittle than the other materials, so I apply a layer of blue painter's tape to the top of these inlay pieces before cutting them. That way if they break, the tape keeps the pieces in order until you can repair them with CA glue.

Acrylester comes in a square bar (made for pen turning), so it first has to be cut into slices on the bandsaw or by hand with a hacksaw. Try to maintain a uniform thickness, and sand the slice flat afterward using 100-grit paper and a hard block.

Attach the drawing to the inlay blank with spray glue and press it firmly in place. Many of the materials have varying shimmer based on how they are placed. Pay attention to that

Photos, except where noted: Asa Christiana; p. 90 (top 2): Craig Thibodeau

How to level it safely



Try a float. *With its smooth, milled teeth, this tool can file a hard inlay flush without touching the soft surrounding wood. Thibodeau wraps the tip with tape and flexes the back of the tool upward to focus the cutting action on the inlay (above). A sanding block finishes the job (below). Again, Thibodeau vacuums away the unhealthy dust.*

Engrave fine details. *This insect looks better with tiny legs and antennae. Thibodeau uses a white pen for layout on dark woods, and an engraver's chisel (onglette graver) to incise a very fine line, which darkens when finish is applied.*

when you orient the drawing. Use a 000 blade in the saw. Point the teeth toward the handle so the saw will cut on the pull, and tighten the blade until it makes a ping sound when plucked.

Place the piece to be cut onto the V-block so that the blade is near the back of the V, and begin cutting. Try to split the drawn line while cutting, and proceed slowly or you'll break the blade. Try to keep the sawblade vertical and in roughly the same position as you cut, moving the workpiece not the saw.

All the materials will probably require some minor filing after cutting, to clean saw marks, blend curves, or just smooth the edges. Sanding blocks and small jeweler's files work well. Just be sure to file the edges 90° to the face.

Careful scribing yields a precise recess

I use a couple of dots of CA glue to hold the piece in place, and trace around the inlay with a fine-tip scalpel (much sharper than an X-Acto knife). I use a small router fitted with a 1/16-in.-dia. spiral-cut bit to remove most of the waste. If you have one, switch to a 1/32-in. bit to get into corners. Begin routing in the center of the inlay and work slowly toward the edges. Vacuum the waste as you go to keep the inlay lines visible. Carefully rout right to the line but not past it. Take your time. There is no fix for routing past the line.

Test-fit the inlay, and trim away wood that interferes with the fit. Don't press the inlay into place yet or it might not come out for gluing; just adjust the fit until the bottom edge of the inlay enters easily. Apply a thin but even layer of glue. Then press the inlay as far as you can into the cavity by hand, and wipe away the excess glue. (If you are using CA glue, don't use the activator for this step.) Now use a clamp and a wood block to press the inlay all the way into the cavity, making sure it seats fully. Clamp firmly but not so hard as to crack the materials. Even though CA glue is supposed to cure faster than epoxy, both should be left overnight to dry.

You can level the inlay by sanding only, wrapping P100-grit paper around a hard block to keep it flat, but I like to start with a special file with curved, milled teeth, called a float or an auto-body file. After the inlay feels level with the surrounding wood, I switch to the sanding block, using P220- and P320-grit paper. The inlay materials are usually harder than the wood, so be careful to sand only the inlay and not the background, so you don't create a depression.

When the inlay is flush and finish-sanded, check the glueline for holes or bubbles. Mix up some epoxy and use a toothpick or other small pointed stick to fill any tiny gaps. Resand it to the final grit as before.

Once you know the basic materials and techniques for inlaying exotic materials, there is a new world of images and effects at your disposal. □

Craig Thibodeau is a professional furniture maker in San Diego, Calif.

Tools of the trade

stewmac.com
Magnifying headset, jeweler's sawblades and files, CA glue, inlay router bits, collet adapter, onglette graver

mcmaster.com
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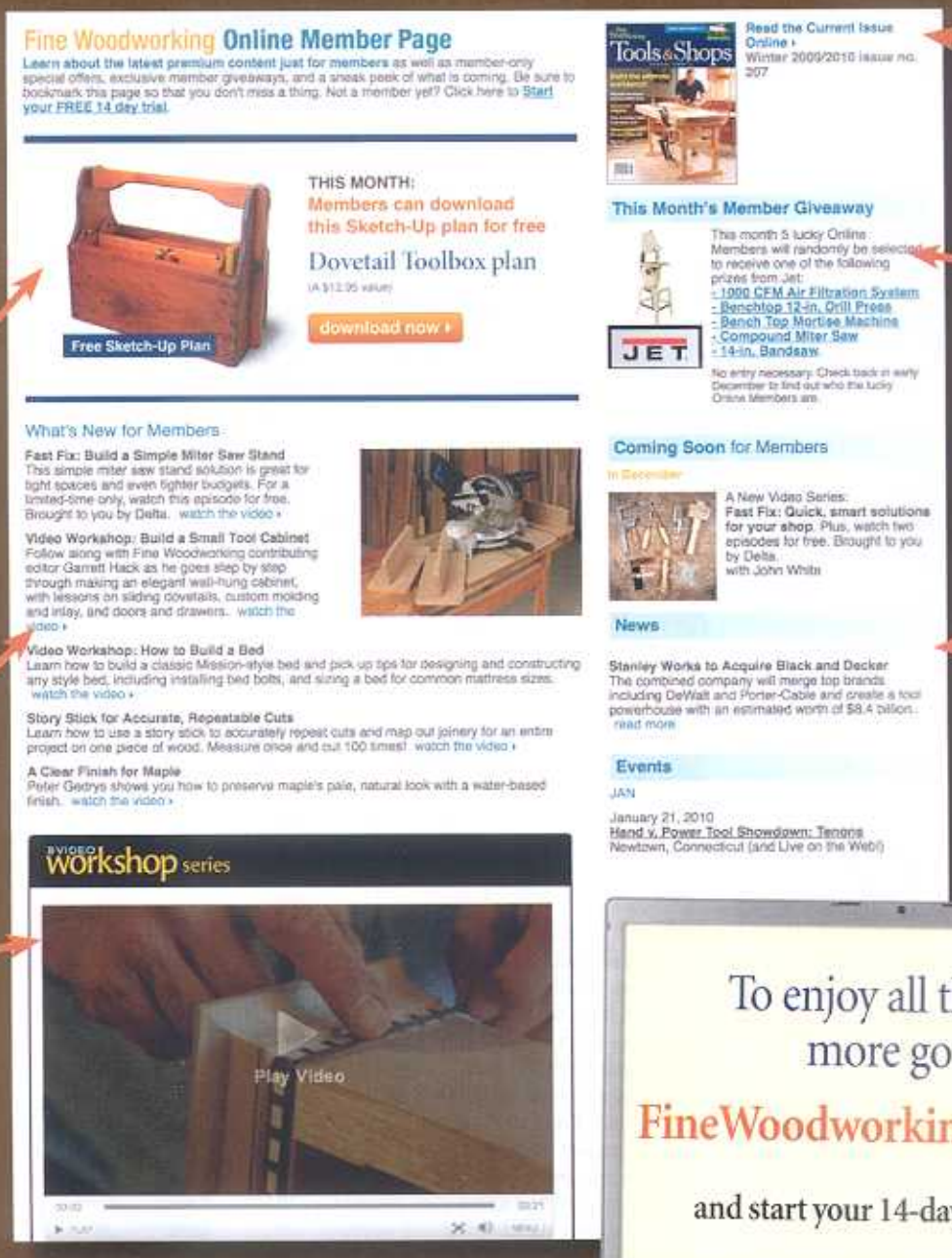

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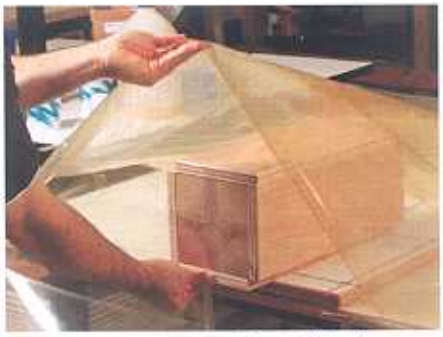
how they did it

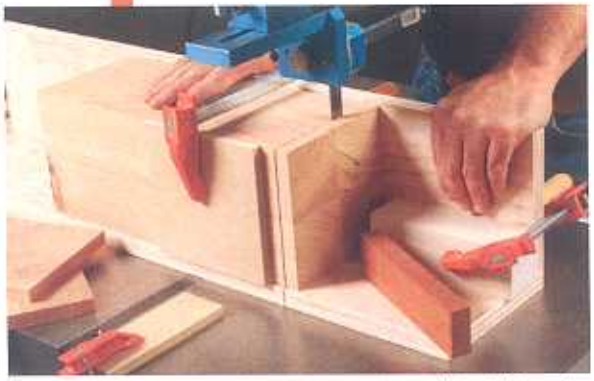
End grain on display

One of the main reasons the sideboard on the back cover is so eye-catching is its end-grain drawer fronts, made from tight-grained, old-growth pine. It is very uncommon to see furniture made with end grain as a primary surface. That isn't because it lacks beauty. Its tight grain patterns and color are easily as attractive as the faces and edges of boards. But end grain presents an array of technical challenges, such as slicing and joining it to create panels, and controlling its movement. San Antonio furniture maker John O'Brien wasn't daunted, however. He used a vacuum bag and clever jigs and clamping cauls to overcome every obstacle. And the centuries-old longleaf pine proved to be remarkably stable.

Dramatic drawer fronts



Four-square glue-up. *After milling four perfectly square blanks, with the end-grain running diagonally on each, O'Brien simplifies the glue-up by using a vacuum bag and two L-shaped plywood platens to keep the pieces perfectly flush with each other.*



Smooth slices. *He attaches a jig to his bandsaw's miter-gauge to cut off 17/32-in.-thick slices. He inserts a mahogany spacer between the jig's stop and the workpiece. After the workpiece is clamped, O'Brien removes the spacer so the cut piece can fall away from the blade.*

Ingenious jig. *After gluing and biscuiting the slices, he puts them in a dead-flat clamping jig. Fences keep the pieces aligned and small wedges apply the pressure. The little plywood blocks between the wedges keep them from slipping as O'Brien taps them tight. Just to be sure the drawer front stays flat, he puts an MDF platen on top and pops everything back into the vacuum bag. The same glue-up jig holds the pieces perfectly for scraping and sanding. After applying a finish and cutting the notch for the drawer pulls, O'Brien drives screws through the inside of the drawer box to attach the front.*

Perfect pulls

One sander, two jigs. *The pulls come from similar end-grain slices, four to a slice, each centered on one of the seams. O'Brien uses an angled sled guided by a piece of angle iron to plunge the stock lightly into a spindle sander (above). A jig on the opposite side of the spindle slides along the same metal guide to create the shallow curve on the front edge of the pull (below).*

Photos: Anissa Seale (top right); Asa Christiana (all others)

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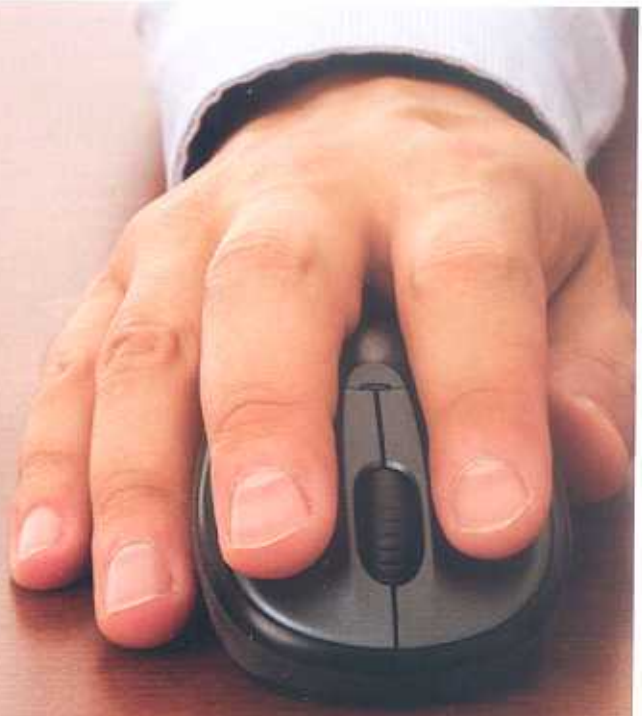

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Old-Growth Splendor

Photos: Ansen Seale

When furniture maker John O'Brien and designer Harold Wood bought "a monster beam" of longleaf yellow pine for $2,500 from a South Texas lumberyard, making the selection "was a crapshoot," O'Brien said. One in a pile of mammoth timbers salvaged from a dismantled 19th-century South Carolina textile mill, the beam was 25 ft. long, 17 in. wide, and 14 in. thick—500 board feet in a single stick. They could only examine the wood at one end, where a thin slice was cut off to reveal the end grain; the rest was encased in thick layers of old white paint. The beauty of the old-growth end-grain sold them, though, and they had the beam sawn into planks on the spot. Longleaf pine, once coveted for ships' masts, bridge timbers, and railroad ties, makes a superb furniture wood, and after a "frightening drive" hauling the 25-ft. planks to the shop, O'Brien found working with them a pure pleasure. Later, Wood designed this sideboard with end-grain drawer fronts to highlight the part of the beam that first caught their attention. As the builder, O'Brien was concerned about wood movement, "but we wanted to see how far we could push it." In fact, by balancing the end-grain visually, Wood and O'Brien seem to have balanced it structurally as well, and over the past year the drawer fronts have remained very stable. *—Jonathan Binzen*

How They Did It Turn to p. 98 to see how O'Brien overcame the technical challenges of working with end grain.

Pro Portfolio For an audio slide show of more astounding work by the team of Wood and O'Brien, go to FineWoodworking.com/extras.